



Biological Assessment
REDLANDS PASSENGER RAIL PROJECT
Redlands, San Bernardino County,
California



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1.0 INTRODUCTION

This Biological Assessment (BA) has been prepared for the Redlands Passenger Rail Project (RPRP or proposed action), located in San Bernardino County, CA. In accordance with the requirements of 50 CFR Section 402(12), the purpose of this BA is to evaluate the potential effects of constructing the proposed action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the proposed action.

1.1 REGULATORY SETTING

Federal Endangered Species Act

The federal ESA defines and lists *species* as “endangered” or “threatened” and provides regulatory protection for the listed species. The federal ESA provides a program for conservation and recovery of threatened and endangered species. It also ensures the conservation of designated critical habitat that the USFWS has determined is required for the survival and recovery of these listed species. Section 9 of the federal ESA prohibits the “Take” of species listed by USFWS as threatened or endangered. *Take* is defined as: “...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct.” In recognition that *Take* cannot always be avoided, Section 10(a) of the federal ESA includes provisions for *Take* that is incidental to, but not the purpose of, otherwise lawful activities. Section 10(a)(1)(B) permits (incidental take permits) may be issued if *Take* is incidental and does not jeopardize the survival and recovery of the species.

Section 7(a)(2) of the federal ESA requires that all federal agencies, including the USFWS, evaluate projects with respect to any species proposed for listing or already listed as endangered or threatened and any proposed or designated critical habitat for the species. Federal agencies must undertake programs for the conservation of endangered and threatened species and are prohibited from authorizing, funding, or carrying out any action that will jeopardize a listed species or destroy or modify its critical habitat.

As defined in the federal ESA, individuals, organizations, states, local governments, and other nonfederal entities are affected by the designation of critical habitat only if their actions occur on federal lands; require a federal permit, license, or other authorization; or involve federal funding (USFWS 2011).

The proposed action does not occur within an approved Habitat Conservation Plan (HCP). Therefore, potential impacts to threatened or endangered species, as considered by the USFWS, are not covered under an existing HCP. Consequently, should any listed species be detected during the associated focused species surveys, incidental take permits would need to be obtained.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code Section 4321-4347) is a Federal statute requiring the identification and analysis of potential environmental effects associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decision makers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. The process for implementing NEPA is outlined in Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*.

The Federal Transit Administrative (FTA), Region 9, is the federal lead agency under NEPA for the proposed action. As a federal agency, FTA must meet NEPA requirements whenever it is the FTA’s decision that would result in an impact on the human environment, even if the impact would be beneficial and regardless of who proposes the action or where it would take place (40 CFR 1508.18). FTA is requiring the preparation of an Environmental Impact Statement (EIS) for the proposed action to fulfill the requirements of NEPA, and consultation with USFWS is being performed as part of the EIS process.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 Code of Federal Regulations (C.F.R.) Part 10, including feathers, or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21).

Section 404 Permit (Clean Water Act)

The Clean Water Act establishes a program to regulate the discharge of dredge and fill material into waters of the U.S. including wetlands. Activities regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. Either an individual 404(b) permit or authorization to use an existing USACE Nationwide Permit will need to be obtained if any portion of construction requires fill into a river, stream, or stream bed that has been determined to be a jurisdictional waterway. When applying for a permit, a company or organization must show that they would avoid wetlands when practicable, minimize wetland impacts, and provide compensation for any unavoidable destruction of wetlands (CWIS 2007). Section 404 also requires that USACE consult with USFWS under Section 7 of the ESA prior to issuing a permit approval. For the proposed action, USACE has provided concurrence that FTA lead the Section 7 consultation process with USFWS due to its federal lead agency responsibility under NEPA.

Section 401 Water Quality Certification (Clean Water Act)

The Clean Water Act protects water quality by regulating the dumping or flow of pollutants into streams, lakes, and rivers. A water quality certification, obtainable in California through the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCB), must be obtained in order to receive a 404 permit or be authorized under the 404 nationwide permits (USEPA 2011).

1.2 CONSULTATION HISTORY

On May 1, 2013, FTA sent a letter to USFWS requesting initiation of formal Section 7 consultation to address impacts from the proposed action under the ESA. The USFWS received the draft biological technical report on May 28, 2013. A site visit at the proposed action location was conducted on July 15, 2013 and was attended by staff from USFWS, the California Department of Fish and Wildlife (CDFW), and project representatives from HDR and the San Bernardino Associated Governments (SANBAG). During the field visit, HDR and SANBAG provided an overview of the proposed action, walked sensitive habitats with USFWS and CDFW, and discussed additional information necessary for the USFWS to initiate formal Section 7 consultation. On August 9, 2013, USFWS submitted a letter to FTA outlining additional information required to complete the Section 7 initiation package, including the following:

- A Final Biological Technical Report (BTR), which was sent to USFWS on July 24, 2013;
- Concurrence from the U. S. Army Corps of Engineers (USACE) that FTA will act as the lead Federal agency for the Section 7 Consultation. This concurrence was provided to FTA in an email from USACE on August 21, 2013;
- A Biological Assessment (BA);
- A discussion of hydrological effects within Santa Ana River during construction and post-construction, which is included in this BA;
- Avoidance/Minimization Measures for Santa Ana River woolly star, which are included in this BA; and
- A Habitat Management Plan (HMP), which is included in Section 4 of this BA.

This BA is intended to satisfy the additional information requested by USFWS in its August 9, 2013 letter.

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 PROPOSED ACTION

2.1.1 LOCATION OF PROPOSED ACTION

The proposed action extends from the City of San Bernardino east to the City of Redlands within southwestern San Bernardino County, California (Appendix C, Figure 1). The proposed action limits include the existing track and right-of-way along with adjacent areas beginning at E Street in San Bernardino and extending east to the University of Redlands, just east of University Avenue (Appendix C, Figures 2a and 2b). The Action area starts just west of Mile Post (MP) 1, east of E Street within the City of San Bernardino and ends at MP 10.1 at the University of Redlands (Appendix C, Figure 3). The western endpoint of the Action area roughly corresponds with 472625.405003 meters (m) East and 3773265.404 m North (WGS 84 UTM 11N). The eastern end of the Action area corresponds with 485190.263559 m East and 3768624.11534 m North (WGS 84 UTM 11N).

Five major water crossings occur within the Action area. The western-most water crossing occurs at Warm Creek (Historic) at approximately MP 1.1. Further east, the railroad corridor crosses Twin Creek at approximately MP 2.2. At MP 3.4, the railroad corridor crosses the Santa Ana River. East of the Santa Ana River, the Action area parallels the Mission Zanja Flood Control Channel for approximately 2.6 miles (MP 3.4 to MP 6.0). At MP 5.78, the Bryn Mawr Avenue crosses the Mission Zanja Flood Control Channel and intersections with the railroad corridor. Further east, the railroad corridor crosses the Mill Creek Zanja at MP 9.4.

2.1.2 DESCRIPTION OF PROPOSED ACTION

The Redlands Passenger Rail Project (RPRP or proposed action) would involve the implementation of rail improvements along the Redlands Corridor to facilitate commuter rail service between the City of San Bernardino and the University of Redlands in the City of Redlands. Appendix C, Figure 3 depicts the location of the proposed action.

Construction of the proposed action would occur within an existing railroad right-of-way (ROW) owned by the San Bernardino Associated Governments (SANBAG). SANBAG's ROW averages 50 to 100 feet in width with the exception of portions of downtown Redlands where the ROW measures less than 40 feet. Additional details regarding each of the components comprising the proposed action and associated operations are described under the following subheadings.

Track Improvements

The proposed action would include 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)(Appendix C, Figures 3E and 3F). The proposed track ballast and sub-grade along the 9-mile corridor would be constructed to 50 feet in width, sufficient to support a parallel maintenance road. In downtown Redlands, this width would be reduced to less than 40 feet in recognition of the constrained ROW. This would require demolition and replacement of the existing track. The rail improvements would also include the construction of a new train signaling and communications system.

Structural Crossings and Bridges

The proposed action would require the replacement or retrofitting of up to six structural crossings to facilitate the loading requirements of the passenger trains and track foundation. These structural crossings consist of existing bridge structures located at Warm Creek (Historic) at MP 1.1; Twin Creek at MP 2.2; the Santa Ana River (SAR) at MP 3.4; the Gage Canal at MP 3.8; Bryn Mawr Avenue at MP 5.78; and Mill Zanja Creek at MP 9.4. Figures 3A, 3B, 3D, 3F, and 3J illustrate the extent of these improvements.

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. New structural supports would be constructed behind a temporary cofferdam constructed of sheet piling or similar method, such as the use of cast-in-steel-shell (CISS) piles. The structural foundation would consist of a reinforced concrete supported by piling, with conventional reinforced concrete piers extending up to the bridge decks.

Roadway Grade Crossings and Signaling

The Action area traverses 32 existing roadway grade crossings including two I-10 underpasses. Roadways grade crossing not subject to closure would be re-designed in accordance with the latest *Grade Crossing Design* guidelines that require in certain cases raised medians, widened sidewalks, traffic striping, flashing lights, pedestrian gate arms where requested by the California Public Utilities Commission (CPUC), and swing gates.

Proposed Rail Platforms

There are currently five (5) station stops proposed for the proposed action with new rail platforms 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. Figures 3A, 3C, 3D, 3H, 3I, and 3J illustrate the location for each of the proposed stations. The E Street Rail Platform would be constructed in conjunction with the already approved Downtown San Bernardino Passenger Rail Project (DSBPRP) and, therefore, only track improvements would be required west of E Street to align the tracks with the planned rail platforms.

Rail platforms would in most instances be less than 200 feet long¹. Pedestrian crossovers would be provided for each platform with accessible parking provided adjacent to pedestrian crossovers.

Train Layover Facility

The proposed action would require the development of a new Train Layover Facility to include sufficient storage tracks for maintenance activities and operational activities including offices, training rooms, and a crew break room. The Train Layover Facility would be constructed on a long narrow site immediately south of I-10 and west of California Street and would contain up to seven spur tracks (Appendix C, Figure 3F).

Utility Replacement and Relocation

The proposed action would likely necessitate the relocation of existing subsurface and overhead crossing utilities (i.e., water, sewer, storm drain, power, gas, fiber optic, and telephone lines) in accordance with applicable utility accommodation design criteria and engineering standards. The exact method of improvement, if required, would be determined in coordination with the affected utility provider in conjunction with the proposed action's final design.

Drainage

Several drainage facility improvements would be necessary to accommodate the proposed action. 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. However, it is likely that the majority of the storm drain casings within the rail ROW would need to be extended to span the entire width of the rail ROW. These improvements would be coordinated with the cities of San Bernardino and Redlands along with San Bernardino County Flood Control District (SBCFCD). In addition, longitudinal storm drain lines

¹ A minimum of 170 feet is required to accommodate two 85-foot Bombardier passenger coaches.

located within the rail corridor would need to be relocated further from the proposed track centerlines to comply with BNSF engineering standards.

Mission Zanja Channel Improvements. Mission Zanja Flood Control 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 Action Area to the south (Appendix C, Figures 3D through 3F). 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 overcrossing.

Mission Zanja Channel is characterized as an improved, trapezoidal earthen channel with some segments including wire revetment (USACE, 1994). To ensure the structural integrity of the track improvements along sections of Mission Zanja Channel, the proposed action may include bank stabilization improvements (e.g., armoring, slope keying, etc.) to sections of the northern bank of the Mission Zanja Channel, from MP 3.5 to just east of MP 6, to ensure that the bank is able to support the additional loading requirements and withstand scour during high flow events. At this time, SANBAG is considering the use of an articulated concrete block (ACB) to support the armoring of the northern bank, which would allow for the growth of limited vegetation. This improvement would be coordinated and constructed with the SBCFCD, which maintains the Mission Zanja Channel.

Maintenance

Maintenance of the railroad ROW is currently the responsibility of BNSF, which is the current operator of the rail line. This includes routine maintenance of the track and track ties, grade crossings, and communication system. Vegetation management and weed abatement would also be required along the ROW. Each platform would also require routine landscaping and facility maintenance (e.g., replacement of lighting fixtures). Typical railroad maintenance and inspections would be conducted by a contractor hired by SANBAG throughout the operational phase of the proposed action in accordance with SCRRRA/Metrolink and BNSF standard practices.

Construction

Construction of the proposed action would 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 Cook Street. Construction scheduling and phasing would ultimately be at the discretion of SANBAG's contractor. A description of anticipated construction activities over the course of the proposed action is provided as follows:

- Construction easement acquisition, 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 for the proposed rail corridor, as necessary;
- Re-grade, install drainage, and construct bridge crossings, including as appropriate, new, standard height parapets on both sides of each bridge, construct in-fill walls, plug deck drains, construct new spread footings at each pile, and seal parapet joints;
- Construct new rail platforms at proposed rail platform locations and layover facility; and,
- Construct new continuous welded rail track, roadway grade crossings, and install pedestrian access improvements and landscaping, where appropriate.

These activities would likely overlap at times. Staging areas for construction equipment and materials would be located primarily within the SANBAG ROW to the extent feasible. In addition, a part of the proposed layover facility would be used as a centralized construction staging area for heavy equipment

due to its centralized location along the rail corridor. The total construction area for the proposed action is estimated at 137.3 acres.

2.1.3 PURPOSE AND NEED

The overall purpose of the proposed action is to provide a cost-effective, alternative travel option for communities located along the Redlands Corridor in a way that maintains freight service and improves transit mobility, travel times, and corridor safety while minimizing adverse environmental impacts. The proposed action would provide travelers and commuters with a new mobility option within a dedicated ROW that would be capable of achieving shorter travel times than automobiles while facilitating the continuation of existing freight service along the rail corridor consistent with SANBAG's purchase agreement with the BNSF Railroad. Through implementation of the proposed action, SANBAG would provide new passenger rail service to the communities of Redlands, Loma Linda, and San Bernardino.

The proposed action would assist SANBAG and the State of California in meeting the air pollution and greenhouse gas emission reduction targets as mandated under Assembly Bill (AB) 32, known as the Global Warming Solutions Act of 2006, and, Senate Bill (SB) 375, known as the California's Sustainable Communities and Climate Protection Act of 2008. These two laws establish the basis for both SCAG and SANBAG to accommodate regional growth through increased access to alternative modes of transit for local communities. The proposed action would further the objectives of these two statutes by expanding local transit opportunities.

2.2 AVOIDANCE AND MINIMIZATION MEASURES

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 project's Storm Water Pollution Prevention Plan (SWPPP) would identify Best Management Practices (BMPs) to address potential short-term impacts and post-construction (long-term) measures to be implemented for the proposed action. Stormwater pollution prevention BMPs included as a part of the SWPPP would be implemented in accordance with the California Stormwater Construction Handbook (latest edition) and the Construction General Permit Order No. 2009-0009-DWQ.

To minimize construction activity in the channel and maintain a passage for wildlife and storm flows, structural bridge improvements would be constructed in two or more phases. A similar approach would be employed for the removal of any existing structures. To minimize the sedimentation, in-channel construction activities would be limited to the period between April 15 and October 15 to the extent feasible. 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.

2.3 EXISTING CONDITIONS

2.3.1 DEFINITIONS

The following definitions are used to describe the location of the various survey activities conducted during on-site fieldwork:

- **Project footprint** is defined as the limits of impacts associated with full build-out of the proposed action. The Project footprint is synonymous with the proposed action's construction footprint (or direct impacts), which is estimated at 137.3 acres.
- **Action area** is defined as the area within 200 feet on either side of the centerline of the existing rail corridor that was mapped and evaluated for potential direct and indirect impacts to biological resources. In several instances, additional areas were added to the Action area to include entire

properties given uncertainties related to the actual placement of physical improvements. The Action area for the proposed action is approximately 534 acres.

2.3.2 SOILS AND TOPOGRAPHY

Soils within the survey boundary were mapped using the Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2008). The proposed action crosses eight different soil types (see Appendix C, Figure 4, Soils), including:

- **Grangeville Fine Sandy Loam (Gr)** – This nearly level soil occurs on alluvial fans and alluvial plains and is used for pasture, truck crops, tomatoes, and flowers. It is a poorly drained, very deep fine sandy loam derived from granitic alluvium. The available water holding capacity is 6 to 8.5 inches. Runoff is very slow, and the erosion hazard is slight. The elevation ranges from 50 to 200 feet.
- **Tujunga Gravelly Loamy Sand (TvC), 0-9 percent slopes** – This soil occurs on alluvial fans and flood plains and is used mainly for grazing. Tujunga series consists of very deep, somewhat excessively drained soils formed in alluvium weathered mostly from granitic sources. The soils formed in sandy alluvium derived mostly from granitic sources. Runoff is very low or negligible and permeability is rapid. The elevation ranges from 5 to 4,300 feet.
- **Hanford Coarse Sandy Loam (HaC), 2-9 percent slopes** – This soil occurs on stream bottoms, floodplains and alluvial fans and is used for growing a wide range of fruits, vegetables, and general farm crops. Hanford series consists of very deep, well drained soils that formed in moderately coarse textured alluvium dominantly from granite. Runoff is well drained or low and permeability is moderately rapid. The elevation ranges from 150 to 3,500 feet.
- **Psammets and Fluvents, Frequently Flooded (Ps)** – Psamment soils are sandy in all layers and are among the most productive rangeland soils. Psammets are used mostly as rangeland, pasture, or wildlife habitat. Fluvents are more the more or less freely drained entisols that have formed in recent water-deposited sediments on flood plains, fans, and deltas along rivers and small streams. Fluvents are used as rangeland, forest, pasture, or wildlife habitat and sometimes used as cropland. Most fluvents are frequently flooded with normal stratification of materials unless they are protected by dams or levees.
- **Tujunga Loamy Sand (TvB), 0-5 percent slope** – This soil occurs in somewhat excessively drained soils formed in alluvium and is used for growing citrus, grapes and other fruits but mainly used for grazing. Tujunga series consists of mostly weathered granitic sources. Runoff is very low to negligible with rapid permeability. The elevation ranges from 5-4,300 feet.
- **Grangeville Fine Sandy Loam, Saline-Alkali (Gs)** – This nearly level soil occurs on alluvial fans and alluvial plains and is used for pasture, truck crops, tomatoes, and flowers. It is a poorly drained, very deep fine sandy loam derived from granitic alluvium. The available water holding capacity is 6 to 8.5 inches. Formerly, most areas of Grangeville soils were occasionally flooded. Runoff is negligible, with moderate permeability in saline-sodic phases. The elevation ranges from 50 to 200 feet.
- **Hanford Sandy Loam (HbA), 0-2 percent slopes** – This soil occurs on stream bottoms, floodplains and alluvial fans and is used mostly for growing a wide range of fruits, vegetables, and general farm crops. Hanford series consists of mostly granite and other quartz bearing rocks. Runoff is well drained, negligible to low runoff, and with moderately rapid permeability. The elevation ranges from 150-3,500 feet.
- **Ramona Sandy Loam (RmC), 2-9 percent slopes** – This soil occurs on terraces and fans and used mostly for production of grain, irrigated citrus and deciduous fruits. Ramona series consists

of mostly granitic and related rock sources. Runoff is slow to rapid and permeability is moderately slow. The elevation ranges from 250-3,500 feet.

