

Lilac to Rancho Double Tracking Project

Prepared for

San Bernardino County Transportation Authority

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Appendix J through Appendix P

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Noise and Vibration Impact Assessment



MEMORANDUM

To: Jason Reynolds, CH2M

From: Tony Evans
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Date: April 10, 2018

Subject: **Final:** Noise and Vibration Impact Assessment, SBCTA Lilac to Rancho Double Track Project



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EXECUTIVE SUMMARY

A noise and vibration assessment was conducted for the CP Lilac to CP Rancho Double Track Project (Proposed Project) proposed by San Bernardino County Transportation Authority (SBCTA) in association with the Southern California Regional Rail Authority (SCRRA, or Metrolink). This assessment has been conducted in accordance with the noise and vibration impact criteria defined in the Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment* (FTA-VA-90-1003-06, May 2006). There are 21 clusters of residential single- and multi-family receivers along the Project alignment along with the Templo Bautisto Monte Calvario that were assessed. The Templo Bautisto Monte Calvario is a Baptist Church adjacent to the SBCTA Right-of-Way and is considered by FTA to be an institutional noise-sensitive land use (Category 3).

Noise and vibration measurements were conducted beginning in May 2017 and continuing through July 2017 to document the existing noise and vibration environment in the Proposed Project area and to determine the noise and vibration emissions of the existing Metrolink and UPRR freight train operations. Noise measurements were performed at 9 locations throughout the Proposed Project corridor to document the existing conditions at the 21 receiver clusters. The measurements performed occurred over a minimum of 24-hour long period. Measurements of vibration generated by the train traffic were performed at distances from the tracks ranging from 25 to 250 ft. These measurements show how soil characteristics affect vibration levels as the vibration propagates from the train tracks to adjacent buildings. The results of the noise and vibration measurements were used to define the reference noise and vibration levels that were used as the basis of the future build, with Proposed Project, predictions.

The results of the impact assessment indicate that the Proposed Project would not result in increases in noise exposure that would exceed the applicable FTA noise impact threshold at any of the noise sensitive receiver clusters.

For residences south of the alignment, the Proposed Project would result in an increase in vibration levels relative to existing conditions in the range of 0.3 to 16.0 VdB. These changes are due to the new track being closer to the existing residences than the existing track. The proposed second track is predicted to exceed the existing levels by 3 VdB or more, the FTA threshold for impact, at three clusters affecting 52 residences. In addition, there is a groundborne noise impact predicted at the Templo Bautisto Monte Calvario (Receiver I1).

However, the Proposed Project features include the installation of ballast mats, that would address the predicted increases at all but one of those receivers where the addition of the second track is predicted to cause future groundborne noise or groundborne vibration levels that exceed the FTA impact thresholds. A ballast mat is a resilient layer that would be installed under the track ballast or sub-ballast isolating the trackwork from the ground. Ballast mats are typically constructed of material ranging from natural rubber to rock wool that is one to two inches thick. The station limits for the ballast mat feature locations are presented in Table 0-1. As referenced above, three of the four predicted vibration impact locations will be avoided through the use of ballast mats and an integrate project feature.

After incorporation of the ballast mat project feature, the predicted vibration impact, a single family residential structure, would be located where the centerline of the new track would be only 18 ft from the residence. This limited distance is close enough that it would be impractical for the ballast mat project feature alone to address this predicted impact. In similar potential vibration impact situations for Light Rail projects, a floating slab track (FST) has typically been recommended. However, to our knowledge, an FST has never been installed on tracks that also have freight train traffic. The residential property, located at 2422 W Rialto Avenue, would be close enough to the Proposed Project second track that there



would be limited options for addressing and potentially mitigating the predicted impacts related to groundborne vibration. The potential options are that were considered include the following:

1. Adjust the location of the second track so it will be farther from this residence. This option is not feasible because the existing columns and open bays through the UPRR Overpass provide only a single alignment option for the second track.
2. Impose a slow order for the freight and Metrolink trains. To eliminate the vibration impact, it would be necessary to limit train speeds to below 10 mph. This is not feasible because:
(a) Imposing a slow order on freight traffic is impractical due to operational conditions required and the length of the freight trains, and (b) A slow order in this area would severely degrade the capacity of the Metrolink operations in this corridor.
3. Install double layer ballast mats under the railroad track ballast. Using two layers of a relatively soft ballast mat would reduce vibration levels by 5 to 8 decibels in the key frequency range. Ballast mats are a relatively standard vibration mitigation measure for light rail lines. Because of the greater axle loads on typical freight trains, this option would need to be carefully evaluated during final design to ensure the specified ballast mat would reduce the vibration levels to below the impact threshold and would not be prematurely damaged by the heavy axle loads of freight trains.
4. Install an FST system to protect the single residence. FST's consist of a concrete slab track that is supported by resilient elements. The resilient elements typically are either natural rubber discs or coil springs. The fundamental resonance of the floating slab system would need to be in the 5 to 8 Hz range. Use of FST systems to reduce vibration levels on rail transit systems are relatively common. Use of FST systems on freight rail systems is extremely rare.
5. Move the residence. Based on preliminary review of the property lines in this area, it appears that the residence is partially encroaching on UPRR and Metrolink right of way. If this is confirmed, the residence would need to be moved out of the rail right of way. This shift in the location of the residential structure could introduce the use of ballast mats as a viable option to reduce vibration levels and potentially eliminate the predicted impact.
6. Acquire the residence, which is anticipated to be substantially less than the cost of a floating slab system that would eliminate the predicted impact at this residence.

Based the evaluation of these potential options detailed mitigation measures were developed and are presented Section 6. Mitigation Measures.

Table 0-1: Ballast Mat Locations				
	Track Side	Length (feet)	Station Start	Station End
BM1	South	570	2807+00	2812+70
BM2	South	1550	2860+50	2876+00
BM3	South	700	2888+00	2895+00
Total		2,820		

Construction noise and vibration levels were estimated for the planned method of construction. There are no expected impacts that could not be addressed with appropriate construction methods (temporary



sounds barriers, property tuned and muffled construction equipment, and notifications). A more detailed analysis will be provided when the Proposed Project is advanced to final design.



1. INTRODUCTION

This report provides the following information:

- The methodology used to characterize the existing and future conditions along the proposed CP Lilac to CP Rancho Double Track Project,
- background information on the potential airborne noise and groundborne noise and vibration effects related to the Proposed Project,
- information on the impact criteria and models used for assessing potential noise and vibration impacts, and
- impact analysis and, where appropriate, recommendations on suitable measures to address, and if needed, mitigate the predicted noise and vibration impacts.

Background information on noise and vibration, including definitions and key concepts that may be useful for interpreting the predictions and recommendations in the Plan, are included in Appendix A.

1.1 Project Description

The San Bernardino County Transportation Authority (SBCTA) and the Los Angeles County Metropolitan Transportation Authority (Metro) completed the Metrolink San Bernardino Line (SBL) Infrastructure Improvement Strategic Study in September 2014 (SBL Study). The SBL, also known as the San Gabriel Subdivision, is a 55-mile rail corridor operated by Metrolink for the Southern California Regional Rail Authority (SCRRA) to provide commuter rail service between Los Angeles Union Station and the San Bernardino Station. The BNSF Railway and the UPRR also use this critical rail line as a shared corridor, which is the busiest commuter rail line in Southern California.

The purpose of the SBL Study was to identify cost-effective infrastructure improvements to provide increased average train speed, reduced travel times, and enhanced overall operational capacity of the Metrolink SBL. The SBL Study recommended the construction of a second mainline track within two out of the five existing single-track corridors on the SBL, which has resulted in the LA Metro Lone Hill to CP White Double Track Project and the SBCTA CP Lilac to CP Rancho Double Track Project. These projects are critical to regional mobility because they would enhance rail operations on this highly-utilized commuter rail line in Southern California.

SBCTA, the owner of the rail corridor within San Bernardino County and the lead agency for the Proposed Project, is preparing the preliminary engineering and environmental clearance of approximately 3 miles of a second mainline track from CP Lilac MP 52.4 to approximately CP Rancho, near MP 55.1, on the SBL. The proposed CP Lilac to CP Rancho Double Track Project consists of the following features and evaluations:

- The addition of a second passenger platform on the south side of the existing Metrolink Rialto Station with architectural and other station facility required improvements.
- The evaluation of overhead, at-grade, or below-grade pedestrian access design options to the new Rialto Station south side platform.
- The protection in-place of the existing UPRR Colton Cut-off Overpass near Rialto Avenue and the compliance with horizontal and vertical clearances.
- The removal of the existing No. 20 Right-Hand turnout west of Lilac Avenue, or the consideration of the construction of a crossover. The removal of the existing turnout would require “straight railing”



the track to properly tie into the proposed second mainline track on the north side of the existing mainline track.

- The construction of a new No. 20 Left-Hand turnout east of Rialto Avenue. The exact location of the proposed east end of the Proposed Project is being evaluated to provide a “best fit” alignment on a tangent segment between approximately MP 54.9 and MP 55.06.
- Railroad signals as well as positive train control considerations and required improvements.
- Necessary retaining walls.
- Existing culvert extensions and protection in-place as required. There are three 24-inch reinforced concrete pipes (RCP) and one 42-inch RCP near the west end of the Rialto station, and 48-inch and 36-inch RCP east of Pepper Avenue.
- Civil improvements including grading, drainage, and utilities. Existing San Bernardino County Flood Control District “East Rialto Storm Drain” flood control channel on the north side and drainage ditches on the south side of the right-of-way are being evaluated for protection in-place and mitigation during the Proposed Project.
- Quiet zone feasibility study for each of the eight at-grade crossings within the double track footprint. In addition, two at-grade crossings, Cactus Avenue on the west and Rancho Avenue on the east, are also being evaluated. Quiet zone features potentially include but are not limited to wayside horns, quad-gates, and additional access/crossing controls.
- Traffic, including traffic management plan, emergency access, and other ingress/egress issues.
- The addition of a second track through eight at-grade crossings, starting at Lilac Avenue in the City of Rialto on the west end of the Proposed Project and ending east of Rialto Avenue in the City of San Bernardino on the east end of the Proposed Project.

The Proposed Project evaluation and assessment also includes coordination with applicable regulatory agencies to ensure compliance with their applicable permitting requirements. The technical analysis and study (including this report), will support independent California Environmental Quality Act (Initial Study/Mitigated Negative Declaration) and National Environmental Policy Act (Categorical Exclusion) environmental approvals.

The Proposed Project, including all features and permanent footprint modifications, would be implemented within the existing railroad right-of-way; the public roadway right-of-way limits and limited modifications to existing access areas from adjacent properties.

As indicated above, the Proposed Project would also include the option to install the infrastructure necessary to apply to FRA for designation of the project corridor as a Quiet Zone. This includes safety-related improvements to roadways and sidewalks, upgraded traffic and pedestrian crossings, and improvements that would avoid the need for sound-walls.

Figure 1-1 shows the Proposed Project. The Project area is a railroad corridor owned by SBCTA within a mixed suburban and industrial area.

Land use along the rail corridor consists of a mix of residential and industrial use. The alignment is generally surrounded by development; however, occasional vacant lots, open space, and numerous trees are found adjacent to the corridor. Numerous flood control facilities are also located along the alignment. According to the California Scenic Highway Mapping System, there are no designated or eligible scenic



routes along the corridor. Public viewpoints of the area are generally from vehicles, residential homes, and industrial offices.

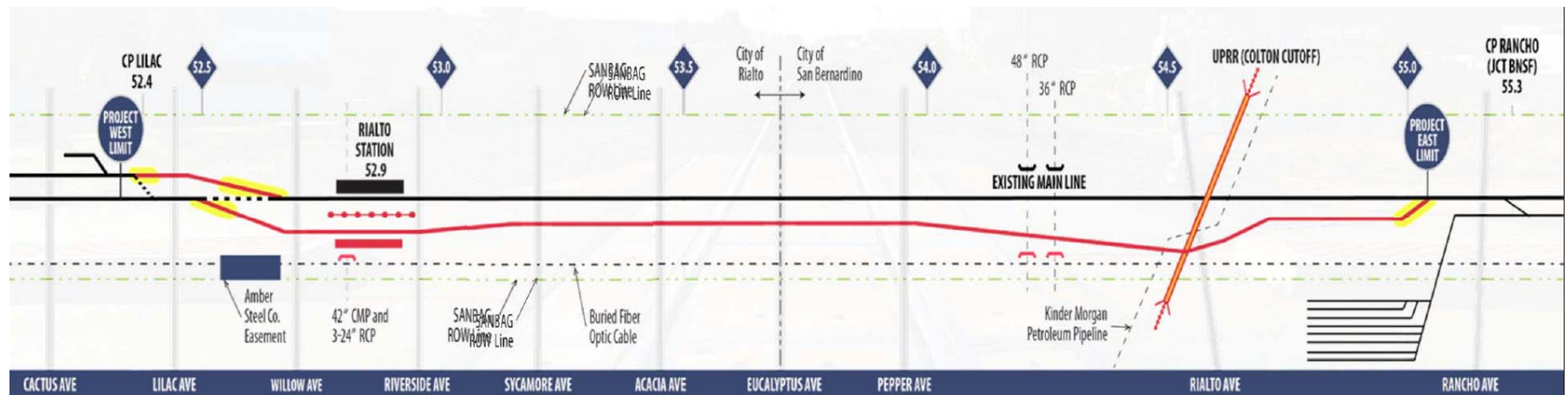


Figure 1-1: Alignment Map of Proposed Project



2. REGULATORY REQUIREMENTS

Noise and vibration impacts for the Project are based on criteria defined in the Federal Transit Administration document, *Transit Noise and Vibration Impact Assessment*¹, which is also referenced as the “FTA Guidance Manual.”

2.1 Noise Criteria

The FTA noise impact criteria are based on the best available research on community response to noise. This research shows that characterizing the overall noise environment using measures of noise *exposure* provides the best correlation with human annoyance.

Table 2-1 lists the three land-use categories that the FTA uses along with the applicable noise metric for each category. For Category 2 land uses, noise exposure is characterized using L_{dn} , while for Category 1 and Category 3 land uses, noise exposure is characterized using the maximum hourly L_{eq} . It is noteworthy that Category 2 land uses (residential) includes residences, motels, hotels, and any other place where people typically sleep. The basic concept of the FTA noise impact criteria is that more project noise is allowed in areas where existing noise is higher, but that the allowable decibel increase in total noise exposure (the decibel sum of existing noise and project noise) decreases.

Table 2-1: FTA Land Use Categories and Noise Metrics		
Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)^a$	A tract of land where quiet is an essential element of their intended purpose. This category includes lands set aside for serenity and quiet and such land uses as outdoor amphitheaters and concert pavilions, as well as national historic landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor L_{dn}	Residences and buildings in which people sleep. This category includes homes, hospitals, and hotels, where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)^a$	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities can be considered to be in this category. Certain historical sites and parks also are included.

Source: FTA, 2006.

Note:

^a L_{eq} for the noisiest hour of rail-related activity during hours of noise sensitivity.

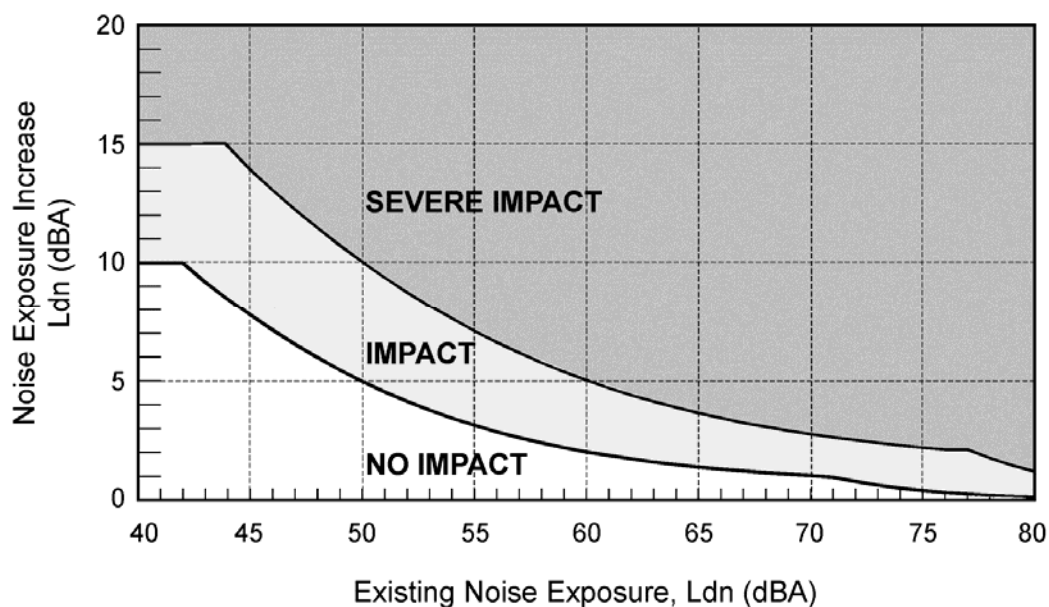
¹ Federal Transit Administration Document FTA-VA-90-1003-06, May 2006.



The FTA defines two levels of noise impact: moderate and severe. In accordance with the FTA Guidance Manual, mitigation to eliminate noise impacts must be investigated for both degrees of impact. The manual also states that for severe impacts "...there is a presumption by the FTA that mitigation is incorporated into the project unless there are truly extenuating circumstances which prevent it." In considering mitigation for severe impacts in this study, the goal is to reduce noise levels to below the moderate impact threshold. The FTA allows more discretion for mitigation of moderate impacts based on the consideration of factors including cost, number of sensitive receivers affected, community views, the amount by which the predicted levels exceed the impact threshold, and the sensitivity of the affected receivers.

As shown in Figure 2-1, the FTA noise impact criteria are defined by the two curves which allow lower increases in cumulative noise exposure as existing noise increases. Below the lower curve in Figure 2-1, a proposed project is considered to have no noise impact because the introduction of the project is not predicted to result in a significant increase in the number of people highly annoyed by the new noise. Project noise above the upper curve is considered to cause Severe Impact, which correlates to a significant percentage of additional people highly annoyed by the increase in noise exposure. Between the two curves the proposed project is considered to have Moderate Impact. The change in cumulative noise level is noticeable to most people, but may not be sufficient to cause a substantial increase in the number of people highly annoyed by the increase.

The communities adjacent to the double track project are exposed to relatively high levels of noise because FRA requires all trains to sound their horns starting ¼ mile from each grade crossing. This is a safety measure that has been shown to reduce the number of accidents at grade crossings. The mandatory use of train horns can be eliminated through applying to the FRA for designation of a corridor as a quiet zone. Designation of a corridor as a quiet zone requires that supplementary safety measures be installed at the grade crossings such that public safety is not compromised by the quiet zone. A study prepared by JMDiaz Inc. includes the evaluation of features/improvements that would be required to implement a quiet zone in the Proposed Project study area.



Source: FTA, 2006.

Figure 2-1. FTA Noise Impact Criteria



2.2 Vibration Criteria

The FTA groundborne vibration and noise impact criteria are based on land use and train frequency, as shown in Table 2-2. It should be noted that there are separate FTA criteria for groundborne noise. Groundborne noise is the “rumble” that can be radiated from the motion of room surfaces in buildings that is caused by groundborne vibration. Although expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are set significantly lower than for airborne noise to account for the annoying low-frequency character of groundborne noise. Because airborne noise tends to mask groundborne noise for above ground (i.e., at-grade or elevated) rail systems, groundborne noise criteria are usually applied to subway operations where airborne noise is not a factor. For the single-family and multi-family residences in the proposed rail alignment, the airborne noise inside is expected to dominate the groundborne noise generated by the vibration of interior room surfaces.

However, at the Templo Bautisto Monte Calvario (Receiver I1, a Category 3 Land Use), it is expected that the interior spaces are well insulated from exterior noise. This receiver is the only receiver along the proposed Project alignment that is considered to be potentially sensitive to groundborne noise. As discussed in Section 6, without the incorporation of the ballast mat project features, groundborne noise at this referenced building is predicted to exceed the FTA threshold of 43 dBA.

Table 2-2: FTA Vibration Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (VdB Re 1 micro inch/sec)			Groundborne Noise Impact Levels (dB re 20 micro pascals)		
	Frequent Events ^a	Occasional Events ^b	Infrequent Events ^c	Frequent Events ^a	Occasional Events ^b	Infrequent Events ^c
Category 1. Buildings where vibration would interfere with interior operations.	65 VdB ^d	65 VdB ^d	65 VdB ^d	N/A ^e	N/A ^e	N/A ^e
Category 2. Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3. Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: FTA, 2006.

Notes:

^aFrequent events are defined as more than 70 vibration events of the same kind per day per day.

^bOccasional events are defined as between 30 and 70 events of the same kind per day per day.

^cInfrequent events are defined as fewer than 30 events of the same kind per day.

^dThis criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

^eVibration-sensitive equipment is not sensitive to groundborne noise.

2.2.1 Existing Vibration Conditions

One factor not incorporated in the criteria is how to account for existing vibration. Following is the guidance provided by the FTA Guidance Manual on how to handle representative scenarios:

1. *Infrequently used rail corridor (fewer than five trains per day):* Use the general vibration criteria, Table 2-2.



2. *Moderately used rail corridor (5 to 12 trains per day):* If the existing train vibration exceeds the impact criteria given in Table 2-2, there would be no impact from the Project vibration if the levels estimated using the FTA procedures are at least 5 VdB less than the existing train vibration. Otherwise, the vibration criteria in Table 2-2 apply to the Project.

3. *Heavily used rail corridor (more than 12 trains per day):* If the existing train vibration exceeds the impact criteria given in Table 2-2, the Project would cause additional impact if the Project significantly increases the number of vibration events. Approximately doubling the number of trains is required for a significant increase, but the Project does not include such an increase. Because there is not a significant increase in vibration events, there would be additional impact only if the Project vibration, estimated using the FTA procedures, would be at least 3 VdB greater than the existing vibration.

4. *Moving existing tracks:* Another scenario where existing vibration can be significant is when a new high-speed rail line would use an existing rail right-of-way and results in shifting the location of existing tracks. The track relocation and reconstruction can result in lower vibration levels, in which case this aspect of the Project represents a benefit rather than an adverse impact. If the track relocation would cause higher vibration levels at sensitive receptors, then the Projected vibration levels from both rail systems must be compared with the appropriate impact criterion to determine whether there would be new impacts. If impact is judged to have existed prior to moving the tracks, new impact will be assessed only if the relocation results in more than a 3-vibration decibel increase in vibration level.

2.3 Construction Criteria

2.3.1 Construction Noise

The FTA *Noise and Vibration Impact Assessment Guidance Manual* does not provide criteria for assessing construction noise impacts and recommends developing criteria on a project-specific basis unless local ordinances can be found to apply. Project construction would take place in the Cities of Rialto and San Bernardino in San Bernardino County, so different noise ordinances will be applicable to Project construction activities.

2.3.1.1 County of San Bernardino

The County of San Bernardino Development Code does not address construction noise.

2.3.1.2 City of Rialto

The City of Rialto Municipal Code and noise ordinances, Title 9, Chapter 9.50.070, covers noise due to construction. It states that it is unlawful for any person to perform construction work except between the hours given in the table below without obtaining a permit from the City. In concert with this permit requirement active coordination and collaboration with the City of Rialto will occur. The specifics of this coordination and collaboration are provided under Mitigation Measure NOI-3 (Section 6. Mitigation Measures).

	October 1 through April 30	May 1 through September 30
Monday-Friday	7:00 am to 5:30 pm	6:00 am to 7:00 pm
Saturday	8:00 am to 5:00 pm	8:00 am to 5:00 pm



Sunday	No permissible hours	No permissible hours
State Holidays	No permissible hours	No permissible hours

2.3.1.3 City of San Bernardino

The City of San Bernardino Municipal Code and noise ordinances, Title 8, Chapter 8.54.070, covers noise due to construction. It states that it is unlawful for any person to perform construction work except between the hours of 7:00 am and 8:00 pm.

2.3.2 Construction Vibration

The cities in the project corridor do not include limits on construction vibration. Therefore, guidelines provide by the FTA Guidance Manual have been used. Table 2-3 presents the FTA recommended thresholds for minimizing the potential for damage to several types of buildings. The thresholds are presented in terms of both peak-particle velocity (PPV) and root mean square (RMS) vibration velocity. The thresholds for construction vibration are substantially higher than the thresholds for rail operations because they are based on potential for damage instead of human annoyance.

Table 2-3: Building Construction Vibration Damage Criteria		
Building Category	PPV ^a (in/sec)	Approximate L_v ^b (VdB)
I. Reinforced –concrete, steel or timber	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: FTA, 2006.

Notes:

^a PPV = Peak particle velocity

^b L_v = Root mean square (RMS) velocity in decibels (VdB), using a decibel reference of 1 μin/sec and assuming a crest factor of 4.



3. AFFECTED ENVIRONMENT

3.1 Noise and Vibration Sensitive Receivers

Noise and vibration sensitive land uses in the Project area include single- and multi-family dwelling units, institutional, and commercial uses. All receivers are within the future double-track area. The following 21 sites were selected to represent clusters of noise and vibration receivers that would be affected by the proposed Project (Figure 3-1 through Figure 3-3).

RESIDENTIAL CLUSTERS

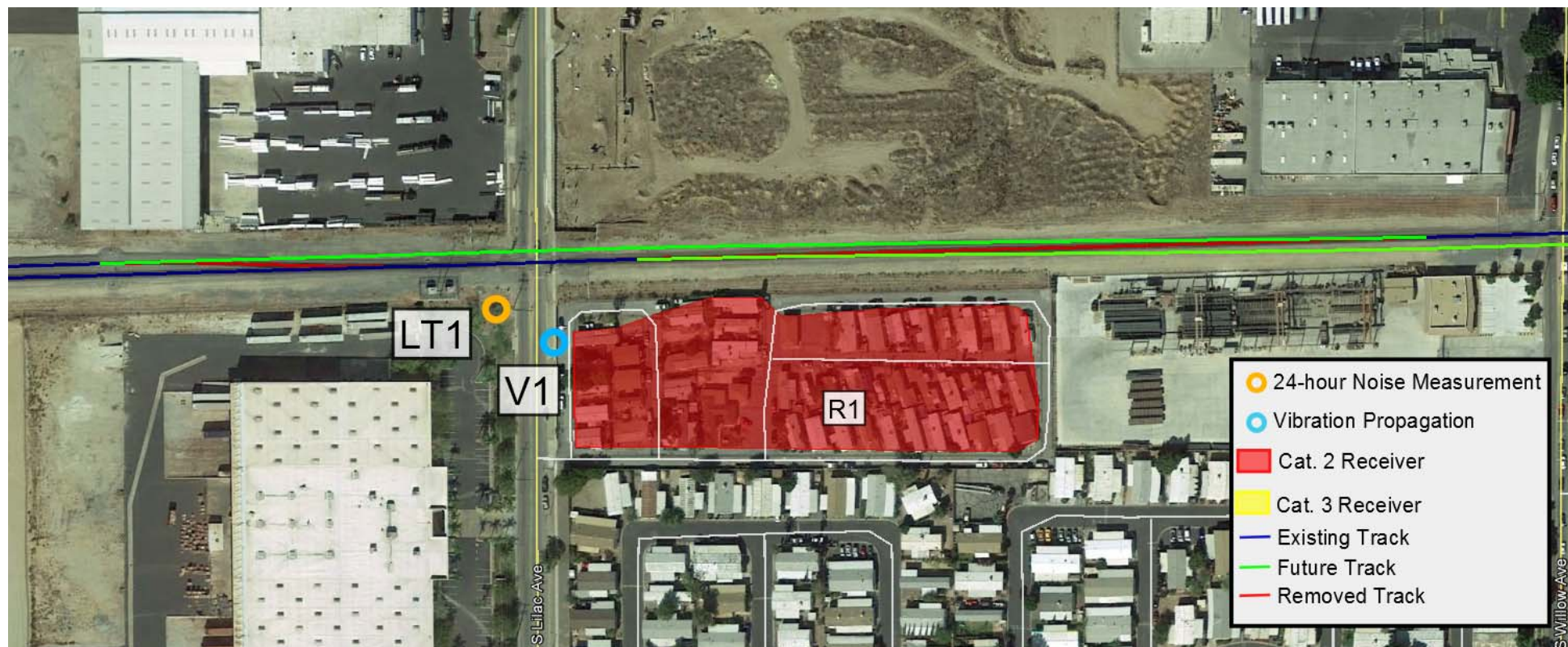
- R1 - This cluster consists 48 units at the Lilac Mobile Home Park at 301 S Lilac Ave. It is on the south side of the alignment.
- R2 - This cluster contains the 22 single-family residences on the south between 301 and 459 Allen Street. They are on the north side of the alignment.
- R3 - This cluster contains the 14 single-family residences and 8 multi-family units between 342 E Bonnie View Drive and 318 S Acacia Avenue. They are on the south side of the alignment.
- R4 - This cluster contains the 7 single-family residences between 501 Allen Street and 163 S Encina Avenue. They are on the north side of the alignment.
- R5 - This cluster contains the 19 single-family residences between 319 S Acacia Avenue and 688 E Bonnie View Drive. They are on the south side of the alignment in an area that would be double-track after the Project is completed.
- R6 - This cluster consists 22 units at the El Dorado Mobile Home Park at 160 S Eucalyptus Avenue. It is on the north side of the alignment.
- R7 - This cluster contains the 14 single-family residences between 3093 and 2943 W Oregon Street as well as the three residences between 2904 and 2926 Dynamic Place. They are on the north side of the alignment.
- R8 - This cluster contains the 18 single-family residences between 3094 and 2914 Atchison Street as well as the residence at 244 S Pepper Avenue. They are on the south side of the alignment.
- R9 - This cluster consists 24 units at the Acacia Villa Mobile Home Park at 2865 W Rialto Avenue. It is on the north side of the alignment.
- R10 - This cluster contains the 2 single-family residences at 138 and 140 S Meridian Avenue. They are on the north side of the alignment.
- R11 - This cluster contains the 19 single-family residences between 2689 and 2579 W Via San Miguel as well as the residences at 156 S Via San Luis and 2565 W Via San Carlos. They are on the north side of the alignment. There is an existing sound wall at this cluster.
- R12 - This cluster contains the 22 single-family residences between 2694 and 2504 Atchison Street. They are on the south side of the alignment. There is an existing sound wall at this cluster.
- R13 - This cluster contains the 5 single-family residences between 2564 and 2534 W Via San Carlos. They are on the north side of the alignment. There is an existing sound wall at this cluster.
- R14 - This cluster contains the 2 single-family residences at 2520 and 2506 W Rialto Avenue. They are on the north side of the alignment.



- R15 - This cluster consists of the single-family residence at 2496 W Rialto Avenue. It is on the north side of the alignment.
- R16 - This cluster consists of the single-family residence at 2422 W Rialto Avenue. It is on the south side of the alignment. This residence is less than 60 feet from the existing track and less than 20 feet from the planned future track.
- R17 - This cluster contains the 6 single-family residences between 2390 and 2348 W Rialto Avenue. They are on the south side of the alignment.
- R18 - This cluster consists 22 units at the Royal Coach Mobile Manor at 2280 W Rialto Avenue. It is on the south side of the alignment.
- R19 - This cluster consists 10 units at the Bonanza Mobile Home Park at 2260 W Rialto Avenue. It is on the south side of the alignment.
- R20 - This cluster consists 22 units at the Orangewood Estates Mobile Home Park at 2160 W Rialto Avenue. It is on the south side of the alignment.
- R21 - This cluster contains the 20 single-family residences between 2297 and 2203 W King Street as well as the residence at 207 N Terrace Street. They are on the north side of the alignment.

INSTITUTIONAL CLUSTERS

- I1 - This receiver is the Templo Bautisto Monte Calvario at 311 S Sycamore Avenue. It is on the south side of the alignment. This receiver is an indoor land use activity with no outdoor uses.



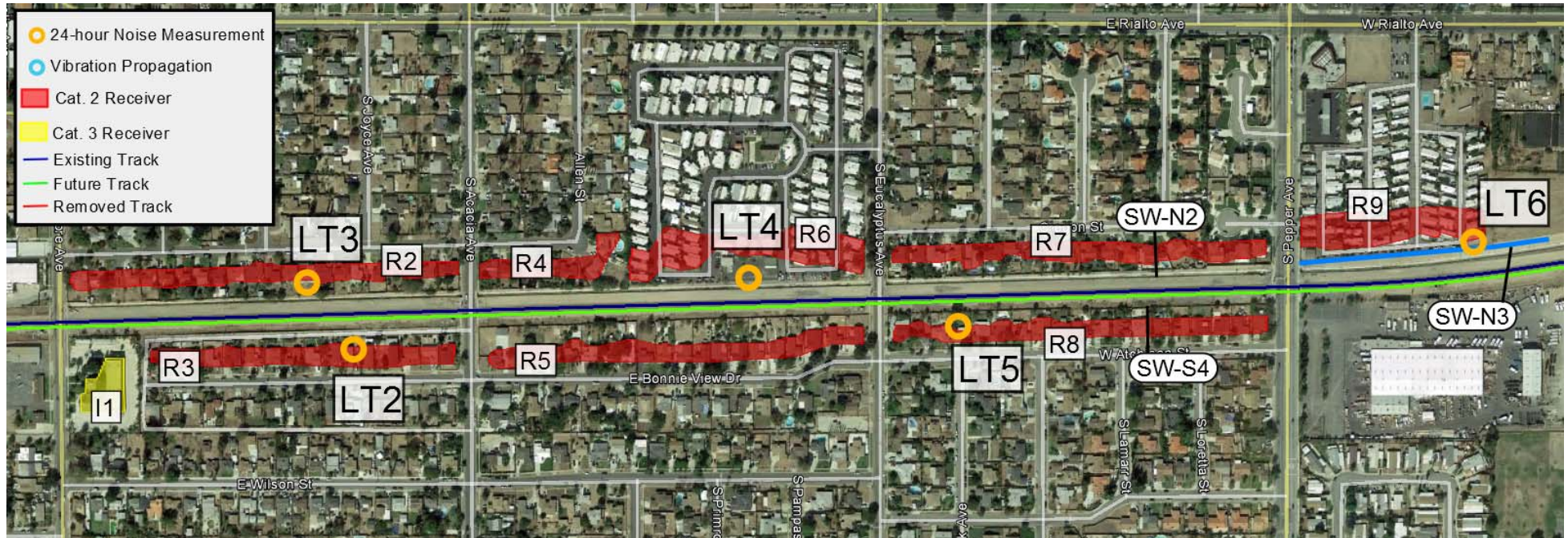


Figure 3-2: Measurement and Receiver Overview: Center Section (R2 through R9, I1)



Figure 3-3: Measurement and Receiver Overview: East Section (R10 through R21)



3.2 Existing Noise Environment

3.2.1 24-Hour Noise and Vibration Measurements

As part of this assessment, noise and vibration measurements were conducted in May through July 2017 to document the existing noise and vibration environment in the Project area and determine the noise and vibration emissions of the existing Metrolink and UPRR freight train operations. This section presents the results of the noise and vibration measurements, documents the existing conditions at representative sensitive receivers within the Project area, and defines the noise and vibration characteristics of the passenger and freight trains.

Measurements were performed at 11 locations throughout the alignment to determine the existing conditions at the 22 receiver clusters. Twenty-four-hour measurements were performed at 9 of these locations, Sites LT1 through LT9 (see Figure 3-1 through Figure 3-3), to determine the existing ambient noise environment throughout the alignment. The noise measurements included train horns and at-grade crossing bells. The results were used to define the reference noise levels that are used as the basis of the FTA impact assessment.

Vibration propagation measurements were performed at the remaining two sites to determine the vibration propagation characteristics of the soil and the vibration generated by the trains.

Table 3-1 summarizes the results of the noise measurements, the approximate distances of the locations from the centerline of the existing track, and the measured noise level at the locations. Table 3-1 also lists the receiver clusters that are represented by each of the 9 noise measurement sites. The 24 one-hour equivalent sound levels (Leq) are plotted in Appendix B.

3.2.2 Vibration Propagation Measurements

The vibration predictions for this Project are based on existing passby vibration levels of Metrolink trains measured at two locations on ballast and tie track at Sites V1 and V2 (see Figure 3-1 through Figure 3-3). The results of these measurements are presented in Table 3-2 as the average maximum vibration level (Lmax) at different distances from the track.

Table 3-1: Summary of 24-Hour Noise Measurements

Site	Location	Distance to Track Centerline (feet)	Clusters Represented by Measurement Site	Start Date	Start Time	Noise L _{dn} (dBA)
LT1	Lilac Mobile Home Park	60	R1	7/11/2017	12:09 pm	82
LT2	442 E Bonnie View Dr	97	R3, R5, and I1	5/25/2017	12:55 pm	69
LT3	411 Allen St	103	R2	5/30/2017	2:08 pm	73
LT4	El Dorado Mobile Home Park	72	R4, R6, and R7	5/9/2017	12:47 pm	76
LT5	3064 Atchison St	95	R8	5/11/2017	11:52 am	74
LT6	Acacia Villa Mobile Home Park	94	R9 and R10	5/9/2017	11:44 am	74
LT7	2512 Atchison St	90	R11, R12 and R13	5/11/2017	11:00 am	65
LT8	Royal Coach Mobile Manor	83	R14 through R20	5/30/2017	2:59 pm	69
LT9	2233 W King St	77	R21	5/14/2017	11:42 am	69



Table 3-2: Summary of Train Passby Vibration Propagation Measurements						
Site	Location	Average Speed (mph)		Distance to Near Track Centerline (feet)	Average Lmax (VdB)	
		Eastbound	Westbound		Eastbound	Westbound
V1	Lilac Ave	51	36	25	91	88
				50	87	85
				75	84	83
				100	78	76
				150	73	72
				200	72	69
V2	Forest River, Inc.	64	56	57	74	71
				79	73	70
				153	69	68
				202	68	66
				250	66	64
				200	63	62



4. IMPACT ASSESSMENT METHODS

The FTA Guidance Manual detailed noise and vibration assessment methodologies were used to predict noise and vibration levels from future train operations related to the Project. The prediction models for both noise and vibration are described below.

The FTA recommended approach for assessing potential noise and vibration effects is to characterize the Project's noise environment for "clusters" of receivers based on measurements at representative locations in the community. Representative locations were selected along the alignment to represent clusters of receivers where the existing and future train noise and vibration is assessed. These locations, which in most cases are adjoining the SBCTA right-of-way, are used to measure the existing train noise and vibration.

4.1 Train Noise

The primary components of wayside noise from passenger and freight train operations are typically the diesel propulsion engine and the wheel/rail noise. Secondary sources, such as vehicle air-conditioning and other ancillary equipment, would sometimes be audible, but are not expected to be significant factors. Due to the frequency of grade crossings in the Project area, the train horns were an important source of train noise in the project corridor.

The predicted wayside noise from passenger and freight train operations was based on the noise measurements of existing train operations. These measurements were conducted at 14 residential locations along the Project alignment, some of which were near grade crossings to capture the sound of the train horns and grade crossing bells. The ATS staff members who performed the measurements were physically present at 2 sites to note the train passby details including speed, direction, number of locomotives and cars.

There is currently a total of 38 weekday scheduled Metrolink commuter trips in the Project corridor and up to four additional weekday UPRR freight trips utilizing the rail corridor. The operating speed is 79 miles per hour (mph) for passenger trains and 30 mph for freight trains between MP 52.4 (CP Lilac) and MP 55.1 (CP Rancho). The Proposed Project is not expected to change the frequency of Metrolink or UPRR freight trains. Also, the future train speeds with the Proposed Project are assumed to be the same as the existing speeds.

4.2 Vibration

The potential vibration impact from rail operations was assessed based on the increase in vibration from future train operations with the Project as compared to the existing conditions. Note that the potential for an increase in vibration levels is because the second track would be closer to some residences. As discussed above, the number of train operating in the corridor and the train speeds are not anticipated to change as a result of this Project. According to the criteria in the FTA Guidance Manual, if vibration levels from future train operations are predicted to be 3 VdB greater than existing levels, an impact would occur.

Vibration measurements were conducted at six sites along the corridor at residences within the first row of receivers. In addition, vibration propagation characteristics were measured at two sites in the Project area. The results of these two types of measurements were combined to develop a prediction model of the future vibration levels under the proposed Project.



The design of the Project includes turnouts at the beginning and end of the double track section. The Metrolink standard for the new turnouts are concrete tie pseudo tangential geometry with Welded Spring Manganese (WSM) frogs. These frogs are low impact design and are not expected to contribute to the noise or groundborne vibration. The noise and groundborne vibration generated at these turnouts is expected to be the same as tangent track. No additional adjustments were added to the predicted groundborne noise and vibration at those receivers near these turnouts. As part of the later design phases of this Project, the effectiveness of the WSM frogs will be confirmed by conducting noise and vibration measurements at existing Metrolink turnouts where these frogs have been installed.

4.3 Construction

4.3.1 Noise

Construction noise varies greatly depending on the construction process, type and condition of equipment used, and layout of the construction site. Many of these factors are traditionally left to the contractor's discretion, which makes it difficult to accurately estimate levels of construction noise. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment. For most construction equipment, the engine, which is usually diesel, is the dominant noise source. This is particularly true of engines without sufficient muffling.

Projecting construction noise requires a construction scenario of the equipment likely to be used and the average utilization factors or duty cycles (i.e., the percentage of time during operating hours that the equipment operates under full power during each phase). Table 4-1 shows categories of equipment that are expected to be used and the typical noise generated by this equipment when it is operating at full load. The typical noise levels, along with estimates of what equipment would be used during the loudest phases of the project, and the usage factors (how long the equipment is used) for each category of equipment are used to estimate construction noise levels.

Construction noise estimates are always approximate because of the lack of specific information available at the time of the environmental assessment. Project designers usually try to minimize constraints on how the construction will be performed and what equipment will be used so that contractors can perform construction in the most cost-effective manner. Standard management practices have been included that incorporate effective, best-practice noise control measures during construction.

Based on the provided construction methodology estimates, a 10-hour Leq of 94 dBA should be expected at 50 feet from the geometric center of the work site. With at-grade track construction, the duration of the activities at a specific location along the alignment will be relatively limited, usually a matter of several weeks. As a result, even when there may be noise impacts, the limited duration of the construction can mean that some forms of mitigation are not cost effective.



Table 4-1: Construction Equipment Noise Levels	
Equipment	Sound Level (Leq) at 50 Feet Under Full Load
Forklift	85 dBA
Excavator	80 dBA
Backhoe	80 dBA
Roller	74 dBA
Crane	83 dBA
Track Regulator	85 dBA
Track Surfacing Equipment	85 dBA
Scraper	89 dBA
Crane	83 dBA
Ballast Truck	88 dBA

Source: FTA, 2006.

4.3.2 Vibration

Construction vibration impact is typically determined based on the potential of construction activities to cause damage to buildings near the construction site. There are two primary factors that determine whether structure damage can be expected from construction vibration. The first is the presence of historic buildings which have a much lower vibration damage threshold. There are no historic structures present within the project area. The second factor is the use of pile driving or blasting, both activities that induce very high vibration levels. The construction of this project does not require these activities. As such it is very unlikely that there will be construction vibration impacts related to this project. However, more detailed analysis will be performed during final design to confirm.



5. NOISE AND VIBRATION EFFECTS

5.1 Train Noise Predictions

Noise and vibration sensitive land uses have been grouped, as described in Section 4.1, into clusters that are represented by the 9 long-term noise measurement and monitoring locations. This section discusses the potential direct effects of the proposed Project on the sensitive land uses in the Project corridor. Noise and vibration predictions were developed for each of the clusters according to the methods described in Section 4 and are presented in Table 5-1 and Table 5-2.

The Proposed Project without Quiet Zone implementation is not predicted to result in noise level increases that would exceed the applicable FTA noise impact threshold at any of the receiver clusters.

Table 5-1: Category 2 Receiver Analysis Results

Receiver	Measurement Site	Existing L_{dn} (dBA) ^(a)	FTA Impact Criteria ^(b) (dB)		Predicted Without Quiet Zones				Number of Receivers
			Moderate	Severe	L_{dn} (dBA)	Change (dB)	Exceedance (dB)	Impact Status	
R1	LT1	76.1	0.3	2.1	75.4	-0.7	--	--	48
R2	LT3	68.0	1.2	3.1	67.6	-0.5	--	--	22
R3	LT2	69.3	1.1	2.9	70.1	0.7	--	--	22
R4	LT4	72.0	0.8	2.5	71.6	-0.4	--	--	7
R5	LT2	69.8	1.1	2.8	70.6	0.8	--	--	19
R6	LT4	72.5	0.7	2.5	72.0	-0.5	--	--	22
R7	LT4	71.9	0.8	2.5	71.6	-0.4	--	--	17
R8	LT5	69.8	1.1	2.8	70.3	0.5	--	--	19
R9	LT6	70.2	1.0	2.7	70.2	-0.1	--	--	24
R10	LT6	67.5	1.2	3.2	67.4	0.0	--	--	2
R11	LT7	56.4	2.8	6.5	56.1	-0.3	--	--	21
R12	LT7	58.1	2.4	5.7	58.7	0.6	--	--	22
R13	LT7	54.6	3.3	7.3	54.4	-0.2	--	--	5
R14	LT8	61.0	1.9	4.7	61.0	0.0	--	--	2
R15	LT8	64.6	1.4	3.7	64.5	-0.1	--	--	1
R16	LT8	67.6	1.2	3.1	68.1	0.5	--	--	1
R17	LT8	62.6	1.7	4.2	62.7	0.1	--	--	6
R18	LT8	65.7	1.3	3.5	65.8	0.1	--	--	22
R19	LT8	62.5	1.7	4.3	62.5	0.0	--	--	10
R20	LT8	59.7	2.1	5.1	59.7	0.0	--	--	22
R21	LT9	59.2	2.2	5.3	60.2	1.0	--	--	21

(a) The existing L_{dn} was derived by taking the nearest appropriate L_{dn} and applying an adjustment factor to account for the difference in distance.

(b) The FTA impact criteria are in terms of the maximum increase in noise exposure that is allowed before there is a noise impact.



Table 5-2: Category 3 Receiver Analysis Results

Receiver	Measurement Site	Existing L_{eq} (dBA) ^(a)	FTA Impact Criteria ^(b) (dB)		Predicted Without Quiet Zones			
			Moderate	Severe	L_{eq} (dBA)	Change (dB)	Impact Status	Exceedance (dB)
I1	LT2	65.1	1.4	3.6	65.4	0.3	--	--
<p>(a) The existing L_{eq} was derived by taking the nearest appropriate L_{eq} and applying a correction factor to account for the difference in distance.</p> <p>(b) The FTA impact criteria are in terms of the maximum increase in noise exposure that is allowed before there is a noise impact.</p>								

5.2 Train Vibration Predictions

Table 5-3 and Table 5-4 present the vibration predictions at the sensitive clusters. There is a predicted increase in existing vibration levels at some of the clusters and at other locations the predicted vibration levels are the same as the existing vibration level (see Table 5-3). The predicted vibration increases range of 0.2 to 16.0 VdB. The predicted changes are primarily due to the change in distance between the proposed double track and the existing track. However, as referenced above and illustrated on Figure 6-1 through Figure 6-3, the Proposed Project includes, as an integrated project feature, the installation of ballast mats, that are predicted to avoid the introduction of vibration impacts, except at a single residential property. The vibration levels, without the ballast mats, are predicted to exceed the FTA threshold for impact of a 3 VdB or greater increase over the existing vibration levels at Clusters R12, R16 and R18. These clusters represent 52 residential receivers. Table 5-5 shows the results of the groundborne noise analysis at the Templo Bautisto Monte Calvario (Cluster I1). The increased vibration from the second track would cause the groundborne noise experienced by the church to exceed the FTA Impact Threshold. However, as referenced above the ballast mat project feature avoids vibration based impacts at all receivers except for R16.

Table 5-3: Category 2 Receiver Vibration Analysis Results

Receiver	Existing Vib. L_{max} (VdB)	Predicted Vib. L_{max} (VdB)	Change (dB)	FTA Impact (dB)	Impact Status	Exceedance (dB)
R1	83.3	83.8	0.5	3.0	--	--
R2	76.2	76.2	0.0	3.0	--	--
R3	75.6	78.1	2.5	3.0	--	--
R4	77.5	77.5	0.0	3.0	--	--
R5	76.7	79.6	2.9	3.0	--	--
R6	78.9	78.9	0.0	3.0	--	--
R7	77.4	77.4	0.0	3.0	--	--
R8	78.1	81.1	3.0 ^(a)	3.0	--	--
R9	73.9	73.9	0.0	3.0	--	--
R10	68.2	68.2	0.0	3.0	--	--
R11	74.7	74.7	0.0	3.0	--	--
R12	79.4	82.8	3.4	3.0	Y	0.4
R13	70.7	70.7	0.0	3.0	--	--
R14	66.9	66.9	0.0	3.0	--	--
R15	74.1	74.1	0.0	3.0	--	--



R16	82.4	98.3	16.0	3.0	Y	13.0
R17	69.7	71.7	2.0	3.0	--	--
R18	77.0	80.7	3.7	3.0	Y	0.7
R19	69.5	70.2	0.8	3.0	--	--
R20	65.1	65.4	0.2	3.0	--	--
R21	78.6	78.6	0.0	3.0	--	--
(a) The change in noise at this receiver rounds up to the impact threshold and, as such, is not considered an impact.						

Table 5-4: Category 3 Receiver Vibration Analysis Results

Receiver	Existing Vibration L _{max} (VdB)	Predicted Vibration L _{max} (VdB)	Change (dB)	FTA Impact (dB)	Impact Status	Exceedance (dB)
I1	73.6	75.0	1.5	3.0	--	--

Table 5-5: Category 3 Receiver Groundborne Noise Analysis Results

Receiver	Existing Groundborne Noise L _{max} (dBA)	Predicted Groundborne Noise L _{max} (dBA)	FTA Impact (dBA)	Impact Status	Exceedance (dB)
I1	42.0	43.7	43.0	Y	0.7



6. MITIGATION MEASURES

6.1 Operational Noise Mitigation

Because there were no noise impacts identified for this project, noise mitigation is not required. However, the existing noise levels in the Project area are quite high and would benefit greatly from the introduction of Quiet Zones. The report prepared by JMDiaz Inc. provides information on the requirements for having FRA designate the corridor as a quiet zone.

6.2 Operational Vibration Mitigation

Vibration mitigation measures are limited to the recommended options for R16, the single residential property at 2422 W Rialto Avenue, as is presented in Table 6-2.

While the ballast mat project feature (Figure 6-1 through Figure 6-3) avoids potential impacts at I1, R12 and R18, there would still a significant impact at R16. Options evaluated for eliminating the vibration impact at this residence but rejected due to lack of feasibility are:

1. Adjust the location of the second track so it will be farther from this residence. This option is not feasible because the existing columns and open bays through the UPRR Overpass provide only a single alignment option for the second track.
2. Impose a slow order for the freight and Metrolink trains. To eliminate the vibration impact, it would be necessary to limit train speeds to below 10 mph. This is not feasible because: (a) Imposing a slow order on freight traffic is impractical due to operational conditions required and the length of the freight trains, and (b) A slow order in this area would severely degrade the capacity of the Metrolink operations in this corridor.
3. Install ballast mats under the ballast. Using two layers of a relatively soft ballast mat would reduce vibration levels by 5 to 8 decibels in the key frequency range. Ballast mats are a relatively standard vibration mitigation measure for light rail lines. Because of the greater axle loads on typical freight trains, this option would need to be carefully evaluated during final design to ensure the specified ballast mat would reduce the vibration levels to below the impact threshold and would not be prematurely damaged by the heavy axle loads of freight trains.
4. Install an FST system to protect the single residence. FST's consist of a concrete slab track that is supported by resilient elements. The resilient elements typically are either natural rubber discs or coil springs. The fundamental resonance of the floating slab system would need to be in the 5 to 8 Hz range. Use of FST systems to reduce vibration levels on rail transit systems are relatively common. Use of FST systems on freight rail systems is extremely rare.

The two mitigation options that were found to be feasible and are still under consideration are:

NOI-2 – The necessary elements of Mitigation Measure NOI-2, will be completed prior to potential implementation of Mitigation Measure NOI-3 in attempt to avoid the potential for a full acquisition of the residential structure at 2422 W Rialto Ave. Implementation of NOI-2 will include the following three (3) steps:

- Step 1 – Complete a property line/SBCTA ROW survey to delineate the corresponding parcel boundaries associated with the impacted property located at 2422 W Rialto Ave, and the SBCTA ROW boundary. This delineation will establish the ROW limits in relation the improvements located on the property located at 2422 W Rialto Ave. The survey and the corresponding results



will also confirm if the improvements currently in place at 2422 W Rialto Ave are encroaching into SBCTA ROW. Depending on the results of the above described delineation the second step as part of this mitigation measure may require partial financial responsibility of the current owner of the property at 2422 W Rialto Ave. Property owner approval may be necessary of access onto the property at 2422 W Rialto Ave is required to complete the survey.

- Step 2 – Conduct the necessary vibration measurements, evaluation, modeling (if deemed necessary), and document the results. The results will provide a determination on the minimum separation distance from the proposed second main-line railroad track alignment to address the currently predicted vibration impact. If the vibration measurement results determine that the separation from tracks is to not sufficient to address the predicted vibration impact then an additional evaluation of a double layer of ballast mats will be included to supplement the evaluation and determine if the combined action will address the predicted vibration impact.
- Step 3 – Based on the results from Step 1 and 2, assuming the results of Step 2 present a viable mitigation for the predicted vibration impact the proceeding with Step 3 will be undertaken. Initiate the relocation of the existing residential structure, according to the minimum separation distance required. The relocation will include an evaluation the existing improvements needed on-site and determination on the preferred location within the limits of the parcel boundaries at 2422 W Rialto Ave. The on-site evaluation of the property located at 2422 W Rialto Ave will include the spatial requirements, supplemental improvements needed (foundation and relocated utility connections), City of San Bernardino development standards and building permit requirements, and also any potential secondary modifications or removals of other on-site improvements that would also be required. Step 2 may also include the inclusion of a double layer of ballast mats with the second main-line track alignment. The limits of the double layer ballast mat, if deemed necessary, will be provided as part of the Step 1 documentation results. If the results from Step 2 determine that relocation of the existing residential structure at 2422 W Rialto Ave, alone or in concert with a double layer ballast mat is not a viable mitigation for the predicted vibration impact at this property then Mitigation Measure NOI-3 will be implemented.

NOI-3 – This mitigation measure will only be considered for implementation after the stepped process associated with Mitigation Measure NOI-2 have been completed and determine to be a non-viable mitigation option. Mitigation Measure NOI-3 will involve the preparation of a relocation impact technical memorandum that will document the necessary steps and provisions associated with the full acquisition of the property located at 2422 W Rialto Ave. This full acquisition will also include a comprehensive evaluation of comparable replacement property resources. The replacement resources will be evaluated based on current and fair market value, including size (parcel and building square footage (primary structure) and configuration (number of bedrooms/bathrooms). Any secondary improvements currently on-site at 2422 W Rialto Ave will be considered in concert with the property appraisal conducted. The evaluation of costs associated with this option in comparison to the on-site relocation and ballast mats will also be evaluated to determine the best option and most viable solution

Table 6-1: Ballast Mat Locations

	Track Side	Length (feet)	Station Start	Station End	Receivers Mitigated
BM1	South	570	2807+00	2812+70	I1
BM2	South	1550	2860+50	2876+00	R12
BM3	South	700	2888+00	2895+00	R18
Total		2,820			



Table 6-2: Mitigated Vibration Impact Analysis

Receiver	Impact Threshold (dB)	Predicted		Predicted w/ Ballast Mat (Project Feature)	
		Change (dB)	Exceedance (dB)	Change (dB)	Exceedance (dB)
R16	3.0	16.0	13.0	8.6	5.6

Table 6-3: Mitigated Groundborne Noise Analysis

Receiver	FTA Impact (dBA)	Predicted		Predicted w/ Ballast Mat (Project Feature)	
		Groundborne Noise L_{max} (dBA)	Exceedance	Predicted Groundborne Noise L_{max} (dBA)	Exceedance
I1	43.0	43.7	0.7	33.2	--



Figure 6-1: Ballast Mat locations: West Section (R1)



Figure 6-2: Ballast Mat locations: Center Section (R2 through R9, I1)



Figure 6-3: Ballast Mat and R16 mitigation locations: East Section (R10 through R21)



6.3 Construction Noise and Vibration Mitigation

Temporary noise during construction of the new tracks has the potential of being intrusive to residents near the construction sites. Most of the construction would consist of site preparation and laying new track, and would only occur during daytime hours.

Construction activities will be carried out in compliance with all applicable local noise regulations as specified in Mitigation Measure NOI-1.

NOI-1 – Complete the Work Permit preparation, submittal and approval process with the City of Rialto to allow weekend construction activities. The approved Work Permit, issued by the City Manager, will allow anticipated weekend construction that would extend beyond the authorized timelines and days according to the City's Municipal Code (Title 9, Chapter 9.50.070). The specific timelines that will be permitted according to this mitigation measures include the following:

- Construction activities will be allowed beginning on Friday from 5:31 pm through to Saturday at 7:59 am
- Construction activities will be allowed beginning on Saturday's from 5:01 pm through to Monday at 6:59 am

Consistent with the City of Rialto's Work Permit requirements to demonstrate sufficient need and justifications, the construction activities necessary during the above defined work windows are associated with the proposed at-grade roadway crossing improvements. These roadway crossings must be modified and the prescribed improvements implemented (Project Description, Section 2.0). To avoid any potential for secondary impacts to north-south access across the railroad corridor and to also avoid undue detours each roadway crossing and its corresponding improvements will occur over a single weekend with only one crossing being closed and improvements being constructed at a time. No concurrent roadway closure or construction will occur.

In addition, specific residential property line noise limits will be developed during final design and included in the construction specifications for the Project, and noise monitoring will be performed during construction to verify compliance with the limits. This approach allows the contractor flexibility to meet the noise limits in the most efficient and cost-effective manner. Noise control measures that will be applied as needed to meet the noise limits include the following:

- Avoiding nighttime construction in residential neighborhoods.
- Using specially quieted equipment with enclosed engines and/or high-performance mufflers.
- Locating stationary construction equipment as far as possible from noise-sensitive sites.
- Constructing noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.
- Re-routing construction-related truck traffic along roadways that will cause the least disturbance to residents.
- Drilled piles or the use of a sonic or vibratory pile driver should be used instead of impact pile driving.

With the incorporation of the appropriate noise mitigation measures, impacts from construction-generated noise is not expected to be significant. To provide added assurance, a complaint resolution procedure should also be put in place to rapidly address any noise problems that may develop during construction.

Construction activities that could cause intrusive vibration include vibratory compaction, jackhammers, and use of tracked vehicles such as bulldozers. Sources of high vibration such as blasting and pile driving would not be used for this project.



REFERENCES

- Federal Transit Administration Office of Planning and Environment, *Transit Noise and Vibration Impact Assessment*, Document FTA-VA-90-1003-06, May 2006.



APPENDIX A: NOISE AND VIBRATION BACKGROUND INFORMATION

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound. Sound can vary in intensity by over one million times within the range of human hearing. Therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity, and compress the scale to a more manageable range.

Sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. The ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale has been developed. A-weighted decibels are abbreviated as “dBA.” On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA. As a point of reference, Figure A-1 includes examples of A-weighted sound levels from common indoor and outdoor sounds.

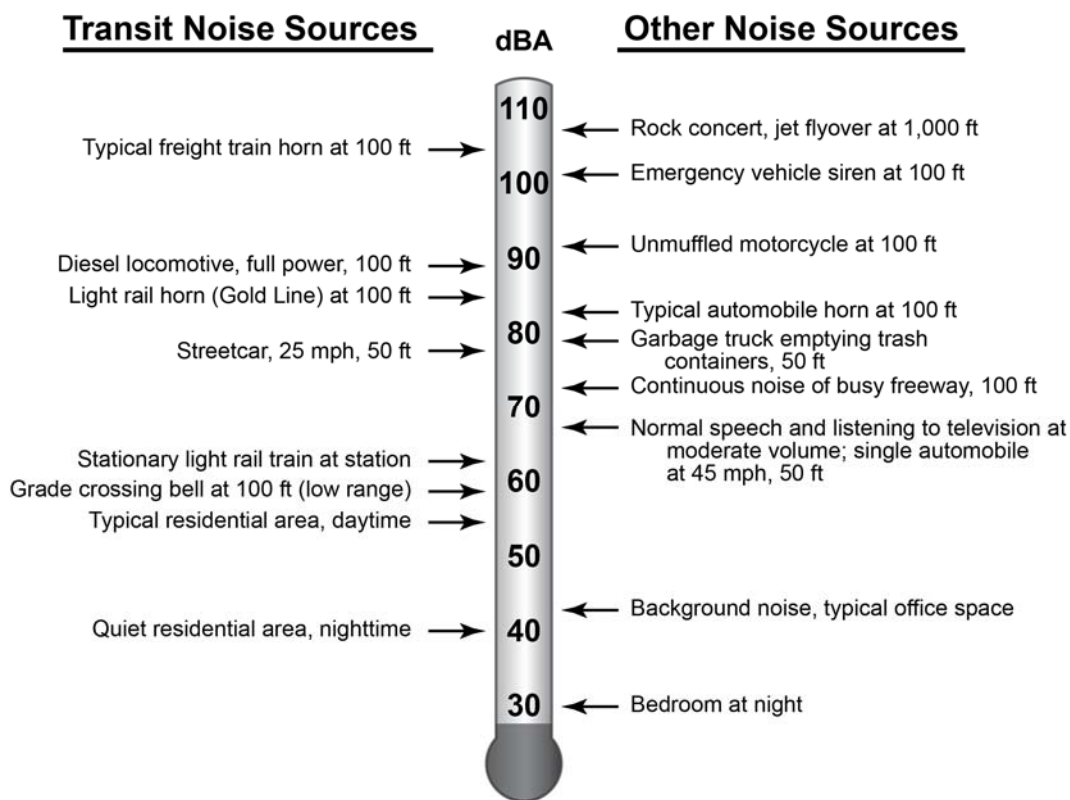


Figure A-1: Typical Outdoor and Indoor Noise Levels

Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dBA. The smallest recognizable change in sound level is approximately 1 dBA. A 3-dBA increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. A 10-dBA increase is judged by most people as an approximate doubling of the perceived loudness.



Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source and the receiver and having intervening obstacles, such as walls, buildings, or terrain features that block the direct path between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include the proximity of the sound source to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

Brief definitions of the measures of environmental noise used in this report are:

- **Equivalent Sound Level (Leq):** Environmental sound fluctuates constantly. The equivalent sound level (Leq), sometimes referred to as the energy-average sound level, is the most common means of characterizing community noise. Leq represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound.
- **Day-Night Sound Level (Ldn):** Ldn is basically a 24-hour Leq with an adjustment to reflect the greater sensitivity of most people to nighttime noise. The adjustment is a 10-dB penalty for all sound that occurs between the hours of 10 P.M. and 7 A.M. The effect of the penalty is that, when calculating Ldn, any event that occurs during the nighttime is equivalent to 10 of the same event during the daytime. Ldn is the most common measure of total community noise over a 24-hour period.
- **Maximum Sound Level (Lmax):** The maximum sound level over a period of time or for a specific event can also be a useful parameter for characterizing specific noise sources. Standard sound level meters have two settings, fast and slow, which represent different time constants. Lmax using the fast setting will typically be 1 to 3 dB greater than Lmax using the slow setting.
- **Percent Exceedance Level (Lxx):** This is the sound level that is exceeded for xx percent of the measurement period. For example, L99 is the sound level exceeded 99 percent of the measurement period. For a one-hour period, the sound level is less than L99 for 36 seconds of the hour and the sound level is greater than L1 for 36 seconds of the hour. L1 represents typical maximum sound levels, L33 is approximately equal to Leq when free-flowing traffic is the dominant noise source, L50 is the median sound level, and L99 is close to the minimum sound level.
- **Sound Exposure Level (SEL):** SEL is a measure of the total sound energy of an event. In essence, all sound from the event is compressed into a one-second period. This means that SEL increases as the event duration increases and as the event sound level increases. SEL is useful for estimating the Ldn that would be caused by individual events such as train passbys.

Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration of the motion. One potential effect from the proposed Project is an increase in vibration that is transmitted from the tracks through the ground into adjacent houses. When evaluating human response, groundborne vibration is usually expressed in terms of decibels using the RMS vibration velocity. RMS is defined as the average of the squared amplitude of the vibration signal. To avoid confusion with sound decibels, the abbreviation VdB is used for vibration decibels. All vibration decibels in this report use a decibel reference of 1 μ m/sec. Vibration can also be expressed as the peak particle velocity (PPV), which is generally used to evaluate whether vibration has potential to cause damage to fragile building structures. Peak particle velocity is normally expressed in inches per second.

The potential adverse effects of rail transit groundborne vibration are as follows:

- **Perceptible Building Vibration:** This is when building occupants feel the vibration of the floor or other building surfaces. Experience has shown that the threshold of human perception is



around 65 VdB and that vibration that exceeds 75 to 80 VdB may be intrusive and annoying to building occupants.

- **Rattle:** The building vibration can cause rattling of items on shelves and hanging on walls, and various rattle and buzzing noises from windows and doors.
- **Reradiated Noise:** The vibration of room surfaces radiates sound waves that may be audible to humans. This is referred to as groundborne noise. When audible groundborne noise occurs, it sounds like a low-frequency rumble. For surface rail systems, the groundborne noise is usually masked by the normal airborne noise radiated from the transit vehicle and the rails.
- **Damage to Building Structures:** Vibration from rail systems is usually one to two orders of magnitude below the most restrictive thresholds for preventing building damage. However, fragile and extremely fragile structures may be susceptible to damage if the tracks are in sufficient proximity to the structure.

Figure A-2 shows typical RMS vibration velocity levels from rail and nonrail sources as well as the human and structure response to such levels.

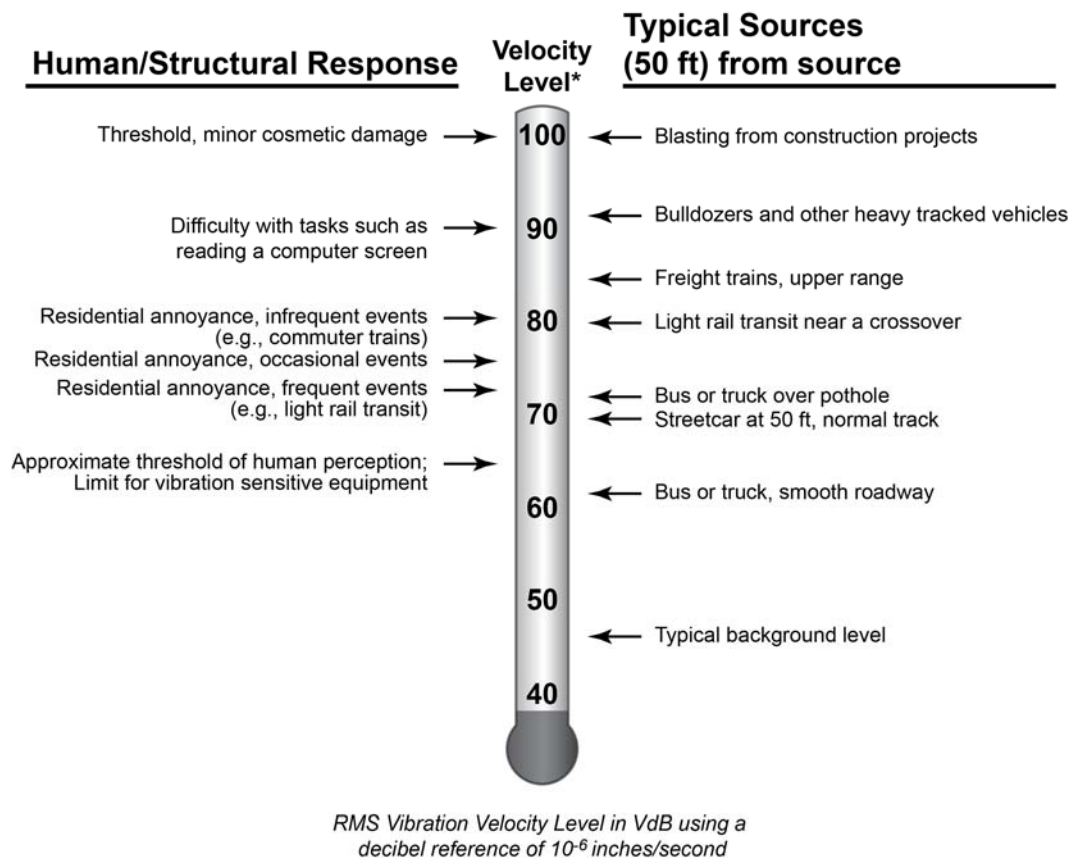


Figure A-2: Typical RMS Vibration Velocity Levels

Often it is necessary to determine the contribution at different frequencies when evaluating vibration or noise signals. The 1/3-octave band spectrum is the most common procedure used to evaluate frequency components of acoustic signals. The term “octave” has been borrowed from music where it refers to a



span of eight notes. The ratio of the highest frequency to the lowest frequency in an octave is 2:1. For a 1/3-octave band spectrum, each octave is divided into three bands. An octave consists of three 1/3 octaves.

The 1/3-octave band spectrum of a signal is obtained by passing the signal through a bank of filters. Each filter excludes all components except those that are between the upper and lower range of one 1/3-octave band. The FTA Noise and Vibration Impact Assessment Guidance Manual is a good reference for additional information on transit noise and vibration and the technical terms used in this section.

Construction equipment can produce high levels of vibration, and many pieces of equipment will incite vibration levels greater than expected from train operations. Vibration from construction equipment is generally expressed as a peak particle velocity (PPV) in units of inches per second. The PPV is an instantaneous linear peak value and is more appropriate for assessing vibration when damage is a concern.



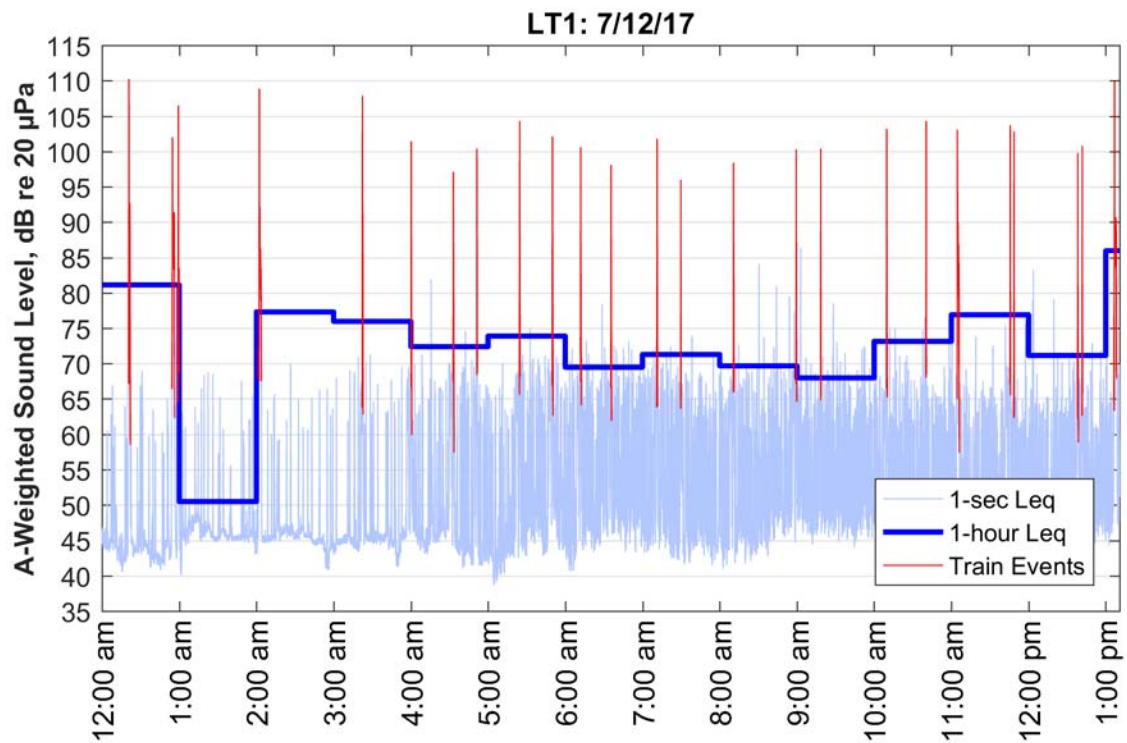
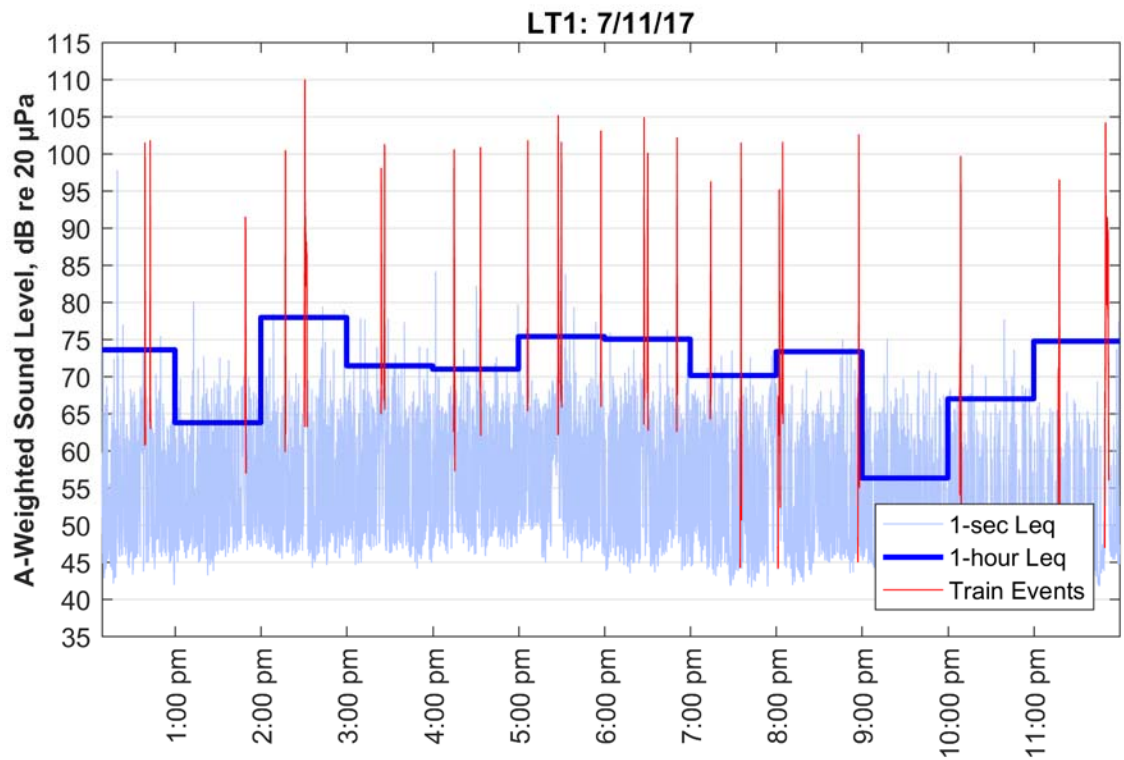
APPENDIX B: NOISE AND VIBRATION MEASUREMENTS

B.1 24-Hour Noise Measurements

LT1: 360 S Lilac Avenue

This measurement recorded noise levels over a period of 24-hours and was started at 12:09 pm on 7/11/17. It was located at the northeast corner of the property at 360 S Lilac Avenue adjacent to the Metro ROW at 60 feet south of the centerline of the track.



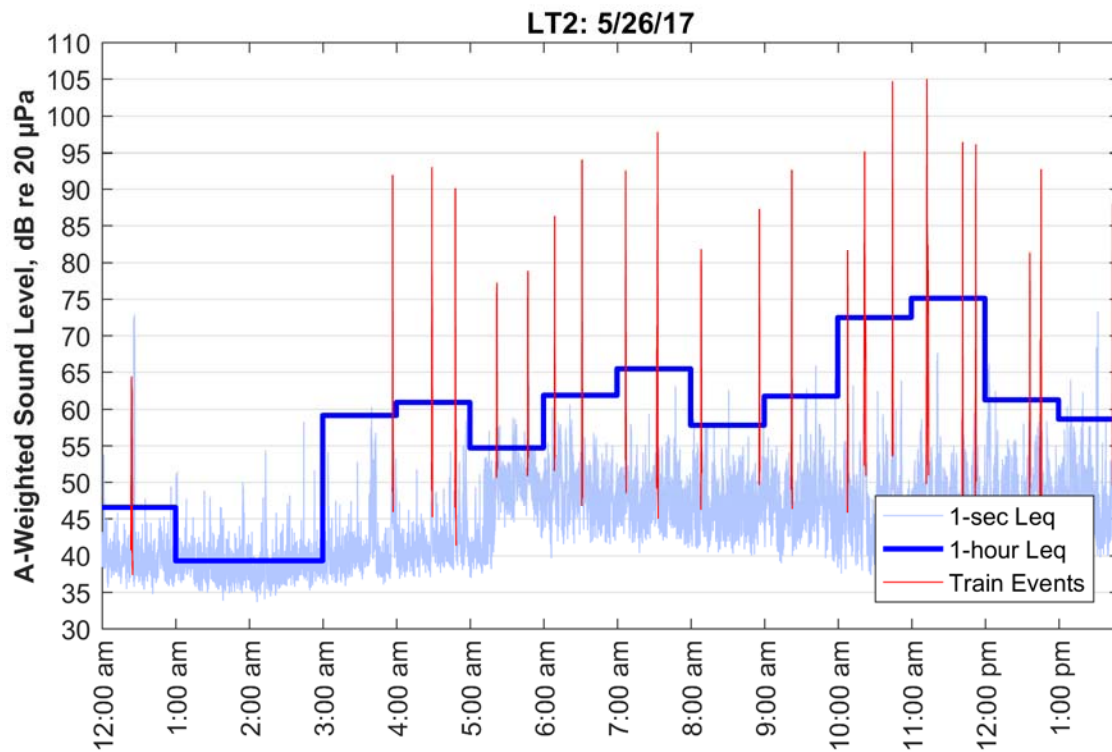
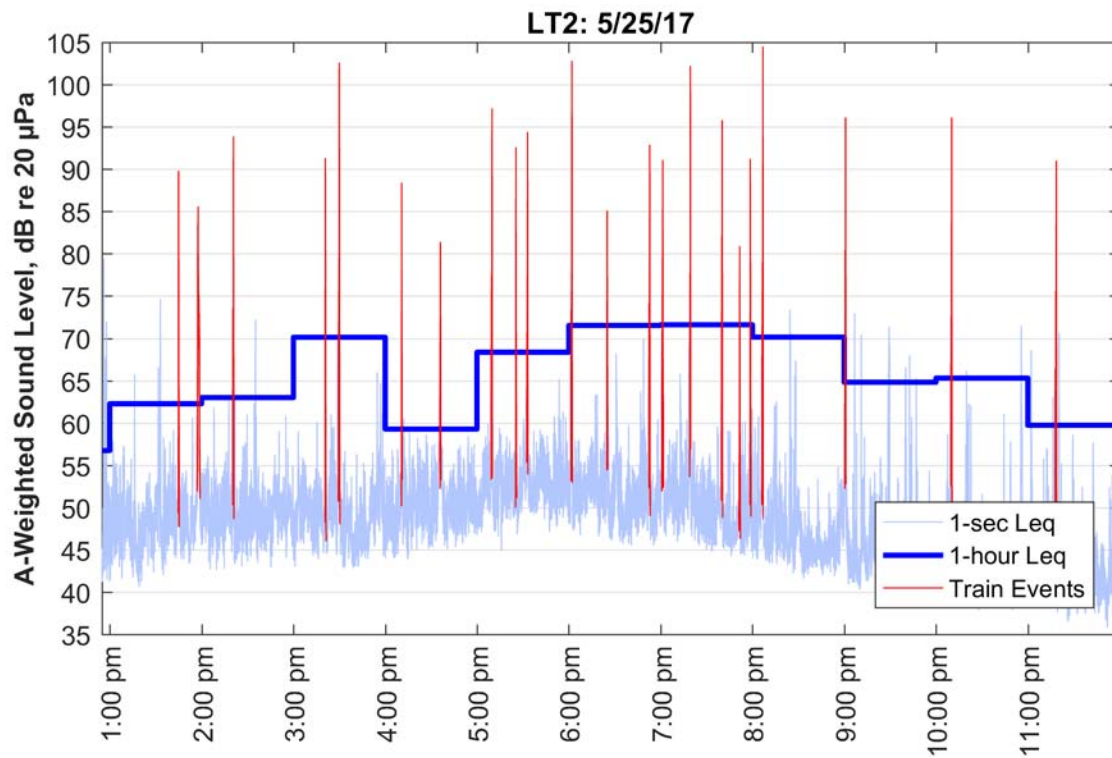




LT2: 442 E Bonnie View Drive

This measurement recorded noise and vibration levels over a period of 24-hours and was started at 12:55 pm on 5/25/17. It was in the back yard of the residence at 442 E Bonnie View Drive facing the SBCTA ROW at 97 feet south of the centerline of the track.



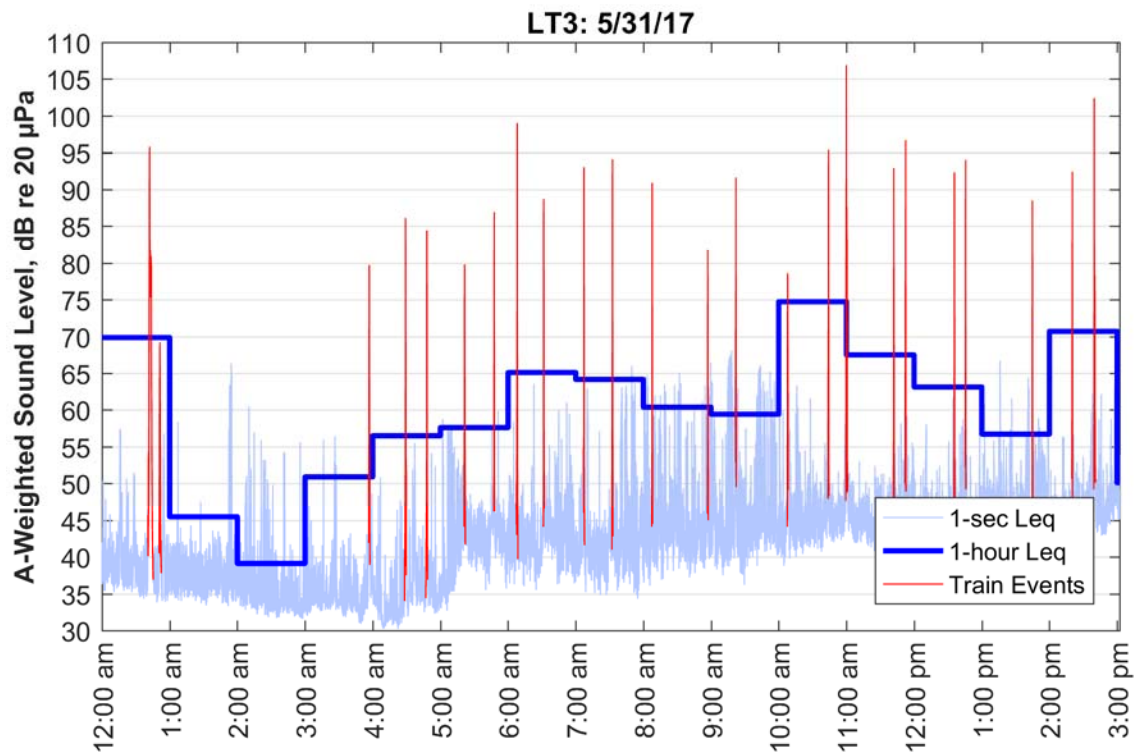
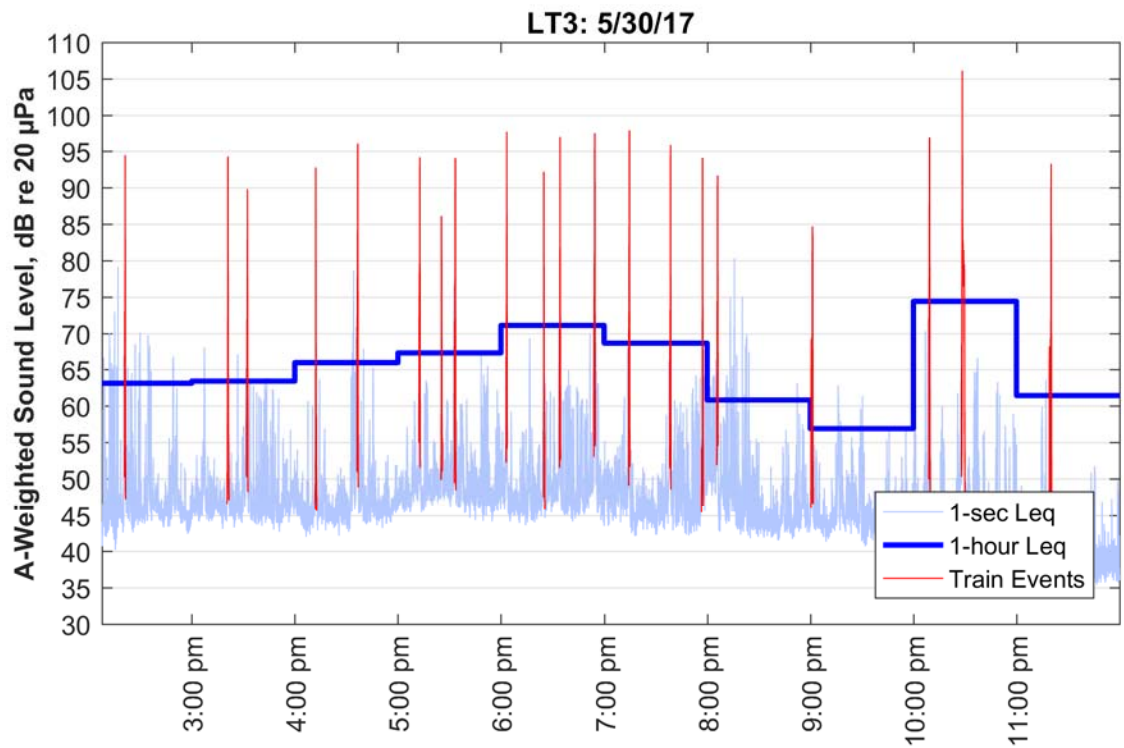




LT3: 411 Allen Street

This measurement recorded noise levels over a period of 24-hours and was started at 2:08 pm on 5/30/17. It was located in the backyard of the residence at 411 Allen Street at 103 feet north of the centerline of the track. There is a wooden fence between this measurement and the track.



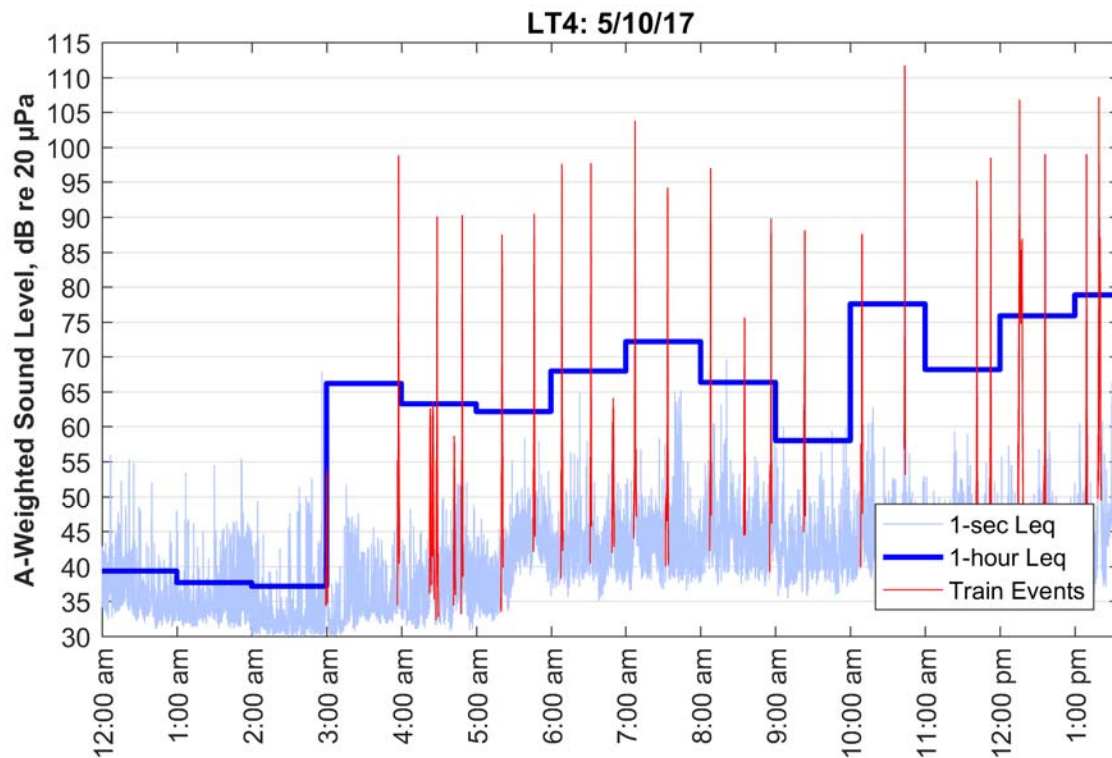
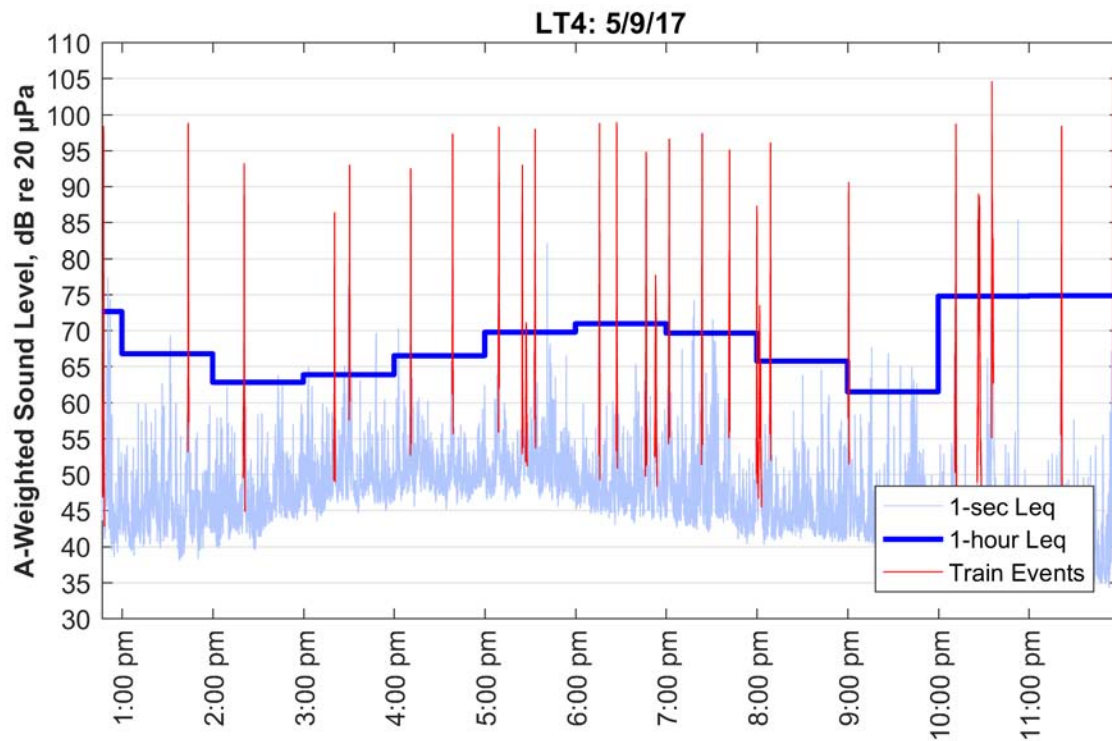




LT4: El Dorado Mobile Home Park

This measurement recorded noise levels over a period of 24-hours and was started at 12:47 pm on 5/9/17. It was located at the southern edge of the El Dorado Mobile Home Park facing the SBCTA ROW at 72 feet north of the centerline of the track.



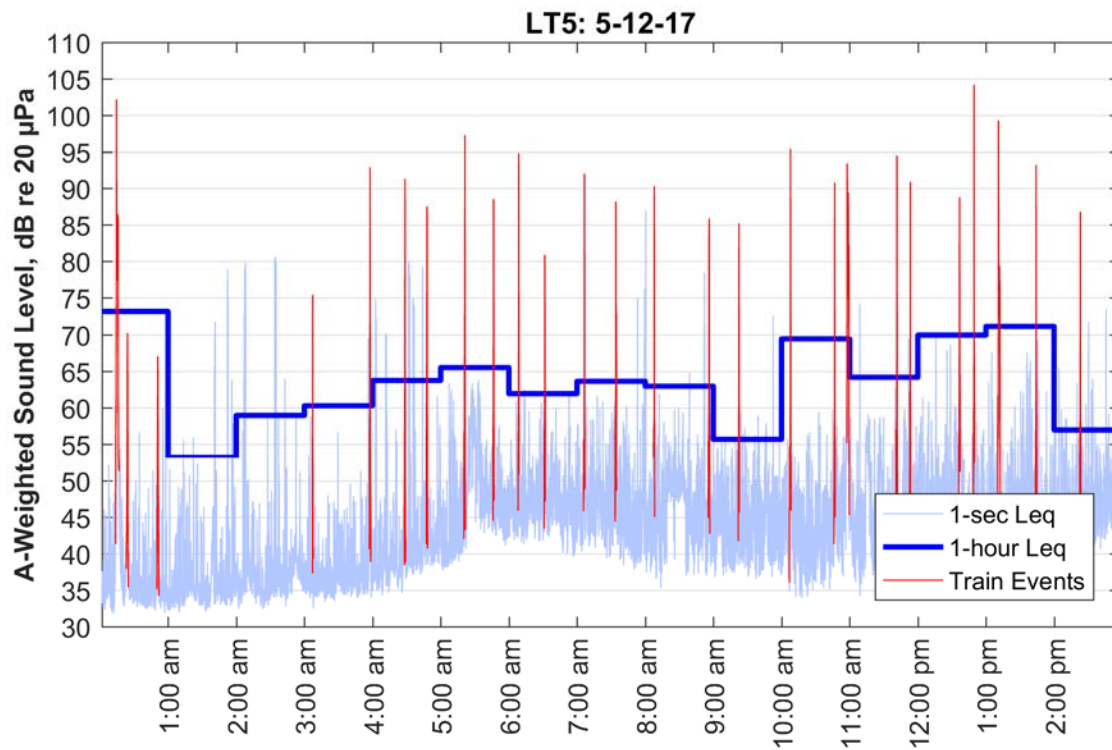
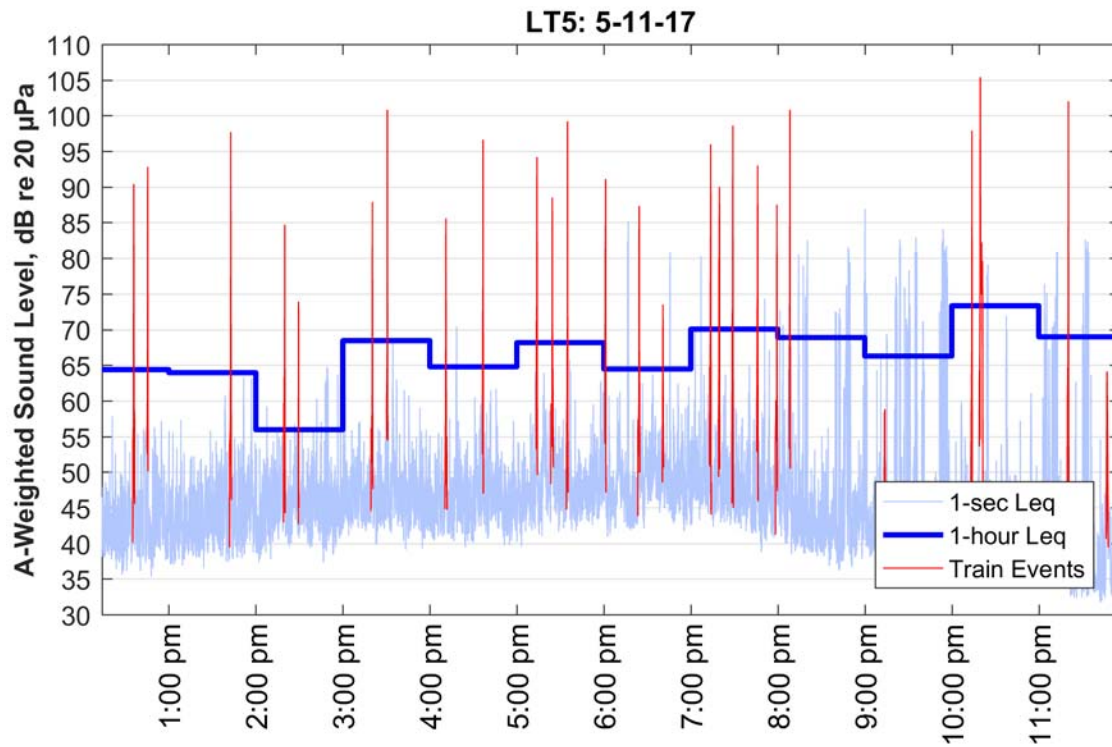




LT5: 3064 Atchison Street

This measurement recorded noise and vibration levels over a period of 24-hours and was started at 11:52 am on 5/11/17. It was located in the backyard of the residence at 3064 Atchison Street facing the SBCTA ROW at 95 feet south of the centerline of the track.



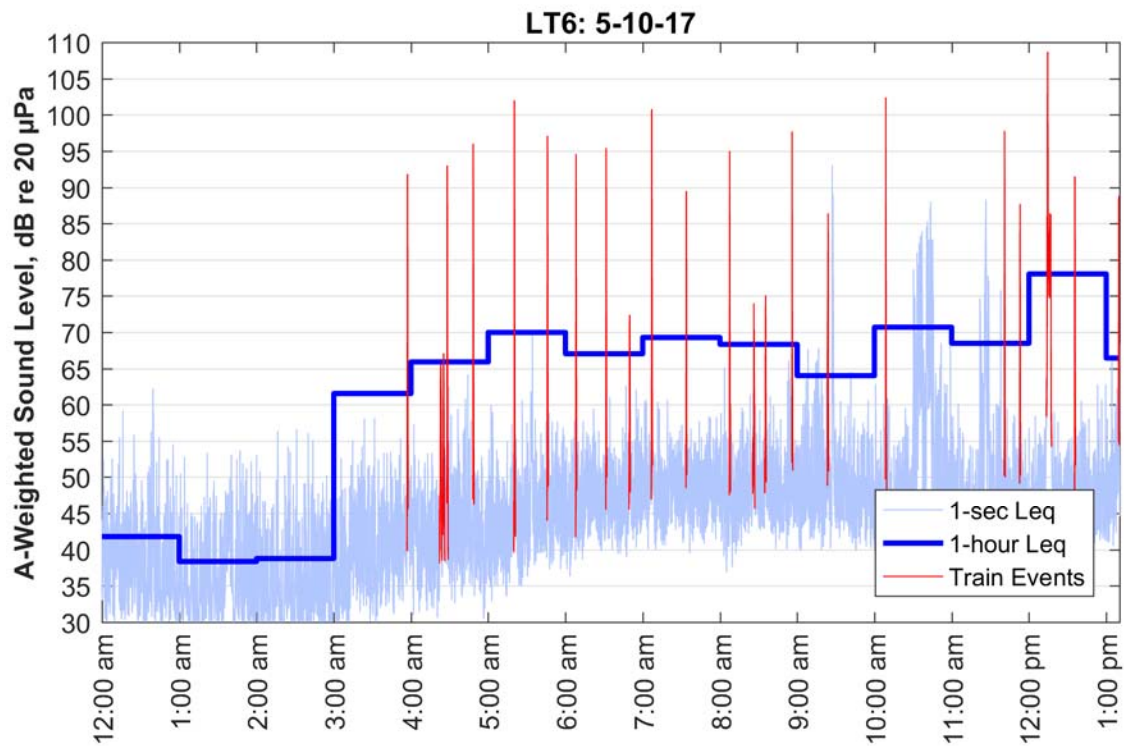
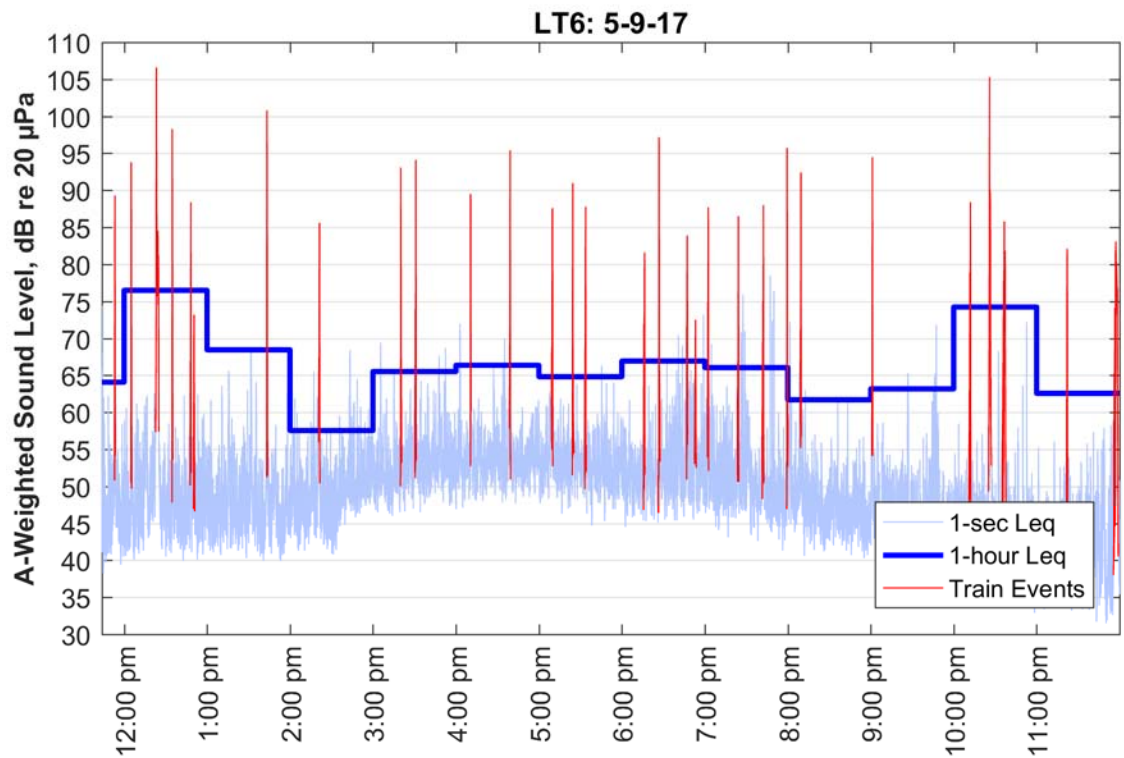




LT6: Acacia Villa Mobile Home Park

This measurement recorded noise levels over a period of 24-hours and was started at 11:44 am on 5/9/17. It was located at the southeast corner of the Acacia Villa Mobile Home Park at 94 feet north of the centerline of the track.

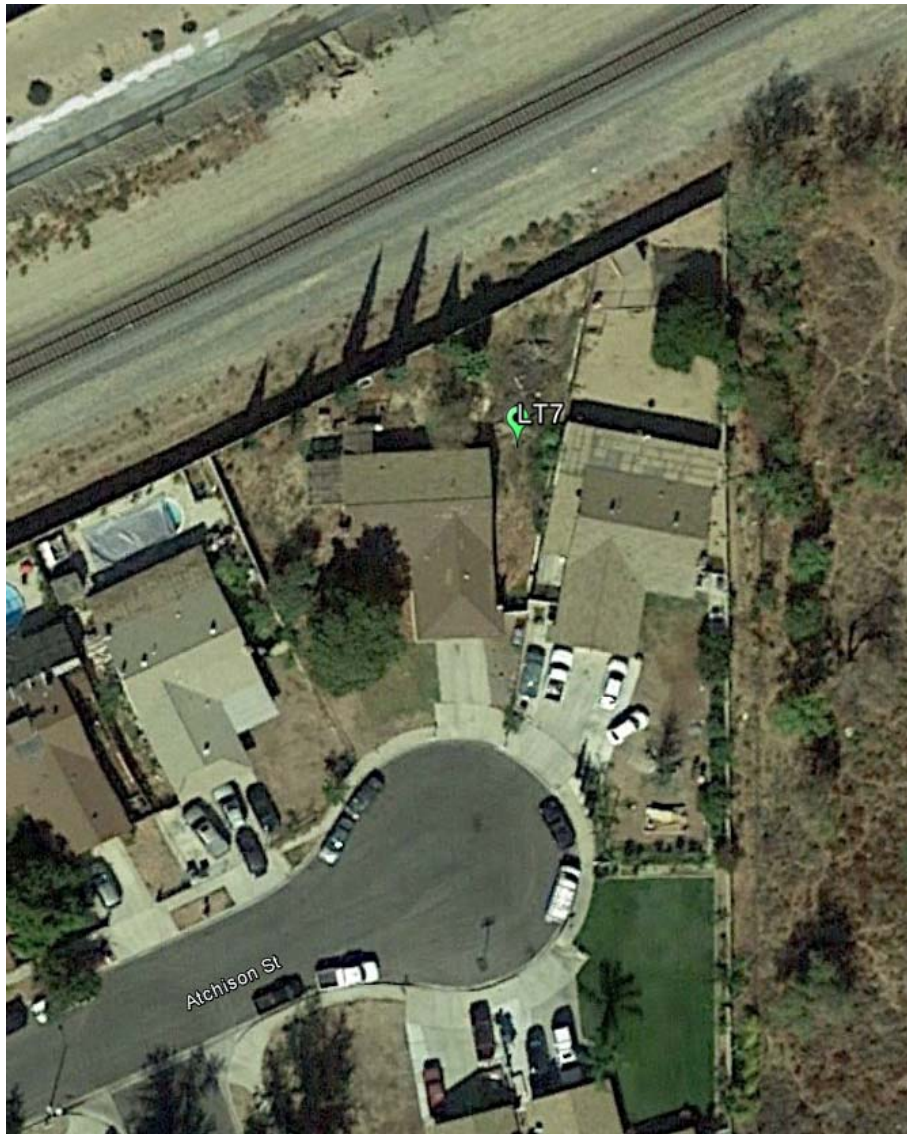


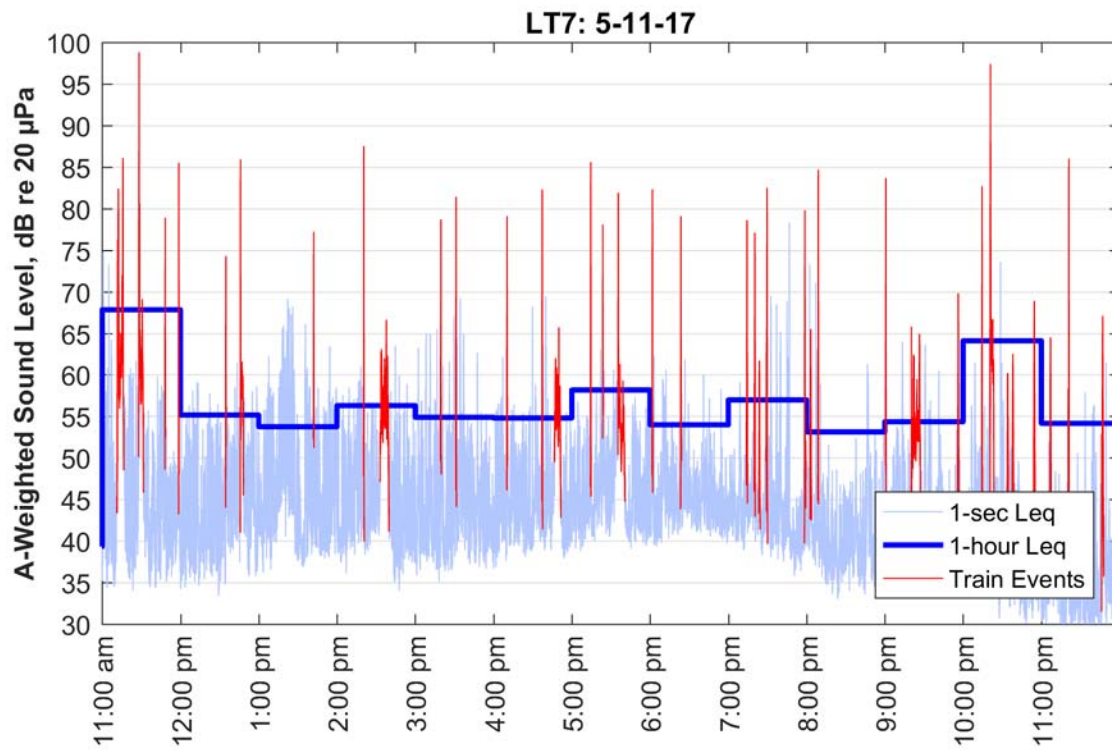
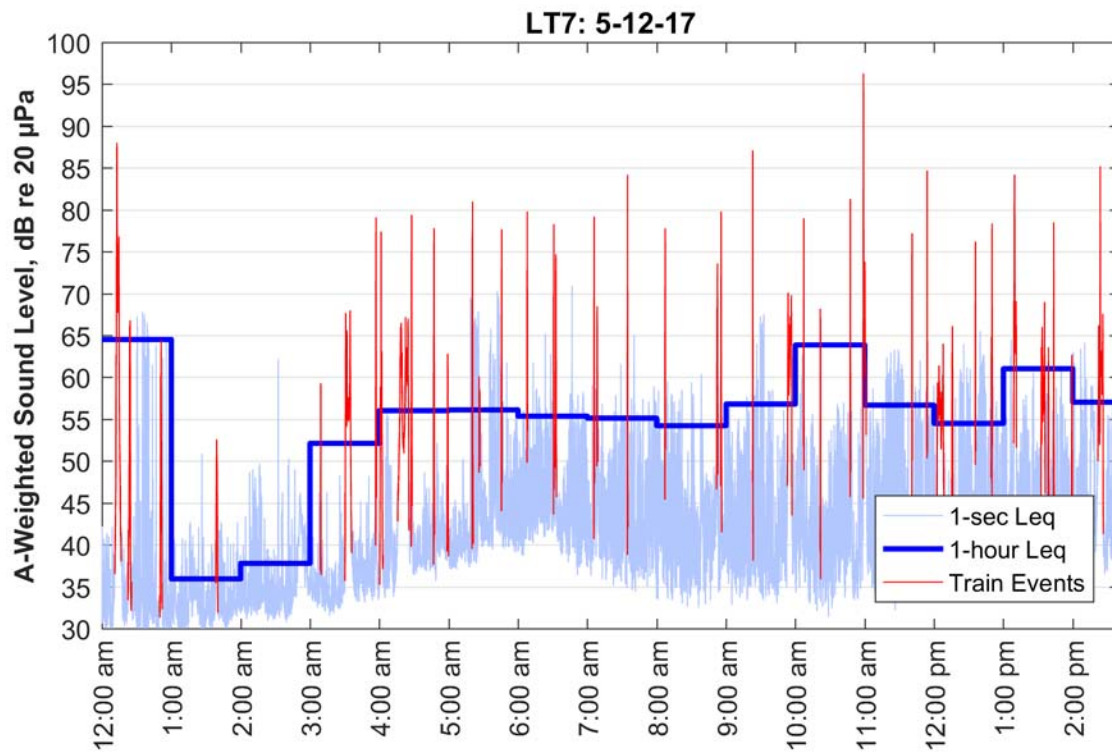




LT7: 2512 Atchison Street

This measurement recorded noise levels over a period of 24-hours and was started at 11:00 am on 5/11/17. It was located in the backyard of the residence at 2512 Atchison Street facing the SBCTA ROW at 90 feet south of the centerline of the track. There is an existing sound wall at this location that is approximately 12 feet tall.



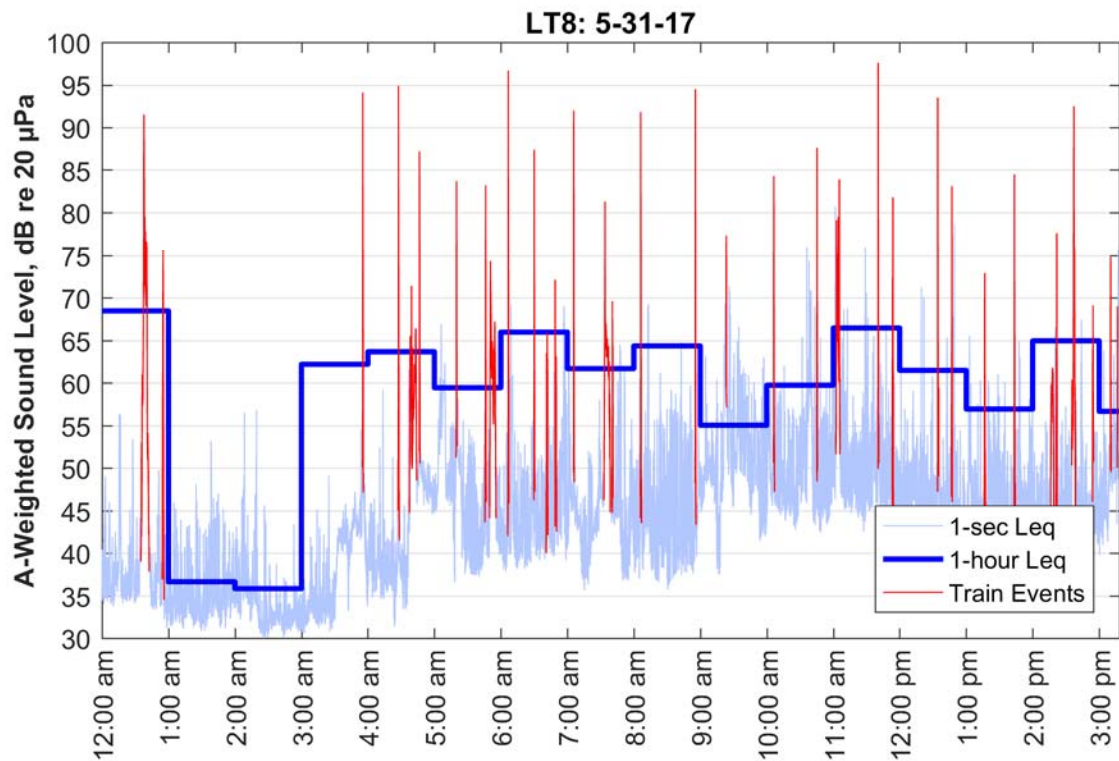
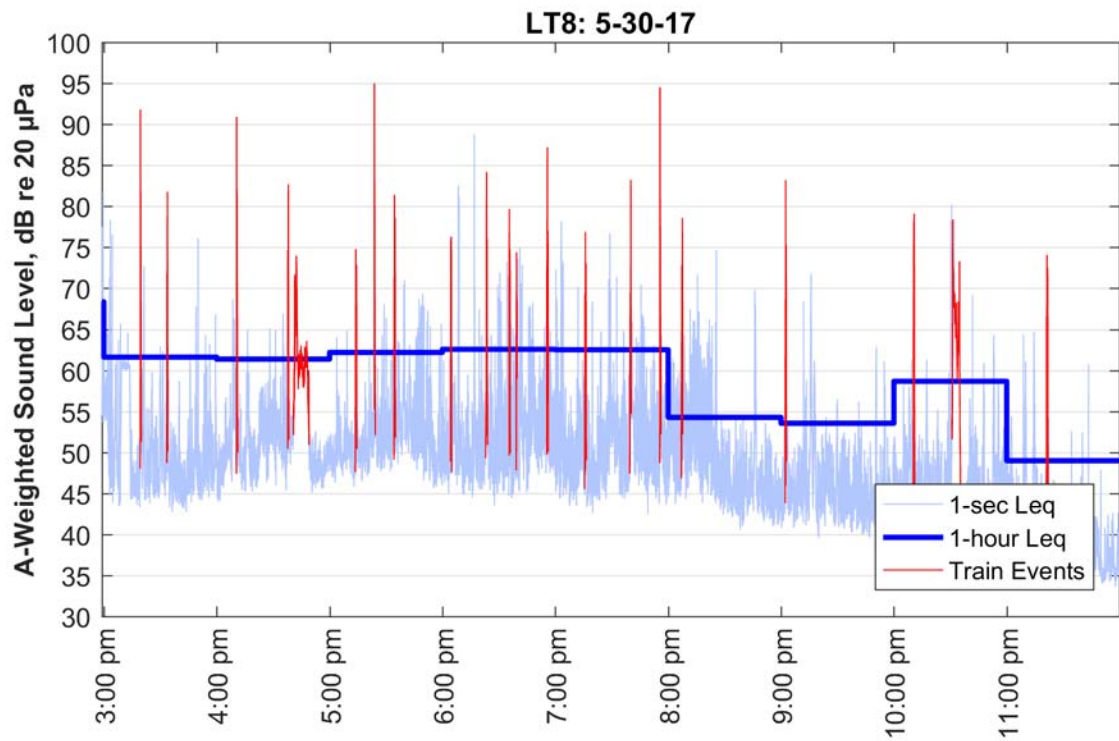




LT8: Royal Coach Mobile Manor

This measurement recorded noise levels over a period of 24-hours and was started at 2:59 pm on 5/30/17. It was located at the north end of the Royal Coach Mobile Manor property facing the SBCTA ROW at 83 feet south of the centerline of the track. There is a wooden fence at this location.



