CHAPTER 2.0 ALTERNATIVES CONSIDERED

2.1 HISTORY OF ALTERNATIVES ANALYZED

In early 2009, SANBAG acting in its role as the San Bernardino County Transportation Commission, embarked on an effort to prepare an Alternatives Analysis (AA) with the goal of identifying a Locally Preferred Alternative (LPA) that would qualify for FTA Section 5309 New Starts/Small Starts funding. At the time, the immediate goal was to define a fixed-guideway transit project that could be designed, implemented, funded, and operated. Numerous options were discussed to minimize capital costs (such as reducing trackwork, stations, and vehicles) and operating costs (such as reducing service frequencies and hours of operation).

As part of the AA, a screening methodology and evaluation was developed and conducted for each of the alternatives evaluated including Diesel Multiple Unit (DMU), Light Rail Transit (LRT), Passenger Rail (extension of Metrolink service), and Bus Rapid Transit (BRT). The process focused on the consistency of each transit mode with the Project's purpose and need, as described in Chapter 1, application of the primary FTA New Starts/Small Starts project justification criteria, and identification of environmental issues that could affect the viability of the alternatives. As a result of the AA process, SANBAG determined that the Project would not meet FTA's criteria for New Starts/Small Starts funding. After careful consideration of other viable funding options without using FTA New/Small Starts funding, SANBAG concluded it was necessary to maintain existing freight operations and develop compatible transit infrastructure to allow for the use of multiple funding mechanisms.

SANBAG is proposing the Redlands Passenger Rail Project (RPRP or Project) as the means to implement a new mode of transit service to serve key markets in the Redlands Corridor while still accommodating freight service in the corridor and is considering several alternatives and design options for the Project in this EIS/EIR. SANBAG and FTA released the Draft EIS/EIR for public review and comment on August 6, 2014. The public and agency review and comment period closed on September 29, 2014. This final EIS/EIR has been prepared to respond to comments received on the draft EIR/EIS for the Project per the requirements of NEPA (40 CFR 1503(a) and CEQA (CEQA Guidelines, Section 15008(c).

2.2 PROJECT OVERVIEW

This chapter describes the Project components and construction and operational activities associated with the Build Alternatives and Design Options considered by SANBAG for the Project. SANBAG proposes the introduction of passenger rail service on an existing railroad right-of-way (ROW) in need of improvements between the City of San Bernardino and the City of Redlands in San Bernardino County. This EIS/EIR considers the No Build Alternative, two Build Alternatives, and three Design Options for the Project. The alternatives and design options considered are described as follows: Alternative 1 – No Build; Alternative 2 – Preferred Project; Alternative 3 – Reduced Project Footprint; Design Option 1 – Train Layover Facility (Waterman Avenue); Design Option 2 – Use of Existing Train Layover Facilities; and Design Option 3 – Waterman Avenue Rail Station. These alternatives and design options are considered at an equal level of detail in this EIS/EIR consistent with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

The Build Alternatives and Design Options would include replacement of rail infrastructure along a nine-mile section of railroad owned by SANBAG and is part of the former Atchison, Topeka and Santa Fe (AT&SF) Railroad's Redlands Subdivision; commonly referred to as the "Redlands Branch,, "Short Line," or "Redlands Spur." Each of the Build Alternatives would include passenger rail operations along the existing rail corridor with stops at five locations. Two of the five stops proposed would be located at E Street and either Tippecanoe Avenue or Waterman Avenue in the City of Bernardino; and the remaining three stops would be located within the City of Redlands at New York Street, Orange Street (Downtown Redlands), and University Street (University of Redlands). Each of the Build Alternatives would also include track and subgrade improvements, new rail stations, and improvements to existing bridge structures and at-grade highway-rail crossings. A train layover facility is also proposed as part of the Project; and the Design Options considered provide for flexibility in its location.

2.3 PROJECT LOCATION AND STUDY AREA

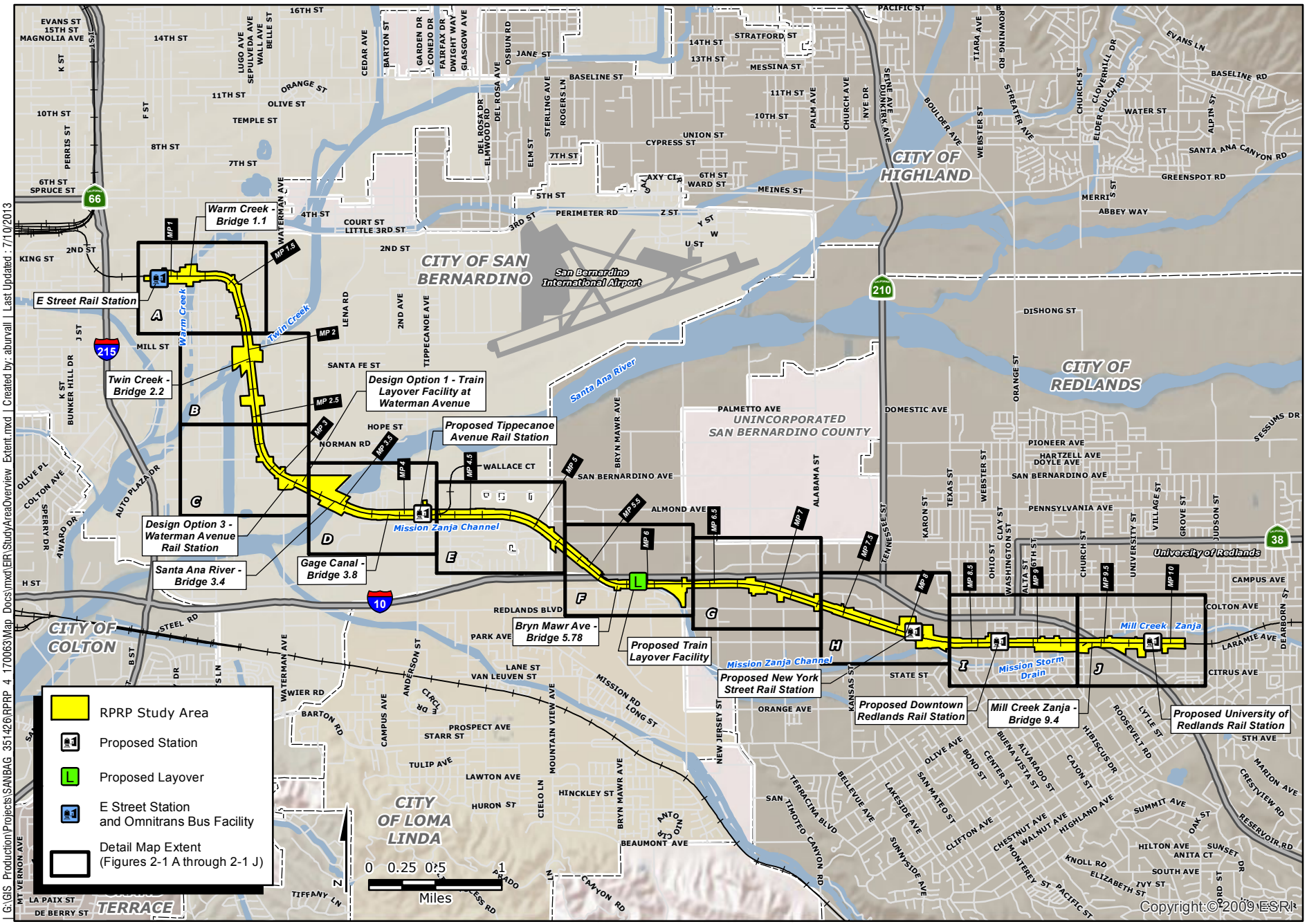
Figure 2-1 provides an overview map of the Study Area for the Project considered in this EIS/EIR. Figures 2-1A through 2-1J, *RPRP Study Area Detail*, identify the location of physical disturbance associated with the Project footprint that would occur for the Preferred Project as described in Section 2.6 below. For the purposes of this EIS/EIR, the Study Area for the Project extends a minimum of 200 feet in either direction from the centerline of the existing railroad ROW for the entire length of the corridor. Additional areas beyond this 200-foot limit are included, as appropriate, to facilitate consideration of related facilities including, but not limited to new stations, potential parking areas, train layover facilities, at-grade crossings, drainage improvements, and bridge improvements that may extend outside the existing railroad ROW.

The Study Area follows the Redlands Subdivision, which extends east of the San Gabriel Subdivision. The "Redlands Branch" was originally constructed in the 1880's by predecessors to the AT&SF Railway Company. The AT&SF divested its assets in 1992 and the physical railroad ROW was purchased by SANBAG while the freight rights and operations over the railroad were purchased by (merged into) the BNSF. The BNSF now provides freight access to existing freight customers along the ROW. The Study Area includes the easternmost nine miles of the 10-mile long Redlands Subdivision and extends along the existing SANBAG ROW that ranges between 50 to 100 feet in width through the cities of San Bernardino and Redlands. In some areas, the SANBAG ROW is restricted to less than 38 feet (e.g., downtown Redlands).

The Study Area description is presented according to mile post (MP) from west to east. The Study Area starts just west of MP 1, east of E Street within the City of San Bernardino and ends at MP 10.1 at the University of Redlands.

MP 1 to 3.2 (see Figures 2-1A, 2-1B, and 2-1C). The Build Alternatives and Design Options all originate at or about the railroad crossing at E Street, just west of MP 1[1], and extend east approximately 1/2 mile before turning southward. Track improvements are proposed eastward from the planned E Street Rail Station proposed in conjunction with the Downtown San Bernardino Passenger Rail Project (DSBPRP) immediately adjacent to and west of E Street.

[1] References to mile posts are based on the Track Chart for the Redlands Spur – San Bernardino, CA (MP 0.0) to Redlands, CA (MP 9.5) – prepared by the BNSF, dated October 1, 2004. This EIS/EIR uses mile post references to describe existing conditions along the rail corridor.



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RPRP Study Area Overview

Figure 2-1

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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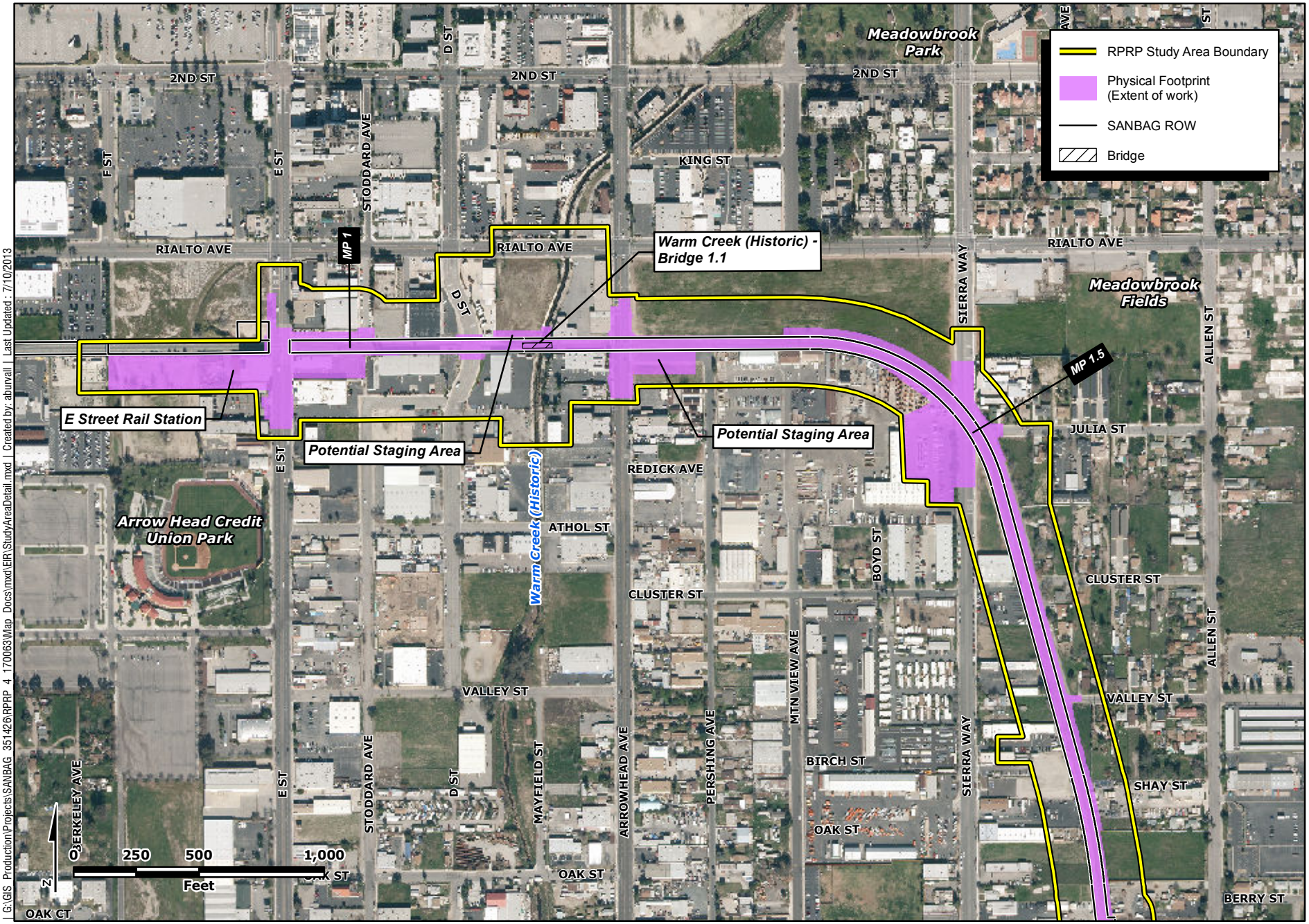

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RPRP Study Area Detail – MP 1 to MP 1.8

Figure 2-1 A

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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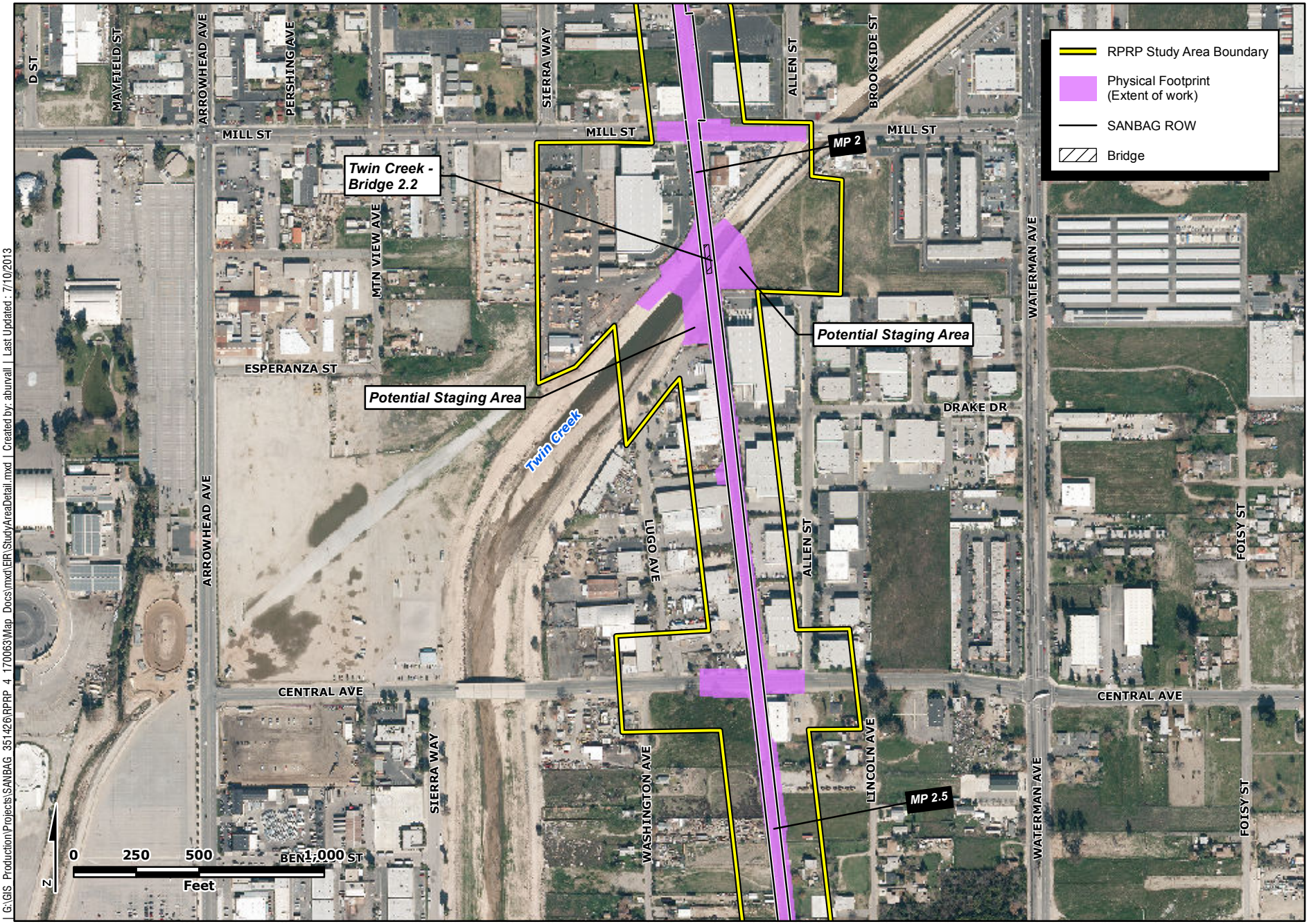

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RPRP Study Area Detail – MP 1.9 to MP 2.6

Figure 2-1 B

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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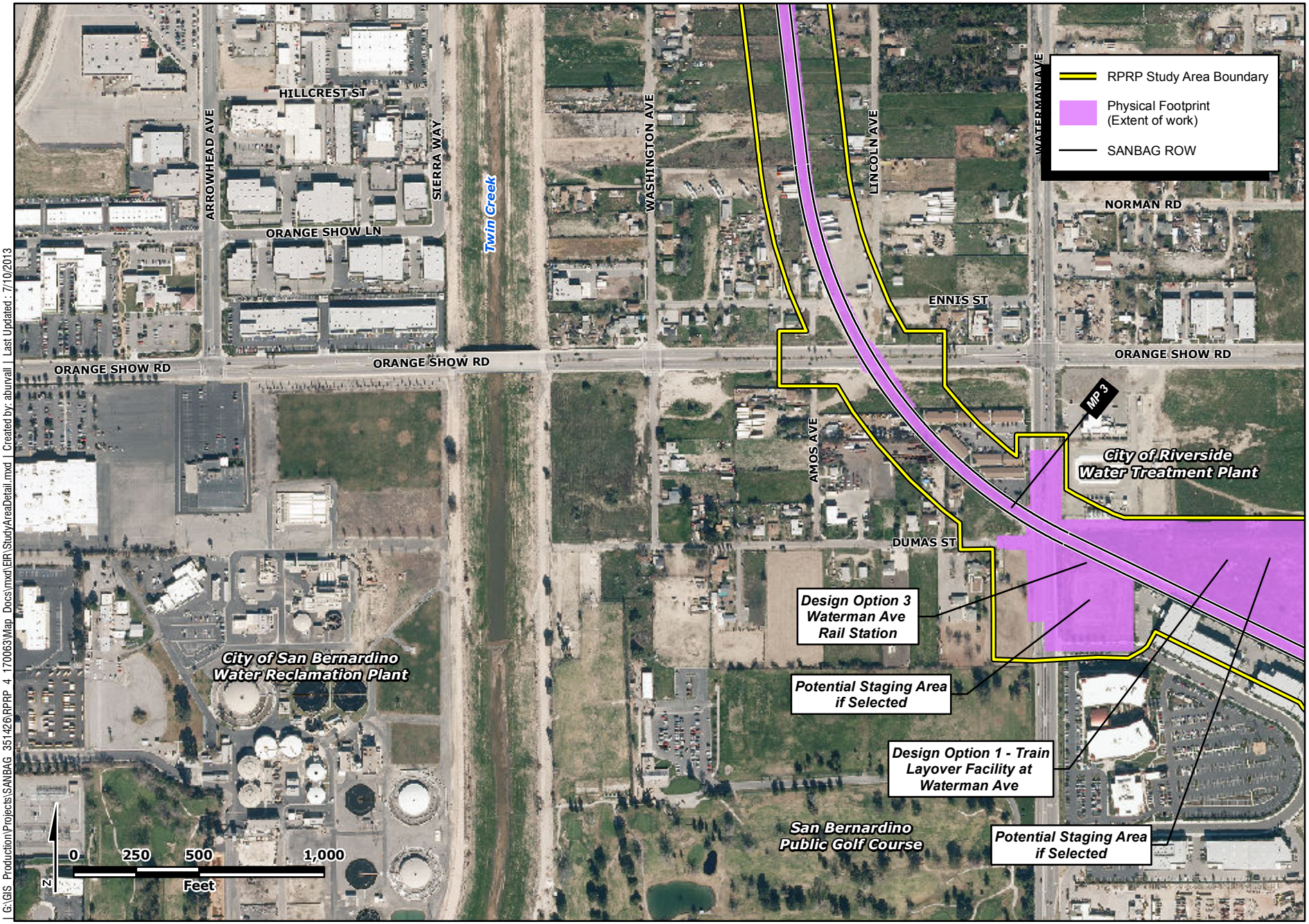

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RPRP Study Area Detail – MP 2.7 to MP 3.2

Figure 2-1 C

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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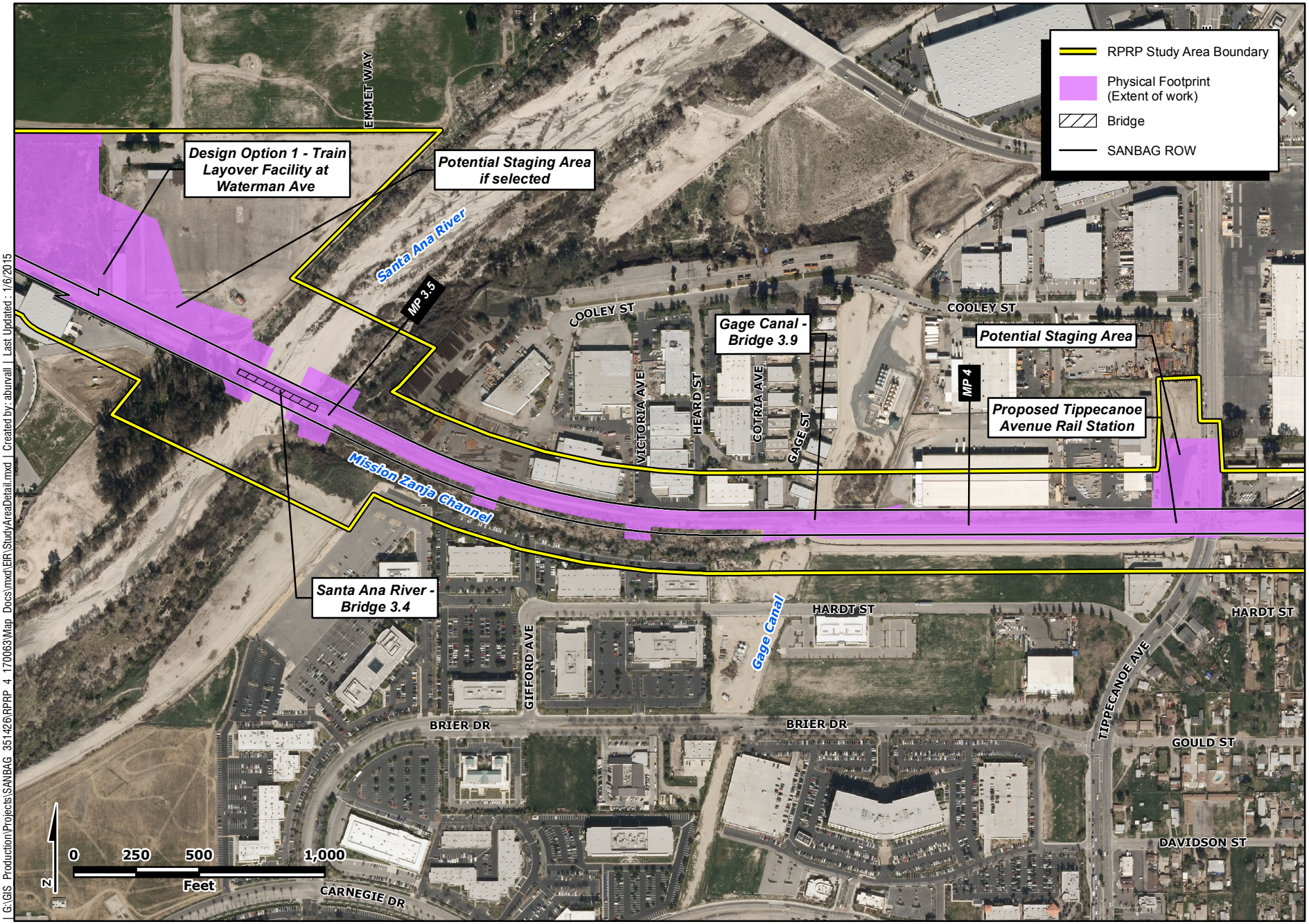