2.3.3 TOPOGRAPHY

The Action area is located in the southeastern margin of the San Bernardino Basin, in un-sectioned portions of Township 1 South; Range 4 West and Township 1 South at elevations above 1,000 feet above mean sea level (AMSL) (Appendix C, Figures 2a and 2b). The local topography is typical of low land valley areas with gentle slopes ranging from 1 to 3 percent. The general topography within the Action area grades towards the SAR from the cities of San Bernardino and Redlands, respectively. Topographical elevations in the general proximity of the Santa Ana River averages 1,028 feet AMSL and extend up to 1,078 feet AMSL in the vicinity of downtown San Bernardino and 1,474 feet AMSL in downtown Redlands.

2.3.4 HYDROLOGY

The Action Area is located within the Santa Ana River Watershed, which is approximately 2,800 square miles in area, originates at San Gorgonio Peak in San Bernardino County and drains southwesterly through Riverside and Orange Counties prior to emptying into the Pacific Ocean at Newport Beach. The Action Area is located within the Upper Santa Ana River Watershed, which is hydraulically disconnected from the lower watershed by San Prado Dam. The Study Area corresponds with the Santa Ana River Wash (HUC 18070203507), Mission Zanja (HUC 180702030506), and the Warm Creek (HUC 180702030508) sub-watershed units.

A total of five major offsite drainage features either cross or are located longitudinally to the rail corridor. The crossings from west to east are known as Warm Creek (Historic) [Bridge 1.1], Twin Creek [Bridge 2.2], the SAR [Bridge 3.4], Bryn Mawr Avenue [Bridge 5.78], and Mill Creek Zanja [Bridge 9.4]. Bridges 5.78 and 9.4 cross the Mission Zanja Flood Control Channel (Mission Zanja Channel), which is a major drainage channel located adjacent and to the south of the eastern segment of the rail corridor.

2.3.5 VEGETATION

Vegetation types or plant communities are assemblages of plant species that usually coexist in the same area. The classification of vegetation communities is based upon the life form of the dominant species within that community and the associated flora. Vegetation was classified using the R.F. Holland system of natural communities as described in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Nomenclature follows Hickman (1993) and Roberts, et al. (2004). The Action area supports 15 distinct vegetation communities (Table 1); however, the predominant land cover was identified as being urban/developed. Two State-ranked sensitive vegetation communities occur within the Action area, southern cottonwood willow riparian forest and southern willow scrub. These communities are considered sensitive by the CDFW. The majority of the Action area is made up of paved roadways, man-made structures, adjacent lands that are unvegetated, and landscaped parcels. A vegetation communities map depicting the location of these communities is included as Appendix C, Figures 5a-5t.

Disturbed Habitat (Holland Code 11300)

Disturbed habitat (DH) is primarily used to identify areas of severe impacts to natural communities to the extent where it is no longer sustaining or functioning naturally. These areas have been previously physically disturbed, but continue to retain a soil substrate. Disturbed areas consist of predominantly non-native weedy and ruderal exotic species. This is not a natural community and generally does not provide habitat for wildlife or sensitive species. Examples of disturbed habitat include areas that have been graded, cleared areas for fuel management, staging areas, off-road vehicle trails, and abandoned home sites.

Table 1. Existing Vegetation within the Action Area

Vegetation Communities	Action Area Acreage
Disturbed Habitat	24.54
Disturbed Wetland	0.02
Eucalyptus Woodland	2.78
Flat-top Buckwheat Scrub (disturbed)	0.91
Mulefat Scrub	0.04
Non-Jurisdictional Ditch	1.31
Non-Native Grassland	61.90
Non-Vegetated Channel	29.22
Oak Woodland	9.62
Orchard and Vineyards	5.28
Southern Cottonwood Willow Riparian Forest	8.27
Southern Willow Scrub	0.64
Tamarisk Scrub	0.47
Urban/Developed	388.88
Total	533.88

Disturbed habitat in the Action area consists of abandoned staging areas, home sites, and parking areas, unpaved roads, and areas that have been graded, repeatedly cleared, and/or experienced repeated use that prevents natural revegetation (Appendix D, Photograph 1). Characteristic species include invasive, non-native forbs, such as prickly Russian-thistle/ tumbleweed (*Salsola tragus*), London rocket (*Sisymbrium irio*), fennel (*Foeniculum vulgare*). In addition, a limited amount of annual grasses typical of non-native grassland (42200) occur but do not dominate DH.

Disturbed Wetland (Holland Code 11200)

Disturbed Wetland (DW) is generally associated with areas of wetlands that have been disturbed in the past by clearing, grubbing, or mowing. The vegetation community has indicators of wetland species that have been disturbed and non-native species such as castor bean (*Ricinus communis*), giant reed grass (*Arundo donax*), pampas grass (*Cortaderia selloana*), and other invasive species.

Within the Action area, a small area of DW occurs along the northern portion of the streambed in Twin Creek just west of the existing railroad bridge. Vegetation is sparse and consists of young arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), Typha (*Typha* sp.), and water speedwell (*Veronica anagallis-aquatica*). Within the DW a significant amount of trash and debris has accumulated such as mattresses, clothing, and shopping carts (Appendix D, Photograph 2). There is evidence of vegetation maintenance (i.e., mowing) within the streambed. The DW does not connect upstream or downstream to wetland habitats.

Eucalyptus Woodland (Holland Code 11100)

Eucalyptus woodland (EW) is characterized by landscaped areas around homes or roadways. The primary indicator in EW is eucalyptus (*Eucalyptus* spp.), which is a non-native tree species from Australia. The understory is sparse and mostly dominated by leaf litter and weedy species including brome grasses.

Within the Action area, EW occurs adjacent to the SAR with individuals and smaller stands of Eucalyptus occurring throughout the Action area (Appendix D, Photograph 3).

Flat-top Buckwheat Scrub (Holland Code 37K00)

Flat-top buckwheat scrub (FBS) consists of a monoculture of successional vegetation that formally supported coastal sage scrub and chaparral in areas that experience continued disturbances. In the survey corridor this community is disturbed, however, it is dominated by flat-topped buckwheat (*Eriogonum fasciculatum*) and Wright's buckwheat (*Eriogonum wrightii*), with the presence of other species. Other species that were present include annual brome grasses, fescue (*Vulpia* spp.), filaree (*Erodium* spp.), deerweed (*Lotus scoparius*), white sage (*Salvia apiana*), and ranchers fiddleneck (*Amsinckia menziesii* vars. *intermedia*).

Within the Action area, FBS occurs within a vacant lot located north of the railroad tracks adjacent to Warm Creek and east of D Street. This habitat is disturbed due to frequent mowing.

Mulefat Scrub (Holland Code 63310)

Mulefat scrub (MFS) is generally characterized by tall, herbaceous riparian scrub dominated by mulefat. This vegetation community is frequently flooded and absent floods this community would likely succeed to cottonwood- or sycamore-dominated riparian forest or woodlands.

Within the Action area this habitat occurs primarily within the SAR.

Non-native Grassland (Holland Code 42200)

Non-native grassland (NNG) is often associated with numerous species of wildflowers and a dense to sparse cover of annual grasses. Characteristic plant species of NNG include oat (*Avena* sp.), rip gut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), foxtail brome (*Bromus madritensis* ssp. *rubens*), four-spot clarkia (*Clarkia purpurea*), sierra shooting star (*Dodecatheon clevelandii*), and California melica (*Melica californica*).

NNG within the Action area is often disturbed and appears to have been previously irrigated and/or cultivated for agricultural purposes. Characteristics that comprise this attribute include the occurrence of previously open space between rows and these areas appear to be currently maintained.

Proposed Non-jurisdictional Ditch (no Holland Code)

Several proposed non-jurisdictional ditches (NJD) occur within the Action area. These ditches occur entirely within upland areas and are generally associated with the railroad ROW. These features are typically unvegetated, or vegetated with weedy ruderal species, and do not provide significant wildlife habitat. These features serve to drain road runoff from the ROW and are often connected through a series of culverts running parallel with the ROW.

Non-Vegetated Channel (Holland Code 64200)

Non-Vegetated Channel (NVC) consists primarily of engineered/leveed channels maintained by the SBCFCD or local municipality. The channels consist of a concrete, fine to coarse sandy or sandy cobbly substrate and are sparsely vegetated or unvegetated. Leveed banks consist of either concrete, concrete-covered cobble, or rock rip rap.

Within the SAR are small patchy areas of Riversidean Alluvial Fan Sage Scrub (Holland Code 32720), which includes scalebroom (*Lepidospartum squamatum*), broom matchweed (*Gutierrezia sarothrae*), and coastal goldenbush (*Isocoma menziesii*). These areas are considerably less than 15 percent vegetated and were therefore left out of the larger vegetation assessment.

Within the Action area, NVC occurs primarily in Warm Creek, and portions of Twin Creek (Appendix D, Photographs 2 and 5).

Oak Woodland (Holland Code 71100)

Oak woodland (OW) consists primarily of monotypic stands or various species of oak (*Quercus* sp.) with a poorly developed shrub layer, and well developed herbaceous layer generally dominated by grasses (*Bromes* spp.).

In the Action area this vegetation community consists of uniformly distributed scrub oak (*Quercus berberidifolia*) with an occasional live oak (*Quercus agrifolia*) and a disturbed understory made up of non-native grasses that appear to be maintained (Appendix D, Photograph 6). The area provides little habitat value due to the amount of disturbance and the surrounding land uses.

Orchard and Vineyards (Holland Code 18100)

Orchard and Vineyards (OV) occurs as an active orange grove located north of the ROW between California and Nevada Streets.

Southern Cottonwood Willow Riparian Forest (Holland Code 61330)

Tall, open, broad-leaved winter-deciduous riparian forests dominated by Fremont cottonwood (*Populus fremontii*) and several willow species (*Salix* spp). This habitat occurs in sub-irrigated and frequently overflowed lands along rivers and streams. The dominant species require moist, bare mineral soil for germination and establishment. The understory is generally vegetated by herbaceous and viney species such as sedges (*Carex* sp.), grape (*Vitis* sp.), and introduced wetland species.

Within the Action area, Southern cottonwood willow riparian forest (SCWRF) occurs primarily within the western portion of Mission Zanja Channel and within the SAR. SCWARF is a State-ranked S3.2 (threatened) sensitive habitat.

Southern Willow Scrub (Holland Code 63320)

Southern willow scrub (SWS) is usually made up of a dense thicket of various willow species (*Salix* spp.). This habitat occurs in loose, sandy alluvium near stream channels and is frequently flooded. The habitat is limited by the dense thicket of willows and frequent flooding which impacts the development of an understory.

Within the Action area, SWS occurs as small patches within the SAR and Twin Creek (Appendix D, Photographs 4 and 7). SWS is a State-ranked S2.1 (very threatened) sensitive habitat.

Tamarisk Scrub (Holland Code 63810)

Tamarisk scrub (TS) is made up of almost a monoculture of any of several tamarisk (*Tamarix* spp.) species. This vegetation community is often associated with major disturbances in areas where native vegetation is being supplemented by tamarisk.

Within the Action area Tamarisk Scrub occurs in primarily within the SAR and the Mission Zanja Channel.

Urban/Developed (Holland Code 12000)

Urban/Developed (UD) land is comprised of areas of intensive use with much of the land constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported. Developed land is highly modified and characterized by permanent or semi-permanent structures, pavement, unvegetated areas and landscaped areas that require irrigation.

Within the survey corridor, developed areas are comprised of paved roadways, man-made structures, adjacent lands that are unvegetated, or landscapes with a variety of ornamental (typically non-native/exotic) plants (Appendix D, Photograph 8).

3.0 DETERMINATION OF EFFECT

3.1 SPECIES EVALUATED

Species Requiring No Further Analysis

This document addresses potential effects to species that are federally listed or proposed for listing under the ESA. All federally listed species documented in the California Natural Diversity Database (CNDDDB) as occurring within the USGS 7.5' Redlands Quadrangle and the surrounding eight quadrangles were evaluated for potential to occur within the project Action area. The evaluation considered each species known range and the presence of suitable habitat within the Action area based upon field observations. Although there are several federally listed and proposed species considered in this BA, only six species are analyzed in detail as a result of the proposed action. The remaining species would be unaffected by the proposed action based on their absence within the proposed Action area or a low potential for occurrence based on local habitat conditions. Appendix A includes a complete list of the botanical and wildlife species considered in the Action area. Appendix B contains the species inventory based on the California Natural Diversity Database (CNDDDB).

Species Included in the Analysis

The following federally threatened, endangered, or candidate species occur, have the potential to occur, or have designated critical habitat within the proposed Action area:

- Santa Ana River wooly star (*Eriastrum densifolium ssp. sanctorum*)
- Slender-horned spineflower (*Dodecahema leptoceras*)
- Least Bell's vireo (*Vireo bellii pusillus*)
- Southwestern willow flycatcher (*Empidonax traillii extimus*)
- San Bernardino kangaroo rat (*Dipodomys merriami parvus*)
- Santa Ana sucker (*Catostomus santaanae*)

Information regarding each species is provided in Sections 3.3 through 3.8, including a brief description of the species, current status, basic ecology, and distribution, as well as an assessment of potential effects that the proposed action may have on each species. Where adverse effects are identified, measures are presented to mitigate effects to each species.

3.2 CRITICAL HABITAT

The action addressed within this BA falls within USFWS designated critical habitat for the Santa Ana sucker and San Bernardino kangaroo rat.

The portion of the Action area within the Santa Ana River (SAR) occurs within critical habitat for the Santa Ana sucker (SAS). Specifically, the proposed action occurs within critical habitat Unit 1, Subunit 1a in an area that is not currently occupied by the species but provides transit of water and coarse materials downstream to occupied habitat. Substrate at the SAR/Bridge 3.4 is primarily sand with some coarser material (e.g., cobbles) mixed in. Sand dominates the river bed downstream to the Prado Basin. Coarse materials (gravel and cobbles) from upstream sources pass through the Action area during larger runoff events when water velocity is high enough to transport them.

The historical range of the San Bernardino kangaroo rat (SBKR) extends from the San Bernardino Valley in San Bernardino County to the Menifee Valley in Riverside County (Lidicker 1960). SBKR occur on sandy soils and sandy loam soils within relatively open vegetation, generally along rivers, streams and

drainages. San Bernardino kangaroo rat is described as being confined to primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than eolian (wind) processes. Burrows are dug in loose soil, usually near or beneath shrubs. While the general habitat preference for the species is alluvial scrub, it mainly occurs in early and intermediate seral stages of this plant community (McKernan 1997).

3.3 SANTA ANA RIVER WOOLY STAR – “MAY AFFECT AND LIKELY TO ADVERSELY AFFECT”

3.3.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The Santa Ana River Woolly Star is a perennial herb that is native to California at elevations of 298 to 2,001 feet (91 to 610 meters) above mean sea level. This species is associated with sandy or gravelly chaparral and coastal scrub (alluvial fan). This species blooms and is best surveyed for in May through September (CNPS 2010).

3.3.2 SURVEY INFORMATION

Habitat for this federally endangered species occurs in sandy areas associated with all sandy-bottomed drainages located within the Action area (e.g., SAR, Mission Zanja Channel, etc.) Prior to the site-specific rare plant surveys, the nearest documented occurrence of this species in the CNDDDB is located within approximately 1,700 feet of the Action area. One individual was observed during the 2012 springtime rare plant survey located within approximately 50 feet of Bridge 3.4 in the SAR (see Appendix C, Figure 5G). This individual was also confirmed present during the site visit with USFWS in July 2013.

3.3.3 DETERMINATION OF EFFECT

One individual Santa Ana River woolly star was observed within the Action area. Any impact to this species would result in a “may affect-likely to adversely affect” determination to this species. Potential direct and indirect impacts and the mitigation measures proposed to eliminate potential impacts under the proposed action are presented below.

3.3.4 DIRECT IMPACTS

Construction

Based on springtime rare plant surveys within the Action area, a single federally endangered Santa Ana River woolly star was observed within the vicinity of the proposed improvements for Bridge 3.4 at the SAR (see Appendix C, Figure 5G). The observed individual is located approximately 0.7 miles downstream from the closest, locally established population and, therefore, not considered part of a larger population in the Action area. The plant is located within the proposed temporary impact footprint, and construction activities associated with the installation of cofferdam (or CISS piles) carry a potential to directly impact the Santa Ana River woolly star individual.

Operations

Future operations would be restricted to the existing railroad ROW with maintenance activities required to maintain the track free of debris, including vegetation. These activities would be restricted to SANBAG’s ROW and would not extend into adjacent sensitive habitats. For this reason, no direct impacts during operation are anticipated.

3.3.5 POTENTIAL INDIRECT IMPACTS

No indirect impacts to Santa Ana River woolly star are anticipated from implementation of the proposed action.

3.3.6 CONSERVATION MEASURES

Conservation Measure 1. Protection of Sensitive Plants and Habitats. SANBAG shall require the construction contractor to implement the following measures to protect sensitive plants and habitats during project-related construction.

1. SANBAG shall designate an approved biologist (project biologist) who will be responsible for overseeing compliance with protective measures for the biological resources during clearing and work activities within and adjacent to areas of native habitat. The project biologist will be familiar with the local habitats, plants, and wildlife and maintain communications with the contractor to ensure that issues relating to biological resources are appropriately and lawfully managed. The project biologist will review final plans, designate areas that need temporary fencing, and monitor construction. The biologist will monitor activities within designated areas during critical times such as vegetation removal, the installation of Best Management Practices (BMPs) and fencing to protect native species, and ensure that all avoidance and minimization measures are properly constructed and followed.
2. Project employees and contractors that will be on-site shall complete environmental worker-awareness training conducted by the project biologist. The training will advise workers of potential impacts to the sensitive habitat and listed species and the potential penalties for impacts to such habitat and species. At a minimum, the program will include the following topics: occurrences of the listed species and sensitive vegetation communities in the area, a physical description and their general ecology, sensitivity of the species to human activities, legal protection afforded these species, penalties for violations of Federal and State laws, reporting requirements and work features designed to reduce the impacts to these species; and to the extent practicable, promote continued successful occupation of areas adjacent to the work footprint. Included in this program will be color photos of the listed species, which will be shown to the employees. Following the education program, the photos will be posted in the contractor and resident engineer's office, where they will remain through the duration of the work. Photos of the habitat in which sensitive species are found will also be posted on-site. The contractor will be required to provide SANBAG with evidence of the employee training (e.g., sign in sheet or stickers) upon request. Employees and contractors will be instructed to immediately notify the project biologist of any incidents, such as construction vehicles that move outside of the work area boundary. The project biologist will be responsible for notifying the USFWS within 72 hours of any similar incident.
3. Prior to construction, SANBAG shall delineate the construction area (including staging and laydown areas) between Mile Posts 3.3 and 4.0 and erect exclusionary construction fencing along the perimeter of the identified construction area to protect adjacent sensitive habitats (SWS, SCWRF and Santa Ana woolly star). Limits of the exclusionary fencing shall be confirmed by the project biologist prior to habitat clearing. Exclusionary fencing shall be maintained throughout the duration of construction work from Mile Posts 3.3 to 4.0. Exclusionary fencing can be removed at the conclusion of construction work as approved by the project biologist.

All construction-related vehicles and equipment storage shall occur in the construction area and/or previously disturbed areas as approved by the project biologist. Project-related vehicle traffic shall be restricted to established roads, construction areas, storage areas, and staging and parking areas.