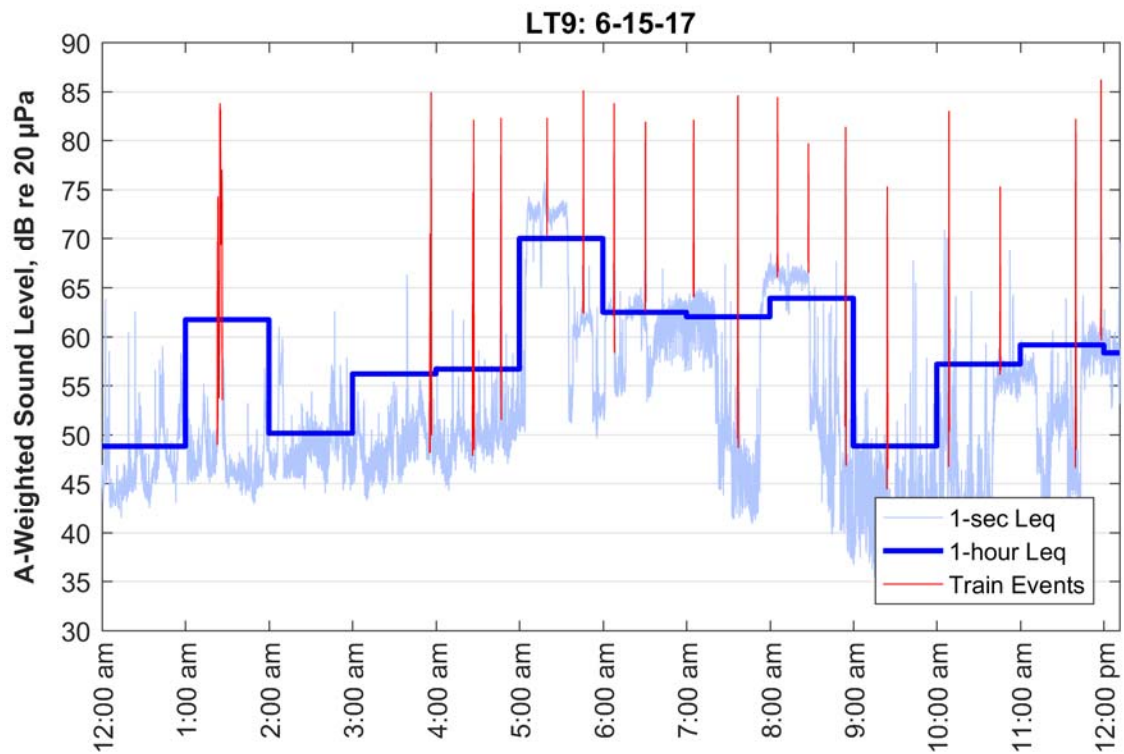
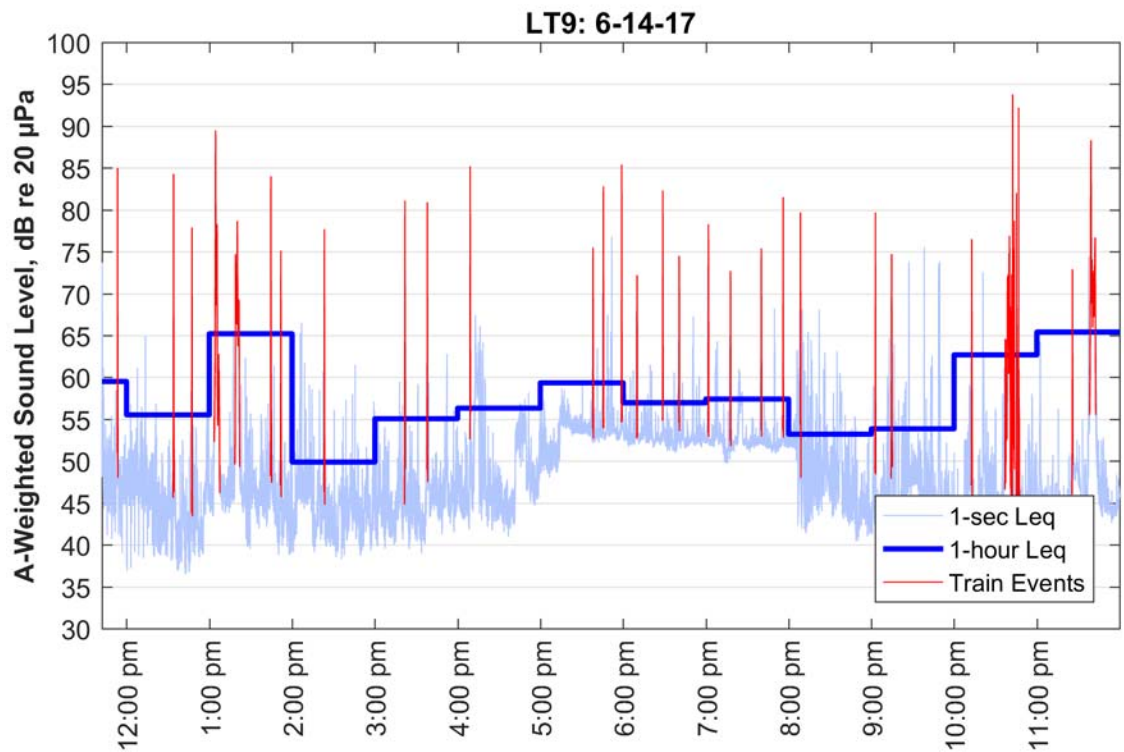




LT9: 2233 W King St

This measurement recorded noise levels over a period of 24-hours and was started at 11:42 am on 5/14/17. It was located in the backyard of the residence at 2233 W King St facing the SBCTA ROW at 77 feet north of the centerline of the track. There is a wooden fence at this location and the property is at the top of an embankment that is roughly 15 feet higher than the ROW. On the other side of the SBCTA ROW is an active freight railyard.



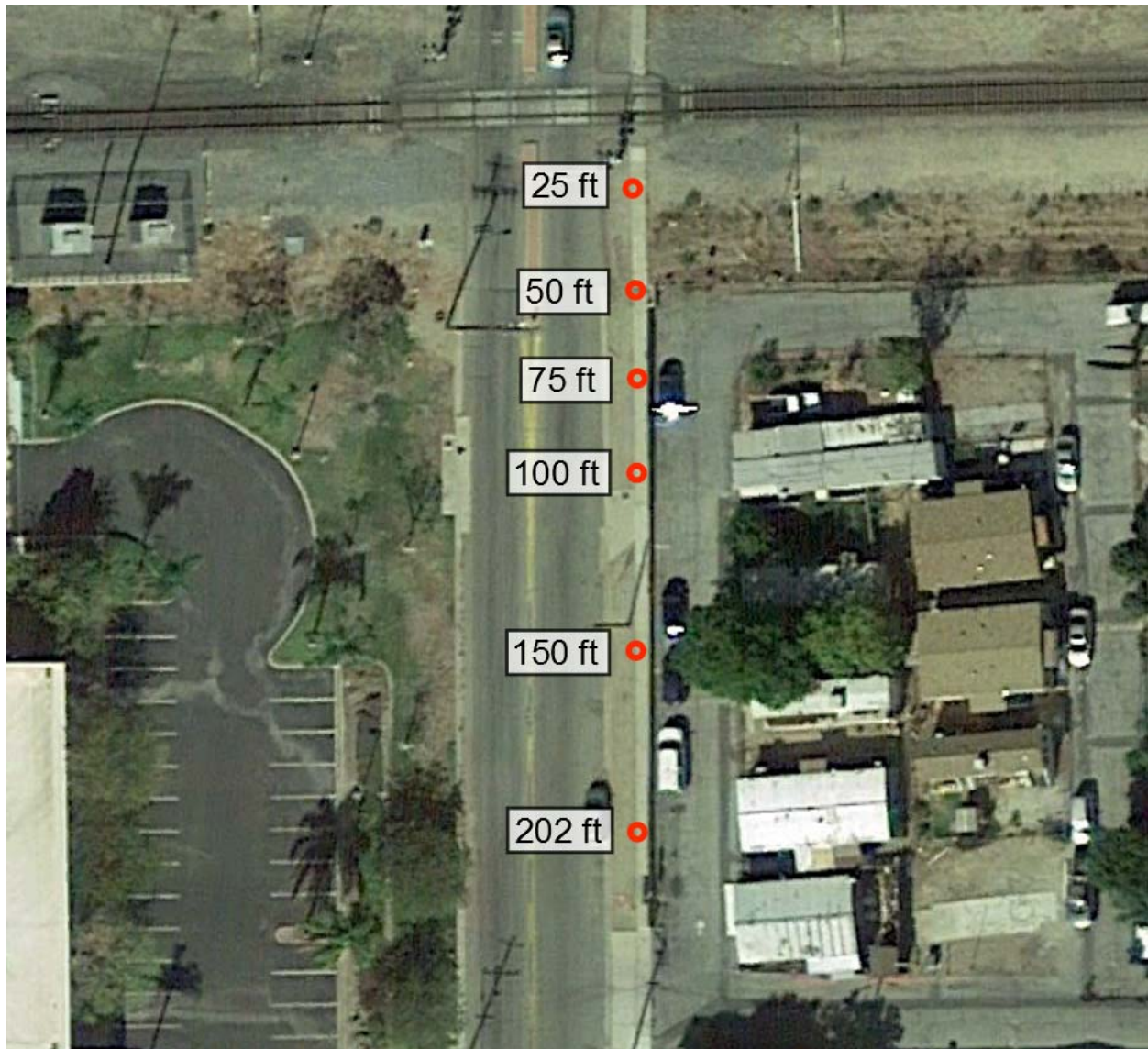




B.2 Vibration Measurements

Site V1: Lilac Avenue

This vibration measurement was performed on 6/15/17 and covered a period of 4.5 hours starting at 9:55 am. The vibration transducers were placed along the sidewalk on the east side of Lilac Avenue at distances varying from 25 feet to 200 feet from the centerline of the SBCTA track.





Site: V2 Forest River, Inc.

This vibration measurement was performed on 7/12/17 and covered a period of 4 hours starting at 11:41 am. The vibration transducers were placed along the east edge of the Forest River, Inc., property at distances varying from 57 feet to 200 feet from the centerline of the SBCTA track.



Appendix K

Traffic Impact Study

San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Prepared for

Moffatt & Nichol

April 2018



2600 Michelson Drive, Suite 500
Irvine, CA 92612

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Figure 3. PM Peak Hour Overlapping Train Scenarios

Acronyms and Abbreviations

ADT	Average Daily Traffic
AWSC	all-way stop control
BNSF	Burlington Northern Santa Fe Railway
CEQA	California Environmental Protection Act
CP	Control Point
FRA	Federal Railway Administration
HCM	Highway Capacity Manual
LAS	Los Angeles Union Station
LH	Left-Hand
MP	Milepost
mph	miles per hour
NEPA	National Environmental Policy Act
PCE	passenger car equivalent
RH	Right-Hand
SBCTA	San Bernardino County Transportation Authority
SBL	San Bernardino Line
SCRRA	Southern California Regional Rail Authority
TIA	Traffic Impact Analysis
TMP	Traffic Management Plan
TWSC	two-way stop control
UPRR	Union Pacific Railroad
vph	vehicles per hour

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Introduction

The San Bernardino County Transportation Authority (SBCTA), as the owner of the rail corridor within San Bernardino County and as the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three miles of a second main line track between Control Point (CP) Lilac Milepost (MP) 52.4 to approximately CP Rancho, near MP 55.1 on the San Bernardino Line (SBL).

The SBL, also known as the San Gabriel Subdivision, is the busiest commuter rail line in Southern California. It is a 55-mile rail corridor operated by Metrolink for the Southern California Regional Rail Authority (SCRRA) to provide commuter rail service between Los Angeles Union Station (LAS) and the San Bernardino Station. The Burlington Northern Santa Fe (BNSF) Railway and the Union Pacific Railroad (UPRR) also use this rail line as a shared corridor and have several industrial tracks to provide freight service for the region.

This Traffic Impact Analysis (TIA) was conducted to assess the potential impacts that the Proposed Project may have on the local roadway network. The analysis evaluates the associated changes to the operation of the existing at-grade crossings and adjacent intersections, assesses pedestrian safety and potentially needed improvements, and evaluates the temporary traffic disruption during project construction. The traffic analysis was prepared to satisfy the requirements of the planned California Environmental Protection Act (CEQA) [Categorical Exemption] and the National Environmental Policy Act (NEPA) [Categorical Exclusion] documents.

1.1 Study Area

Figure 1 shows the project study area. The addition of a second track will affect eight at-grade railroad crossings starting at Lilac Avenue in the City of Rialto on the west end of the Proposed Project and ending east of Rialto Avenue in the City of San Bernardino on the east end. Five of the at-grade crossings are within the City of Rialto, two are in the City of San Bernardino, and one (Eucalyptus Avenue) spans the limits of both cities with the west half of the crossing in the City of Rialto and the east half in the City of San Bernardino.

Quiet Zone-related improvements are proposed at the eight at-grade intersections, as well as at Cactus Avenue to the west (City of Rialto) and Rancho Avenue to the east (City of San Bernardino). Although the double track does not extend to Cactus and Rancho Avenues, the intersections are included in the traffic analysis to assess the proposed at-grade Quiet Zone-only intersection improvements (see Quiet Zone Feasibility Study, JMD, 2017).

1.1.1 Existing Intersections

Table 1 lists the at-grade study intersections, the jurisdiction in which they are located, the number of traffic lanes, and existing average daily traffic (ADT) at the crossing.

Table 1. Study At-Grade Rail Crossings

Map ID	FRA ID#	Crossing Street	Rail Mile Post (San Gabriel Sub)	City Jurisdiction	# Traffic of Lanes	Average Daily Traffic (ADT)
1	026139H	Cactus Avenue	52.19	Rialto	4	13,660
2	026138B	Lilac Avenue	52.44	Rialto	2	4,575
3	026137U	Willow Avenue	52.69	Rialto	2	8,510
4	026136M	Riverside Avenue	52.94	Rialto	4	21,220
5	026135F	Sycamore Avenue	53.19	Rialto	2	7,470
6	026134Y	Acacia Avenue	53.45	Rialto	2	4,175
7	026133S	Eucalyptus Avenue	53.7	Rialto/San Bernardino	2	5,265
8	026132K	Pepper Avenue	53.95	San Bernardino	4	23,120
9	026131D	Rialto Avenue	54.54	San Bernardino	2	11,070
10	026130W	Rancho Avenue	55.20	San Bernardino	2	10,010

Sixteen intersections adjacent to the at-grade crossings (potentially affected by the double track) were also evaluated and are listed in Table 2.

Table 2. Adjacent Study Intersections

Map ID	Intersection	Traffic Control
1	Lilac Ave & Rialto Ave	AWSC
2	Lilac Ave & Merrill Ave	AWSC
3	Willow Ave & Rialto Ave	Signal
4	Willow Ave & Merrill Ave	Signal
5	Riverside Ave & Rialto Ave	Signal
6	Riverside Ave & Merrill Ave	Signal
7	Sycamore Ave & Rialto Ave	TWSC
8	Sycamore Ave & Merrill Ave	Signal
9	Acacia Ave & Rialto Ave	AWSC
10	Acacia Ave & Merrill Ave	AWSC
11	Eucalyptus Ave & Rialto Ave	AWSC
12	Eucalyptus Ave & Merrill Ave	Signal
13	Pepper Ave & Rialto Ave	Signal
14	Pepper Ave & Merrill Ave	Signal
15	Meridian Ave & Rialto Ave	Signal
16	Macy St & Rialto Ave	AWSC

Notes:

AWSC= All-way stop control; TWSC= two-way stop control

1.1.2 Existing Roadways

Cactus Avenue is a four-lane north-south roadway in the study area and classified as a major arterial in the City of Rialto General Plan. Cactus Avenue carries 13,660 ADT near the railroad tracks.

Lilac Avenue is a two-lane north-south roadway in the study area and classified as a collector street in the City of Rialto General Plan. Lilac Avenue carries 4,575 ADT near the railroad tracks. Curtis Elementary

School is located south of the Proposed Project area on Lilac Avenue within a half-mile of the railroad tracks.

Willow Avenue is a two-lane north-south roadway in the study area and classified as a collector street in the City of Rialto General Plan. Willow Avenue carries 8,510 ADT near the railroad tracks.

Riverside Avenue is a four-lane north-south roadway in the study area. Riverside Avenue is classified as a major arterial between I-210 and Foothill Boulevard (to the north of the railroad tracks), a modified arterial II between Foothill Boulevard and the railroad tracks, and a major arterial between the railroad tracks and San Bernardino Avenue (to the south of the tracks). Riverside Avenue carries 21,220 ADT near the railroad tracks. Omnitrans Bus Route 22 runs on Riverside Avenue in the study area. Riverside Avenue is a designated Class III Bike Route (signed bike route, no striping) between I-210 and Valley Boulevard.

Sycamore Avenue is a two-lane north-south roadway in the study area and classified as a collector street in the City of Rialto General Plan. Sycamore Avenue carries 7,470 ADT near the railroad tracks. Boyd Elementary School is located on the northeast corner of Sycamore Avenue and Merrill Avenue, within a half-mile south of the railroad tracks.

Acacia Avenue is a two-lane north-south roadway in the study area and classified as a collector street in the City of Rialto General Plan. Acacia Avenue carries 4,175 ADT near the railroad tracks.

Eucalyptus Avenue is a two-lane north-south roadway in the study area and classified as a collector street in the City of Rialto General Plan. Omnitrans Bus Route 15 runs on Eucalyptus Avenue in the study area. Eucalyptus Avenue carries 5,265 ADT near the railroad tracks.

Pepper Avenue is a four-lane north-south roadway in the study area and classified as a major arterial and a designated truck route between the railroad tracks and I-210. Pepper Avenue carries 23,120 ADT near the railroad tracks.

Rialto Avenue is a two-lane east-west roadway in the study area and classified as a major arterial between Maple Avenue and Willow Avenue and a secondary arterial between Willow Avenue and Pepper Avenue. Rialto Avenue carries 11,070 ADT near the railroad tracks.

Rancho Avenue is a two-lane north-south roadway in the study area and classified as a local street. Rancho Avenue carries 10,010 ADT near the railroad tracks.

1.2 Project Description

The Proposed Project includes the construction of approximately three miles of a second main line track (double track). The double track project would provide the following benefits:

- safety enhancement, by allowing trains in opposing direction to operate on separate tracks;
- improvements in service reliability in train operations, reducing impact of delayed trains onto other trains, and allowing recovery when train delays occur; and
- capacity enhancement for potential future increased operations, by eliminating delays caused by train meets on the existing single track.

The Proposed Project would include the following features:

- The addition of a second track through eight at-grade crossings.
- The addition of a second passenger platform on the south side of the existing Metrolink Rialto Station, with architectural and other station facility required improvements.
- The evaluation of three pedestrian access design options to the new south side platform:
 - Option 1 – Pedestrian Overpass

- Option 2 – Pedestrian Underpass
- Option 3 – At-Grade Pedestrian Crossing
- The protection in-place of the existing UPRR Colton Cut-off Overpass near Rialto Avenue and the compliance with horizontal and vertical clearances.
- The removal of the existing No. 20 Right-Hand (RH) turnout west of Lilac Avenue, or the consideration of the construction of a crossover. The removal of the existing turnout would require ‘straight railing’ the track to properly tie into the proposed second main line track on the north side of the existing main line track.
- The construction of a new No. 20 Left-Hand (LH) turnout east of Rialto Avenue. The exact location of the proposed east end of the project would be evaluated to provide a ‘best fit’ alignment on a tangent segment between approximately MP 54.9 and MP 55.06.
- Railroad signals as well as Positive Train Control (PTC) considerations and required improvements.
- Necessary retaining walls and ballast mats. Existing culvert extensions and protection-in place as required. Civil improvements including grading, drainage, and utilities.

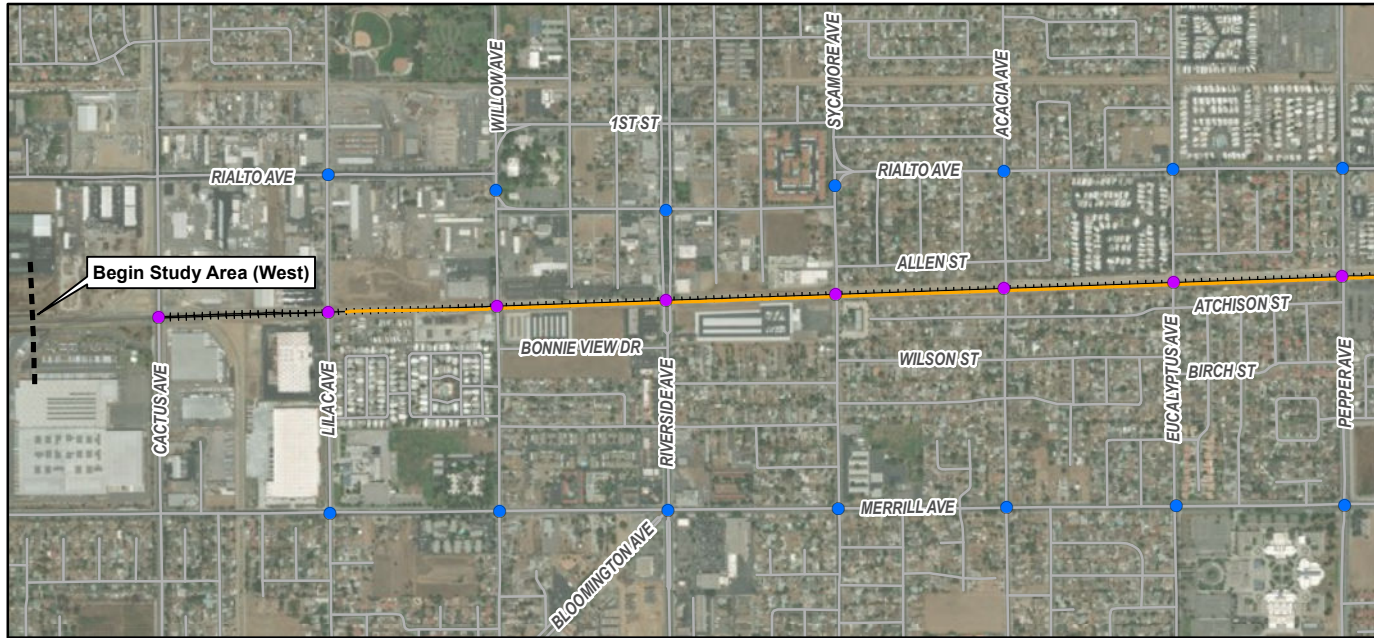
A Quiet Zone Feasibility Study was prepared to evaluate each of the eight at-grade crossings within the double track footprint and at two at-grade crossings: Cactus Avenue on the west and Rancho Avenue on the east. Based on the study, the Quiet Zone features could potentially include but not be limited to way-side horns, quad-gates, and additional access/crossing controls. The Quiet Zone would eliminate routine horn blowing by approaching trains in accordance with current quiet zone requirements established by the Federal Railroad Administration (FRA). The Quiet Zone improvements are discussed in more detail in Section 4.

Construction of the Proposed Project would occur in four consecutive stages over approximately 28 months, with construction commencing in March 2020 and being completed in June 2022. Details of the construction stages are provided in Table 3. Construction would occur five to six days per week for eight to 10 hours per day. Project construction would occur predominantly within the rail right-of-way with minimal work along the intersection roadways and minor road closures. Select weekend work would be required at each of the eight crossings (one weekend per crossing) from Friday evening to Monday morning.

Table 3. Proposed Construction Phasing

Stage	Duration	Construction Workers (per day)	Pick-up Trucks (per day)	Hauling Trucks (per day)
Stage 1	12 months	20-30	6	6
Stage 2a	6 months	10-15	6	6
Stage 2b	6 months	15-25	6	6
Stage 3	months	15-25	6	6

Frame 1a

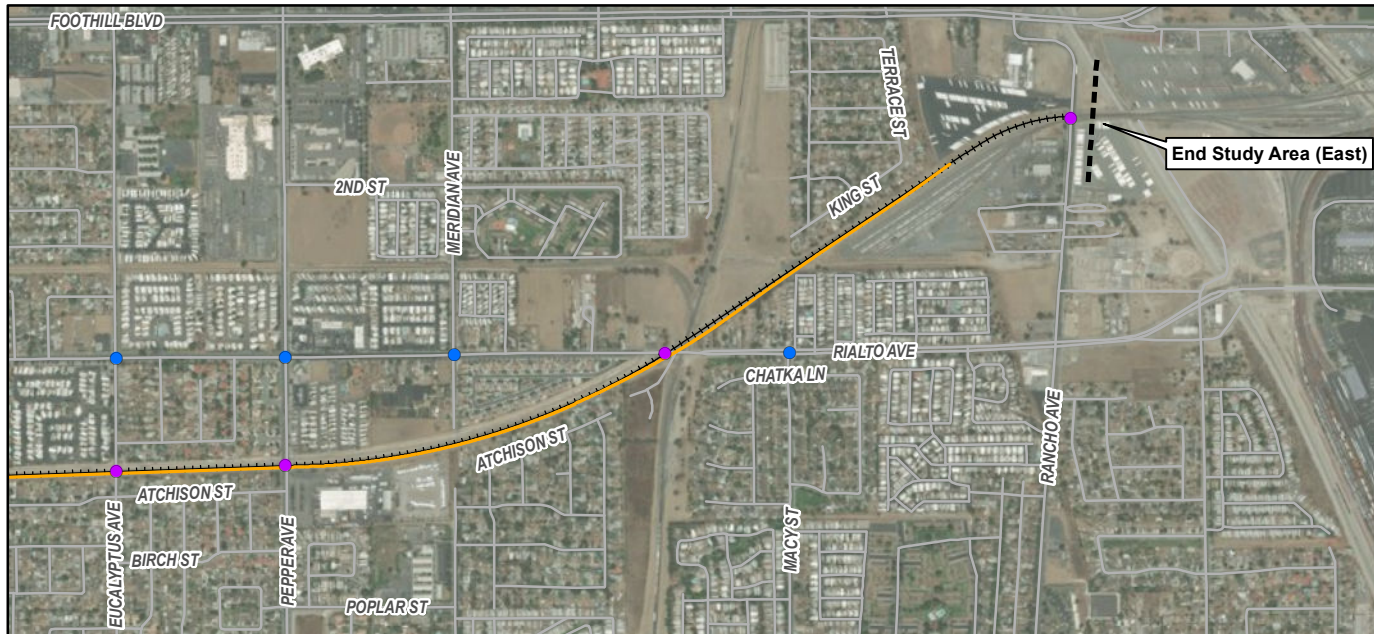


Legend

- ++++ Existing Track
- New Track
- - - Study Limits
- At-Grade Study Crossings
- Adjacent Study Intersections

Basemap Source:
1. ESRI World Imagery

Frame 1b



0 1,500 3,000
Feet

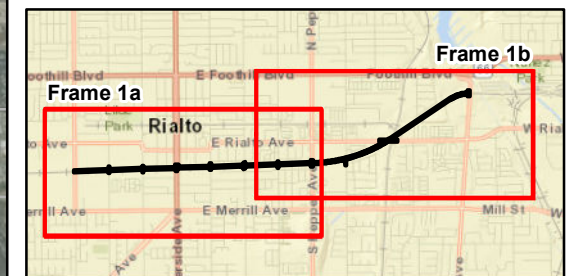


Figure 1
Project Study Area
SBCTA Lilac to Rancho
Double Track Project
City of Rialto, California
City of San Bernardino, California

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Methodology

The TIA evaluates the potential change in vehicle delay and vehicle queuing at the at-grade crossings that would be affected by the Proposed Project, as well as the potential queuing impacts to 16 upstream intersections (see Table 2) along the Proposed Project Corridor. The analysis includes the changes in operations at the crossings for the Existing (2017), Opening Day (2021), and Future (2040) conditions, with and without the Proposed Project. The methods used to analyze the vehicle delay and queuing are described in further detail below.

2.1 Data Collection

Roadway traffic counts were collected over a 24-hour period adjacent to the at-grade rail crossings. Data were collected in 15-minute intervals for both directions of travel on the roadways on Tuesday, May 16 and Wednesday, May 17, 2017 and on Tuesday, March 13, 2018 through Friday, March 16, 2018. The collected data are included in Appendix A.

The hourly volumes at each location were reviewed to identify the period with the highest hourly volume recorded during the train schedule. By using the periods with the highest hourly volume, the subsequent analysis is considered to be conservative. These hourly volumes are summarized in tabular format in Appendix A.

Pedestrian counts were also collected at the rail crossings on May 16, 2017 and on March 16, 2018 from 5:00 AM to 7:00 AM and from 5:00 PM to 7:00 PM. The pedestrian counts captured the total volume for both direction of travel across the at-grade rail crossing. The pedestrian counts are provided in Appendix B.

The ADT data for local roads near the Proposed Project were also used to assess the potential impacts during the Proposed Project construction.

2.2 Vehicle Delay

Rail activity causes delay at railroad crossings where trains pass and require auto and truck traffic to stop. The amount of delay is related to the length of the train, the speed of the train and the volume of auto and truck traffic that is blocked. The potential impact of train movements on the roadway traffic operating conditions (at the crossing) can be measured using average vehicle delay (in seconds) at each crossing. The average delay per vehicle is calculated by dividing the total vehicle delay by the number of arriving vehicles for the given time period. This is a universally accepted approach for evaluating vehicle delay at signalized intersections consistent with methodologies contained in the Highway Capacity Manual (HCM) (Transportation Research Board, National Research Center, 2010). At-grade crossings operate similarly to traditional signalized intersections where some vehicles experience no delay (during a green phase or when the gate is up) and others are stopped for a certain period of time (during a red phase or when a train is crossing).

The methodology outlined in the FHWA *Railroad-Highway Grade Crossing Handbook, Revised Second Edition, August 2007* was used to estimate the gate up/down times, delay and 95th percentile queue length. The FHWA methodology was determined to be the most appropriate method for the Proposed Project. The analysis steps included:

- Calculating the average vehicle arrival and departure rates (vehicles per minute per lane).

- Determining the effective red time (or gate down time) for the peak period, which is based on the speed and length of the train, the width of the crossing, the clearance distance, and the lead and lag times for gate operation.
- Calculating the vehicle hours of delay (function of vehicle arrival and departure rates, number of traffic lanes, and the square of the effective red time).
- Calculating the 95th percentile queue length, by direction.
- Determining the total number of vehicles arriving per period.
- Determining the total number of vehicles that are delayed.
- Calculating the percentage of time that the crossing is blocked by trains.
- Calculating the average vehicle delay (total delay divided by number of arriving vehicles per time period).
- Summarizing the vehicle delay by crossing for each scenario

The delay calculation uses the following formula:

$$\text{Delay, } D = \frac{1}{2} \times \frac{qT_g^2}{1 - \frac{q}{d}}$$

where:

- D Vehicular delay (vehicle-minutes)
 Q Vehicle arrival rate (vehicles per minute)
 T_g Effective red time (or effective gate closure time) in minutes
 d Vehicle departure rate, or saturation flow rate (vehicles per minute)

2.3 Queuing Analysis

When the vehicular traffic on the surface street must stop, there is no vehicular flow and queues begin to form on the local streets, potentially affecting upstream intersections. An estimate of those queues provides an assessment of the impact the trains will have upon local street operations. The 95th percentile queuing (for each direction) was estimated at the eight study rail crossings and the queue length estimates were used to determine the potential impacts to upstream intersections (Table 2). The evaluation of impacts was limited to an assessment of the percentage of time when queues will affect operations at the intersection. The queuing calculation uses the following formula:

Queue Length, QL = 2qr(1 + p) x 25, where $r = 35 + (L / (1.47 S))$

where:

- q Vehicle flow Rate (vehicles per lane per sec)
 r Effective red time (seconds)
 p Heavy vehicle %
 25 Effective length of passenger vehicle (feet)
 L Train length (feet)
 S Speed (miles per hour)

2.4 Assumptions

The analysis is based on a number of assumptions regarding the existing and future train operations, as well as data inputs to calculate the vehicle delay and queues:

- Opening Year is 2022 and Future Year is 2040.

- The Opening Year and Future Year peak hour volumes were developed by applying a three percent growth rate per year to the existing traffic volumes. This rate is based on the City of San Bernardino Traffic Impact Study Guidelines (City of San Bernardino, 2004) and a review of recent published traffic studies for the area.
- Vehicle delay is based on the peak hourly vehicular volume.
- There are 48 trains per day in the Existing Year and Opening Year scenarios (38 Metrolink trains and 10 freight trains). No increase in train service (Metrolink or freight) is anticipated as a result of the Proposed Project.
- There will be an additional 10 Metrolink trains for the Future Year scenario, based on the SCRAA Strategic Plan (for a total of 58 trains). Additional trains would be added during non-peak hours. The increase in Metrolink service is not a product of and will occur with or without the Proposed Project.
- The peak frequency of Metrolink trains is 20 to 30 minutes. These peak headways occur in the westbound direction from 4:00 AM until 7:00 AM (no eastbound trains during these hours), and in the eastbound direction from 5:00 PM to 8:00 PM (three westbound trains and one eastbound train during these hours). Reduced service (ranging from approximately 45 to 90 minutes) is in place during non-peak hours. The peak headways were used to determine the number of trains arriving and departing the station during peak hours and the potential for overlapping east and westbound trains.
- At the crossings, there is a system response time of five seconds, a total warning time of 30 seconds and a gate up time of 10 seconds.
- Metrolink trains operate at 79 miles per hour (mph).
- Dwell time at stations is one minute.
- Deceleration rate into the Rialto station is 8.3 feet/second², taking approximately 0.15 miles and 14 seconds to decelerate from 79 to 0 mph.
- Acceleration rate out of the Rialto station is 3.3 feet/second², taking approximately 0.38 miles and 35 seconds to accelerate from 0 to 79 mph.
- Current Metrolink trains range from four cars/one locomotive (395 feet) to eight cars/two locomotives (790 feet). A typical Metrolink train consists of five cars and one locomotive (480 feet). For the Future Year scenario, the length of the trains would still vary, but the trend would be longer trains, up to eight cars/two locomotives (790 feet). Metrolink trains with 8 cars/2 locomotives (790 feet) are used for the Existing, Opening and Future Year scenarios.
- Eastbound trains are held for passing (due to delay of other trains) at the 8,169-foot-long Rialto Siding located approximately 0.5 miles west of the Rialto station. Westbound trains are held at the San Bernardino station located 2.7 miles east of Rialto station.
- Trains are held in the Rialto Siding (in the eastbound direction) when opposing westbound trains are delayed. Hold time is five minutes plus any delay time in the eastbound train causing the meet. Trains are held at the San Bernardino station when opposing eastbound trains are delayed. Hold time is eight minutes plus any delay time in the westbound train causing the meet.
- With the double track in place, trains will not need to be held due to delay of an opposing train, because the train will be operating on a separate track.
- Hourly truck percentages along the surface streets are based on vehicle classification counts and range from three to four percent.

- Saturation flow rates for surface streets are estimated to be 1900 vehicles per hour per lane, consistent with values used in the 2010 HCM.
- There is an average of 10 freight trains per day. Freight trains are not scheduled, but generally occur at off-peak hours during the day between Metrolink trains and at night after Metrolink service ends.
- Freight levels are not anticipated to increase as a result of the Proposed Project.
- The only proposed changes to the Cactus Avenue and Rancho Avenue intersections are the proposed Quiet Zone improvements. There would be no changes to the train operations and therefore no changes in vehicle delay or queuing at the intersections.

The calculated estimated speed of the trains and the total effective red times at the crossings are presented in Table 4.

Table 4. Effective Red Time

Crossing	Mile Post	Distance from the Rialto station (mile)	Speed (mph)		System Response Time (sec)	Total Warning Time (sec)	Crossing Time (sec)		Gate Up Time (sec)	Effective Red Time (sec)	
			EB	WB			EB	WB		EB	WB
Cactus Ave	52.19	0.61	79	79	5	30	7	7	10	52	52
Lilac Ave	52.44	0.36	79	75	5	30	7	7	10	52	52
Willow Ave	52.69	0.11	58	23	5	30	9	23	10	54	68
Rialto Station	52.8	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Riverside Ave	52.94	0.14	29	74	5	30	19	7	10	64	52
Sycamore Ave	53.19	0.39	79	79	5	30	7	7	10	52	52
Acacia Ave	53.45	0.65	79	79	5	30	7	7	10	52	52
Eucalyptus Ave	53.7	0.9	79	79	5	30	7	7	10	52	52
Pepper Ave	53.95	1.15	79	79	5	30	7	7	10	52	52

2.5 Train Scenarios

The key consideration for the evaluations was whether overlapping trains can occur. An overlapping train scenario occurs when the eastbound and westbound trains pass the grade crossing at approximately the same time, so that the gate remains down while both trains pass. The graphic on the left side of Figure 2 shows simultaneous overlapping trains, where they pass the roadway at exactly the same time. Overlapping trains can also be consecutive, as shown on the right side of the graphic. In this case, the eastbound train will pass the roadway just after the westbound train departs. Overlapping trains result in changes to the effective red (or “gate down”) time, which in turn affects delay. Overlapping trains could only occur with the Proposed Project.

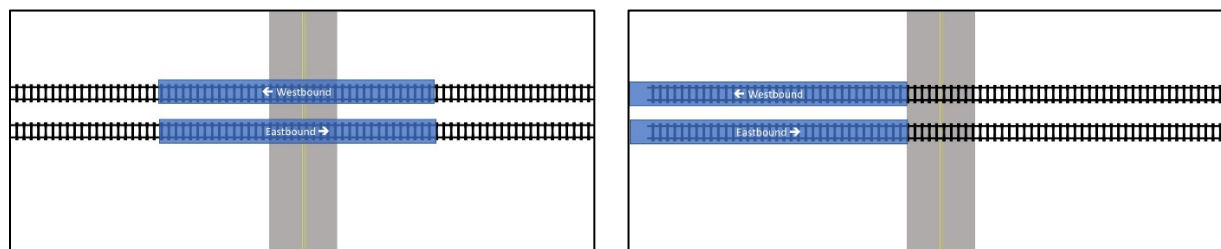


Figure 2. Overlapping Train Scenarios
Lilac to Rancho Double Track Project

The AM and PM peak hours were evaluated separately, because train arrival patterns are different in the two scenarios. Based on the train schedule and peak headways described in Section 2.4, the westbound direction is the peak direction during the AM peak hour and the eastbound direction is the peak direction during the PM peak hour.

In the AM peak hour, a total of three westbound trains cross the at-grade crossings. This calculation is based on a peak headway of 20 minutes (e.g., one train departs every 20 minutes within the hour). There are no eastbound trains during the AM peak hour. Since there are no eastbound trains during the AM peak hour, there is no overlap between eastbound and westbound trains. Therefore, the double track would have no effect during the AM peak hour and the vehicle delay and queue length will be same with and without the Proposed Project.

In the PM peak hour, there are three trains in the eastbound direction (e.g., one train departs every 20-minutes within the hour) and one train in the westbound direction. Without the Proposed Project, the four trains cross without any overlap of the eastbound and westbound trains (because there is no double track and therefore no space for an overlap to occur). Therefore, the delay for each of the four train crossings is added to estimate the total vehicle delay for the existing conditions scenario.

With the Proposed Project, there are three potential eastbound and westbound train scenarios. These scenarios were used to evaluate the maximum potential delay of overlapping trains, considering different combinations of arrival times for the eastbound and westbound trains. For the evaluation of the Proposed Project operations, the impacts are estimated based on calculations of the effects of the gates on the vehicular traffic, throughout the peak hour, averaged for all the scenarios.

Figure 3 illustrates the scenarios. Each scenario box represents one hour, and the blue and gray boxes represent the period of time when the gates are down due to a passing train. Whenever the boxes overlap (as in Scenario 2) or nearly overlap (Scenario 3), the gates will remain down for both the eastbound and westbound trains. Scenarios 2 and 3 are only possible with the Proposed Project. Details of the scenarios are provided in the bullets below.

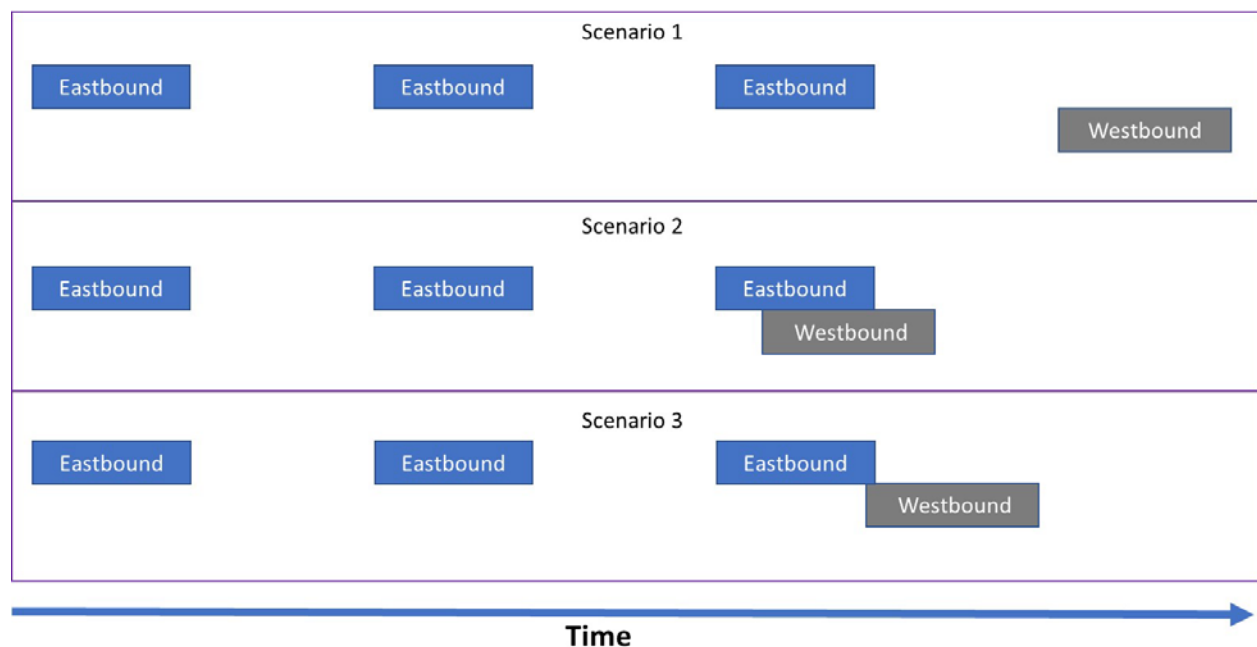


Figure 3. PM Peak Hour Overlapping Train Scenarios
Lilac to Rancho Double Track Project

- Scenario 1: This scenario is the same as existing conditions. The three eastbound trains and one westbound train would pass the at-grade crossings within the Proposed Project limits independently, with no overlap. With this scenario, it is assumed that the queues would dissipate between the train crossings.
- Scenario 2: Two trains in the eastbound direction would pass the at-grade crossing with no overlap. Then the eastbound and westbound trains would pass the at-grade crossings at approximately the same time, so the effective red time periods overlap. The duration of effective red time varies, depending on the exact timing of the two trains. For example, the effective red time for Cactus Avenue is 52 seconds for a non-overlap crossing. If both the eastbound and westbound trains cross the intersection at the same time, the effective red time will still be 52 seconds. If the second train comes one second later, then the total effective red time for an overlap crossing will be 53 seconds. The maximum overlap effective red time is twice the single train time (e.g., a maximum of 104 seconds at Cactus Avenue).
- Scenario 3: The westbound train will arrive just after the eastbound train, but before the dissipation of the queue. In this case, the vehicle delay for the two trains will be slightly greater than the delay for two independent non-overlapping trains (Scenario 1).

There are an infinite number of combinations of Scenarios 2 and 3, so the analysis focused on overlaps at one-second intervals. For example, at Cactus Avenue, with an effective red time of 52 seconds for non-overlap crossings, the total effective red time for overlap crossings can vary between 52 and 104 seconds.

Traffic Operations Analysis

The results of the traffic operations analysis for the Existing, Opening, and Future Year conditions are summarized in this section. The impacts on the eight at-grade crossings were evaluated using the methods outlined in Section 2 and include vehicle delay and 95th percentile queuing at the crossings.

The scenarios described in Section 2.5 were evaluated using the delay and queue calculations in Sections 2.2 and 2.3. Delay and queuing were used to evaluate traffic operations, because these performance measures have a direct effect on users of the transportation system. These measures also provide a quantitative means of comparing the potential impacts of the Proposed Project.

Detailed vehicle delay queuing calculations are provided in Appendix C.

3.1 Existing Year (2017) Conditions

The existing conditions analysis is provided below.

3.1.1 Vehicle Delay

Table 5 presents the existing conditions hourly volume, average delay and the average delay experienced by the stopped vehicles in the AM and PM peak hours. Since the speed of the trains is lowest and the effective red times are highest at the Riverside Avenue crossing, the maximum vehicle delay (37.4 seconds in the morning peak hour and 38.3 seconds in the afternoon peak hour) is experienced at this location.

Table 5. Vehicle Delay - Existing (2017) Conditions

Crossing	AM			PM		
	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)
Lilac Avenue	422	1.3	29.2	360	1.7	28.7
Willow Avenue	650	1.5	32.7	629	2.3	35.0
Riverside Avenue	1147	2.0	37.4	1528	2.6	38.3
Sycamore Avenue	472	1.3	29.6	581	1.8	30.6
Acacia Avenue	386	1.3	28.8	363	1.7	28.6
Eucalyptus Avenue	492	1.3	29.8	423	1.7	29.2
Pepper Avenue	1764	1.5	33.8	1535	1.9	32.5
Rialto Avenue	787	1.4	32.7	860	1.9	33.5

3.1.2 Queuing Analysis

Table 6 presents the existing conditions 95th percentile queue length. The majority of the eight crossing locations involve minor roadways where volumes and queue lengths are relatively small. There is sufficient storage for queues to the nearest upstream signalized intersection (both northbound and southbound) at all locations during existing conditions.

Table 6. Queuing Analysis - Existing (2017) Conditions

Crossing	95th Percentile Queue (feet)					
	Northbound			Southbound		
	Storage*	AM	PM	Storage*	AM	PM
Lilac Avenue	1500	183	152	1000	130	117
Willow Avenue	1525	254	303	685	256	318
Riverside Avenue	1530	237	375	640	284	319
Sycamore Avenue	1600	168	226	3500	182	205
Acacia Avenue	1650	126	137	850	160	132
Eucalyptus Avenue	1680	160	177	820	205	136
Pepper Avenue	1700	265	322	780	389	247
Rialto Avenue	3000	305	299	1520	279	339

* Distance to upstream signalized intersection

3.2 Opening Year (2022) Conditions

The double tracking will provide improved efficiency for rail operations. Effects on the vehicular operations will be relatively minor, but changes in train arrival patterns will affect vehicle queuing and delay. The Opening Year analysis is provided below.

3.2.1 Vehicle Delay

Tables 7 and 8 present the vehicle delay for the Opening Year conditions with and without the Proposed Project. Since the eastbound and westbound trains are not expected to overlap in the AM peak hour, there will be no change in delay. A small increase in average delay (less than one percent) is expected with the Proposed Project in the PM peak period, resulting in a negligible impact on vehicle delay.

Table 7. Vehicle Delay – Opening Year (2022) Without Project

Crossing	AM			PM		
	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)
Lilac Avenue	489	1.3	29.8	417	1.7	29.0
Willow Avenue	754	1.5	33.8	729	2.3	36.2
Riverside Avenue	1330	2.0	38.5	1772	2.7	39.9
Sycamore Avenue	547	1.3	30.3	674	1.8	31.5
Acacia Avenue	447	1.3	29.4	420	1.7	29.1
Eucalyptus Avenue	570	1.3	30.5	490	1.7	29.7
Pepper Avenue	2045	1.6	35.6	1779	2.0	33.9
Rialto Avenue	912	1.5	34.1	997	2.0	35.1

Table 8. Vehicle Delay - Opening Year (2022) With Project

Crossing	AM			PM		
	Volume (vph)	Average Delay- All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)	Volume (vph)	Average Delay- All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)
Lilac Avenue	489	1.3	29.8	417	1.7	29.5
Willow Avenue	754	1.5	33.8	729	2.3	36.6
Riverside Avenue	1330	2.0	38.5	1772	2.7	40.2
Sycamore Avenue	547	1.3	30.3	674	1.8	31.8
Acacia Avenue	447	1.3	29.4	420	1.7	29.4
Eucalyptus Avenue	570	1.3	30.5	490	1.7	30.0
Pepper Avenue	2045	1.6	35.6	1779	2.0	34.2
Rialto Avenue	912	1.5	34.1	997	2.0	35.5

3.2.2 Queuing Analysis

Table 9 presents the 95th percentile queue length for the Opening Year conditions, with and without the Proposed Project. Since the eastbound and westbound trains are not expected to overlap in the AM peak hour, there will be no change in the 95th percentile queue length. A small increase in average queue length (less than three percent) is expected with the Proposed Project in the PM peak period. There would still be sufficient storage for queues to the nearest upstream signalized intersection (both northbound and southbound) at all locations. There would be no impact on the upstream intersections.

Table 9. Queuing Analysis - Opening Year (2022) Conditions

Crossing	95th Percentile Queue (feet)											
	Without Project						With Project					
	Northbound			Southbound			Northbound			Southbound		
	Storage	AM	PM	Storage	AM	PM	Storage	AM	PM	Storage	AM	PM
Lilac Avenue	1500	212	175	1000	150	136	1500	212	180	1000	150	139
Willow Avenue	1525	294	352	685	296	368	1525	294	358	685	296	375
Riverside Avenue	1530	275	435	640	329	370	1530	275	442	640	329	375
Sycamore Avenue	1600	194	262	3500	211	237	1600	194	268	3500	211	242
Acacia Avenue	1650	146	159	850	186	153	1650	146	162	850	186	156
Eucalyptus Avenue	1680	186	205	820	237	158	1680	186	210	820	237	161
Pepper Avenue	1700	307	373	780	451	286	1700	307	381	780	451	292
Rialto Avenue	3000	353	346	1520	323	393	3000	353	354	1520	323	401

* Distance to upstream signalized intersection

3.3 Future Year (2040) Conditions

The Future Year analysis is provided below. The analysis assumes 10 additional Metrolink trains would be in service based on the SCRAA Strategic Plan for the future train operations. These additional trains are expected with or with the Proposed Project.

3.3.1 Vehicle Delay

Tables 10 and 11 present the vehicle delay for the Future Year conditions with and without the Proposed Project. Since there is no overlap between eastbound and westbound trains in the AM peak hour, there will be no change in delay with the Proposed Project. A small increase in average delay (less than one percent) is expected with the Proposed Project in the PM peak period.

Table 10. Vehicle Delay - Future Year (2040) Without Project

Crossing	AM			PM		
	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)
Lilac Avenue	833	1.5	33.3	711	1.9	32.0
Willow Avenue	1283	1.9	41.0	1241	2.8	43.4
Riverside Avenue	2264	2.4	45.3	3015	3.4	50.8
Sycamore Avenue	932	1.5	34.3	1147	2.1	37.1
Acacia Avenue	762	1.4	32.4	716	1.8	31.9
Eucalyptus Avenue	971	1.5	34.9	835	1.9	33.2
Pepper Avenue	3481	2.2	49.1	3029	2.5	43.4
Rialto Avenue	1553	1.9	43.9	1697	2.7	46.9

Table 11. Vehicle Delay - Future Year (2040) With Project

Crossing	AM			PM		
	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)	Volume (vph)	Average Delay - All Vehicles (sec/veh)	Average Delay - Stopped Vehicles (sec)
Lilac Avenue	833	1.5	33.3	711	1.9	32.3
Willow Avenue	1283	1.9	41.0	1241	2.8	43.9
Riverside Avenue	2264	2.4	45.3	3015	3.4	51.2
Sycamore Avenue	932	1.5	34.3	1147	2.1	37.5
Acacia Avenue	762	1.4	32.4	716	1.8	32.2
Eucalyptus Avenue	971	1.5	34.9	835	1.9	33.6
Pepper Avenue	3481	2.2	49.1	3029	2.5	43.8
Rialto Avenue	1553	1.9	43.9	1697	2.7	47.4

3.3.2 Queuing Analysis

Table 12 presents the 95th percentile queue length for the Future Year conditions, with and without the Proposed Project. A small increase in average queue length (less than three percent) is expected with the Proposed Project in the PM peak period. There would still be sufficient storage for queues to the nearest upstream signalized intersection (both northbound and southbound) at all locations.

Table 12. Queuing Analysis - Future Year (2040) Conditions

Crossing	95th Percentile Queue (feet)											
	Without Project						With Project					
	Northbound			Southbound			Northbound			Southbound		
	Storage	AM	PM	Storage	AM	PM	Storage	AM	PM	Storage	AM	PM
Lilac Avenue	1500	361	299	1000	256	231	1500	361	306	1000	256	236
Willow Avenue	1525	501	598	685	504	627	1525	501	609	685	504	638
Riverside Avenue	1530	468	741	640	561	629	1530	468	752	640	561	639
Sycamore Avenue	1600	331	446	3500	360	404	1600	331	456	3500	360	413
Acacia Avenue	1650	249	271	850	316	260	1650	249	276	850	316	266
Eucalyptus Avenue	1680	316	350	820	404	269	1680	316	358	820	404	275
Pepper Avenue	1700	522	636	780	768	487	1700	522	650	780	768	498
Rialto Avenue	3000	601	589	1520	550	668	3000	601	602	1520	550	683

* Distance to upstream signalized intersection

3.4 Construction Analysis

The Proposed Project trip generation during peak construction is presented in Table 13. The peak construction period, considering materials transportation, operation of heavy equipment and the construction workforce, would occur during Stage 1 for approximately 12 months. During the peak construction period, the Proposed Project would generate 75 daily trips and 30 trips during each peak hour. This assumes up to 30 workers per day, six pickup trucks, and six heavy haul vehicles. Heavy haul vehicles were converted to passenger car equivalent units (PCEs) at a ratio of 1.5 passenger cars for each truck, consistent with the 2010 HCM guidelines. It was assumed that the truck trips would occur outside of peak hours.

Table 13. Construction Trip Generation - Project Daily and Peak Hour Trips

Trip Type	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Pick-up Trucks	6	0	0	0	0	0	0
Delivery/Haul Trucks	6	0	0	0	0	0	0
Delivery/Haul Trucks PCE (1.5)	9	0	0	0	0	0	0
Workers	60	30	0	30	0	0	0
Total Construction Traffic in PCE	75	30	0	30	0	30	30

The construction-related activities are not expected to use rail services, so there will be no impact on the regional rail network. A bus bridge will be used to maintain Saturday and Sunday Metrolink service.

Workers will park in one of three potential locations: 1) within the existing Rialto Station parking lot (subject to acceptance by SBCTA if the parking lot is not at full utilization); 2) on a Temporary Construction Easement on vacant property located either directly south of the existing Rialto Station area (just south of the railroad right-of-way) or in the vacant lot in the South East quadrant of the Riverside Avenue grade crossing (this temporary construction easement would be a potential Contractor laydown/construction trailer area). a. The land use in the area is residential and commercial, with a number of properties currently vacant.

For the station pedestrian overpass, temporary lane restrictions within the existing Rialto Station parking lot will be required for approximately six months. No public road/lane closures are required for station area construction.

Construction of the double track and related grade crossing construction will require temporary weekend road closures at the eight grade crossings (one weekend for each crossing). Lane restrictions (one lane in each direction) will also be required for two weeks at each grade crossing location.

Traffic Management Plan

Construction of the Proposed Project would result in a temporary increase in local traffic as a result of construction-related workforce traffic and material deliveries, and construction activities occurring within the public right-of-way. The Proposed Project-added trips represent a short-term minimal increase in traffic compared to the existing roadway volumes (1.7 percent or less than the daily traffic).

Construction of the Proposed Project would also require temporary lane closures, traffic detours, construction staging, and the use of oversized equipment. Proposed Project construction would be coordinated with all affected local agencies and include implementation of a Traffic Management Plan (TMP). The TMP would include recommendations for appropriately managing traffic during the construction period by implementing measures such as incident management, construction schedule restrictions, staging, and traffic control, and public outreach. Such measures would promote traffic movement during construction to minimize potential impacts to local traffic. The TMP would be prepared in accordance with the *California Manual of Uniform Traffic Control Devices* Revision 2 (Caltrans, 2014) and all applicable requirements of the affected local agencies.

Public transit operates in the vicinity of the Proposed Project area and Proposed Project construction could temporarily disrupt transit service. Bicycle facilities also exist in the area of construction. The TMP would include procedures for notifying and coordinating with Omnitrans, in advance of construction activities. The TMP would establish methods for minimizing construction effects on transit service and bike facilities, by maintaining access to such facilities along the Proposed Project construction area or providing an alternative route if one is needed.

Emergency access routes will be maintained to and around the Proposed Project construction area(s) for the duration of Proposed Project construction. Construction vehicles and equipment are expected to be staged or parked within Proposed Project area right-of-way, and approved temporary construction work and staging areas. Any road closures will be temporary and short-term, and these closures will be coordinated with the local jurisdictions to reduce the effects of potential temporary and short-term emergency access. Emergency responders will be notified prior to construction and ensuring access for emergency vehicles and all applicable local, state, and Federal traffic control measures will be followed to ensure the safety of the local as well as construction traffic.

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Pedestrian Safety Assessment

Table 14 summarizes the pedestrian-related features and activity at the at-grade crossings. Pedestrian counts were collected along the at-grade crossings from 5:00 AM to 7:00 AM and from 5:00 PM to 7:00 PM to assess the pedestrian activity across the tracks. Schools and emergency services (fire and police) were also identified within a half-mile radius of the tracks to determine if the tracks are potentially along a school and/or emergency route.

Table 14. Pedestrian Activity/Features at At-Grade Crossings - Existing Conditions

Crossing Street	Pedestrian Counts		Sidewalk?	Other Features	School Route?	Transit Route?	Emergency Route?
	AM	PM					
Cactus Avenue	0	1	Partial	4 Standard No. 9 Crossing gates; Double track; 100' median islands	No	No	No
Lilac Avenue	3	4	Partial	2 Standard No. 9 Crossing gates; 50' median islands	Yes Curtis Elementary, 451 S. Lilac Ave.	No	No
Willow Avenue	3	5	Yes	2 Standard No. 9 Crossing gates; 50' median islands	No	No	Yes
Riverside Avenue	11	23	Yes	4 Standard No. 9 Crossing gates; 100' median islands, crosswalk	No	Yes	No
Sycamore Avenue	3	10	Yes	2 Standard No. 9 Crossing gates; 50' median islands	Yes; Boyd Elementary, 310 E. Merrill Ave.	No	No
Acacia Avenue	9	11	Yes	2 Standard No. 9 Crossing gates; 50' median islands	No	No	No
Eucalyptus Avenue	3	18	Yes	2 Standard No. 9 Crossing gates; 50' median islands	No	Yes	No
Pepper Avenue	10	13	Yes	2 Standard No. 9 Crossing gates (median); 2 Standard No. 9a Crossing gates; 2 cantilever flasher; 15' median islands	No	No	No
Rialto Avenue	6	12	No	2 Standard No. 9 Crossing gates; skewed crossing	No	No	No
Rancho Avenue	1	2	Partial	2 Standard No. 9 Crossing gates; Double track; 100' median islands	No	No	No

Riverside Avenue has the highest pedestrian traffic, but volumes are still relatively low. The Rialto Metrolink station is located on Riverside Avenue and this street is also used as part of a transit route. An east-west crosswalk is provided north of the tracks. Eucalyptus Avenue is also used as part of a transit route and has a moderate number of pedestrians during the afternoon peak hour. The Lilac Avenue and Sycamore Avenue crossings are located within a half-mile of a school, however, the pedestrian traffic at

these crossings is relatively low. Field observations suggest limited use of these crossings for access to and from the nearby schools.