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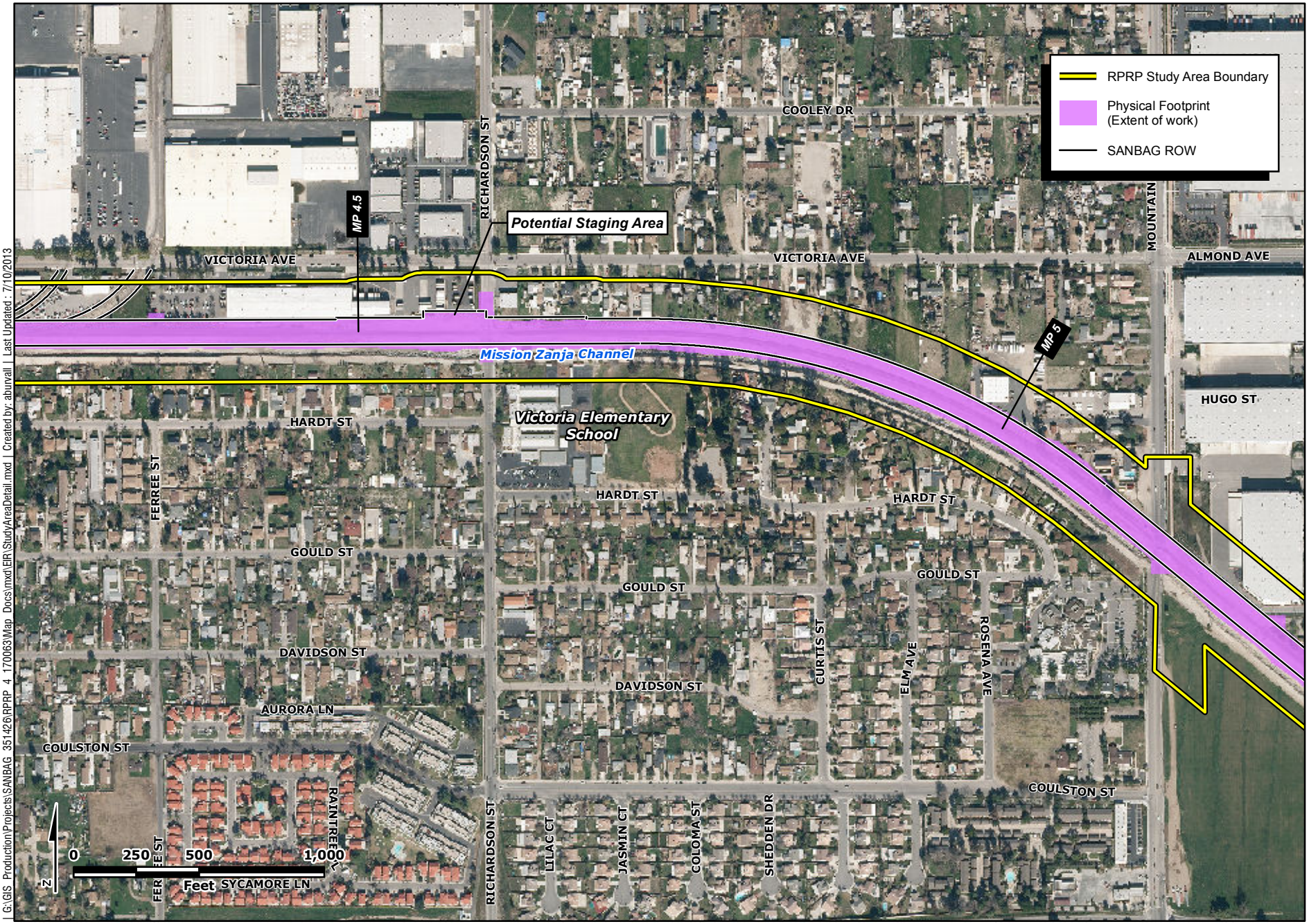
RPRP Action Area Detail – MP 3.3 to MP 4.2

Figure 2-1 D (Revised)

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR



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RPRP Study Area Detail – MP 4.3 to 5.2

Figure 2-1 E

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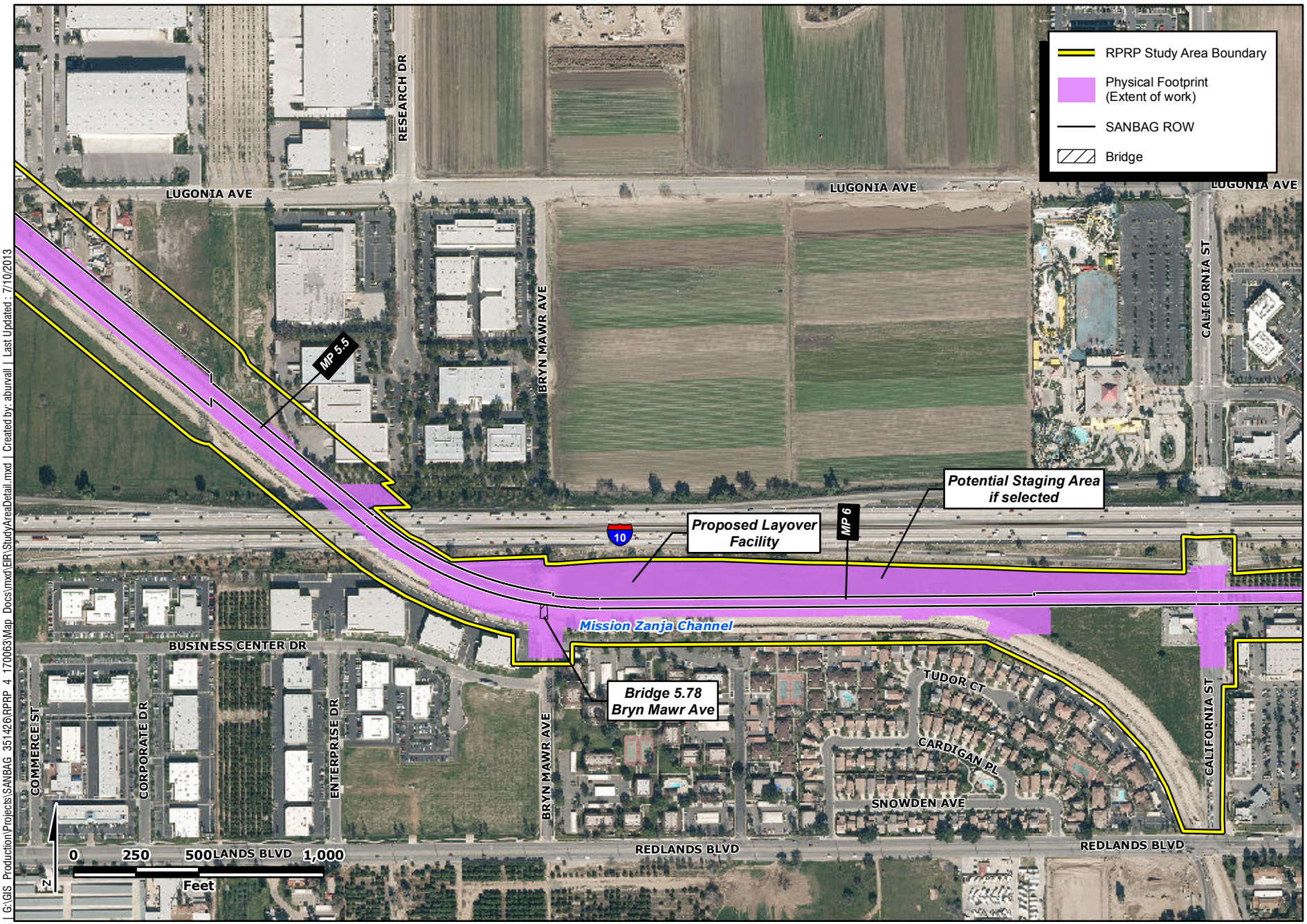

RPRP Study Area Detail – MP 5.3 to MP 6.3

Figure 2-1 F

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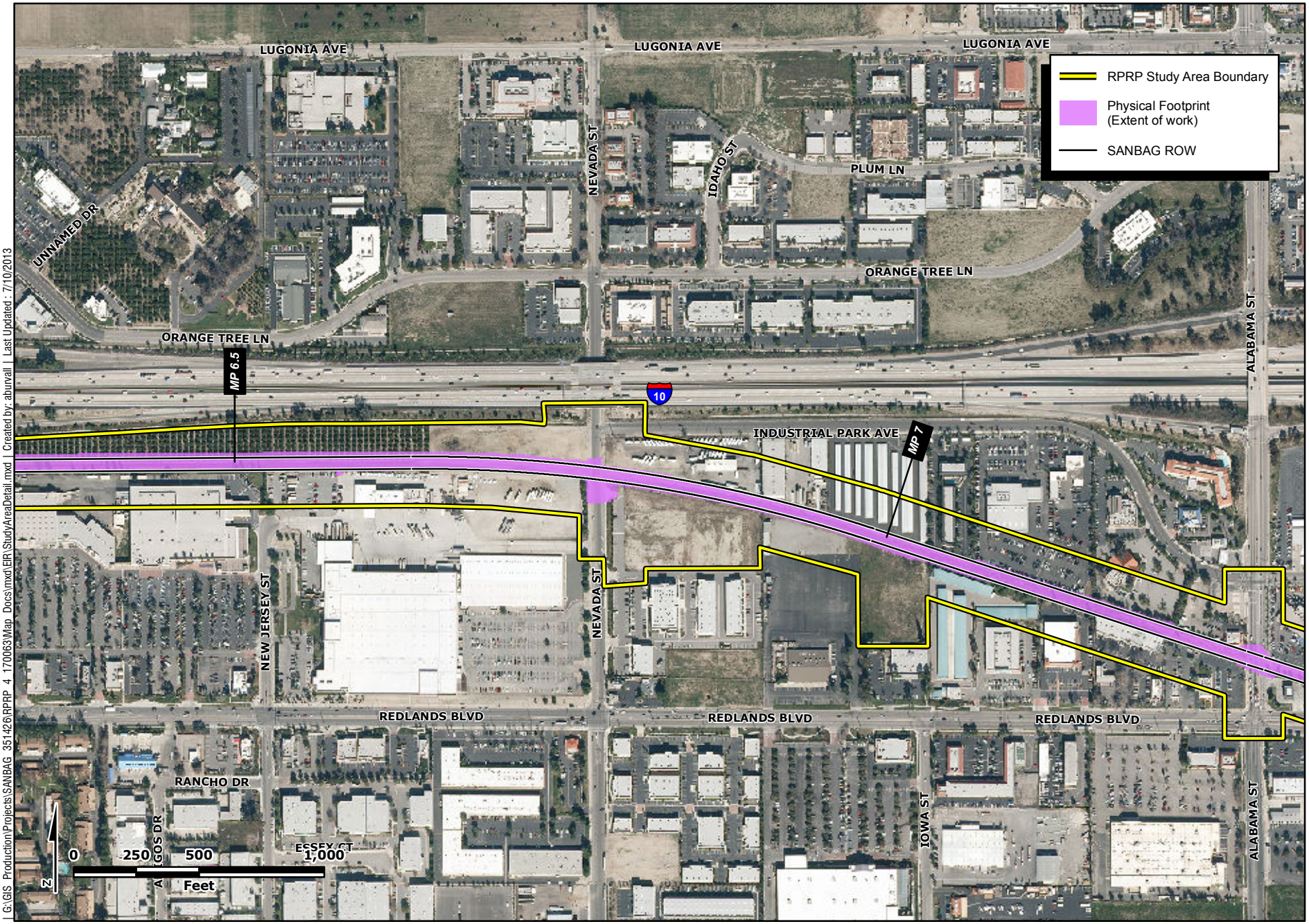

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RPRP Study Area Detail – MP 6.4 to MP 7.3

Figure 2-1 G

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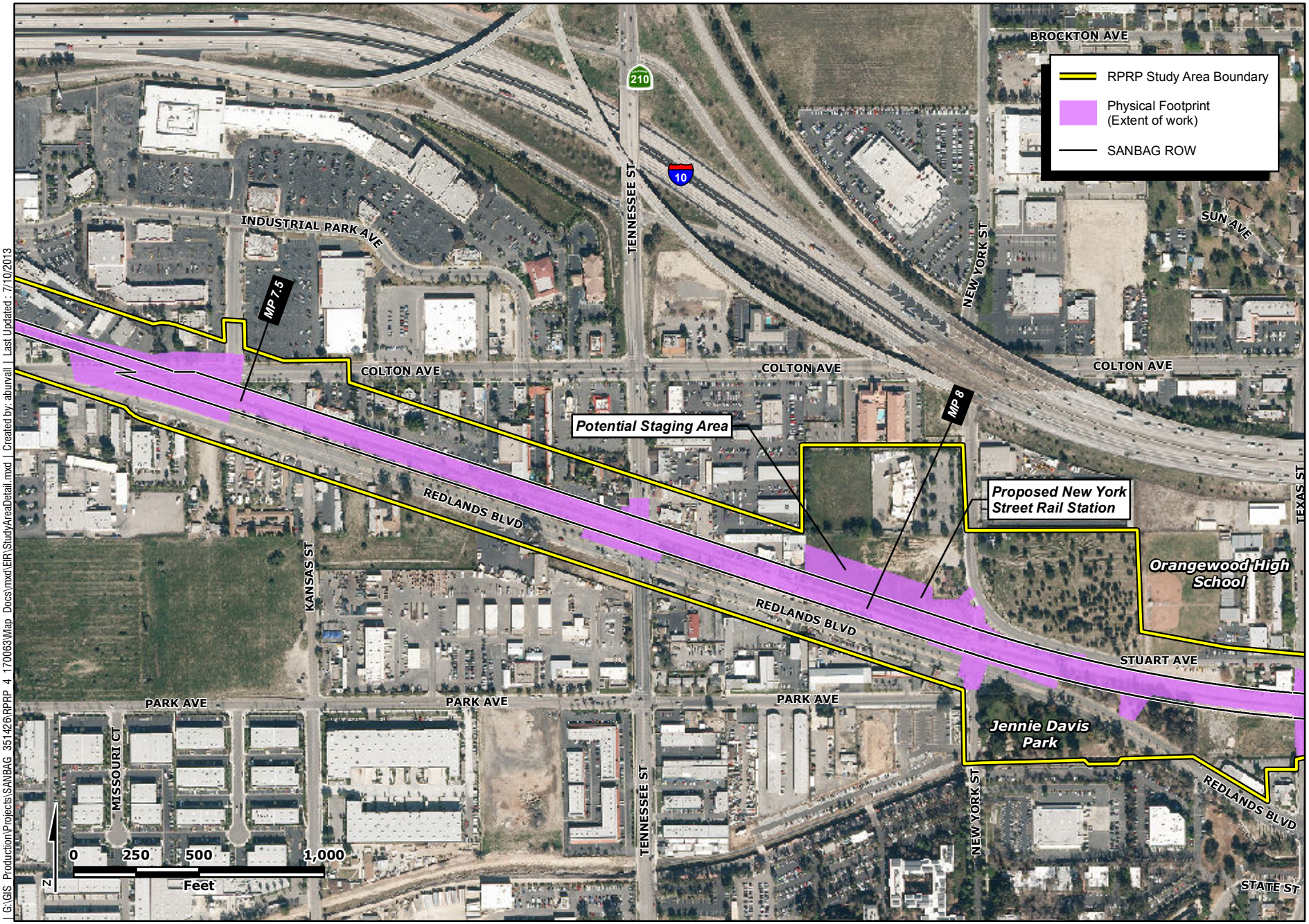

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RPRP Study Area Detail – MP 7.4 to MP 8.3

Figure 2-1 H

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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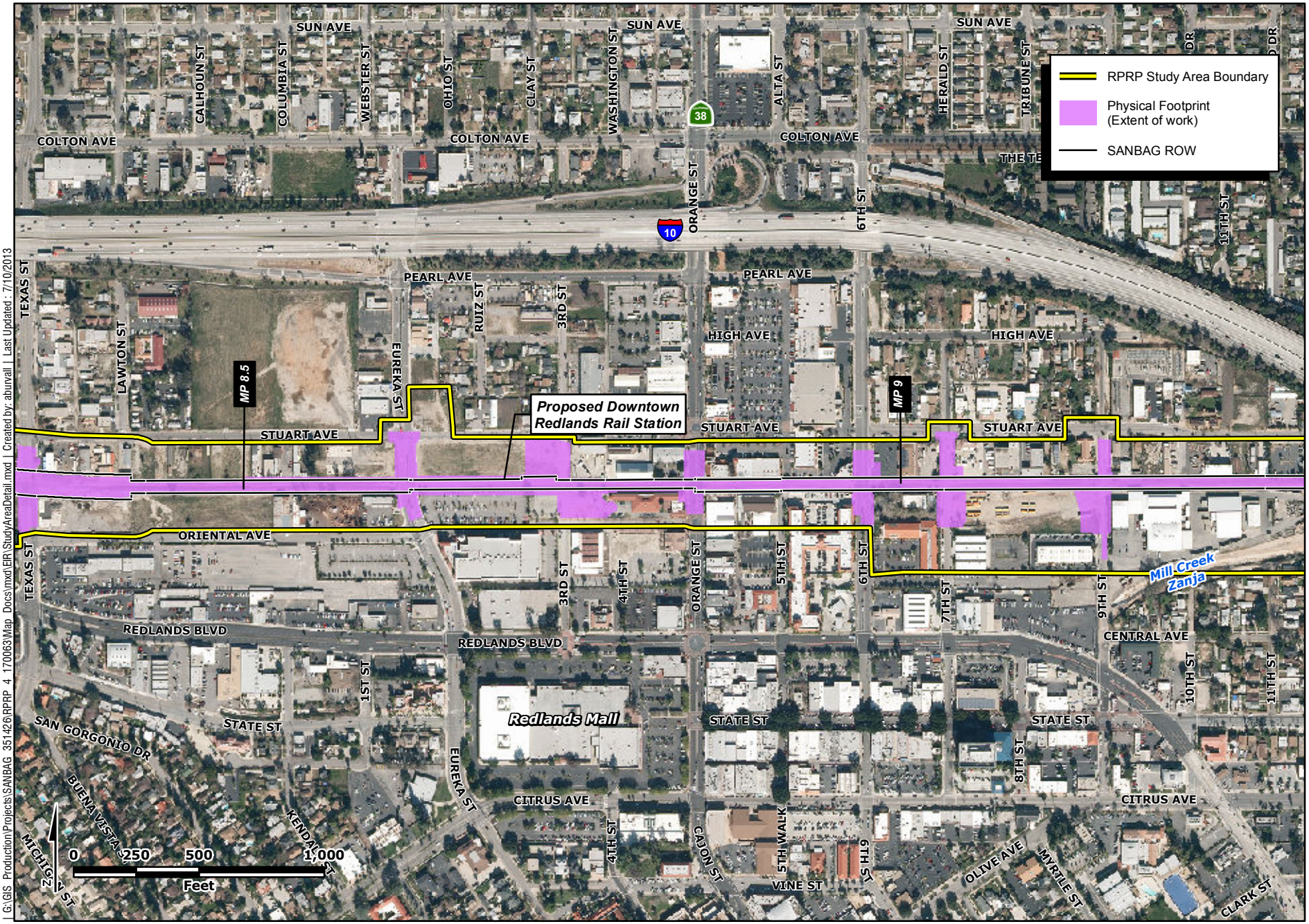

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RPRP Study Area Detail – MP 8.4 to MP 9.3

Figure 2-1 I

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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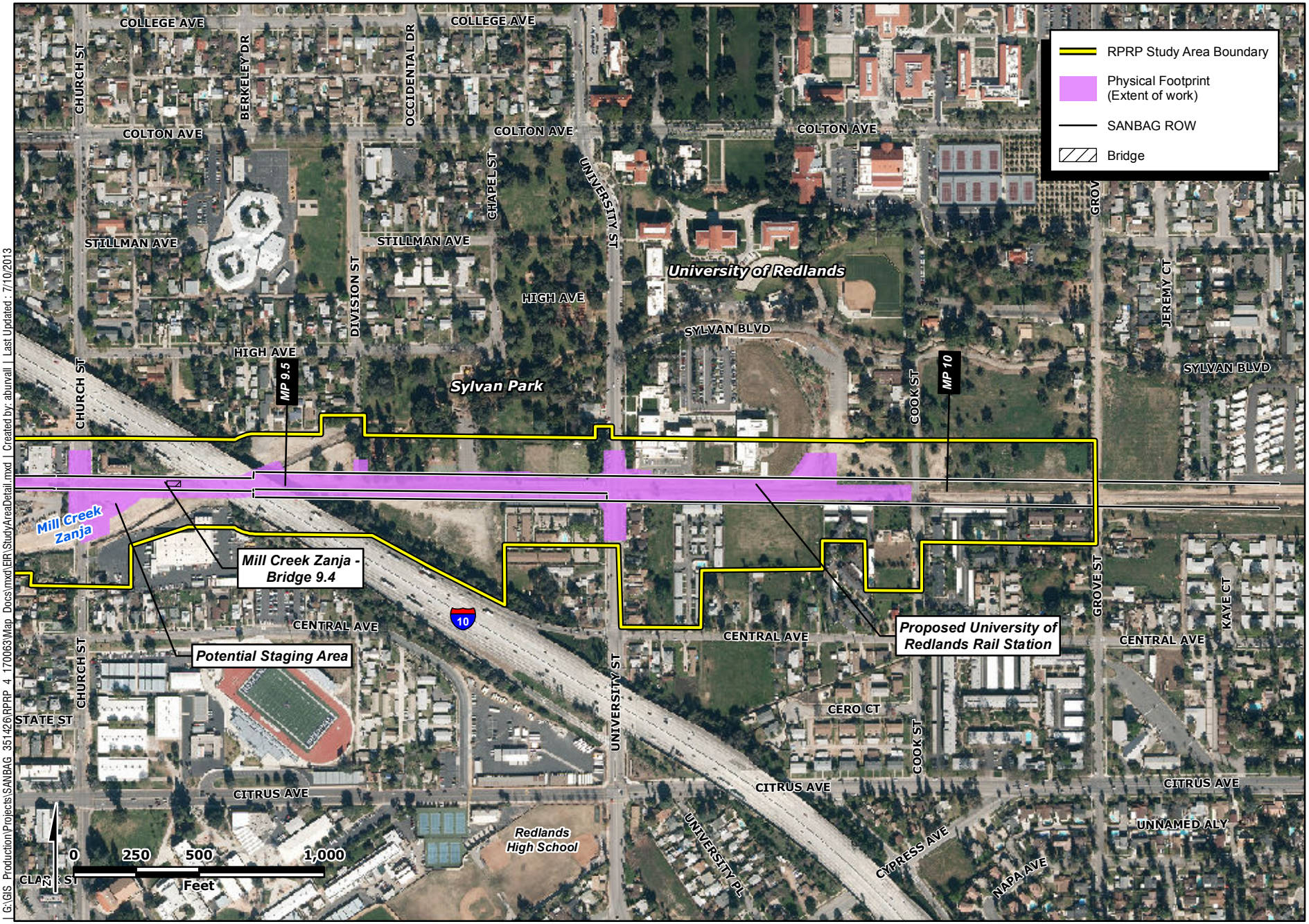

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RPRP Study Area Detail – MP 9.4 to MP 10.1

Figure 2-1 J

FTA/SANBAG | Redlands Passenger Rail Project | EIS/EIR

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Major roadways east of E Street are illustrated in Figure 2-1A and include D Street, Arrowhead Avenue, and Sierra Way. The Study Area begins transitioning south immediately before Sierra Way. This section of the Study Area traverses Warm Creek, which runs north to south, just east of D Street. This segment of the Study Area is generally bordered by existing industrial and commercial development with some isolated vacant parcels. Residential uses are concentrated to the east along Dorothy Avenue.