If construction activity extends beyond the exclusionary fencing into sensitive vegetation communities, areas of disturbance shall be quantified and an appropriate restoration approach shall be developed in consultation with USFWS. For example, if construction extends beyond the limits of the exclusionary fencing, temporarily disturbed areas shall be restored to the natural (preconstruction) conditions, which may include the following: salvage and stockpiling of topsoil, re-grading of disturbed sites with salvaged topsoil, and re-vegetation with native locally available species.

Conservation Measure 2. Pre-Construction Plant Survey. Prior to construction, a qualified biologist retained by SANBAG shall conduct pre-construction surveys for special status plant species including Santa Ana River woolly star and slender-horned spineflower. If one or more species are detected, then SANBAG shall consult with the USFWS to develop additional minimization measures prior to project construction (if necessary). These additional measures may include construction timing restrictions and/or construction monitoring.

Conservation Measure 3: Seed Collection and Reseeding: Prior to construction, seed will be collected from any individuals observed during the pre-construction plant survey and stored for reseeded after project completion. Fifty percent of seed will be broadcast and imprinted at the end of the first blooming period after temporary impacts within the Santa Ana River are restored to pre-project contours. The remaining seed will be broadcast and imprinted at the end of the following blooming season. Focused surveys will be conducted during the blooming period following seeding to document germination.

3.4 SLENDER-HORNED SPINEFLOWER – “NO EFFECT”

3.4.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The Slender-horned Spineflower is an annual herb that is native to California at elevations of 656 to 2,493 feet (200 to 760 meters) above mean sea level (Calflora 2010). This species is associated with sandy chaparral, cismontane woodland and coastal scrub (alluvial fan) (CNPS 2010). This species blooms and is best surveyed for in April through June (CNPS 2010).

3.4.2 SURVEY INFORMATION

Focused surveys for sensitive plants known to occur, or with the potential to occur in the Action area were conducted in 2012. Habitat for the federally endangered species occurs as sandy areas associated with all sandy-bottomed drainages located within the Action area (e.g., SAR, Warm Creek, Mission Zanja Channel, etc.) The species is known to occur upstream and downstream of where the SAR transects the Action area and upstream of the Action area in Warm Creek. CNDDDB data indicate that there is one elemental occurrence of this species within the Action area; however, this record was in 1983. Although moderately suitable habitat occurs within the Action area, this species was not observed during focused rare plant surveys.

3.4.3 DETERMINATION OF EFFECT

Given that this species was not observed during focused rare plant surveys, impacts to the slender-horned spineflower would not occur due to implementation of the proposed action. Therefore, the proposed action will have “no effect” on slender-horned spineflower.

3.4.4 CONSERVATION MEASURES

Although this species was not observed during focused surveys, given the span of time between the previous survey and anticipated construction, SANBAG proposes the implementation of Conservation Measures 1, Protection of Sensitive Plants and Habitats, and Conservation Measure 2, Pre-Construction Plant Survey.

3.5 LEAST BELL'S VIREO – “MAY AFFECT AND LIKELY TO ADVERSELY AFFECT”

3.5.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The least Bell's vireo historically occurred throughout California, including the coastal ranges, Central Valley, Sierra Nevada foothills, Owens Valley, Death Valley, Mojave Desert and northwestern Baja California (Matthews and Moseley 1990). In 1990, 80 percent of the U.S. population occurred along just five drainages: Santa Margarita River, Sweetwater River, San Luis Rey River, San Diego River and the SAR (Prado Basin) (Ehrlich et al. 1992).

Habitat for the LBV includes riparian, shrubland/chaparral, and woodland. LBV prefer dense brush, mesquite, willow-cottonwood forest, streamside thickets, and scrub oak in arid regions but often near water (AOU 1983). They often return to the same breeding territory in successive years and only make nests in shrubs or low trees usually averaging about 1 meter aboveground (Franzreb 1989). The loss of about 95 percent of the former U.S. range and the loss of breeding habitat due to agricultural, urban and commercial development, flood control, river channelization and cowbird parasitism have lead to a dramatic decline in population and distribution (1994 End. Sp. Tech. Bull. 19(5):12; Saul 1995, Greaves 1997) (Franzreb 1989).

The LBV usually has a clutch size of 3-5 with incubation lasting 14 days. The LBV eats almost exclusively insects, spiders, snails, fruits, and forages in dense brush and occasionally tree tops (Terres 1980, NGS 1983).

3.5.2 SURVEY INFORMATION

This species was observed within the Action area during general biological surveys conducted in June and July 2012. During focused protocol surveys several LBV were detected (see Appendix E). On April 16, 2012 a male was observed calling approximately 600 feet to the northeast of the bridge crossing along the eastern side of the river in SCWRF habitat (Appendix C, Figure 5G). This male was also observed again on April 27, 2012 and May 8, 2012. On April 27, 2012, another male was observed approximately 500 feet south of the bridge along the east bank in the riparian forest floodplain. GLA observed a pair of LBV displaying breeding behavior which was detected south of the railroad within the Mission Zanja Channel (Appendix C, Figure 5G). Several single male LBV were also detected outside of the Action area. A single male LBV (LBV 1) was observed approximately 400 feet south of the railroad crossing on June 1, 11, 25, and July 5, 2012. LBV 2 was a single male that was observed approximately 500 feet north of the bridge crossing on June 1 and June 11, 2012. LBV 3 was a male that was observed on June 11, 2012, approximately 600 feet south of the railroad crossing. LBV 3 arrived south of the project site, was observed briefly counter singing with LBV 1 and then flew back south out of the Action area.

3.5.3 DETERMINATION OF EFFECT

LBV have been observed within the Action area. Any impact to this species, including loss of habitat, would result in a “may affect-likely to adversely affect” determination to this species. Potential direct and indirect impacts and the mitigation measures proposed to eliminate potential impacts of the proposed action are presented below.

3.5.4 DIRECT IMPACTS

Construction

Four LBV territories (5 individuals; 4 males and 1 female) were mapped within the vicinity of the Action area of the SAR and the confluence of the Mission Zanja Channel with the SAR (see Appendix E). Of these, one breeding pair of LBV were observed within the Mission Zanja Channel, approximately

110 feet from the project centerline but outside of the Action area (see Appendix C, Figure 5G). In total, implementation of the proposed action will permanently impact 0.96 acres of suitable LBV habitat consisting of SCWRF. In addition, the proposed action will temporarily impact 0.74 acre of suitable LBV habitat including 0.62 acres of SCWRF and 0.12 acres of SWS. Of the 0.62 acres of SCWRF temporarily impacted by the proposed action, approximately 0.14 acres of SCWRF located south of the railroad ROW are considered occupied by a breeding pair of LBV based on focused surveys in 2012.

Operations

The long term operation of the proposed action would result in minimal physical disturbance to adjacent suitable habitat for LBV (railroad right-of-way maintenance per Federal Railroad Administration requirements). Direct impacts to LBV during operation are not anticipated.

3.5.5 POTENTIAL INDIRECT IMPACTS

Construction

Given that construction in the vicinity of the SAR and Mission Zanja Channel could occur year round, construction activities would coincide with the LBV breeding season (March 15-September 15). During construction of the proposed action, construction activities could produce noise levels that would adversely affect breeding LBV. USFWS typically applies a noise level criterion of 60 dBA Leq for assessing project-related noise effects to listed bird species. Therefore, if active LBV nests occur within the 60 dBA Leq contour generated by construction equipment, an indirect impact associated with construction-related noise could result.

Operations

During operations, the proposed action would result in minimal physical disturbance (railroad right-of-way maintenance per Federal Railroad Administration requirements) to adjacent suitable habitat and the potential for indirect impacts to LBV is considered low. Specifically, the projected post-project 60 dBA Leq noise contour does not intersect occupied habitat (Figure 6).

3.5.6 CONSERVATION MEASURES

SANBAG proposes the implementation of Conservation Measure 1, Protection of Sensitive Plants and Habitats, in conjunction with the conservation measures described below, to mitigate potential impacts to LBV.

Conservation Measure 4. Pre-Construction Wildlife Survey. Prior to construction, a qualified biologist retained by SANBAG shall conduct pre-construction surveys for special status wildlife species including least Bell's vireo, southwestern willow flycatcher, and San Bernardino kangaroo rat to verify presence or absence in the Project area. If one or more species are detected, then SANBAG shall consult with the USFWS (and/or CDFW if appropriate) to develop additional minimization measures prior to project construction (if necessary). These additional measures may include construction timing restrictions and/or construction monitoring.

Conservation Measure 5. Least Bells Vireo (LBV). The following measures will be implemented to minimize direct and indirect impacts to LBV during construction:

- a. Impacts associated with clearing and grubbing of Southern Cottonwood Willow Riparian Forest (SCWRF) and Southern Willow Scrub (SWS) will be timed to avoid the breeding season of the least Bell's vireo (March 15 to September 15), unless SANBAG provides survey documentation to USFWS that confirms the riparian habitat is not occupied by LBV.
- b. Temporary impact areas will be restored to pre-grade contours following bridge construction. Natural recruitment is anticipated to occur rapidly due to the large amount of intact native

riparian habitat that will remain as a seed source. Additionally, the riparian habitat being impacted is adapted to frequent disturbance. The individual species making up the community tend to have large quantities of seeds and very rapid growth that promote rapid re-establishment. Container planting and seeding has not been proposed due to potential conflicts with County Flood Control Maintenance requirements, high risk of plant material being washed out during subsequent storm events and potential conflicts with future Santa Ana River Trail construction. For erosion control purposes, temporarily impacted areas outside of the active floodplain will be hydroseeded with native grasses and shrubs.

- i. The temporarily impacted SCWRF and SWS habitat will be monitored annually for five years, until LBV is documented using the re-established habitat or until habitat attains 80 percent cover including both shrub and overstory stratum. If recruitment of SCWRF and SWS species is not evident within two years of project construction or habitat has not attained 60 percent cover within three years, impacts will be treated as permanent and additional mitigation for areas not meeting success criteria shall be provided through in-lieu fee payment to an appropriate mitigation bank for enhancement, restoration or establishment of LBV habitat at a ratio of 1:1.
- ii. Temporary direct impacts to potentially suitable LBV habitat will be mitigated as follows: The temporal loss of occupied LBV habitat resulting from temporary removal of SCWRF associated with the Mission Zanja Channel shall be mitigated through in-lieu fee payment to an appropriate mitigation bank for enhancement, restoration or establishment of LBV habitat at a ratio of 3:1. The temporal loss of suitable unoccupied LBV habitat resulting from temporary removal of SCWRF and SWS shall be mitigated through in-lieu fee payment to an appropriate mitigation bank for enhancement, restoration or establishment of LBV habitat at a ratio of 2:1.
- c. Permanent direct impacts to occupied LBV habitat (SCWRF) shall be mitigated at a ratio of 3:1 through in-lieu fee payment to an appropriate mitigation bank for enhancement, restoration and/or creation of LBV habitat within the Santa Ana River watershed.
- d. If active LBV nests are identified during pre-construction surveys and noise levels at the nest exceed 60 dBA Leq, noise attenuation structures will be placed or other noise attenuation measures (e.g., reducing the number of construction vehicles or using different types of construction vehicles) will be implemented to reduce noise levels at the nest to 60 dBA Leq (or ambient noise level if greater than 60 dBA Leq). During construction adjacent to these areas, noise monitoring shall occur during the LBV breeding season and be reported daily to USFWS. Construction activities that create noise in excess of the aforementioned levels will cease operation until effective noise attenuation measures are in place to the extent practicable.

3.6 SOUTHWESTERN WILLOW FLYCATCHER – “NOT LIKELY TO ADVERSELY AFFECT”

3.6.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The southwestern willow flycatcher (SWFL) breeds throughout the southwestern U.S. as far east as Texas and possibly northern Baja California. SWFL typically nest in relatively dense riparian vegetation where surface water is present for part of the year, or soil moisture is high enough to maintain the appropriate vegetation characteristics. SWFL breeding habitat is restricted to relatively dense growths of trees and shrubs in riparian ecosystems and can be composed of a single species of willow (*Salix* sp.) or a mixture of native and nonnative trees and shrubs (Bent 1960). Species decline is a result of destruction and fragmentation of riparian habitat by the way of dams, reservoirs, diversions, channelization, groundwater

pumping, and mismanagement of livestock, recreational development and cowbird parasitism (USFWS 2002) (USFWS 2011).

SWFL eat mainly insects (wasps, bees, flies, beetles, spittlebugs butterflies/moths and caterpillars) caught in flight while occasionally gleaning insects from foliage and berries (Bent 1960). Breeding usually occurs from early June through the end of July with incubation of normally one brood lasting 12-15 days. The riparian scrub/forest habitat associated with the SAR and Mission Zanja Channel provides suitable breeding habitat for SWFL. Habitat ranges from around 1,460 feet in elevation.

3.6.2 SURVEY INFORMATION

Suitable habitat for this species was observed in the Action area during general biological surveys conducted in February 2012. Although suitable habitat for this species exists on site, no SWIFL were detected during the five protocol surveys within the Action area (Appendix F).

3.6.3 DETERMINATION OF EFFECT

While no SWFL were detected within the Action area, suitable habitat for this species occurs in the Action area. Any impact to this species, including loss of habitat, would result in a “may affect-likely to adversely affect” determination to this species. Potential direct and indirect impacts and the conservation measures proposed to eliminate potential impacts under the proposed action are presented below.

3.6.4 DIRECT IMPACTS

Construction

No SWFL were observed within the Action area, therefore, direct impacts to this species are not likely. However, given the presence of suitable habitat and the duration of time prior to construction (2015), it is possible that SWIFL could occur within the Action area and be impacted by construction.

Operations

Once operational, the proposed action would result in minimal physical disturbance to adjacent suitable habitat for SWFL. Direct impacts to SWFL during operation are not anticipated.

3.6.5 POTENTIAL INDIRECT IMPACTS

Construction

During construction of the proposed action, construction activities could produce noise levels that would adversely affect SWFL if they were to establish residency within the Action area prior to the start of construction. Therefore, an indirect impact associated with construction-related noise could result.

Operations

During operations, the proposed action would result in minimal physical disturbance to adjacent suitable habitat and the potential for indirect impacts to sensitive zoological or bird species is considered low. For example, the potential for noise from passing trains to adversely affect breeding birds is very remote given the limited presence of suitable breeding habitat within the urbanized rail corridor and the infrequent and transient train movements past a given point.

3.6.6 CONSERVATION MEASURES

While SWFL was not observed during focused surveys, given the span of time between the previous survey and anticipated construction, SANBAG proposes the implementation of Conservation Measure 1, Protection of Sensitive Plants and Habitats, Conservation Measure 4, Pre-Construction Wildlife Survey, and Conservation Measure 5, LBV to ensure that the project results in no potential adverse effect to the species if they became established within the Action area prior to initiation of construction.

3.7 SAN BERNARDINO KANGAROO RAT– “NOT LIKELY TO ADVERSELY AFFECT”

3.7.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The historical range of the San Bernardino kangaroo rat (SBKR) extends from the San Bernardino Valley in San Bernardino County to the Menifee Valley in Riverside County (Lidicker 1960). SBKR occurs on sandy soils and sandy loam soils within relatively open vegetation, generally along rivers, streams and drainages. The habitat of the San Bernardino kangaroo rat is described as being confined to primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than eolian (wind) processes. Burrows are dug in loose soil, usually near or beneath shrubs. While the general habitat preference for the species is alluvial scrub, it mainly occurs in early and intermediate seral stages of this plant community (McKernan 1997).

3.7.2 SURVEY INFORMATION

The Action area is within the historical range of SBKR. The USFWS (2008) has designated parts of the SAR as critical habitat for the species. CNDDDB data indicate there is one record of elemental occurrence of this species within the Action area, which occurred in 1993. The disturbed and relatively undisturbed habitat that occurs where the site intersects Warm Creek and the SAR are potential SBKR habitat. Elsewhere along the Action area, the ROW does not contain floodplain and agricultural habitats that could support SBKR, and is separated from such habitats by urban development. Robust populations of SBKR are documented approximately 1 mile upstream of the Action area. According to recent surveys conducted in the vicinity of the proposed action, SBKR have recently (2010 and 2012) been located approximately 0.25 mile upstream of the SAR crossing.

The trapping results show that SBKR do not currently occupy habitat within the Action area (Appendix G). No SBKR were trapped over the course of the 5-night trapping survey.

3.7.3 DETERMINATION EFFECT

While no SBKR were detected within the Action area, the Action area is within the historical range of SBKR. Any impact to this species, including loss of habitat, would result in a “may affect-likely to adversely affect” determination to this species. Potential direct and indirect impacts and the conservation measures proposed to eliminate potential impacts under the proposed action are presented below.

3.7.4 DIRECT IMPACTS

Construction

Based on the completion of focused surveys for SBKR, no evidence of their presence was documented in the Action area (see Appendix G). However, the Action area at the SAR overlaps with Unit 1 of designated SBKR critical habitat. Temporary impacts to 1.68 acres and permanent impacts to 0.85 acres of the 8,935 acres of the total designated SBKR critical habitat within Unit 1 would not result in an adverse modification to critical habitat as designated within this Unit 1. Furthermore, the proposed action will not change the hydrologic processes in any way that will contribute to further loss of primary constituent elements (PCEs) identified for SBKR within the SAR. However, given the duration of time prior to construction (2015) and the presence of marginally suitable habitat, it is possible that SBKR could take residence within the Action area and be impacted by construction.

Operations

Once operational, the proposed action would not require additional direct impacts to the SAR, which is considered critical habitat for SBKR. Furthermore, the proposed action will not change the hydrologic

processes within the Action area that could contribute to further loss of PCEs identified for SBKR within the SAR. For these reasons, no long term operational direct impacts are anticipated.

3.7.5 POTENTIAL INDIRECT IMPACTS

Construction

Indirect impacts would generally be attributed to temporary construction-related dust and water quality effects. For example, hazardous materials leaks, such as fuel, hydraulic fluid, and/or lubricants, from equipment working in or above the river channel, although unlikely, have a potential to contaminate dry or moist river bed sediments when no flow is present. This contamination, if not cleaned up immediately, could remain within the Action area or be transported downstream during higher flow events to critical habitat occupied by SBKR. Degradation of existing critical habitat functions and values would be considered an indirect impact. However, implementation of project design features and BMPs identified in the SWPPP and National Pollutant Discharge Elimination System (NPDES) permit prepared for the proposed action would reduce impacts to water quality during construction.

Operations

During operations, the proposed action would result in minimal physical disturbance to adjacent suitable habitat and the potential for indirect impacts to SBKR is considered low.

3.7.6 CONSERVATION MEASURES

While SBKR was not observed during focused surveys, given the span of time between the previous survey and anticipated construction, SANBAG proposes the implementation of Conservation Measure 1, Protection of Sensitive Plants and Habitats, and Conservation Measure 4, Pre-Construction Wildlife Survey in addition to the conservation measures proposed below to ensure that the project results in no potential adverse effect to the species if they became established within the Action area prior to initiation of construction.

Conservation Measure 6. Prepare and Implement a SWPPP. The construction contractor will develop a SWPPP that complies with the requirements of the NPDES General Construction Permit (Order 2009-0009-DWQ as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ) and implement the BMPs described in the SWPPP. The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by SANBAG prior to commencement of work and shall be made conditions of the contract with the contractor.