The Proposed Project would not increase the number of trains using the corridor, nor the number of train crossings and there would be no increase in safety risk to pedestrians. Moreover, with the double tracking of this corridor, new safety features would be required and upgrades to the crossing protections would be incorporated at each of the at-grade crossings. The Final Quiet Zone Feasibility Study (July 2017) also recommends installing, at a minimum, the improvements listed in Table 15, which would also increase pedestrian safety, including potential and comparable crossing protection upgrades at both Cactus Avenue and Rancho Avenue. Final selection and implementation of the Table 3-6 safety improvements will be conducted and incorporated during final design of the Proposed Project.

Table 15. Recommended Pedestrian-Related Safety Improvements

Crossing Street	Recommended Improvements
Cactus Avenue	Install pedestrian treatments along east crossing including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to standard LED.
Lilac Avenue	Remove the existing raised median islands and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Willow Avenue	Remove the existing raised median islands and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Riverside Avenue	Remove the existing raised median islands and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks. Relocate adjacent pedestrian roadway crossing further north away from railroad crossing.
Sycamore Avenue	Remove the existing raised median islands and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Acacia Avenue	Remove the existing raised median island and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, new sidewalk and fencing at railroad right of way including gate for Metrolink access. Install curb to prohibit movements exiting the alley and entering the crossing. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Eucalyptus Avenue	Remove the existing raised median island and install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, new sidewalk and fencing at railroad right of way including gate for Metrolink access. Installing exit gate to prohibit movements through crossing from adjacent alley. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Pepper Avenue	Install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, new sidewalk and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Rialto Avenue	Install two 100' minimum raised median islands. Widen roadway to 4 lanes to match east and west approaches. Construct driveway for adjacent property away from crossing to discourage

	vehicles turning towards the crossing. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, new sidewalk and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.
Rancho Avenue	Install two 100' minimum raised median islands. Pedestrian treatments including pedestrian crossing gates and swing gates with hand railings, tactile warning strips, new sidewalk and fencing at railroad right of way including gate for Metrolink access. Upgrade all flashers to LED and install new concrete crossing panels for both tracks.

Summary

The Proposed Project and the double tracking of the corridor would allow the crossing of trains in opposing directions at the same time. While most of the crossings would still be single train events, there will be occasional eastbound and westbound overlaps with the Proposed Project. At times, these overlapping trains will result in lower or higher vehicle delay and queuing. A summary of the potential changes in vehicle delay and queuing with the Proposed Project is presented in Table 16. The result of the analysis is that the minimal resulting increases in delay and queuing would not introduce project-related impacts to access or movement in and around the project area.

Table 16. Summary of Potential Project Effects - With Project Conditions

Scenario	AM Peak Hour			PM Peak Hour		
	Vehicle Delay	Queue Length	Upstream Signals	Vehicle Delay	Queue Length	Upstream Signals
Opening Year	No change	No change	No effect	< 1% increase	< 3% increase	No effect
Future Year	No change	No change	No effect	< 1% increase	< 3% increase	No effect

The traffic analysis shows that a relatively small change in operations is expected in the PM peak period. The average vehicle delay is expected to increase less than one percent and the queue length is expected to increase less than three percent. There would be no significant impact as these increases results in no noticeable change in vehicle operations. Furthermore, there would be no impact to the upstream intersections. No change is expected in the AM peak period for either vehicle delay or the queue length. Pedestrian safety would also be increased through a series of improvements, at all of the at-grade crossings.

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References

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- Metrolink. 2017. Timetable. All Lines. April 3. Online:
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Appendix A

Traffic Volume Data

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: LILAC AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	4	12	9	2	27
1:00	5	2	3	3	13
2:00	3	1	4	3	11
3:00	2	3	2	3	10
4:00	2	3	2	2	9
5:00	3	2	6	2	13
6:00	4	6	7	5	22
7:00	15	20	20	23	78
8:00	29	29	60	85	203
9:00	67	27	25	20	139
10:00	23	25	24	27	99
11:00	27	24	25	31	107
12:00	41	24	30	27	122
13:00	26	23	29	54	132
14:00	24	34	35	48	141
15:00	41	72	44	40	197
16:00	44	64	44	51	203
17:00	47	55	37	54	193
18:00	47	51	53	52	203
19:00	42	38	39	30	149
20:00	32	38	22	26	118
21:00	19	16	13	17	65
22:00	12	17	18	18	65
23:00	9	12	7	5	33
				TOTAL	2352
AM PEAK HOUR		0815-0915			
VOLUME		241			
PM PEAK HOUR		1615-1715			
VOLUME		206			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	10	6	6	4	26
1:00	4	1	0	2	7
2:00	2	3	2	3	10
3:00	2	1	1	1	5
4:00	2	3	5	7	17
5:00	9	10	10	16	45
6:00	9	17	20	17	63
7:00	24	27	35	37	123
8:00	43	32	43	44	162
9:00	47	39	32	32	150
10:00	31	20	22	21	94
11:00	26	31	28	25	110
12:00	28	23	34	42	127
13:00	23	23	29	32	107
14:00	34	31	37	40	142
15:00	30	31	31	32	124
16:00	40	45	46	36	167
17:00	22	41	50	38	151
18:00	42	37	49	28	156
19:00	13	34	42	28	117
20:00	27	26	24	31	108
21:00	25	16	22	14	77
22:00	12	22	15	11	60
23:00	12	8	5	6	31
				TOTAL	2179
AM PEAK HOUR		0830-0930			
VOLUME		173			
PM PEAK HOUR		1715-1815			
VOLUME		171			

TOTAL BI-DIRECTIONAL VOLUME

4531

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: LILAC AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	6	14	3	3	26
1:00	7	1	4	2	14
2:00	6	2	1	1	10
3:00	1	5	1	3	10
4:00	4	2	0	2	8
5:00	2	2	5	7	16
6:00	2	8	13	8	31
7:00	8	13	22	17	60
8:00	29	37	56	92	214
9:00	66	22	36	18	142
10:00	20	36	17	25	98
11:00	23	20	32	28	103
12:00	25	19	19	28	91
13:00	30	20	35	54	139
14:00	36	49	32	45	162
15:00	62	62	66	37	227
16:00	40	37	47	52	176
17:00	45	36	46	45	172
18:00	48	55	50	44	197
19:00	52	35	38	29	154
20:00	39	32	11	21	103
21:00	24	31	19	20	94
22:00	13	16	10	21	60
23:00	13	14	14	12	53
				TOTAL	2360
AM PEAK HOUR		0815-0915			
VOLUME		251			
PM PEAK HOUR		1445-1545			
VOLUME		235			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	5	6	2	6	19
1:00	3	2	1	3	9
2:00	3	4	1	1	9
3:00	0	2	1	1	4
4:00	4	4	6	8	22
5:00	12	9	12	24	57
6:00	6	17	23	18	64
7:00	20	28	42	38	128
8:00	36	49	54	39	178
9:00	39	32	29	28	128
10:00	29	22	33	22	106
11:00	20	21	33	19	93
12:00	22	32	32	30	116
13:00	28	34	35	32	129
14:00	25	49	42	40	156
15:00	32	35	34	43	144
16:00	48	39	50	38	175
17:00	31	38	40	38	147
18:00	34	41	34	43	152
19:00	30	29	20	30	109
20:00	31	22	13	24	90
21:00	28	25	20	14	87
22:00	18	13	18	12	61
23:00	11	8	5	8	32
				TOTAL	2215
AM PEAK HOUR		0815-0915			
VOLUME		181			
PM PEAK HOUR		1545-1645			
VOLUME		180			

TOTAL BI-DIRECTIONAL VOLUME

4575

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: WILLOW AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	11	5	1	5	22
1:00	3	4	5	7	19
2:00	2	5	3	2	12
3:00	0	4	4	4	12
4:00	5	7	9	15	36
5:00	10	15	36	27	88
6:00	25	25	42	50	142
7:00	54	54	72	118	298
8:00	76	44	60	44	224
9:00	38	56	54	64	212
10:00	47	53	72	63	235
11:00	56	47	46	63	212
12:00	50	53	56	78	237
13:00	78	72	64	81	295
14:00	98	92	90	82	362
15:00	96	76	94	77	343
16:00	74	78	64	99	315
17:00	92	78	74	75	319
18:00	72	76	74	60	282
19:00	42	72	38	37	189
20:00	48	44	40	30	162
21:00	24	30	44	25	123
22:00	16	16	14	23	69
23:00	7	8	6	10	31
				TOTAL	4239
AM PEAK HOUR		0715-0815			
VOLUME		320			
PM PEAK HOUR		1400-1500			
VOLUME		362			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	4	7	5	5	21
1:00	3	3	10	2	18
2:00	3	5	7	5	20
3:00	6	7	4	9	26
4:00	14	12	15	22	63
5:00	18	26	25	22	91
6:00	28	29	31	42	130
7:00	43	69	92	107	311
8:00	67	62	44	53	226
9:00	46	53	38	57	194
10:00	50	50	50	57	207
11:00	46	63	43	67	219
12:00	66	58	44	62	230
13:00	55	72	72	63	262
14:00	93	89	70	70	322
15:00	80	116	68	76	340
16:00	82	86	88	55	311
17:00	62	68	78	67	275
18:00	90	52	76	60	278
19:00	42	69	54	31	196
20:00	38	36	32	33	139
21:00	43	32	22	24	121
22:00	19	9	22	7	57
23:00	14	6	6	4	30
				TOTAL	4087
AM PEAK HOUR		0715-0815			
VOLUME		335			
PM PEAK HOUR		1515-1615			
VOLUME		342			

TOTAL BI-DIRECTIONAL VOLUME

8326

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: WILLOW AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	12	1	4	18
1:00	3	4	2	5	14
2:00	3	2	2	0	7
3:00	3	2	5	6	16
4:00	6	5	13	14	38
5:00	11	9	29	28	77
6:00	22	36	35	59	152
7:00	53	62	84	100	299
8:00	82	49	52	38	221
9:00	53	49	58	48	208
10:00	48	58	70	56	232
11:00	56	54	63	64	237
12:00	60	60	54	87	261
13:00	73	87	99	86	345
14:00	93	92	89	80	354
15:00	73	72	93	78	316
16:00	78	76	88	82	324
17:00	96	95	85	74	350
18:00	82	82	69	41	274
19:00	34	54	43	32	163
20:00	47	32	31	41	151
21:00	25	40	38	25	128
22:00	18	22	20	12	72
23:00	13	17	8	12	50
				TOTAL	4307
AM PEAK HOUR		0715-0815			
VOLUME		328			
PM PEAK HOUR		1330-1430			
VOLUME		370			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	5	6	2	4	17
1:00	1	3	6	2	12
2:00	3	1	5	3	12
3:00	8	6	5	6	25
4:00	6	16	13	16	51
5:00	22	31	24	14	91
6:00	30	38	32	52	152
7:00	42	66	90	92	290
8:00	67	52	62	26	207
9:00	55	41	48	62	206
10:00	46	48	54	49	197
11:00	46	70	62	57	235
12:00	68	60	40	78	246
13:00	80	68	80	77	305
14:00	111	80	91	81	363
15:00	70	62	82	66	280
16:00	79	79	85	78	321
17:00	94	80	76	60	310
18:00	100	64	84	64	312
19:00	51	62	32	41	186
20:00	47	32	29	36	144
21:00	35	34	24	21	114
22:00	26	16	21	16	79
23:00	19	10	10	9	48
				TOTAL	4203
AM PEAK HOUR		0715-0815			
VOLUME		315			
PM PEAK HOUR		1400-1500			
VOLUME		363			

TOTAL BI-DIRECTIONAL VOLUME

8510

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: RIVERSIDE AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	34	24	26	20	104
1:00	21	21	21	18	81
2:00	21	22	17	20	80
3:00	17	14	18	15	64
4:00	23	21	26	32	102
5:00	36	35	52	56	179
6:00	46	46	61	100	253
7:00	105	96	120	156	477
8:00	120	126	105	114	465
9:00	148	118	152	148	566
10:00	135	158	108	156	557
11:00	157	146	156	135	594
12:00	144	160	124	172	600
13:00	152	172	153	192	669
14:00	190	162	200	179	731
15:00	196	146	235	190	767
16:00	205	170	179	204	758
17:00	208	227	205	199	839
18:00	208	186	172	148	714
19:00	115	168	125	130	538
20:00	138	117	100	95	450
21:00	100	106	96	86	388
22:00	70	52	54	70	246
23:00	65	54	44	48	211
				TOTAL	10433
AM PEAK HOUR		1045-1145			
VOLUME		615			
PM PEAK HOUR		1645-1745			
VOLUME		844			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	24	24	16	16	80
1:00	20	14	12	20	66
2:00	18	13	14	24	69
3:00	23	28	32	34	117
4:00	38	56	66	60	220
5:00	53	92	88	89	322
6:00	68	110	110	146	434
7:00	123	176	160	162	621
8:00	135	150	122	142	549
9:00	122	130	126	121	499
10:00	124	134	117	164	539
11:00	150	176	160	170	656
12:00	166	149	149	184	648
13:00	147	144	183	164	638
14:00	182	186	172	177	717
15:00	172	114	217	182	685
16:00	190	172	188	188	738
17:00	200	182	180	136	698
18:00	186	164	156	138	644
19:00	116	168	142	130	556
20:00	110	105	98	82	395
21:00	105	95	72	66	338
22:00	58	49	54	46	207
23:00	53	44	34	28	159
				TOTAL	10595
AM PEAK HOUR		1100-1200			
VOLUME		656			
PM PEAK HOUR		1530-1630			
VOLUME		761			

TOTAL BI-DIRECTIONAL VOLUME

21028

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: RIVERSIDE AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	31	28	26	34	119
1:00	30	26	26	22	104
2:00	24	19	11	19	73
3:00	15	17	12	24	68
4:00	28	29	36	23	116
5:00	38	38	42	44	162
6:00	40	60	70	96	266
7:00	104	117	108	157	486
8:00	140	116	120	138	514
9:00	133	121	124	147	525
10:00	144	156	131	128	559
11:00	134	146	156	130	566
12:00	149	142	150	185	626
13:00	182	196	177	188	743
14:00	186	163	178	182	709
15:00	196	137	248	196	777
16:00	194	210	207	216	827
17:00	192	211	213	197	813
18:00	186	185	190	144	705
19:00	130	132	140	110	512
20:00	100	114	112	82	408
21:00	110	98	92	70	370
22:00	92	82	73	44	291
23:00	54	57	53	35	199
				TOTAL	10538
AM PEAK HOUR		0945-1045			
VOLUME		578			
PM PEAK HOUR		1530-1630			
VOLUME		848			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	19	21	13	21	74
1:00	17	16	18	13	64
2:00	19	15	23	25	82
3:00	20	26	32	37	115
4:00	39	57	70	64	230
5:00	63	97	88	98	346
6:00	91	110	98	129	428
7:00	126	134	164	189	613
8:00	142	146	120	104	512
9:00	116	124	126	126	492
10:00	140	124	150	136	550
11:00	170	134	159	138	601
12:00	140	158	152	183	633
13:00	161	182	168	176	687
14:00	174	190	206	206	776
15:00	172	172	200	186	730
16:00	183	175	162	180	700
17:00	187	189	176	152	704
18:00	192	167	182	154	695
19:00	118	149	124	101	492
20:00	122	109	104	94	429
21:00	106	78	96	90	370
22:00	64	44	52	50	210
23:00	55	42	29	25	151
				TOTAL	10684
AM PEAK HOUR		0730-0830			
VOLUME		641			
PM PEAK HOUR		1400-1500			
VOLUME		776			

TOTAL BI-DIRECTIONAL VOLUME

21222

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: SYCAMORE AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	8	5	6	4	23
1:00	2	3	3	3	11
2:00	2	4	3	2	11
3:00	0	4	5	3	12
4:00	4	7	7	9	27
5:00	12	9	18	13	52
6:00	20	14	32	29	95
7:00	36	52	43	78	209
8:00	52	47	37	36	172
9:00	32	29	28	38	127
10:00	48	46	36	48	178
11:00	52	39	54	42	187
12:00	54	52	35	46	187
13:00	36	63	55	50	204
14:00	63	82	62	72	279
15:00	58	84	96	83	321
16:00	84	74	76	78	312
17:00	91	90	76	68	325
18:00	74	56	68	66	264
19:00	47	62	48	52	209
20:00	60	42	42	44	188
21:00	38	36	24	24	122
22:00	26	23	21	19	89
23:00	9	10	9	7	35
				TOTAL	3639
AM PEAK HOUR		0715-0815			
VOLUME		225			
PM PEAK HOUR		1515-1615			
VOLUME		347			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	10	3	4	2	19
1:00	3	8	4	2	17
2:00	3	2	6	5	16
3:00	5	7	14	15	41
4:00	13	17	19	28	77
5:00	25	32	48	26	131
6:00	23	52	37	59	171
7:00	47	58	74	60	239
8:00	54	34	47	44	179
9:00	30	29	36	44	139
10:00	37	40	43	66	186
11:00	44	47	68	59	218
12:00	54	54	56	43	207
13:00	63	64	62	50	239
14:00	62	75	65	56	258
15:00	70	63	70	74	277
16:00	72	65	69	59	265
17:00	71	76	67	72	286
18:00	68	78	53	68	267
19:00	52	55	56	42	205
20:00	49	32	41	41	163
21:00	34	40	28	24	126
22:00	16	21	13	11	61
23:00	11	15	9	6	41
				TOTAL	3828
AM PEAK HOUR		0715-0815			
VOLUME		246			
PM PEAK HOUR		1700-1800			
VOLUME		286			

TOTAL BI-DIRECTIONAL VOLUME

7467

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: SYCAMORE AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	3	2	3	6	14
1:00	3	5	5	1	14
2:00	5	4	4	3	16
3:00	2	2	2	6	12
4:00	12	6	7	15	40
5:00	14	12	17	11	54
6:00	17	17	30	26	90
7:00	35	40	50	71	196
8:00	63	31	36	40	170
9:00	29	32	28	40	129
10:00	28	28	36	53	145
11:00	44	53	39	46	182
12:00	30	50	43	66	189
13:00	61	46	54	66	227
14:00	84	72	83	86	325
15:00	81	77	98	92	348
16:00	72	100	62	90	324
17:00	85	69	64	66	284
18:00	74	77	50	76	277
19:00	43	43	52	40	178
20:00	41	36	46	48	171
21:00	31	25	23	33	112
22:00	26	16	16	8	66
23:00	8	11	6	9	34
				TOTAL	3597
AM PEAK HOUR		0715-0815			
VOLUME		224			
PM PEAK HOUR		1530-1630			
VOLUME		362			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	4	3	3	5	15
1:00	2	7	8	1	18
2:00	0	3	5	3	11
3:00	4	10	13	13	40
4:00	19	18	16	24	77
5:00	26	39	39	29	133
6:00	23	39	39	44	145
7:00	56	65	64	66	251
8:00	49	45	52	49	195
9:00	37	34	49	43	163
10:00	40	39	47	58	184
11:00	46	34	52	42	174
12:00	42	55	51	68	216
13:00	59	49	64	74	246
14:00	59	67	66	79	271
15:00	65	70	70	83	288
16:00	71	72	66	71	280
17:00	74	74	49	67	264
18:00	66	55	58	61	240
19:00	49	68	45	42	204
20:00	33	44	33	37	147
21:00	34	28	35	22	119
22:00	26	14	19	19	78
23:00	17	11	15	5	48
				TOTAL	3807
AM PEAK HOUR		0700-0800			
VOLUME		251			
PM PEAK HOUR		1530-1630			
VOLUME		296			

TOTAL BI-DIRECTIONAL VOLUME

7404

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: ACACIA AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	8	5	0	1	14
1:00	2	0	2	3	7
2:00	2	2	2	2	8
3:00	1	1	6	0	8
4:00	4	4	10	4	22
5:00	8	5	9	7	29
6:00	9	8	14	19	50
7:00	30	55	32	44	161
8:00	34	28	22	22	106
9:00	14	17	18	23	72
10:00	20	32	22	27	101
11:00	25	22	24	20	91
12:00	28	26	24	21	99
13:00	24	32	31	34	121
14:00	42	44	58	43	187
15:00	42	64	36	42	184
16:00	45	44	30	46	165
17:00	44	48	49	44	185
18:00	50	48	40	31	169
19:00	43	38	32	26	139
20:00	22	19	19	12	72
21:00	21	18	15	4	58
22:00	10	7	17	1	35
23:00	6	3	3	6	18
				TOTAL	2101
AM PEAK HOUR		0715-0815			
VOLUME		165			
PM PEAK HOUR		1430-1530			
VOLUME		207			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	1	3	2	4	10
1:00	3	5	2	3	13
2:00	2	2	1	2	7
3:00	3	2	1	1	7
4:00	1	4	5	5	15
5:00	6	7	9	6	28
6:00	6	12	19	20	57
7:00	35	58	55	42	190
8:00	40	23	22	20	105
9:00	15	19	15	15	64
10:00	19	20	21	33	93
11:00	35	30	21	22	108
12:00	30	35	40	32	137
13:00	30	32	30	21	113
14:00	25	25	40	32	122
15:00	45	48	44	44	181
16:00	48	40	33	32	153
17:00	30	25	44	48	147
18:00	56	58	40	50	204
19:00	55	40	32	33	160
20:00	20	20	15	9	64
21:00	9	15	19	12	55
22:00	8	5	6	5	24
23:00	4	4	3	5	16
				TOTAL	2073
AM PEAK HOUR		0715-0815			
VOLUME		195			
PM PEAK HOUR		1730-1830			
VOLUME		206			

TOTAL BI-DIRECTIONAL VOLUME

4174

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: ACACIA AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	4	3	2	0	9
1:00	0	2	3	1	6
2:00	4	2	4	2	12
3:00	2	2	4	2	10
4:00	4	4	9	6	23
5:00	6	7	11	11	35
6:00	9	7	16	22	54
7:00	28	58	46	40	172
8:00	30	27	16	26	99
9:00	19	17	20	19	75
10:00	20	22	18	31	91
11:00	22	25	23	24	94
12:00	18	20	25	20	83
13:00	54	40	31	28	153
14:00	35	56	72	38	201
15:00	40	44	36	50	170
16:00	45	45	34	34	158
17:00	48	54	44	38	184
18:00	42	54	35	21	152
19:00	28	23	29	22	102
20:00	10	29	18	14	71
21:00	22	17	17	18	74
22:00	8	9	11	5	33
23:00	5	8	6	6	25
				TOTAL	2086
AM PEAK HOUR		0715-0815			
VOLUME		174			
PM PEAK HOUR		1415-1515			
VOLUME		206			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	2	1	3	2	8
1:00	4	3	2	4	13
2:00	1	2	1	1	5
3:00	2	1	2	3	8
4:00	2	5	5	3	15
5:00	2	5	20	19	46
6:00	15	15	20	35	85
7:00	40	65	60	55	220
8:00	53	50	32	32	167
9:00	30	20	25	25	100
10:00	20	19	15	19	73
11:00	21	23	40	32	116
12:00	20	20	21	25	86
13:00	40	38	35	25	138
14:00	20	30	55	30	135
15:00	32	30	30	45	137
16:00	40	32	39	38	149
17:00	30	45	40	35	150
18:00	30	44	48	20	142
19:00	20	15	19	21	75
20:00	20	19	19	15	73
21:00	10	10	8	6	34
22:00	8	4	5	8	25
23:00	4	4	1	1	10
				TOTAL	2010
AM PEAK HOUR		0715-0815			
VOLUME		233			
PM PEAK HOUR		1745-1845			
VOLUME		157			

TOTAL BI-DIRECTIONAL VOLUME	4096
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24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: EUCALYPTUS AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	8	3	2	1	14
1:00	3	2	4	3	12
2:00	3	1	4	1	9
3:00	0	5	8	3	16
4:00	5	11	3	8	27
5:00	4	2	6	10	22
6:00	8	10	22	27	67
7:00	44	85	46	47	222
8:00	43	34	31	20	128
9:00	25	20	26	24	95
10:00	30	14	19	29	92
11:00	24	30	27	26	107
12:00	36	34	25	31	126
13:00	38	33	24	42	137
14:00	36	69	80	48	233
15:00	51	102	46	54	253
16:00	68	54	62	64	248
17:00	60	70	62	68	260
18:00	66	55	51	29	201
19:00	34	33	38	30	135
20:00	37	40	24	25	126
21:00	31	29	20	15	95
22:00	19	12	15	12	58
23:00	5	6	5	6	22
				TOTAL	2705
AM PEAK HOUR		0700-0800			
VOLUME		222			
PM PEAK HOUR		1430-1530			
VOLUME		281			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	7	4	2	6	19
1:00	2	5	1	1	9
2:00	2	4	1	3	10
3:00	1	1	5	4	11
4:00	8	10	9	8	35
5:00	5	24	14	12	55
6:00	16	24	36	42	118
7:00	81	104	42	45	272
8:00	45	47	34	36	162
9:00	19	17	22	21	79
10:00	21	19	32	23	95
11:00	31	28	24	32	115
12:00	31	28	32	36	127
13:00	34	35	35	32	136
14:00	51	59	50	60	220
15:00	49	53	46	56	204
16:00	40	32	60	42	174
17:00	58	50	52	44	204
18:00	46	46	44	22	158
19:00	39	37	30	29	135
20:00	23	22	24	21	90
21:00	16	14	14	18	62
22:00	12	13	16	9	50
23:00	4	3	6	5	18
				TOTAL	2558
AM PEAK HOUR		0700-0800			
VOLUME		272			
PM PEAK HOUR		1400-1500			
VOLUME		220			

TOTAL BI-DIRECTIONAL VOLUME

5263

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: EUCALYPTUS AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	6	6	4	6	22
1:00	5	1	2	2	10
2:00	3	3	1	1	8
3:00	3	4	5	3	15
4:00	3	11	6	6	26
5:00	3	4	10	11	28
6:00	10	10	18	25	63
7:00	45	82	33	46	206
8:00	54	42	30	22	148
9:00	22	22	18	28	90
10:00	21	20	34	34	109
11:00	16	23	33	21	93
12:00	29	33	38	22	122
13:00	60	40	44	44	188
14:00	32	78	95	62	267
15:00	63	64	94	61	282
16:00	72	62	65	67	266
17:00	54	64	57	42	217
18:00	48	56	31	46	181
19:00	46	39	36	21	142
20:00	35	19	25	23	102
21:00	29	23	24	16	92
22:00	10	12	14	8	44
23:00	9	6	8	5	28
				TOTAL	2749
AM PEAK HOUR		0715-0815			
VOLUME		215			
PM PEAK HOUR		1415-1515			
VOLUME		298			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	4	6	3	2	15
1:00	1	2	1	6	10
2:00	2	3	2	4	11
3:00	3	4	7	4	18
4:00	1	8	8	9	26
5:00	5	24	14	11	54
6:00	15	17	25	48	105
7:00	82	99	38	58	277
8:00	63	42	26	22	153
9:00	28	22	20	10	80
10:00	17	29	23	25	94
11:00	36	21	32	24	113
12:00	18	14	34	30	96
13:00	41	50	29	44	164
14:00	44	64	67	29	204
15:00	47	46	43	63	199
16:00	45	41	47	48	181
17:00	40	45	34	43	162
18:00	37	46	46	33	162
19:00	25	37	30	24	116
20:00	21	18	17	14	70
21:00	21	11	18	20	70
22:00	14	17	13	11	55
23:00	6	10	10	8	34
				TOTAL	2469
AM PEAK HOUR		0700-0800			
VOLUME		277			
PM PEAK HOUR		1345-1445			
VOLUME		219			

TOTAL BI-DIRECTIONAL VOLUME	5218
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24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: PEPPER AVENUE AT RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	42	33	26	38	139
1:00	24	21	24	24	93
2:00	34	12	20	27	93
3:00	23	26	22	27	98
4:00	22	38	34	53	147
5:00	44	47	53	64	208
6:00	56	64	98	90	308
7:00	150	154	204	192	700
8:00	124	130	105	110	469
9:00	114	129	119	113	475
10:00	140	127	113	128	508
11:00	136	130	143	146	555
12:00	136	144	120	144	544
13:00	162	176	148	182	668
14:00	168	238	226	208	840
15:00	182	254	243	214	893
16:00	211	220	204	192	827
17:00	218	248	205	224	895
18:00	214	182	152	174	722
19:00	176	138	141	113	568
20:00	106	111	112	110	439
21:00	96	114	94	82	386
22:00	98	64	62	84	308
23:00	65	54	65	52	236
				TOTAL	11119
AM PEAK HOUR			0700-0800		
VOLUME			700		
PM PEAK HOUR			1515-1615		
VOLUME			922		

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	24	30	15	20	89
1:00	28	18	21	26	93
2:00	12	28	25	28	93
3:00	36	46	76	58	216
4:00	60	99	92	81	332
5:00	106	137	176	128	547
6:00	140	158	193	204	695
7:00	233	284	252	256	1025
8:00	226	194	136	158	714
9:00	136	140	160	110	546
10:00	136	127	141	144	548
11:00	144	142	149	131	566
12:00	135	122	144	138	539
13:00	127	153	169	166	615
14:00	218	214	176	162	770
15:00	174	184	180	158	696
16:00	141	152	152	135	580
17:00	179	174	192	142	687
18:00	152	161	144	152	609
19:00	135	132	99	96	462
20:00	115	116	104	102	437
21:00	78	88	90	77	333
22:00	84	58	48	57	247
23:00	36	40	36	28	140
				TOTAL	11579
AM PEAK HOUR			0700-0800		
VOLUME			1025		
PM PEAK HOUR			1345-1445		
VOLUME			774		

TOTAL BI-DIRECTIONAL VOLUME

22698

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: PEPPER AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	50	52	24	38	164
1:00	26	27	28	24	105
2:00	21	30	20	21	92
3:00	28	19	28	14	89
4:00	26	37	58	36	157
5:00	49	50	60	66	225
6:00	62	58	78	102	300
7:00	142	184	202	199	727
8:00	151	140	112	99	502
9:00	130	104	140	110	484
10:00	108	126	132	142	508
11:00	146	106	146	156	554
12:00	121	168	146	155	590
13:00	166	180	192	168	706
14:00	222	222	242	196	882
15:00	204	223	278	226	931
16:00	238	213	196	218	865
17:00	238	192	208	203	841
18:00	163	187	166	138	654
19:00	153	134	119	137	543
20:00	126	126	110	137	499
21:00	104	110	118	86	418
22:00	72	94	67	58	291
23:00	55	60	55	53	223
				TOTAL	11350
AM PEAK HOUR		0715-0815			
VOLUME		736			
PM PEAK HOUR		1515-1615			
VOLUME		965			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	31	25	27	21	104
1:00	28	26	24	21	99
2:00	23	28	28	26	105
3:00	38	53	60	46	197
4:00	67	99	96	78	340
5:00	100	140	166	152	558
6:00	139	148	178	204	669
7:00	268	289	256	260	1073
8:00	217	182	174	154	727
9:00	140	134	164	135	573
10:00	133	113	140	127	513
11:00	122	176	140	148	586
12:00	152	124	148	152	576
13:00	149	167	191	170	677
14:00	190	214	182	194	780
15:00	187	187	182	168	724
16:00	192	190	156	150	688
17:00	170	166	175	132	643
18:00	150	142	146	134	572
19:00	109	94	115	84	402
20:00	90	114	102	88	394
21:00	104	102	66	76	348
22:00	64	77	67	51	259
23:00	41	48	40	35	164
				TOTAL	11771
AM PEAK HOUR		0700-0800			
VOLUME		1073			
PM PEAK HOUR		1400-1500			
VOLUME		780			

TOTAL BI-DIRECTIONAL VOLUME

23121

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 LOCATION: RIALTO AVENUE AT
 RAILROAD CROSSING
 DATE: TUESDAY MAY 16, 2017

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	11	15	10	11	47
1:00	9	8	11	11	39
2:00	10	9	10	6	35
3:00	7	5	16	5	33
4:00	11	19	14	20	64
5:00	22	22	30	36	110
6:00	24	42	59	69	194
7:00	64	95	103	122	384
8:00	94	84	63	54	295
9:00	68	65	59	66	258
10:00	77	56	62	66	261
11:00	50	52	69	79	250
12:00	74	68	64	53	259
13:00	64	76	59	79	278
14:00	82	108	117	100	407
15:00	99	85	132	113	429
16:00	115	121	77	98	411
17:00	95	104	111	98	408
18:00	82	82	74	88	326
19:00	82	76	66	57	281
20:00	66	54	51	56	227
21:00	51	45	33	39	168
22:00	32	27	25	35	119
23:00	26	24	15	25	90
				TOTAL	5373
AM PEAK HOUR		0715-0815			
VOLUME		414			
PM PEAK HOUR		1530-1630			
VOLUME		481			

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	9	18	4	15	46
1:00	6	13	12	7	38
2:00	4	5	6	6	21
3:00	8	14	16	24	62
4:00	20	14	27	26	87
5:00	28	35	38	35	136
6:00	30	46	47	71	194
7:00	74	70	110	105	359
8:00	85	56	68	79	288
9:00	53	73	73	63	262
10:00	64	60	78	62	264
11:00	67	80	71	66	284
12:00	96	73	62	74	305
13:00	72	84	104	110	370
14:00	97	90	104	87	378
15:00	93	108	96	120	417
16:00	114	116	112	136	478
17:00	112	140	130	120	502
18:00	104	88	88	82	362
19:00	78	68	80	55	281
20:00	62	50	50	44	206
21:00	43	44	26	34	147
22:00	32	26	26	27	111
23:00	24	11	12	20	67
				TOTAL	5665
AM PEAK HOUR		0715-0815			
VOLUME		370			
PM PEAK HOUR		1645-1745			
VOLUME		518			

TOTAL BI-DIRECTIONAL VOLUME

11038

24-HOUR ADT COUNT SUMMARY

CLIENT: CH2M HILL
 PROJECT: SBCTA - RIALTO TO LILAC PROJECT
 LOCATION: RIALTO AVENUE AT
 RAILROAD CROSSING
 DATE: WEDNESDAY MAY 17, 2017

DIRECTION:		EB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	10	9	14	9	42
1:00	8	6	6	5	25
2:00	9	12	4	6	31
3:00	8	12	13	14	47
4:00	16	12	20	22	70
5:00	23	20	26	38	107
6:00	26	42	52	52	172
7:00	84	84	104	119	391
8:00	97	84	68	48	297
9:00	62	70	57	55	244
10:00	46	60	64	72	242
11:00	62	70	54	67	253
12:00	75	71	73	68	287
13:00	81	110	85	86	362
14:00	88	101	118	104	411
15:00	102	83	106	94	385
16:00	118	84	106	106	414
17:00	96	107	104	88	395
18:00	107	88	69	74	338
19:00	75	78	69	66	288
20:00	78	63	52	46	239
21:00	53	38	44	28	163
22:00	26	23	34	19	102
23:00	20	22	18	26	86
				TOTAL	5391
AM PEAK HOUR		0715-0815			
VOLUME		404			
PM PEAK HOUR		1415-1515			
VOLUME		425			

DIRECTION:		WB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	12	12	7	6	37
1:00	10	4	6	3	23
2:00	8	5	3	4	20
3:00	7	9	16	16	48
4:00	27	20	29	24	100
5:00	29	34	42	48	153
6:00	49	46	48	62	205
7:00	74	74	118	118	384
8:00	71	71	60	62	264
9:00	68	78	74	70	290
10:00	72	63	82	78	295
11:00	70	70	72	67	279
12:00	72	74	80	77	303
13:00	89	100	82	102	373
14:00	94	97	93	106	390
15:00	105	104	98	120	427
16:00	120	119	100	100	439
17:00	102	114	95	100	411
18:00	104	108	68	64	344
19:00	73	70	82	70	295
20:00	64	52	56	55	227
21:00	48	64	39	41	192
22:00	32	31	23	25	111
23:00	20	10	21	18	69
				TOTAL	5679
AM PEAK HOUR		0700-0800			
VOLUME		384			
PM PEAK HOUR		1545-1645			
VOLUME		459			

TOTAL BI-DIRECTIONAL VOLUME

11070

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: CACTUS AVENUE @
 RAILROAD TRACKS
 DATE: TUESDAY MARCH 13, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	33	10	8	12	63
1:00	9	14	7	7	37
2:00	5	3	14	8	30
3:00	14	20	16	22	72
4:00	24	26	32	37	119
5:00	42	44	48	74	208
6:00	77	98	124	144	443
7:00	118	92	78	80	368
8:00	75	79	80	79	313
9:00	90	76	69	94	329
10:00	81	80	74	94	329
11:00	85	99	92	93	369
12:00	112	122	120	143	497
13:00	134	114	164	132	544
14:00	184	180	177	156	697
15:00	168	176	156	164	664
16:00	147	120	168	125	560
17:00	152	135	115	85	487
18:00	89	70	76	61	296
19:00	84	66	56	42	248
20:00	46	52	34	44	176
21:00	34	40	30	27	131
22:00	20	26	16	20	82
23:00	28	15	16	10	69
				TOTAL	7131
AM PEAK HOUR		0615-0715			
VOLUME		484			
PM PEAK HOUR		1400-1500			
VOLUME		697			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	11	3	4	6	24
1:00	10	5	5	8	28
2:00	8	12	22	18	60
3:00	32	37	35	55	159
4:00	48	56	78	78	260
5:00	38	58	106	98	300
6:00	125	158	166	146	595
7:00	147	121	105	101	474
8:00	84	70	63	78	295
9:00	66	74	86	78	304
10:00	54	65	82	84	285
11:00	85	92	94	70	341
12:00	92	97	100	82	371
13:00	112	121	120	132	485
14:00	116	144	143	104	507
15:00	134	119	138	112	503
16:00	118	107	122	114	461
17:00	109	86	90	89	374
18:00	80	66	84	59	289
19:00	60	62	48	50	220
20:00	38	62	52	30	182
21:00	22	23	33	14	92
22:00	17	14	7	6	44
23:00	7	7	10	7	31
				TOTAL	6684
AM PEAK HOUR		0615-0715			
VOLUME		617			
PM PEAK HOUR		1345-1445			
VOLUME		535			

TOTAL BI-DIRECTIONAL VOLUME	13815
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WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: CACTUS AVENUE @
 RAILROAD TRACKS
 DATE: WEDNESDAY MARCH 14, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	36	10	9	6	61
1:00	7	7	8	6	28
2:00	8	5	10	13	36
3:00	8	14	26	20	68
4:00	18	26	28	28	100
5:00	32	47	54	72	205
6:00	84	89	112	123	408
7:00	126	87	84	72	369
8:00	70	71	76	86	303
9:00	78	76	74	61	289
10:00	94	97	88	88	367
11:00	92	104	108	133	437
12:00	138	174	149	105	566
13:00	126	109	113	122	470
14:00	110	126	133	134	503
15:00	130	126	146	154	556
16:00	127	144	138	152	561
17:00	127	122	102	92	443
18:00	78	68	69	68	283
19:00	75	61	76	58	270
20:00	58	73	65	52	248
21:00	38	30	46	28	142
22:00	20	27	16	22	85
23:00	22	15	16	18	71
				TOTAL	6869
AM PEAK HOUR		0615-0715			
VOLUME		450			
PM PEAK HOUR		1530-1630			
VOLUME		571			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	5	10	5	6	26
1:00	4	4	9	6	23
2:00	10	17	18	23	68
3:00	27	23	36	62	148
4:00	35	54	74	77	240
5:00	48	72	88	111	319
6:00	110	155	156	195	616
7:00	162	120	81	86	449
8:00	74	69	77	52	272
9:00	73	66	77	81	297
10:00	76	76	95	92	339
11:00	86	104	104	96	390
12:00	140	142	121	122	525
13:00	105	104	108	95	412
14:00	112	100	125	94	431
15:00	118	124	118	124	484
16:00	99	106	122	112	439
17:00	102	90	103	91	386
18:00	80	80	73	47	280
19:00	86	50	51	42	229
20:00	52	46	54	43	195
21:00	43	27	30	21	121
22:00	19	21	16	16	72
23:00	6	9	7	10	32
				TOTAL	6793
AM PEAK HOUR		0615-0715			
VOLUME		668			
PM PEAK HOUR		1200-1300			
VOLUME		525			

TOTAL BI-DIRECTIONAL VOLUME	13662
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WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: CACTUS AVENUE @
 RAILROAD TRACKS
 DATE: THURSDAY MARCH 15, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	24	17	9	8	58
1:00	7	14	12	6	39
2:00	6	4	11	12	33
3:00	9	18	18	24	69
4:00	15	26	27	32	100
5:00	17	44	48	68	177
6:00	64	86	78	79	307
7:00	52	63	71	46	232
8:00	59	60	86	81	286
9:00	66	73	82	68	289
10:00	80	86	74	98	338
11:00	94	94	96	94	378
12:00	98	113	112	125	448
13:00	103	102	133	112	450
14:00	125	143	128	158	554
15:00	136	128	117	132	513
16:00	168	126	176	160	630
17:00	126	98	106	108	438
18:00	90	85	80	70	325
19:00	75	60	70	56	261
20:00	58	76	75	50	259
21:00	53	44	40	32	169
22:00	30	20	20	15	85
23:00	19	15	19	30	83
				TOTAL	6521
AM PEAK HOUR		1045-1145			
VOLUME		382			
PM PEAK HOUR		1600-1700			
VOLUME		630			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	7	17	6	5	35
1:00	7	3	9	10	29
2:00	10	12	20	23	65
3:00	22	37	50	49	158
4:00	40	46	69	67	222
5:00	44	64	82	90	280
6:00	116	114	144	122	496
7:00	94	69	108	86	357
8:00	93	76	82	66	317
9:00	72	74	82	76	304
10:00	79	68	70	84	301
11:00	93	78	91	80	342
12:00	76	102	91	86	355
13:00	90	96	112	93	391
14:00	94	110	119	111	434
15:00	114	112	124	109	459
16:00	102	118	126	98	444
17:00	112	104	79	78	373
18:00	78	74	65	60	277
19:00	85	80	65	40	270
20:00	44	46	48	32	170
21:00	35	50	32	20	137
22:00	20	21	20	15	76
23:00	19	19	5	11	54
				TOTAL	6346
AM PEAK HOUR		0600-0700			
VOLUME		496			
PM PEAK HOUR		1445-1545			
VOLUME		461			

TOTAL BI-DIRECTIONAL VOLUME

12867

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: CACTUS AVENUE @
 RAILROAD TRACKS
 DATE: FRIDAY MARCH 16, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	20	15	10	9	54
1:00	8	15	10	12	45
2:00	12	8	11	2	33
3:00	6	12	19	25	62
4:00	23	28	22	35	108
5:00	20	48	44	47	159
6:00	65	85	77	76	303
7:00	75	60	68	50	253
8:00	52	63	85	80	280
9:00	65	67	69	77	278
10:00	76	78	80	80	314
11:00	90	80	76	76	322
12:00	79	102	120	115	416
13:00	144	148	115	120	527
14:00	100	180	165	186	631
15:00	154	184	164	186	688
16:00	158	158	220	172	708
17:00	134	122	112	126	494
18:00	104	102	80	59	345
19:00	60	72	80	56	268
20:00	60	52	44	47	203
21:00	33	30	31	38	132
22:00	27	24	27	21	99
23:00	20	16	10	11	57
				TOTAL	6779
AM PEAK HOUR		1030-1130			
VOLUME		330			
PM PEAK HOUR		1545-1645			
VOLUME		722			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	15	10	9	12	46
1:00	10	6	8	12	36
2:00	10	11	20	25	66
3:00	23	20	44	50	137
4:00	54	56	68	68	246
5:00	50	64	60	100	274
6:00	132	100	165	132	529
7:00	100	65	67	80	312
8:00	75	76	78	60	289
9:00	76	77	75	70	298
10:00	70	65	60	44	239
11:00	90	85	78	93	346
12:00	100	94	106	101	401
13:00	100	112	132	124	468
14:00	100	156	144	138	538
15:00	134	116	112	118	480
16:00	120	102	130	108	460
17:00	86	103	108	92	389
18:00	102	74	60	73	309
19:00	60	71	42	47	220
20:00	58	51	56	31	196
21:00	35	36	26	28	125
22:00	14	18	12	9	53
23:00	10	12	9	5	36
				TOTAL	6493
AM PEAK HOUR		0600-0700			
VOLUME		529			
PM PEAK HOUR		1415-1515			
VOLUME		572			

TOTAL BI-DIRECTIONAL VOLUME	13272
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24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
PROJECT: SANDAG DOUBLE TRACK
LOCATION: RANCHO AVENUE @
RAILROAD TRACKS
DATE: TUESDAY MARCH 13, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	19	30	22	32	103
1:00	22	38	20	24	104
2:00	34	22	25	28	109
3:00	24	32	26	26	108
4:00	32	22	44	43	141
5:00	34	64	36	34	168
6:00	44	32	41	43	160
7:00	58	102	84	74	318
8:00	64	76	53	64	257
9:00	65	46	62	58	231
10:00	48	70	54	68	240
11:00	76	42	76	60	254
12:00	52	47	72	46	217
13:00	74	78	78	74	304
14:00	68	74	72	84	298
15:00	67	74	90	76	307
16:00	108	68	96	79	351
17:00	88	76	74	88	326
18:00	73	62	68	72	275
19:00	67	50	42	50	209
20:00	56	47	43	38	184
21:00	32	36	25	33	126
22:00	32	34	16	18	100
23:00	18	22	10	24	74
				TOTAL	4964
AM PEAK HOUR		0715-0815			
VOLUME		324			
PM PEAK HOUR		1600-1700			
VOLUME		351			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	18	27	16	10	71
1:00	16	20	18	14	68
2:00	4	16	10	6	36
3:00	14	25	20	19	78
4:00	14	30	42	28	114
5:00	54	51	32	35	172
6:00	34	28	59	60	181
7:00	74	72	93	60	299
8:00	87	64	55	91	297
9:00	60	74	82	63	279
10:00	78	84	68	76	306
11:00	49	58	60	62	229
12:00	58	70	61	68	257
13:00	68	52	62	65	247
14:00	80	86	77	82	325
15:00	52	76	70	112	310
16:00	80	84	92	96	352
17:00	96	86	78	68	328
18:00	85	76	72	63	296
19:00	72	50	60	62	244
20:00	32	45	46	30	153
21:00	38	44	26	32	140
22:00	30	34	25	18	107
23:00	14	11	26	18	69
				TOTAL	4958
AM PEAK HOUR		0715-0815			
VOLUME		312			
PM PEAK HOUR		1630-1730			
VOLUME		370			

TOTAL BI-DIRECTIONAL VOLUME

9922

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: RANCHO AVENUE @
 RAILROAD TRACKS
 DATE: WEDNESDAY MARCH 14, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	12	8	20	14	54
1:00	8	13	20	12	53
2:00	10	14	12	14	50
3:00	8	10	16	11	45
4:00	16	21	19	54	110
5:00	22	22	40	33	117
6:00	42	44	27	37	150
7:00	39	72	73	56	240
8:00	66	54	66	62	248
9:00	56	63	68	56	243
10:00	59	40	60	42	201
11:00	43	70	64	54	231
12:00	44	45	50	78	217
13:00	79	59	68	84	290
14:00	82	58	71	86	297
15:00	71	99	77	87	334
16:00	99	108	86	72	365
17:00	94	62	108	80	344
18:00	56	82	72	60	270
19:00	66	54	52	39	211
20:00	52	48	48	51	199
21:00	31	43	32	43	149
22:00	42	42	28	35	147
23:00	21	10	24	21	76
				TOTAL	4641
AM PEAK HOUR		0715-0815			
VOLUME		267			
PM PEAK HOUR		1545-1645			
VOLUME		380			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	3	24	16	4	47
1:00	14	6	10	8	38
2:00	8	12	13	13	46
3:00	18	17	14	20	69
4:00	16	24	32	30	102
5:00	27	47	38	26	138
6:00	38	35	54	52	179
7:00	72	56	89	71	288
8:00	50	46	47	66	209
9:00	70	82	66	50	268
10:00	59	58	38	50	205
11:00	46	80	100	68	294
12:00	69	57	68	68	262
13:00	74	65	56	68	263
14:00	65	72	63	93	293
15:00	67	78	74	74	293
16:00	84	94	80	80	338
17:00	86	64	113	78	341
18:00	72	82	64	70	288
19:00	59	63	42	50	214
20:00	52	60	57	42	211
21:00	44	38	40	52	174
22:00	37	33	44	28	142
23:00	14	19	20	25	78
				TOTAL	4780
AM PEAK HOUR		1100-1200			
VOLUME		294			
PM PEAK HOUR		1730-1830			
VOLUME		345			

TOTAL BI-DIRECTIONAL VOLUME

9421

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
PROJECT: SANDAG DOUBLE TRACK
LOCATION: RANCHO AVENUE @
RAILROAD TRACKS
DATE: THURSDAY MARCH 15, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	24	34	14	11	83
1:00	22	30	30	24	106
2:00	24	28	23	18	93
3:00	12	31	32	27	102
4:00	31	28	37	31	127
5:00	28	36	46	43	153
6:00	34	38	46	58	176
7:00	56	64	60	67	247
8:00	64	49	66	64	243
9:00	60	48	50	58	216
10:00	44	39	41	54	178
11:00	50	66	44	45	205
12:00	57	61	72	32	222
13:00	34	59	64	40	197
14:00	42	52	40	66	200
15:00	79	76	84	72	311
16:00	74	76	66	72	288
17:00	78	71	66	82	297
18:00	54	57	52	62	225
19:00	65	73	56	51	245
20:00	55	60	61	50	226
21:00	44	40	32	30	146
22:00	44	50	58	32	184
23:00	30	21	20	20	91
				TOTAL	4561
AM PEAK HOUR		0715-0815			
VOLUME		255			
PM PEAK HOUR		1500-1600			
VOLUME		311			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	12	14	10	2	38
1:00	14	20	10	17	61
2:00	10	13	4	8	35
3:00	16	18	15	19	68
4:00	21	32	34	37	124
5:00	48	56	48	48	200
6:00	35	42	58	70	205
7:00	57	104	92	84	337
8:00	64	54	63	54	235
9:00	57	48	57	62	224
10:00	62	42	72	58	234
11:00	56	54	51	50	211
12:00	46	70	46	60	222
13:00	62	46	50	56	214
14:00	51	54	29	69	203
15:00	69	48	62	58	237
16:00	56	50	58	82	246
17:00	76	64	79	57	276
18:00	54	52	56	76	238
19:00	74	48	53	58	233
20:00	46	51	65	60	222
21:00	48	44	32	30	154
22:00	25	20	19	19	83
23:00	20	29	30	8	87
				TOTAL	4387
AM PEAK HOUR		0715-0815			
VOLUME		344			
PM PEAK HOUR		1645-1745			
VOLUME		301			

TOTAL BI-DIRECTIONAL VOLUME

8948

WILTEC

Phone: (626) 564-1944

Fax: (626) 564-0969

24-HOUR ADT COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANDAG DOUBLE TRACK
 LOCATION: RANCHO AVENUE @
 RAILROAD TRACKS
 DATE: FRIDAY MARCH 16, 2018

DIRECTION:		NB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	20	25	15	19	79
1:00	21	30	35	20	106
2:00	21	22	20	20	83
3:00	19	35	31	34	119
4:00	30	30	44	40	144
5:00	39	35	30	50	154
6:00	48	44	40	56	188
7:00	58	65	60	69	252
8:00	77	45	50	56	228
9:00	58	44	44	59	205
10:00	50	46	48	44	188
11:00	45	65	68	41	219
12:00	44	42	45	60	191
13:00	65	58	70	80	273
14:00	84	66	64	94	308
15:00	101	74	69	74	318
16:00	81	92	90	85	348
17:00	88	76	101	81	346
18:00	72	61	52	98	283
19:00	64	66	64	63	257
20:00	45	76	62	53	236
21:00	42	46	34	37	159
22:00	48	51	37	30	166
23:00	31	32	11	20	94
				TOTAL	4944
AM PEAK HOUR		0715-0815			
VOLUME		271			
PM PEAK HOUR		1615-1715			
VOLUME		355			

DIRECTION:		SB			
TIME	00-15	15-30	30-45	45-60	HOUR TOTALS
0:00	15	21	25	20	81
1:00	10	15	5	8	38
2:00	8	22	22	18	70
3:00	11	40	44	35	130
4:00	58	56	31	32	177
5:00	33	34	68	60	195
6:00	79	79	100	75	333
7:00	79	65	60	76	280
8:00	65	77	79	0	221
9:00	76	88	80	85	329
10:00	86	55	56	67	264
11:00	68	77	65	60	270
12:00	77	77	65	60	279
13:00	69	77	75	77	298
14:00	50	58	70	100	278
15:00	95	86	80	90	351
16:00	100	100	65	68	333
17:00	80	75	70	70	295
18:00	65	60	65	60	250
19:00	32	35	55	48	170
20:00	40	41	40	33	154
21:00	30	25	30	21	106
22:00	22	20	15	19	76
23:00	20	21	25	20	86
				TOTAL	5064
AM PEAK HOUR		0915-1015			
VOLUME		339			
PM PEAK HOUR		1530-1630			
VOLUME		370			

TOTAL BI-DIRECTIONAL VOLUME	10008
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Appendix B

Pedestrian Volume Data

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INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: LILAC AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	1	1	2
615-630	1	0	1
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	1	1	2
530-630	2	1	3
545-645	2	1	3
600-700	2	1	3

BICYCLES			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: LILAC AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	1	1	2
545-600	0	0	0
600-615	0	0	0
615-630	1	0	1
630-645	0	0	0
645-700	1	0	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	1	2
515-615	1	1	2
530-630	2	1	3
545-645	1	0	1
600-700	2	0	2

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	1	1
515-530	0	2	2
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	2	1	3
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	3	3
515-615	0	2	2
530-630	0	0	0
545-645	2	1	3
600-700	2	1	3

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: WILLOW AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	1	1
530-545	0	0	0
545-600	0	0	0
600-615	0	1	1
615-630	0	0	0
630-645	0	0	0
645-700	0	1	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	1	1
515-615	0	2	2
530-630	0	1	1
545-645	0	1	1
600-700	0	2	2

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	1	0	1
600-615	0	0	0
615-630	0	0	0
630-645	1	0	1
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	0	1
515-615	1	0	1
530-630	1	0	1
545-645	2	0	2
600-700	1	0	1

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: WILLOW AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	1	0	1
545-600	0	1	1
600-615	0	0	0
615-630	0	1	1
630-645	2	0	2
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	1	2
515-615	1	1	2
530-630	1	2	3
545-645	2	2	4
600-700	2	1	3

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	0	1
515-530	0	1	1
530-545	0	2	2
545-600	3	1	4
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	1	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	4	4	8
515-615	3	4	7
530-630	3	3	6
545-645	3	1	4
600-700	0	1	1

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: RIVERSIDE AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	2	2
515-530	0	0	0
530-545	1	0	1
545-600	2	0	2
600-615	0	0	0
615-630	1	1	2
630-645	0	1	1
645-700	2	1	3
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	3	2	5
515-615	3	0	3
530-630	4	1	5
545-645	3	2	5
600-700	3	3	6

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	0	1
515-530	1	0	1
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	2	2
630-645	1	0	1
645-700	1	1	2
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	2	0	2
515-615	1	0	1
530-630	0	2	2
545-645	1	2	3
600-700	2	3	5

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: RIVERSIDE AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	3	4
515-530	0	0	0
530-545	3	2	5
545-600	0	1	1
600-615	0	1	1
615-630	0	1	1
630-645	1	1	2
645-700	5	4	9
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	4	6	10
515-615	3	4	7
530-630	3	5	8
545-645	1	4	5
600-700	6	7	13

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	2	2
530-545	0	2	2
545-600	2	1	3
600-615	0	3	3
615-630	0	0	0
630-645	0	0	0
645-700	0	1	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	2	5	7
515-615	2	8	10
530-630	2	6	8
545-645	2	4	6
600-700	0	4	4

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: SYCAMORE AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	2	0	2
645-700	0	1	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	2	0	2
600-700	2	1	3

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	1	1
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	1	1
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: SYCAMORE AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	1	1
530-545	0	0	0
545-600	1	0	1
600-615	1	0	1
615-630	1	0	1
630-645	0	1	1
645-700	2	3	5
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	1	2
515-615	2	1	3
530-630	3	0	3
545-645	3	1	4
600-700	4	4	8

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	1	0	1
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	0	1
515-615	1	0	1
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: THURSDAY MAY 18, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: RIALTO AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	NORTH LEG	SOUTH LEG	TOTALS
500-515	0	0	0
515-530	0	1	1
530-545	0	1	1
545-600	0	1	1
600-615	0	0	0
615-630	0	0	0
630-645	0	3	3
645-700	0	0	0
HOUR TOTALS	NORTH LEG	SOUTH LEG	TOTALS
500-600	0	3	3
515-615	0	3	3
530-630	0	2	2
545-645	0	4	4
600-700	0	3	3

BICYCLES			
15 MIN COUNTS	NORTH LEG	SOUTH LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	1	1
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	NORTH LEG	SOUTH LEG	TOTALS
500-600	0	1	1
515-615	0	1	1
530-630	0	1	1
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: RIALTO AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	NORTH LEG	SOUTH LEG	TOTALS
500-515	1	0	1
515-530	0	3	3
530-545	0	1	1
545-600	0	2	2
600-615	1	0	1
615-630	2	1	3
630-645	0	1	1
645-700	0	0	0
HOUR TOTALS	NORTH LEG	SOUTH LEG	TOTALS
500-600	1	6	7
515-615	1	6	7
530-630	3	4	7
545-645	3	4	7
600-700	3	2	5

BICYCLES			
15 MIN COUNTS	NORTH LEG	SOUTH LEG	TOTALS
500-515	0	1	1
515-530	0	0	0
530-545	0	2	2
545-600	0	1	1
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	1	2	3
HOUR TOTALS	NORTH LEG	SOUTH LEG	TOTALS
500-600	0	4	4
515-615	0	3	3
530-630	0	3	3
545-645	0	1	1
600-700	1	2	3

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: ACADIA AVENE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	1	1
615-630	0	0	0
630-645	0	2	2
645-700	5	1	6
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	1	1
530-630	0	1	1
545-645	0	3	3
600-700	5	4	9

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: ACACIA AVENE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	0	1
515-530	0	1	1
530-545	1	3	4
545-600	1	1	2
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	3	0	3
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	3	5	8
515-615	2	5	7
530-630	2	4	6
545-645	1	1	2
600-700	3	0	3

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	1	1
515-530	0	0	0
530-545	1	0	1
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	1	2
515-615	1	0	1
530-630	1	0	1
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: PEPPER AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	2	2
545-600	0	0	0
600-615	0	0	0
615-630	1	0	1
630-645	2	1	3
645-700	2	2	4
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	2	2
515-615	0	2	2
530-630	1	2	3
545-645	3	1	4
600-700	5	3	8