Immediately after MP 2, the Study Area crosses Mill Street, then continues south for approximately one mile crossing Central Avenue and Orange Show Road before transitioning back to the east at MP 3, just west of Waterman Avenue. This section of the Study Area traverses Twin Creek, which generally runs northeast to southwest through the Study Area. Industrial and commercial uses generally border this section of the Study Area north of Central Avenue. South of Central Avenue, land uses bordering the Study Area transition to residential with large lots. East of Waterman Avenue, adjacent land uses transition back to industrial.

MP 3.2 to 5.2 (see Figures 2-1D and 2-1E). As illustrated in Figure 2-1D, at MP 3.5 the Study Area crosses the Santa Ana River (SAR). This crossing occurs at an existing railroad trestle bridge which is approximately 365 feet in length. East of the SAR, the Study Area continues east, paralleling the Mission Zanja Flood Control Channel (Mission Zanja Channel) for approximately 2.6 miles, and crossing the Gage Canal before MP 4. Along this section of the Study Area, major features crossed include the Gage Canal, Tippecanoe Avenue, Richardson Street, and Mountain View Avenue prior to entering an existing bridge and overhead structure at U.S. Interstate 10 (I-10) (see Figure 2-1F).

Tippecanoe Avenue marks a land use transition from commercial and industrial uses to the west and varying densities of residential development to east. At Mountain View Avenue, the Study Area exits the City of San Bernardino and enters the City of Redlands. Mountain View Avenue marks another significant transition in land use with residential use predominately to the west and commercial and industrial uses to the east.

MP 5.2 to 8.3 (see Figures 2-1F, 2-2G, and 2-1H). After crossing to the south of I-10 just prior to MP 5.7 and Bryn Mawr Avenue, the Study Area borders the northern limits of the City of Loma Linda and continues east parallel and to the south of I-10. I-10 is located immediately north with a cluster of residential land uses located further south of the Mission Zanja Channel. Further to the east, the Study Area crosses California, Nevada, and Alabama Streets where land use transitions to a combination of office, commercial, and manufacturing uses (see Figure 2-1G). At approximately MP 7, or just west of Nevada Street, the Study Area transitions to the east-southeast, and parallels Redlands Boulevard between Alabama Street and New York Street.

Once oriented parallel to Redlands Boulevard, the Study Area crosses Colton Avenue and Tennessee Street prior to reaching New York Street. Commercial and office uses generally border this portion of the Study Area (see Figure 2-1H). To the east of New York Street, the railroad ROW diverts away from Redlands Boulevard and parallels Stuart Avenue to the south.

MP 8.3 to 10 (see Figures 2-1I and 2-1J). At approximately MP 8.25, the Study Area enters downtown Redlands at Texas Street (as defined by the Downtown Redlands Specific Plan). At approximately MP 8.8, the Downtown Redlands Rail Station is proposed west of Orange Street, just south of the railroad ROW on an approximate 2.6-acre site (see Figure 2-1I). The existing Historic Redlands Station is located just east of the proposed rail stations. Along this section of the Study Area, the railroad ROW crosses Eureka Street, Orange Street, 6th, 7th, and 9th Streets, and Church Street. This section of the railroad ROW is bordered by a combination of residential, commercial, office, and retail uses.

Just east of MP 9.4 and Church Street, the Study Area crosses over Mill Creek Zanja and I-10 before entering the University of Redlands. East of I-10, the Study Area parallels Park Avenue with Sylvan Park located adjacent and to the north. Further east, the Study Area ends just west of Cook Street. Land uses bordering the rail corridor east of I-10 generally consist of residential uses to the south of varying densities and the University of Redlands to the north.

2.4 ALTERNATIVES AND DESIGN OPTIONS CONSIDERED

During SANBAG's initial alternatives analysis, multiple transit modes and supporting transit infrastructure were considered. Several key factors narrowed the range of build alternatives for consideration in this EIS/EIR. Of these factors, SANBAG's need to facilitate continued freight movements along the railroad corridor, minimization of property acquisitions through the use of SANBAG's existing ROW, and avoidance of environmental resources were the most critical. As described in more detail in Section 2.5, transit modes that would require the construction of a separate, parallel track system, which would double the size of the Project's physical footprint, were not carried forward in favor of transit modes that could operate on the same track infrastructure. Through this screening process, the use of diesel-powered locomotives or a DMU were determined to be vehicle options that would satisfy this requirement. This EIS/EIR considers the following build alternatives and design options with the operation of one of these compatible vehicle technologies:

- Alternative 1 – No Build
- Alternative 2 – Preferred Project
- Alternative 3 – Reduced Footprint Alternative
- Design Option 1 – Train Layover Facility (Waterman Avenue)
- Design Option 2 – Use of Existing Train Layover Facilities
- Design Option 3 – Waterman Avenue Station

Each of these alternatives and design options are described in further detail under the following subheadings.

2.4.1 Alternative 1 - No Build

This EIS/EIR considers the No Project Alternative, as required by CEQA, and the No Action Alternative, as required by NEPA, as a single alternative to the Preferred Project. Under the No Build Alternative, SANBAG would not implement the Project and passenger rail service would not be extended from San Bernardino east to the University of Redlands. Additionally, the No Build Alternative would not include: (1) improvements to or reconstruction of rail infrastructure to accommodate passenger rail service; (2) roadway closures; (3) rail station improvements; or (4) a train layover facility. Existing conditions within the rail corridor would remain unchanged, and the rail line east of E Street would continue to be used for low-speed, local freight service and maintained as a Class 1 railroad track consistent with BNSF's existing operating plans with no corresponding potential for passenger rail service along the eastern nine miles of the Redlands Subdivision. Future freight train activity along the entire railroad corridor is plausible; however, to an undetermined extent.

Under the No Build Alternative, SANBAG would still be required to perform regularly scheduled maintenance of the existing track and corresponding improvements at grade crossings and bridges to facilitate continued freight service per SANBAG's obligations with BNSF. As a result, the No Build Alternative assumes that some renovation and rehabilitation projects would be required within the next 10 years to facilitate continued freight operations. These maintenance improvements may occur along the existing track alignment and may extend throughout the railroad corridor to Redlands. This may include maintenance of existing bridges including Bridges 1.1 (Historic Warm Creek), 2.2 (Twin Creek), and 3.4 (SAR); and improvements to the crossing at MP 3.9 (Gage Canal). Complete replacement of nearly all existing grade crossings may also be required.

These maintenance improvements may not occur until required and programmed into SANBAG's annual budget based on available funding. For the purposes of analysis, this EIS/EIR assumes that these improvements may occur incrementally over the next 10 years and may require construction activities within the existing ROW. These activities would be contained within the existing ROW and would not require acquisition of adjacent property.

Existing bus service operated by Omnitrans would continue to provide the main source of transit service between San Bernardino and Redlands. This would include Omnitrans' bus routes 8 and 9 that operate at 60-minute headways, but are offset by 30 minutes with transit times ranging from 45 to 50 minutes between San Bernardino and Redlands. Route 15, operated at a 30-minute headway, also serves both downtown areas, but travels north to the City of Highland thereby increasing the travel time up to 60 minutes between San Bernardino and Redlands. Routes 2 and 19 do not provide direct connections and would require transfers to travel between downtown San Bernardino and Redlands, thereby resulting in travel times of up to 60 minutes. Section 3.3, Transportation provides a description of the existing transit services that would continue to operate under the No Build Alternative.

2.4.2 Alternative 2 – Preferred Project

The Preferred Project would involve the implementation of rail improvements along the Redlands Corridor to facilitate passenger rail service between E Street in the City of San Bernardino and the University of Redlands in the City of Redlands. Major physical components part of the Preferred Project and described in this chapter include: track improvements; improvements to or replacement of existing bridges; roadway at-grade crossings improvements; new stations; a train layover facility; property acquisitions and relocations; utility replacement and relocation; and drainage improvements.

The five station stops proposed in conjunction with the Project would be located at E Street and Tippecanoe Avenue within the City of San Bernardino and New York Street, Orange Street, and University Street within the City of Redlands. Service would be provided by up to two passenger trainsets composed of up to two cars and one diesel locomotive or two DMUs shuttling between downtown San Bernardino and the University of Redlands on 30-minute headways during the peak morning and evening periods, and on one hour headways during off peak hours and weekends. Up to two Metrolink express trains would also run westbound in the AM peak period and eastbound in the PM peak period, originating/terminating at the Downtown Redlands Rail Station and may be composed of a typical Metrolink trainset. With the exception of the express train, daily operations would not interline with Metrolink's Los Angeles Union Station line (Metrolink San Bernardino Line) or Inland Empire to Orange County line (Metrolink IEOC line). Rather, the RPRP would interface with Metrolink's IEOC and San Bernardino Lines at E Street

to facilitate passenger rail service to Downtown Los Angeles, to the west. The Project does not include any corresponding increase in freight service.

The overall Project and major components are described in Sections 2.4.2.1 through 2.4.2.15 below, and are generally illustrated in Figure 2-1A through Figure 2-1J.

2.4.2.1 Description of Passenger Rail Operations

The Project would incorporate the use of previously owned or new passenger rail locomotives or new DMUs with operations commencing in early 2018. The vehicle type purchased by SANBAG proposed for the Project would meet Tier 4 requirements[2]. Three types of vehicle options were considered for the Project's vehicle fleet: two (2) diesel-powered locomotives, (an MP-36 or F-59), and a DMU. Functionality would be built into the system to allow for up to two Metrolink express trains during the AM and PM peak periods to interline with the Project and extend Metrolink service to Downtown Redlands. A summary of the estimated operating characteristics of the Project is provided in Table 2-1.

Table 2-1. Project Operating Characteristics (Average)

	Day of Week	Frequency (minutes)	Hours
Service Frequency and Hours of Operation:	Weekday	30 minutes – peak	6:00 a.m. – 9:00 a.m. 3:00 p.m. – 7:00 p.m.
		60 minutes – off peak	5:00 a.m. – 6:00 a.m. 9:00 a.m. – 3:00 p.m. 7:00 p.m. – 10:00 p.m.
	Weekend	60 minutes	5:00 a.m. – 10:00 p.m.
Vehicle Capacity	Each vehicle accommodates 132-162 seats (coaches and cab cars). The maximum capacity of the vehicle is greater than the number of seats due to standing room on the trains.*		
Train Consist	2-car trains during the entire span of service (1 locomotive with 2 cars)		
Vehicle Fleet Requirement	6 Total Fleet (including 3 locomotives and 6 cars)		
Route Length	9.11 miles		
Average Station Spacing	2.3 miles		
Average Speed	37.6 miles per hour		
Maximum Speed	55 miles per hour		
Run Time Estimate (E Street to Univ. of Redlands	Approximately 17 minutes (run time estimate includes actual run time and stations dwell time)		
Local Train Mileage (Daily)	481.7 miles		
Express Train Mileage (Daily)	36 miles**		

Note: *Metrolink Coaches and Cab Cars (Bombardier). Load standard assumes 100% of seats.
**Mileage only includes additional express train miles traveled along rail corridor and not west of E Street.
Source: HDR Engineering 2013

[2] Tier 4 locomotives and locomotive engines are required to meet applicable standards set by the U. S. EPA at the time of original manufacture and each subsequent remanufacture. Emission regulations for locomotive engines are contained in the US Code of Federal Regulations, 40 CFR Parts 85, 89 and 92.

Local rail service would operate between the E Street and University of Redlands Rail Stations with stops at each of the station stops along the route. Trains would operate every 30 minutes in the peak periods and every hour in the off-peak period. This would translate to 25 average daily round trips during weekdays. Typical weekday operations are summarized in Table 2-2. Of these total daily trips, up to two AM peak period trains and two PM peak period trains would interline with Metrolink at E Street. These interlined trains would operate as express runs to/from the Downtown Redlands Station to Los Angeles Union Station. During weekday operations, up to 16 employees may be present at any given time, including security personnel. SANBAG may employ one Operations Manager to manage the contracted operation of the system.

Table 2-2. Project Weekday Operations

Route Segment	Average Speed (mph)	Travel Time (minutes)	Distance (miles, approx.)
Eastbound Operations			
EB: 1 - E Street to Tippecanoe	32.43	6.09	3.29
EB: 2 - Tippecanoe to New York	35.87	6.59	3.94
EB: 3 - New York to Downtown Redlands	19.40	2.07	0.67
EB: 4 - Downtown Redlands to University of Redlands	34.12	1.84	1.05
Average/Total/Total	**30.5**	**16.6**	**9**
Westbound Operations			
WB: 1 - University of Redlands to Downtown Redlands	22.60	2.79	1.05
WB: 2 - Downtown Redlands to New York	19.72	2.04	0.67
WB: 3 - New York to Tippecanoe	36.91	6.40	3.94
WB: 4 - Tippecanoe to E Street	36.62	5.40	3.29
Average/Total/Total	**29**	**16.6**	**9**

Source: HDR Engineering 2013

Ridership forecasts were prepared by Cambridge Systematics, Inc. (2013), for a year 2038 horizon year and are based on the transit operating plans as described in the Project's Ridership Study (see Appendix C). The daily-unlinked transit ridership[3] forecasts for the Project indicates that up to 820 daily riders may use the new passenger rail service at opening day in 2018 (see Appendix C). Daily ridership in the future is contingent on many factors including, but not limited to, regional growth patterns and future land use projections. Ridership projections in future conditions (2038) would increase to 1,330 daily trips (see Appendix C). Projections beyond these initial estimates based on future cumulative projects are discussed in Chapter 4, Cumulative Effects. These ridership projections assume no changes in existing bus routes.

An initial control point[4] at the entry to the rail corridor, east of the E Street Rail Station, would allow entry of trains into the rail corridor from the station tracks to the west and would be controlled by Southern California Regional Railroad Authority (SCRRA) centralized train control

[3] Unlinked trips (passenger boardings) are used to describe the relative amount of activity on transit routes and at transit stations for the alternatives.

[4] Train movements generally occur between control points or interlockings, which are controlled by a centralized controller or dispatcher.

and dispatch. After passenger rail operations are secured in the evening, the once weekly or bi-weekly local freight services would be allowed to enter the branch line to service shippers. Scheduling would be coordinated with other local transit service providers to optimize the Project's inter-linkage with other transit modes.

2.4.2.2 Track Improvements

The Project would utilize the railroad ROW owned by SANBAG, which varies from 38 to 100 feet in width. In most instances, this ROW is sufficient to accommodate the Project. In instances where the ROW is 50 feet or less, temporary construction activities could extend up to an additional 10 feet on each side of the ROW. For example, the track subgrade may require cut and fill that extends beyond the current railroad ROW; however, these activities may be contained within the 10-foot (+/-) temporary construction ROW and balanced through the use of retaining structures, engineered slopes, or permanent improvements within the 50-foot ROW. Existing grades along the rail corridor would be consistent in the post-construction condition to reduce changes to existing drainage patterns.

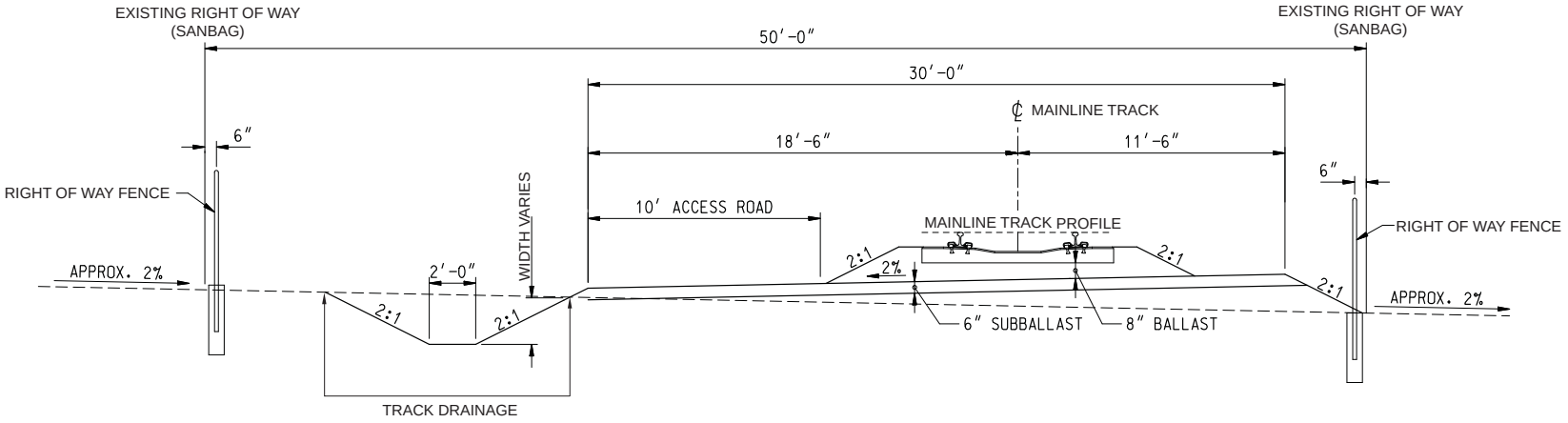
The Project includes the construction of track improvements to facilitate train movements along a single track through the rail corridor with an approximately 10,000-foot-long section of passing track or siding, from just west of Richardson Street to just east of California Street (MP 5.5 to MP 7.4). The proposed track ballast and sub-grade along the nine-mile corridor would generally be constructed to 50 feet in width and would require demolition and replacement of the existing track. Existing ballast and sub-grade materials would be reused to the extent possible and may serve as fill material to raise the site of the proposed layover facility. The track improvements would include the installation of new continuously welded rail on concrete ties and new ballast and sub-ballast sections throughout the rail corridor.[5]

Figures 2-2A through 2-2C illustrate three typical cross-sections of the proposed track improvements along the railroad corridor, which may include a new single track, with drainage improvements and maintenance road where feasible, a siding track cross-section, and constrained right-of-way track cross-section through downtown Redlands.

2.4.2.3 Structural Crossings and Bridges

The Project would require the replacement or retrofitting of up to six existing structural bridge crossings to facilitate the loading requirements of the passenger and freight trains and track foundation. The location of each of these proposed structural replacements/retrofits is illustrated in Figure 2-1. Five of the six structural crossings consist of existing bridge structures at water crossings including Warm Creek, Twin Creek, SAR, Mission Zanja Flood Control Channel (at Bryn Mawr Avenue), and Mill Creek Zanja. As currently proposed, the bridge replacements could include the installation of new concrete aprons, new parapet walls, in-fill walls, concrete abutments, and/or placement of new concrete foundations. Temporary shoring may be used to support the affected portion of the bridge during construction. For each bridge crossing, Table 2-3 provides additional details regarding each of the proposed replacements/retrofits for each of the structural crossings.

[5] These improvements would adhere to typical railroad standards like those established by the BNSF and Southern California Regional Railroad Authority (SCRRA) for the rail, rail ties, ballast and subballast materials, grade crossing panels, placement of drainage structures and retaining walls, and horizontal and vertical clearances.

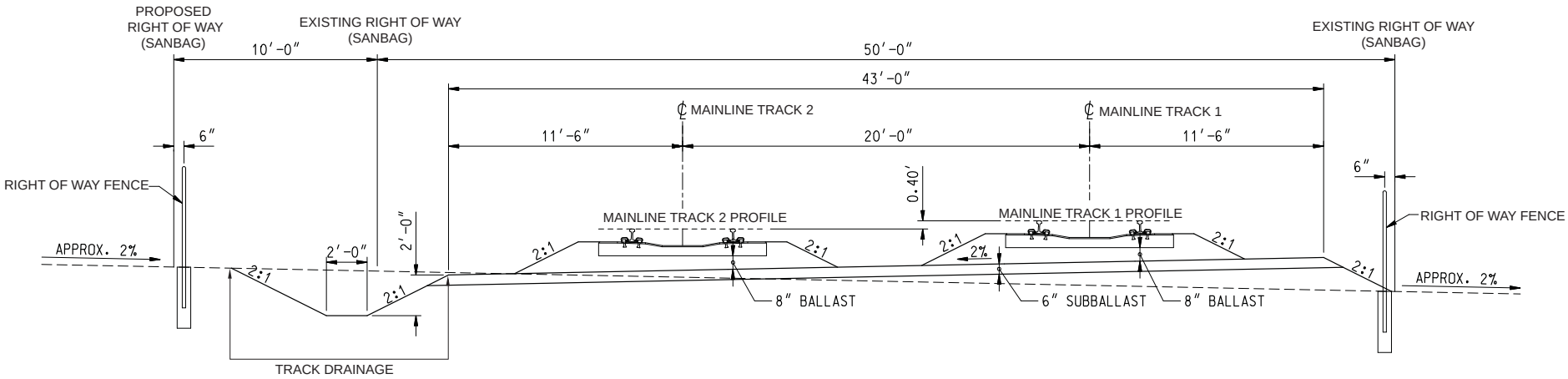


SINGLE TRACK TYPICAL SECTION

(LOOKING EAST)

Typical Cross Section (Single Track, 50 foot ROW)

Figure 2-2A

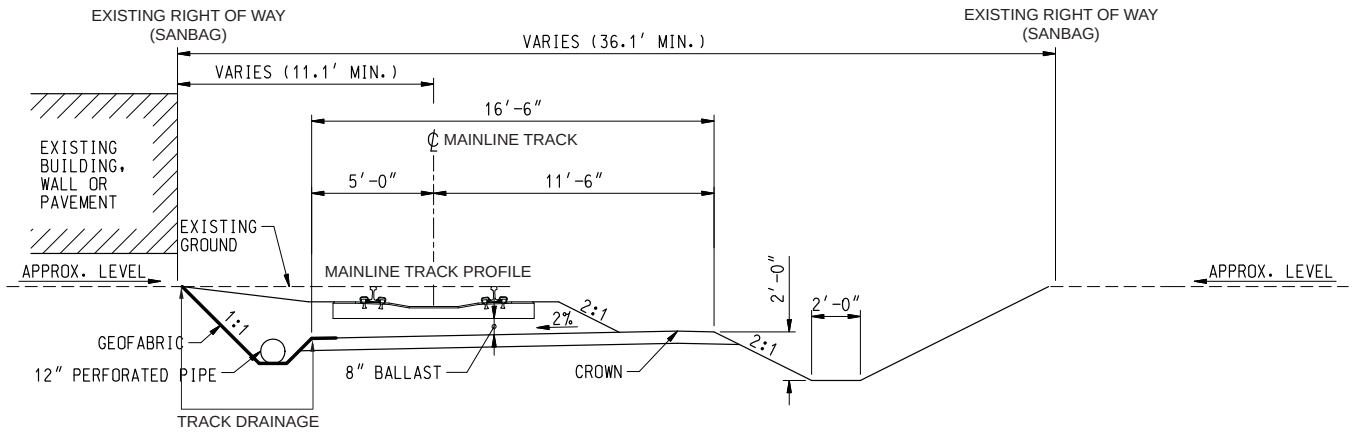


DOUBLE TRACK TYPICAL SECTION

(LOOKING EAST)

Typical Cross Section (with Siding Track, 60 foot ROW)

Figure 2-2B



DOWNTOWN REDLANDS SINGLE TRACK TYPICAL SECTION

(LOOKING EAST)

Typical Cross Section (Downtown Redlands, 38 foot ROW)

Figure 2-2C

Table 2-3. Preferred Project-Related Structural Crossing Improvements

Bridge (Br)	Replacement (Yes/No)	Dimensions	Design Features
Br. 1.1 – Warm Creek Bridge	Yes	Up to 90 feet in length and 28 feet in width. Note: Current bridge is 117 feet in length	• Two Design Options under consideration: (A) concrete box girder with a shorter span (up to 70 feet) and walkways or (B) a ballast deck concrete slab bridge with a longer span (up to 90 feet). • No permanent fill required. • Staging may occur to the west of Warm Creek and north of the railroad ROW, and on Hilda Street. • May be constructed off-line, within 5 to 6-months construction window that may include mobilization and removal of the existing bridge (portion). • All work would occur within footprint identified in Figure 2-1A.
Br. 2.2 – Twin Creek Bridge Retrofit	No	Up to 148 feet in length and 20 feet in width	• Existing bridge to remain with speed restriction across it. • Replacement of timber and sidewalk elements, shore up structurally and repaint. • Minor mitigation may be needed if existing paint is found to be lead based. • Limited track outage required; up to a 3-month construction window. • All work would occur within footprint identified in Figure 2-1B.
Br. 3.4 – Santa Ana River Bridge	Yes	Up to 365 feet in length and 20 feet in width	• Steel beam bridge to be constructed in line of the existing structure. • Construction access/staging may occur from the north end of the western bank. Access to the eastern bank may occur via a temporary bridge crossing (earthen fill) from the west. • Five (5) new pier structures spaced at 62 feet; pile installation and work zone isolation proposed via steel sleeve (or cast-in-steel shell [CISS]) pile method or traditional cofferdam. • Existing bridge foundations and piers may be removed to a minimum depth below the existing surface after installation of new bridge foundation. • Channel banks underneath bridge to be excavated to maintain channel capacity. • Proposed design may accommodate Santa Ana River Trail along the eastern bank. • 30-month construction window may be required. • 85% of substructure work may occur without any track outage to replace existing superstructure. • All work would occur within footprint identified in Figure 2-1D. • Additional armoring is proposed along the planned abutment embankment on the north side of the proposed replacement.