The SWPPP shall be prepared by a qualified SWPPP developer with BMPs selected to achieve maximum pollutant removal and that represent the best available technology that is economically achievable. Emphasis for BMPs shall be placed on controlling discharges of oxygen-depleting substances, floating material, oil and grease, acidic or caustic substances or compounds, and turbidity. BMPs for soil stabilization and erosion control practices and sediment control practices will also be required. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) is required to determine adequacy of the measure.

3.8 SANTA ANA SUCKER – “NOT LIKELY TO ADVERSELY AFFECT”

3.8.1 STATUS, ECOLOGY, AND DISTRIBUTION

Federal Status: Endangered

The Santa Ana sucker (SAS) is a small fish that occurs in the rivers, larger streams and tributaries in southern California and it is believed that the species’ historical occupancy varied depending on suitability and access to these different areas (USFWS 2000, p. 19686). Santa Ana sucker generally inhabits perennial streams that have water depths ranging from a few inches to several feet and water currents from slight to swift (Smith 1966, p. 57).

The SAS’s population has declined due to habitat availability/modification as a result of surrounding urban encroachment. Modifications to the watershed such as diversions, dams and recharge basins along with the volume and flow rate of water are key factors that shape the watershed and impact the SAS population (Appendix H). The SAS has lost approximately 70 percent of its historic range in the SAR watershed and 75 percent of its historic range (USFWS 2000, pp. 19687-19688).

3.8.2 SURVEY INFORMATION

The proposed action is located near the upstream edge of Critical Habitat Unit 1 (SAR), Subunit 1B, in an area that is not currently occupied by SAS due to an existing barrier to upstream movement at La Cadena Drive. This area is not currently occupied by the species but provides transit of water and coarse materials downstream to occupied habitat. Downstream distance to occupied habitat from the SAR (Bridge 3.4) is approximately 2.25 miles. Based on these circumstances, no SAS are expected to occur within the Action area or the Action area (Appendix H).

3.8.3 DETERMINATION OF EFFECT

While no SAS are expected to occur within the Action area, a portion of the Action area within the SAR occurs within critical habitat for the SAS. Any impact to this species, including loss of habitat, would result in a “may affect-likely to adversely affect” determination to this species. Potential direct and indirect impacts and the conservation measures proposed to eliminate potential impacts under the proposed action are presented below.

3.8.4 DIRECT IMPACTS

Construction

Due to a number of barriers that occur downstream of the proposed Action area there is no risk of direct take of individual SAS in conjunction with implementing the proposed action (Appendix H). Although the proposed action will not likely result in the loss of a federally listed species, it would temporarily affect critical habitat through construction-related disruption of the channel bed and banks. This would include the temporary placement of both the proposed bridge supports along side of the existing bridge supports. However, these effects would be temporary and are not expected to result in direct take of SAS.

Operations

Based on hydraulic modeling, the proposed bridge piles (i.e., supports) at Bridge 3.4 (SAR) are not anticipated to substantially alter sediment and water transport downstream (Appendix I). Each bridge pile would be the same width as the existing piles but approximately 20 feet longer and oriented parallel to river flows. The river channel under the new bridge would be widened (approximately 70 feet), particularly on the north side. The new bridge requires five new piles that would occur in the widened portion of the SAR. Hydraulic modeling determined the new bridge would result in a slightly lower water surface elevation and velocity during a 100-year flow event (Appendix I) as compared to the existing structure. Therefore, the new bridge piles would not impede water transport under the new bridge nor

would it change water surface elevations downstream of the bridge. Based on these considerations, the proposed design for both the Preferred Project and Reduced Project Footprint would not adversely affect water or sediment transport downstream. For these reasons, no long term operational direct impacts are anticipated.

3.8.5 POTENTIAL INDIRECT IMPACTS

Construction

Indirect impacts would generally be attributed to temporary construction-related water quality effects. For example, hazardous materials leaks, such as fuel, hydraulic fluid, and/or lubricants, from equipment working in or above the river channel, although unlikely, have a potential to contaminate dry or moist river bed sediments when no flow is present. This contamination, if not cleaned up immediately, could be transported downstream during higher flow events to critical habitat occupied by SAS. Degradation of existing critical habitat functions and values would be considered an indirect impact. However, implementation of project design features and BMPs identified in the SWPPP and NPDES construction permit prepared for the proposed action would reduce impacts to water quality during construction.

Construction of the new Bridge 3.4 would result in disturbances within the river channel and on the banks related to access, installation of temporary cofferdam(s) or CISS piles (or similar bridge structure type), dredging in the river bed and/or excavation along the banks, and removal of the cofferdam(s) or CISS piles (or similar bridge structure type) when construction is completed. Dredging and/or excavation of the river banks under the bridge to widen the channel would have the potential to cause suspension of fine sediments if the work occurs in flowing water or the disturbed soils later are exposed to flowing water before those soils are stabilize.

Installation and removal of temporary cofferdam(s), CISS piles (or similar bridge structure type), and bridge support structures may result in temporary indirect impacts to downstream SAS critical habitat. However, erosion and sedimentation into suitable habitat would be minimized through implementation of the SWPPP, such that temporary indirect impacts would be minimized. With the implementation of a flow diversion plan during the course of construction, existing river flows would be allowed to pass through the construction site, including coarser bed materials (e.g., cobbles).

Operations

During operations, the proposed action would result in minimal physical disturbance to adjacent suitable habitat and the potential for indirect impacts to SAS is considered low.

3.8.6 CONSERVATION MEASURES

SANBAG proposes the implementation of Conservation Measure 6. Prepare and Implement a SWPPP in conjunction with the conservation measures proposed below.

Conservation Measure 7. Prepare and Implement a Flow Diversion Plan For Construction.

SANBAG or SANBAG's construction contractor shall develop a Flow Diversion Plan(s) for in-channel construction activities proposed within Warm Creek (Historic)(Bridge 1.1); Twin Creek (Bridge 2.2), SAR (Bridge 3.4), Zanja Channel (Bridges 3.9, and 5.8, and bank improvements), and Mill Creek Zanja (Bridge 9.4). SANBAG's contractor shall incorporate measures to minimize changes to flood flow elevation(s) during construction, address accumulation of floating debris, provide measures that minimize sedimentation to surface waters, and include contingency measures in the event of substantial rainfall. The diversion plan specific to Bridge 3.4 would also address the need for the continued passage of flow and coarser sediments (e.g., <2 inches in diameter) over the duration of in-channel construction.

3.9 CUMULATIVE IMPACTS

Numerous other projects, independent of the RPRP, would occur within an approximately five mile radius of the Action area. The projects range from road improvements to flood control facility improvements. The effects associated with the proposed action could combine with other projects adjacent to and outside the Action area. For this reason, the cumulative analysis considers a broader geographic context for biological resources (e.g., Reach 3 of the Santa Ana River).

From a cumulative perspective, a majority of the projects considered would occur entirely within upland urban areas and would not result in impacts to biological resources. Rather, there are six main projects in the vicinity of or adjacent to the Action area that are anticipated to potentially contribute to biological resource impacts based on their location: (1) Long-Term Maintenance of Flood Control and Transportation Facilities throughout San Bernardino County; (2) Mountain View Avenue Bridge over the SAR; (3) SAR Trail and Mission Zanja Channel Bridge; (4) Upper SAR Wash HCP; (5) I-10 HOV; and (6) Mountain View Avenue Bridge at Mission Zanja Channel. Similar to the proposed action, these projects could result in direct and indirect impacts to suitable habitat or take of one or more federally-listed species, fill of wetlands and non-wetland waters of the U. S., and/or other indirect impacts (e.g. sedimentation).

Sensitive Botanical Species

Implementation of the proposed action would result in an impact to one individual of the federally endangered Santa Ana River woolly star located south of the existing Bridge 3.4 located in the SAR. This individual is the only sensitive plant observed within the Action area and is not part of a larger population. The nearest population of Santa Ana River woolly star is located approximately 0.7 miles upstream of the Action area in the SAR. Although the direct effect to the individual Santa Ana River woolly star may be unavoidable, it would not be considered a cumulative adverse effect to the species' population as a whole with the application of the proposed conservation measures. While other cumulative projects could result in similar impacts by affecting populations within or outside the Action area, compliance with the proposed conservation measures would minimize the potential for the proposed action to result in a cumulatively adverse effect to Santa Ana River woolly star.

Sensitive Zoological Species

Implementation of the proposed action would result in direct effects to SWS and SCWRF, which are habitats that support the federally endangered LBV and other sensitive avian species. Degradation of wildlife habitat caused by the proposed action, when combined with other habitat effects occurring from other proposed transportation projects (e.g., Mountain View Avenue SAR Bridge and I-10 HOV Bridge), the SAR Trail, and SBCFCD maintenance activities, could result in cumulatively adverse effects. The effects of the proposed action would be minimized through the proposed conservation measures for each of the listed species considered in this BA (e.g., pre-construction surveys, wildlife fencing, presence of an environmental monitor, etc.). Similar to the proposed action, other cumulative projects considered would also be subject to these regulatory requirements (e.g., Sections 7 and 10 of the ESA). Based on these considerations, the incremental effect of the proposed action would not be cumulatively adverse.

4.0 HABITAT MANAGEMENT PLAN

As part of the RPRP, SANBAG will implement the habitat management plan described in this section to compensate for effects to LBV and supporting habitats resulting from implementation of the RPRP. Table 2 outlines on- and off-site habitat improvement activities proposed to compensate for the action-related impacts. Consistent with current USFWS's mitigation policy (501 FW 2) and USACE's Mitigation Rule, SANBAG proposes to purchase in-lieu fee credits for off-site mitigation to compensate for temporal and permanent impacts to LBV habitat. The basis for selecting in-lieu fee (ILF) credits to support off-site mitigation is centered on two primary issues: (1) SANBAG's need to maintain its ROW free of vegetation and related obstructions; and (2) the fact that adjacent lands impacted by construction are subject to SBCFCD ownership and regular and planned maintenance. ILF credits would be purchased from an approved ILF program prior to the start of construction, which is scheduled for 2015. Evidence of payment would be provided to USFWS.

Table 2. Habitat Impacts Related to the Redlands Passenger Rail Project

Habitat	Temporary Impacts		Permanent Impacts		Combined
	Total (Acres) ¹	Proposed Compensatory Mitigation (Acres) ^{2, 3}	Total (Acres) ¹	Proposed Compensatory Mitigation (Acres) ^{2, 4}	Proposed Compensatory Mitigation (Acres) ²
Southern Cottonwood Willow Riparian Forest	0.62	0.74 ⁵	0.96	0.96	1.70
Southern Willow Scrub	0.12	0.12	--	0.00	0.12
Total	0.74	0.86	0.96	0.96	1.82

¹ Total habitat includes Twin Creek, Santa Ana River, and Mission Zanja Channel.

² Through in-lieu fee payment to approved mitigation bank for restoration for creation and/or enhancement of LBV habitat within the Santa Ana River watershed.

³ Temporary impacts are mitigated at a ratio of 1:1 to account for temporal changes in habitat conditions following construction and prior to natural revegetation.

⁴ Permanent impacts are mitigated at a ratio of 1:1 due to the poor suitability of the SCWRF habitat within SANBAG's right-of-way.

⁵ 0.12 acres of temporary impacts are considered occupied and mitigated at a ratio of 2:1 per Conservation Measure 5.

All temporarily disturbed areas will be re-contoured to pre-project conditions. Temporarily impacted areas outside of the active floodplain will be hydroseeded with native grasses and shrubs for long-term erosion control. Riparian areas within the active floodplain and adjacent terraces will revegetate through natural processes. Natural recruitment is anticipated to occur rapidly due to the large amount of intact native riparian habitat that will remain as a seed source. Additionally, the riparian habitat being impacted is adapted to frequent disturbance. The individual species making up the community tend to have large quantities of seeds and very rapid growth that promote rapid reestablishment. Container planting and seeding has not been proposed due to potential conflicts with County Flood Control Maintenance requirements and high risk of plant material being washed out during subsequent storm events. Biotechnical bank stabilization methods such as straw wattles and biodegradable erosion control mats may also be implemented as needed and where appropriate. To avoid possible entrapment of small animals, including listed species, plastic monofilament netting will not be used. As noted above, the temporary impact areas will be monitored annually for five years, until least Bell's vireo is documented using the re-established habitat or until habitat attains 80 percent cover including both shrub and overstory stratum. If recruitment of SCWRF and SWS species is not evident within two years of project construction or habitat has not attained 60 percent cover within three years, impacts will be treated as permanent and additional mitigation for areas not meeting success criteria shall be provided.

In general, most construction activities would take place from September 16 through March 14 after the breeding season for LBV. Some activities may begin as early as July 15 if required permits are issued and preconstruction surveys confirm that the work would not adversely affect nesting birds. No long-term management of the restored areas outside of SANBAG's ROW is proposed as these areas would be subject to long-term maintenance activities routinely implemented by SBCFCD.

5.0 FINDINGS

The proposed action would not result in adverse modification of critical habitat for any federally listed species. Adverse modification is defined in ESA implementing regulations (50 CFR 404.02) as a direct or indirect alteration that appreciably diminishes the value of the critical habitat for both the survival and recovery of the species. Although critical habitat for the SBKR and SAS could be affected, the conservation value of SBKR Critical Habitat Unit 1 and SAS Critical Habitat will not be affected. Focused surveys did not detect SBKR within the Action area and SAS is not anticipated to occur within the Action area due to the lack of suitable habitat. Therefore, the proposed action is not likely to affect SBKR or SAS.

As described in this BA, suitable habitat for the federally endangered LBV and federally endangered SWFL also occurs within the Action area in the vicinity of the Santa Ana River. Focused surveys did not detect SWFL within the Action area, therefore the proposed action is not likely to affect the species. Focused surveys identified four LBV territories, including at least one nesting pair, in the vicinity of the proposed action. Based on the proximity of the nesting pair, the proposed action may affect, and is likely to adversely affect the LBV. Additionally, a single federally endangered Santa Ana River woolly star was observed within the proposed Action area and, as described in this BA, the proposed action may affect, and is likely to adversely affect, an individual Santa Ana River woolly star.

As described in this BA, conservation measures have been incorporated into the proposed action that would avoid and minimize adverse effects to these species. These measures will be supported by the proposed mitigation plan and habitat management plan, which will compensate for direct and indirect impacts to suitable habitat. Therefore, the proposed action would not appreciably reduce the reproduction, numbers, or distribution of any federally listed species.

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APPENDIX A

Potential Sensitive Botanical and Zoological Species

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APPENDIX A

Potential Sensitive Botanical Species

Species	Sensitivity Status	Habitat and Distribution	Potential for Occurrence
<i>Brassicaceae</i>			
Gambel's water cress <i>Nasturtium gambelii</i>	Federally Endangered	Perennial herb. Occurs in marshes, streambanks, and lake margins below 4,800 feet in elevation	Low– project area supports potentially suitable habitat, however, there is a low occurrence of ponded or marshy areas within the project area. CNDDDB data identifies the survey areas as within the species' occurrence territory. However, only three known populations occur in the state. The most recent record of an elemental occurrence in the survey area was 1935. The species was not observed within the Action area during 2012 rare plant surveys.
<i>Caryophyllaceae</i>			
Marsh sandwort <i>Arenaria paludicola</i>	Federally Endangered	Perennial herb. Occurs in boggy marshes and meadows below 1,200 feet in elevation	None – project area does not support suitable habitat. CNDDDB data identifies the Action area within the species' occurrence territory. However the most recent record of an elemental occurrence in the Action area was 1899.
<i>Chenopodiaceae</i>			
San Jacinto Valley crownscale <i>Atriplex coronate</i> var. <i>notatior</i>	Federally Endangered	Annual herb. Occurs in vernal-pools and playas below 1650 feet in elevation.	None – project area does not support suitable habitat. The species was not observed within the Action area during 2012 rare plant surveys.
<i>Malvaceae</i>			
Bird-foot checkerbloom <i>Sidalcea pedata</i>	Federally Endangered	Perennial herb. Occurs in meadows and seeps below 8200 feet in elevation.	None – project area does not support suitable habitat. The species was not observed within the Action area during 2012 rare plant surveys.
<i>Orobanchaceae</i>			
Ash-gray paintbrush <i>Castilleja cinerea</i>	Federally Threatened	Perennial herb (hemiparasitic). Occurs in pinyon and juniper woodland, montane coniferous forest, meadows and seeps and mojavean desert scrub. From below 9710 feet in elevation.	None – project area does not support suitable habitat. The species was not observed within the Action area during 2012 rare plant surveys.

Species	Sensitivity Status	Habitat and Distribution	Potential for Occurrence
Polygonaceae			
Santa Ana River woolly star <i>Eriastrum densifolium</i> ssp. <i>sanctorum</i>	Federally Endangered	Occurs in sandy or gravelly chaparral and coastal scrub (alluvial fan).	High – An individual plant was observed within a portion of the Action area located within the SAR during 2012 rare plant surveys.
Slender-horned spineflower <i>Dodecahema leptoceras</i>	Federally Endangered	Annual herb. Occurs in alluvial sand and coastal scrub. From 700 to 2,700 feet in elevation.	Moderate – project area supports potentially suitable habitat. CNDDDB data identifies the Action area as within the species' occurrence territory. However the most recent record of an elemental occurrence in the Action Area was 1983. The species was not observed within the Action area during 2012 rare plant surveys.
Scrophulariaceae			
salt marsh bird's-beak <i>Cordylanthus maritimus</i> ssp. <i>maritimus</i>	Federally Endangered	Annual herb (hemiparasitic). Occurs in coastal salt-marsh, dunes, and wetlands. From below 38 feet in elevation.	None – project area does not support suitable habitat CNDDDB data identifies the Action area as within the species' occurrence territory. However the most recent record of an elemental occurrence in the Action Area was 1888.
Themidaceae			
Thread-leaved brodiaea <i>Brodiaea filifolia</i>	Federally Threatened	Perennial bulbiferous herb. Occurs in coastal scrub and chaparral openings, vernal pools, playas, valley and foothill grassland. From below 3675 feet in elevation.	None – project area does not support suitable habitat. The species was not observed within the Action area during 2012 rare plant surveys.