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	1	1
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	1	1
600-700	0	1	1

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: EUCALYPTUS AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	1	2	3
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	1	2	3

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: EUCALYPTUS AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	7	3	10
515-530	0	0	0
530-545	0	0	0
545-600	0	3	3
600-615	0	3	3
615-630	0	1	1
630-645	1	0	1
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	7	6	13
515-615	0	6	6
530-630	0	7	7
545-645	1	7	8
600-700	1	4	5

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	0	0	0
515-530	0	0	0
530-545	1	0	1
545-600	0	0	0
600-615	0	0	0
615-630	1	0	1
630-645	0	1	1
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	0	1
515-615	1	0	1
530-630	2	0	2
545-645	1	1	2
600-700	1	1	2

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: CH2MHILL, INC.
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMEN - RANCHO TO LILAC - RIALTO
 DATE: TUESDAY MAY 16, 2017
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: PEPPER AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	1	2
515-530	0	0	0
530-545	0	1	1
545-600	0	0	0
600-615	2	3	5
615-630	3	1	4
630-645	0	1	1
645-700	0	0	0
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	1	2	3
515-615	2	4	6
530-630	5	5	10
545-645	5	5	10
600-700	5	5	10

BICYCLES			
15 MIN COUNTS	EAST LEG	WEST LEG	TOTALS
500-515	1	0	1
515-530	1	0	1
530-545	1	1	2
545-600	0	0	0
600-615	1	0	1
615-630	1	1	2
630-645	0	0	0
645-700	1	0	1
HOUR TOTALS	EAST LEG	WEST LEG	TOTALS
500-600	3	1	4
515-615	3	1	4
530-630	3	2	5
545-645	2	1	3
600-700	3	1	4

NORTH LEG

WEST LEG

EAST LEG

SOUTH LEG

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMENT - RANCHO TO LILAC - RIALTO
 DATE: FRIDAY MARCH 16, 2018
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: RANCHO AVENUE
 CITY: SAN BERNARDINO

PEDESTRIANS			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	1	0	1
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	1	0	1
600-700	1	0	1

BICYCLES			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	1	0	1
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	1	0	1
530-630	1	0	1
545-645	1	0	1
600-700	1	0	1

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMENT - RANCHO TO LILAC - RIALTO
 DATE: FRIDAY MARCH 16, 2018
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: RANCHO AVENUE
 CITY: SAN BERNARDINO

PEDESTRIANS			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	1	1
515-530	1	0	1
530-545	0	0	0
545-600	0	0	0
600-615	1	0	1
615-630	0	0	0
630-645	0	0	0
645-700	0	1	1
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	1	1	2
515-615	2	0	2
530-630	1	0	1
545-645	1	0	1
600-700	1	1	2

BICYCLES			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	1	0	1
515-530	0	0	0
530-545	1	0	1
545-600	0	0	0
600-615	1	0	1
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	2	0	2
515-615	2	0	2
530-630	2	0	2
545-645	1	0	1
600-700	1	0	1

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMENT - RANCHO TO LILAC - RIALTO
 DATE: FRIDAY MARCH 16, 2018
 PERIOD: 5:00 AM TO 7:00 AM
 LOCATION: CACTUS AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	0	0	0
600-700	0	0	0

BICYCLES			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	1	0	1
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	1	0	1
515-615	1	0	1
530-630	1	0	1
545-645	1	0	1
600-700	0	0	0

INTERSECTION PEDESTRIAN AND BICYCLE COUNT SUMMARY

CLIENT: JACOBS
 PROJECT: SANBAG DOUBLE TRACK ENVIRONMENT - RANCHO TO LILAC - RIALTO
 DATE: FRIDAY MARCH 16, 2018
 PERIOD: 5:00 PM TO 7:00 PM
 LOCATION: CACTUS AVENUE
 CITY: RIALTO

PEDESTRIANS			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	1	0	1
600-615	0	0	0
615-630	0	0	0
630-645	0	0	0
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	1	0	1
515-615	1	0	1
530-630	1	0	1
545-645	1	0	1
600-700	0	0	0

BICYCLES			
15 MIN	EAST	WEST	TOTALS
COUNTS	LEG	LEG	
500-515	0	0	0
515-530	0	0	0
530-545	0	0	0
545-600	0	0	0
600-615	0	0	0
615-630	0	0	0
630-645	2	0	2
645-700	0	0	0
HOUR	EAST	WEST	TOTALS
TOTALS	LEG	LEG	
500-600	0	0	0
515-615	0	0	0
530-630	0	0	0
545-645	2	0	2
600-700	2	0	2

Appendix C

Vehicle Delay & Queuing Analysis

Existing (2017) AM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	4.12	31.67	2.59	0.15	183.0	129.7	422	18	4.3%	1.26	29.15
026137U	Willow Ave	5.40	31.67	2.71	0.27	254.0	255.5	650	29	4.5%	1.48	32.73
026136M	Riverside Ave	4.35	63.33	3.18	0.63	237.2	284.0	1147	61	5.3%	1.98	37.42
026135F	Sycamore Ave	3.77	31.67	2.59	0.17	167.5	182.3	472	20	4.3%	1.28	29.58
026134Y	Acadia Ave	2.83	31.67	2.59	0.13	126.0	160.1	386	17	4.3%	1.25	28.84
026133S	Eucalyptus Ave	3.60	31.67	2.59	0.18	160.1	204.5	492	21	4.3%	1.29	29.76
026132K	Pepper Ave	5.95	63.33	2.59	0.72	264.6	389.1	1764	76	4.3%	1.48	33.84
026131D	Rialto Ave	6.85	31.67	2.59	0.31	304.6	278.6	787	34	4.3%	1.41	32.67

NB/EB Average Delay per Vehicle (seconds)	SB/WB Average Delay per Vehicle (seconds)	NB/EB Average Delay - Stopped Vehicles (sec)	SB/WB Average Delay - Stopped Vehicles (sec)
1.29	1.23	29.77	28.53
1.48	1.48	32.71	32.75
1.95	2.01	36.82	38.02
1.27	1.28	29.40	29.75
1.23	1.26	28.45	29.22
1.26	1.31	29.22	30.30
1.38	1.55	31.89	35.79
1.43	1.39	33.05	32.29

Existing (2017) PM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	4.12	31.67	2.59	0.15	183.0	129.7	422	18	4.3%	1.26	29.15
026137U	Willow Ave	5.40	31.67	2.71	0.27	254.0	255.5	650	29	4.5%	1.48	32.73
026136M	Riverside Ave	4.35	63.33	3.18	0.63	237.2	284.0	1147	61	5.3%	1.98	37.42
026135F	Sycamore Ave	3.77	31.67	2.59	0.17	167.5	182.3	472	20	4.3%	1.28	29.58
026134Y	Acadia Ave	2.83	31.67	2.59	0.13	126.0	160.1	386	17	4.3%	1.25	28.84
026133S	Eucalyptus Ave	3.60	31.67	2.59	0.18	160.1	204.5	492	21	4.3%	1.29	29.76
026132K	Pepper Ave	5.95	63.33	2.59	0.72	264.6	389.1	1764	76	4.3%	1.48	33.84
026131D	Rialto Ave	6.85	31.67	2.59	0.31	304.6	278.6	787	34	4.3%	1.41	32.67

NB/EB Average Delay per Vehicle (seconds)	SB/WB Average Delay per Vehicle (seconds)	NB/EB Average Delay - Stopped Vehicles (sec)	SB/WB Average Delay - Stopped Vehicles (sec)
1.29	1.23	29.77	28.53
1.48	1.48	32.71	32.75
1.95	2.01	36.82	38.02
1.27	1.28	29.40	29.75
1.23	1.26	28.45	29.22
1.26	1.31	29.22	30.30
1.38	1.55	31.89	35.79
1.43	1.39	33.05	32.29

No Build (2022) AM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	4.77	31.67	2.59	0.18	212	150	489	21	4.3%	1.3	29.7
026137U	Willow Ave	6.26	31.67	2.71	0.32	294	296	754	34	4.5%	1.5	33.8
026136M	Riverside Ave	5.04	63.33	3.18	0.75	275	329	1330	70	5.3%	2.0	38.5
026135F	Sycamore Ave	4.37	31.67	2.59	0.20	194	211	547	24	4.3%	1.3	30.3
026134Y	Acadia Ave	3.28	31.67	2.59	0.16	146	186	447	19	4.3%	1.3	29.4
026133S	Eucalyptus Ave	4.17	31.67	2.59	0.21	186	237	570	25	4.3%	1.3	30.5
026132K	Pepper Ave	6.90	63.33	2.59	0.88	307	451	2045	88	4.3%	1.6	35.6
026131D	Rialto Ave	7.94	31.67	2.59	0.37	353	323	912	39	4.3%	1.5	34.1

Build (2022) AM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	4.77	31.67	2.59	0.18	212	150	489	21	4.3%	1.29	29.75
026137U	Willow Ave	6.26	31.67	2.71	0.32	294	296	754	34	4.5%	1.53	33.84
026136M	Riverside Ave	5.04	63.33	3.18	0.75	275	329	1330	70	5.3%	2.04	38.52
026135F	Sycamore Ave	4.37	31.67	2.59	0.20	194	211	547	24	4.3%	1.31	30.26
026134Y	Acadia Ave	3.28	31.67	2.59	0.16	146	186	447	19	4.3%	1.27	29.37
026133S	Eucalyptus Ave	4.17	31.67	2.59	0.21	186	237	570	25	4.3%	1.32	30.49
026132K	Pepper Ave	6.90	63.33	2.59	0.88	307	451	2045	88	4.3%	1.56	35.61
026131D	Rialto Ave	7.94	31.67	2.59	0.37	353	323	912	39	4.3%	1.47	34.09

No Build (2022) PM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	3.92	31.67	3.46	0.20	175	136	417	24	5.8%	1.68	29.2
026137U	Willow Ave	5.93	31.67	3.85	0.47	352	368	729	47	6.4%	2.32	36.2
026136M	Riverside Ave	7.98	63.33	3.09	1.33	435	370	1772	91	5.1%	2.69	39.9
026135F	Sycamore Ave	5.90	31.67	3.45	0.34	262	237	674	39	5.8%	1.81	31.5
026134Y	Acadia Ave	3.57	31.67	3.45	0.20	159	153	420	24	5.8%	1.68	29.1
026133S	Eucalyptus Ave	4.62	31.67	3.45	0.23	205	158	490	28	5.8%	1.72	29.7
026132K	Pepper Ave	8.39	63.33	3.45	0.97	373	286	1779	102	5.8%	1.96	33.9
026131D	Rialto Ave	7.78	31.67	3.45	0.56	346	393	997	57	5.8%	2.03	35.1

Build (2022) PM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	3.92	31.75	3.45	0.20	180	139	417	24	5.7%	1.69	29.5
026137U	Willow Ave	5.93	31.67	3.83	0.47	358	375	729	47	6.4%	2.33	36.6
026136M	Riverside Ave	7.98	63.33	4.02	1.33	442	375	1772	119	6.7%	2.69	40.2
026135F	Sycamore Ave	5.90	31.67	3.43	0.34	268	242	674	39	5.7%	1.82	31.8
026134Y	Acadia Ave	3.57	31.67	3.43	0.20	162	156	420	24	5.7%	1.68	29.4
026133S	Eucalyptus Ave	4.62	31.67	3.43	0.23	210	161	490	28	5.7%	1.72	30.0
026132K	Pepper Ave	8.39	63.33	3.43	0.97	381	292	1779	102	5.7%	1.97	34.2
026131D	Rialto Ave	7.78	31.67	3.43	0.56	354	401	997	57	5.7%	2.03	35.5

No Build (2040) AM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles
026138B	Lilac Ave	8.12	31.67	2.59	0.33	361.3	255.9	833	36	4.3%	1.45	33.25
026137U	Willow Ave	10.66	31.67	2.71	0.66	501.2	504.3	1283	58	4.5%	1.85	40.96
026136M	Riverside Ave	8.59	63.33	3.18	1.51	468.2	560.5	2264	120	5.3%	2.41	45.31
026135F	Sycamore Ave	7.43	31.67	2.59	0.38	330.5	359.8	932	40	4.3%	1.48	34.32
026134Y	Acadia Ave	5.59	31.67	2.59	0.30	248.6	315.9	762	33	4.3%	1.40	32.42
026133S	Eucalyptus Ave	7.10	31.67	2.59	0.41	315.9	403.7	971	42	4.3%	1.51	34.85
026132K	Pepper Ave	11.74	63.33	2.59	2.11	522.1	767.8	3481	150	4.3%	2.18	49.07
026131D	Rialto Ave	13.52	31.67	2.59	0.82	601.1	549.9	1553	67	4.3%	1.90	43.85

Build (2040) AM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles
026138B	Lilac Ave	8.12	31.67	2.59	0.33	361.3	255.9	833	36	4.3%	1.45	33.25
026137U	Willow Ave	10.66	31.67	2.71	0.66	501.2	504.3	1283	58	4.5%	1.85	40.96
026136M	Riverside Ave	8.59	63.33	3.18	1.51	468.2	560.5	2264	120	5.3%	2.41	45.31
026135F	Sycamore Ave	7.43	31.67	2.59	0.38	330.5	359.8	932	40	4.3%	1.48	34.32
026134Y	Acadia Ave	5.59	31.67	2.59	0.30	248.6	315.9	762	33	4.3%	1.40	32.42
026133S	Eucalyptus Ave	7.10	31.67	2.59	0.41	315.9	403.7	971	42	4.3%	1.51	34.85
026132K	Pepper Ave	11.74	63.33	2.59	2.11	522.1	767.8	3481	150	4.3%	2.18	49.07
026131D	Rialto Ave	13.52	31.67	2.59	0.82	601.1	549.9	1553	67	4.3%	1.90	43.85

No Build (2040) PM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	6.68	31.67	3.46	0.37	299.2	231.3	711	41	5.8%	1.85	31.95
026137U	Willow Ave	10.10	31.67	3.85	0.96	598.4	627.1	1241	80	6.4%	2.79	43.39
026136M	Riverside Ave	13.58	63.33	3.09	2.88	740.7	629.4	3015	155	5.1%	3.44	50.79
026135F	Sycamore Ave	10.03	31.67	3.45	0.68	446.1	403.9	1147	66	5.8%	2.14	37.12
026134Y	Acadia Ave	6.08	31.67	3.45	0.37	270.5	260.1	716	41	5.8%	1.84	31.92
026133S	Eucalyptus Ave	7.87	31.67	3.45	0.45	349.8	269.0	835	48	5.8%	1.92	33.24
026132K	Pepper Ave	14.29	63.33	3.45	2.13	635.5	486.9	3029	174	5.8%	2.53	43.40
026131D	Rialto Ave	13.25	31.67	3.45	1.28	589.1	668.4	1697	98	5.8%	2.71	46.92

Build (2040) PM

FRA ID	Street	Average Vehicle Arrival Rate (veh/minute/lane)	Average Vehicle Departure Rate (veh/minute/lane)	Total Gate Down Time (Minutes)	Vehicle Hours of Delay	NB/EB 95th Percentile Queue Length (ft)	SB/WB 95th Percentile Queue Length (ft)	Total Vehicles Arriving During Peak Hour	Total Vehicles Delayed by At-Grade Crossing	% Time Blocked by Train	Average Delay per Vehicle (seconds)	Average Delay - Stopped Vehicles (sec)
026138B	Lilac Ave	6.68	31.67	3.44	0.37	305.8	236.4	711	41	5.7%	1.85	32.26
026137U	Willow Ave	10.10	31.67	3.83	0.97	609.2	638.3	1241	79	6.4%	2.80	43.90
026136M	Riverside Ave	13.58	63.33	4.02	2.88	751.7	638.7	3015	202	6.7%	3.44	51.15
026135F	Sycamore Ave	10.03	31.67	3.43	0.68	455.9	412.8	1147	66	5.7%	2.14	37.48
026134Y	Acadia Ave	6.08	31.67	3.43	0.37	276.4	265.8	716	41	5.7%	1.84	32.23
026133S	Eucalyptus Ave	7.87	31.67	3.43	0.45	357.5	274.9	835	48	5.7%	1.93	33.57
026132K	Pepper Ave	14.29	63.33	3.43	2.13	649.5	497.6	3029	173	5.7%	2.53	43.82
026131D	Rialto Ave	13.25	31.67	3.43	1.28	602.1	683.2	1697	97	5.7%	2.72	47.38

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Appendix L

Tribal Consultation Correspondence



CH2M
377 Brewer Way
Big Bear City, CA
92314
Tel 714.435-6044
Fax 714.424.2174

June 16, 2017

Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814

Subject: Lilac to Rancho Double Tracking Project

To Whom It May Concern:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) and the Los Angeles County Metropolitan Transportation Authority (Metro) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project whose goals are to provide commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station. SBCTA, as the owner of the rail corridor within San Bernardino County and the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three (3) miles of a second main line track between Control Point (CP) Lilac Milepost (MP) 52.4 to approximately CP Rancho, near MP 55.1 on the SBL. The proposed project is the City of Rialto, San Bernardino County, California.

The project is located on the Fontana and San Bernardino South, CA, 7.5 Minute USGS quadrangles. The legal descriptions are:

Township 1S, Range 5W Sections 11 and 12; Township 1S, Range 4 W, Section 7

The project map is provided along with a 0.5-mile buffer.

We would appreciate your checking the Sacred Lands Files to see if there are any culturally sensitive areas within the immediate project vicinity. We would also like to receive a list of MLD's appropriate for this area since we will attempt to contact local Indian groups to solicit their written input/concerns about the project.

Thanks again for your cooperation and assistance. I look forward to your earliest possible reply.

Sincerely,

CH2M

A handwritten signature in black ink, appearing to read 'Gloriella Cardenas'.

Gloriella Cardenas, M.A., RPA

Enclosures: Project Location Map and Request Form

LOCAL GOVERNMENT TRIBAL CONSULTATION LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364

SACRAMENTO, CA 95814

(916) 653-4082

(916) 657-5390 - Fax

Project Title: Lilac to Rancho Double Tracking Project

Local Government/Lead Agency: San Bernardino County Transportation Authority

Contact Person: Gloriella Cardenas, CH2M HILL

Street Address: 377 Brewer Way

City: Big Bear City **Zip:** 92314

Phone: 714-435-6044

Fax: 714-424-2174

Specific Area Subject to Proposed Action

County: San Bernardino

City/Community: Rialto, California

Local Action Type: CEQA Compliance

General Plan ☐ General Plan Element ☐ General Plan Amendment

☐ Specific Plan ☐ Specific Plan Amendment

☐ Pre-planning Outreach Activity

Project Description:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) and the Los Angeles County Metropolitan Transportation Authority (Metro) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project whose goals are to provide commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station.

☒ Sacred Lands File Search and Native American Contacts List Request
Information Below is Required for a Sacred Lands File Search

USGS Quadrangle Name

The project is located on the Fontana and San Bernardino South, CA, 7.5 Minute USGS quadrangles. The legal descriptions are:

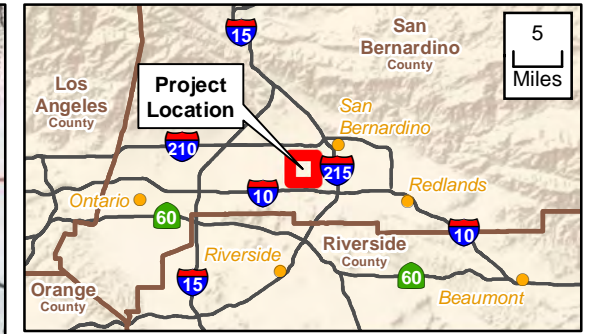
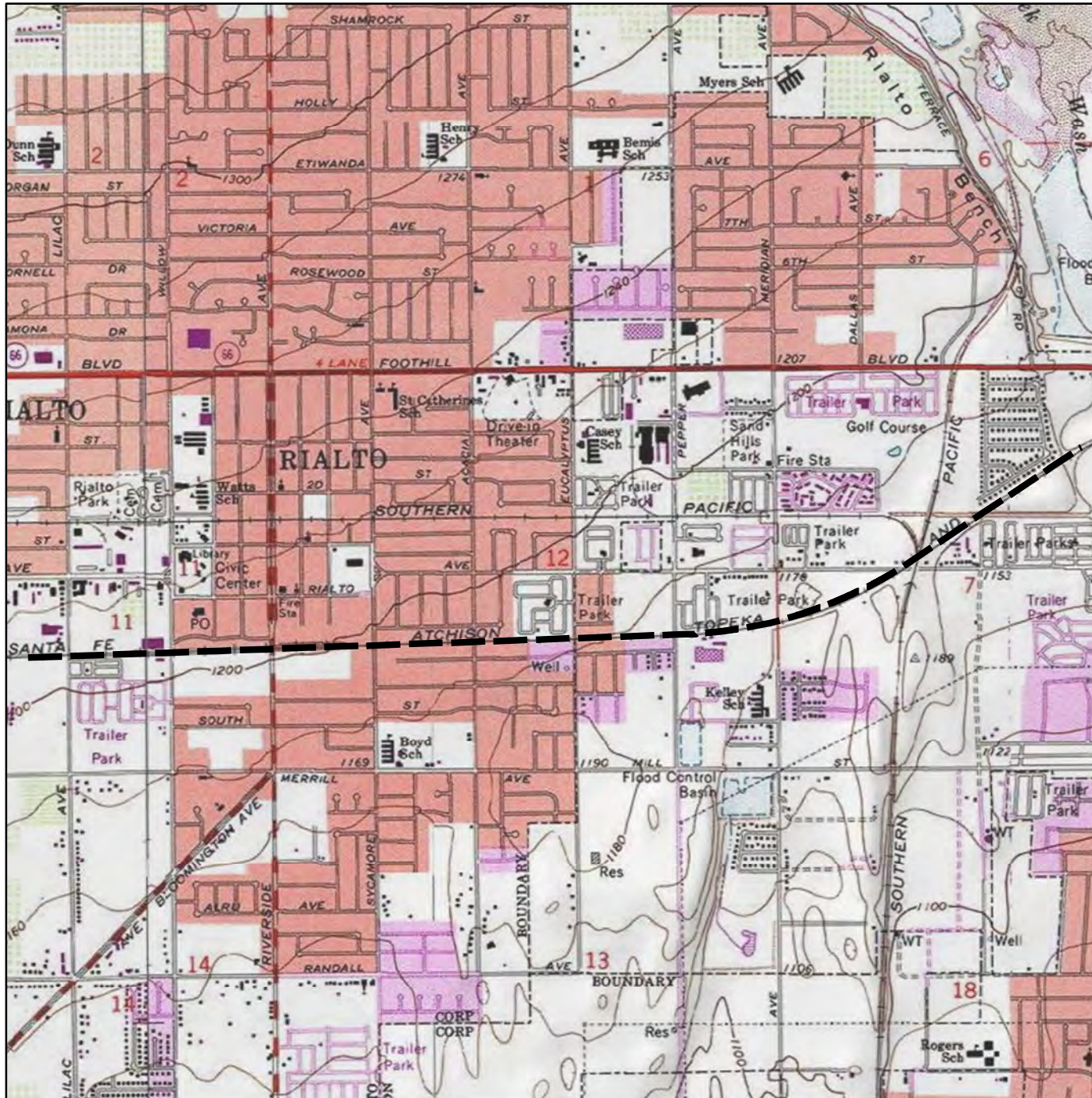
Township 1S, Range 5W Sections 11 and 12; Township 1S, Range 4 W, Section 7

NAHC Use Only

Date Received: _____

Date Completed _____

Native American Tribal Consultation lists are only applicable for consulting with California Native American tribes per Government Code Section 65352.3.



Legend

-- Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

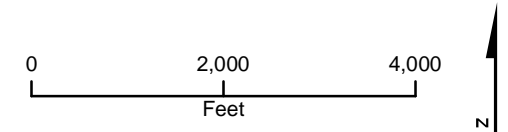


Figure 1
Project Location
 SANBAG Double Track Project
 Rialto, California

NATIVE AMERICAN HERITAGE COMMISSION

Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710



May 5, 2017

Gloriella Cardenas
CH2M HILL

Sent by E-mail: gloriella.cardenas@ch2m.com

RE: Proposed Lilac to Rancho Double Tracking Project, City of Rialto; San Bernardino South and Fontana USGS Quadrangles, San Bernardino County, California

Dear Ms. Cardenas:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

A handwritten signature in blue ink that reads "Gayle Totton".

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

Native American Contact List
May 5, 2017
San Bernardino County

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway Cahuilla
Indio , CA 92203
(760) 342-2593

(760) 347-7880 Fax

Los Coyotes Band of Cahuilla and Cupeno Indians
Shane Chapparosa, Chairman
P.O. Box 189 Cahuilla
Warner Springs , CA 92086
Chapparosa@msn.com
(760) 782-0711

(760) 782-0712 Fax

Ramona Band of Cahuilla
Daniel Salgado, Chairman
P.O. Box 391670 Cahuilla
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105

(951) 763-4325 Fax

San Manuel Band of Mission Indians
Lynn Valbuena, Chairwoman
26569 Community Center Serrano
Highland , CA 92346
(909) 864-8933

(909) 864-3370 Fax

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838 Tataviam
Newhall , CA 91322 Serrano
tsen2u@hotmail.com Kitanemuk
(760) 885-0955 Cell

Gabrielino/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 483-3564 Cell

(626) 286-1262 Fax

Santa Rosa Band of Cahuilla Indians
Steven Estrada, Chairman
P.O. Box 391820 Cahuilla
Anza , CA 92539
(951) 659-2700

(951) 659-2228 Fax

Augustine Band of Cahuilla Indians
Amanda Vance, Chairperson
P.O. Box 846 Cahuilla
Coachella , CA 92236
(760) 398-4722
(760) 369-7161 Fax

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 Gabrielino Tongva
Los Angeles , CA 90012
sgoad@gabrielino-tongva.com
(951) 807-0479

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@gmail.com
(562) 761-6417 Voice/Fax

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person or agency of statutory responsibility as defined in Public Resources Code Sections 21080.3.1 Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Lilac to Rancho Double Tracking Project, City of Rialto, San Bernardino County, California

Native American Contact List
May 5, 2017
San Bernardino County

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive Cahuilla
Palm Springs , CA 92264
(760) 699-6800

(760) 699-6919 Fax

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Road Cahuilla
Banning , CA 92220 Serrano
(951) 849-8807
(951) 755-5200
(951) 922-8146 Fax

Serrano Nation of Mission Indians
Goldie Walker, Chairperson
P.O. Box 343 Serrano
Patton , CA 92369

(909) 528-9027
(909) 528-9032

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director, THPO
5401 Dinah Shore Drive Cahuilla
Palm Springs , CA 92264
ACBCI-THPO@aguacaliente.net
(760) 699-6907
(760) 567-3761 Cell
(760) 699-6924 Fax

Cahuilla Band of Mission Indians
Daniel Salgado, Chairperson
52701 U. S. Highway 371 Cahuilla
Anza , CA 92539
Chairman@cahuilla.net
(951) 763-5549
(951) 763-2808

Gabrielino-Tongva Tribe
Linda Candelaria, Co-Chairperson
1999 Avenue of the Stars, Suite 1100 Gabrielino
Los Angeles , CA 90067
(626) 676-1184 Cell

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Luiseno
San Jacinto , CA 92581 Cahuilla
jontiveros@soboba-nsn.gov
(951) 663-5279
(951) 654-5544, ext 4137
(951) 654-4198 Fax

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 Gabrielino
Covina , CA 91723
gabrielenoindians@yahoo.com
(626) 926-4131

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 Cahuilla
Thermal , CA 92274
mmirelez@tmdci.org
(760) 399-0022, Ext. 1213
(760) 397-8146 Fax

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This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Lilac to Rancho Double Tracking Project, City of Rialto, San Bernardino County, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Amanda Vance, Chairperson
Augustine Band of Cahuilla Indians
P.O. Box 846
Coachella, CA 92236

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr./Ms.:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project, whose goals are to provide improved commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station. SBCTA, as the project proponent within San Bernardino County and also as the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three (3) miles of a second main line track between Control Point (CP) Lilac, located at Milepost (MP) 52.4, to CP Rancho, near MP 55.1 on the Metrolink San Bernardino Line. The proposed project corridor would include improvements within the City of Rialto and City of San Bernardino, San Bernardino County, California.

- The project is located on the Fontana and San Bernardino South, CA, 7.5 Minute USGS quadrangles. The legal descriptions are:
- Township 1S, Range 5W, Sections 11 and 12; Township 1S, Range 4 W, Section 7
- The project map is provided along with a 0.5-mile buffer as well as a Project Background and Description document.

A search of the Sacred Land files by the Native American Heritage Commission (NAHC) on April 28, 2017 failed to indicate the presence of Native American sacred sites in the immediate Project vicinity. A California Historical Resources Information System literature search was completed on November 29, 2016 by staff at the South Central Coastal Information Center (SCCIC) located at California State University, Fullerton, California. No cultural resources have been previously documented within the study area. An archaeological pedestrian survey was conducted on November 30, 2016 by CH2M. No cultural resources were identified within the Project. To date, no prehistoric resources have been identified within the Project, either by the archival research or the pedestrian survey.

State law, under Assembly Bill 52 (Public Resources Code Section 21080.3.1), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed project may have on tribal cultural resources. The request must be in writing to the following contact at SBCTA: Justin Fornelli, PE - Chief of Transit & Rail Programs,

1170 West Third Street, 2nd Floor, San Bernardino, CA 92410 or at jfornelli@gosbcta.com, and a contact person must be identified. SBCTA will begin the consultation process within thirty (30) days of receiving the tribe's request for consultation.

Should SBTCA not receive a response within thirty (30) days, it will be presumed that you have declined consultation.

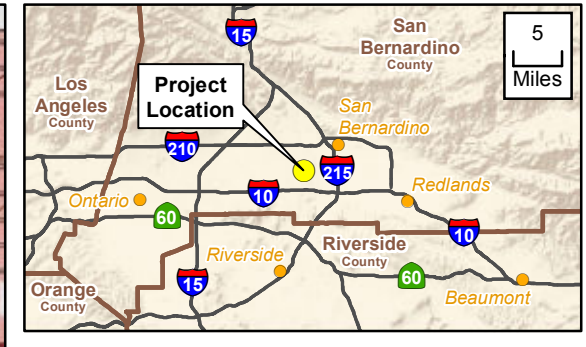
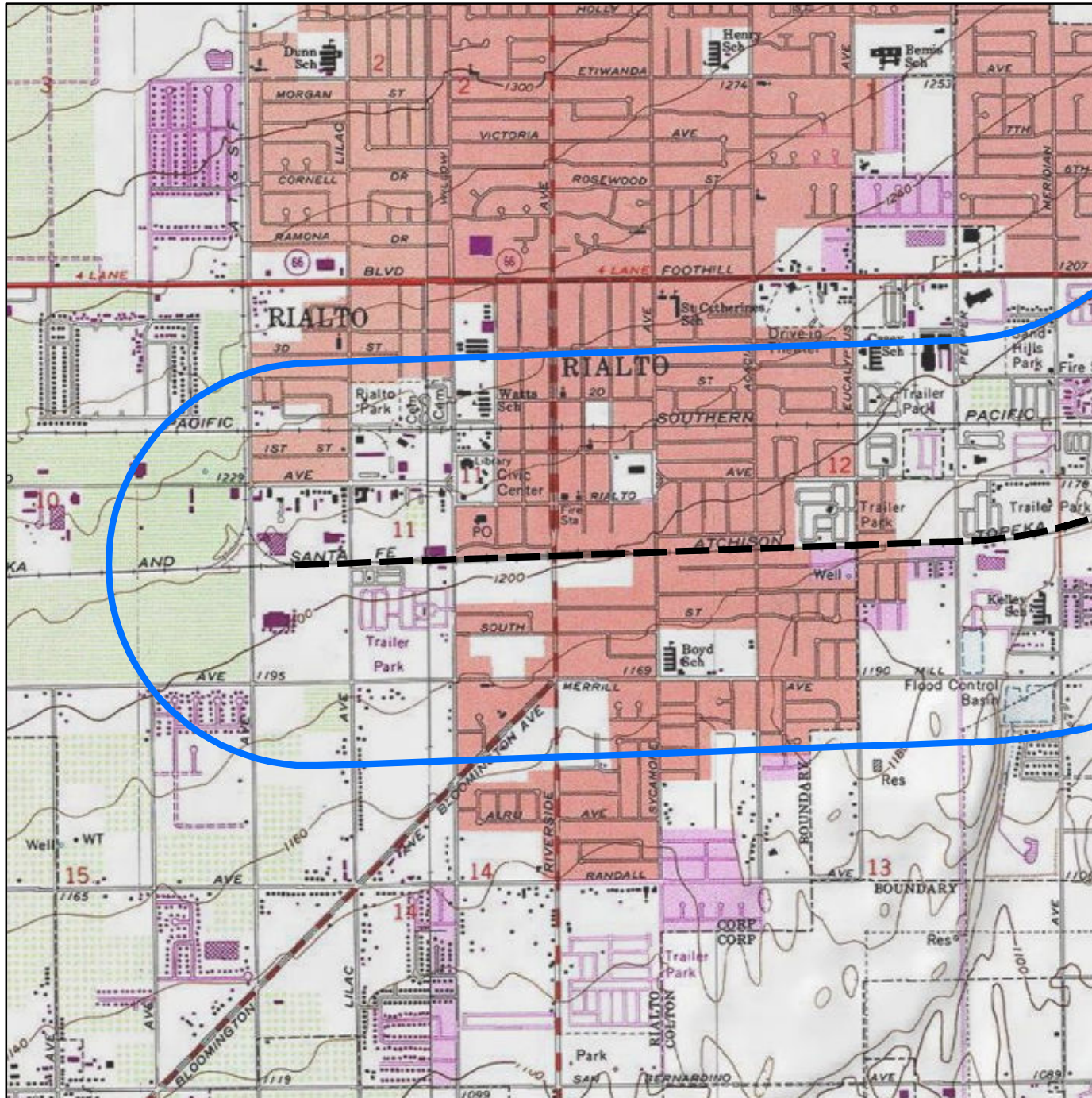
If you know of any traditional cultural properties or values (e.g., burial sites, religious sites, or gathering sites) within the Project area shown on the enclosed map, or if you have any questions regarding issues related to the overall Project, please contact me by phone at 714-435-6044 or by email at gloriella.cardenas@ch2m.com. Your project comments and concerns are important to us. We look forward to hearing from you in the near future.

Respectfully yours,

A handwritten signature in black ink, appearing to read "Gloriella Cardenas", written in a cursive style.

Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

Enclosure—Map of Project Area



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

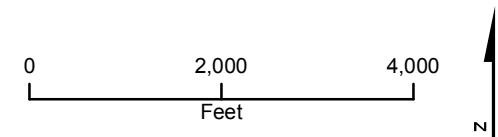
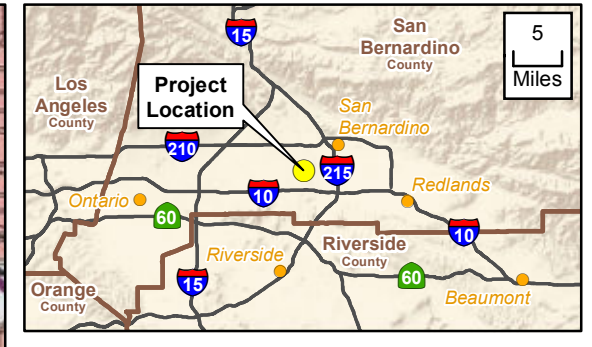
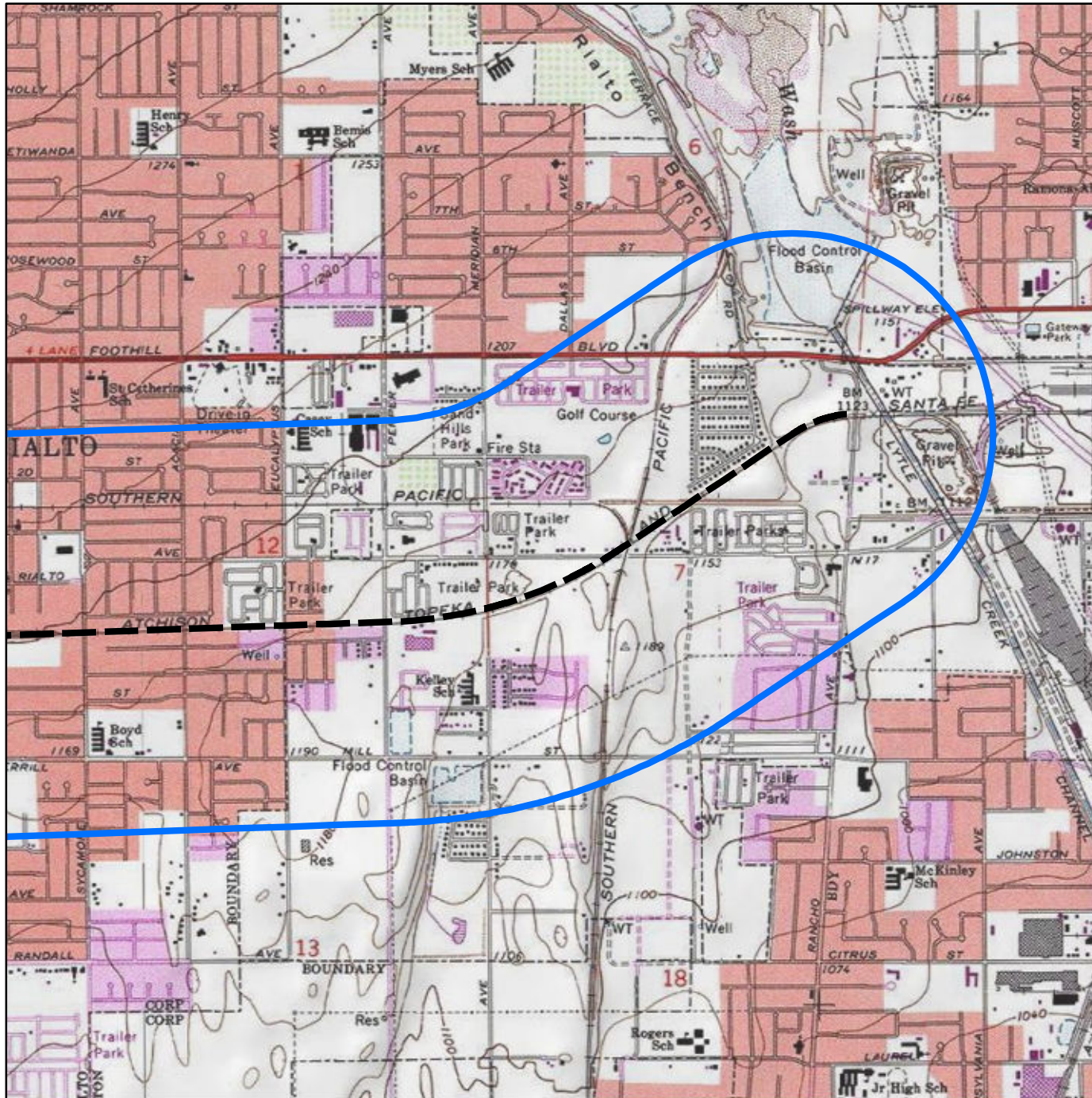


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

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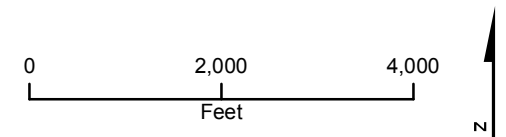


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Andrew Salas, Chairperson
Gabrieleno Band of Mission Indians – Kizh Nation
P.O. Box 939
Covina, CA 91723

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

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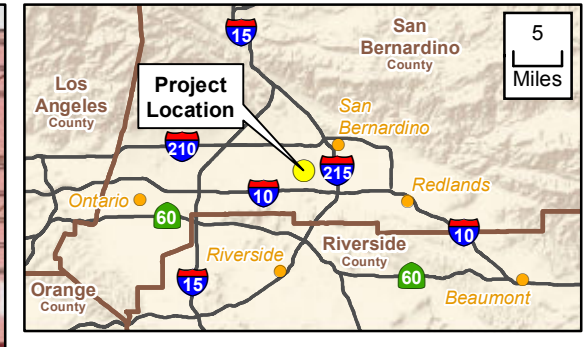
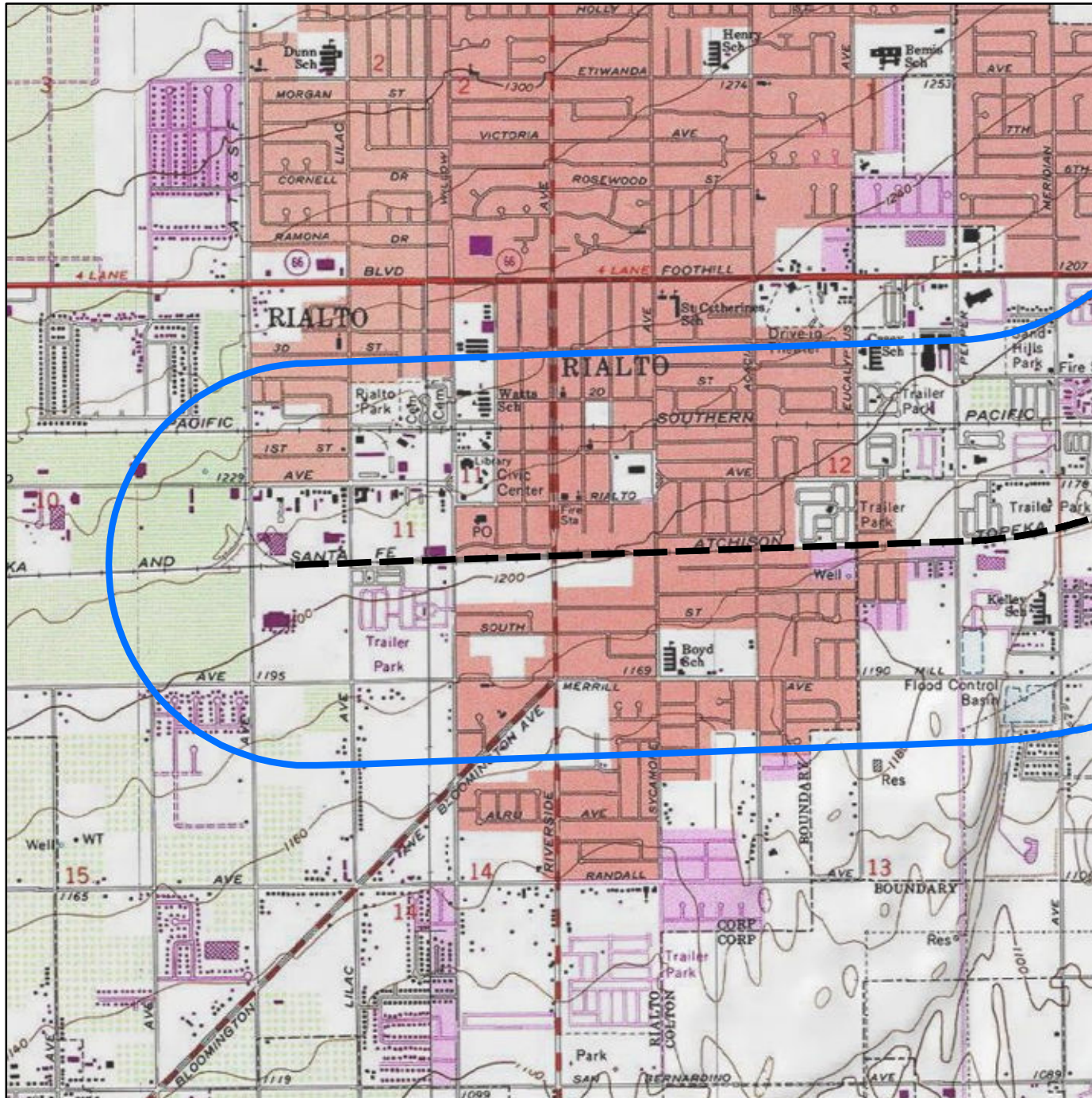
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Respectfully yours,

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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

Enclosure—Map of Project Area



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

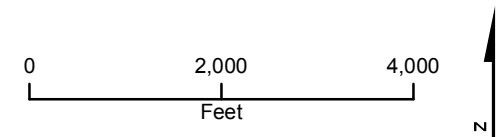
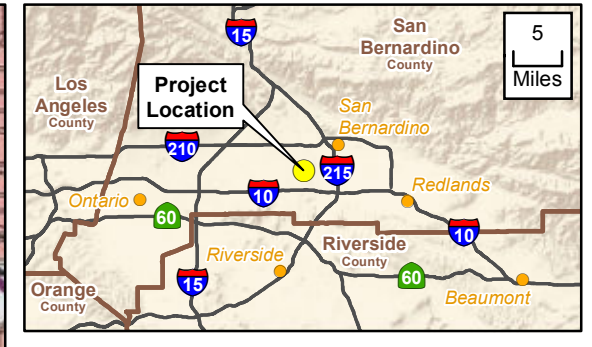
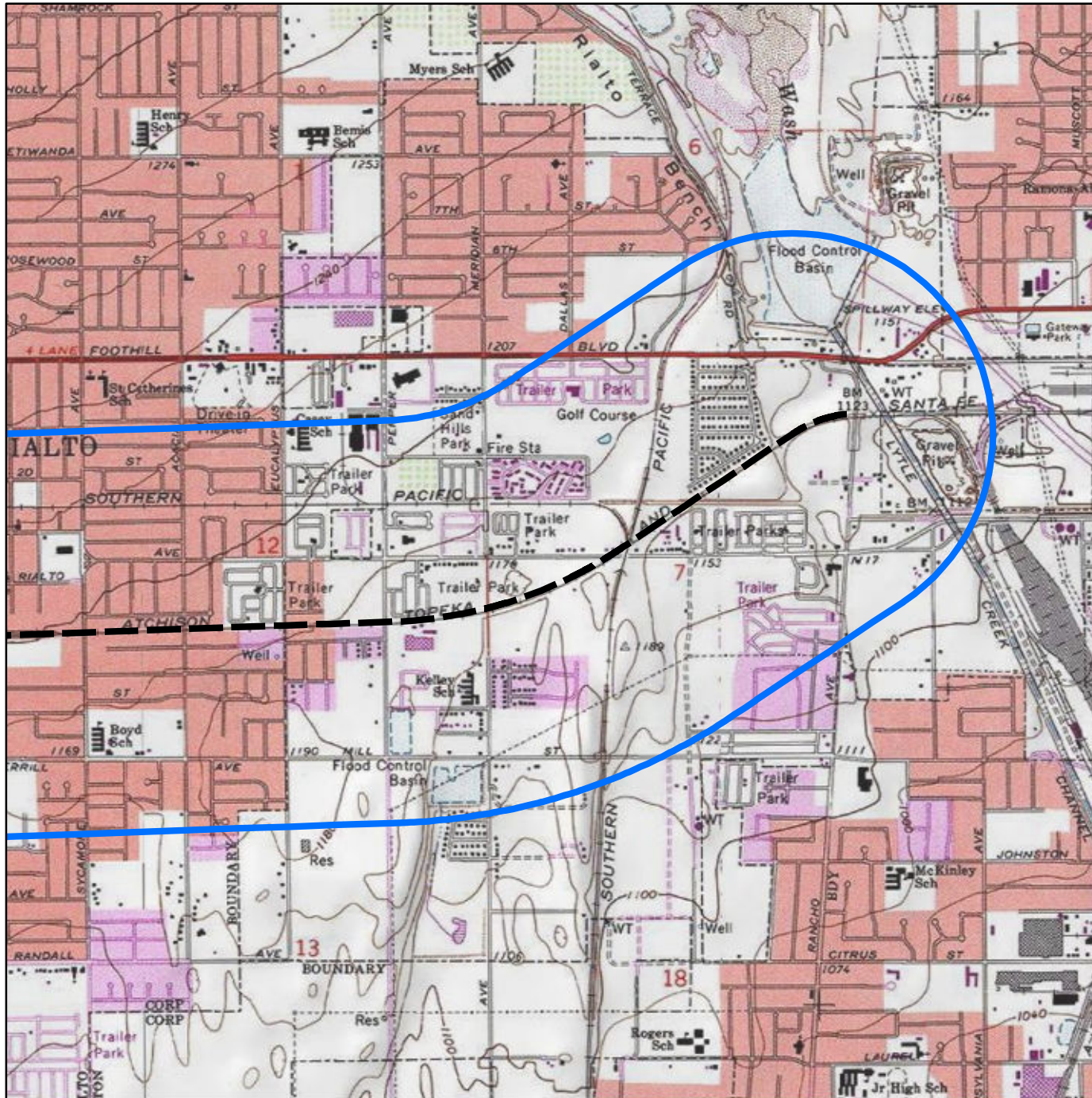


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

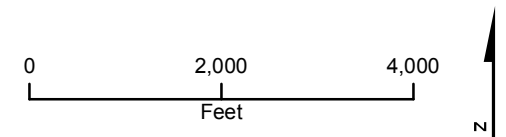


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Anthony Morales, Chairperson
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA 91778

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr./Ms.:

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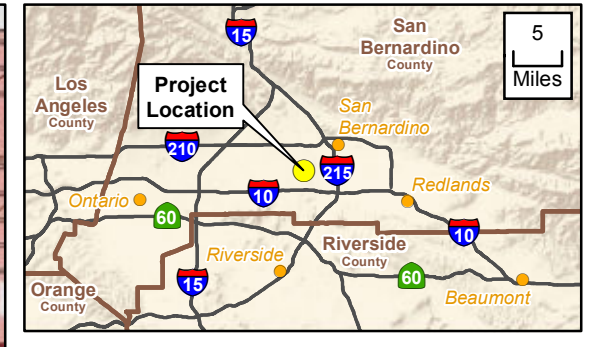
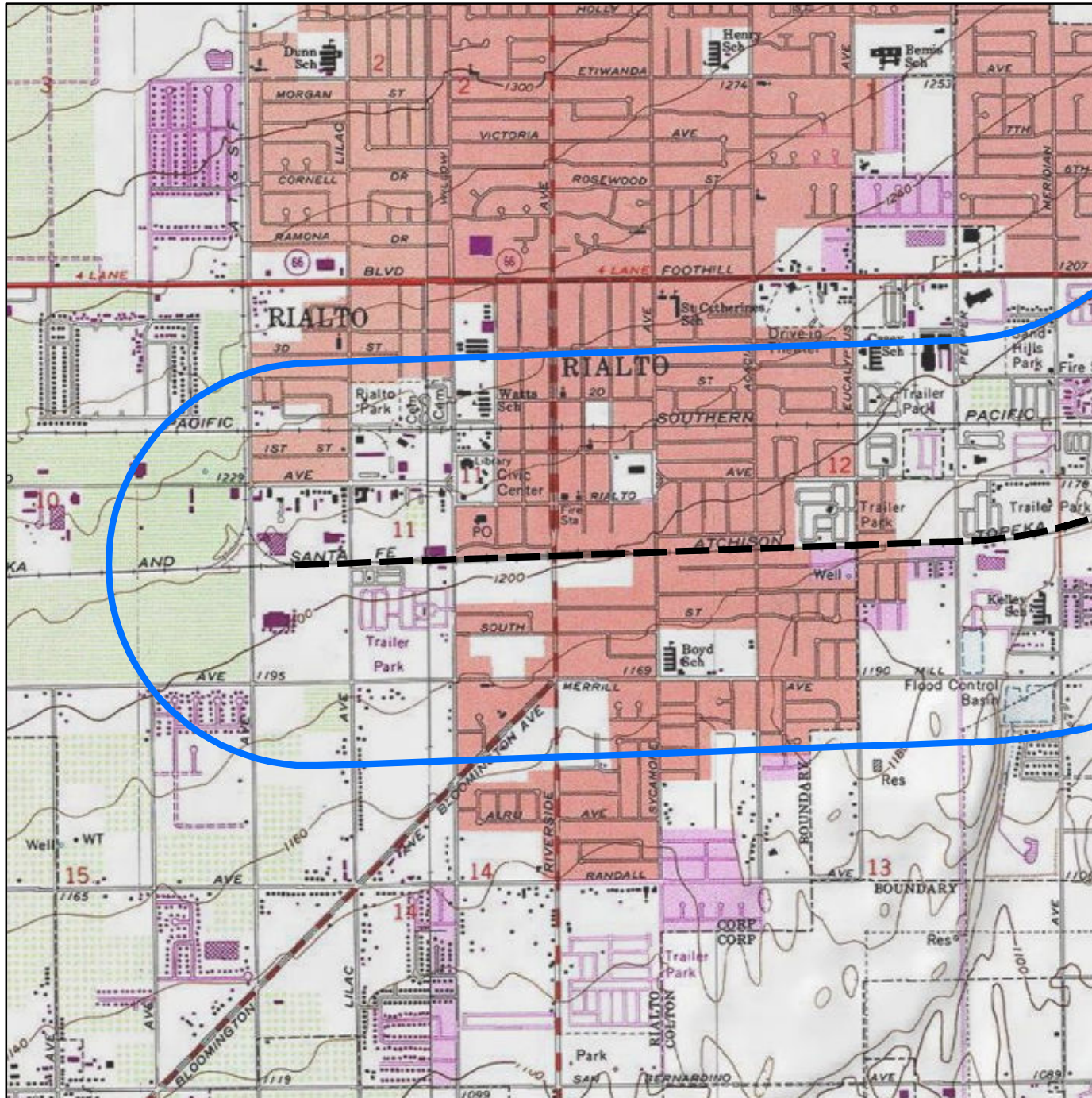
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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

Enclosure—Map of Project Area



Legend

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- 0.5 Mile Buffer of Project Location

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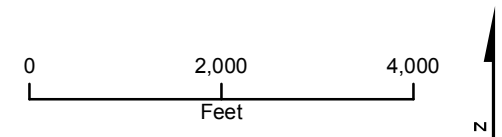
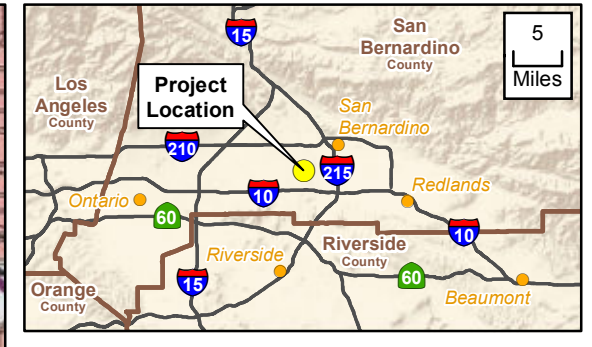
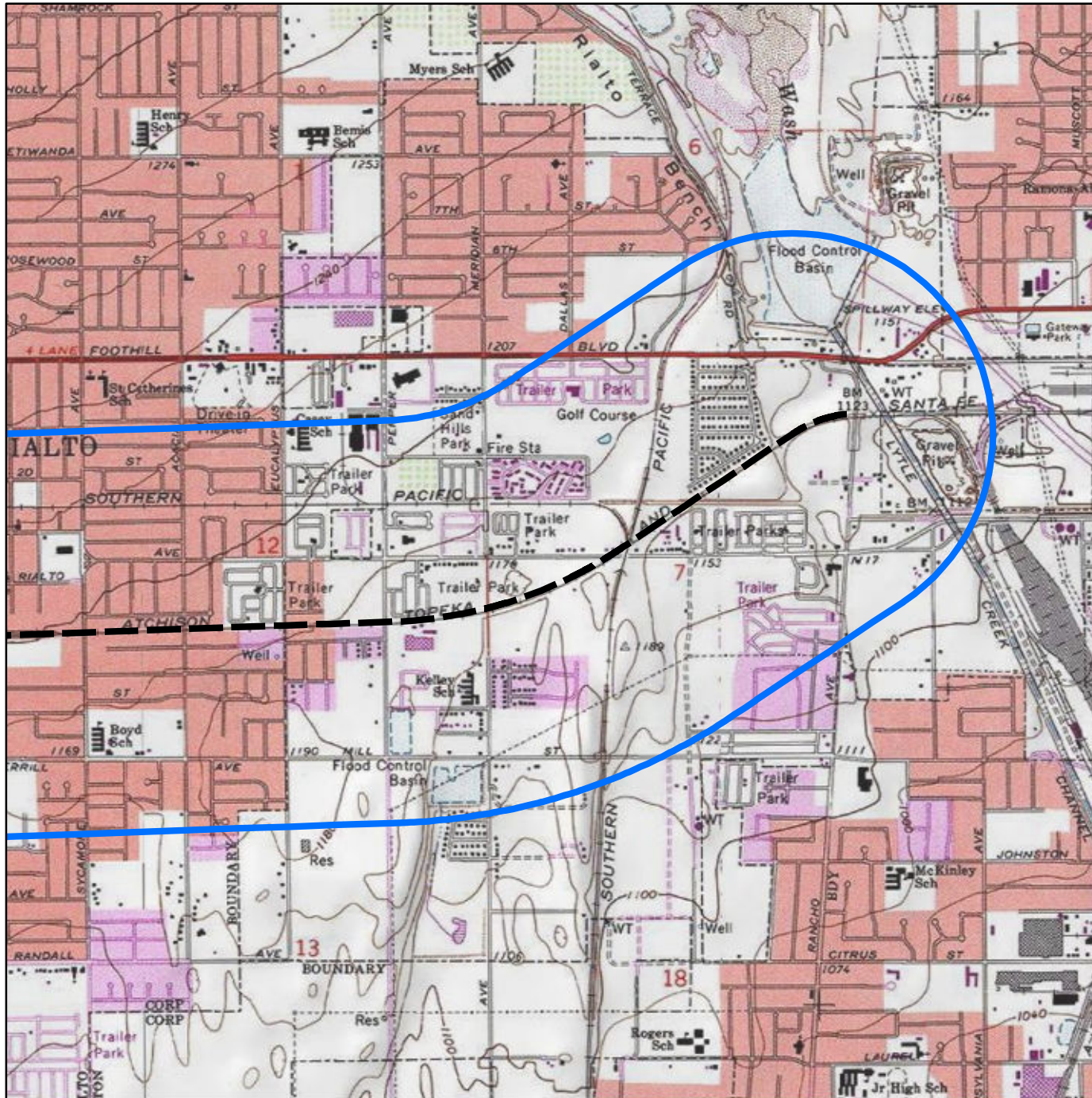


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 Rialto and San Bernardino, California



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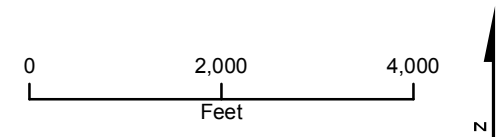