Table 2-3. Preferred Project-Related Structural Crossing Improvements

Bridge (Br)	Replacement (Yes/No)	Dimensions	Design Features
Br. 3.9 – Gage Canal Crossing	Yes	Up to 28 feet in length	• Potential modification of channel hydraulic grade structure as part of improvements to Mission Zanja Channel. • A new pier bridge structure or backfilling of the existing structure are under consideration. • Up to a 2-month construction window. • All work would occur within footprint identified in Figure 2-1D.
Br 5.78 - Bryn Mawr Bridge	Yes	Up to 40 feet in length	• Construct a new single span bridge structure to facilitate private access to proposed train layover facility. • Realignment and increase of the capacity of the existing channel under the new bridge. • All work would occur within footprint identified in Figure 2-1F.
Br. 9.4 – Mill Creek Zanja Bridge	Yes	Up to 42 feet in length and 45 feet in width	• Pier bridge consisting of a 14-inch pre-stressed slab girder placed on a cast-in-place (CIP) abutment. • Four (4) rows of six (6) 30-inch cast-in-drilled-hole (CIDH) piles spaced a 13 to 14 feet. • Up to a one (1) month construction window. • All work would occur within footprint identified in Figure 2-1J.

Source: HDR Engineering 2013

2.4.2.4 Roadway Grade Crossings and Signaling Devices

The Project traverses 30 existing roadway crossings. Two of these consist of grade separations at the I-10, and two crossings located at Bryn Mawr and New York Street were officially closed before the consideration of this Project. Each at-grade crossing improved as part of the Project would also include corresponding improvements to adjoining roadway segments, where required, to maintain safety for both motorized and non-motorized forms of transportation.

The Project proposes upgraded safety improvements at 22 of the existing at-grade crossings, and the closure of five at-grade crossings to roadway traffic. Safety improvements would be implemented in accordance with California Public Utility Commission (CPUC) General Orders. Several of the existing at-grade crossings are equipped with modern constant warning time device systems for train detection, including conventional relay logic networks, motion detection equipment, and more sophisticated microprocessor equipment. SANBAG will reuse the existing modern signal equipment and warning devices to the greatest extent feasible. Crossings may be re-designed to include raised medians, widened sidewalks, traffic striping, flashing lights, pedestrian gate arms, and swing gates where appropriate, or where requested by the CPUC. New warning devices would include passive railroad crossing signs, a simple bell, flashing light signals, and flashing light signals with gates. Lamp units on flashing light signals consist of incandescent lamps or light emitting diode (LED) lamps.

The road closures proposed as part of the Project include D Street, Stuart Avenue, 7th Street, and 9th Street, which would require a formal application to CPUC and the Surface

Transportation Board (STB). An existing private at-grade crossing that provides access to the Caliber Collisions business near New York Street would be closed. Bryn Mawr would also be re-opened as part of the Project to provide private access to the proposed layover facility site but would not require a formal application with the CPUC.

Hilda Street (adjacent to Arrowhead Road) may also be closed, and Dorothy Street (east of Sierra Way) may be modified to become a one-way right turn out only roadway. Park Avenue within the City of Redlands may be converted to an improved, two-lane roadway south of Sylvan Park and the University of Redlands. Table 2-4 provides details for each roadway at-grade crossing and Figures 2-3A and 2-3B identify the intersections that may be closed, improved, or reconfigured to accommodate the Project.

Table 2-4. Roadway Grade Crossings

Existing Grade Crossing	Mile Post	Condition of Existing Crossing	Length (feet)[1]	Project Design Features	Pedestrian Access	Closed or Open After Project
E Street	1.0	At-grade with crossing gates	400	Precast concrete panels; relocate crossing signals; extend/reconfigure existing raised median; pedestrian gates and channelization on west and possibly east side.	Sidewalks	Open
D Street	1.1	At-grade with crossing gates	520	Close existing crossing and install wooden barricades and fencing.	Sidewalks	Closed
Arrowhead Avenue	1.2	At-grade with crossing gates	400	Replace existing crossing gates; install precast concrete panels; extend/reconfigure existing raised median; pedestrian channelization; potential closure of adjacent Hilda Street intersection and conversion to a cul-de-sac.	Sidewalks	Open[2]
South Sierra Way	1.5	At-grade with crossing gates	620	Replace existing warning devices; reconfigure intersection tie in to Julia and Dorothy Streets; closure of San Bernardino Street Division yard driveway south of the tracks; new concrete panels and crossing gates.	Sidewalks	Open
Mill Street	2.0	At-grade with crossing gates	290	Replace existing warning devices; install new concrete panels; install raised median; install new crossing gates; pedestrian improvements both sides of the crossing.	Sidewalks	Open
Central Avenue	2.4	At-grade	500	Install new concrete panels; new crossing gates; and raised median.	Sidewalk on north side of roadway	Open

Table 2-4. Roadway Grade Crossings

Existing Grade Crossing	Mile Post	Condition of Existing Crossing	Length (feet)[1]	Project Design Features	Pedestrian Access	Closed or Open After Project
Orange Show Road	2.8	At-grade with crossing gate	100	Maintain existing precast concrete panels and crossing gates.	Sidewalks	Open
Waterman Avenue	3.0	At-grade with crossing gate	620	Install new precast concrete panels; extend/reconfigure existing raised median; replace existing warning devices; convert Dumas Street to a right in right out configuration; pedestrian channelization.	Sidewalk only on eastside of roadway south of tracks	Open
Tippecanoe Avenue	4.2	At-grade with crossing gate	275	Install new precast concrete panels, install raised median replace existing crossing gates; potential pedestrian gates and channelization.	Sidewalks	Open
Richardson Street	4.6	At-grade	220	Install new precast concrete panels; replace existing crossing gates; install raised median; pedestrian gates on east side; double track crossing location.	Sidewalks	Open
Mountain View Avenue	5.2	At-grade with crossing gate	380	Future project by others to install precast concrete panels; double track crossing location.	Sidewalks may be barricaded	Open
I-10 (BR 5.65)	5.65	Underpass	--	Construct 248 feet of pier protection wall at Bridge 5.65.	--	Open
Bryn Mawr Avenue	5.78	Crossing is officially closed	150	New private at grade crossing to provide access to the proposed layover facility site.	--	Open
California Street	6.3	At-grade with crossing gate	410	Install new precast concrete panels and relocate crossing gates; double track crossing; potential pedestrian gates on both sides; and traffic signal preemption.	Sidewalks	Open
Nevada Street	6.8	At-grade with wig-wag signal	360	Install new precast concrete panels and crossing gates.	Sidewalks	Open
Alabama Street	7.3	At-grade with crossing gates	500	Future project by others to install new precast concrete panels and crossing gates; potential pedestrian gates for all four quadrants; and traffic signal preemption.	Sidewalks	Open

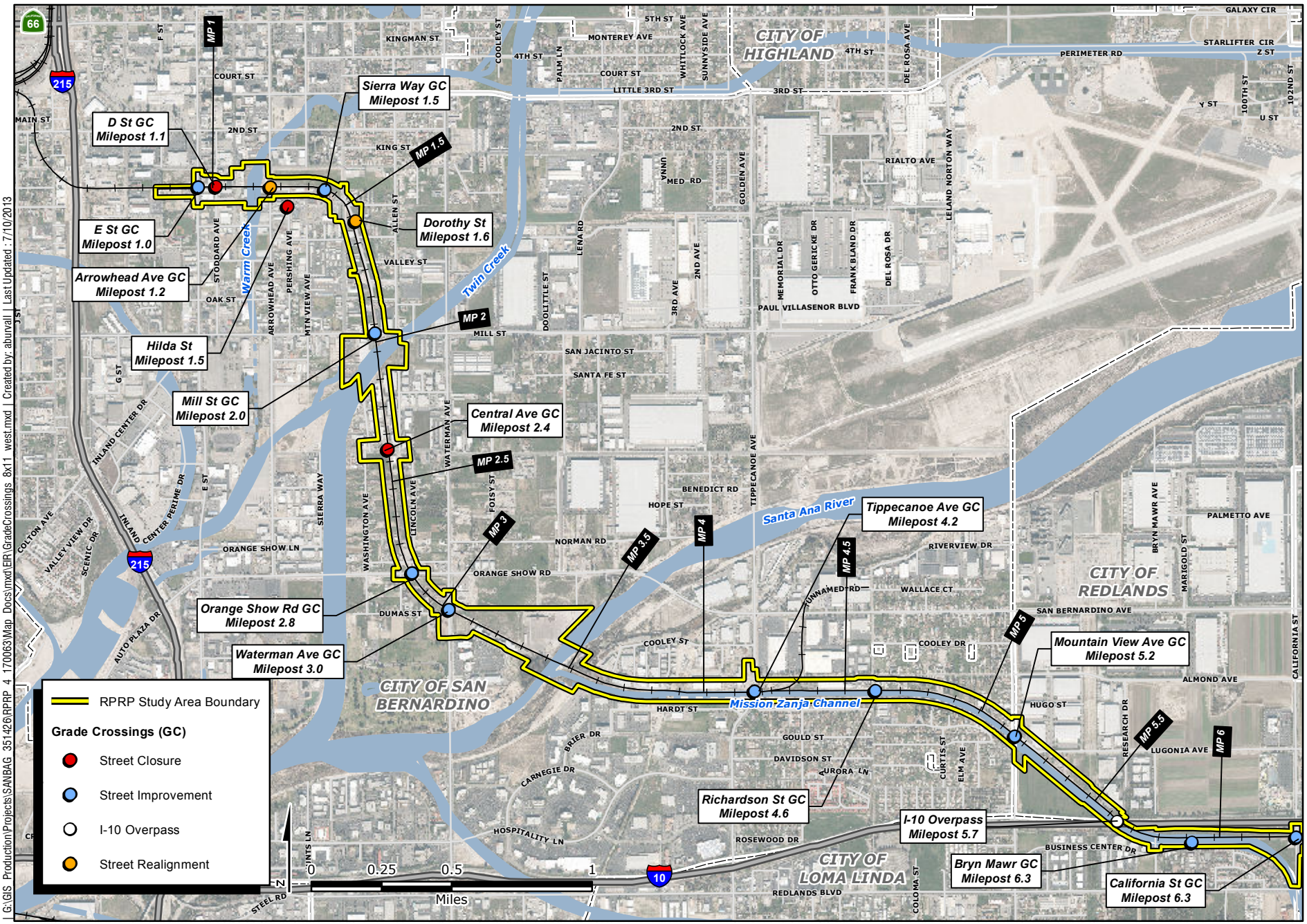
Table 2-4. Roadway Grade Crossings

Existing Grade Crossing	Mile Post	Condition of Existing Crossing	Length (feet)[1]	Project Design Features	Pedestrian Access	Closed or Open After Project
Redlands Boulevard/ Colton Avenue	7.4	At-grade	200	Future project by others to relocate Colton Avenue Crossing and create T-intersection with Redlands Boulevard; and traffic signal preemption.	Sidewalks	Open
Tennessee Street	7.8	At-grade with railroad crossing gate	210	Install precast concrete panels; install warning devices; install raised median; traffic signal preemption.	Bike Lane/ Sidewalks	Open
Caliber Collision Center	7.9	Private crossing	--	Potential crossing closure. Access to existing business may need to be rerouted.	--	Closed
New York Street	8.1	Crossing is officially closed	--	Existing closure to be maintained; New pedestrian crossing would be provided to facilitate access to the ESRI complex.	--	Open
Stuart Avenue	8.2	At-grade	200	Potential crossing closure, removal of pavement and extension of curb on Stuart Avenue and Redlands Boulevard to prevent vehicular access.	Sidewalks	Closed
Texas Street	8.4	At-grade with railroad crossing gate	350	Install new precast concrete panels and crossing gates; install raised medians; replace warning signal configuration; potential pedestrian gates and channelization for both sides of the crossing; traffic signal preemption.	Sidewalks	Open
Eureka Street	8.6	At-grade with crossing gate	340	Install new precast concrete panels; minor repairs to existing crossing equipment; potential pedestrian gates and channelization for both sides of the crossing; and traffic signal preemption.	Sidewalks	Open
Orange Street	8.8	At-grade with crossing gate	250	Install precast concrete panels; potential median; modification of existing sidewalk to accommodate median mounted crossing signals; potential pedestrian gates for both sides of the crossing; traffic signal preemption.	Sidewalks	Open

Table 2-4. Roadway Grade Crossings

Existing Grade Crossing	Mile Post	Condition of Existing Crossing	Length (feet)[1]	Project Design Features	Pedestrian Access	Closed or Open After Project
6th Street	9.0	At-grade with crossing gates	300	Install precast concrete panels, install raised medians; install crossing gates; replace warning signals; potential pedestrian gates and channelization for all four quadrants.	Sidewalks	Open
7th Street	9.1	At-grade crossing with post sign	--	Close existing crossing; create cul-de-sac on south side of crossing; install guard post barricades on north side of crossing, and fencing; maintain pedestrian access.	Pedestrian gate	Closed
9th Street/ Stuart Avenue	9.2	At-grade Railroad post sign	--	Close existing crossing; create cul-de-sac on south side of crossing that maintains access to existing business located on southeast quadrant of crossing; install guard post barricades on north side of crossing.	Sidewalks	Closed
Church Street	9.3	At-grade with crossing gate	275	Install precast concrete panels; install raised median; potential pedestrian gates and channelization for all four quadrants; potential replacement of warning signals.	Sidewalks	Open
I-10 (BR 9.48)	9.48	Underpass	--	Construct 285 feet of pier protection wall at Bridge 9.48; Unauthorized dirt road crossing to be closed.	--	Open
University Street/Park Avenue	9.8	At-grade with crossing gate	360	Install precast concrete panels with crossing gates; potential median on north side of crossing; potential pedestrian gates and channelization for all four quadrants; install exit gates for residential driveways in the SW and SE quadrants; replace warning signals.	Bike Lane/ Sidewalks	Open

[1] Length of roadway improvements at grade crossing.
[2] Potential closure of Hilda Street at intersection of Arrowhead Avenue and conversion to a cul-de-sac.
Source: HDR Engineering 2013



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Roadway Grade Crossings - Western Study Area

Figure 2-3A

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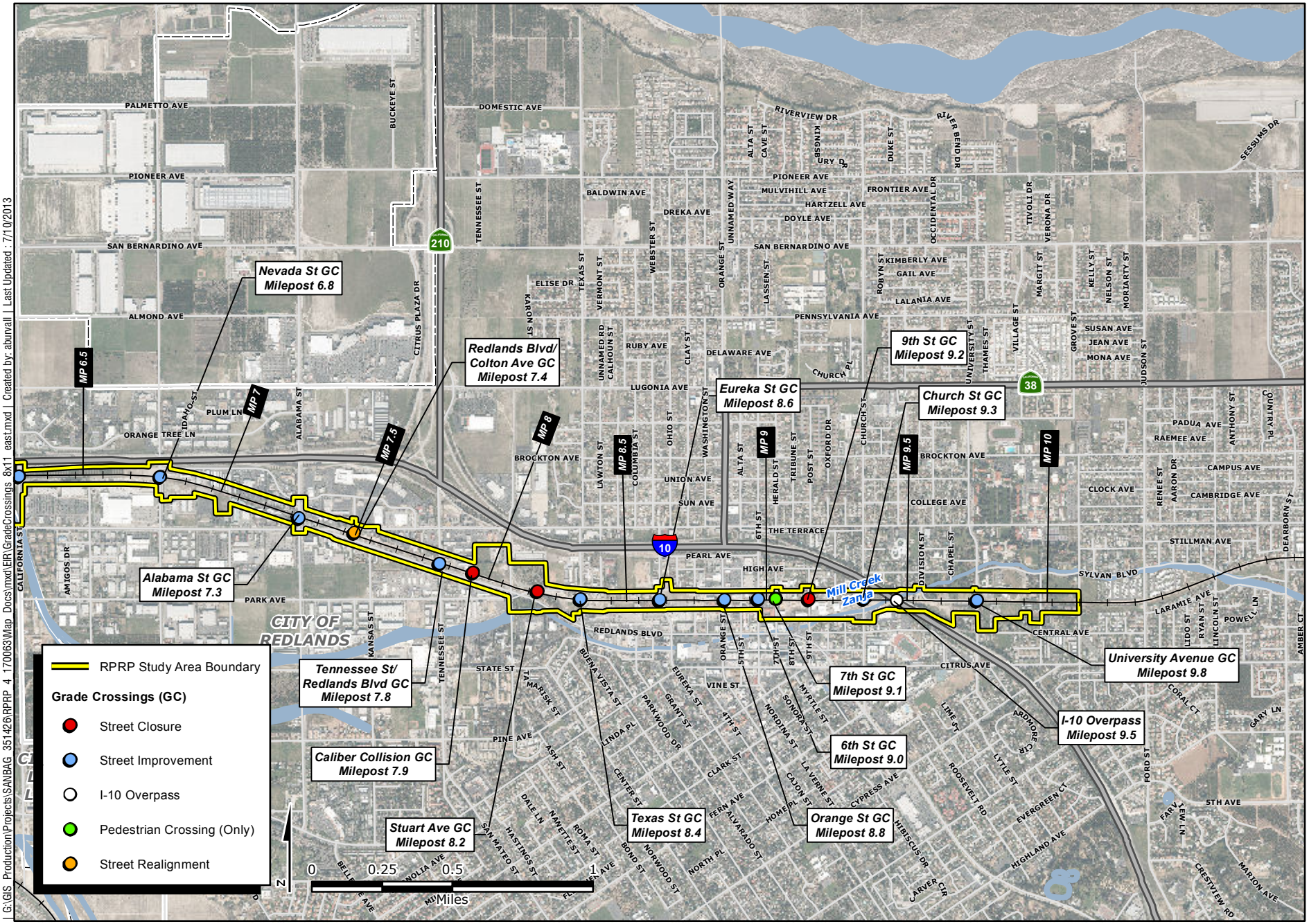

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Roadway Grade Crossings - Eastern Study Area

Figure 2-3B

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There are approximately seven existing traffic signals that fall within 200 feet of railroad at-grade crossings. Railroad preemption signals would be installed at these locations.[6] Two of these occur in the City of San Bernardino and the other five are located in the City of Redlands (see Table 2-4). SANBAG would consult with local jurisdictions to coordinate the traffic signal operations including: preemption signal, signal wire, conduit, and other infrastructure required for the signal preemption.

SANBAG proposes to develop infrastructure that is consistent with and would not preclude the final development of Quiet Zones along the railroad corridor. Upon completion of the Project, each city would be required to complete the Quiet Zone Creation Process in accordance with the regulations, policies and procedures established by the FRA in their Train Horn Final Rule as amended on August 17, 2006 (49 CFR Part 222). SANBAG has entered into a Memorandum of Understanding (MOU) dated February 4, 2015, with the cities of San Bernardino and Redlands that outlines each entities roles and responsibilities to facilitate the implementation of "corridor-wide" quiet zones.

Pier protection walls may also be constructed for each of the two I-10 freeway bridges and overhead structures. Pier protection walls would be designed using American Railway Engineering and Maintenance-of-Way Association (AREMA) and BNSF/Union Pacific (UP) Standards. Table 2-4 provides additional details on the pier protection walls.

2.4.2.5 Proposed Rail Stations[7]

There are five (5) station stops proposed for the Project with new rail stations proposed at four (4) locations. Two (2) station stops (E Street and Tippecanoe Avenue or Waterman Avenue) would be located in the City of San Bernardino, while the other three (3) (New York Street, Downtown Redlands, and the University of Redlands) would be located in the City of Redlands. As previously indicated, the station improvements at E Street would be constructed in conjunction with the DSBPRP and, therefore, only track improvements would be required west of E Street to align the Project tracks with the planned rail station associated with the DSBPRP. Each station would be less than 200 feet in length and constructed within SANBAG's ROW.

Ticket vending machines would be located near or on stations. Standard station amenities including canopies, benches, variable message signs, lighting, closed-circuit television security cameras, ticket vending machines, and trash receptacles may all be provided. Shade structures (or canopies) would be provided to individually distinguish each rail station and to compliment the contextual surroundings. A representative example of the three (3) optional canopy structures under consideration for each of the station stops is provided in Figure 2-4A. Landscape planters or other features may be used to separate stations from open areas, adjacent uses, and walkways. Bicycle storage lockers may also be provided at certain locations as may be consistent with bicycle use planning for the corridor. Pedestrian crossovers[8] would be provided where required at each station area with accessible path of travel and parking provided adjacent to pedestrian crossovers.

[6] Preemption signals would help to prevent collisions, and allow the trains to have priority access through intersections to ensure they remain on schedule and improve commute times.

[7] Stations consist of a rail platform, canopy, parking, and related amenities.

[8] Pedestrian crossovers may consist of at-grade, below grade (e.g., underpass), or above grade crossings (e.g., overpass) pending final design.

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Option A

Option B

Option C

Optional Canopy Structures

Figure 2-4A

2.4.2.6 E Street Rail Station

The Project would utilize the rail platforms, parking area, and optional canopy structures proposed in conjunction with SANBAG's DSBPRP. The Project would include new track to the south of the E Street rail platform; and this EIS/EIR incorporates by reference the previously prepared EA/EIR for DSBPRP. Figure 2-4B illustrates the layout for the proposed rail station at E Street and parking lot proposed as part of the DSBPRP. New pedestrian connections would be constructed from the station to connect with existing routes. Table 2-5 provides additional details on the proposed station improvements at E Street.