Potential Sensitive Zoological Species

Species	Sensitivity Status	Preferred Habitat	Observed On-Site	Potential for Occurrence
Amphibians				
California Red-legged Frog <i>Rana draytonii</i>	Federally Threatened	Occurs in shallow permanent waters of streams, marshes, ponds and lakes. Estivate in or near riparian areas.	No	Low – no suitable breeding habitat within Action area

Species	Sensitivity Status	Preferred Habitat	Observed On-Site	Potential for Occurrence
Invertebrates				
Delhi Sands flower-loving fly <i>Rhaphiomidas terminatus abdominalis</i>	Federally Endangered	Fine, sandy soils, often with wholly or partly consolidated dunes. Restricted to a particular soil type classified as the 'Delhi' series.	No	None- The project site lacks appropriate soils. CNDDDB data identifies the Action area as within the species' occurrence territory.
Fish				
Santa Ana Sucker <i>Catostomus santaanae</i>	Federally Threatened	Slight to swift flowing perennial streams with water depths ranging from a few inches to several feet.	No	None – Action area does not support perennial flows, however Action area occurs within Critical Habitat as a source for sediment for downstream populations of SAS
Birds				
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	Federal candidate for listing,	Deciduous riparian woodland, especially including dense stands of cottonwood and willow, but also including mesquite and tamarisk in some areas.	No	Moderate – The riparian forest habitat associated with the SAR and Mission Zanja Channel provides suitable breeding habitat. CNDDDB data identifies the Action area as within the species' occurrence territory along Twin Creek and the SAR. The species was not observed during 2012 southwestern willow flycatcher and least Bell's vireo protocol surveys.
Southwestern willow flycatcher <i>(Empidonax traillii extimus)</i>	Federally Endangered	Dense riparian habitat along streams, rivers, lakesides, and other wetland habitats.	No	Moderate – The riparian forest habitat associated with the SAR and Mission Zanja Channel provides suitable breeding habitat. The species was not observed during 2012 southwestern willow flycatcher and least Bell's vireo protocol surveys.
Least Bell's vireo <i>Vireo bellii pusillus</i>	Federally Endangered	Dense brush and mesquite associated with riparian systems, willow-cottonwood forest, and streamside thickets.	Yes	High– several individuals were observed within the Action area.

Species	Sensitivity Status	Preferred Habitat	Observed On-Site	Potential for Occurrence
<i>Mammals</i>				
San Bernardino kangaroo rat <i>Dipodomys merriami parvus</i>	Federally Endangered	Alluvial sage scrub on alluvial fans, flood plains, along washes, and in adjacent upland areas.	No	Moderate –Suitable habitat occurs within the project area. CNDDDB data identifies the Action area as within the species' occurrence territory. The most recent record of an elemental occurrence in the Action Area was 1993.
Stephens' kangaroo rat <i>Dipodomys stephensi</i>	Federally Endangered	Primarily annual and perennial grasslands, but also occurs in coastal scrub and sagebrush with sparse canopy cover.	No	None –Suitable habitat occurs within the project area but the project is not within the range of the species.

APPENDIX B

CNDDDB Results



Summary Table Report
California Department of Fish and Wildlife
California Natural Diversity Database



Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Accipiter cooperii</i> Cooper's hawk	G5 S3	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	790 1,680	102 S:3	0	1	1	0	0	1	0	3	3	0	0
<i>Agelaius tricolor</i> tricolored blackbird	G2G3 S2	None None	ABC_WLBCC-Watch List of Birds of Conservation Concern BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered USFWS_BCC-Birds of Conservation Concern	1,100 1,960	429 S:4	1	0	0	0	0	3	2	2	4	0	0
<i>Aimophila ruficeps canescens</i> southern California rufous-crowned sparrow	G5T3 S2S3	None None	CDFW_WL-Watch List	2,120 2,261	185 S:5	0	3	1	0	0	1	0	5	5	0	0
<i>Ambrosia monogyra</i> singlewhorl burrobrush	G5 S2.2	None None	Rare Plant Rank - 2B.2	1,400 1,400	16 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Anniella pulchra pulchra</i> silvery legless lizard	G3G4T3T4Q S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	1,515 2,110	91 S:4	0	1	0	2	0	1	1	3	4	0	0
<i>Antrozous pallidus</i> pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	1,360 1,360	402 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Aquila chrysaetos</i> golden eagle	G5 S3	None None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	2,300 2,300	307 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Arenaria paludicola</i> marsh sandwort	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	1,000 1,000	15 S:1	0	0	0	0	1	0	1	0	0	0	1



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Artemisospiza belli belli</i> Bell's sage sparrow	G5T2T4 S2?	None None	ABC_WLBCC-Watch List of Birds of Conservation Concern CDFW_WL-Watch List USFWS_BCC-Birds of Conservation Concern	2,120 2,120	57 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Aspidoscelis hyperythra</i> orangethroat whiptail	G5 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	900 2,200	346 S:19	0	0	2	2	0	15	17	2	18	1	0
<i>Aspidoscelis tigris stejnegeri</i> coastal whiptail	G5T3T4 S2S3	None None		1,060 2,418	112 S:5	0	1	2	0	0	2	1	4	5	0	0
<i>Astragalus hornii var. hornii</i> Horn's milk-vetch	G4G5T2T3 S1	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	1,000 1,000	14 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Athene cunicularia</i> burrowing owl	G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,090 1,700	1844 S:13	0	3	0	0	1	9	4	9	12	0	1
<i>Atriplex coronata var. notatior</i> San Jacinto Valley crownscale	G4T1 S1	Endangered None	Rare Plant Rank - 1B.1	1,420 1,425	16 S:3	1	2	0	0	0	0	2	1	3	0	0
<i>Atriplex serenana var. davidsonii</i> Davidson's saltscale	G5T2? S2?	None None	Rare Plant Rank - 1B.2	1,430 1,430	28 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Batrachoseps gabrieli</i> San Gabriel slender salamander	G2 S2	None None	IUCN_DD-Data Deficient USFS_S-Sensitive	3,200 3,200	8 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Berberis nevinii</i> Nevin's barberry	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	1,020 5,200	34 S:5	0	0	1	1	1	2	3	2	4	0	1
<i>Brodiaea filifolia</i> thread-leaved brodiaea	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1	1,900 1,900	114 S:2	0	0	1	0	0	1	1	1	2	0	0
<i>Buteo regalis</i> ferruginous hawk	G4 S3S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,936 1,936	96 S:1	0	0	1	0	0	0	0	1	1	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>California macrophylla</i> round-leaved filaree	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive		155 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Calochortus palmeri</i> var. <i>palmeri</i> Palmer's mariposa-lily	G2T2 S2.1	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	6,000 6,450	83 S:3	0	0	0	0	0	3	1	2	3	0	0
<i>Calochortus plummerae</i> Plummer's mariposa-lily	G4 S4	None None	Rare Plant Rank - 4.2	1,200 5,000	230 S:24	0	5	0	0	1	18	7	17	23	1	0
<i>Canyon Live Oak Ravine Forest</i> Canyon Live Oak Ravine Forest	G3 S3.3	None None		3,400 3,400	50 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Carex comosa</i> bristly sedge	G5 S2	None None	Rare Plant Rank - 2B.1	1,000 1,000	29 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Carolella busckana</i> Busck's gallmoth	G1G3 SH	None None		1,160 1,160	4 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Castilleja cinerea</i> ash-gray paintbrush	G2 S2	Threatened None	Rare Plant Rank - 1B.2	6,800 6,800	49 S:1	1	0	0	0	0	0	0	1	1	0	0
<i>Castilleja lasiorhyncha</i> San Bernardino Mountains owl's-clover	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	6,000 7,300	46 S:7	0	2	0	1	0	4	3	4	7	0	0
<i>Catostomus santaanae</i> Santa Ana sucker	G1 S1	Threatened None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	838 2,600	27 S:3	0	1	1	0	0	1	1	2	3	0	0
<i>Centromadia pungens</i> ssp. <i>laevis</i> smooth tarplant	G3G4T2 S2	None None	Rare Plant Rank - 1B.1	1,000 2,100	104 S:13	0	1	2	1	1	8	5	8	12	1	0
<i>Ceratochrysis longimala</i> Desert cuckoo wasp	G1 S1	None None		900 900	2 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Chaetodipus fallax fallax</i> northwestern San Diego pocket mouse	G5T3 S2S3	None None	CDFW_SSC-Species of Special Concern	1,150 2,200	94 S:22	0	7	5	4	0	6	3	19	22	0	0
<i>Charina trivirgata</i> rosy boa	G4G5 S3S4	None None	IUCN_LC-Least Concern USFS_S-Sensitive	1,767 2,700	48 S:3	0	2	0	0	0	1	0	3	3	0	0
<i>Charina umbratica</i> southern rubber boa	G2G3 S2S3	None Threatened	USFS_S-Sensitive	5,400 7,240	45 S:23	0	1	0	0	0	22	22	1	23	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Chloropyron maritimum ssp. maritimum</i> salt marsh bird's-beak	G4?T1 S1	Endangered Endangered	Rare Plant Rank - 1B.2	1,000 1,000	27 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Chorizanthe parryi var. parryi</i> Parry's spineflower	G2T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive USFS_S-Sensitive	1,000 3,280	94 S:24	1	1	2	0	1	19	15	9	23	1	0
<i>Chorizanthe xanti var. leucotheca</i> white-bracted spineflower	G4T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	2,300 2,300	48 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	G5T3Q S1	Candidate Endangered	BLM_S-Sensitive USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	1,000 1,690	119 S:2	0	1	0	0	1	0	1	1	1	1	0
<i>Crotalus ruber</i> red-diamond rattlesnake	G4 S2?	None None	CDFW_SSC-Species of Special Concern	900 2,280	148 S:6	0	0	0	0	0	6	6	0	6	0	0
<i>Cuscuta obtusiflora var. glandulosa</i> Peruvian dodder	G5T4T5 SH	None None	Rare Plant Rank - 2B.2		6 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Dendroica petechia brewsteri</i> yellow warbler	G5T3? S2	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	1,460 1,460	48 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Diadophis punctatus modestus</i> San Bernardino ringneck snake	G5T2T3Q S2?	None None	USFS_S-Sensitive	3,137 4,797	10 S:3	1	2	0	0	0	0	0	3	3	0	0
<i>Dipodomys merriami parvus</i> San Bernardino kangaroo rat	G5T1 S1	Endangered None	CDFW_SSC-Species of Special Concern	1,030 2,200	47 S:24	3	2	6	2	1	10	5	19	23	1	0
<i>Dipodomys stephensi</i> Stephens' kangaroo rat	G2 S2	Endangered Threatened	IUCN_EN-Endangered	1 2,500	214 S:33	1	6	11	8	4	3	24	9	29	1	3
<i>Dodecahema leptoceras</i> slender-horned spineflower	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	1,100 2,200	35 S:9	0	1	1	0	3	4	8	1	6	1	2
<i>Elanus leucurus</i> white-tailed kite	G5 S3	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	2,760 2,760	158 S:1	0	0	1	0	0	0	0	1	1	0	0
<i>Empidonax traillii extimus</i> southwestern willow flycatcher	G5T1T2 S1	Endangered Endangered	ABC_WLBCC-Watch List of Birds of Conservation Concern	790 3,400	70 S:5	1	1	1	0	0	2	0	5	5	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Eremophila alpestris actia</i> California horned lark	G5T3Q S3	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	1,100 2,430	77 S:4	0	0	1	2	0	1	1	3	4	0	0
<i>Eriastrum densifolium ssp. sanctorum</i> Santa Ana River woollystar	G4T1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	840 2,300	22 S:17	0	3	7	4	1	2	4	13	16	1	0
<i>Euchloe hyantis andrewsi</i> Andrew's marble butterfly	G3G4T1 S1	None None		4,800 6,000	6 S:4	0	0	0	0	0	4	4	0	4	0	0
<i>Eumops perotis californicus</i> western mastiff bat	G5T4 S3?	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern WBWG_H-High Priority	1,380 2,470	293 S:6	0	0	0	1	0	5	6	0	6	0	0
<i>Fimbristylis thermalis</i> hot springs fimbristylis	G4 S2.2	None None	Rare Plant Rank - 2B.2	1,900 1,900	14 S:1	0	0	0	1	0	0	0	1	1	0	0
<i>Galium californicum ssp. primum</i> Alvin Meadow bedstraw	G5T1Q S1	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	1,180 1,180	4 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Gila orcuttii</i> arroyo chub	G2 S2	None None	AFS_VU-Vulnerable CDFW_SSC-Species of Special Concern USFS_S-Sensitive	838 880	49 S:2	0	0	1	1	0	0	0	2	2	0	0
<i>Glaucomys sabrinus californicus</i> San Bernardino flying squirrel	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	4,600 5,300	11 S:5	1	0	2	0	0	2	3	2	5	0	0
<i>Haliaeetus leucocephalus</i> bald eagle	G5 S2	Delisted Endangered	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	5,150 5,200	315 S:3	0	0	1	0	0	2	2	1	3	0	0
<i>Helianthus nuttallii ssp. parishii</i> Los Angeles sunflower	G5TH SH	None None	Rare Plant Rank - 1A	1,000 1,000	8 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Heuchera parishii</i> Parish's alumroot	G3 S3	None None	Rare Plant Rank - 1B.3 USFS_S-Sensitive	5,600 6,600	70 S:5	0	0	0	0	0	5	5	0	5	0	0



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<i>Horkelia cuneata var. puberula</i> mesa horkelia	G4T2 S2.1	None None	Rare Plant Rank - 1B.1 USFS_S-Sensitive	1,100 1,100	58 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Icteria virens</i> yellow-breasted chat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	1,460 1,690	84 S:2	0	1	0	0	0	1	0	2	2	0	0
<i>Imperata brevifolia</i> California satintail	G2 S2.1	None None	Rare Plant Rank - 2B.1 USFS_S-Sensitive	1,480 3,800	31 S:4	0	0	0	1	0	3	2	2	4	0	0
<i>Ivesia argyrocoma var. argyrocoma</i> silver-haired ivesia	G2T2 S2.2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	5,620 5,620	41 S:1	0	0	0	1	0	0	0	1	1	0	0
<i>Lampropeltis zonata (parvirubra)</i> California mountain kingsnake (San Bernardino population)	G4G5 S2?	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive	3,460 3,460	9 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Lanius ludovicianus</i> loggerhead shrike	G4 S4	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,460 2,596	94 S:3	0	1	0	0	0	2	0	3	3	0	0
<i>Lasiurus xanthinus</i> western yellow bat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern WBWG_H-High Priority	1,050 2,600	57 S:8	0	0	0	0	0	8	6	2	8	0	0
<i>Lasthenia glabrata ssp. coulteri</i> Coulter's goldfields	G4T3 S2.1	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	1,430 1,460	89 S:5	2	1	0	0	0	2	1	4	5	0	0
<i>Lepidium virginicum var. robinsonii</i> Robinson's pepper-grass	G5T3 S3	None None	Rare Plant Rank - 4.3	850 2,100	142 S:9	0	0	0	0	0	9	7	2	9	0	0
<i>Lepus californicus bennettii</i> San Diego black-tailed jackrabbit	G5T3? S3?	None None	CDFW_SSC-Species of Special Concern	1,060 2,745	96 S:12	0	3	8	0	0	1	0	12	12	0	0
<i>Lilium parryi</i> lemon lily	G3 S3	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	5,450 7,915	138 S:13	1	0	1	2	0	9	7	6	13	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Lycium parishii</i> Parish's desert-thorn	G3? S2S3	None None	Rare Plant Rank - 2B.3		14 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Malacothamnus parishii</i> Parish's bush-mallow	GHQ SH	None None	Rare Plant Rank - 1A	1,290 1,290	1 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Monardella macrantha ssp. hallii</i> Hall's monardella	G5T3 S3	None None	Rare Plant Rank - 1B.3 USFS_S-Sensitive	3,500 5,300	38 S:5	0	5	0	0	0	0	3	2	5	0	0
<i>Monardella pringlei</i> Pringle's monardella	GX SX	None None	Rare Plant Rank - 1A	1,000 1,000	2 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Nama stenocarpum</i> mud nama	G4G5 S1S2	None None	Rare Plant Rank - 2B.2	1,400 1,400	22 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Nasturtium gambelii</i> Gambel's water cress	G1 S1	Endangered Threatened	Rare Plant Rank - 1B.1	1,000 1,000	12 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Neotamias speciosus speciosus</i> lodgpole chipmunk	G4T2T3 S2S3	None None		6,800 7,300	24 S:3	0	0	0	0	0	3	3	0	3	0	0
<i>Neotoma lepida intermedia</i> San Diego desert woodrat	G5T3? S3?	None None	CDFW_SSC-Species of Special Concern	1,200 1,630	115 S:5	0	2	2	0	0	1	1	4	5	0	0
<i>Nyctinomops femorosaccus</i> pocketed free-tailed bat	G4 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern WBWG_M-Medium Priority	1,200 1,600	90 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Onychomys torridus ramona</i> southern grasshopper mouse	G5T3? S3?	None None	CDFW_SSC-Species of Special Concern	1,180 2,000	26 S:3	0	0	0	0	0	3	3	0	3	0	0
<i>Packera bernardina</i> San Bernardino ragwort	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	7,000 7,000	35 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Perideridia parishii ssp. parishii</i> Parish's yampah	G4T3T4 S2.2?	None None	Rare Plant Rank - 2B.2	5,600 7,480	37 S:8	0	0	1	0	0	7	2	6	8	0	0
<i>Perognathus alticolus alticolus</i> white-eared pocket mouse	G1G2TH SH	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered USFS_S-Sensitive	5,500 6,153	3 S:3	0	0	0	0	3	0	3	0	0	3	0



Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database



Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Perognathus longimembris brevinasus</i> Los Angeles pocket mouse	G5T1T2 S1S2	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	1,000 2,000	49 S:16	1	3	4	1	0	7	7	9	16	0	0
<i>Phrynosoma blainvillii</i> coast horned lizard	G3G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive	1,000 4,600	677 S:23	1	8	0	0	2	12	17	6	21	0	2
<i>Plegadis chihi</i> white-faced ibis	G5 S1	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	1,425 1,425	20 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Polioptila californica californica</i> coastal California gnatcatcher	G3T2 S2	Threatened None	ABC_WLBCC-Watch List of Birds of Conservation Concern CDFW_SSC-Species of Special Concern	1,100 2,180	807 S:14	0	3	2	0	1	8	7	7	13	0	1
<i>Rana draytonii</i> California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	2,600 2,600	1335 S:1	0	1	0	0	0	0	1	0	1	0	0
<i>Rana muscosa</i> southern mountain yellow-legged frog	G1 S1	Endangered Endangered	CDFW_SSC-Species of Special Concern IUCN_EN-Endangered USFS_S-Sensitive	1,800 6,680	167 S:5	0	1	0	0	3	1	3	2	2	1	2
<i>Rhaphiomidas terminatus abdominalis</i> Delhi Sands flower-loving fly	G1T1 S1	Endangered None		1,000 1,180	13 S:6	0	1	3	0	1	1	0	6	5	1	0
<i>Rhinichthys osculus ssp. 3</i> Santa Ana speckled dace	G5T1 S1	None None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern USFS_S-Sensitive	1,525 2,080	14 S:3	0	3	0	0	0	0	0	3	3	0	0
<i>Ribes divaricatum var. parishii</i> Parish's gooseberry	G4TH SH	None None	Rare Plant Rank - 1A	1,000 1,000	4 S:1	0	0	0	0	1	0	1	0	0	1	0
<i>Riversidian Alluvial Fan Sage Scrub</i> Riversidian Alluvial Fan Sage Scrub	G1 S1.1	None None		1,300 2,900	30 S:4	0	1	1	0	1	1	4	0	3	0	1
<i>Schoenus nigricans</i> black bog-rush	G4 S2.2	None None	Rare Plant Rank - 2B.2 USFS_S-Sensitive	1,950 1,950	13 S:1	0	0	0	0	0	1	0	1	1	0	0
<i>Sidalcea hickmanii ssp. parishii</i> Parish's checkerbloom	G3T1 S1	None Rare	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	4,600 4,600	17 S:1	0	0	0	0	0	1	1	0	1	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Sidalcea malviflora ssp. dolosa</i> Bear Valley checkerbloom	G5T2T3 S2S3	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive		18 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Sidalcea neomexicana</i> Salt Spring checkerbloom	G4? S2S3	None None	Rare Plant Rank - 2B.2 USFS_S-Sensitive	1,050 1,050	15 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Sidalcea pedata</i> bird-foot checkerbloom	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	6,040 6,040	24 S:1	0	0	0	0	1	0	1	0	0	0	1
<i>Southern Coast Live Oak Riparian Forest</i> Southern Coast Live Oak Riparian Forest	G4 S4	None None		1,780 1,820	246 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Southern Cottonwood Willow Riparian Forest</i> Southern Cottonwood Willow Riparian Forest	G3 S3.2	None None		860 2,840	111 S:3	0	0	0	0	0	3	3	0	3	0	0
<i>Southern Mixed Riparian Forest</i> Southern Mixed Riparian Forest	G2 S2.1	None None		1,980 1,980	14 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Southern Riparian Forest</i> Southern Riparian Forest	G4 S4	None None		2,160 2,160	20 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Southern Riparian Scrub</i> Southern Riparian Scrub	G3 S3.2	None None		1,360 1,840	56 S:2	0	0	0	0	0	2	2	0	2	0	0
<i>Southern Sycamore Alder Riparian Woodland</i> Southern Sycamore Alder Riparian Woodland	G4 S4	None None		1,100 3,000	230 S:16	0	0	0	0	0	16	16	0	16	0	0
<i>Southern Willow Scrub</i> Southern Willow Scrub	G3 S2.1	None None		2,200 2,200	45 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Spea hammondi</i> western spadefoot	G3 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	1,510 2,525	423 S:7	0	1	2	0	0	4	2	5	7	0	0
<i>Sphenopholis obtusata</i> prairie wedge grass	G5 S2.2	None None	Rare Plant Rank - 2B.2	800 1,000	19 S:2	0	0	0	0	0	2	2	0	2	0	0