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June 12, 2017

Daniel Salgado, Chairman
Ramona Band of Cahuilla
P.O. Box 391670
Anza, CA 92539

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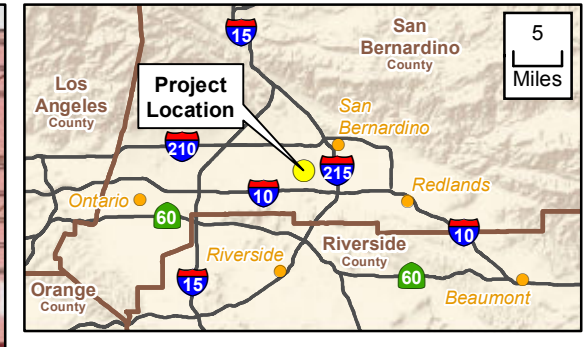
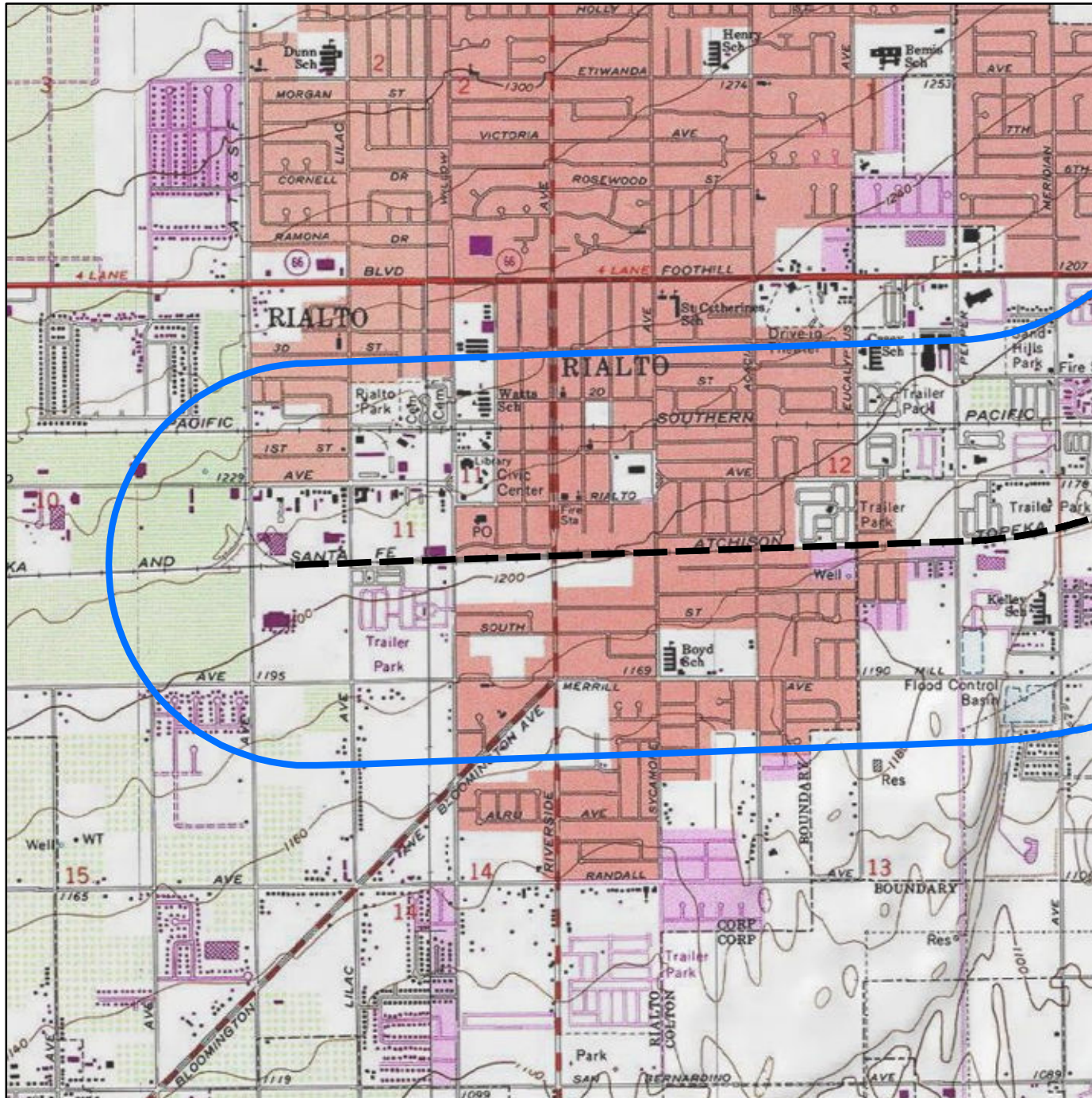
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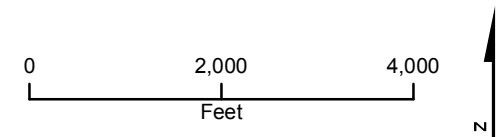
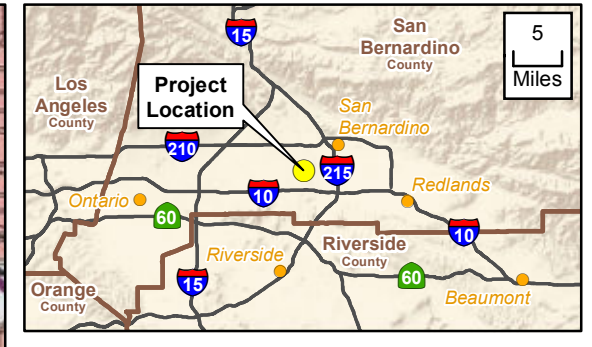
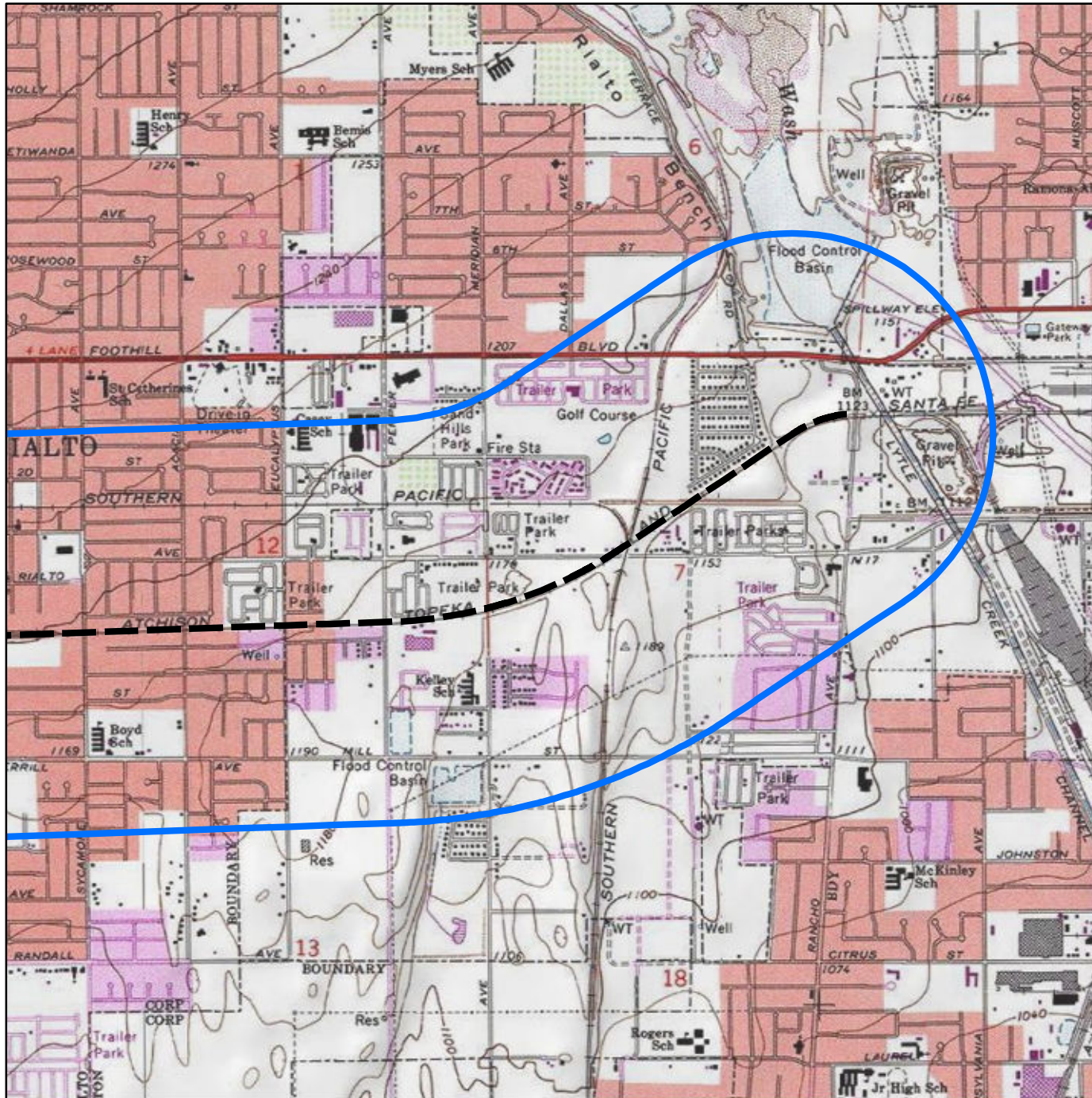


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 Rialto and San Bernardino, California



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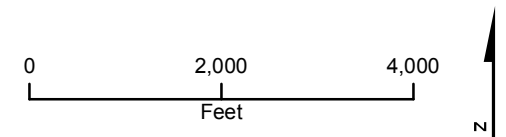


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CH2M HILL
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Tel 714.435-6044

June 12, 2017

Daniel Salgado, Chairperson
Cahuilla Band of Mission Indians
52701 U.S. Highway 371
Anza, CA 92539

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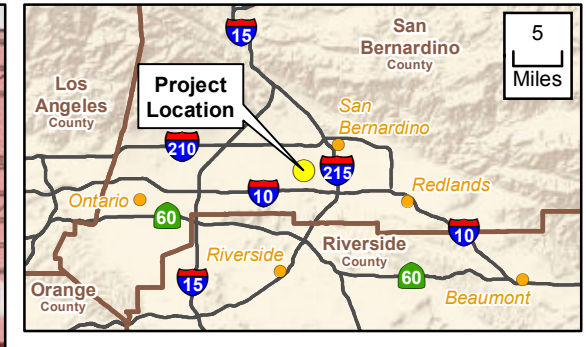
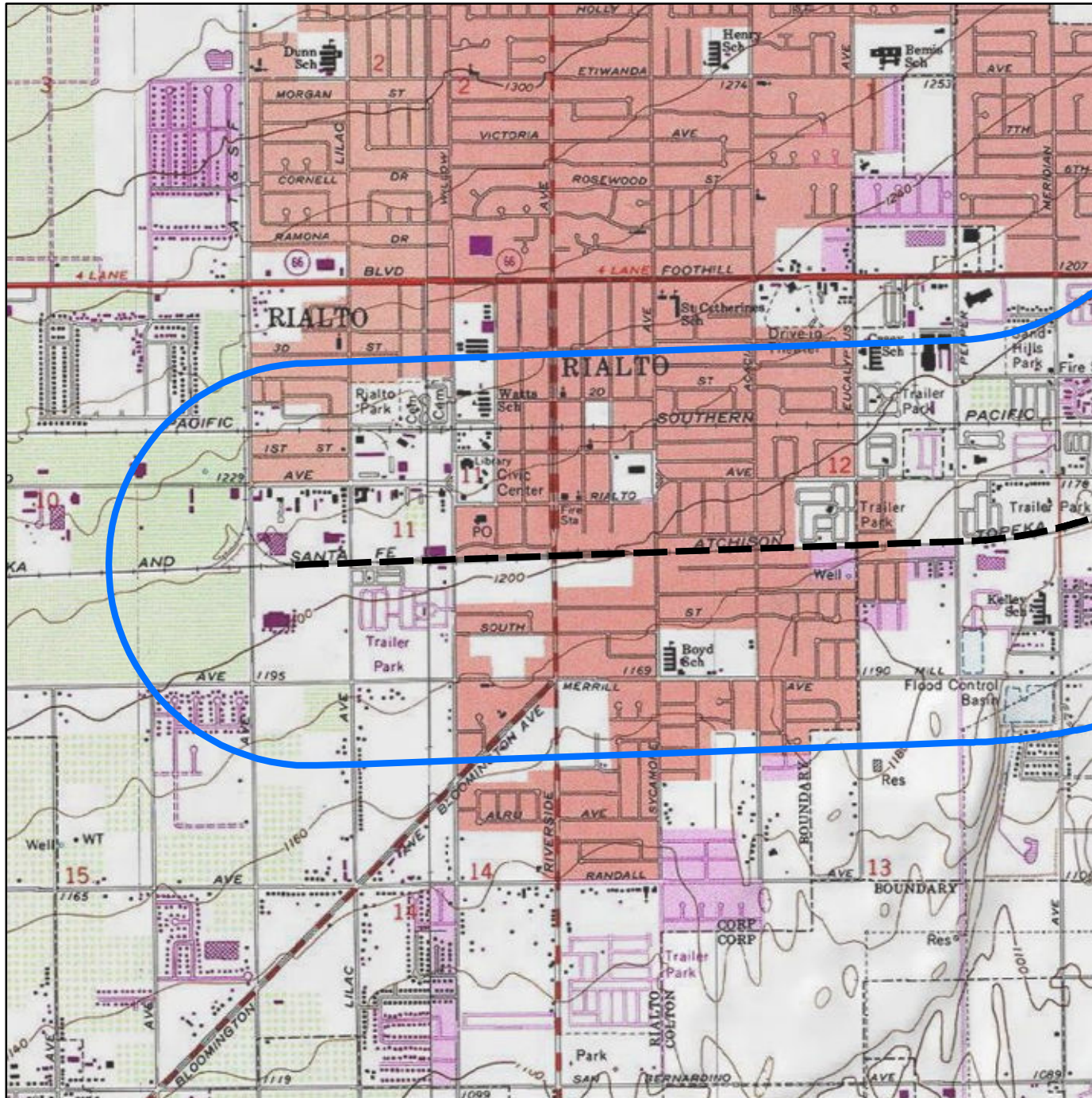
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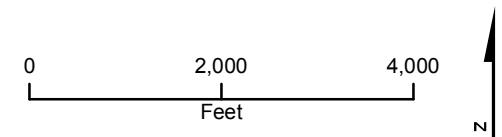
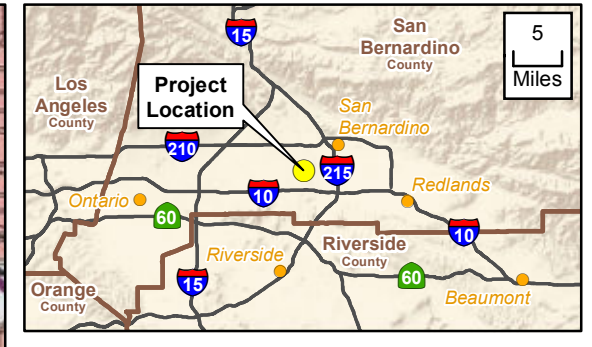
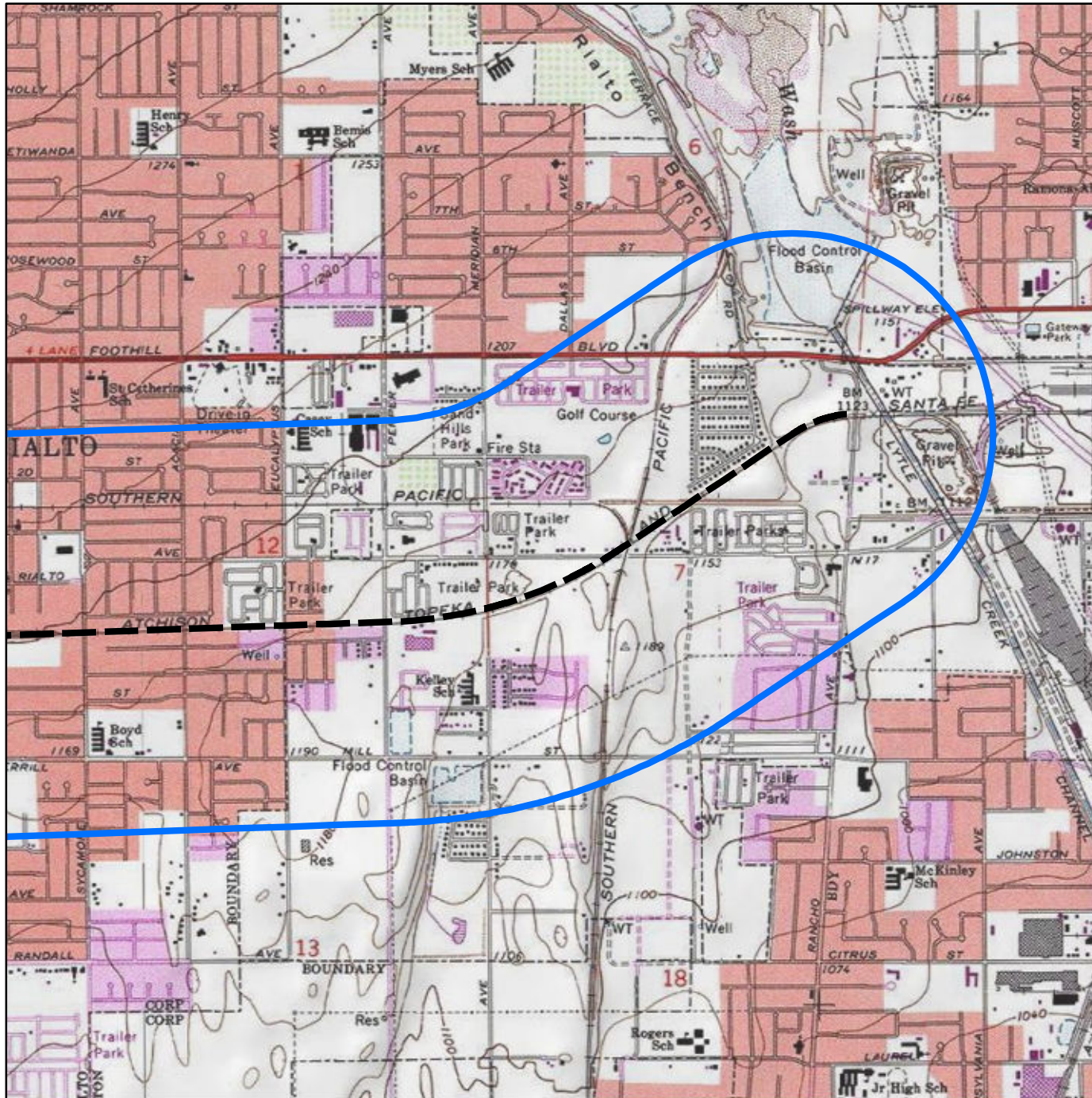


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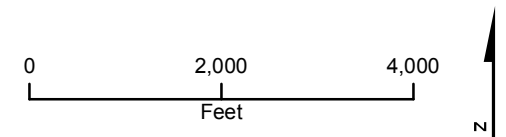


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6 Hutton Center Dr. Suite
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June 12, 2017

Doug Welmas, Chairperson
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway
Indio CA 92203

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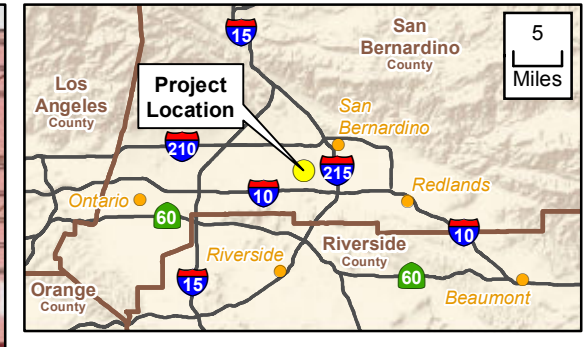
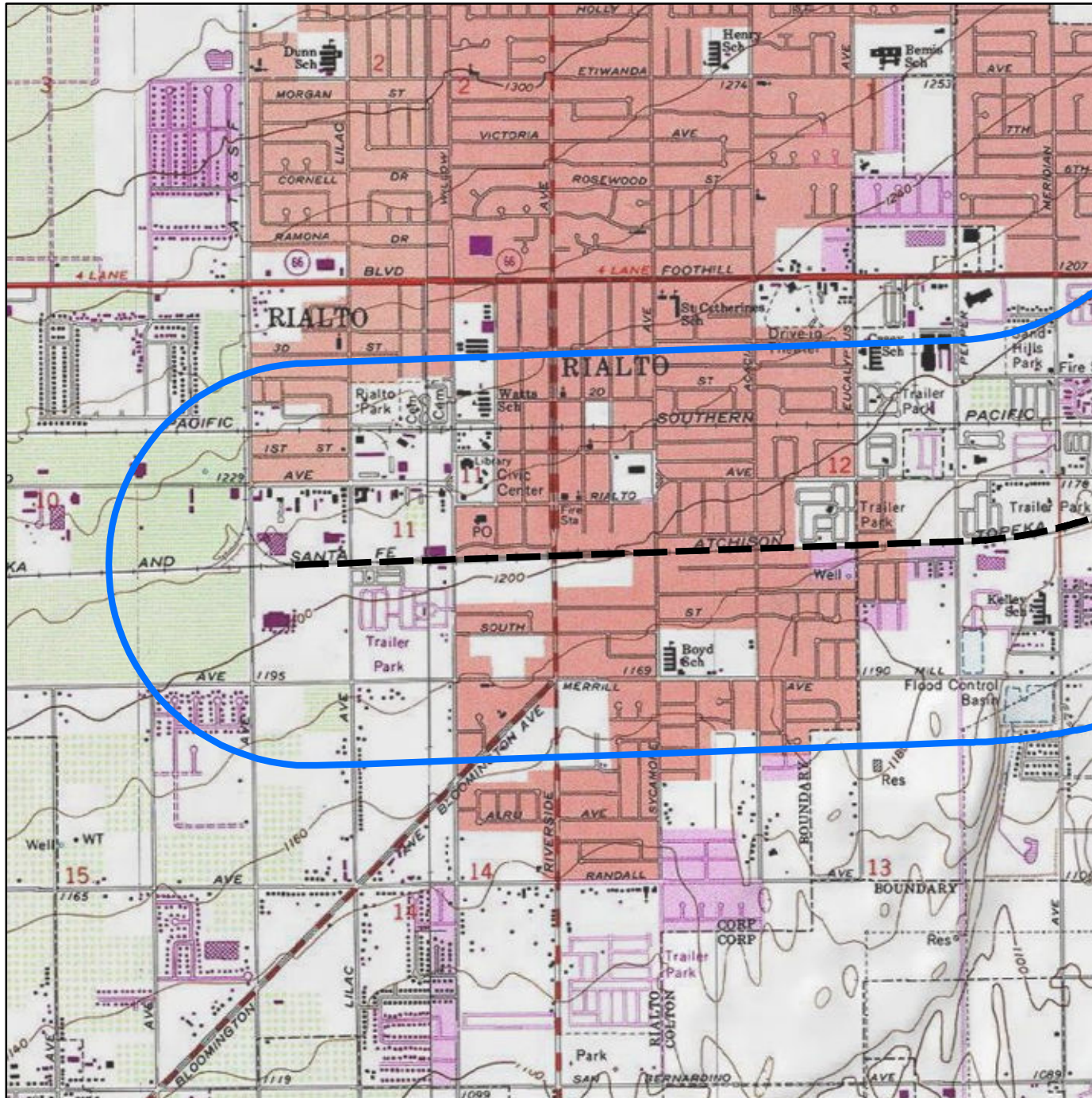
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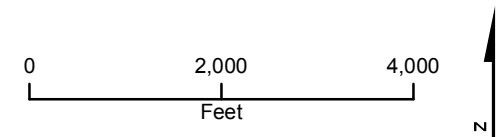
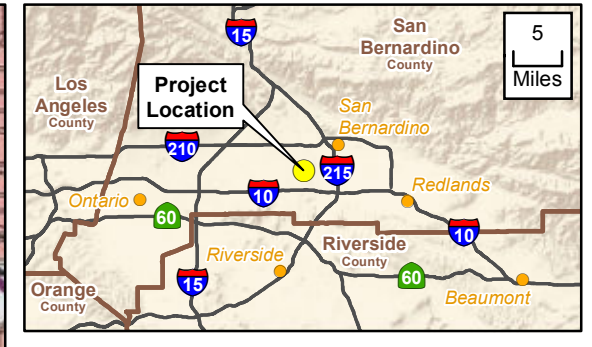
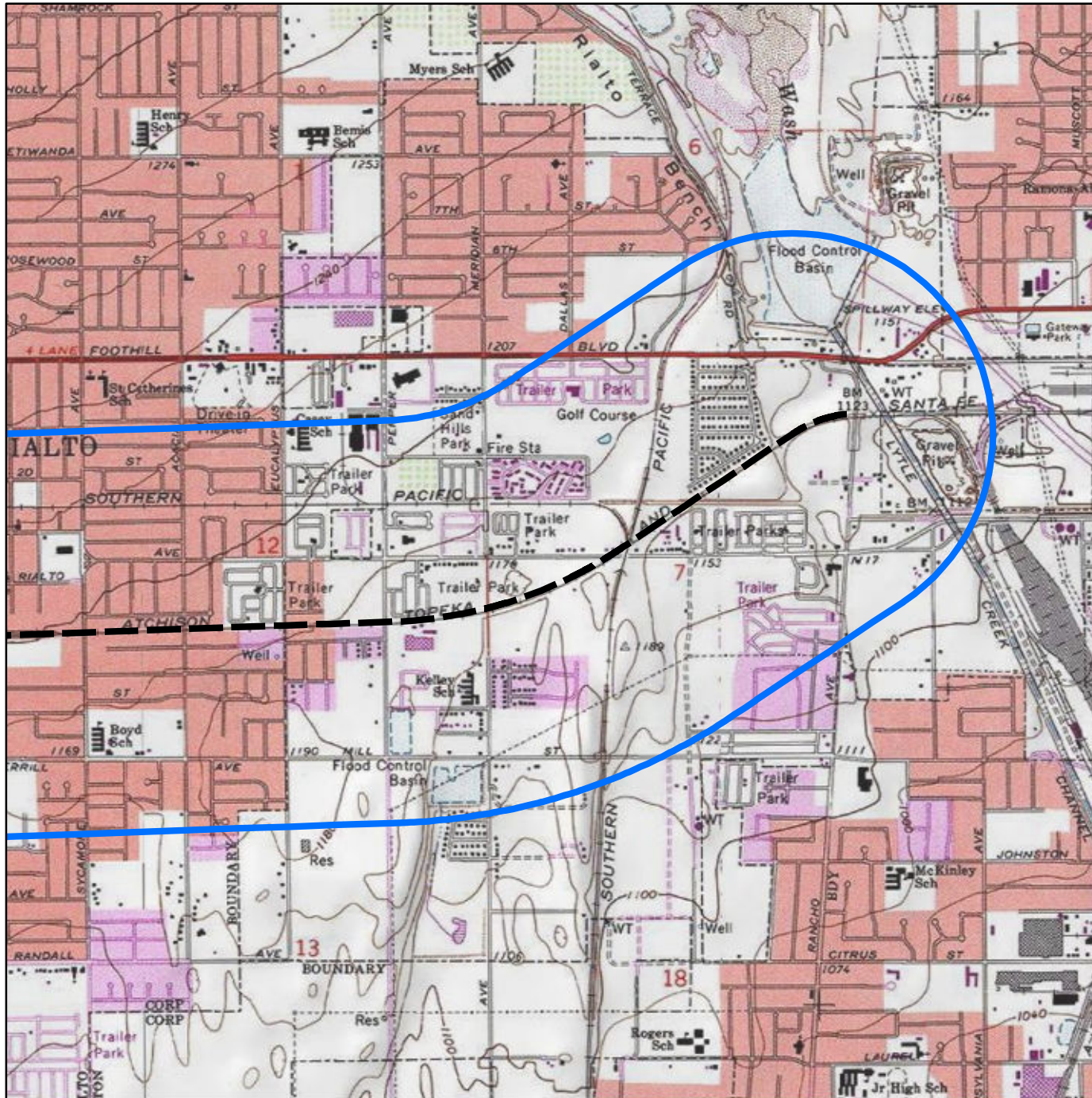


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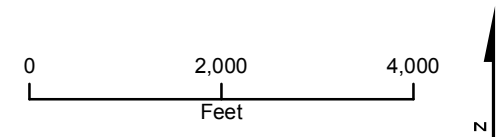
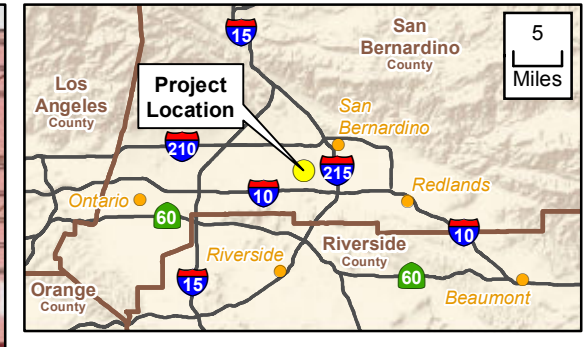
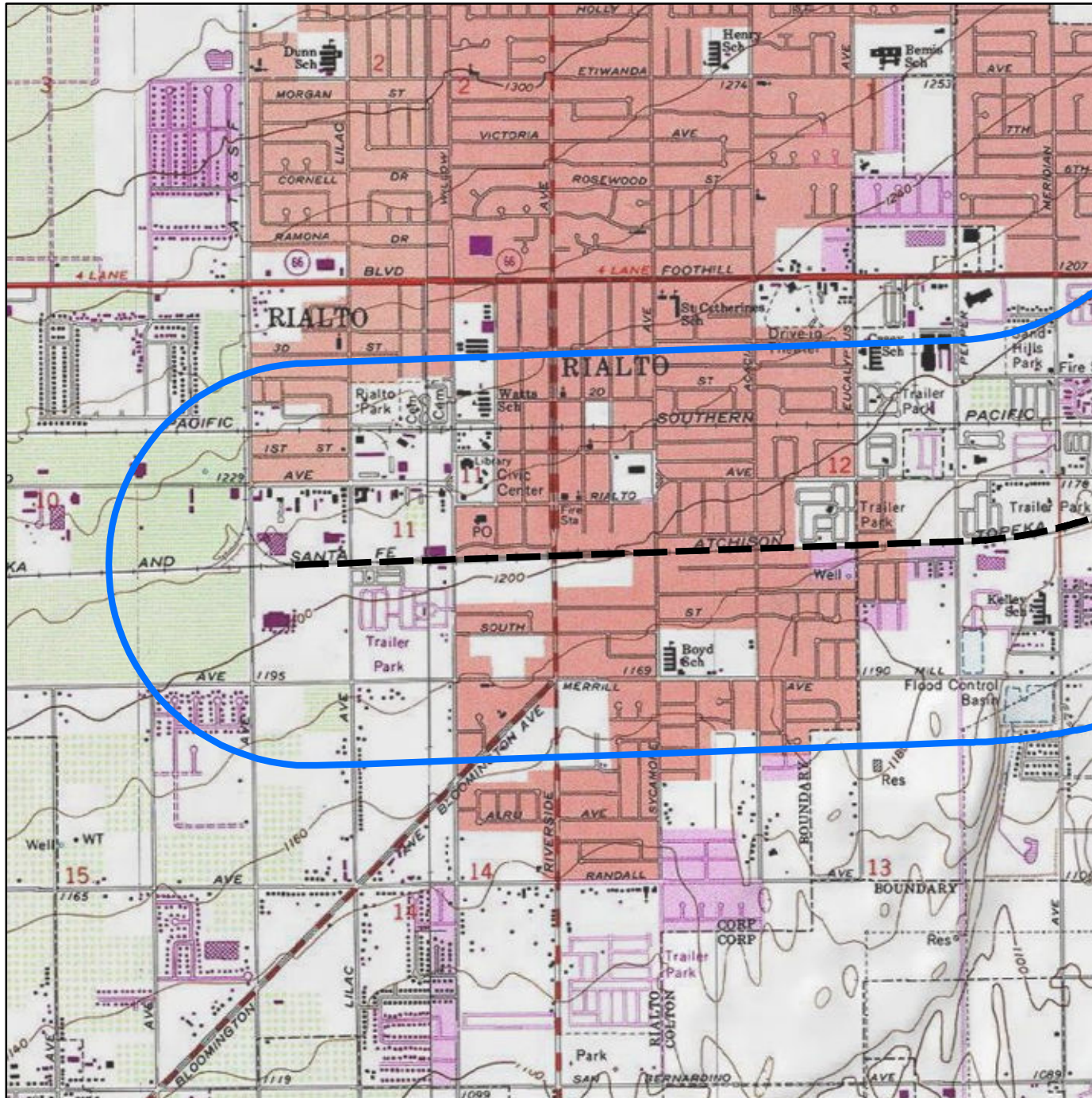


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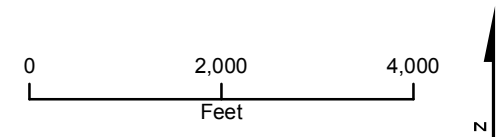
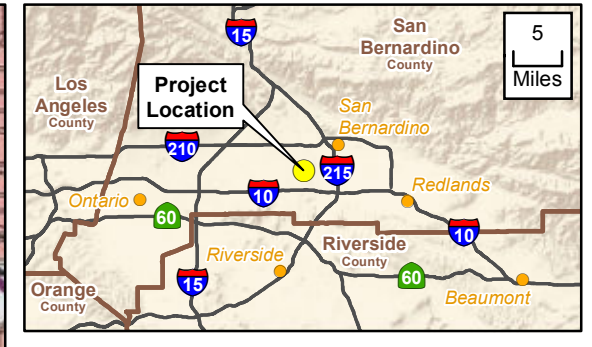
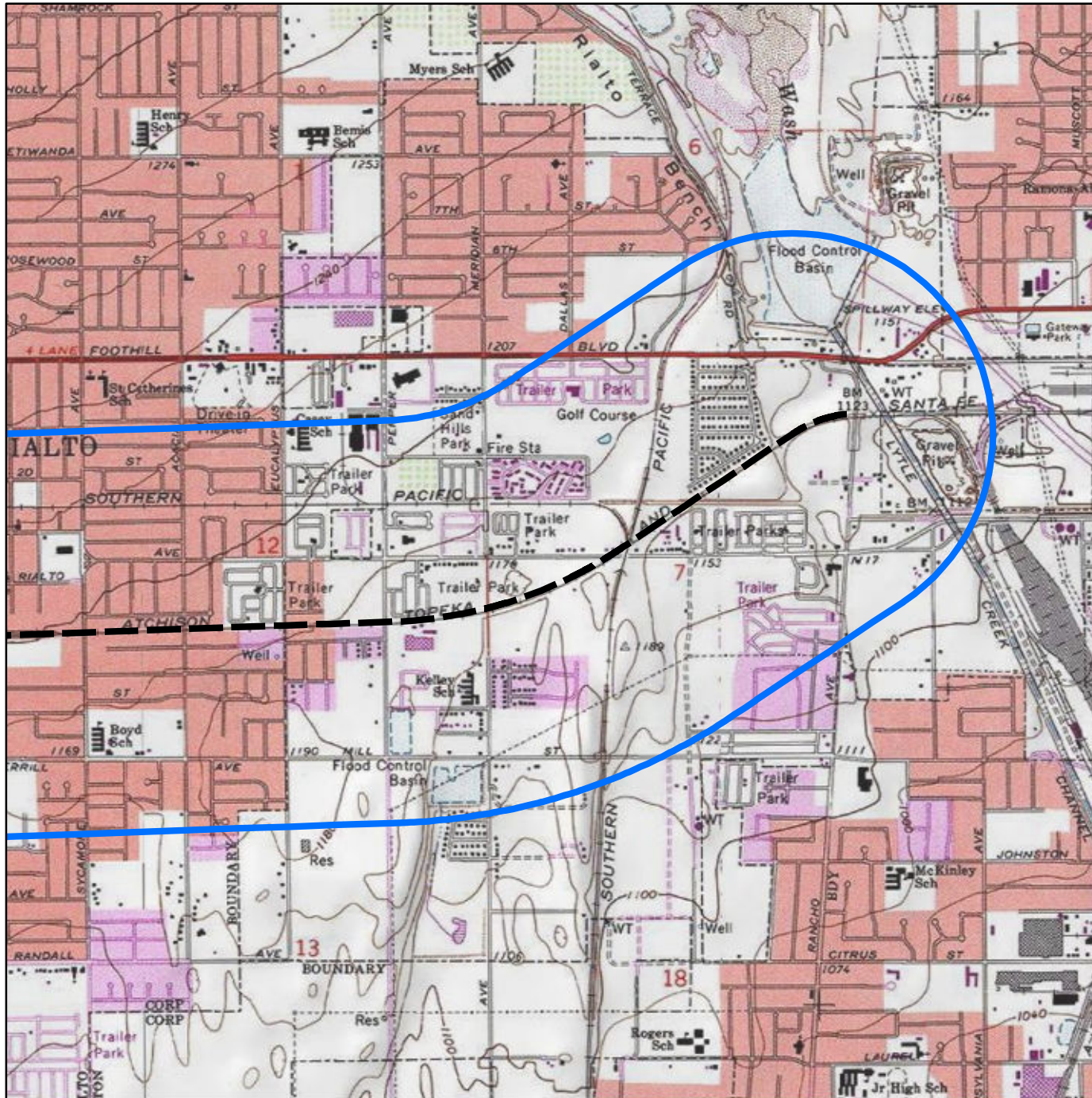


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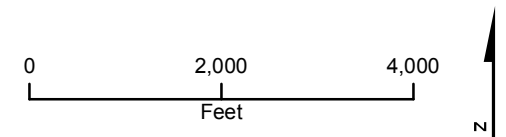


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Goldie Walker, Chairperson
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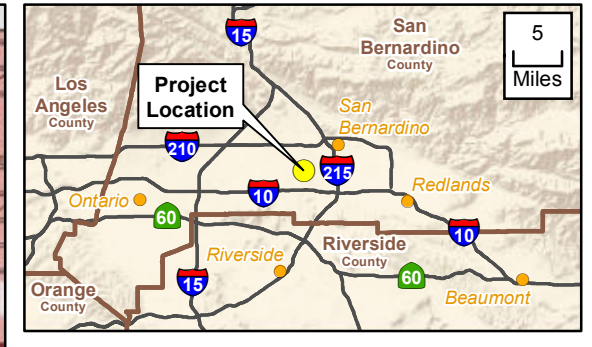
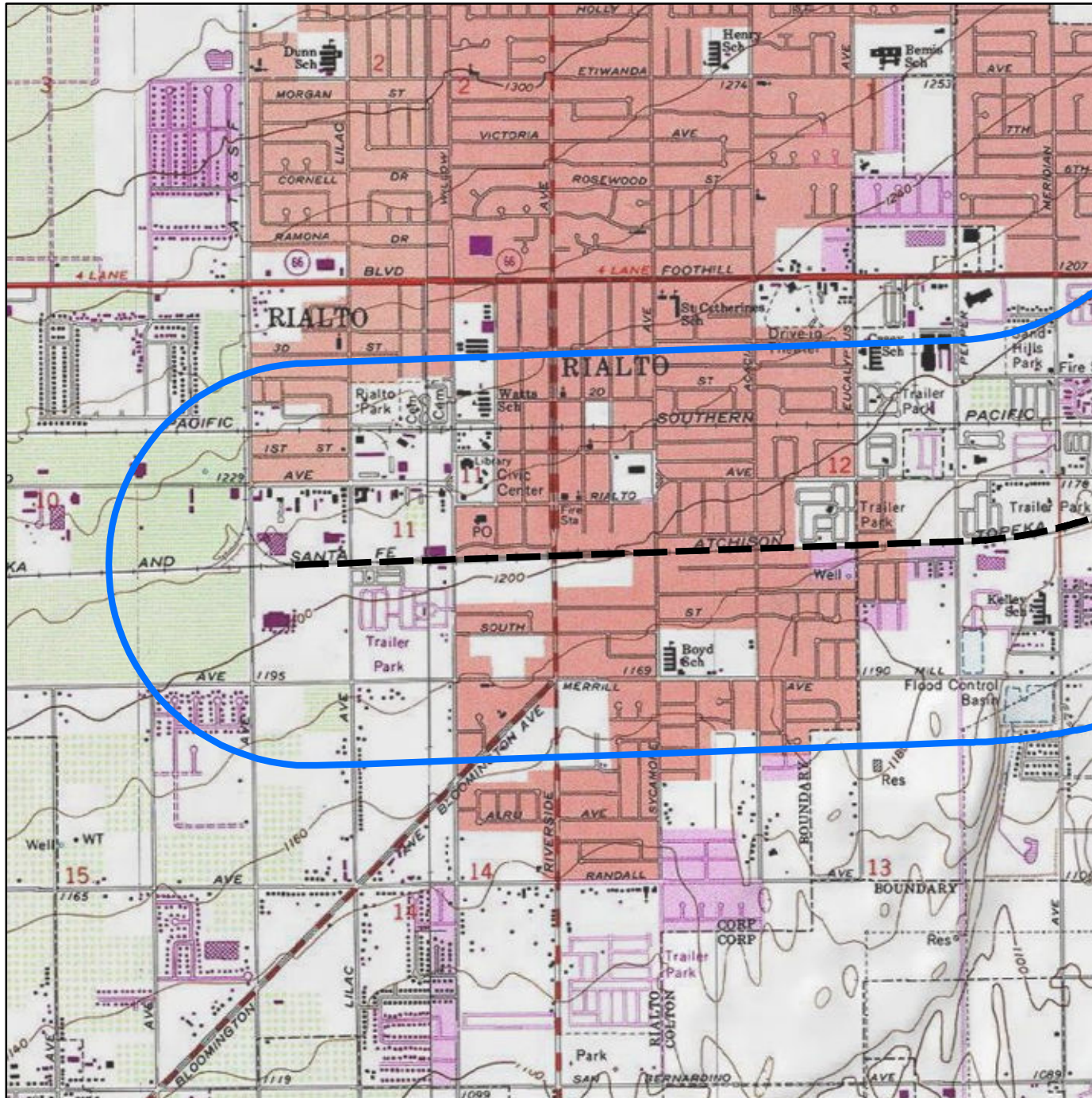
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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

Enclosure—Map of Project Area



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

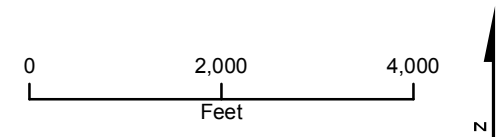
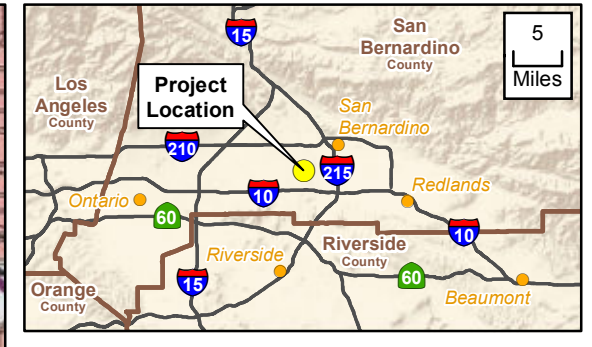
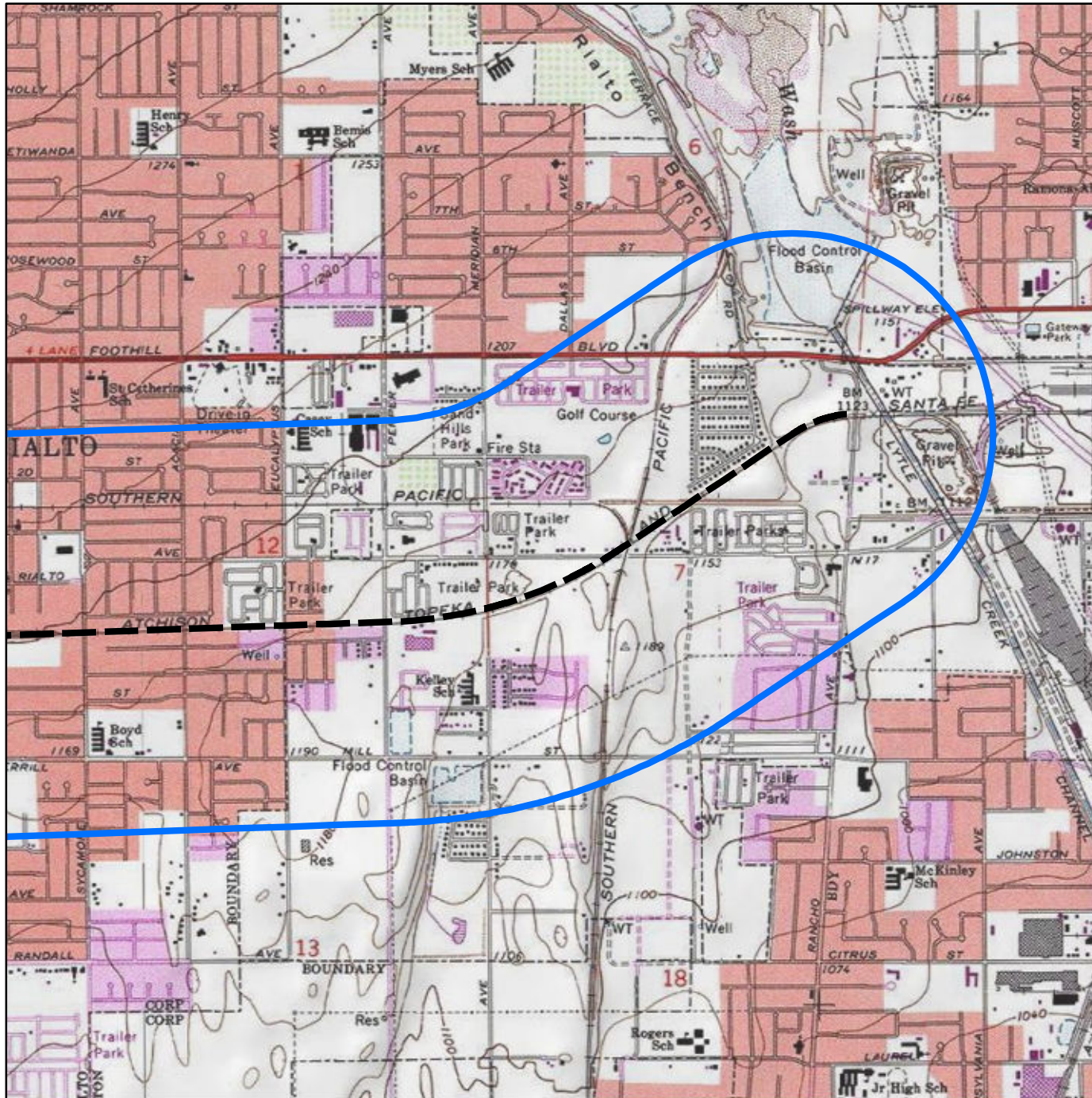


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



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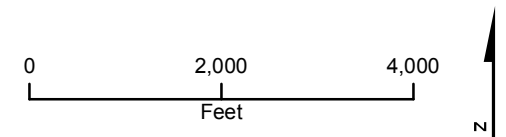


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Jeff Grubbe, Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr./Ms.:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project, whose goals are to provide improved commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station. SBCTA, as the project proponent within San Bernardino County and also as the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three (3) miles of a second main line track between Control Point (CP) Lilac, located at Milepost (MP) 52.4, to CP Rancho, near MP 55.1 on the Metrolink San Bernardino Line. The proposed project corridor would include improvements within the City of Rialto and City of San Bernardino, San Bernardino County, California.

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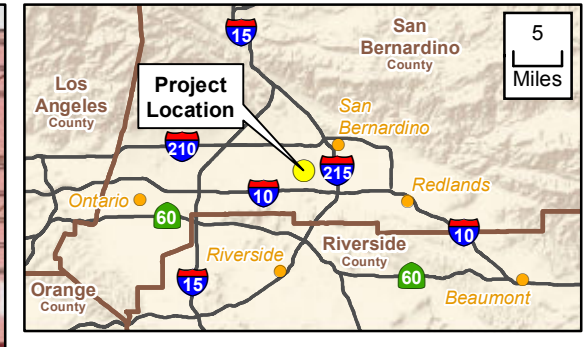
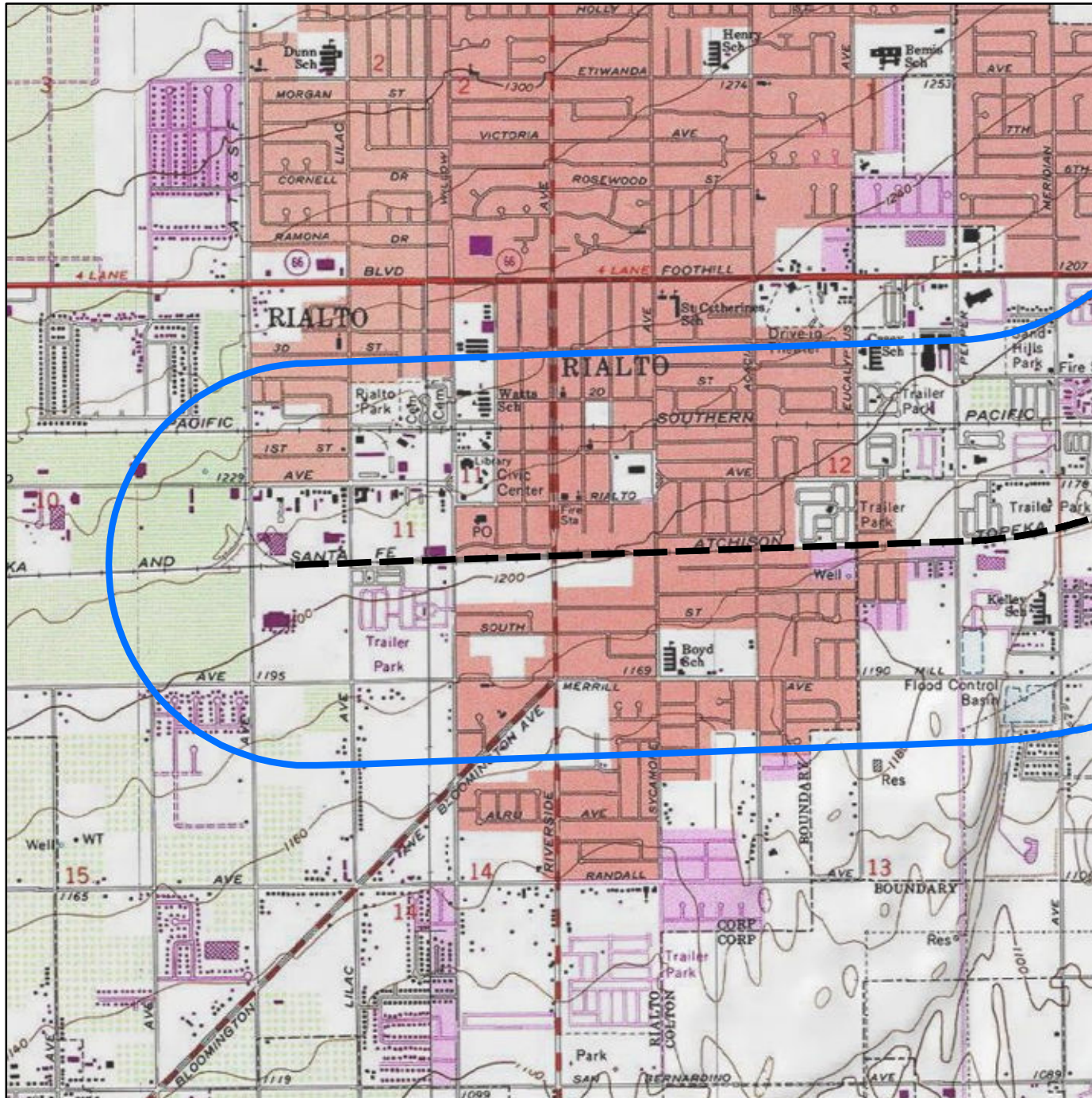
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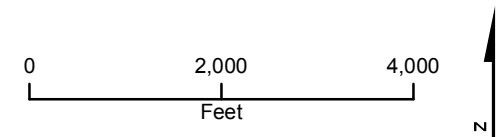
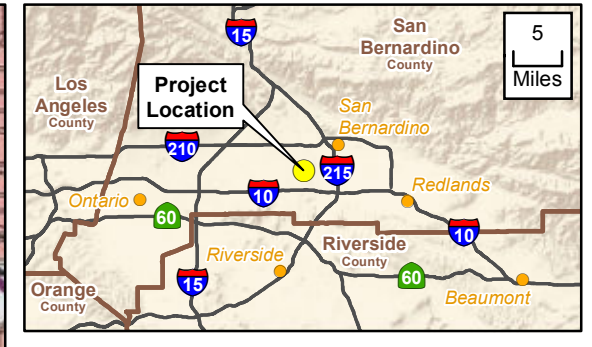
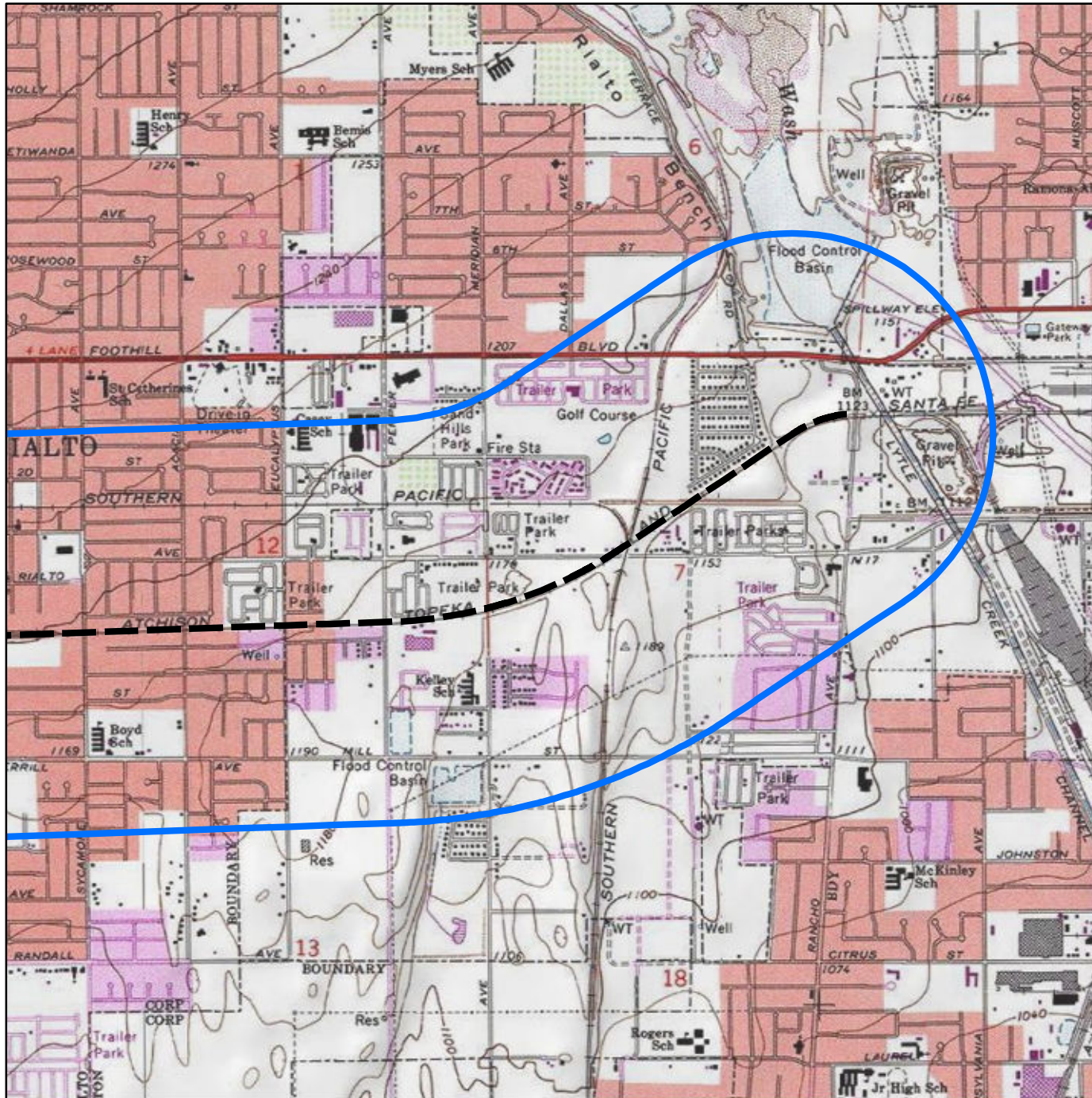


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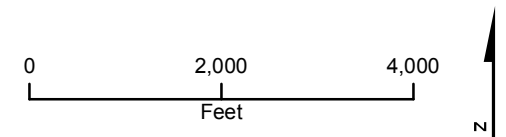


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CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

John Valenzuela, Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, CA 91322

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

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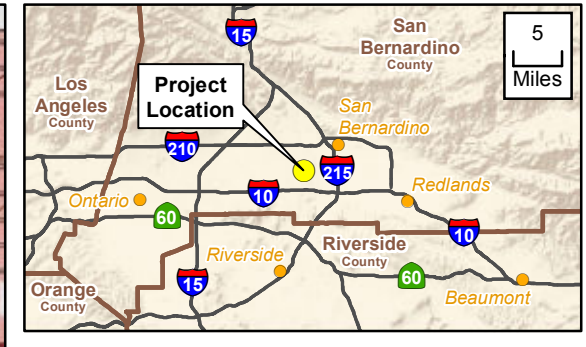
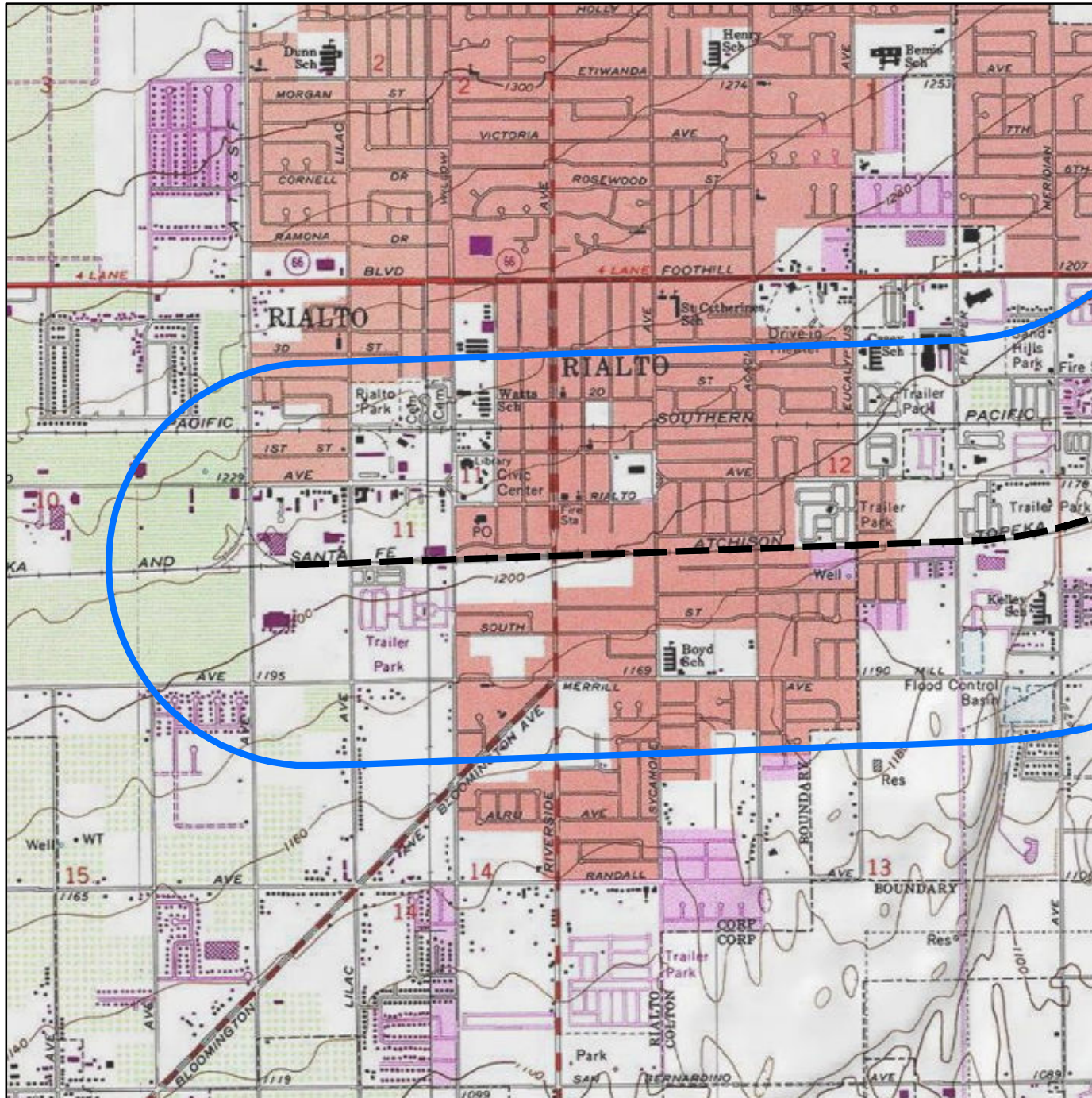
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Cultural Resources Specialist