2.4.2.7 Tippecanoe Avenue Rail Station

The Tippecanoe Avenue rail platform would be constructed at a location just west of Tippecanoe Avenue and north of the tracks, inside the existing railroad ROW (see Figure 2-4C). The station improvements and parking area at this location, including new tracking, would include a physical footprint of up to 1.1 acres, and includes portions of SANBAG's ROW. Table 2-5 provides additional details on the proposed station improvements at Tippecanoe Avenue.

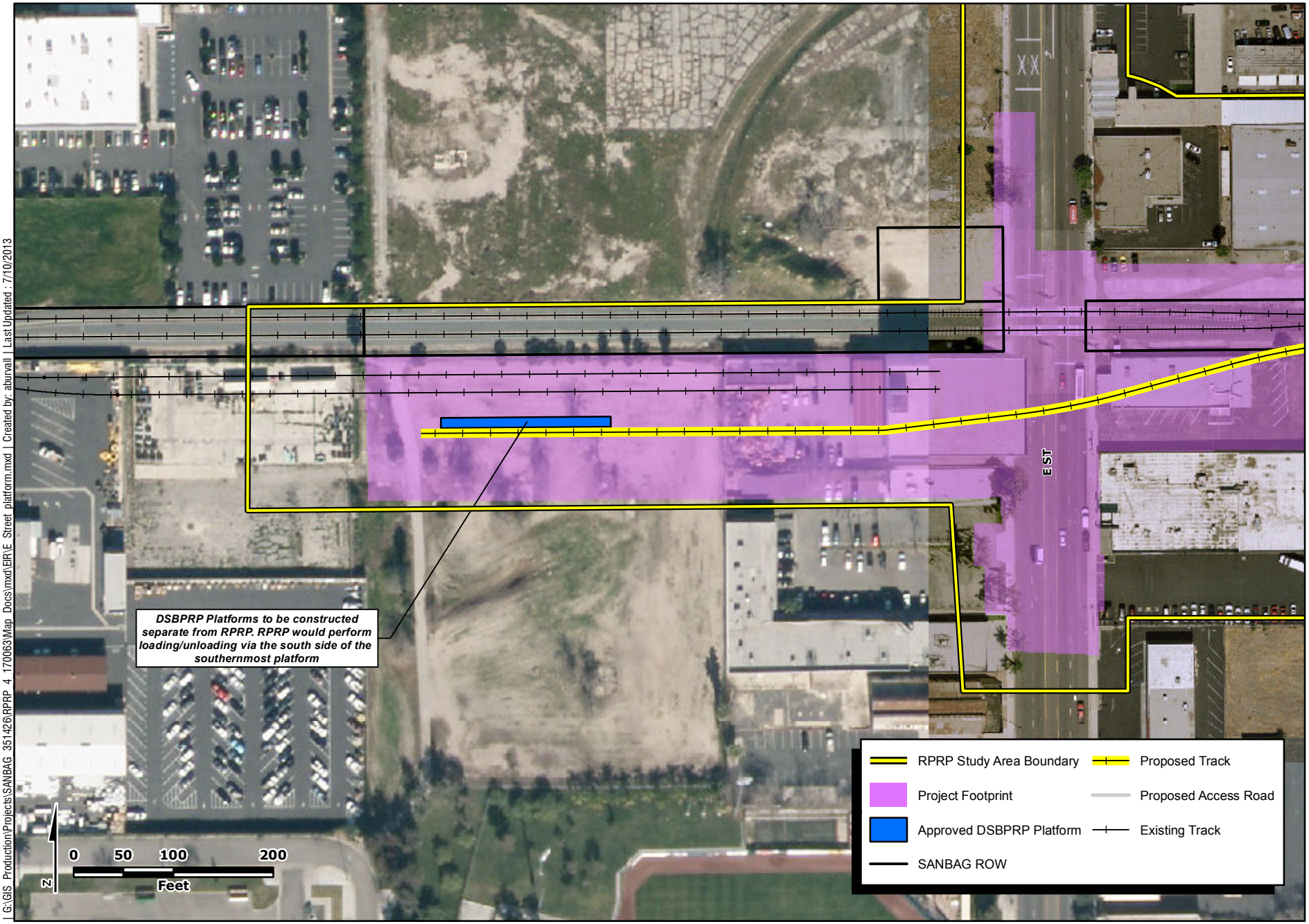
2.4.2.8 New York Street Rail Station

The New York Street rail platform would be constructed at a location just north of Redlands Boulevard and within the existing railroad ROW (see Figure 2-4D). The station improvements at this location, including new tracking, would include a physical footprint of up to 3.6 acres. New pedestrian facilities are proposed south of the station to provide a connection with existing pedestrian walkways south of Redlands Boulevard. Table 2-5 provides additional details on the proposed station improvements at New York Street.

2.4.2.9 Downtown Redlands Rail Station

New station facilities would be constructed within the existing railroad ROW to the west of Orange Street and the existing Downtown Redlands Santa Fe Depot, a registered historic place, and north of the track (see Figure 2-4E). The station improvements at this location, including new tracking, would include a physical footprint of up to 2.6 acres. Pedestrian connections from the station platform would be constructed to connect with existing walkways, including the grand plaza, which provides connectivity to Orange Street. No alterations to the existing Redlands Santa Fe Depot are proposed as part of the Project. Table 2-5 provides additional details on the proposed station improvements in Downtown Redlands.

Per an existing agreement between SANBAG and the City of Redlands, the City of Redlands would provide up to 200 parking spaces to support the parking needs for Downtown Redlands. As a result, the parking structure's planned capacity would also be sufficient to accommodate the Project. The parking structure is not proposed as part of the Project and, therefore, if for whatever reason the parking structure is not constructed, SANBAG would construct a reduced, at-grade parking area to the north of the station platform. The at-grade parking area would be constructed at the same location with sufficient capacity to accommodate up to 70 parking stalls. Pedestrian access would also be provided via an at-grade crossing.



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E Street Rail Platform

Figure 2-4B

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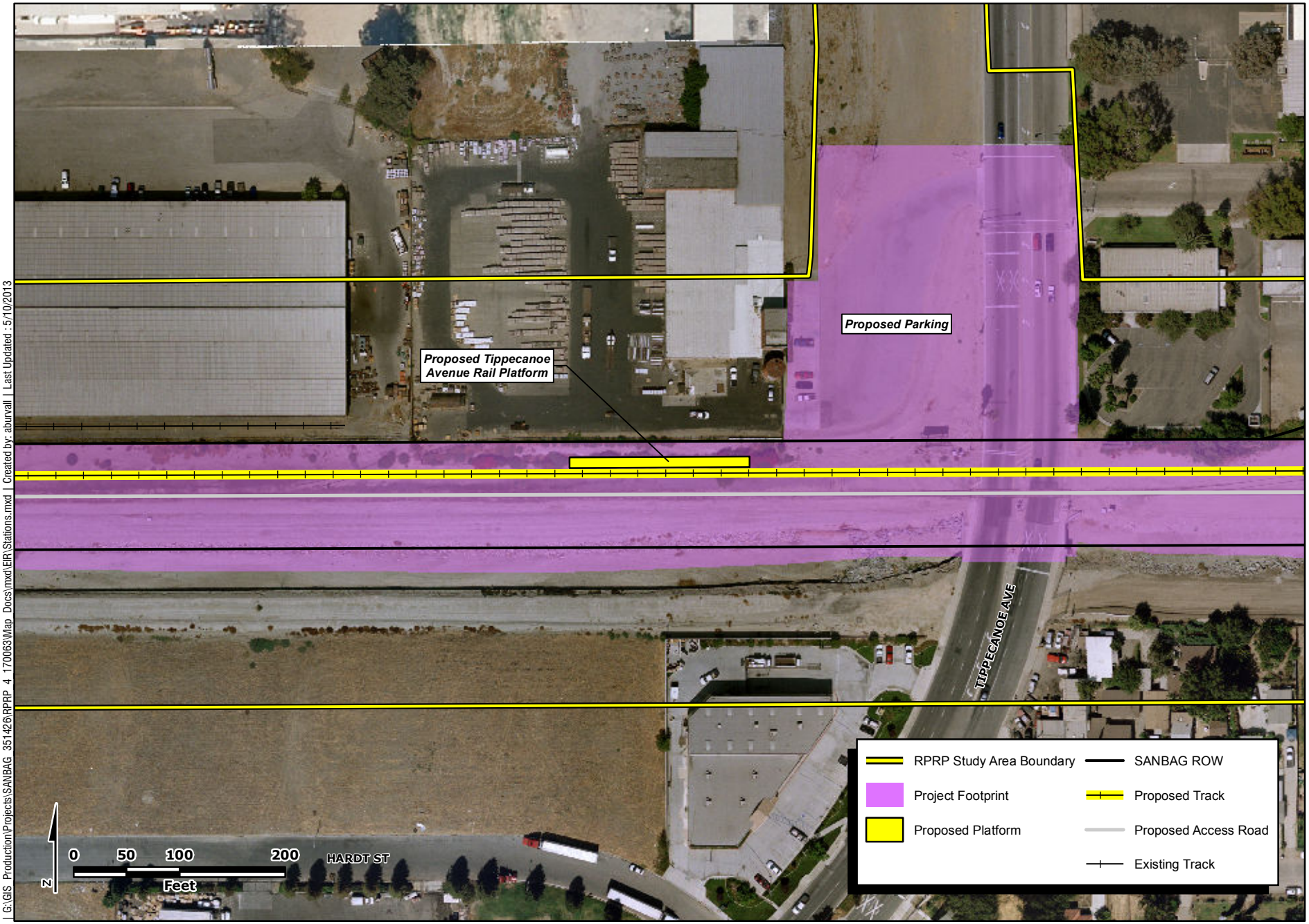

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Tippecanoe Avenue Rail Station

Figure 2-4 C

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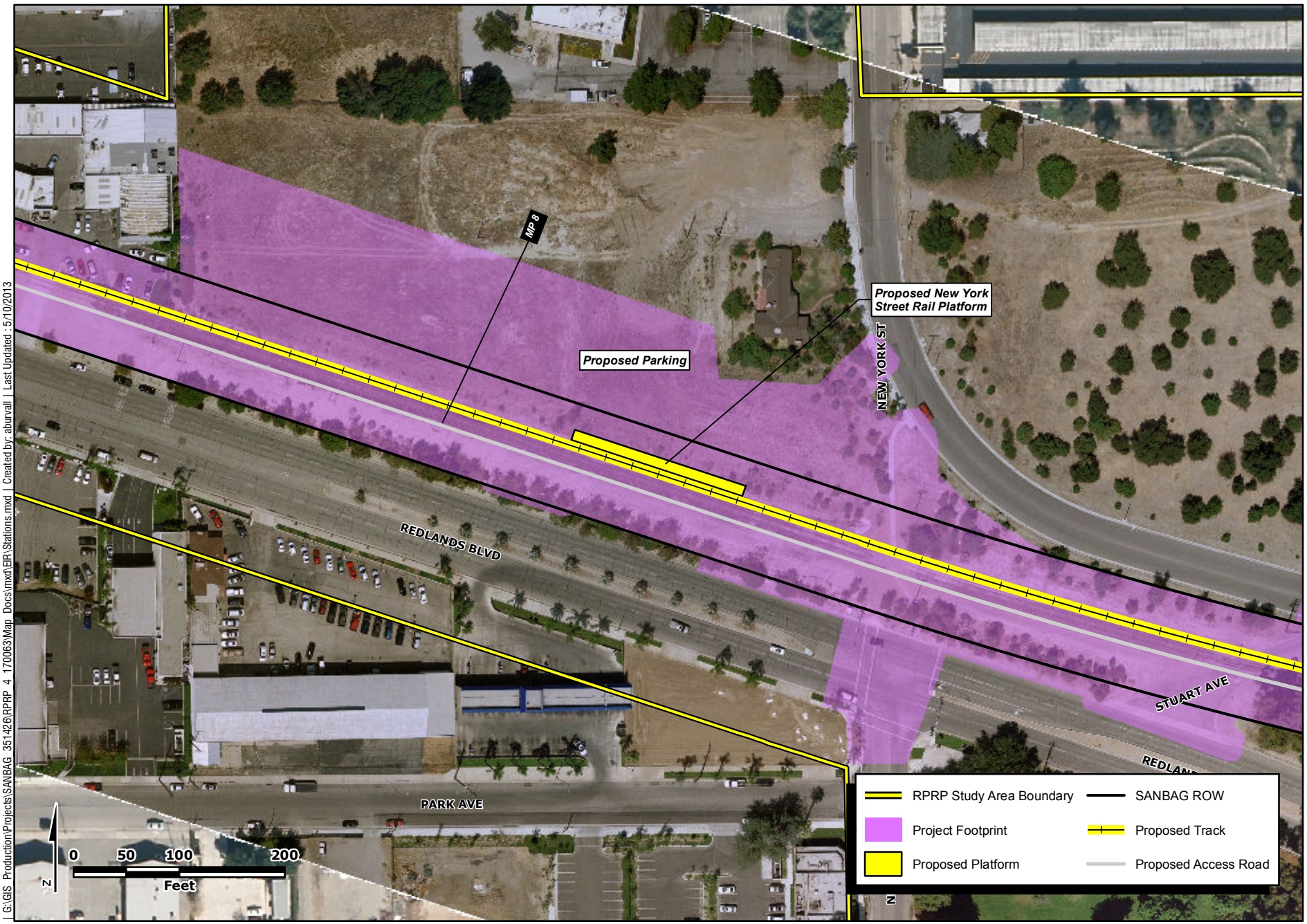
Table 2-5. Rail Station Characteristics

Station Name	APN(s)[1]	Station and Building Characteristics	Pedestrian Crossing	Parking[2] and Vehicular Access	Number of Bike Lockers	Development Lead(s)
E Street	13602113	• Single platform approximately 170 feet long and 10 feet wide, north of the proposed tracks. • No additional structures proposed as part of RPRP.	At-Grade	• Up to 100 parking spaces of the 265-space parking lot proposed in conjunction with the DSBPRP would be for RPRP travelers.	Up to 12	SANBAG
Tippecanoe Avenue	28103121 28104129 28104113	• Single platform approximately 170 feet long and 10 feet wide, north of the proposed tracks. • Security and equipment storage buildings.	At-Grade	• Up to 20 parking spaces may be provided north of the station on the southeast corner of APN: 281-041-29). • Park and ride and bus stop amenities are proposed within the vicinity of the station.	Up to 10	SANBAG
New York Street	16925104	• Single platform approximately 170 feet long and 10 feet wide to the south of the proposed track and within the existing railroad ROW. • Security and equipment storage buildings.	At-Grade	• Up to 30 parking spaces are proposed by the developer east of the stations in a triangular area just north of the railroad ROW if consistent with land use plans. • Parking may also be provided along the northern portion of the railroad ROW, east of New York Street. • Park and ride and bus stop amenities are proposed within the vicinity of the station.	Up to 10	SANBAG and ESRI

Table 2-5. Rail Station Characteristics

Station Name	APN(s)[1]	Station and Building Characteristics	Pedestrian Crossing	Parking[2] and Vehicular Access	Number of Bike Lockers	Development Lead(s)
Downtown Redlands	16928136	• Single platform approximately 170 feet long and 10 feet wide to the north of the proposed track and within the existing railroad ROW. • No additional structures required.	At-Grade (potential future overpass)	• Up to 70 parking spaces via an at-grade surface parking lot (if required). • A 400-space parking structure is currently planned immediately north of and adjacent to the passenger platforms on an approximate 2-acre site by the City of Redlands as part of the "Park Once" project. Up to 200-parking spaces would be allocated to the Project. The timing of construction for this facility is unknown.	Up to 10	City of Redlands
University of Redlands	17020131 17018149	• Two platforms approximately 200 feet long and 10 feet wide. • Security and equipment storage buildings.	At-Grade	• Up to 40 parking spaces. • Based on existing agreements between SANBAG and the City of Redlands, up to 100 parking spaces at the University would be provided by the City.	Up to 20	University of Redlands

Source: HDR Engineering 2013
Notes: [1] Assessor Parcel Numbers (APNs) outside SANBAG's ROW. See Section 3.3, Land Acquisitions, Displacements, and Relocations for more detail.
[2] The Ridership Study (Appendix C, Conceptual Engineering Documents) was used to determine parking space quantities for each rail station.



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New York Street Rail Station

Figure 2-4 D

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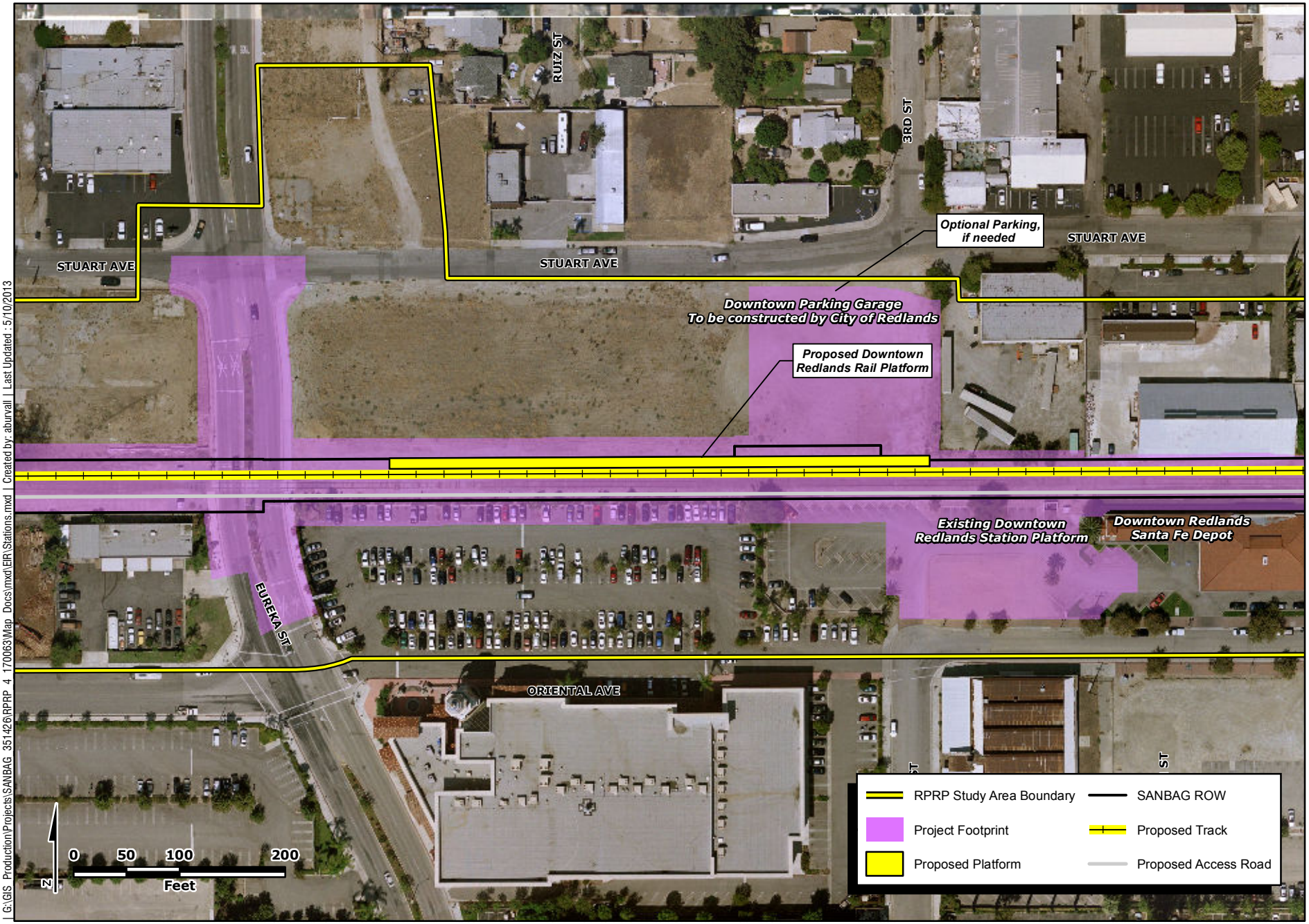

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Downtown Redlands Rail Station

Figure 2-4 E

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2.4.2.10 University of Redlands Rail Station

The University of Redlands Rail Station would consist of new station facilities constructed to the east of University Street (see Figure 2-4F). The station improvements at this location, including new tracking, would include a physical footprint of up to 4.4 acres. Table 2-5 provides additional details on the proposed station improvements at University Avenue.

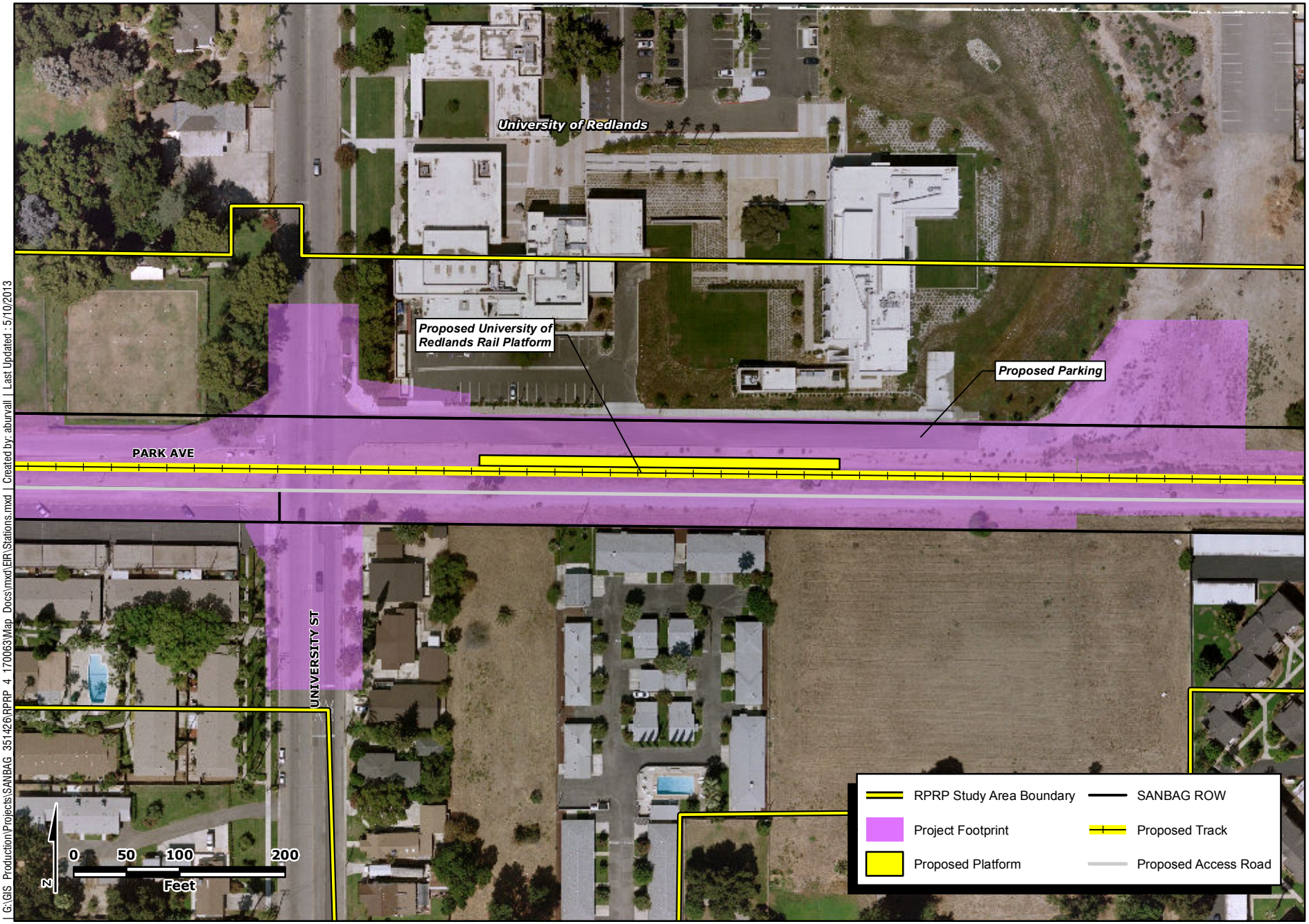
Per an existing agreement between SANBAG and the City of Redlands, the City of Redlands would provide up to 100 parking spaces to support the parking needs for the area surrounding the University. Off-site parking is not proposed as part of the Project and, therefore, if these parking spaces are not provided in time for opening day, SANBAG would provide up to 40 parking spaces east of University Avenue, north of the tracks, and within SANBAG's ROW.