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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
<i>Spinus lawrencei</i> Lawrence's goldfinch	G3G4 S3	None None	ABC_WLBCC-Watch List of Birds of Conservation Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,690 1,690	3 S:1	0	1	0	0	0	0	0	1	1	0	0
<i>Streptanthus bernardinus</i> Laguna Mountains jewel-flower	G3 S3	None None	Rare Plant Rank - 4.3	5,990 7,100	22 S:7	0	3	1	0	0	3	6	1	7	0	0
<i>Streptanthus campestris</i> southern jewel-flower	G2 S2.3	None None	Rare Plant Rank - 1B.3 USFS_S-Sensitive	4,000 6,200	40 S:4	0	0	0	1	0	3	3	1	4	0	0
<i>Symphytotrichum defoliatum</i> San Bernardino aster	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	2,000 2,000	76 S:3	0	0	0	0	1	2	3	0	2	0	1
<i>Taxidea taxus</i> American badger	G5 S4	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	1,040 5,200	471 S:3	0	0	0	0	0	3	3	0	3	0	0
<i>Thamnophis hammondi</i> two-striped garter snake	G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive	1,955 3,460	143 S:7	2	2	1	0	1	1	1	6	6	1	0
<i>Thelypteris puberula</i> var. <i>sonorensis</i> Sonoran maiden fern	G5T3 S2.2?	None None	Rare Plant Rank - 2B.2 USFS_S-Sensitive	2,000 2,000	21 S:1	0	0	1	0	0	0	0	1	1	0	0
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's trichocoronis	G4T3 S1	None None	Rare Plant Rank - 2B.1	1,420 1,420	9 S:1	0	0	0	0	0	1	1	0	1	0	0
<i>Vireo bellii pusillus</i> least Bell's vireo	G5T2 S2	Endangered Endangered	ABC_WLBCC-Watch List of Birds of Conservation Concern IUCN_NT-Near Threatened	790 2,000	315 S:8	1	1	4	0	0	2	1	7	8	0	0

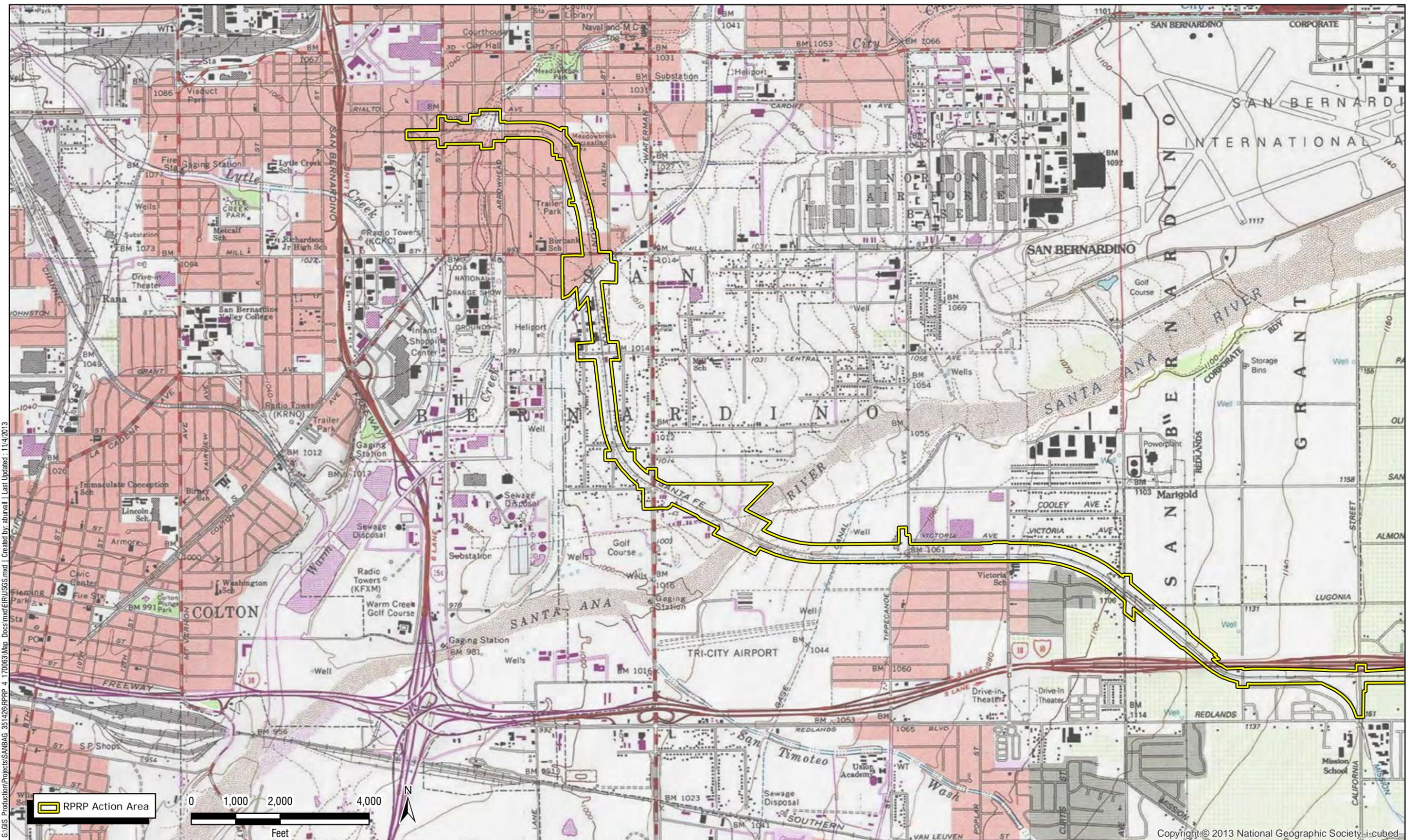
APPENDIX C

Project Figures



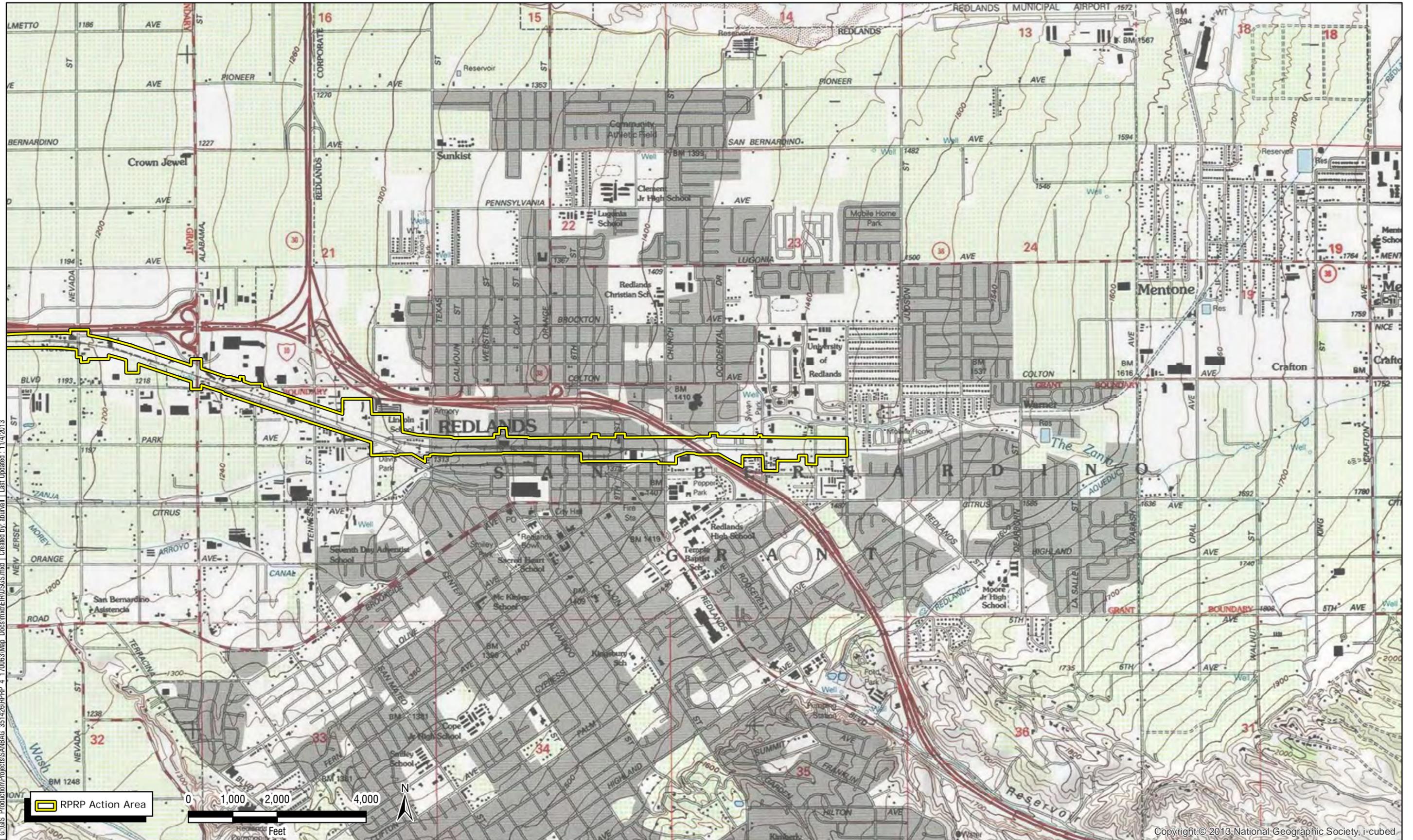
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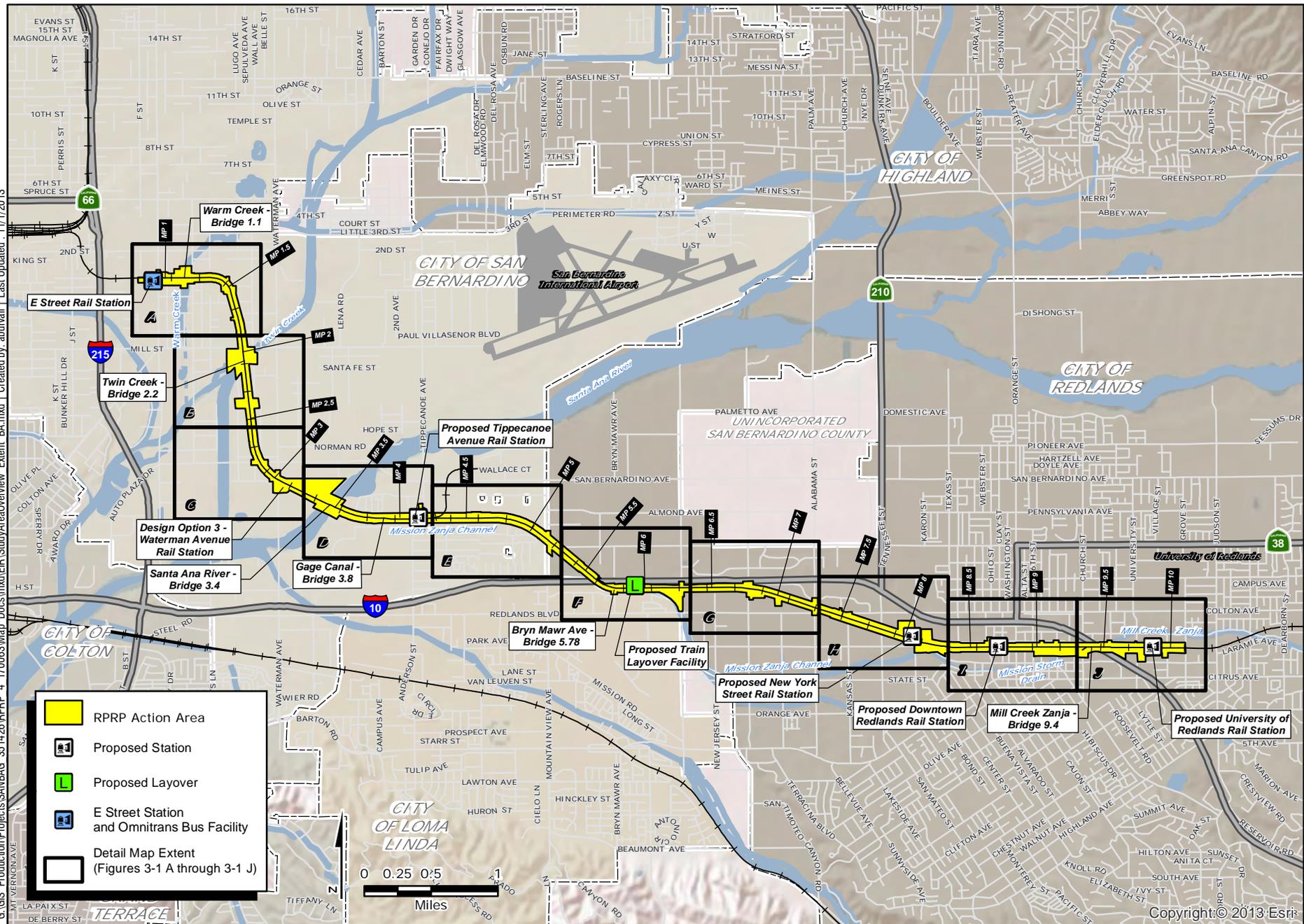
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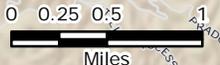


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	RPRP Action Area
	Proposed Station
	Proposed Layover
	E Street Station and Omnitrans Bus Facility
	Detail Map Extent (Figures 3-1 A through 3-1 J)



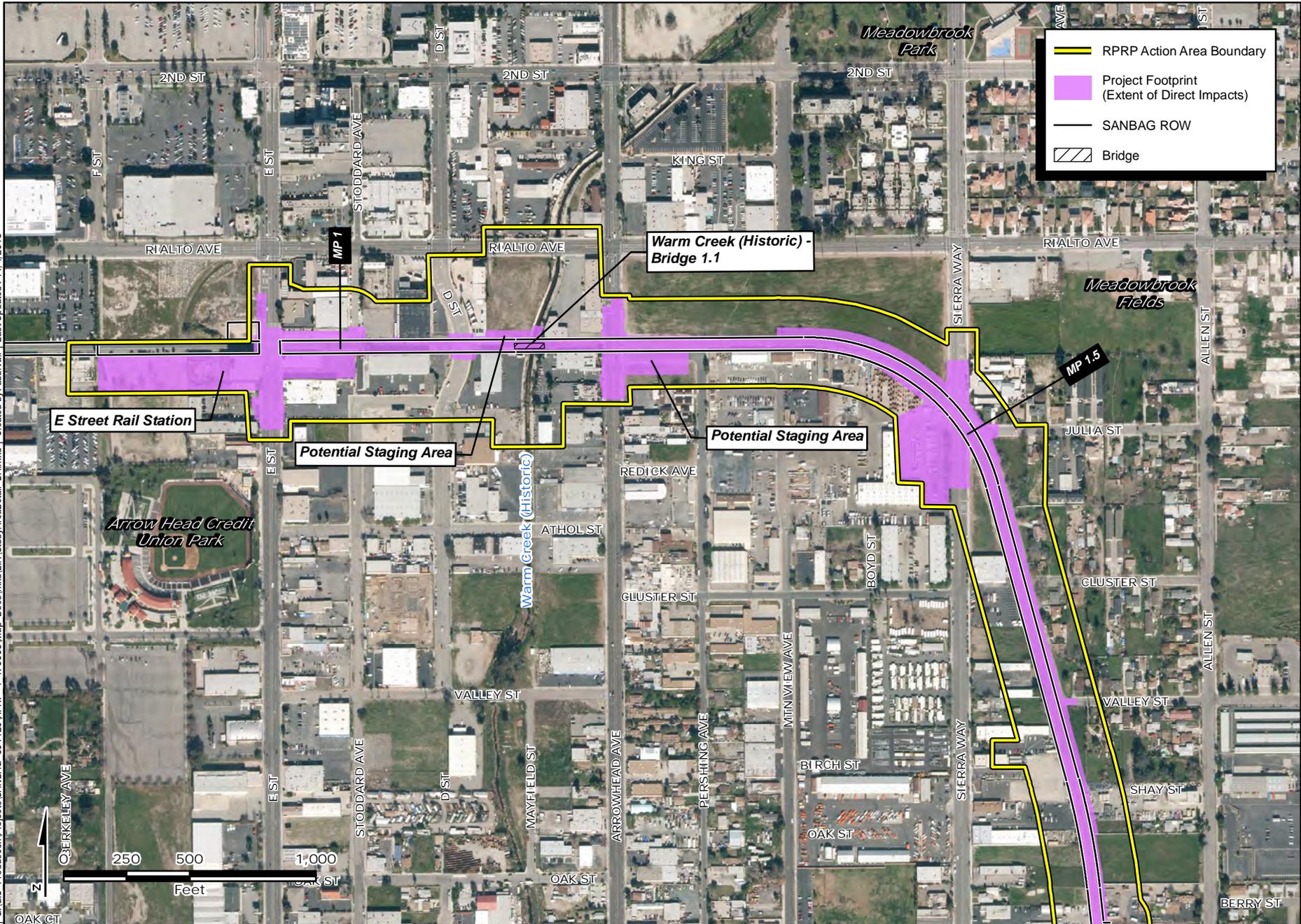
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RPRP Action Area Overview