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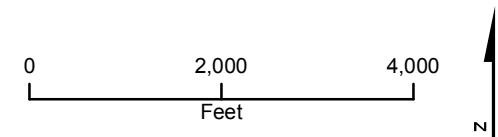
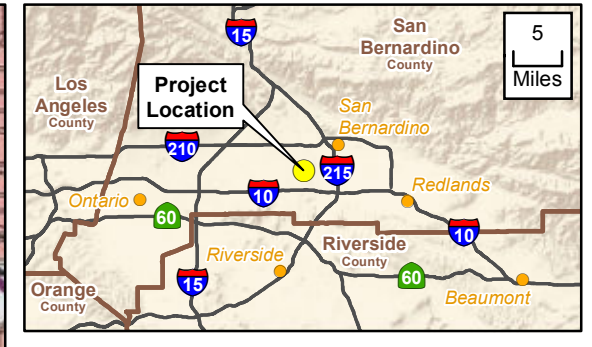
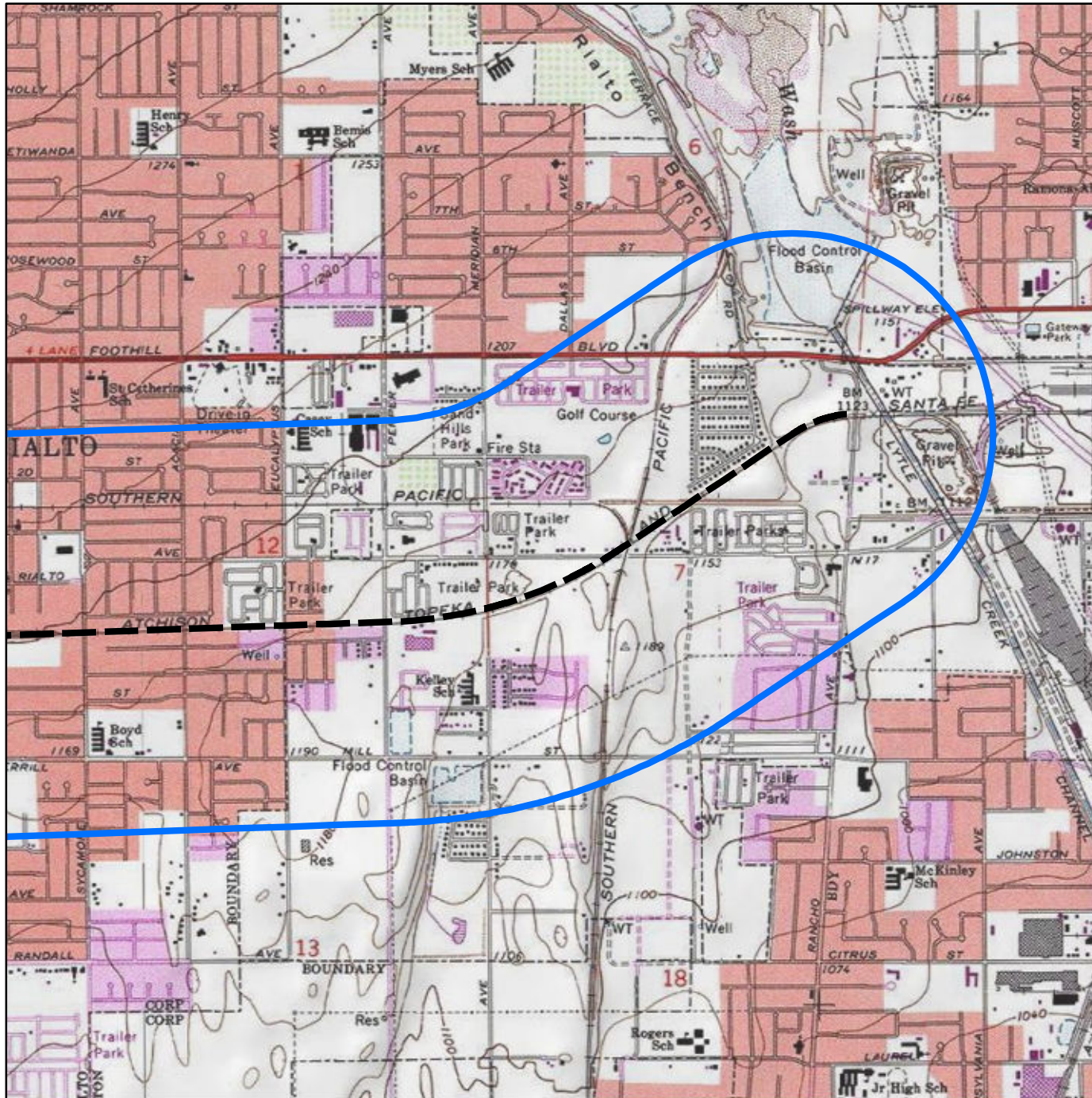


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 Rialto and San Bernardino, California



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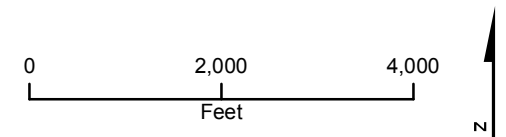


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 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Joseph Ontiveros, Cultural Resource Department
Soboba Band of Luiseno Indians
P.O. Box 487
San Jacinto, CA 92583

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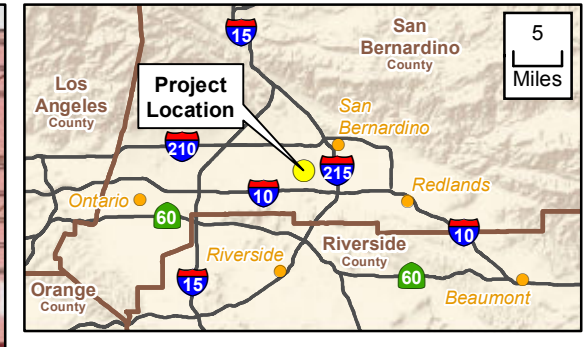
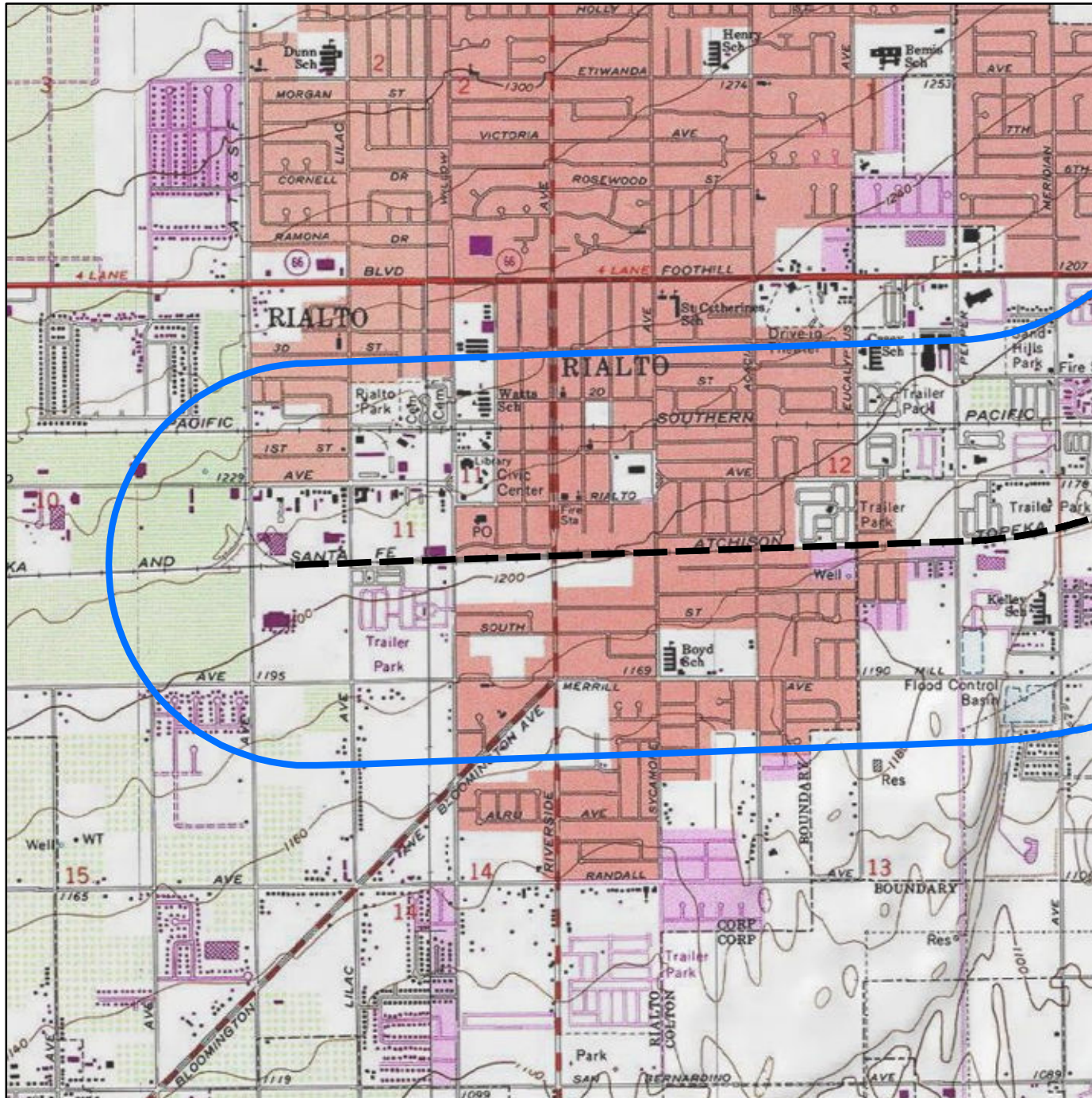
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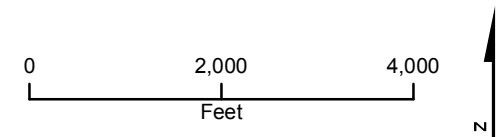
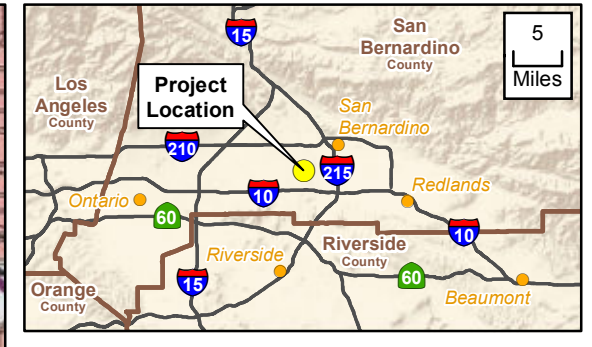
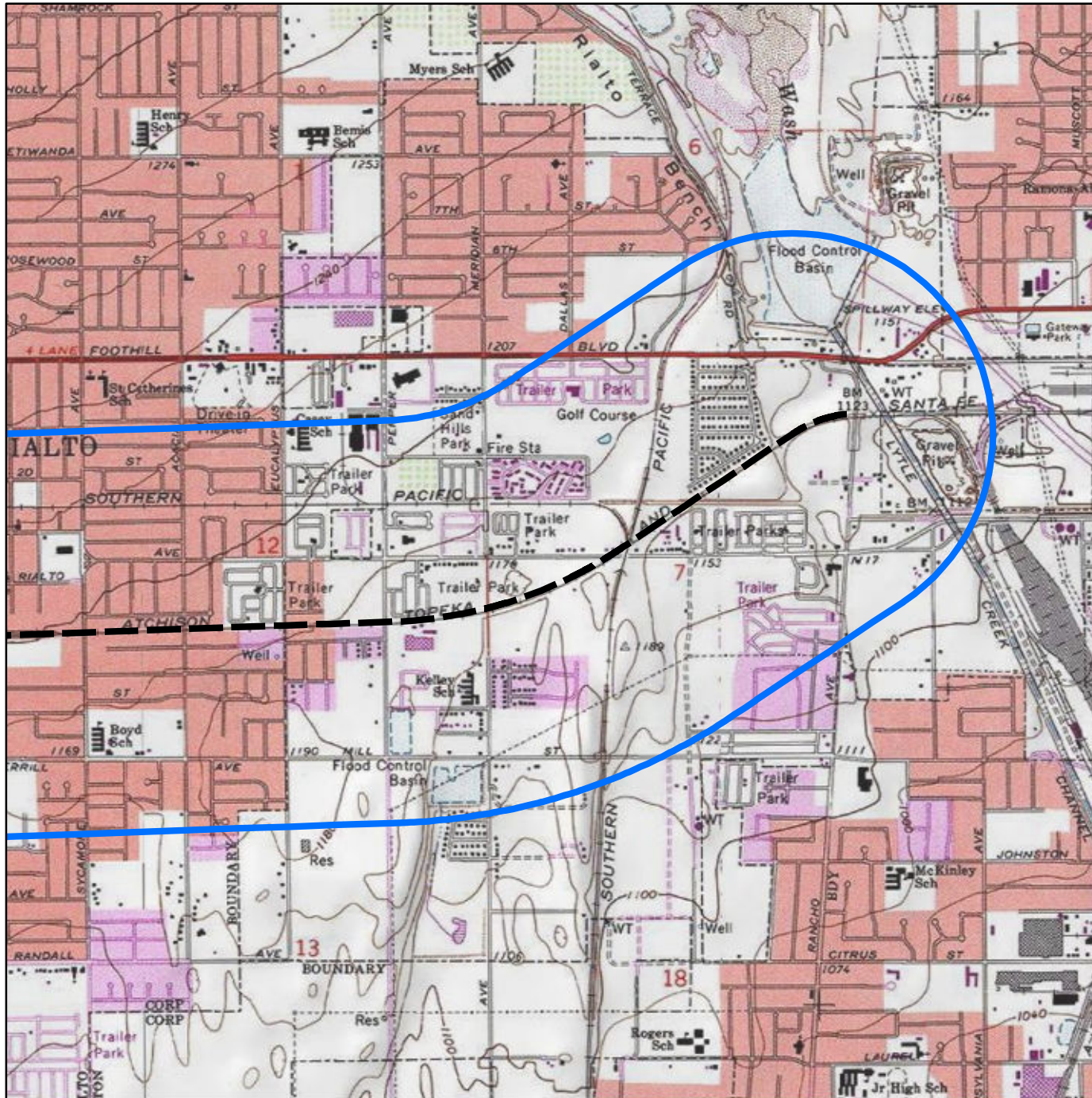


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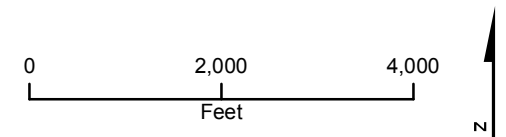


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 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Linda Candelaria, Co-Chairperson
Gabrielino-Tongva Tribe
1999 Avenue of the Stars, Suite 1100
Los Angeles, CA 90037

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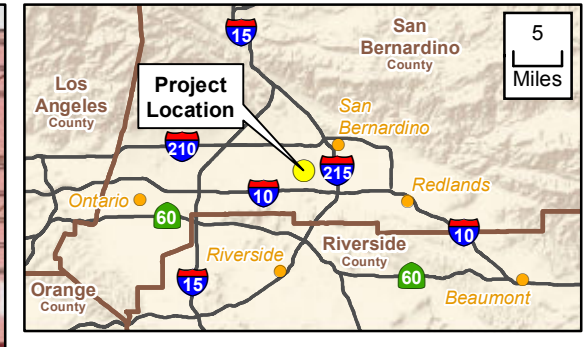
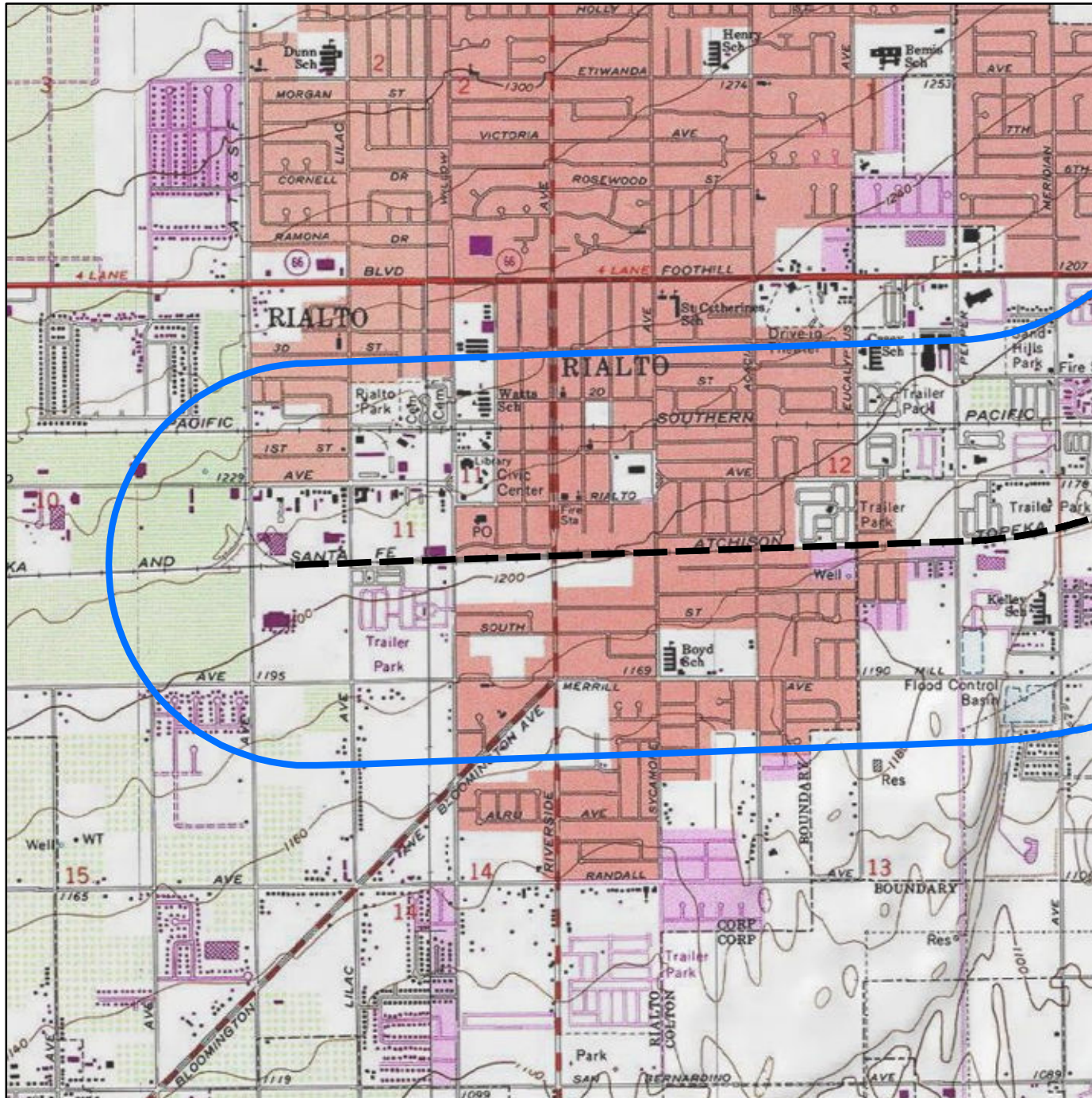
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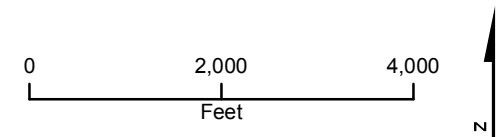
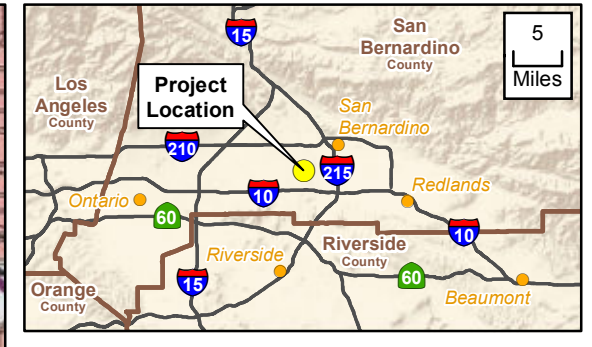
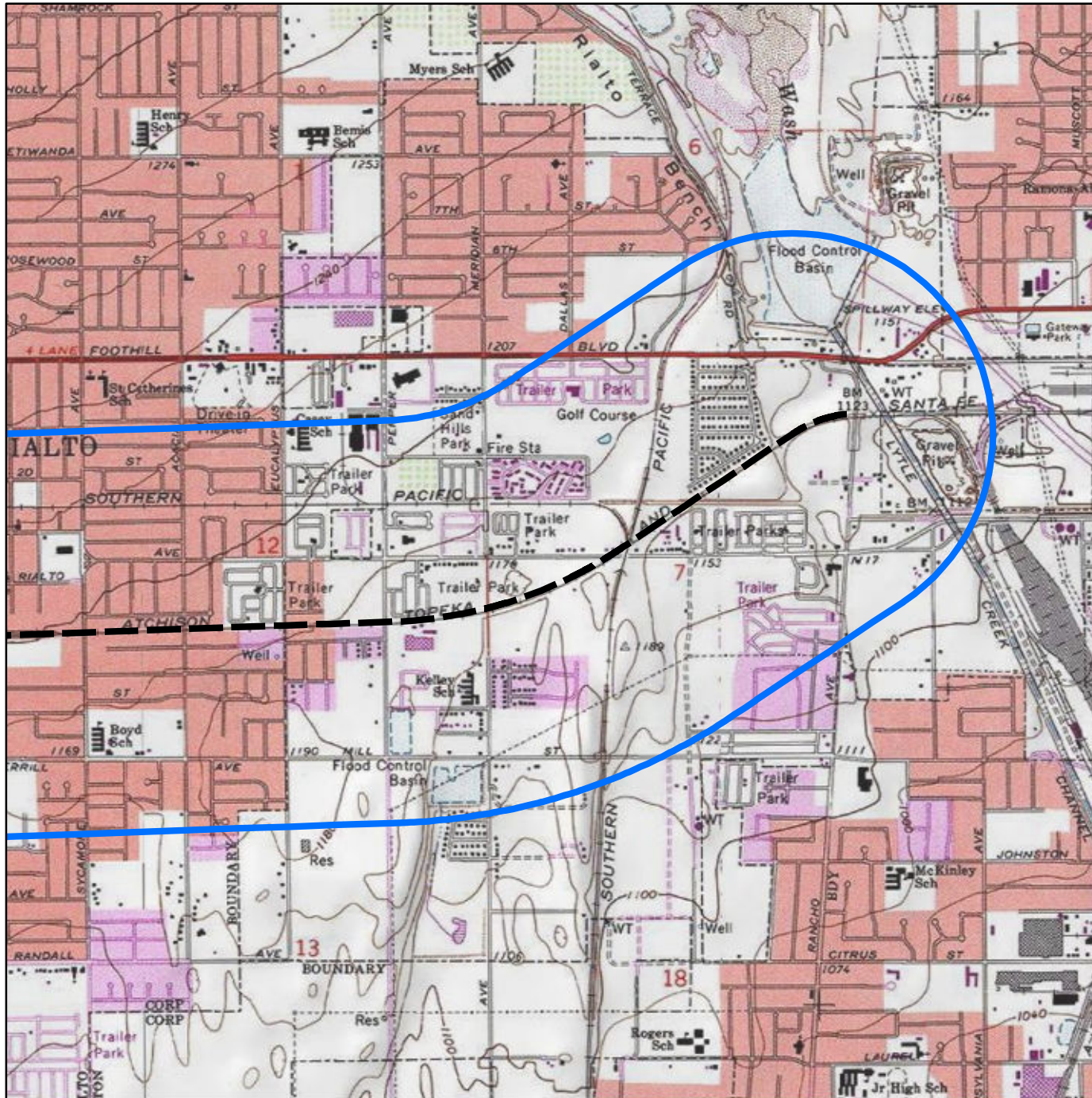


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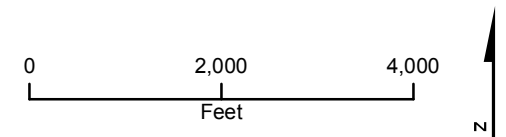


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CH2M HILL
6 Hutton Center Dr. Suite
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Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Michael Mirelez, Cultural Resource Coordinator
Torres- Martinez Desert Cahuilla Indians
P.O. Box 1160
Thermal, CA 92274

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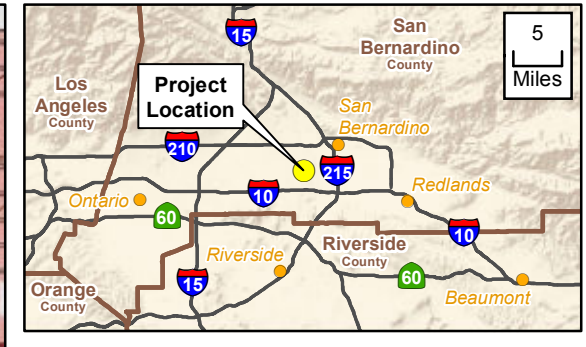
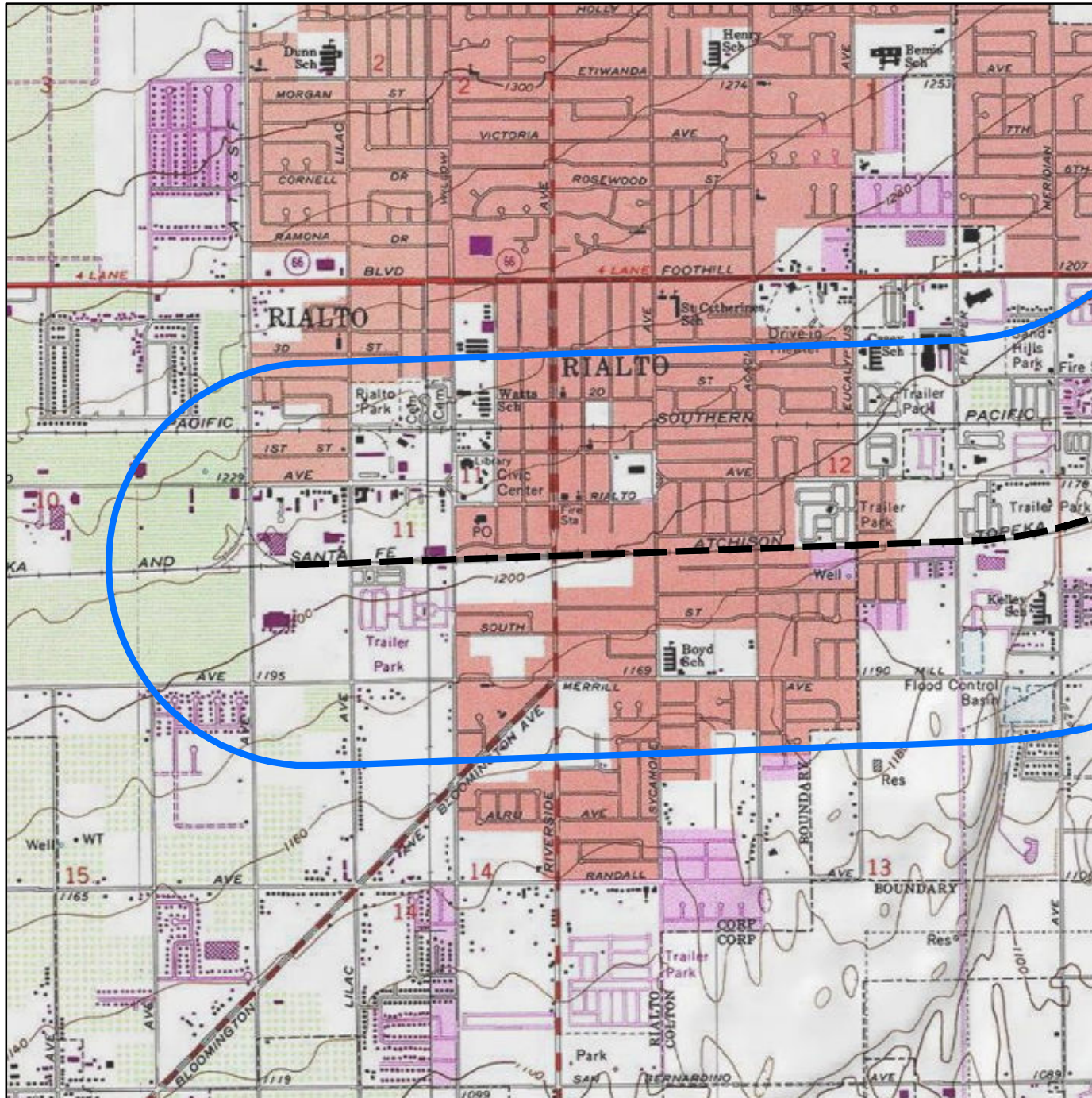
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Basemap Source: ESRI, USGS

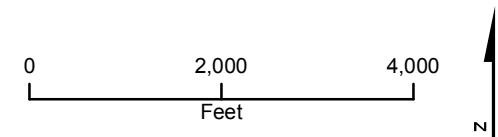
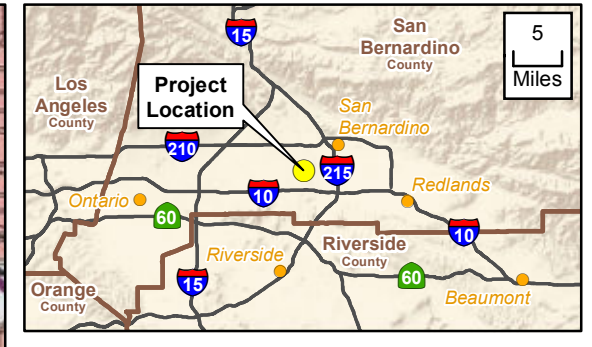
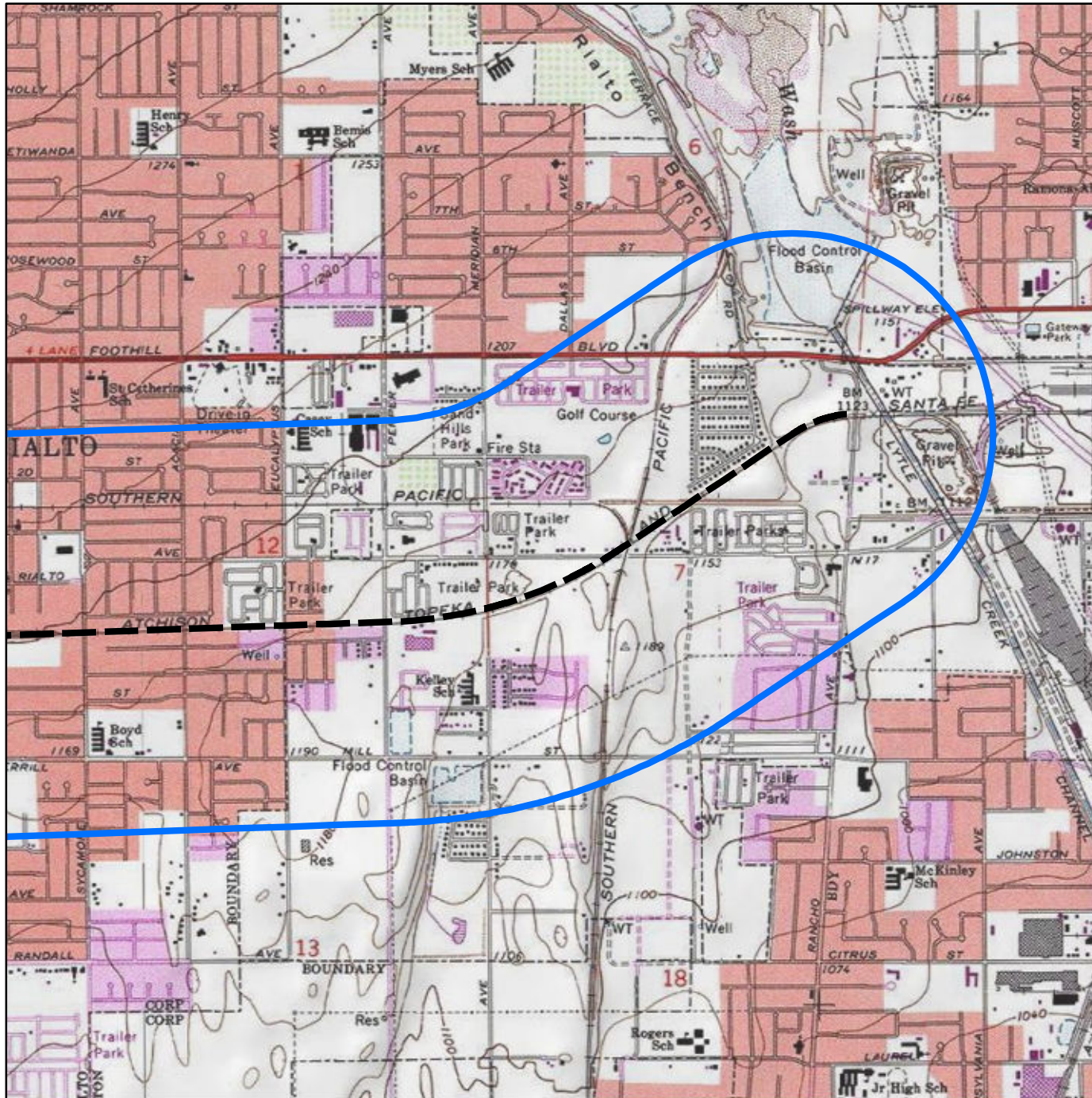


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

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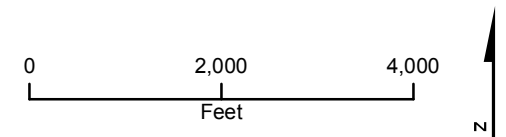


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Patricia Garcia-Plotkin, Director, THPO
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr./Ms.:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project, whose goals are to provide improved commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station. SBCTA, as the project proponent within San Bernardino County and also as the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three (3) miles of a second main line track between Control Point (CP) Lilac, located at Milepost (MP) 52.4, to CP Rancho, near MP 55.1 on the Metrolink San Bernardino Line. The proposed project corridor would include improvements within the City of Rialto and City of San Bernardino, San Bernardino County, California.

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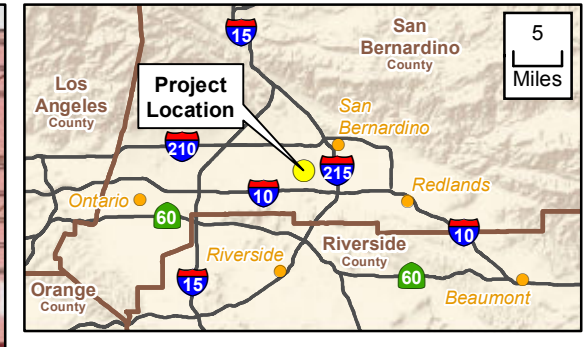
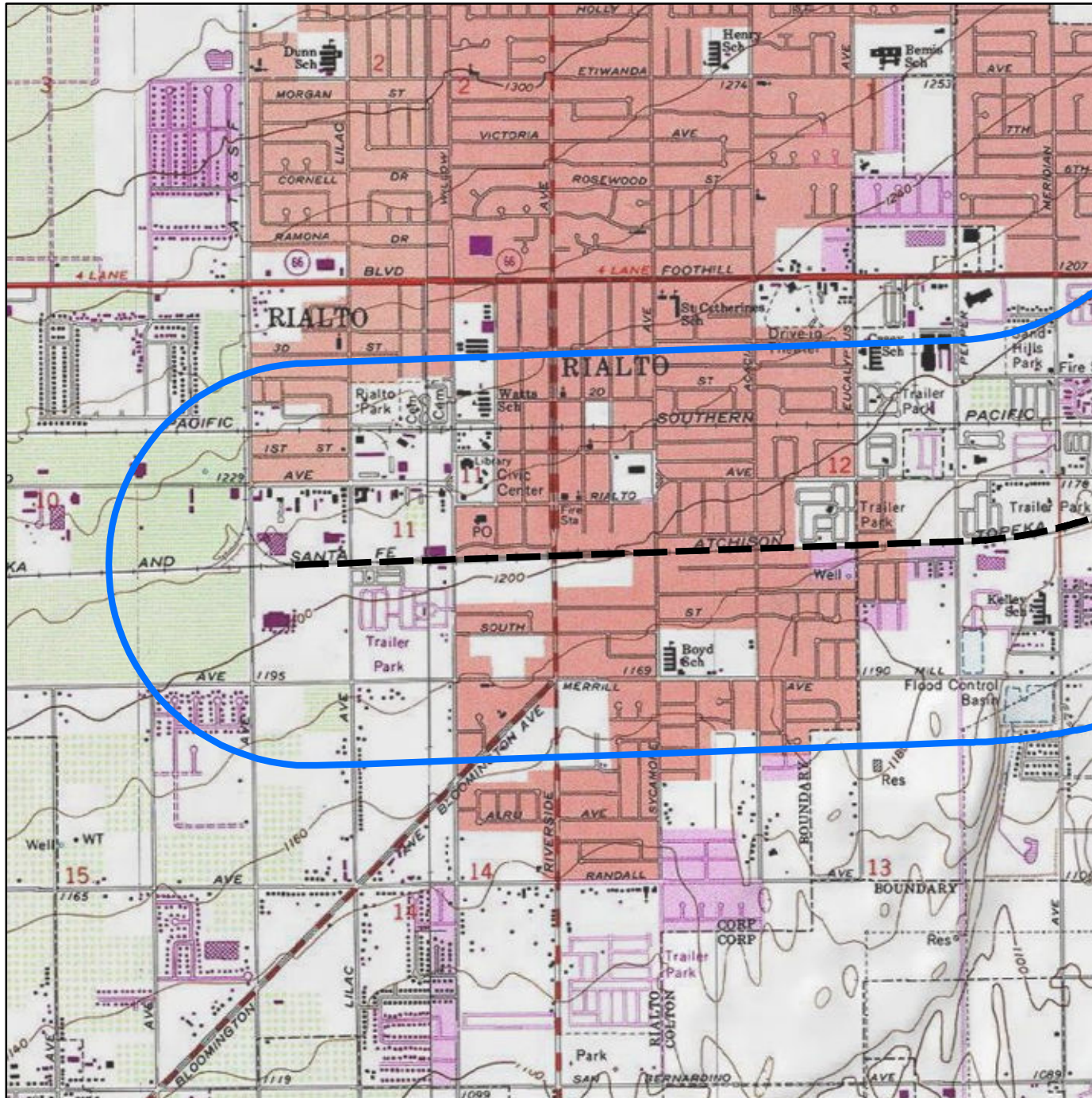
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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

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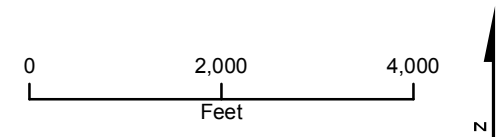
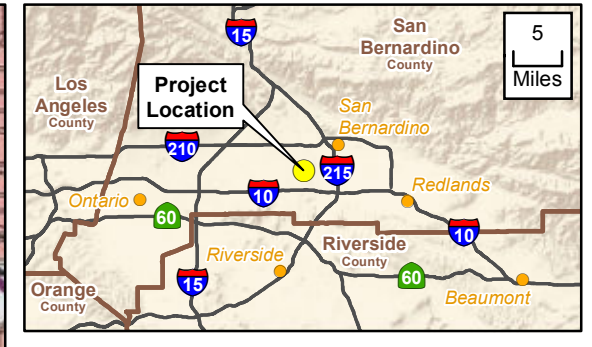
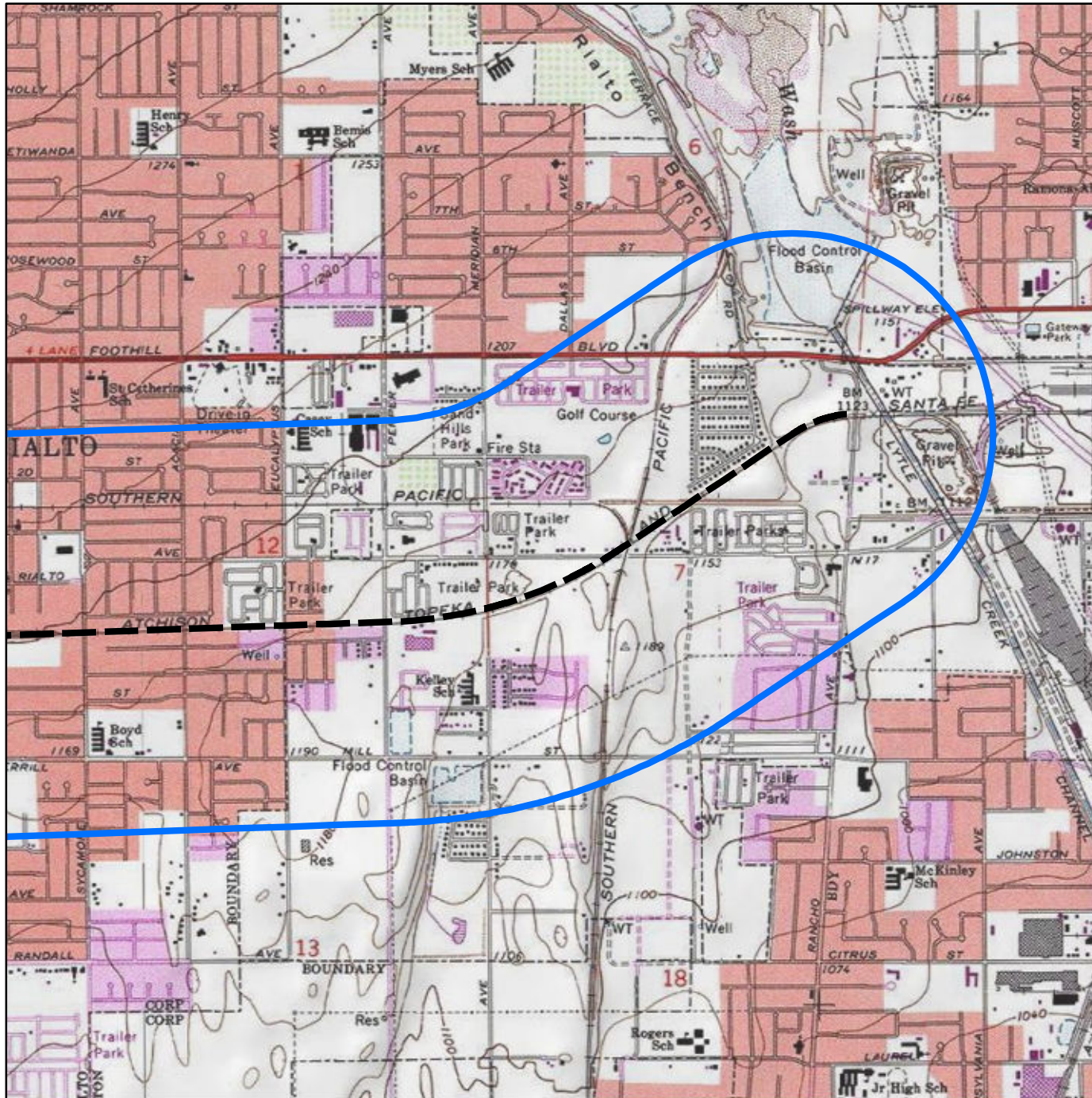


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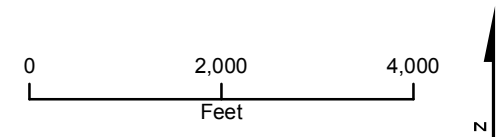


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 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Robert F. Dorame, Tribal Chair
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, CA 90707

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

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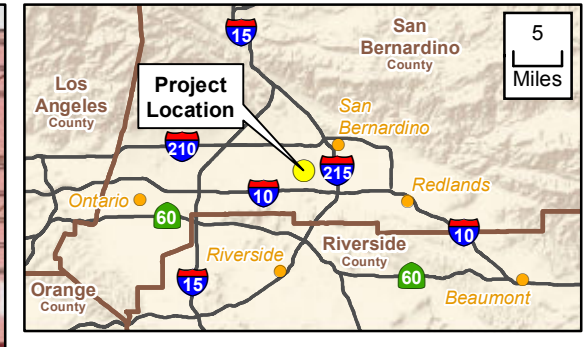
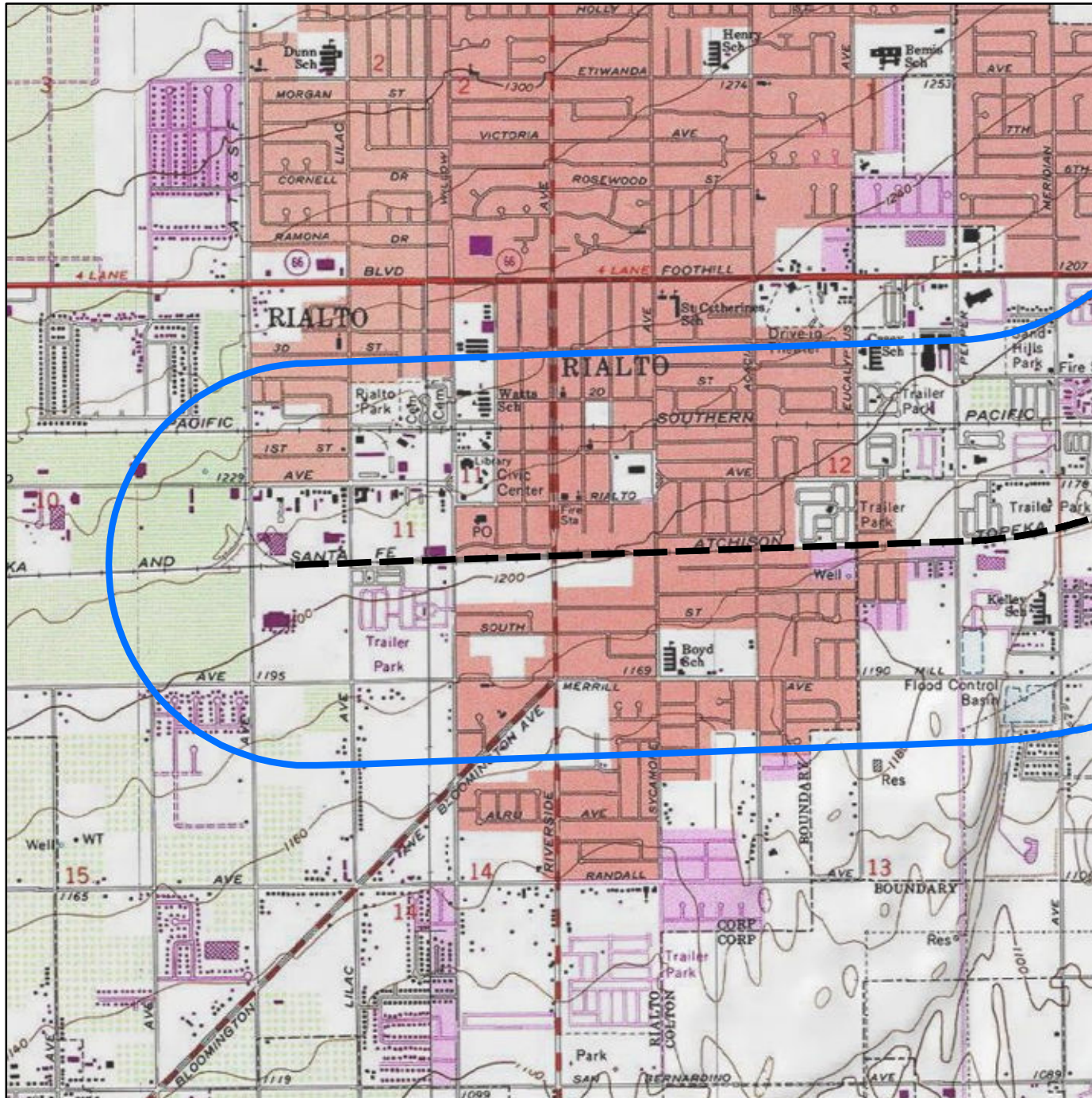
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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

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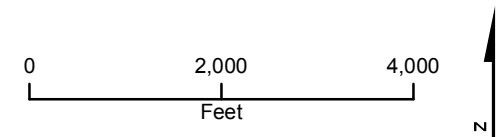
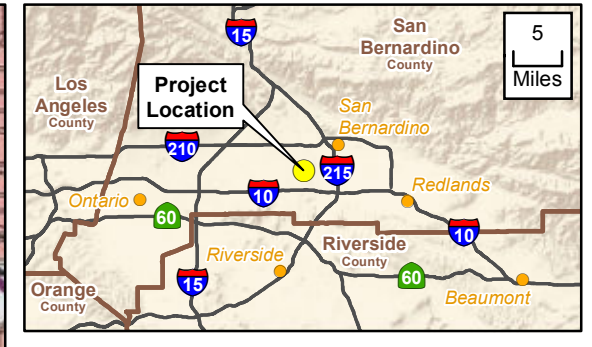
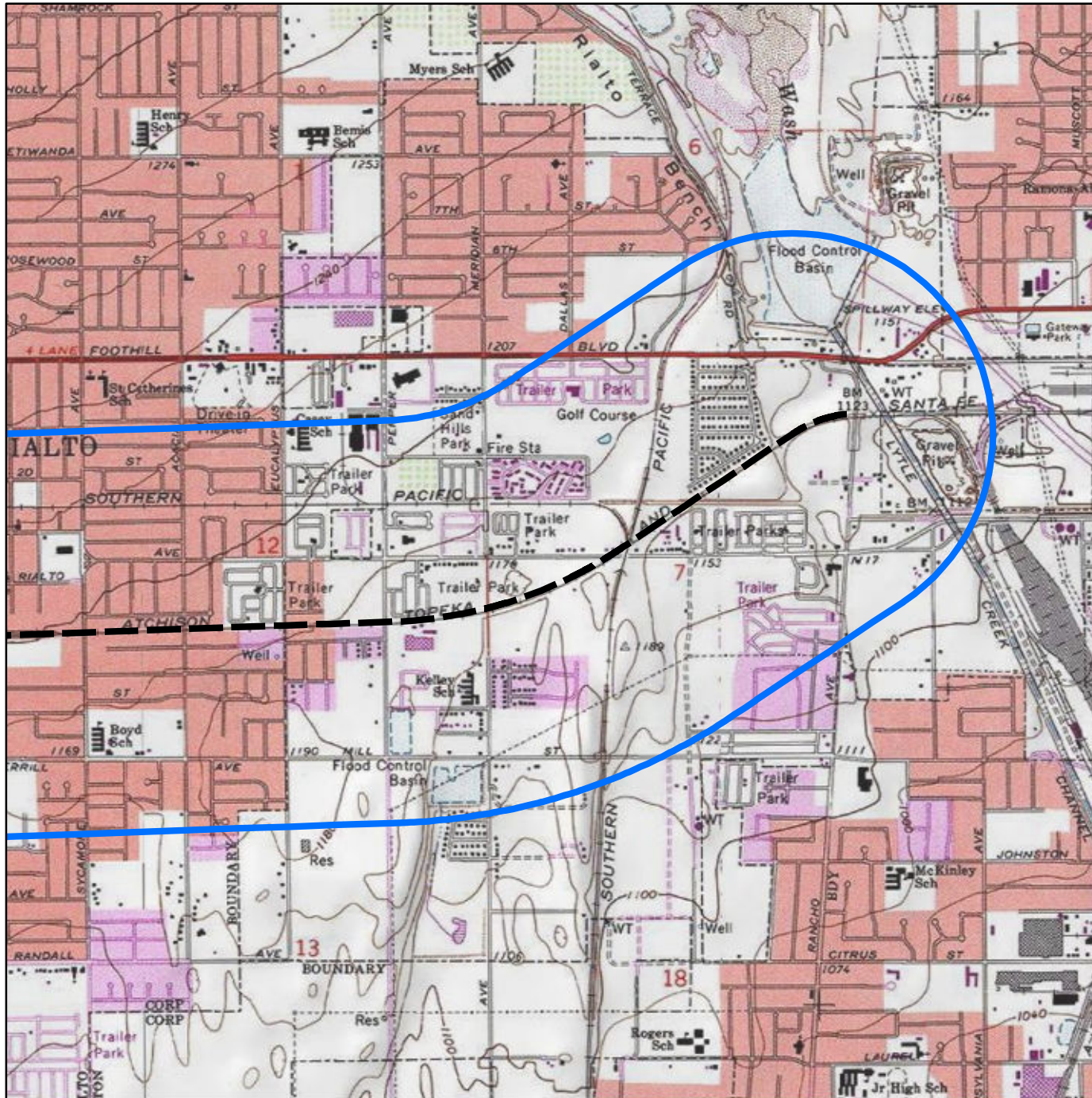


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 Rialto and San Bernardino, California



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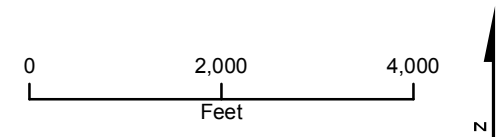


Figure 1 Sheet 02 of 02
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 SBCTA Double Track Project
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CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Robert Martin, Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

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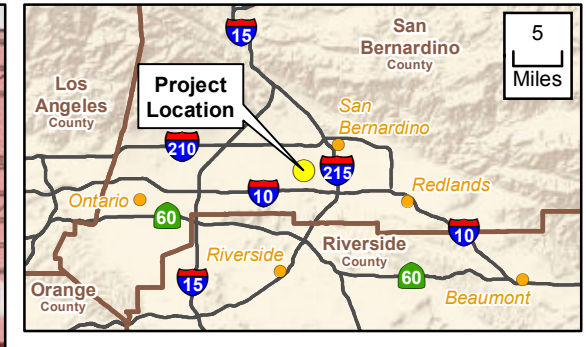
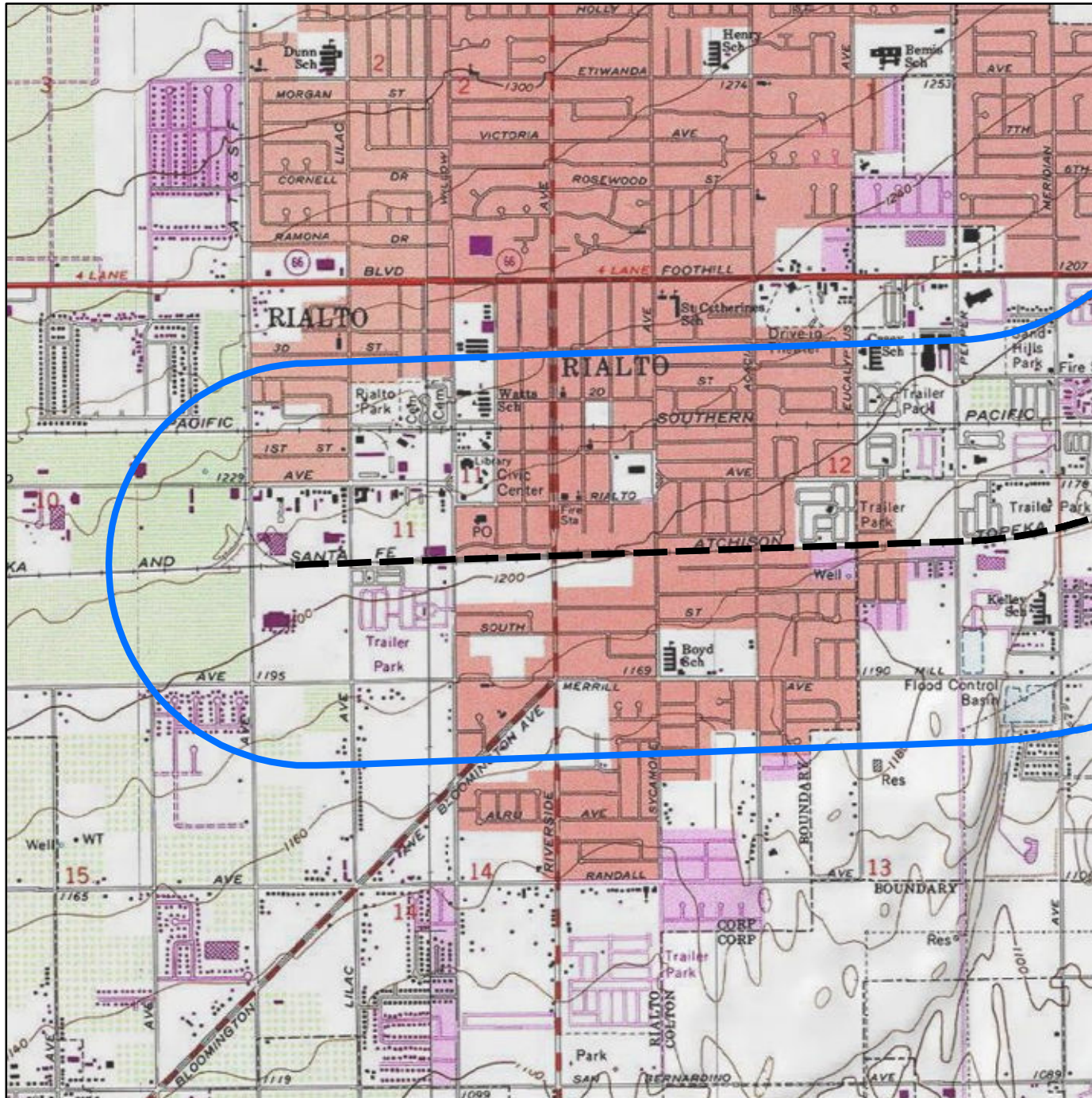
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Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