2.4.2.11 Train Layover Facility

The Project would require the development of a new train layover facility that would include sufficient tracks for light maintenance activities and operational activities including storage of trains. Other on-site facilities would include but not be limited to offices, training rooms, and a crew break room. The estimated total building square footage at the facility is approximately 3,000 square feet. The train layover facility is proposed on a long narrow site immediately south of I-10 and west of California Street (see Figure 2-5) and would contain up to seven tracks. The facility site is comprised of four parcels, including Assessor's parcel numbers (APNs) 292-035-01, 292-034-02, -05, and -08, with the physical footprint of the facility at approximately 7.8 acres. The train layover facility components would include the following:

- Compressed air, potable water, flushing stations, toilet dump stations, ground power, and wayside power;
- Service tracks with inspection pits contained within an enclosed canopy (or train shed);
- A portable fueling and containment equipment area;
- Site lighting for servicing equipment and operations at night;
- A secured materials storage yard;
- An employee parking lot accessible from Bryn Mawr Avenue;
- A separator for collection of industrial waste from the service pit. Industrial waste would be collected and routed through a grit trap and oil/water separator prior to discharge to the sanitary sewer collection system; and
- Track drip pans where locomotives are stored.

Excess ballast materials from along the railroad ROW would be reused to raise the site and provide for the foundation of the proposed layover facility.



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University of Redlands Rail Station

Figure 2-4 F

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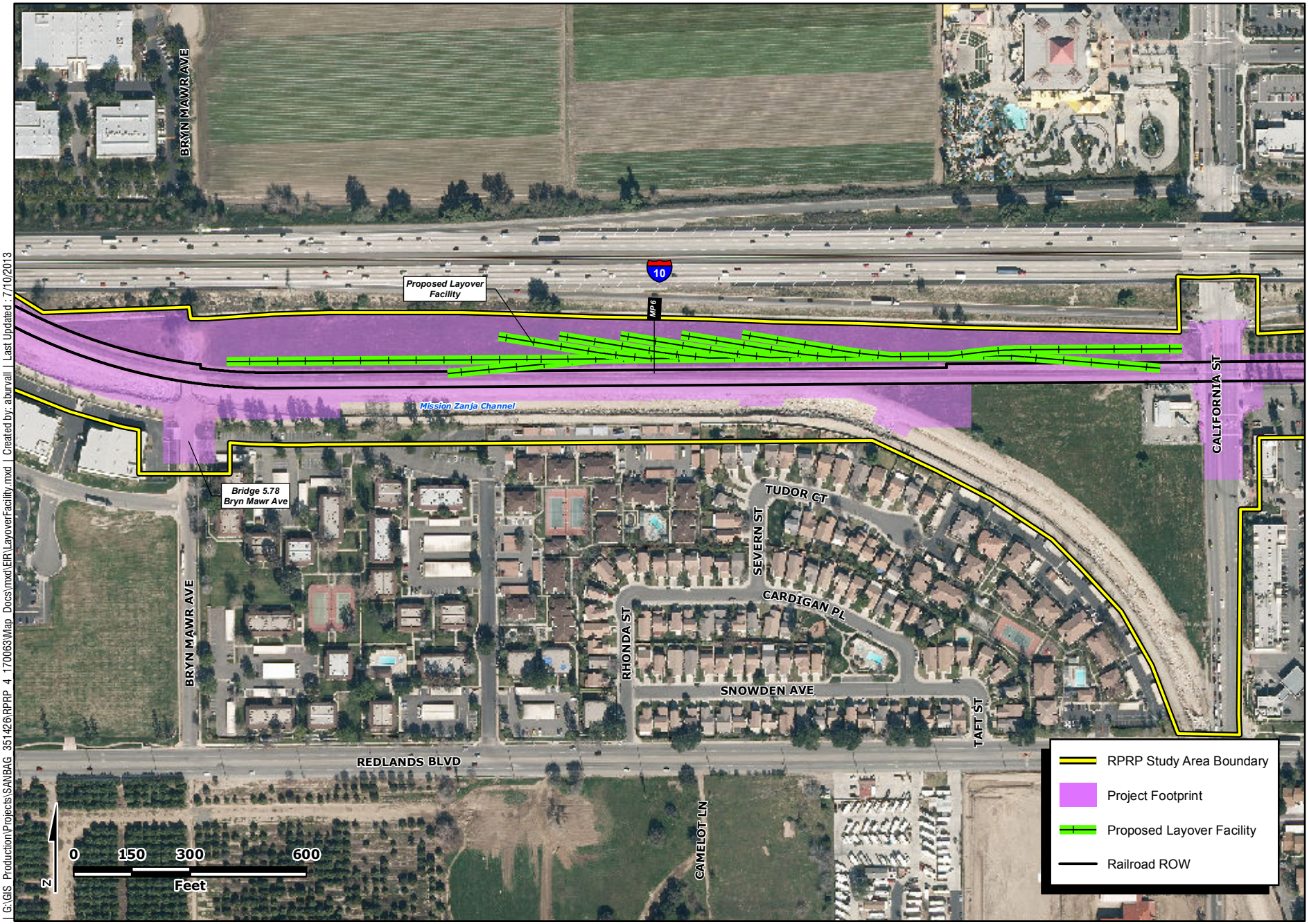

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Proposed Layover Facility

Figure 2-5

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2.4.2.12 Property Acquisitions and Relocations

The Project requires acquisition of new railroad ROW along the constrained sections of the existing railroad ROW, at the proposed layover site, and at areas near the proposed rail stations, with the exception of E Street.

The physical improvements associated with the Project may require up to 58 partial property acquisitions, up to four full property acquisitions, up to 32 roadway easements (roadway, temporary construction, sidewalk, utility, and alley vacations), and potentially two (2) business relocations. Both private and public properties could be affected by the Project. It is anticipated that the majority of properties affected would be subject to temporary construction easements (TCEs) (up to 60 properties), which may be established for appropriate lengths of time within the approximate 24 to 36-month construction period.

2.4.2.13 Utility Replacement/Relocation and Railroad Signal/Communications Equipment

The Project would require the relocation of some of the existing subsurface and overhead crossing utilities (i.e., water, sewer, storm drain, power, gas, fiber optic, and telephone lines) in accordance with applicable utility design criteria and engineering standards. These utilities would be evaluated for conformance with applicable standards for underground and overhead utility crossings. Critical subsurface utilities located within the railroad ROW would be exposed and surveyed during the final design phase of the Project to verify location, size, and material type. Railroad signal houses and street lights may also be relocated or replaced, as necessary, to accommodate the track improvements.

A new fiber optic cable and network would be installed within the railroad ROW along all or a portion of the alignment to facilitate communications between various signal and systems related equipment associated with the project. Antennas would be installed as a radio backup in the event the fiber optic is destroyed. The antennas would be mounted on mono pole towers (50’ maximum) at each station, and at each control point. The first control point is at the E Street station area. The second control point is at the beginning of the siding between Tippecanoe Avenue and Richardson Street. The third control point is at the end of the siding west of Nevada Street. The final control point would be constructed at the University of Redlands station and located on the microwave tower.

Drainage

Improvements to existing drainage facilities along the railroad corridor would be necessary as part of the Project. It is anticipated that a majority of the storm drain facilities would be protected in place and would not need to be lowered to meet minimum depth requirements. Most of the existing culverts under the tracks would be reconstructed as part of the Project. Some existing facilities that were constructed by other agencies may also need to be reconstructed. Finally, some new drainage facilities would be added to improve drainage along the railroad ROW. All drainage improvements would be coordinated with the cities of San Bernardino and Redlands along with San Bernardino County Flood Control District (SBCFCD) and Caltrans.

Mission Zanja Flood Control Channel. The Mission Zanja Flood Control Channel (Mission Zanja Channel) runs parallel to the rail line from the SAR to approximately 900 feet west of California Street for a distance of approximately 2.6 miles where it diverges from the Study Area to the south. At approximately milepost 9.4 (Bridge 9.4), the creek rejoins the railroad further east, as Mill Creek Zanja, where it passes under the railroad just west of the I-10 bridge and

overhead crossing. The Mission Zanja Channel is characterized as an improved, trapezoidal earthen channel with some segments including wire revetment (USACE 1994). The capacity of the open channel ranges from 1,400 to 6,000 cubic feet per second (cfs). Several of the roadway bridges along the Mission Zanja Channel limit the flow-carrying capacity to less than 1,500 cfs along portions that parallel the rail corridor.

Channel reconfiguration of the Mission Zanja Channel may be proposed from the Gage Canal to Tippecanoe Street to increase the channel capacity. This may include a combination of channel deepening and widening and, potentially, modification to the Gage Canal cascade structure. To ensure the structural integrity of the track improvements along sections of Mission Zanja Channel and maximize the use of SANBAG's ROW, the Project would include bank stabilization improvements (e.g., armoring) to portions of the northern bank of the Mission Zanja Channel, from MP 3.5 to just east of MP 6. At this time, SANBAG is proposing the use of an articulated concrete block (ACB) to support the armoring at these locations, which would allow for the growth of limited vegetation. These improvements would be constructed and coordinated with the SBCFCD, which maintains the channel.

Additionally, reconfiguration of the existing channel from MP 3.9 to 4.2 in the vicinity of the Gage Canal may be necessary and could include, but is not limited to, modifications to the existing hydraulic grade structure, construction of a short floodwall, or other improvements to minimize scour of the tracks. At Bridge 5.78 in the vicinity of Bryn Mawr Avenue, the Mission Zanja Channel would be realigned slightly to the south to accommodate the bridge improvement and improve existing channel hydraulics. The channel realignment would extend up to 700 feet along the length of the existing channel.

Regional Flood Control Improvements. The City of Redlands in cooperation with SBCFCD is planning several projects, which collectively, would reduce existing flood hazards within the railroad corridor in western Redlands. The City of Redlands recently initiated a Storm Drain Master Plan process to assess a combination of regional detention projects and conveyance capacity upgrades to alleviate flooding concerns in the City of Redlands, including the downtown area. However, the timing of these improvements in conjunction with other related projects under the jurisdiction of the SBCFCD is uncertain. For this reason, this EIS/EIR assumes that Project operations would be discontinued in the event of flooding conditions and, operations would not occur until flood levels recede, an assessment for any flood-related damage along the rail corridor is completed, and any necessary repairs are completed.

2.4.2.14 Maintenance

Maintenance of the railroad ROW, known as MOW, is the responsibility of SANBAG, as owner of the railroad, but is currently being performed by BNSF via an agreement with SANBAG. This includes routine maintenance of the track, grade crossings, drainage facilities, and signal system. Vegetation management and weed abatement would also be required along the railroad ROW. Each station would also require routine landscaping and facility maintenance (e.g., replacement of lighting fixtures, cleaning, etc.).

SCRRA owns a fleet of locomotives and coaches that are maintained at the Central Maintenance Facility (CMF) in Los Angeles and at the EMF in Colton. Routine vehicle inspection and light repair is also performed at the Inland Empire Maintenance Facility (IEMF) located approximately one mile west of E Street in San Bernardino in addition to other layover sites throughout the SCRRA rail system. Heavy maintenance or repair activities for the train vehicles would be completed at SCRRA's existing Eastern Maintenance Facility (EMF) in

the City of Colton or at another regionally accessible facility. Throughout operation, typical railroad maintenance and inspections would be conducted in accordance with SCRRA/Metrolink and BNSF standard practices and may be completed by a contractor hired by SANBAG.

2.4.2.15 Construction

Construction of the Project may begin in 2015 and take up to 36 months to complete. Construction would proceed generally from the west of E Street to the SAR and similarly from the SAR east to the University of Redlands. In total, the anticipated construction disturbance area is estimated at 134.9 acres. Of this total construction area, up to 10 acres could be subject to disturbance during the course of construction on any given day.

A description of anticipated construction activities sequenced over the course of Project construction is provided as follows:

- Demolition, clearing and grubbing, and removal of existing track;
- Relocate, extend, or encase utilities, as appropriate, to remove conflicts;
- Construct embankments, culvert extensions, and retaining walls throughout the rail corridor, as necessary;
- Construct improvements at each station location and layover facility; and
- Construct new continuous welded rail track, roadway grade crossings, and install pedestrian access improvements and landscaping, where appropriate.

Staging areas for construction equipment and materials would be located primarily within the SANBAG ROW to the extent feasible. Other staging areas may be acquired, as necessary, by the construction contractor and, to the extent feasible, may include vacated roadway ROW (e.g. Hilda Street). The location of the staging areas would depend on the rail segment, bridge, and station location being constructed. In addition, a part of the proposed layover facility may be used as a centralized construction staging area for heavy equipment due to its centralized location along the rail corridor.

Construction operations in conjunction with the Project may require the discontinuation of freight train movements along the western three miles of the rail corridor (MP 1 to MP 4) during construction. This may require existing material transports along the rail corridor to be transloaded west of the Study Area and re-routed by haul truck to their intended destination. These additional truck trips would be routed along existing truck routes to the extent feasible. SANBAG has calculated that this operational change would result in an average increase of up to 10 haul truck trips on a daily basis during the duration of the track outage.

Construction Related Trips and Fleet Mix

During peak construction where multiple construction activities would occur, this EIS/EIR assumes that up to 100 construction workers or up to four construction crews, including supervisory staff and inspectors, would be active at any given time. The Project is expected to require material imports for ballast and subgrade materials to achieve the necessary grades for the proposed track foundation. Several material sites may be used depending on the type of material involved. For the purposes of analysis, an average haul truck trip distance of 25 miles was assumed based on the proximity of those under consideration. Old ballast materials would be recycled and incorporated into the proposed embankments to the extent feasible with the

remaining materials being used for the foundation of the layover facility, or hauled to the nearest certified disposal or reuse facility.

Total construction material imports are estimated at up to 10 daily haul truck trips assuming the use of 20 cubic yard capacity trucks or 65-foot flatbed trailers with equipment or materials. These trips would be distributed primarily over the second two years of construction. Other construction materials, such as asphalt, concrete, drainage pipe, metal handrails and fences, and other specialty items would most likely be provided from local vendors whenever possible and would likely be delivered to the site via truck. When combined, up to 30 daily truck trips would occur on an average worst-case day during the course of construction. These truck trips would be distributed throughout the local circulation network depending on their origin and destination.

The typical construction vehicle fleet would include a combination of the equipment identified below. This typical construction fleet would be used interchangeably on any given day based on the actual phase of construction (e.g., grading verses rail installation) and actual equipment needs.

- Excavator(s)
- Backhoe(s)
- Grader(s)
- Crane(s)
- Scraper(s)
- Compactor(s)
- Boring machine/drill rig(s), as necessary
- Dump trucks
- Bulldozers
- Front-end loader(s)
- Water truck(s)
- Paver and roller compactor
- Flat-bed delivery truck(s)
- Forklift(s)
- “Redimix” concrete truck(s)
- Compressors/jack hammers/saws

Structural Improvements at Water Crossings

Construction of the structural crossings at local waterways, including the SAR, may require the isolation of the work zone through the installation of a cofferdam and/or construction work pads within the wet area. The Storm Water Pollution Prevention Plan (SWPPP) prepared for the Project would identify Best Management Practices (BMPs) to address potential short-term impacts and post-construction (long-term) measures to minimize water quality impacts.

New structural supports may be constructed behind an encircling temporary cofferdam constructed of sheet piling or similar method, such as the use of cast-in-steel-shell (CISS) piles. The foundation would consist of reinforced concrete supported by piling, with conventional reinforced concrete piers extending up to the bridge decks. To minimize the potential for falling debris into local waterways during bridge construction, a debris containment system would be installed under the bridge to catch any falling debris. If flow is present and as an additional precaution, a boom would be strung across the water feature to keep any material that escapes the containment system from being carried down stream.

2.4.3 Alternative 3 – Reduced Project Footprint

The Reduced Project Footprint Alternative (or Alternative 3) would include the development of the Project within a reduced footprint in order to minimize disturbance of biological and historic resources that border and/or intersect with the railroad corridor. The major reductions or changes in the Project’s footprint under Alternative 3 would occur at the following locations:

- Alternative design for Bridge 3.4 at the Santa Ana River;
- Reduced length of bank improvements along the Mission Zanja Channel;
- Reduced construction limits at the California/I-10 Citrus Grove; and
- Reduced roadway improvements at Sylvan Park.

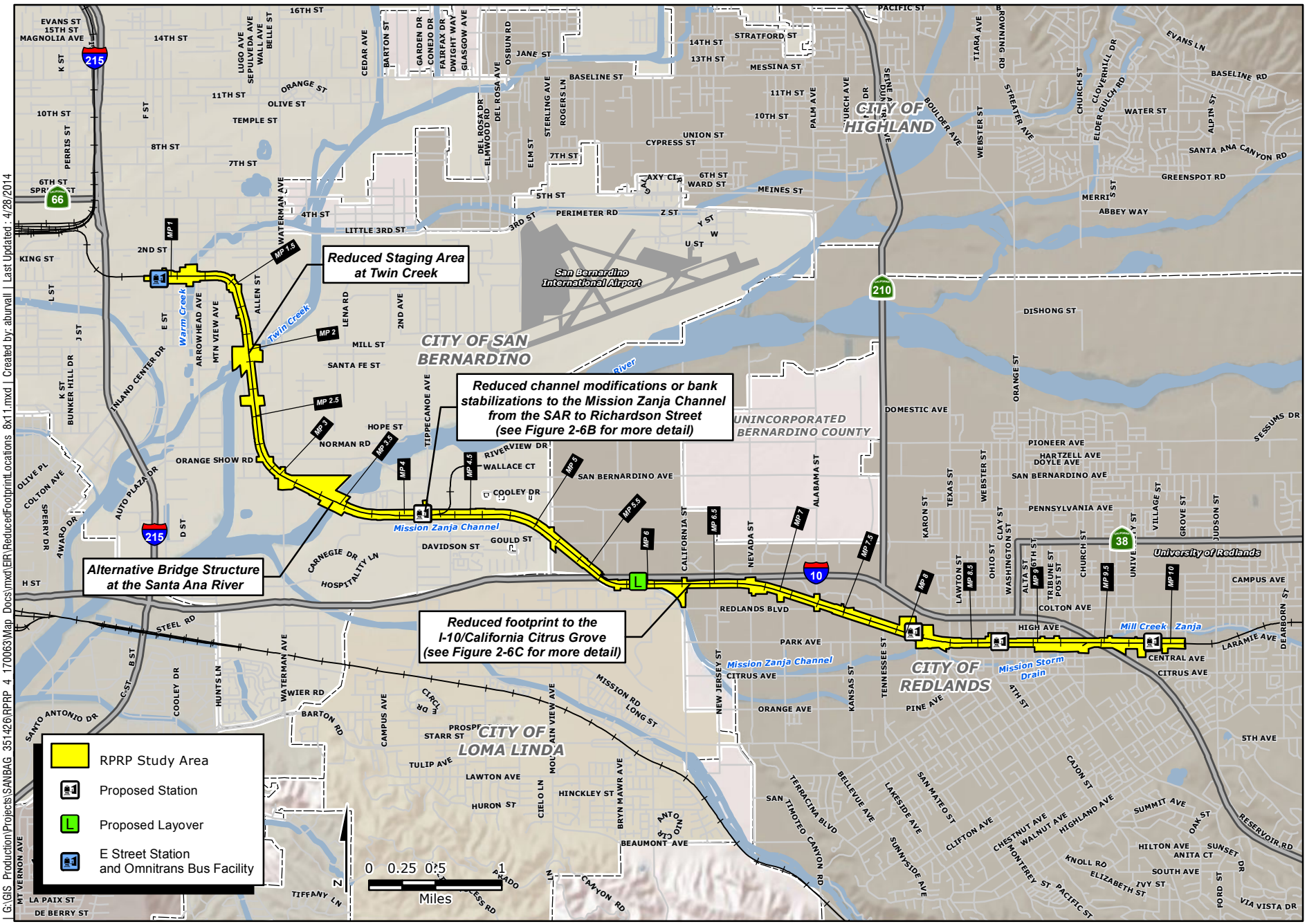
Similar to the Preferred Project, Alternative 3 would involve the construction of new track and grade crossing improvements, replacement or retrofit of existing bridges, and the development of rail station improvements at Tippecanoe Avenue, New York Street, Downtown Redlands, and the University of Redlands. In addition, the train layover facility immediately south of I-10 and west of California Street as described under the Preferred Project would be constructed as part of Alternative 3. The locations where the physical footprint is reduced under this alternative are reflected in Figure 2-6A. Train operations under this alternative would be the same as those identified for the Preferred Project.

Compared to the Preferred Project, this alternative would result in a reduction of the physical disturbance area associated with the Project to avoid direct impacts to local waterways. Under this alternative, channel modifications and stabilization improvements (e.g., armoring) to the northern bank of the Mission Zanja Channel would not be implemented from MP 3.5 to MP 4.5, just west of Richardson Street. The reduced disturbance area along this section of the Zanja Channel is illustrated in Figure 2-6B. To minimize safety concerns associated with the existing channel bank, the track alignment along this section would be shifted further north (e.g., 25 to 30 feet) and away from the existing slope embankment.

An alternative bridge structure is proposed at Bridge 3.4 (SAR) to further minimize the placement of permanent structures within waters of the U. S. Table 2-6 provides a description of the alternative bridge structure that would be employed under this alternative. The design and construction of Bridges 1.1 (Warm Creek), 2.2 (Twin Creek), 5.78 (Bryn Mawr), and 9.4 (Mill Creek Zanja) would be the same as described for the Preferred Project; with the exception of a smaller staging area at Twin Creek (Bridge 2.2).

To minimize potential effects to an existing Orange Grove (local open space resource) that is located adjacent to and north of the railroad ROW, drainage improvements east of California Street would be contained within the railroad ROW (see Figure 2-6C). More specifically, a large-diameter, under-drain pipe would be installed within the railroad ROW to convey runoff from a large catchment area to the north of the ROW as opposed to an open ditch that would be constructed north of the ROW under the Preferred Project. This change in design would avoid the partial property take and TCE required under the Preferred Project, however, at a substantial increase in cost.

With a reduced construction area up to 7.2 acres, direct impacts attributable to the Reduced Project Footprint would be reduced to approximately 130.1 acres. Figure 2-6A illustrates the locations of where reductions in direct physical impacts would occur under Alternative 3.