Figure 3

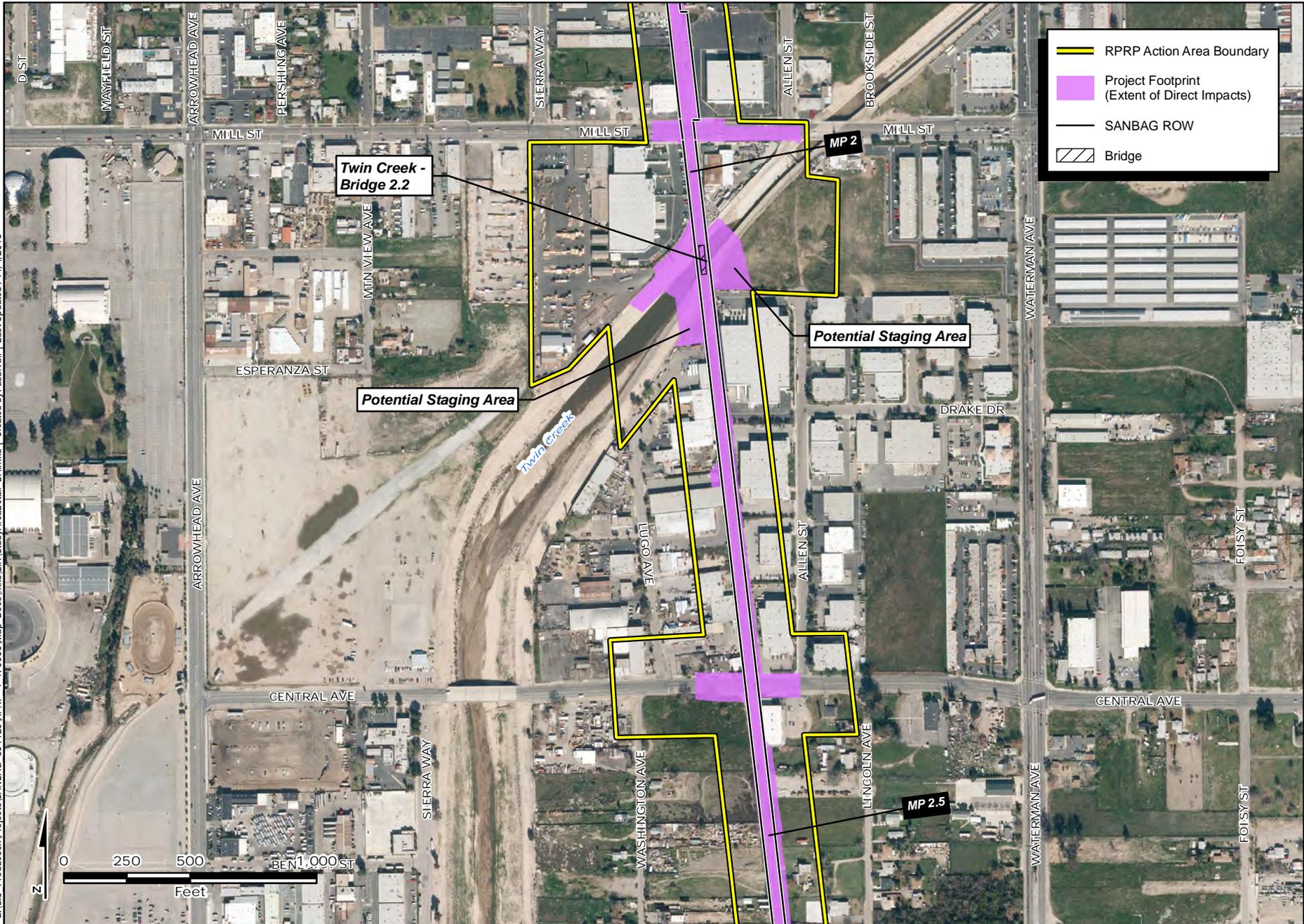
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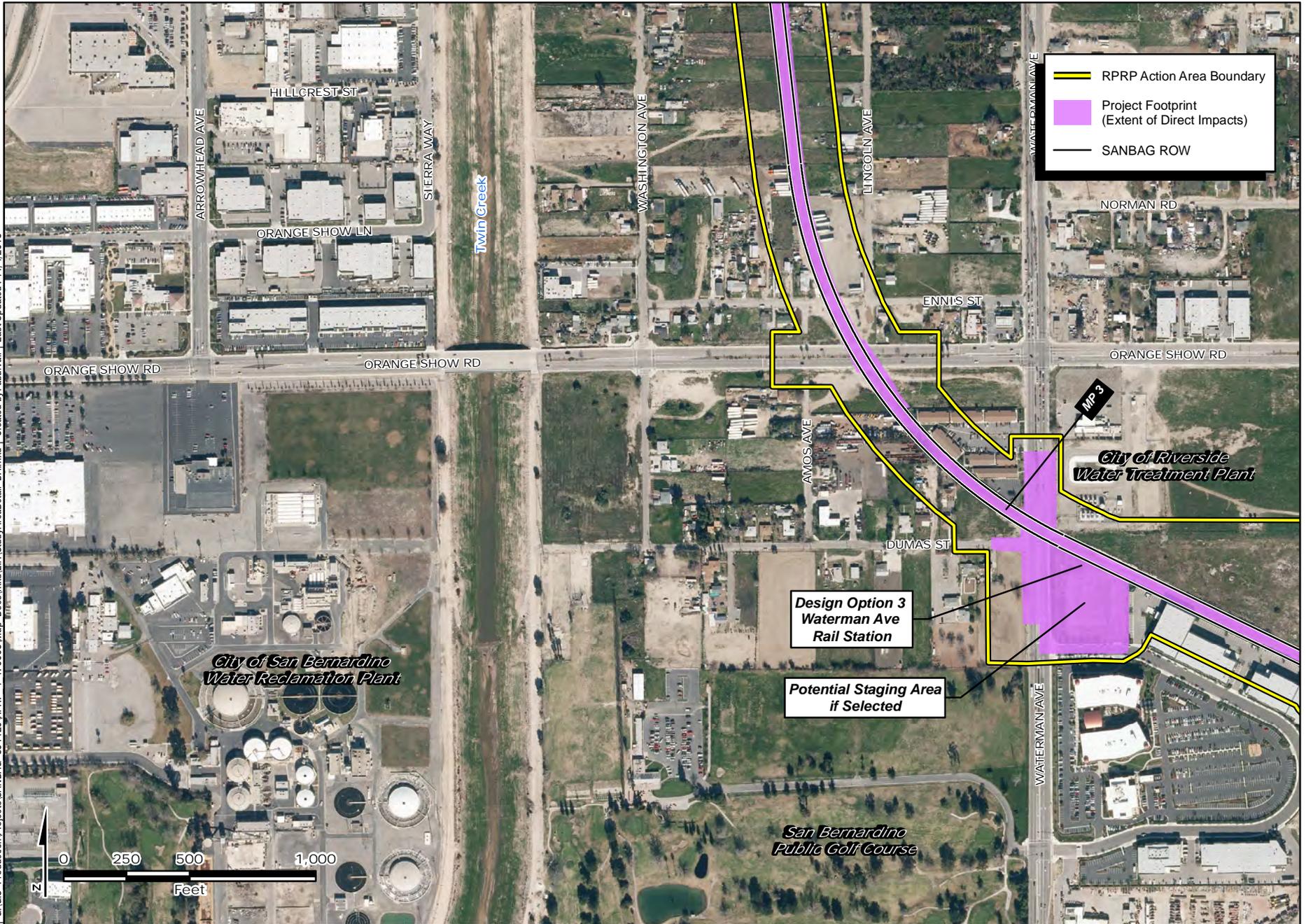
RPRP Action Area Detail – MP 1 to MP 1.8
Figure 3 A

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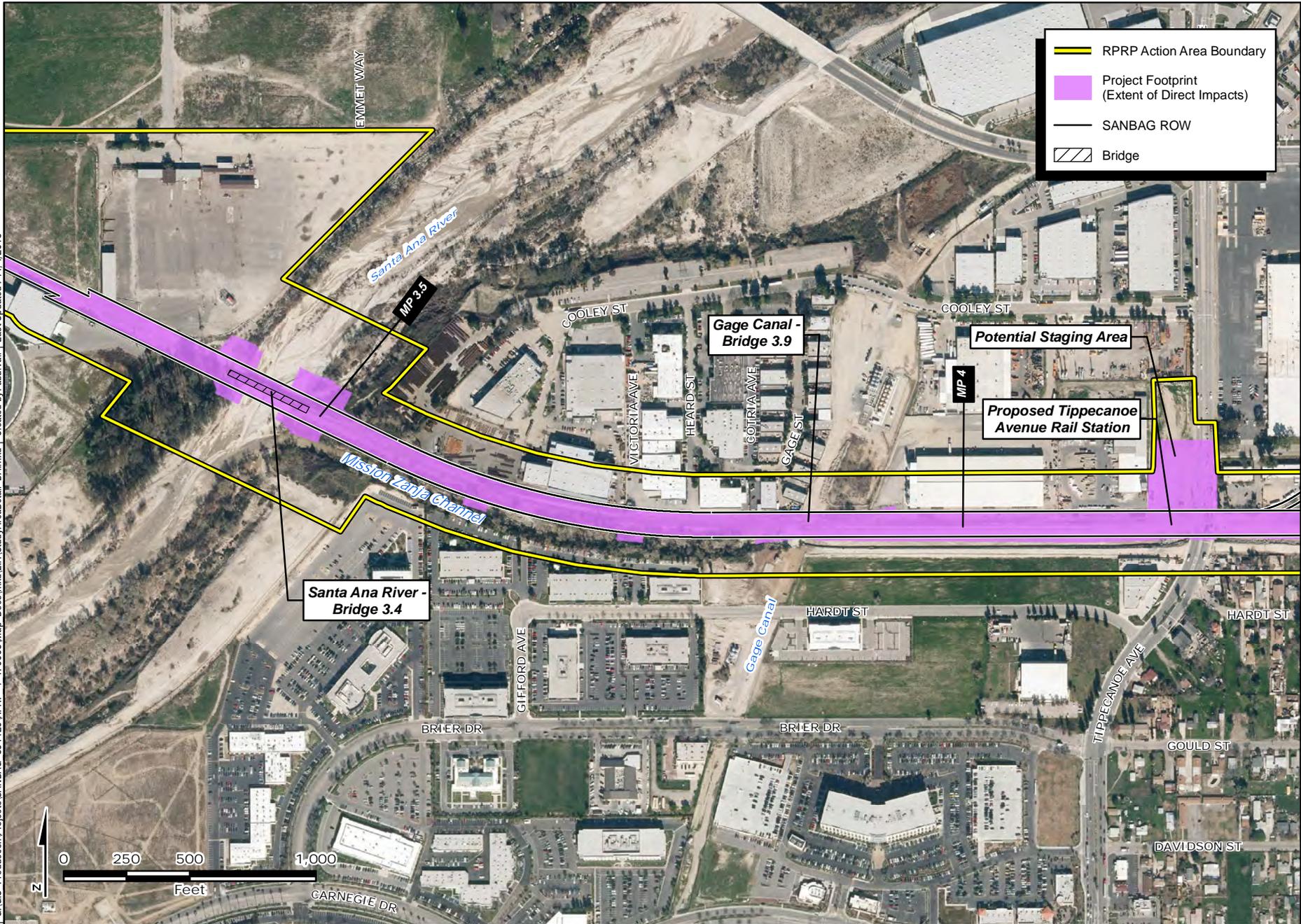
RRP Action Area Detail – MP 1.9 to MP 2.6
Figure 3 B

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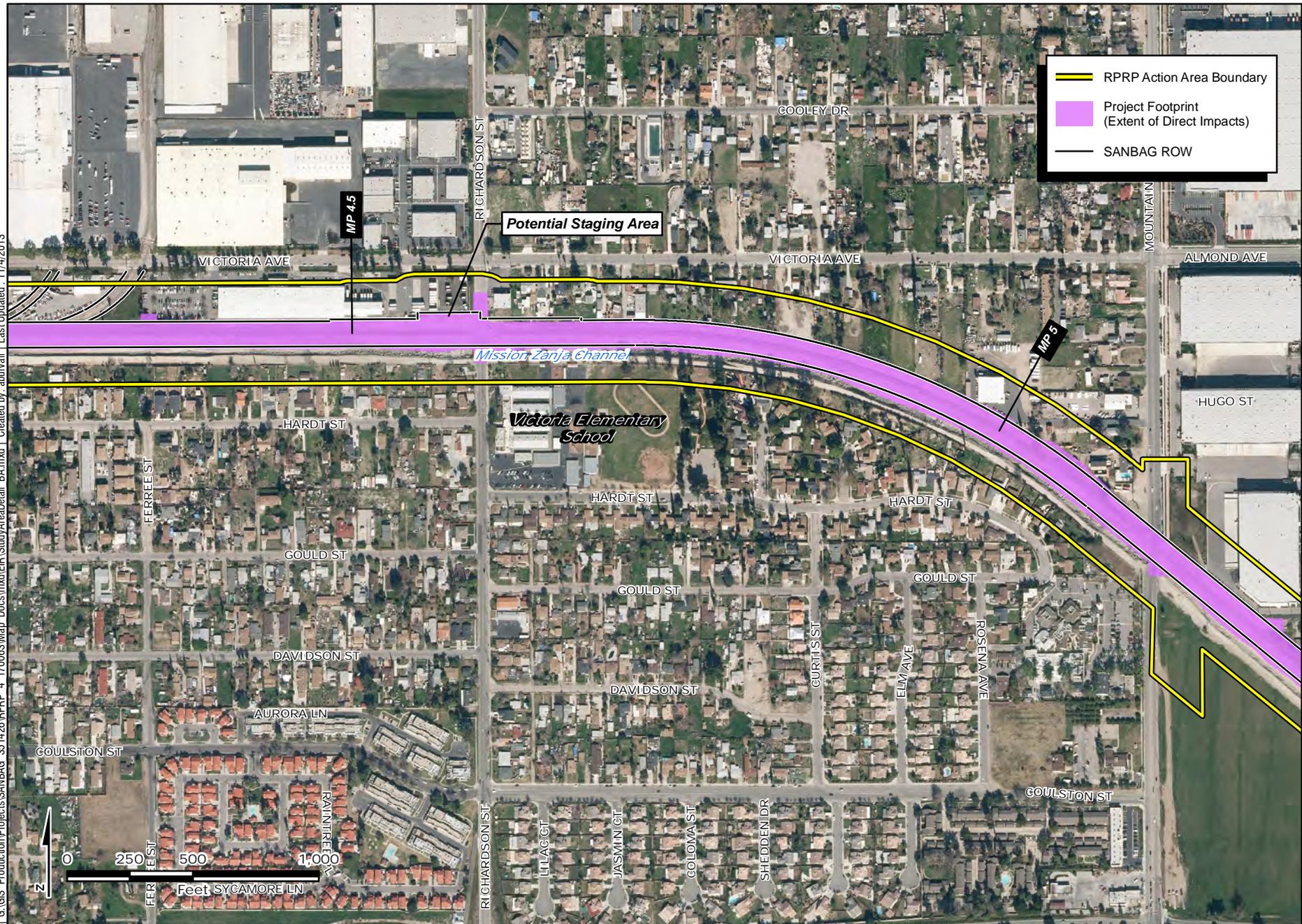
RPRP Action Area Detail – MP 2.7 to MP 3.2
Figure 3 C

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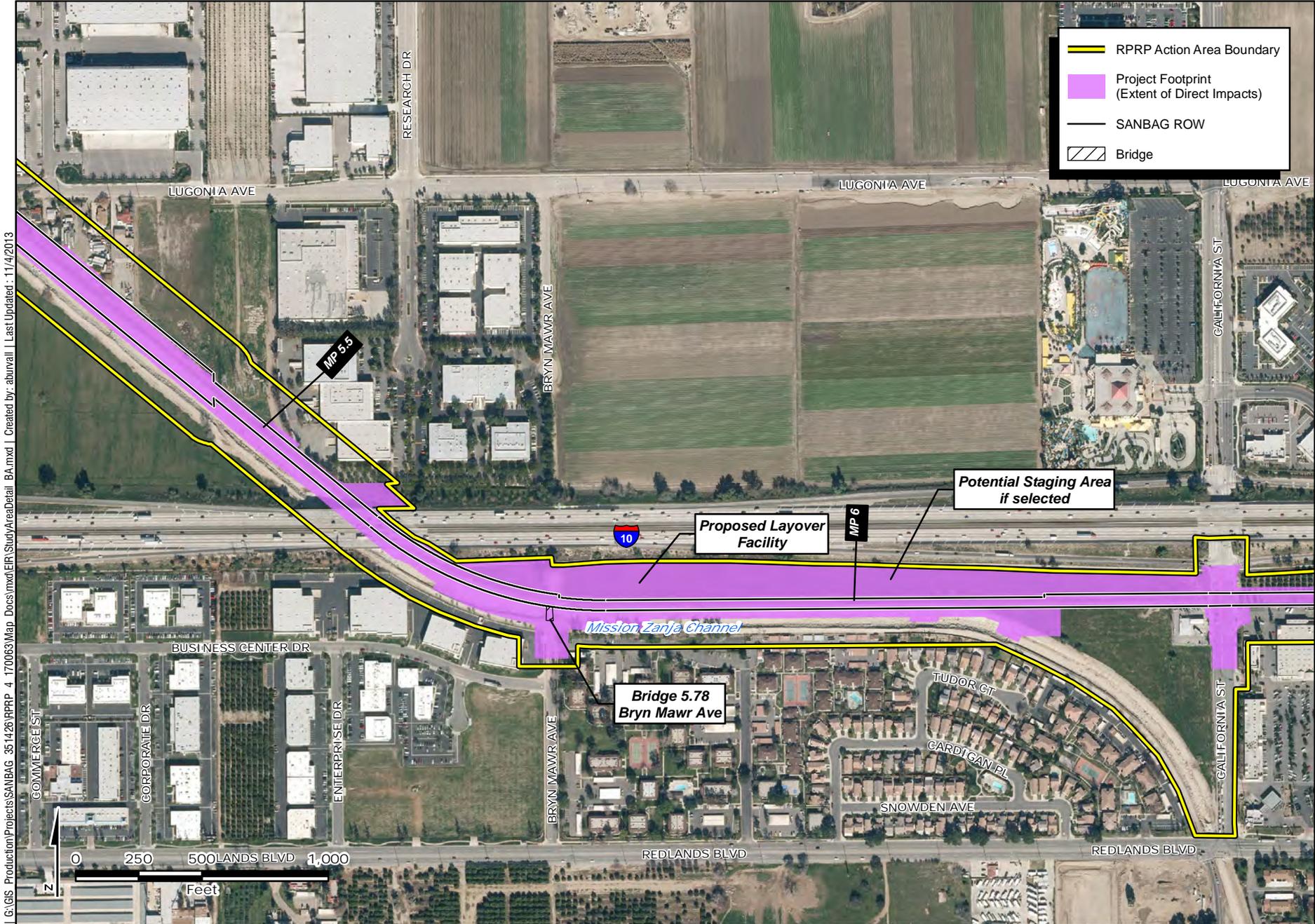