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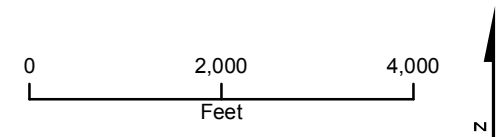
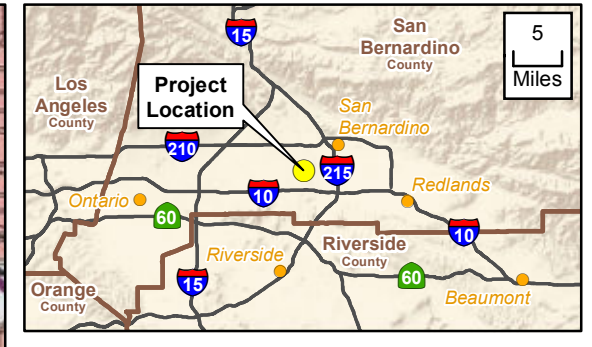
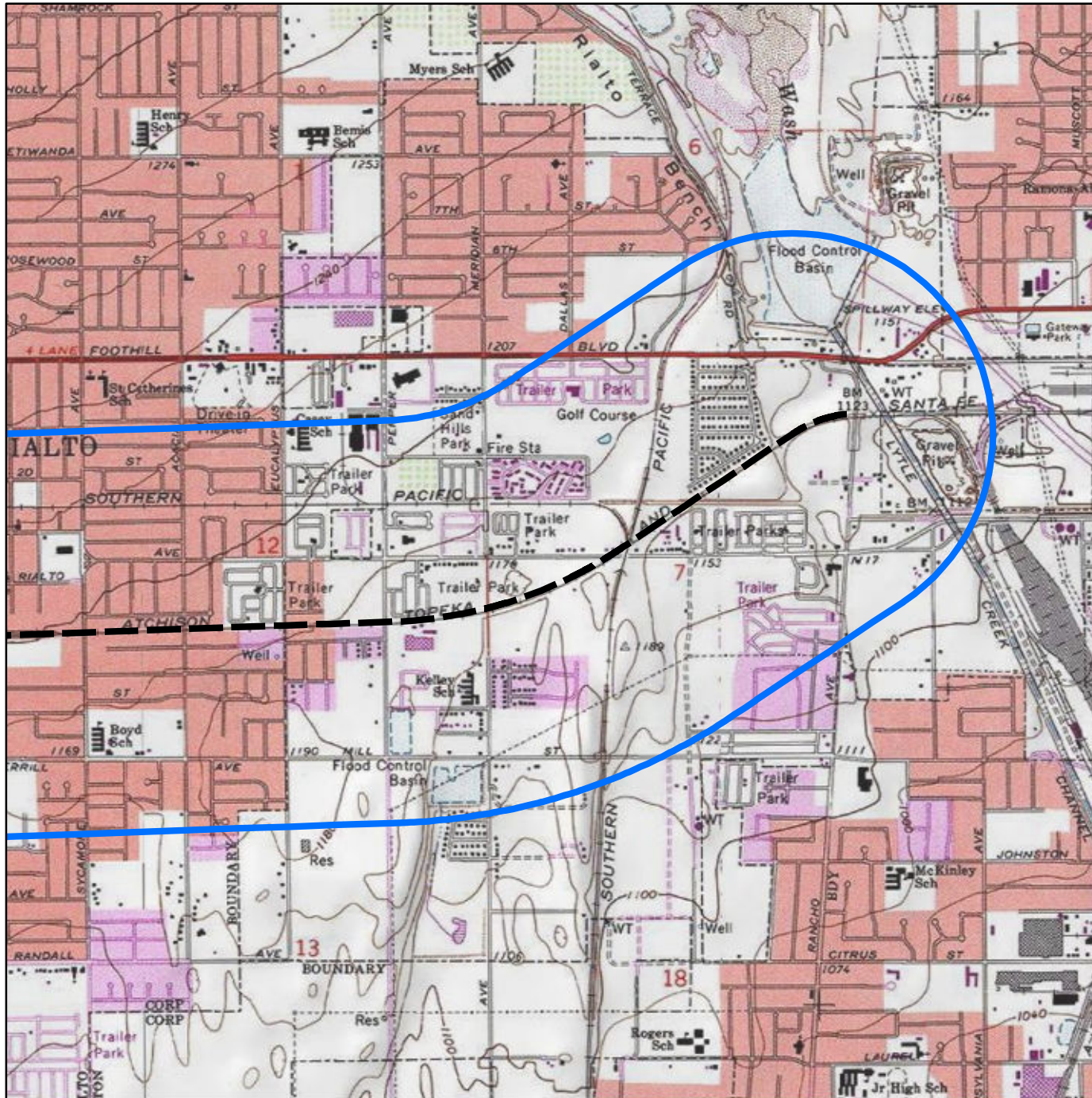


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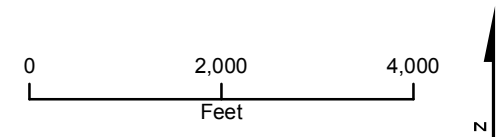


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Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Sandonne Goad, Chairperson
Gabrielino/Tongva Nation
106 ½ Judge John Aiso St. #231
Los Angeles, CA 90012

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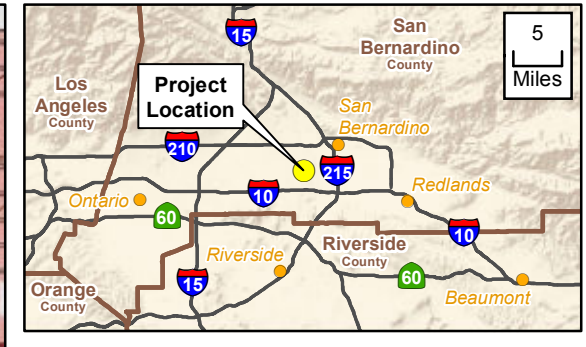
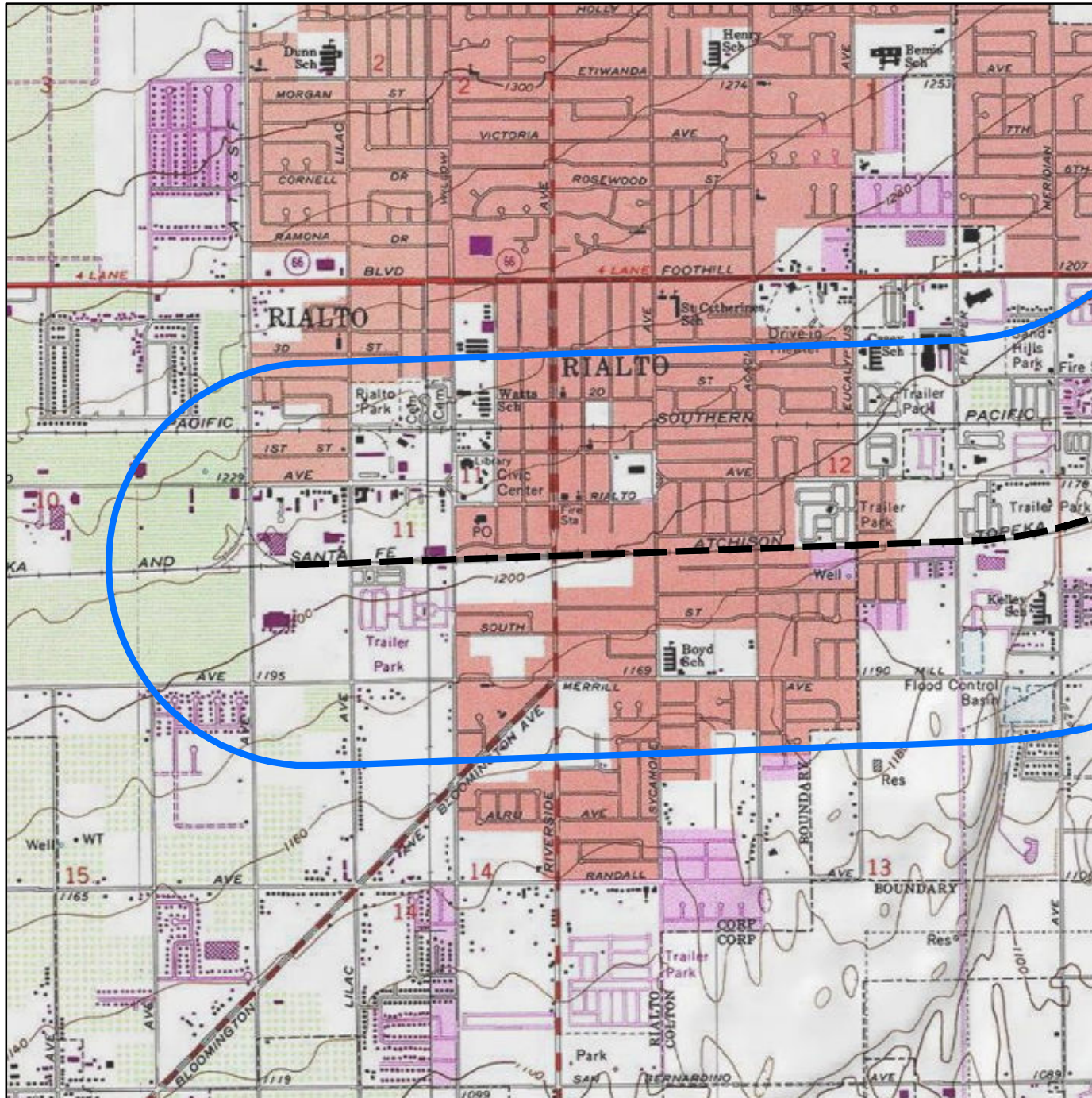
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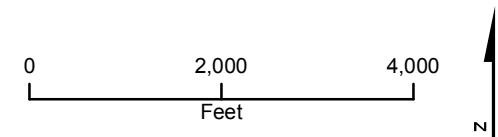
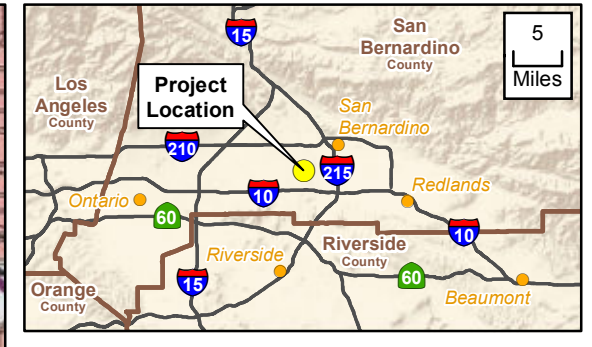
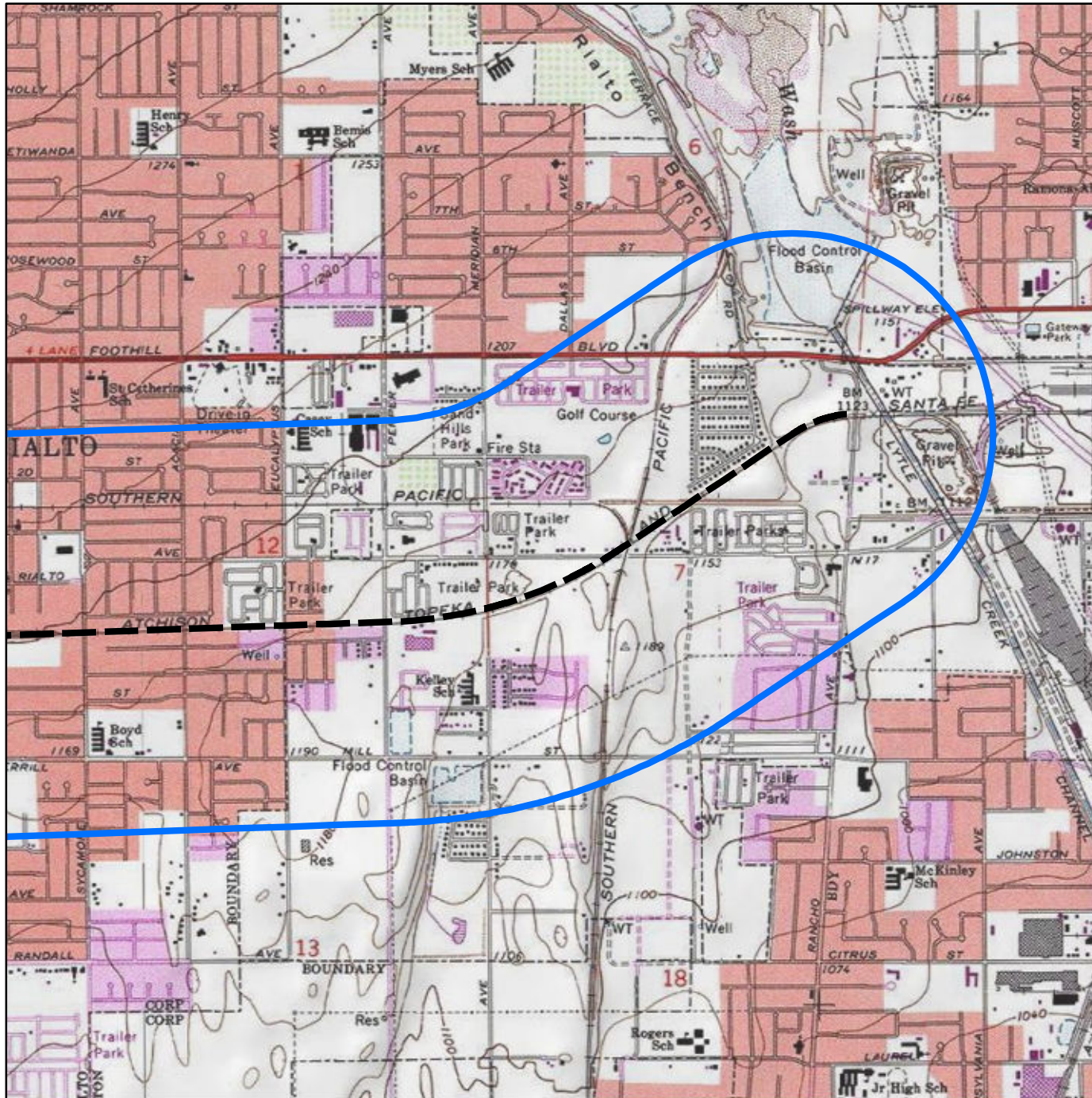


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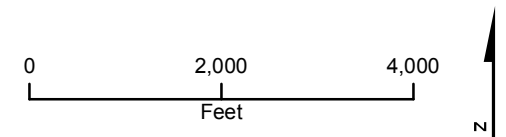


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CH2M HILL
6 Hutton Center Dr. Suite
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CA 92707
Tel 714.435-6044

June 12, 2017

Shane Chapparosa, Chairman
Los Cayotes Band of Cahuilla and Cupeno Indians
P.O. Box 189
Warner Springs, CA 92086

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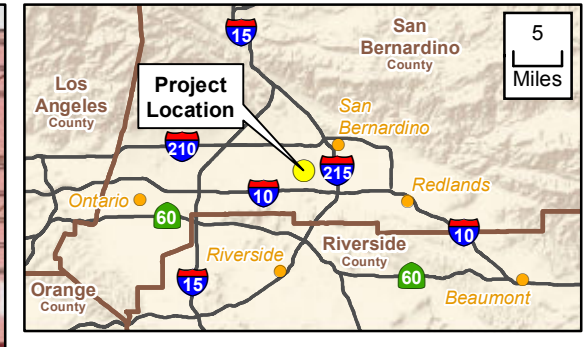
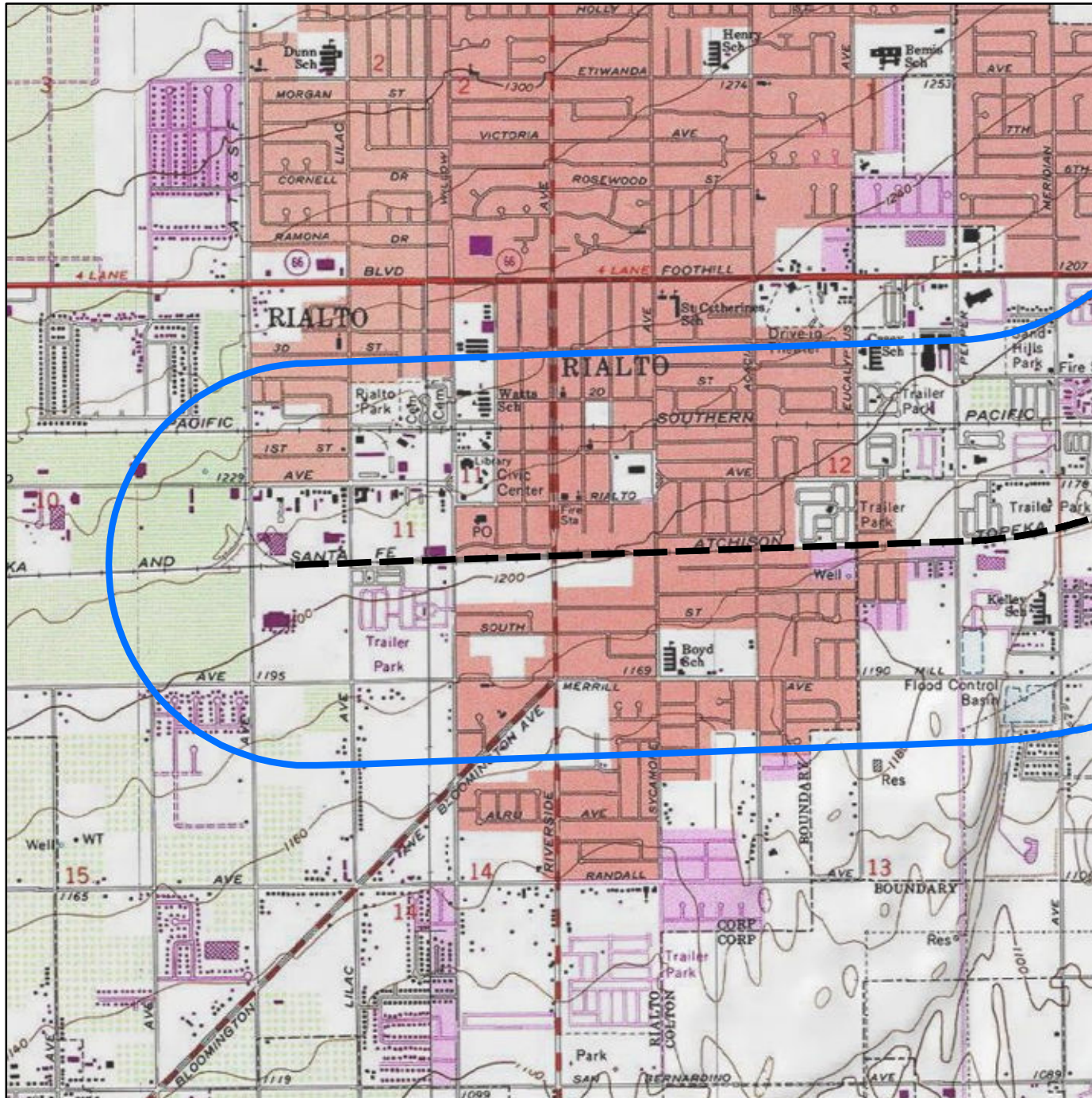
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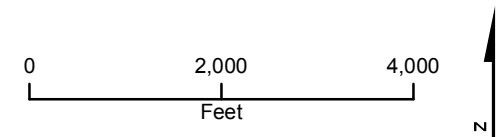
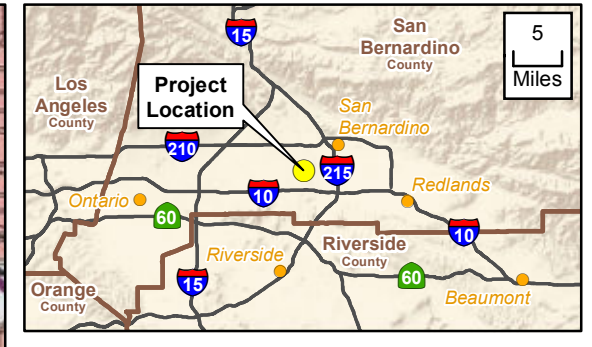
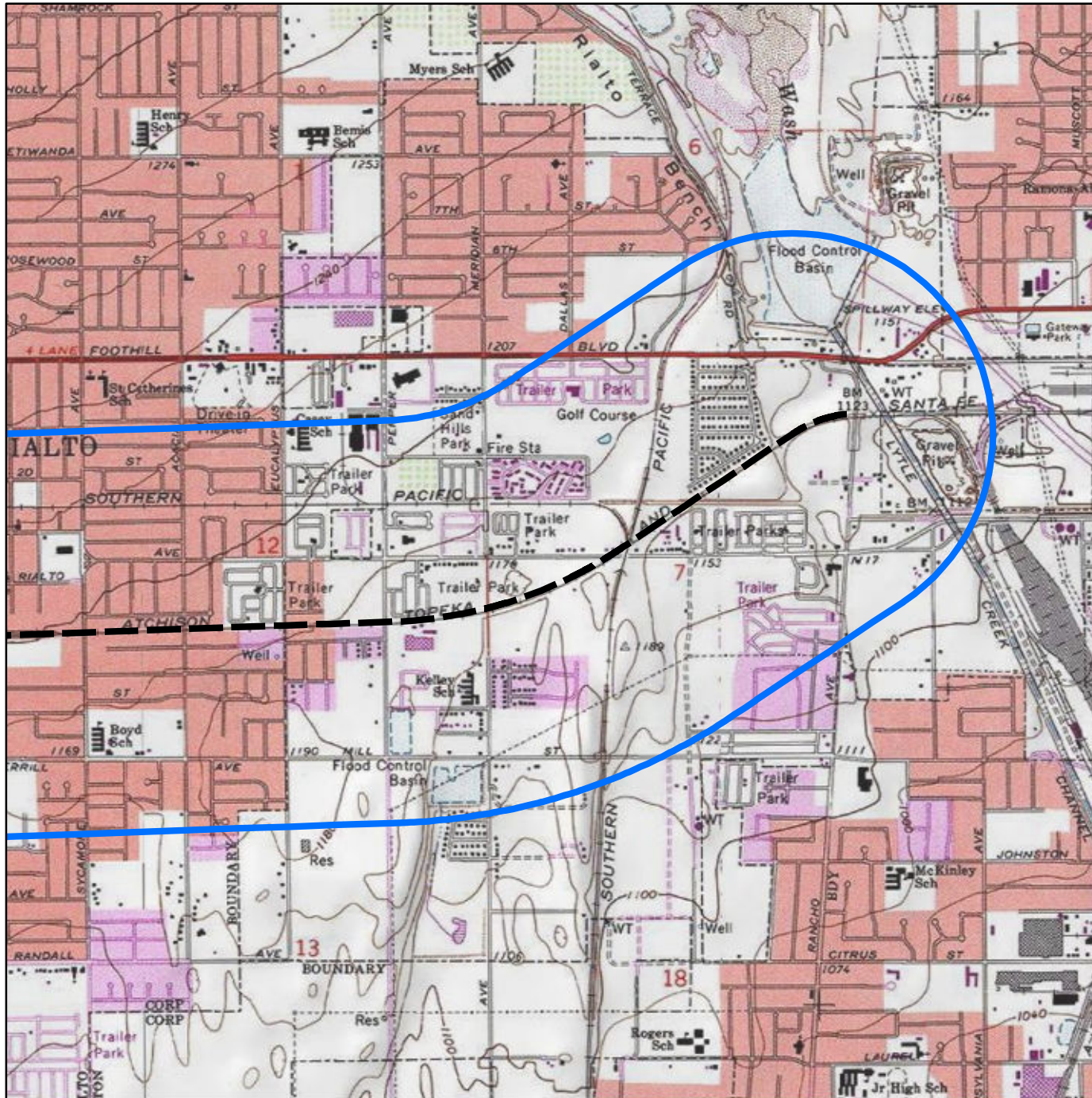


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

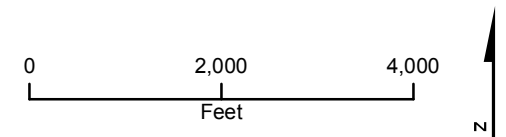


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



CH2M HILL
6 Hutton Center Dr. Suite
700
Santa Ana
CA 92707
Tel 714.435-6044

June 12, 2017

Steven Estrada, Chairman
Santa Rosa Band of Cahuilla Indians
P.O. Box 391820
Anza, CA 92539

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr./Ms.:

CH2M HILL Engineers, Inc. (CH2M) is assisting San Bernardino County Transportation Authority (SBCTA) in a cultural resources assessment of the proposed Lilac to Rancho Double Tracking Project, whose goals are to provide improved commuter rail service between Los Angeles Union Station (LAUS) and the San Bernardino Station. SBCTA, as the project proponent within San Bernardino County and also as the lead agency, is proposing to complete the Preliminary Engineering and Environmental Clearance of approximately three (3) miles of a second main line track between Control Point (CP) Lilac, located at Milepost (MP) 52.4, to CP Rancho, near MP 55.1 on the Metrolink San Bernardino Line. The proposed project corridor would include improvements within the City of Rialto and City of San Bernardino, San Bernardino County, California.

- The project is located on the Fontana and San Bernardino South, CA, 7.5 Minute USGS quadrangles. The legal descriptions are:
- Township 1S, Range 5W, Sections 11 and 12; Township 1S, Range 4 W, Section 7
- The project map is provided along with a 0.5-mile buffer as well as a Project Background and Description document.

A search of the Sacred Land files by the Native American Heritage Commission (NAHC) on April 28, 2017 failed to indicate the presence of Native American sacred sites in the immediate Project vicinity. A California Historical Resources Information System literature search was completed on November 29, 2016 by staff at the South Central Coastal Information Center (SCCIC) located at California State University, Fullerton, California. No cultural resources have been previously documented within the study area. An archaeological pedestrian survey was conducted on November 30, 2016 by CH2M. No cultural resources were identified within the Project. To date, no prehistoric resources have been identified within the Project, either by the archival research or the pedestrian survey.

State law, under Assembly Bill 52 (Public Resources Code Section 21080.3.1), allows California Native American tribes 30 days to request consultation regarding possible significant effects that implementation of the proposed project may have on tribal cultural resources. The request must be in writing to the following contact at SBCTA: Justin Fornelli, PE - Chief of Transit & Rail Programs,

1170 West Third Street, 2nd Floor, San Bernardino, CA 92410 or at jfornelli@gosbcta.com, and a contact person must be identified. SBCTA will begin the consultation process within thirty (30) days of receiving the tribe's request for consultation.

Should SBTCA not receive a response within thirty (30) days, it will be presumed that you have declined consultation.

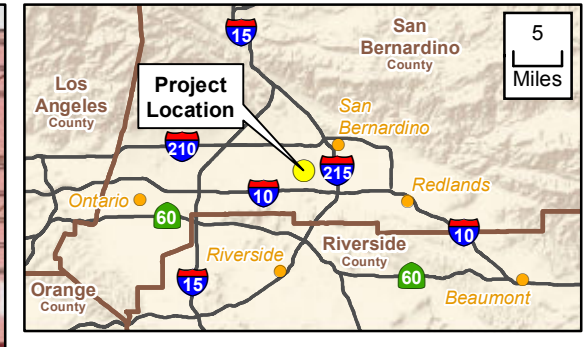
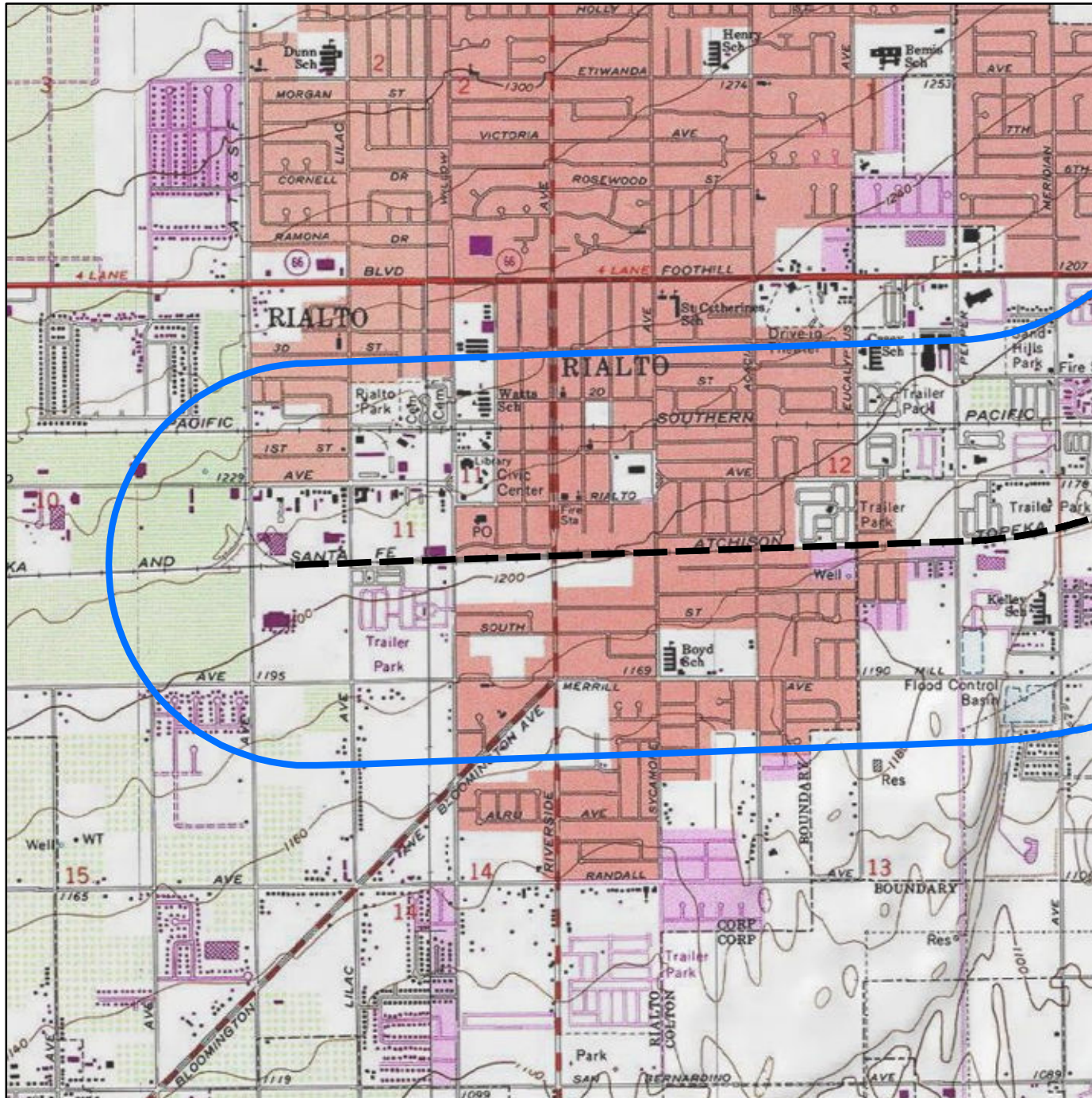
If you know of any traditional cultural properties or values (e.g., burial sites, religious sites, or gathering sites) within the Project area shown on the enclosed map, or if you have any questions regarding issues related to the overall Project, please contact me by phone at 714-435-6044 or by email at gloriella.cardenas@ch2m.com. Your project comments and concerns are important to us. We look forward to hearing from you in the near future.

Respectfully yours,

A handwritten signature in black ink, appearing to read "Gloriella Cardenas", with a stylized, flowing script.

Gloriella Cardenas, M.A., RPA
Cultural Resources Specialist

Enclosure—Map of Project Area



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

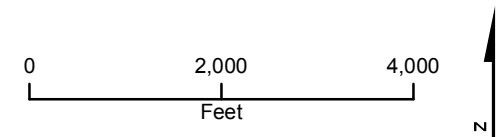
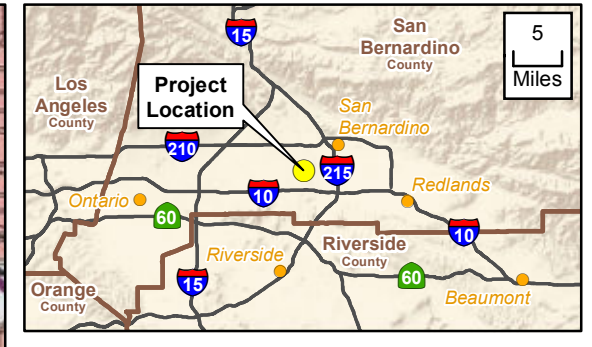
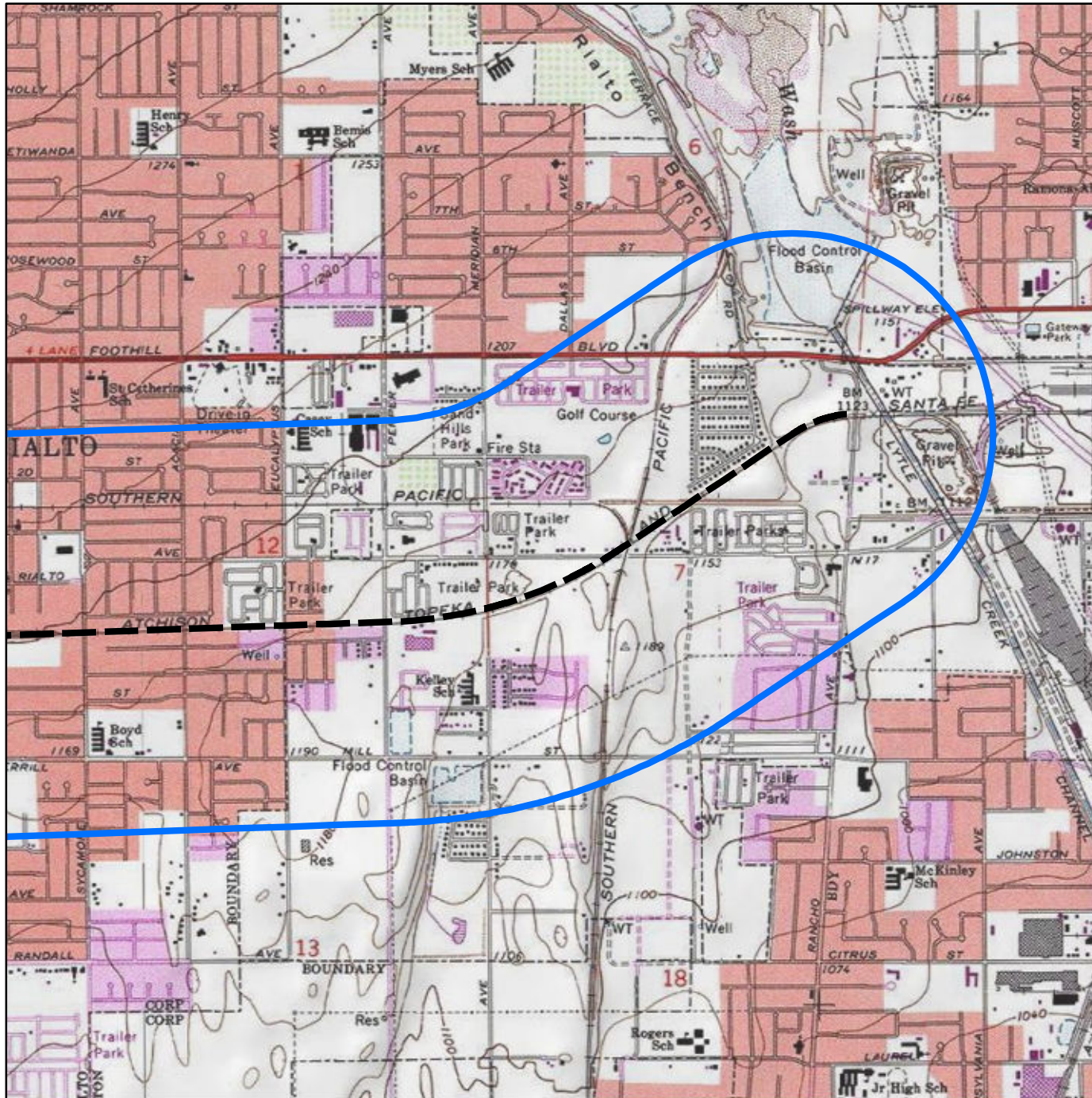


Figure 1 Sheet 01 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



Legend

- Project Location
- 0.5 Mile Buffer of Project Location

Fontana, CA 7.5 USGS Quad, 1967
 San Bernardino South, CA 7.5 USGS Quad, 1975
 Township 1 S, Range 5 W, Sections 11 and 12
 Township 1 S, Range 4 W, Section 7

Basemap Source: ESRI, USGS

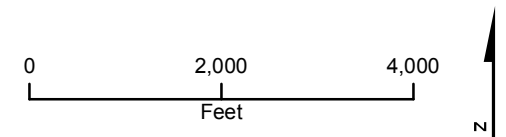


Figure 1 Sheet 02 of 02
Project Location
 SBCTA Double Track Project
 Rialto and San Bernardino, California



GABRIELEÑO BAND OF MISSION INDIANS - KIZH NATION

Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

Ch2m
San Bernardino
6 Hutton Center Dr. Suite 700
CA, 92707

June 21, 2017

Re: AB52 Consultation request for San Bernardino County Transportation Authority Lilac to Rancho Double Tracking Project Located at Milepost Rancho near MP 55.1 on Metrolink San Bernardino Line

Dear Gloriella Cardenas,

Please find this letter as a written request for consultation regarding the above-mentioned project pursuant to Public Resources Code § 21080.3.1, subd. (d). Your project lies within our ancestral tribal territory, meaning descending from, or a higher degree of kinship than traditional or cultural affiliation. Your project is located within a sensitive area and may cause a substantial adverse change in the significance of our tribal cultural resources. Most often, a records search for our tribal cultural resources will result in a "no records found" for the project area. The Native American Heritage Commission, ethnographers, historians, and professional archaeologists can only provide limited information that has been previously documented about California Native Tribes. This is the reason the Native American Heritage Commission (NAHC) will always refer the lead agency to the respective Native American Tribe of the area because the NAHC is only aware of general information and are not the experts on each California Tribe. Our Elder Committee & tribal historians are the experts for our Tribe and are able to provide a more complete history (both written and oral) regarding the location of historic villages, trade routes, cemeteries and sacred/religious sites in the project area. Therefore, to avoid adverse effects to our tribal cultural resources, we would like to consult with you and your staff to provide you with a more complete understanding of the prehistoric use(s) of the project area and the potential risks for causing a substantial adverse change to the significance of our tribal cultural resources.

Consultation appointments are available on Wednesdays and Thursdays at our offices at 901 N. Citrus Ave. Covina, CA 91722 or over the phone. Please call toll free 1-844-390-0787 or email gabrielenoindians@yahoo.com to schedule an appointment.

** Prior to the first consultation with our Tribe, we ask all those individuals participating in the consultation to view a video produced and provided by CalEPA and the NAHC for sensitivity and understanding of AB52. You can view the video at: <http://nahc.ca.gov/2015/12/ab-52-tribal-training/>

With Respect,

Andrew Salas, Chairman

Andrew Salas, Chairman

Albert Perez, treasurer

PO Box 393, Covina, CA 91723

Nadine Salas, Vice-Chairman

Martha Gonzalez Lemos, treasurer

www.gabrielenoindians.org

Christina Swindall Martinez, secretary

Richard Gradias, Chairman of the Council of Elders

gabrielenoindians@yahoo.com

August 22, 2017

Andrew Salas, Chairman
Gabrieleño Band of Mission Indians – Kizh Nation
P.O. Box 939
Covina, CA 91723

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Track Project

Dear Mr. Salas:

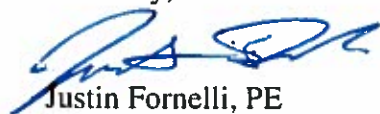
The San Bernardino County Transportation Authority (SBCTA) has received your written request for participation in consultation for the proposed Lilac to Rancho Double Track Project. SBCTA, as the project proponent within San Bernardino County and as the California Environmental Quality Act (CEQA) lead agency, will be conducting consultation with the Gabrieleño Band of Mission Indians – Kizh Nation in compliance with Public Resource Codes § 21080.3.1 (c) and § 21080.3.2 (d) as well as AB 52 under CEQA.

Your concerns regarding ancestral tribal territory and cultural affiliation to the project area are important to SBCTA. We have added the Gabrieleño Band of Mission Indians – Kizh Nation to the project notice list, and we welcome any information regarding traditional cultural properties or values (e.g., burial sites, religious sites, or gathering sites) within the Project area.

As requested in your letter, personnel involved in the consultation process at SBCTA will view the AB 52 Tribal Training, as provided by California Environmental Protection Agency and the Native American Heritage Commission, on the internet.

I would like to invite you and your staff to the SBCTA offices to provide a presentation on the scope of the proposed Project to initiate the consultation and understand any concerns you might have. Please contact me via email at jfornelli@gosbcta.com or via telephone at 909-884-8276, to determine the best time to schedule a meeting.

Sincerely,



Justin Fornelli, PE
Chief of Transit and Rail Programs

March 13, 2018

Andrew Salas, Chairman
Gabrieleño Band of Mission Indians – Kizh Nation
P.O. Box 939
Covina, CA 91723

Re: San Bernardino County Transportation Authority - Lilac to Rancho Double Tracking Project

Dear Mr. Salas:

The purpose of this letter is to provide an update since our last correspondence dated August 22, 2017, regarding the Lilac to Rancho Double Tracking Project (Project). There has been a change in project management at SBCTA, and I would like to introduce myself as the new Project Manager.

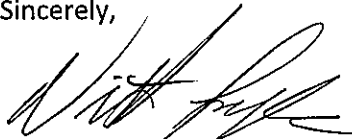
The San Bernardino County Transportation Authority (SBCTA) has received your written request for participation in consultation for the proposed Lilac to Rancho Double Tracking Project. SBCTA, as the project proponent within San Bernardino County and as the CEQA lead agency, will be conducting consultation with the Gabrieleño Band of Mission Indians – Kizh Nation in compliance with Public Resource Codes § 21080.3.1 (c) and § 21080.3.2 (d) as well as AB 52 under CEQA.

Your concerns regarding ancestral tribal territory and cultural affiliation to the Project area are important to SBCTA. We have added the Gabrieleño Band of Mission Indians – Kizh Nation to the project notice list, including the pending Draft CEQA document (Initial Study/Mitigation Negative Declaration) circulation notice in spring of this year (2018). We welcome any information regarding traditional cultural properties or values (e.g., burial sites, religious sites, or gathering sites) within the Project area.

As requested in your letter, personnel involved in the consultation process at SBCTA will view the AB 52 Tribal Training, as provided by California Environmental Protection Agency and the Native American Heritage Commission, on the internet.

I would like to invite you and your staff to the SBCTA offices to provide a presentation on the scope of the proposed Project to initiate the consultation and understand any concerns you might have. Please contact me via email at vlopez@gosbcta.com or via telephone at 909-884-8276, to determine the best time to schedule a meeting.

Sincerely,



Victor Lopez, PE
Program Manager

Appendix M

Draft IS/MND Comments



San Bernardino County
Transportation Authority

COMMENT SHEET

The public review and comment period for Project EIR is
April 16 through May 16, 2018.

INFORMATION:

NAME: Ruben Cortez DATE: _____
ORGANIZATION: Resident
EMAIL: _____ PHONE: (909) 562-0320
ADDRESS: 361 E - ALLEN
CITY: RIMTO STATE: CA ZIP: 92376

COMMENTS:

main concern is, need
to keep blowing of the
horn all through
the way (Reduce noise
Biggest concern.

Comments may be submitted here or emailed to Vlopez@gosbcta.com or mailed to San Bernardino County Transportation Authority, Attn: Victor Lopez, 1170 W. Third Street, 2nd Floor, San Bernardino, CA 92410.



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@goSBCTA



cta

San Bernardino County
Transportation Authority

COMMENT SHEET

The public review and comment period for Project EIR is
April 16 through May 16, 2018.

INFORMATION:

NAME: Marven Norman DATE: 30 April 2018

ORGANIZATION: _____

EMAIL: menorman@gmail.com PHONE: _____

ADDRESS: 1454 Pinal St. Apt. 7

CITY: San Bernardino STATE: CA ZIP: 92404

COMMENTS:

Looks good, get it built ASAP

Comments may be submitted here or emailed to Vlopez@gosbcta.com or mailed to San Bernardino County Transportation Authority, Attn: Victor Lopez, 1170 W. Third Street, 2nd Floor, San Bernardino, CA 92410.



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@goSBCTA



San Bernardino County
Transportation Authority

COMMENT SHEET

The public review and comment period for Project EIR is
April 16 through May 16, 2018.

INFORMATION:

NAME: Tony Ozaeta DATE: 4-30-18
ORGANIZATION: Carpenter Local 944
EMAIL: tonyozaetajr.2@gmail PHONE: 909) 2462874
ADDRESS: 440, W. Jackson St.
CITY: Rialto STATE: Ca. ZIP: 92376

COMMENTS:

We are hoping to see an improvement to our city and support the Sb cta project and would like see the final design approved. We want to have the quiet zone crossing bring growth to Rialto. We are for the Double Track proceed with construction.

Comments may be submitted here or emailed to Vlopez@gosbcta.com or mailed to San Bernardino County Transportation Authority, Attn: Victor Lopez, 1170 W. Third Street, 2nd Floor, San Bernardino, CA 92410.



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English (US) · Español · Português (Brasil) · Français (France) · Deutsch

Ad Choices



Most Relevant

9 Shares



Appendix N

Draft IS/MND Comment Response Matrix

SBTCA Rancho to Lilac Double Tracking Project Comments Response Matrix									
Submittal Number	Commenter Affiliation	Commenter	Contact	Date Submitted	Affiliation Type	Submittal Method	Comment Category	Comment Summary	Response
1	Resident	Cortez, Ruben	(909) 562- 0320	ND	Individual	Comment Card	Noise	Main concern is need to keep blowing of the horn all through the way (reduce noise biggest concern)	The project's noise analysis is located on page 3-20 of the Draft Initial Study. A Quiet Zone Study was also completed for the cooridor. The Quiet Zone Study establishes that the corridor is quiet zone ready according to FRA requirements. Ultimately, the Cities of Rialto and San Bernardino, as project partners, will be responsible for submitting the formal applications/requests for quiet zone implementation approval. SBCTA has completed the necessary steps and documentation for this to happen.
2	Resident	Norman, Marven	menorman@gmail.com	4/30/2018	Individual	Comment Card	Support	Looks good, get it built ASAP	The Construction schedule for the project is outlined in section 2.3.1 of the Draft Initial Study.
3	Carpenter	Ozaeta, Tony	email: tonyozaetajr.2@gmail.com phone: (909) 246-2874	4/30/2018	Carpenter Local 944	Comment Card	Support	We are hoping to see an improvement to our city and support the SBCTA project and would like to see the final design approved. We want to have the quiet zone crossing bring growth to Rialto. We are for the Double track proceed with construction.	The project's noise analysis is located on page 3-20 of the Initial Study. A Quiet Zone Study was also completed for the cooridor. The Quiet Zone Study establishes that the corridor is quiet zone ready according to FRA requirements. Ultimately, the Cities of Rialto and San Bernardino, as project partners, will be responsible for submitting the formal applications/requests for quiet zone implementation approval. SBCTA has completed the necessary steps and documentation for this to happen. The potential for growth from the project is discussed in the Population and Housing analysis in seciton 3-24. The propsoed project is not expected to directly or indirectly induce substantial population growth.
4	Facebook User	Griswold, Erik	Facebook	4/30/2018	Individual	Facebook Comment	Support	Glad to hear conductors are operating trains!	No Response necessary. Comment Noted.
5	Facebook User	Baxter, David	Facebook	5/1/2018	Individual	Facebook Comment	Design	Overpass would be better.	An overpass option was evaluated in the Visual Study. There was also a team discussion regarding the cost and maintenance of the overpass option. The corresponding costs and anticipated maintenance, predominantly the need for elevators, would be much higher than the underpass option. For these reasons the option was eliminated.
6	Facebook User	Avila, Jerry	Facebook	4/30/2018	Individual	Facebook Comment	Support	*thumbs up*	No Response necessary. Comment Noted.

Appendix O

Environmental Commitments Matrix

Envrionmental Commitments Matrix, Rancho to Lilac Double Track Project, SBCTA					
Responsible Party	Section	Environmental Resource Category	Environmental Commitment Description	Timing Requirements of Environmental Commitments (Seasonal Restrictions, Month, Year)	Environmental Commitments Completed (Date) and Sign-Off Signatures (Responsible Party)
Contractor and SBCTA	3.2	Noise	<u>NOI-1:</u> Complete the Work Permit preparation, submittal and approval process with the City of Rialto to allow weekend construction activities. The approved Work Permit, issued by the City Manager, will allow anticipated weekend construction that would extend beyond the authorized timelines and days according to the City’s Municipal Code (Title 9, Chapter 9.50.070). The specific timelines that will permitted according to this mitigation measures include the following: *Construction activities will be allowed beginning on Friday from 5:31 pm through to Saturday at 7:59 am *Construction activities will be allowed beginning on Saturday’s from 5:01 pm through to Monday at 6:59 am Consistent with the City of Rialto’s Work Permit requirements to demonstrate sufficient need and justifications, the construction activities necessary during the above defined work windows are associated with the proposed at-grade roadway crossing improvements. These roadway crossings must be modified and the prescribed improvements implemented (Project Description, Section 2.0). To avoid any potential for secondary impacts to north-south access across the railroad corridor and to also avoid undue detours, each roadway crossing and its corresponding improvements will occur over a single weekend with only one crossing being closed and improvements being constructed at a time. No concurrent roadway closure or construction will occur.	Prior to Construction/Ground-Breaking	
Contractor and SBCTA	3.2	Noise	<u>NOI-2:</u> The necessary environmental commitments of Mitigation Measure NOI-2, will be completed prior to potential implementation of Mitigation Measure NOI-3 in attempt to avoid the potential for a full acquisition of the residential structure at 2422 W Rialto Ave. Implementation of NOI-2 will include the following three (3) steps: *Step 1 – Complete a property line/SBCTA ROW survey to delineate the corresponding parcel boundaries associated with the impacted property located at 2422 W Rialto Ave, and the SBCTA ROW boundary. This delineation will establish the ROW limits in relation the improvements located on the property located at 2422W Rialto Ave. The survey and the corresponding results will also confirm if the improvements currently in place at 2422W Rialto Ave are encroaching into SBCTA ROW. Depending on the results of the above described delineation the second step as part of this mitigation measure may require partial financial responsibility of the current owner of the property at 2422W Rialto Ave. Property owner approval may be necessary of access onto the property at 2422 W Rialto Ave is required to complete the survey. *Step 2 – Conduct the necessary vibration measurements, evaluation, modeling (if deemed necessary), and document the results. The results will provide a determination on the minimum separation distance from the proposed second main-line railroad track alignment to address the currently predicted vibration impact. If the vibration measurement results determine that the separation from tracks is not sufficient to address the predicted vibration impact then an additional evaluation of a double layer of ballast mats will be included to supplement the evaluation and determine if the combined action will address the predicted vibration impact. *Step 3 – Based on the results from Step 1 and 2, assuming the results of Step 2 present a viable mitigation for the predicted vibration impact then proceeding with Step 3 will be undertaken. Initiate the relocation of the existing residential structure, according to the minimum separation distance required. The relocation will include an evaluation the existing improvements needed on-site and determination on the preferred location within the limits of the parcel boundaries at 2422 W Rialto Ave. The on-site evaluation of the property located at 2422 W Rialto Ave will include the spatial requirements, supplemental improvements needed (foundation and relocated utility connections), City of San Bernardino development standards and building permit requirements, and any potential secondary modifications or removals of other on-site improvements that would also be required. Step 2 may also include the inclusion of a double layer of ballast mats with the second main-line track alignment. The limits of the double layer ballast mat, if deemed necessary, will be provided as part of the Step 2 documentation results. If the results from Step 2 determine that relocation of the existing residential structure at 2422 W Rialto Ave, alone or in concert with a double layer ballast mat is not a viable mitigation for the predicted vibration impact	During Final Design/PS&E Stage	
Contractor and SBCTA	3.2	Noise	<u>NOI-3:</u> This environmental commitment will only be considered for implementation after the stepped process associated with Mitigation Measure NOI-2 have been completed and determine to be a non-viable mitigation option. Mitigation Measure NOI-3 will involve the preparation of a relocation impact technical memorandum that will document the necessary steps and provisions associated with the full acquisition of the property located at 2422 W Rialto Ave. This full acquisition will also include a comprehensive evaluation of comparable replacement property resources. The replacement resources will be evaluated based on current and fair market value, including size (parcel and building square footage (primary structure) and configuration (number of bedrooms/bathrooms). Any secondary improvements currently on-site at 2422 W Rialto Ave will be considered in concert with the property appraisal conducted. The evaluation of costs associated with this option in comparison to the on-site relocation and ballast mats will also be evaluated to determine the best option and most viable solution	During Final Design/PS&E Stage	

Envrionmental Commitments Matrix, Rancho to Lilac Double Track Project, SBCTA					
Responsible Party	Section	Environmental Resource Category	Environmental Commitment Description	Timing Requirements of Environmental Commitments (Seasonal Restrictions, Month, Year)	Environmental Commitments Completed (Date) and Sign-Off Signatures (Responsible Party)
Contractor and SBCTA	3.2	Noise	<p>In concert with the noise analysis the local municipal codes from the City of Rialto were reviewed. The City of Rialto Municipal Code and noise ordinances, Title 9, Chapter 9.50.070, covers noise due to construction. It states that it is unlawful for any person to perform construction work except between the hours given in Table 3-3.</p> <p><i>City of Rialto Municipal Code</i> <i>October 1 through April 30 May 1 through September 30</i> <i>Monday-Friday 7:00 am to 5:30 pm 6:00 am to 7:00 pm</i> <i>Saturday 8:00 am to 5:00 pm 8:00 am to 5:00 pm</i> <i>Sunday No permissible hours No permissible hours</i> <i>State Holidays No permissible hours No permissible hours</i></p> <p>The City of San Bernardino Municipal Code and noise ordinances, Title 8, Chapter 8.54.070, also covers noise due to construction. It states that it is unlawful for any person to perform construction work except between the hours of 7:00 am and 8:00 pm (daily).</p> <p>The Proposed Project would require construction activities during select weekends, including improvements at each of the eight at-grade crossings (1 weekend per crossing; total of 8 select weekends) and additional weekend work along and within the SBCTA ROW tracks to bring the second mainline track into service. These activities will be coordinated with the cities of Rialto and San Bernardino, including the necessary permit from the City of Rialto (Municipal Code, Title 9, Chapter 9.50.070) thereby allowing construction activities to occur outside of the permissible days of the week. The referenced coordination and City of Rialto and the required permit represents Mitigation Measure NOI-1.</p>	Prior to Construction/Ground-Breaking	
Contractor and SBCTA	3.2	Noise	<p>In concert with the noise analysis the local municipal codes from the City of San Bernardino were reviewed. The City of San Bernardino Municipal Code and noise ordinances, Title 8, Chapter 8.54.070, also covers noise due to construction. It states that it is unlawful for any person to perform construction work except between the hours of 7:00 am and 8:00 pm (daily).</p> <p>The Proposed Project would require construction activities during select weekends, including improvements at each of the eight at-grade crossings (1 weekend per crossing; total of 8 select weekends) and additional weekend work along and within the SBCTA ROW tracks to bring the second mainline track into service. These activities will be coordinated with the cities of Rialto and San Bernardino, including the necessary permit from the City of Rialto (Municipal Code, Title 9, Chapter 9.50.070) thereby allowing construction activities to occur outside of the permissible days of the week. The referenced coordination and City of Rialto and the required permit represents Mitigation Measure NOI-1.</p>	Prior to Construction/Ground-Breaking	
SBCTA	1.3	Permits and Approvals	Section 404 Nationwide 14 Permit, United States Army Corps of Engineers	During Final Design/PS&E Stage	
SBCTA	1.3	Permits and Approvals	National Pollutant Discharge Elimination System General Construction stormwater permit, including Stormwater Pollution Prevention Plan, Californai Regional Water Qwuality Control Board	During Final Design/PS&E Stage	
SBCTA	1.3	Permits and Approvals	Section 401 permit, California Regional Water Quality Control Board	During Final Design/PS&E Stage	
SBCTA	1.3	Permits and Approvals	Streambed Alteration Agreement, California Department of Fish and Wildlife	During Final Design/PS&E Stage	
SBCTA	1.3	Permits and Approvals	Compliance with applicable rules and regulations, South Coast Air Quality Management District	During Final Design/PS&E Stage	
SBCTA	1.3	Permits and Approvals	Noise permit for construction activities dring select weekend work, City of Rialto	Prior to Construction/Ground-Breaking	
SBCTA	1.3	Permits and Approvals	Encroachment Permit, City of Rialto	Prior to Construction/Ground-Breaking	
SBCTA	1.3	Permits and Approvals	Transportation Permit for hauling oversized material, City of San Bernardino	Prior to Construction/Ground-Breaking	
SBCTA	1.3	Permits and Approvals	Noise permit for construciton activities during select weekend work, City of San Bernardino	Prior to Construction/Ground-Breaking	

Appendix P

Notice of Determination

Notice of Determination**Appendix D****To:**

☒ Office of Planning and Research
 U.S. Mail: _____ Street Address: _____
 P.O. Box 3044 1400 Tenth St., Rm 113
 Sacramento, CA 95812-3044 Sacramento, CA 95814

☒ County Clerk
 County of: San Bernardino
 Address: 222 W. Hospitality Lane
 San Bernardino, CA 92415

From:

Public Agency: SBCTA
 Address: 1170 W. 3rd Street, 2nd Floor
 San Bernardino, CA
 Contact: Victor Lopez
 Phone: 908-884-8276

Lead Agency (if different from above): _____

Address: _____

Contact: _____

Phone: _____

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2018041037

Project Title: Lilac to Rancho Double Tracking

Project Applicant: SBCTA

Project Location (include county): Rialto, San Bernardino County, CA

Project Description:

The San Bernardino County Transportation Authority (SBCTA), as the Project proponent, is proposing to construct approximately three (3) miles of a second main line track along the San Gabriel Subdivision, San Bernardino Line (SBL) railroad corridor between Control Point (CP) Lilac Milepost 52.4 to approximately CP Rancho, near MP 55.1 in the cities of Rialto and San Bernardino. This second track would improve average train speed, travel times, reliability, and overall capacity of the SBL.

This is to advise that the SBCTA _____ has approved the above
 (☒ Lead Agency or ☐ Responsible Agency)

described project on _____ and has made the following determinations regarding the above
 (date)
 described project.

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☐ was ☒ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
6. Findings [☐ were ☒ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:

San Bernardino County Transportation Authority 1170 W. 3rd Street, 2nd Floor San Bernardino, CA 92410-1715

Signature (Public Agency): _____ Title: _____

Date: _____ Date Received for filing at OPR: _____