Alternative 3 - Reduced Project Footprint

Figure 2-6A

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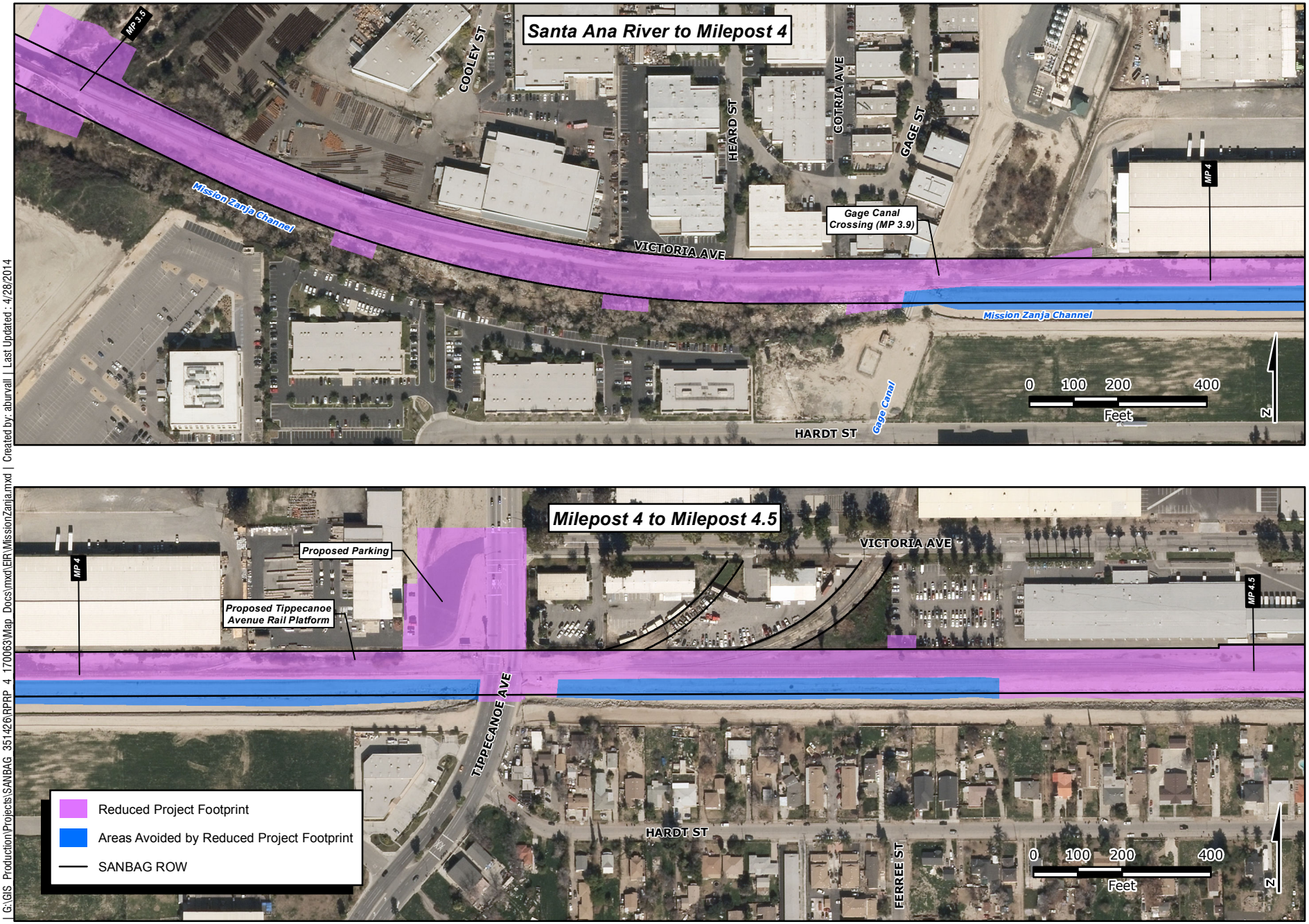

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Mission Zanja Flood Control Channel (Reduced Project Footprint)

Figure 2-6B (Revised)

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Table 2-6. Alternative 3- Reduced Project Footprint Bridge Improvements

Bridge (Br)	Replacement (Yes/No)	Length (feet)	Temporary and Permanent Impact Areas (acres)	Design Features
Br. 3.4 – Santa Ana River Bridge	Yes	Up to 365 feet in length	Temporary: 1.88 acres Permanent: 0.02 acres	• Through plate girder bridge. • In-channel construction work required. • Construction access/staging may occur from the north end of the western bank. Access to the eastern bank may occur via construction of temporary bridge crossing (earthen fill). • Pile installation and work zone isolation proposed via steel sleeve (or CISS pile) method or traditional cofferdam depending on contractor preference. • Existing bridge and bridge piles would be removed after installation of new bridge bents. • Three new pier structures spaced at 90 feet and modify ground surface at banks. • Six (6) 30-inch CIDH piles may be constructed at both bridge abutments. • Accommodates Santa Ana River Trail along the eastern bank. • Up to 30-month construction period (includes cofferdam construction).

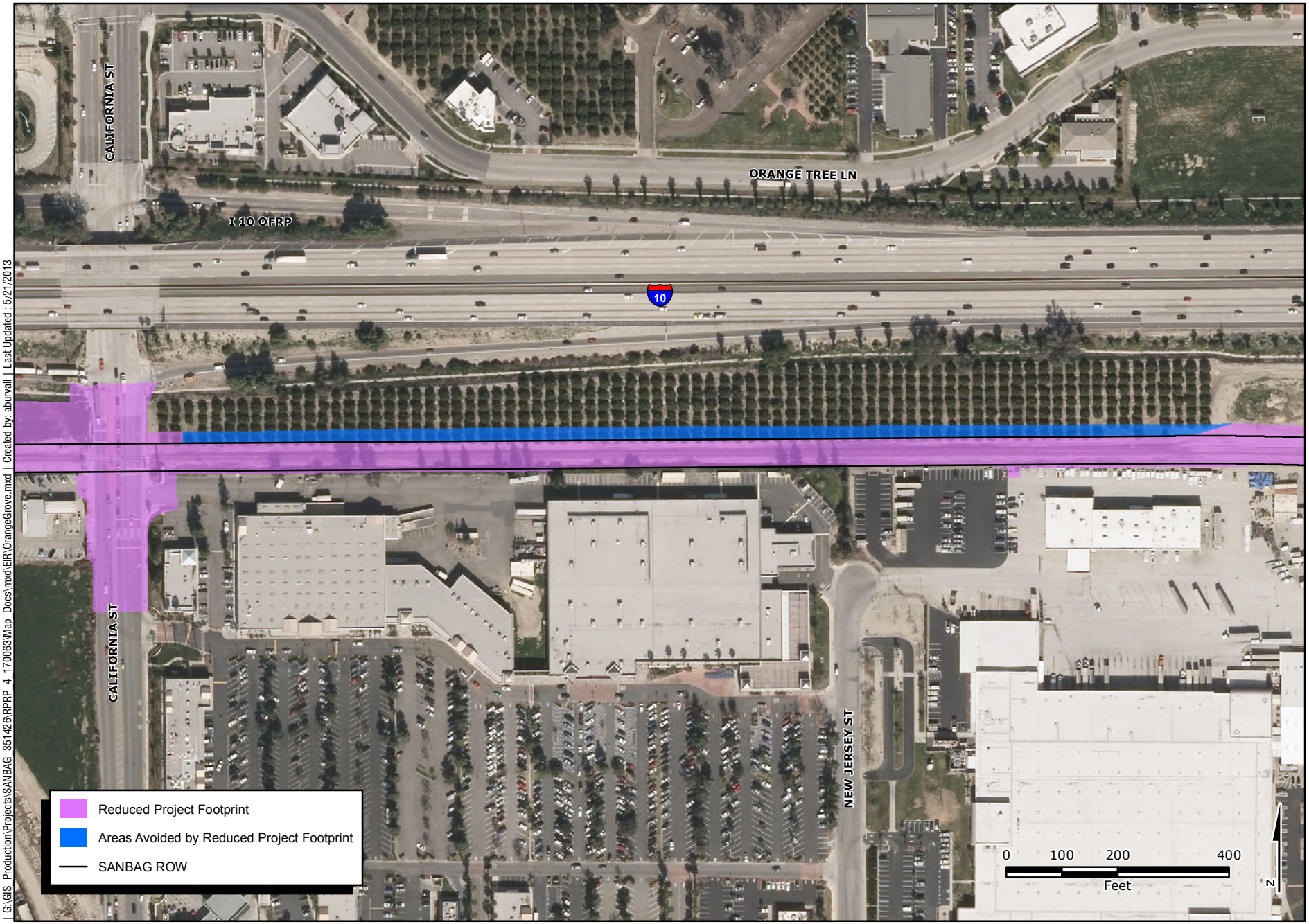
Source: HDR Engineering 2013

2.4.4 Design Option 1 – Train Layover Facility (Waterman Avenue)

Under Design Option 1, SANBAG would construct proposed facilities as described under the Build Alternatives; including construction of new track and grade crossing improvements, replacement or retrofit of existing bridges, and station improvements at Tippecanoe Avenue (or Waterman Avenue), New York Street, Downtown Redlands, and the University of Redlands.

The main distinguishing feature under Design Option 1 that differentiates it from the Build Alternatives is the optional location of the proposed train layover facility at an alternate site located in the City of San Bernardino, west of the SAR along land immediately north of the existing railroad ROW (see Figure 2-7). More specifically, Design Option 1 would include the train layover facility at a location to the south of East Orange Show Road, east of South Waterman Avenue and adjacent and to the west of the SAR. Design Option 1 would require the acquisition of the southern portions of three properties, APN 281-021-49, 281-021-47, and 281-011-61, which total approximately 13.6 acres. Access to the site would be provided via an easement that enters the subject property from the north (see Figure 2-7).

Under Design Option 1, the construction footprint for the Project facilities and alternate train layover facility would be approximately 140.9 acres. As with the Build Alternatives, heavy maintenance or repair activities for the train vehicles would be completed at the existing EMF facility in the City of Colton or at another regionally accessible facility.



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I-10 - California Street Orange Grove (Reduced Project Footprint)

Figure 2-6C

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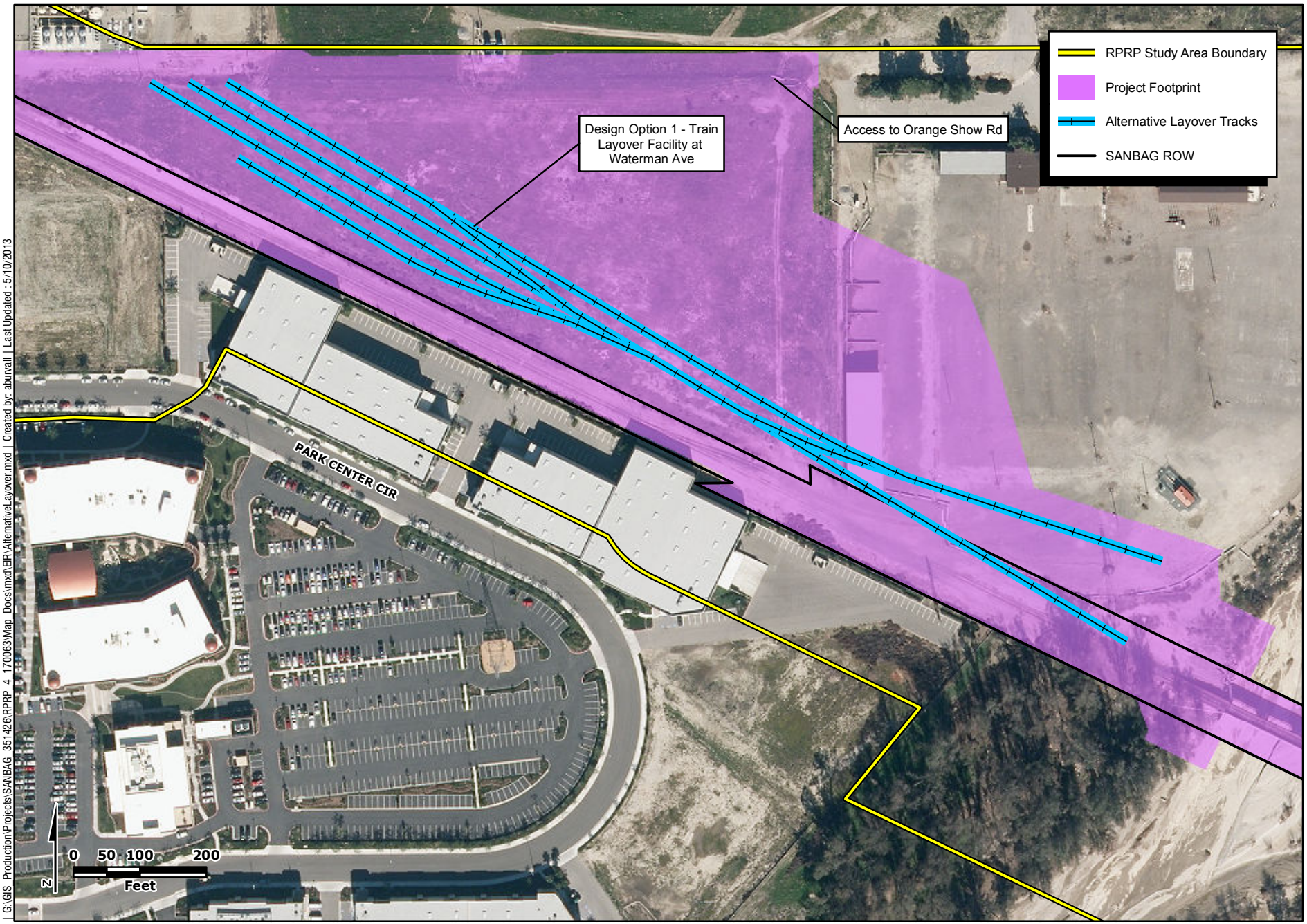

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Design Option 1 -Train Layover Facility (Waterman Avenue)

Figure 2-7

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The main reason for identifying an alternate train layover facility at this location is the property's current industrial zoning and the general absence of sensitive land uses within close proximity of the alternative layover site. The physical layout of the proposed layover facility and components of the train layover facility associated with the Build Alternatives would be similar under this design option. The change in location of the layover facility would not cause any large functional changes to passenger rail operations because the same number of trains would operate daily and total train miles would average approximately 481.7 miles for local trains and 36 miles for the express trains.

2.4.5 Design Option 2 – Use of Existing Train Layover Facilities

Under Design Option 2, SANBAG would construct proposed facilities as described under the Build Alternatives; including construction of new track and grade crossing improvements, replacement or retrofit of existing bridges, and station improvements at Tippecanoe Avenue (or Waterman Avenue), New York Street, Downtown Redlands, and the University of Redlands.

Under Design Option 2, rather than constructing a new layover facility as described for the Build Alternatives and Design Option 1, Design Option 2 would fully integrate Project-related layover operations with existing Metrolink layover operations at two existing facilities. More specifically, this design option would integrate Project-related layover operations with existing train layover operations at Metrolink's EMF or IEMF. The EMF would not need to be expanded to accommodate Project-related layover operations, and the reconfiguration of IEMF to facilitate increased train storage was already considered in the EA/EIR prepared by SANBAG for the DSBPRP, which is incorporated by reference into this EIS/EIR. For this reason, construction activities associated with the IEMF is not considered further in this document. As with the Build Alternatives, heavy maintenance or repair activities for the train vehicles would be completed at the existing EMF facility in the City of Colton or at another regionally accessible facility.

Integration of the Project with existing layover facilities would increase the length of train operations by 10.5 miles to allow for train layover operations to occur at these existing facilities, which are located to the west of E Street. Figure 2-8 illustrates the location of EMF and IEMF in relation to the Study Area. This design option would avoid the need to construct new layover facilities as proposed under the Build Alternatives and Design Option 1; and therefore, under Design Option 2 the construction footprint would be reduced to approximately 127.1 acres. The change in the layover facility would not cause any large functional changes to passenger rail operations because the same number of trains would operate daily, and total revenue miles would average approximately 491.7 miles for local trains and 36 miles for the express trains.

2.4.6 Design Option 3 – Waterman Avenue Rail Station

Under Design Option 3, SANBAG would construct proposed facilities as described under the Build Alternatives; including construction of new track and grade crossing improvements, a layover facility, replacement or retrofit of existing bridges, and the development of station improvements at New York Street, Downtown Redlands, and the University of Redlands. The main distinguishing feature under Design Option 3 from the Preferred Project is that rather than constructing new station improvements at Tippecanoe Avenue, SANBAG would construct station improvements at Waterman Avenue. Operations would be similar to the Preferred Project with a minor change in the travel times between E Street and Waterman Avenue and Waterman Avenue and New York Street as reflected in Table 2-7.

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Design Option 2 - Use of Existing Layover Facilities

Figure 2-8

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Table 2-7. Project Weekday Operations under Design Option 3

Route Segment	Average Speed (mph)	Travel Time (minutes)	Distance (miles, approx.)
Eastbound Operations			
EB: 1 - E Street to Waterman	29.06	4.91	2.38
EB: 2 - Waterman to New York	39.32	7.40	4.85
EB: 3 - New York to Downtown Redlands	25.19	1.60	0.67
EB: 4 - Downtown Redlands to University of Redlands	24.98	2.52	1.05
Average/Total/Total	**29.6**	**16.4**	**9**
Westbound Operations			
WB: 1 - University of Redlands to Downtown Redlands	20.64	3.05	1.05
WB: 2 - Downtown Redlands to New York	26.73	1.50	0.67
WB: 3 - New York to Waterman	38.90	7.48	4.85
WB: 4 – Waterman to E Street	35.85	3.98	2.38
Average/Total/Total	**30.53**	**16.01**	**9**

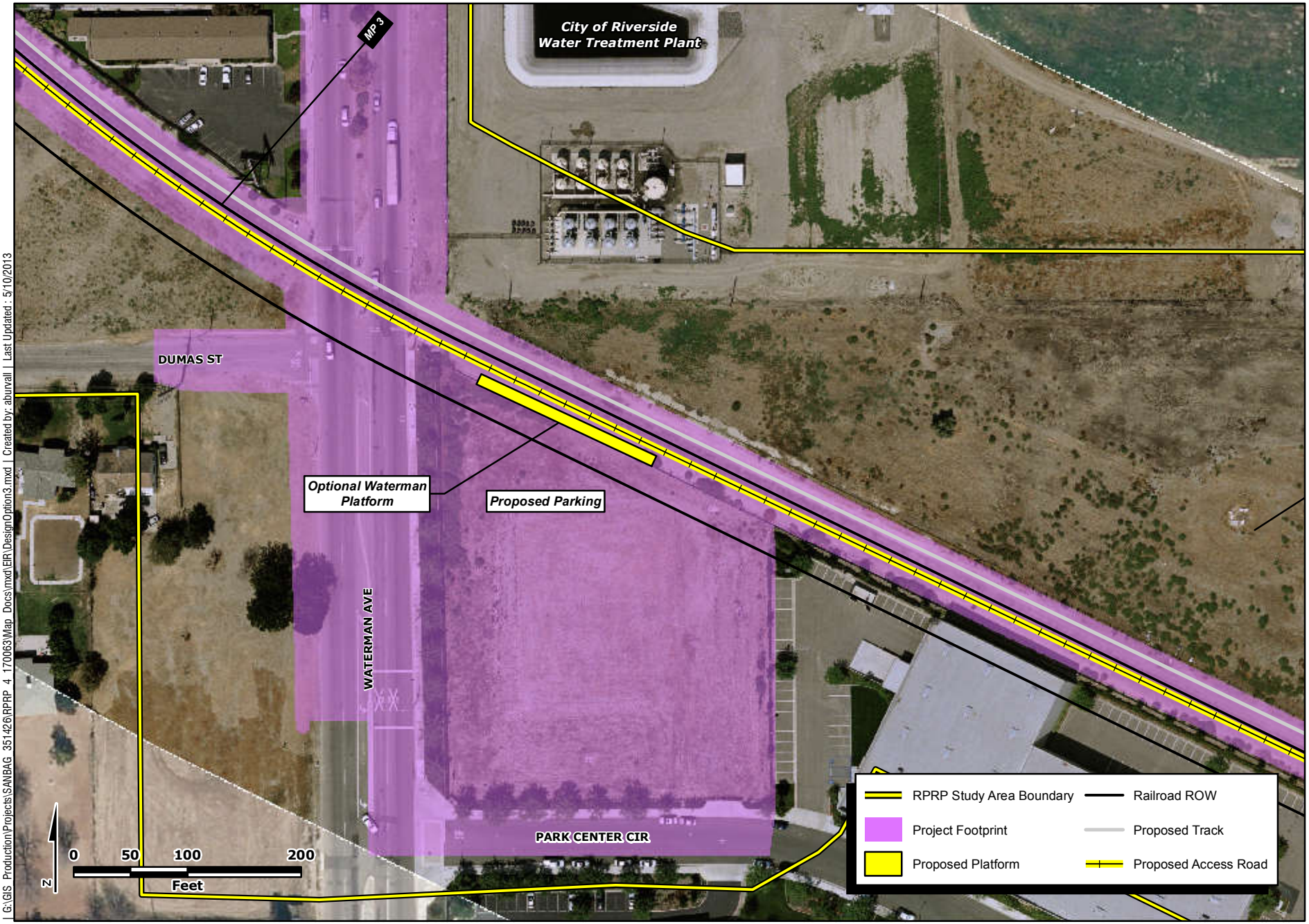
Source: HDR Engineering 2013

The Waterman Avenue rail station would be constructed on the northern portion of an undeveloped, two-acre parcel (APN 028-141-101) located immediately north of the intersection of Park Center Circle and Waterman Avenue and south of the existing railroad ROW (see Figure 2-9). The southern portion of the property would be made available for future development consistent with the site's current zoning. The station improvements proposed at this location would be similar to those described for Tippecanoe Avenue for the Preferred Project with the platform measuring approximately 170 feet in length. This optional station would include up to 20 parking spaces to the south of the station. Vehicle and pedestrian access to the station would occur via Park Center Circle. Design Option 3 would entail a total construction footprint of up to 136.6 acres.

With the placement of the rail station at Waterman Avenue (as opposed to Tippecanoe Avenue), projected ridership for the Project at opening day is estimated at up to 820. In assuming a flat increase in ridership for future conditions, up to 1,330 riders, could be expected in future years under this design option. Similar to the Project, numerous other factors could contribute to higher ridership levels in the future under this design option.

2.5 ALTERNATIVES CONSIDERED BUT REJECTED

Section 15126.6(c) of the CEQA Guidelines states that alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the project objectives, are infeasible, or do not avoid any significant environmental effects. Similarly, NEPA requires a brief discussion of the reasoning for eliminating those alternatives in the EIS that have been rejected for further detailed study (40 CFR 1502.14). The following sections identify the alternatives that were considered but rejected from further consideration in the EIS/EIR.



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Design Option 3 - Waterman Avenue Rail Station

Figure 2-9

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2.5.1 Alternative Mode Technologies

In conjunction with SANBAG's and FTA's consideration of alternative forms of transportation for the Preferred Project, several train technologies were initially considered in addition to the use of passenger rail type equipment, as proposed under the Preferred Project. These other technologies included light-rail transit, battery powered/hybrid propulsion locomotives, and bus rapid transit. The main reason for the elimination of these alternative technologies is that these technologies would be unable to operate on existing freight lines and would require a separate parallel track system along the railroad ROW, which could result in greater impacts to adjacent uses as compared to the Preferred Project. Based on these considerations, these alternative technologies would be unable to accomplish the basic goals and objectives of the Preferred Project and were not carried forward for additional consideration in the EIS/EIR.

2.5.1.1 Light Rail Transit

Light rail transit (LRT) is an electrically powered urban rail system running mostly in exclusive rights-of-way. LRT has a lower capacity and lower speed than heavy rail systems, but higher capacity and higher speed than street-running systems. LRT receives its power from an overhead catenary system. The main reason LRT was rejected for additional consideration in the EIS/EIR was due to the additional costs for LRT over the Preferred Alternative. The associated ROW requirements would also result in a substantial increase of full property takes for LRT implementation. An LRT alternative would be required to operate on a separate track along the freight ROW and would require, at minimum, a 60-foot ROW to allow for the additional tracking and placement of an overhead catenary. The total ROW requirements could extend upwards of 80 feet. Likewise, a LRT system would require the installation of traction power substations that would likely require additional off-site electrical improvements and even additional ROW beyond the necessary 60-foot ROW required to house the LRT and overhead catenary systems. An LRT alternative would not comply with FRA crash standards prohibiting the ability to operate on shared track with freight trains, as opposed to passenger rail service equipment. This could in turn result in the requirement for new gauntlet tracks requiring more ROW to meet level boarding and Americans with Disabilities Act (ADA) requirements.

LRT implementation would require permanent ROW takes for over 350 properties thereby substantially increasing the cost of property acquisition for the RPRP. Several of these property takes would occur along the constrained portions of the existing railroad ROW in downtown Redlands and would require impact or demolition to structures listed in the National Register of Historic Places (NRHP). Additionally, the installation of a 20-foot catenary system would increase the potential to adversely affect integrity of historic properties/resources outside the 60-foot ROW. Further, the requirement for an additional 60-foot ROW would result in substantially greater impacts to the biological resources and Waters of the U. S. both at the Santa Ana River crossing (Bridge 3.4) and along the Mission Zanja Channel.

These factors led SANBAG to reject this mode as a potential alternative for consideration and environmental analysis in the EIS/EIR.

2.5.1.2 Battery Powered Locomotives

Several new technology developments are yielding alternatives to providing energy to a streetcar/light rail via overhead wires. These include inductive energy transfer, on-board fuels such as hydrogen, hydrogen fuel cells, diesel-electric hybrids, and combined battery and capacitor systems. Each of these technologies has been initiated by individual manufacturers, and as such, each technology is considered "proprietary", in that the respective design features of that technology are protected by patent, and are available only from that manufacturer. SANBAG considered each of the technologies for the RPRP.

Based on SANBAG's review of these various technologies, the battery/capacitor powered LRT technology remains in the developmental stages and is several years out from being ready to service a rail system similar to the RPRP. The maximum possible distance to travel without requiring DC power is usually in the range of 1 to 1.5 miles for most manufacturers. Additionally, battery operated vehicles come with considerable limitations such as reduced travel speed. Further, there would be a limited order (amount) of vehicles that would be required to service the RPRP. The relatively small number of vehicle sets required to serve RPRP would potentially deter manufacturers from developing or providing battery operated light rail vehicles as it would not be cost beneficial to them.

Based on these considerations, the battery powered/hybrid propulsion locomotive alternative was not carried forward as a potential alternative for consideration and environmental analysis in this EIS/EIR due to a lack of commercially ready vehicles for procurement in time for the desired opening day of this Project.

2.5.1.3 Bus Rapid Transit

SANBAG initially considered the use of bus rapid transit (BRT) between the City of San Bernardino and the City of Redlands; however, BRT is not freight compatible and a portion of the existing alignment currently provides for rail freight operations precluding the ability to place the BRT system within the railroad ROW. Maintaining freight service along this section of the alignment is mandatory. If freight service is discontinued, removal of freight operations would require abandonment of the railroad and supporting ruling by the STB, financial compensation to BNSF who enjoys an exclusive freight easement along the RPRP corridor, and payment to each of the shippers along the line (existing shippers and others who might claim to have intentions of shipping). If freight service is maintained in conjunction with new BRT service, property takes would be extensive because of the physical separation required for freight railroad operations and a new BRT system; and the keen economic advantage of using the existing railroad ROW is not realized with the BRT mode alternative. A ROW of 90 feet (at minimum) would be required to serve both modes; and as mentioned previously, the narrow width of the existing railroad ROW (40 to 50 feet) limits the ability to accommodate an additional non-freight compatible mode of transit (e.g., BRT, LRT) within the existing railroad ROW.

Along the alignment, implementation of a BRT system would result in greater restrictions for existing vehicle movements at each of the at grade crossing intersections when compared to passenger rail service and presumably greater impacts to roadway/intersections operating conditions along the entire corridor. Traffic signals, not crossing gates are used to protect the road crossings for BRT systems; thus, buses would have to slow at each intersection thereby contributing to a substantially longer travel time than any of the rail modes considered. Even if the two cities approve bus priority traffic signal operations, it is anticipated the operation would

not be a full and true priority, but more likely a coordinated signal. The buses would likely have some amount of delay at many of the crossings to allow for signal phase changes, etc. Assuming a minimum 30-second delay to allow for signal phase changes at each of the at-grade crossings; this would result in an additional 13 minutes to the trip time from end to end on the system. The trip time for the Preferred Project is only 24 minutes, and considering the additional 30-second delay, a 50 percent increase to the total trip time would be realized. Furthermore, many of these crossings are less than 100 feet from major intersections complicating traffic signal design and operations for implementation of BRT service. Additionally, safety concerns associated with at-grade BRT crossings include the fact that motorists, bicyclists, and pedestrians do not expect infrequent bus travel along the narrow railroad ROW and the intersections are not as visible. Thus, accident potential increases due to the difference of vehicle sizes.

Lastly, in order to maximize the potential for reduced vehicle miles traveled (VMT) and associated air quality benefits, SANBAG is proposing overlapping passenger service via Metrolink trains from downtown Redlands to LA, and BRT would not allow for overlapping extension of express passenger service via Metrolink because Metrolink trains would be unable to operate on a BRT line. Based on these considerations, SANBAG did not carry BRT forward as a potential alternative for consideration and environmental analysis in the EIS/EIR.

2.5.2 New Rail Alignment Alternatives

SANBAG did not consider the acquisition of additional railroad ROW due to its pre-existing ownership of the Redlands Branchline. The acquisition of a new ROW required to secure a new rail alignment would result in substantial displacements of existing residential and commercial uses within the cities of Redlands and San Bernardino, thereby increasing land use and community/neighborhood impacts resulting from the Project. A new railroad ROW would no longer take advantage of the existing rail corridor thereby resulting in additional direct impacts to existing drainage crossings, including the Santa Ana River, and associated environmental impacts to biological resources and fisheries. A new ROW could also result in an additional encroachment into the Santa Ana River, which is a designated floodway, and corresponding indirect impacts to the adjacent floodplain. Additionally, the construction of a new ROW could contribute to greater cumulative impacts to local and regional traffic circulation compared to the Preferred Project.

Beyond the operational and physical impacts, a new ROW and additional property acquisition would add substantially to the cost of this alternative. Based on the added ROW requirements, the additional cost would render this alternative cost-prohibitive. Further, the completion of the property acquisition process for securing the necessary ROW would not guarantee SANBAG a secured ROW within the timeframe required for approval of the RPRP.

Based on these circumstances, a New Rail Alignment Alternative would be less certain when compared to use of SANBAG's existing ROW as proposed under the Preferred Project. For these collective reasons, alternative new rail alignment was not carried forward as a potential alternative for consideration and environmental analysis in this EIS/EIR.

2.6 COST AND FINANCING INFORMATION

SANBAG envisions a pay-as-you-go funding scenario for the RPRP with initial capital construction costs estimated at approximately $202 million in (2012) year dollars. This capital cost estimate would generally apply to the Preferred Project, Reduced Project Footprint, Alternative, and Design Option 1 – Train Layover Facility (Waterman Avenue). The capital cost for Design Option 2 – Use of Existing Train Layover Facilities would be slightly less at $197 million by eliminating the need for a new train layover facility. The capital cost for the No Build Alternative is estimated at $30 million to fund needed track and bridge upgrades. The Project would be funded by a variety of federal, state, and local funds available to SANBAG. These funding sources are listed below with the federal funding share estimated at just under $72 million and the remaining funds comprised of state and local funding sources.

- Federal Transit Administration: State of Good Repair Rail
- Federal Transit Administration: Urbanized Area Formula Grant
- Federal Congestion Mitigation and Air Quality
- State Transit Assistance Fund – Population
- Measure I Senior & Disabled Transit Service: (8% of Valley subarea revenue)
- Measure I Metrolink/Rail Service – For Rail Projects (8% of Valley subarea revenue)
- Public Transportation, Modernization, Improvement, and Service Enhancement Account Program
- Prop 1B Security – Transit System Safety, Security, and Disaster Response Account

The initial operation and maintenance (O&M) costs developed for the RPRP are approximately $7.9 million (2010 year dollars), and based on expenses associated with one year of operations at the anticipated level of service. Operations would be funded through Measure I Metrolink/Rail Service.

Transit Funding

The SANBAG Board of Directors adopted a Valley Transit and Rail Conceptual Funding Strategy in May 2013 that identifies funding through 2020 for planned transit services based on current revenue projections. The Funding Strategy includes a combination of federal, state, and local funding sources that total just under $1.5 billion for 2013 through 2020. SANBAG currently plans to allocate a total of $552.4 million to Omnitrans bus operations between Fiscal Year 2014 and 2020 (see Table 2-8). Omnitrans projects an additional $129.1 million for capital projects over that time with total revenues estimated at $681.5 million (see Table 2-9). Based on a Comprehensive Operational Analysis (COA) recently completed for Omnitrans, which was adopted by the SANBAG Board of Directors on November 6, 2013 and the Omnitrans Board of Directors on December 4, 2013, there is a projected annual operating deficit of approximately $0.5 million in 2015 which increases to $3 million in 2020 (see Table 2-8). This shortfall is attributed to operating expenses growing at a faster rate than projected revenue.

The Omnitrans Board of Directors addressed this funding gap by reorganizing the management structure, changing the insurance and liability management policy, and implementing fare increases earlier than previously planned. These decisions were memorialized by the Omnitrans Board of Directors via the Fiscal Year 2015 Budget and Fiscal Year 2015-2020 Short Range

Transit Plan, approved in May and June 2014, respectively. In addition, if actual revenues come in higher than what has been projected, these additional funds could be allocated to Omnitrans to help further offset the operational shortfall. The Omnitrans COA also projected an average annual surplus of capital dollars of $1.5 million for a total projected surplus of capital dollars between 2014 and 2020 of $10.5 million (Table 2-9). Omnitrans plans to continue to maximize the use of Section 5307 capital funds by annually allocating $10.9 million for preventative maintenance or state of good repair on capital assets, which helps to offset operational costs (see Table 2-8).

Table 2-8. Omnitrans COA Revenue / Operating Expense Projections

Operating Projections (in millions)								
	Fiscal Year							
Operating Revenue Sources	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
LTF	$36.35	$37.44	$38.56	$39.72	$40.91	$42.14	$43.40	$278.53
Measure I – BRT	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Measure I –S&D	$5.10	$5.30	$5.60	$5.80	$6.10	$6.40	$6.70	$41.00
STA – Operator	$1.10	$0.90	$0.91	$0.90	$0.90	$0.90	$0.90	$6.51
STA – Population[1]	$2.98	$3.10	$3.10	$3.10	$3.10	$3.10	$3.10	$21.58
FTA Section 5307	$10.90	$10.90	$10.90	$10.90	$10.90	$10.90	$10.90	$76.30
Other	$0.39	$0.70	$0.70	$0.70	$0.70	$0.70	$0.70	$4.59
Fares	$14.76	$17.20	$17.40	$17.70	$18.70	$18.90	$19.20	$123.86
Total Operating Revenue	**$71.58**	**$75.54**	**$77.17**	**$78.82**	**$81.31**	**$83.04**	**$84.91**	**$552.37**
Omnitrans Costs[2]	**$71.58**	**$76.00**	**$79.30**	**$81.10**	**$83.70**	**$85.60**	**$87.90**	**$556.18**
Operating Deficit	**$0.00**	**-$0.46**	**-$2.13**	**-$2.28**	**-$2.39**	**-$2.56**	**-$2.99**	**-$12.81**

Source: AECOM, 2013

1. Use of STA – Population funds for operations requires compliance with efficiency standards defined in CPUC Section 99314.6.
2. Starting in Fiscal Year 2015, $1 million is deducted from fixed route operating costs to reflect reduced service on Route 2, which shadows the sbX route.

The largest source of flexible funding available for operating expenses in the San Bernardino Valley is Local Transportation Funds (LTF). Historically, LTF has been used to fund both capital and operating expenses. As a result of the COA, SANBAG determined that LTF should be reserved for funding operations; and a sustainable rate of allocation should be adhered to in an effort to maintain current levels of transit service throughout the Valley. The Valley Transit and Rail Conceptual Funding Strategy included approximately 78-80% of the annual Valley LTF allocations being made to Omnitrans and 22-20% to Metrolink for their annual operating subsidy. In order to have a sustainable rate of LTF expenditures, and to plan for fiscal years when LTF revenues decline, SANBAG plans to maintain the LTF allocation to Omnitrans at a 3% annual growth rate and the combined LTF and State Transit Assistance Fund – Operator allocation to Metrolink at 3% annual growth rate. The SANBAG Board of Directors approved these growth rates for Omnitrans and Metrolink for Fiscal Year 2015 at their June 2014 meeting as part of the Fiscal Year 2015 SANBAG Budget.

Table 2-9. Omnitrans COA Revenue / Capital Expense Projections

Capital Projections (in millions)								
	Fiscal Year							
Capital Revenue Sources	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
FTA Section 5307	$6.04	$6.04	$6.04	$6.04	$6.04	$6.04	$6.04	$42.28
FTA Section 5310	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
FTA Section 5339	$3.53	$1.76	$1.76	$1.76	$1.76	$1.76	$1.76	$14.09
CMAQ	$5.20	$5.15	$5.18	$6.66	$5.56	$5.47	$7.62	$40.84
STA - Population	$0.17	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.17
Prop. 1B - PTMISEA	$7.90	$4.05	$4.22	$2.94	$4.34	$4.67	$2.72	$30.84
Prop. 1B – TS	$0.13	$0.13	$0.13	$0.13	$0.13	$0.13	$0.13	$0.91
Measure I - BRT	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Capital Revenue	**$22.97**	**$17.13**	**$17.33**	**$17.53**	**$17.83**	**$18.07**	**$18.27**	**$129.13**
Omnitrans Costs	**$20.34**	**$15.73**	**$15.93**	**$16.13**	**$16.43**	**$16.93**	**$17.13**	**$118.62**
Capital Surplus	**$2.63**	**$1.40**	**$1.40**	**$1.40**	**$1.40**	**$1.14**	**$1.14**	**$10.51**

Source: AECOM, 2013

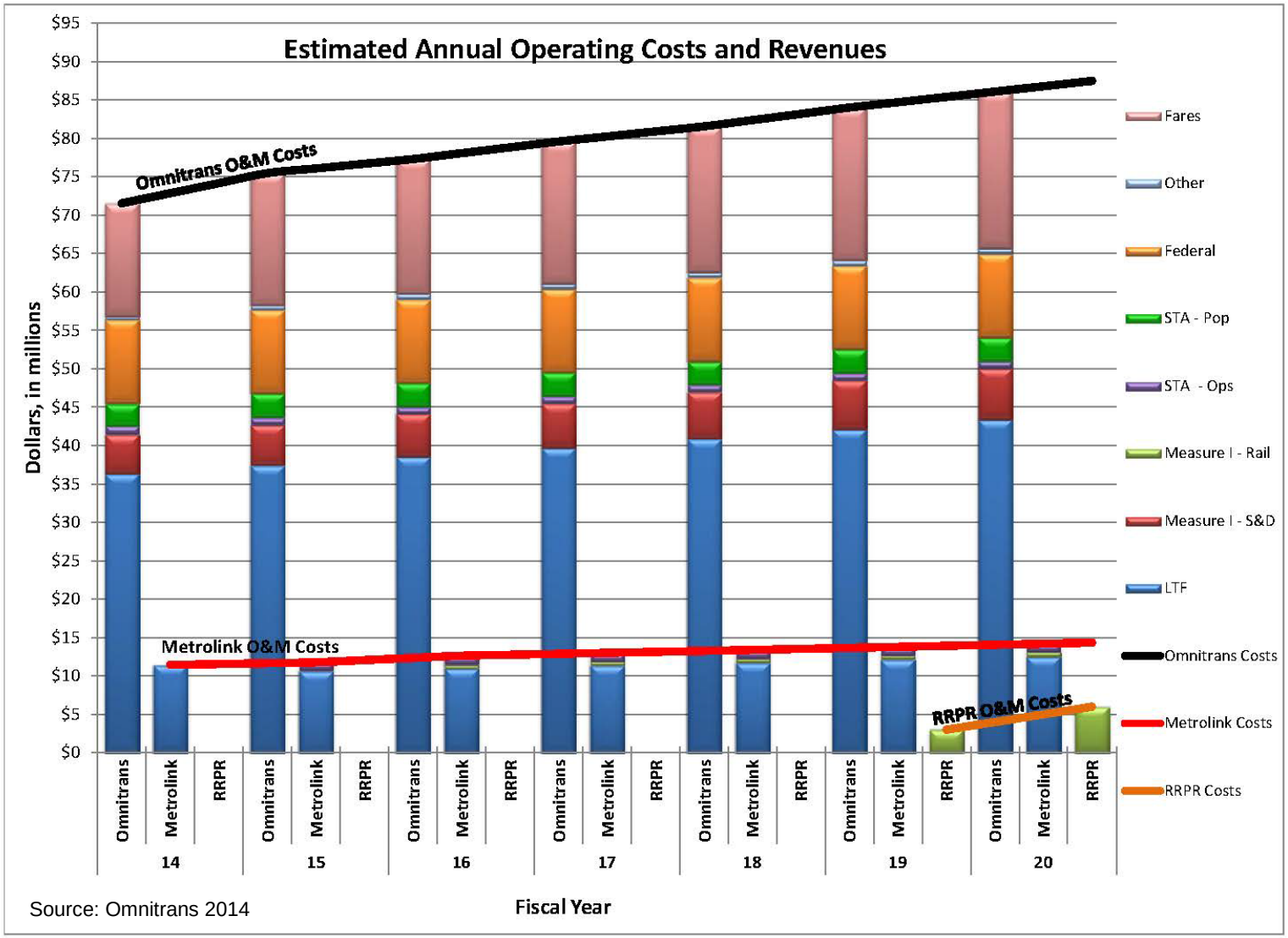
Funding to operate RPRP will come from Measure I Metrolink/Passenger Rail Program funds; a portion of the local sale tax measure specifically designated for rail use, which cannot be transferred to Omnitrans to offset operational expenses. Figure 2-10 depicts the type and estimated amount of operating revenues versus the projected operating costs for Omnitrans, Metrolink, and RPRP for Fiscal Year 2014 through 2020.

Capital funding for the construction and implementation of RPRP comes from a number of sources, which do not affect Omnitrans due to its capital dollar surplus. Since Omnitrans has a surplus of capital dollars and the sources of funding proposed to cover RPRP operating expenses are not available statutorily for Omnitrans' use, sufficient funding is currently allocated for the planned implementation and operation of RPRP.

2.7 ANTICIPATED AGENCY APPROVALS AND PERMITS

The State CEQA Guidelines require that an EIR identify the regulatory approvals that are anticipated for a project. This includes a list of responsible agencies other than the lead agency, which have discretionary approval authority over the project. The Build Alternatives and Design Options would require the involvement of multiple governmental entities at the local, state, and federal levels as part of the project delivery process. A summary of the anticipated agency approvals, both discretionary and ministerial, are identified in Table 2-10.

Figure 2-10. Estimated Annual Operating Revenues and Costs (Revised)



Source: Omnitrans 2014

Table 2-10. Anticipated Agency Approvals and Permits

Agency	Approval/Permit	Jurisdiction/Purpose
Federal Agencies		
U.S. Department of Defense, Army Corps of Engineers (USACE)	Section 404 of the Clean Water Act Permit (Stream Crossings) and track improvements	The USACE is responsible for approving permits under Section 404 of the Clean Water Act (CWA) for discharges of dredge or fill material into waters of the U.S. or jurisdictional wetlands.
U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation (Endangered Species Act)	The USFWS is responsible for administering the federal ESA. In this capacity, USFWS supports other federal agencies (e.g., FTA, USACE) through ESA consultation, preparation of a biological opinion, and issuance of incidental-take authorization for the take of federally listed endangered and threatened species. For the Project, both FTA and USACE are required to consult with the USFWS pursuant to Section 7 of the federal ESA.
U.S. Environmental Protection Agency (USEPA)	None	The USEPA is responsible for reviewing the EIS, filing, and noticing of the Project. USEPA is also responsible for providing concurrence with Section 404 CWA permits issued by USACE.
Federal Railroad Administration	Waiver	The selection of a Non-FRA Compliant DMU would require a waiver for certain sections of 49 CFR Part 21.
State Agencies		
State Historic Preservation Officer (SHPO)	State Level Review of Section 106 Compliance	The SHPO is responsible for the operation and management of the California State Office of Historic Preservation, as well as long-range preservation planning. Both FTA and USACE are required to consult with SHPO to support their compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires a review of a project's impacts that will affect register eligible cultural and historical resources.
California Department of Transportation (Caltrans)	Encroachment Permit (Crossing of State Highways)	The Study Area is within Caltrans District 8, an area that covers Riverside and San Bernardino Counties in Southern California. Encroachments across the I-10 ROW are expected to require an encroachment permit from Caltrans.

Table 2-10. Anticipated Agency Approvals and Permits

Agency	Approval/Permit	Jurisdiction/Purpose
California Public Utilities Commission (CPUC)	Grade crossing approvals	The CPUC regulates privately-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. All proposed at-grade crossings and associated safety improvements will require the approval of the CPUC.
Regional Water Quality Control Board, Santa Ana Region (RWQCB)	National Pollution Discharge Elimination System (NPDES) Permit Stormwater Discharge Permit CWA 401 Water Quality Certification	The State Water Resources Control Board (SWRCB) through the RWQCB, Santa Ana Region, would require SANBAG's construction contractor to file a notice of intent to comply with the National Pollution Discharge Elimination System (NPDES), general stormwater permit for construction activities and, if applicable, the NPDES general stormwater permit for industrial activity. The Project will be covered according to its Standard Industrial Classification (SIC), Railway Maintenance and Operations (SIC 4113). Additionally, the RWQCB retains approval authority over the issuance of a water quality certification, which is required under Section 401 of the CWA.
California Department of Fish and Wildlife (CDFW)	Compliance with CA Endangered Species Act Section 1600, Streambed Alteration Agreement	The CDFW has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations. CDFW is responsible for consultation with lead and responsible agencies to provide the requisite biological expertise to review and comment on environmental documents, including impacts arising from project activities to species listed as endangered or threatened under the California Endangered Species Act. CDFW would have approval authority of potential streambed alteration agreements, pursuant to Sections 1600 of the Fish and Game Code, for bridge replacements at the Santa Ana River along with other potential impacts to Waters of the State along the Study Area.
Local Agencies		
San Bernardino Associated Governments (SANBAG)	Certification of the EIR	SANBAG is the CEQA lead agency for the Project. In conjunction with the project's approval, SANBAG will be required to certify the EIR, adopt any associated findings and overriding considerations, and adopt a MMRP.

Table 2-10. Anticipated Agency Approvals and Permits

Agency	Approval/Permit	Jurisdiction/Purpose
South Coast Air Quality Management District (SCAQMD)	Transportation Conformity Determination	SCAQMD is part of the Transportation Conformity Work Group and is responsible for evaluating and determining whether the transportation project is defined as a project of air quality concern (POAQC).
City of San Bernardino	Encroachment Permits Parcel Map, if applicable General Plan Amendment for Roadway Closures	The Study Area extends through the southeastern part of the City. The City has primary land use authority within the San Bernardino city limits. The exception to this occurs within existing BNSF railroad ROW, now under SANBAG ownership, which is under the jurisdiction of the Surface Transportation Board (STB). The City's approval will be required for encroachments into the City's roadway ROW. Roadway closures proposed in conjunction with the Project may also require an amendment to the circulation element of the City's General Plan.
City of Redlands	Encroachment Permit Parcel Map, if applicable General Plan Amendment for Roadway Closures, if applicable	The Study Area extends through western portions of the City of Redlands. The City has primary land use authority within the city limits, with the exception of existing BNSF railroad ROW, now under SANBAG ownership, under the jurisdiction of the STB. The City's approval will be required for encroachment into the City's roadway ROW. Roadway closures proposed in conjunction with the Project may also require an amendment to the circulation element of the City's General Plan.
San Bernardino County Flood Control District (SBCFCD)	Flood Control Permit(s)	The SBCFCD requires a Flood Control Permit for work within flood control easements that are owned and maintained by the County. The RPRP is expected to require a Flood Control Permit for corresponding drainage improvements that would occur within or adjacent to lands within the SBCFCD's jurisdiction.
City of Riverside	Encroachment Permit	The City of Riverside owns and operates the Gage Canal, which crosses the Study Area just east of the SAR crossing. The redesign for the Gage Canal would need to be coordinated with and approved by the City of Riverside.

Source: HDR Engineering, Inc. 2013