RPRP Action Area Detail – MP 3.3 to MP 4.2
Figure 3 D

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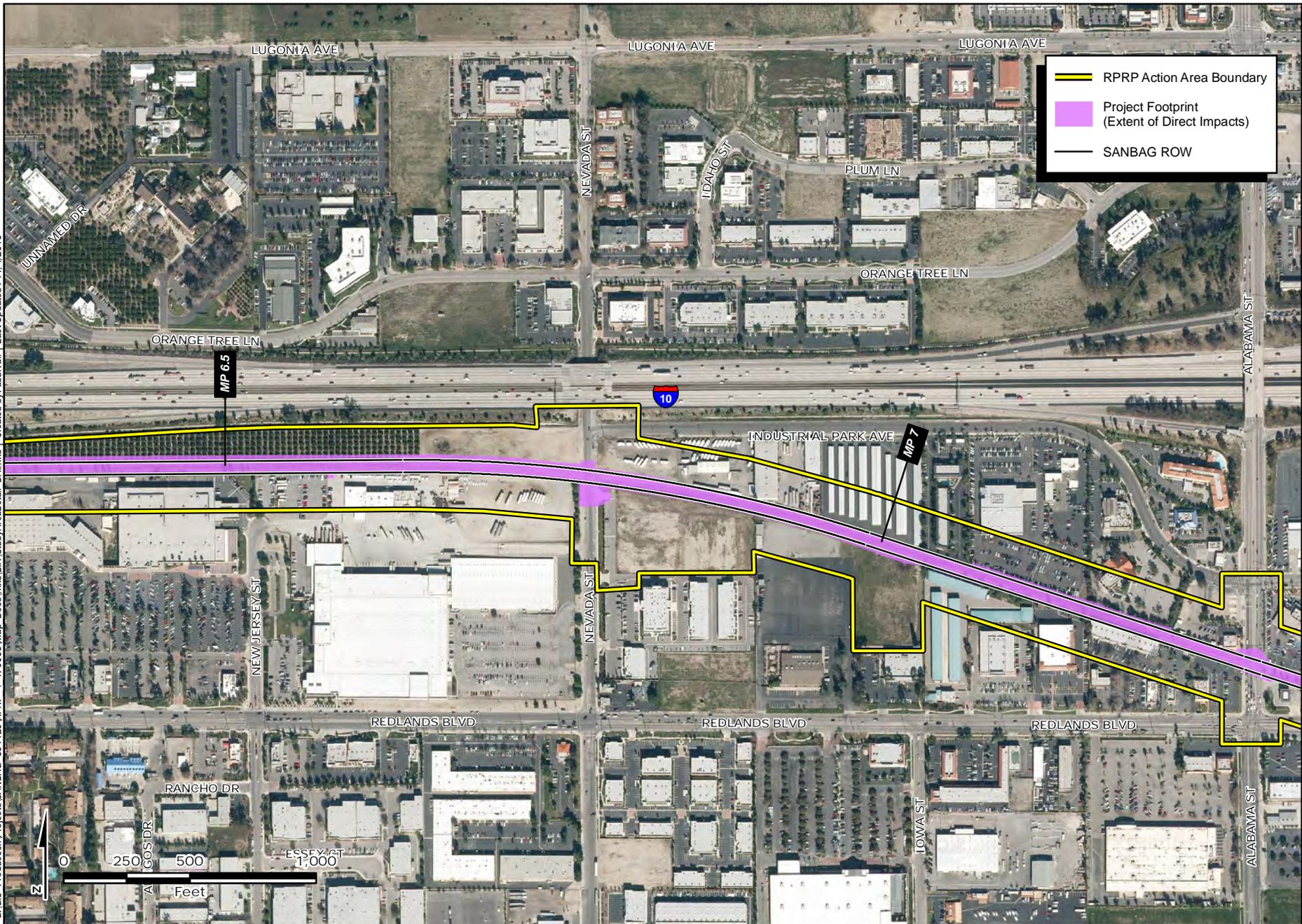
RPRP Action Area Detail – MP 4.3 to 5.2
Figure 3 E



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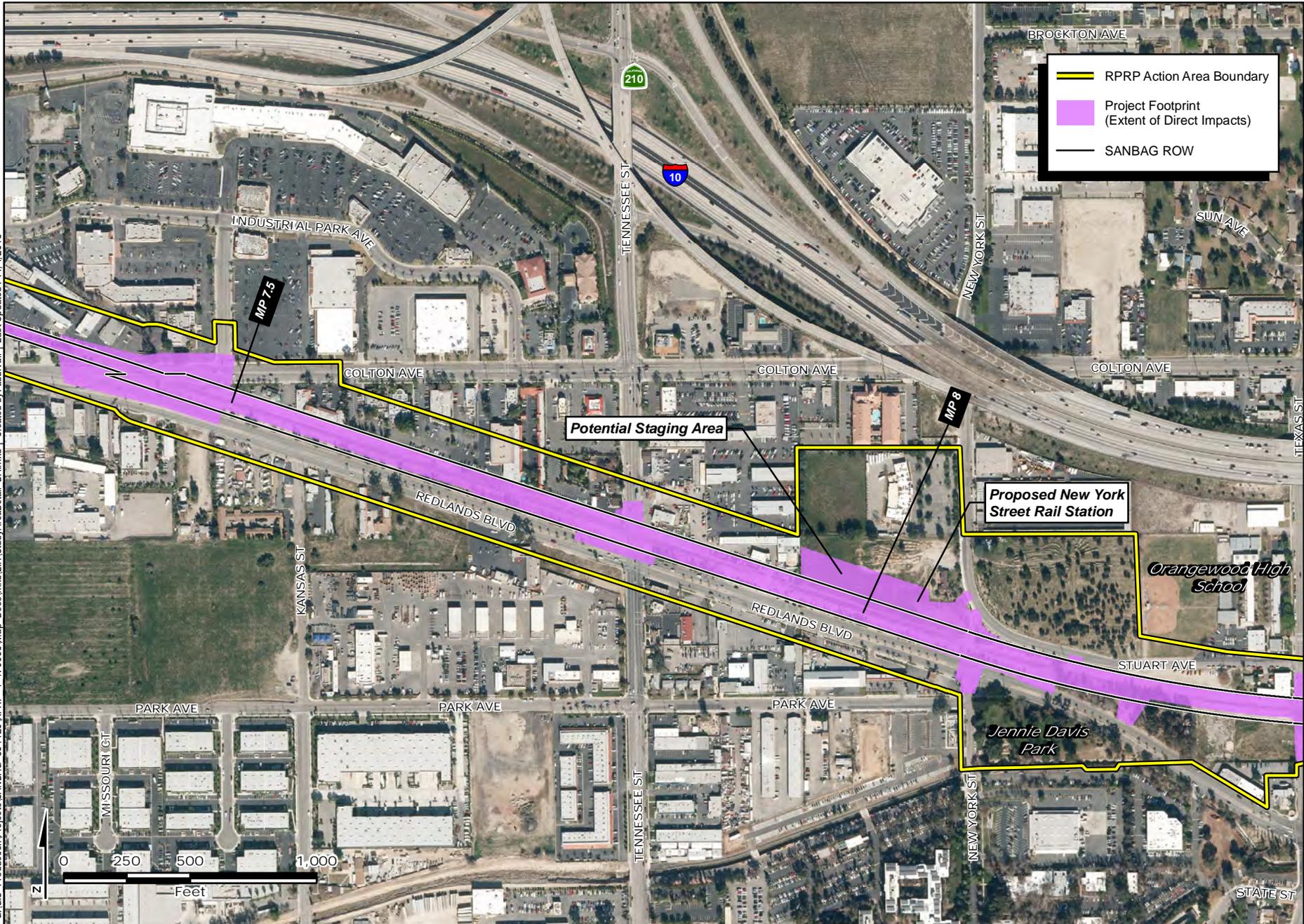
RPRP Action Area Detail – MP 5.3 to MP 6.3
Figure 3 F

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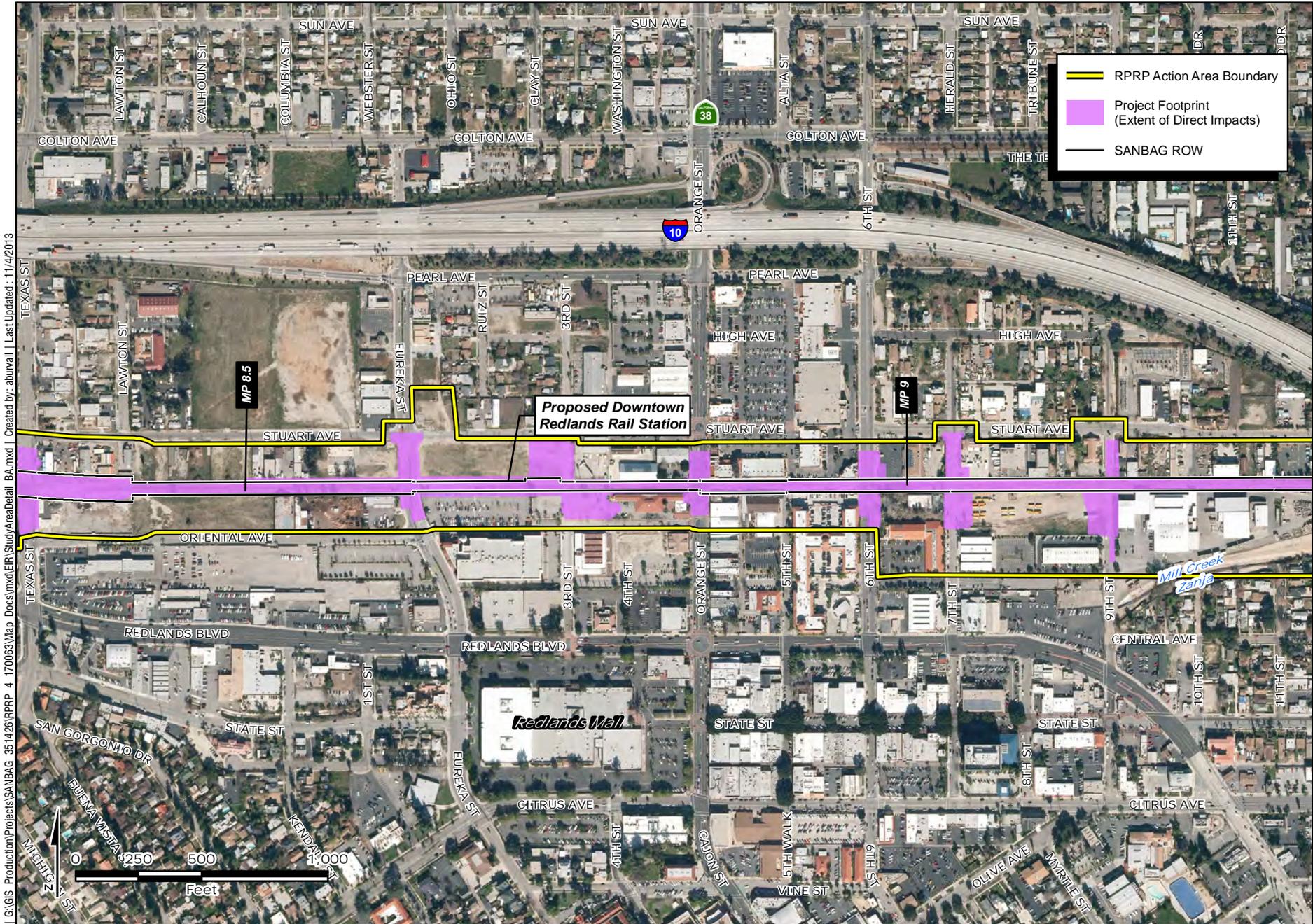


RPRP Action Area Detail – MP 6.4 to MP 7.3
Figure 3 G

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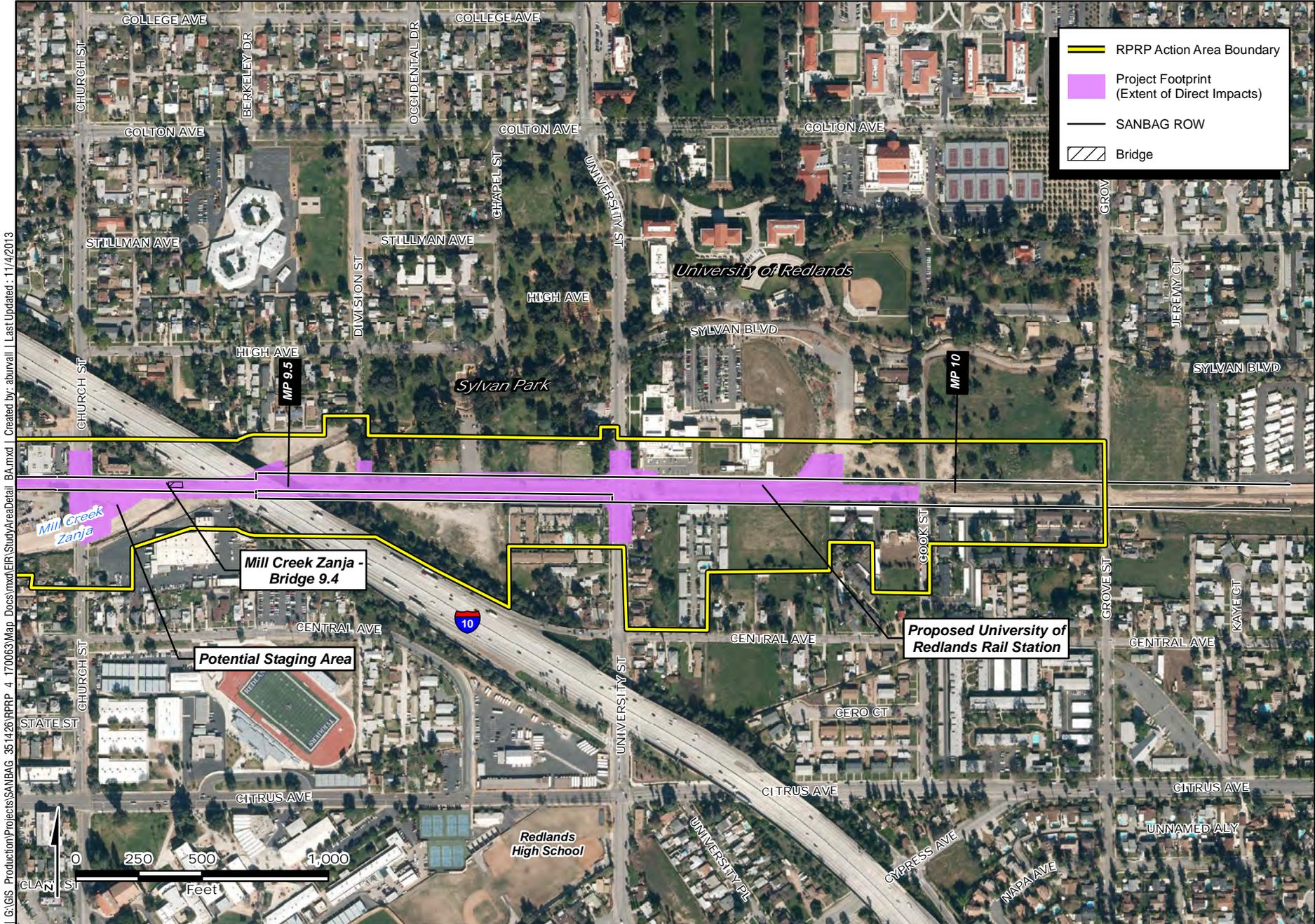


RPRP Action Area Detail – MP 7.4 to MP 8.3
Figure 3 H



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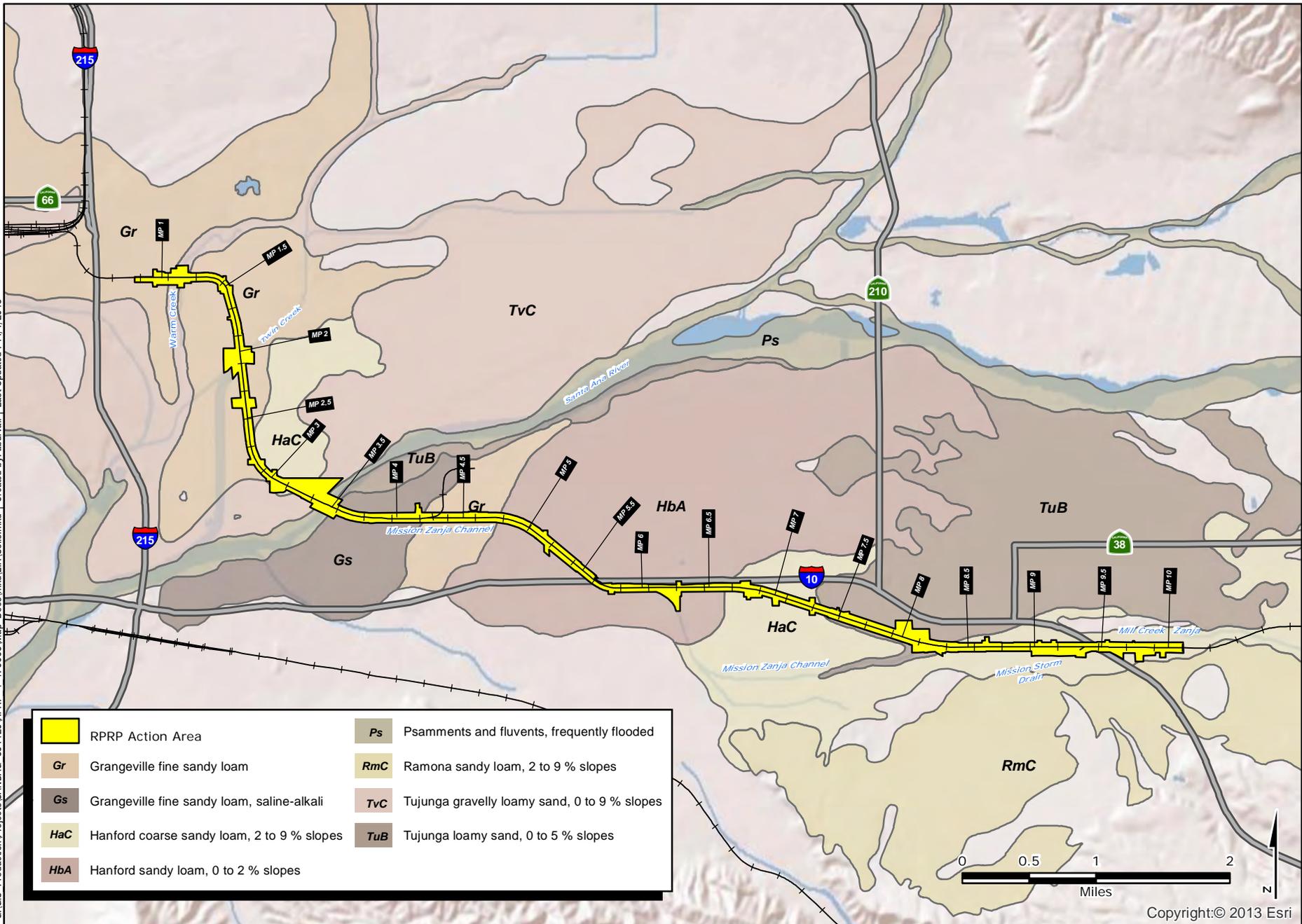
RPRP Action Area Detail – MP 8.4 to MP 9.3
Figure 3 I



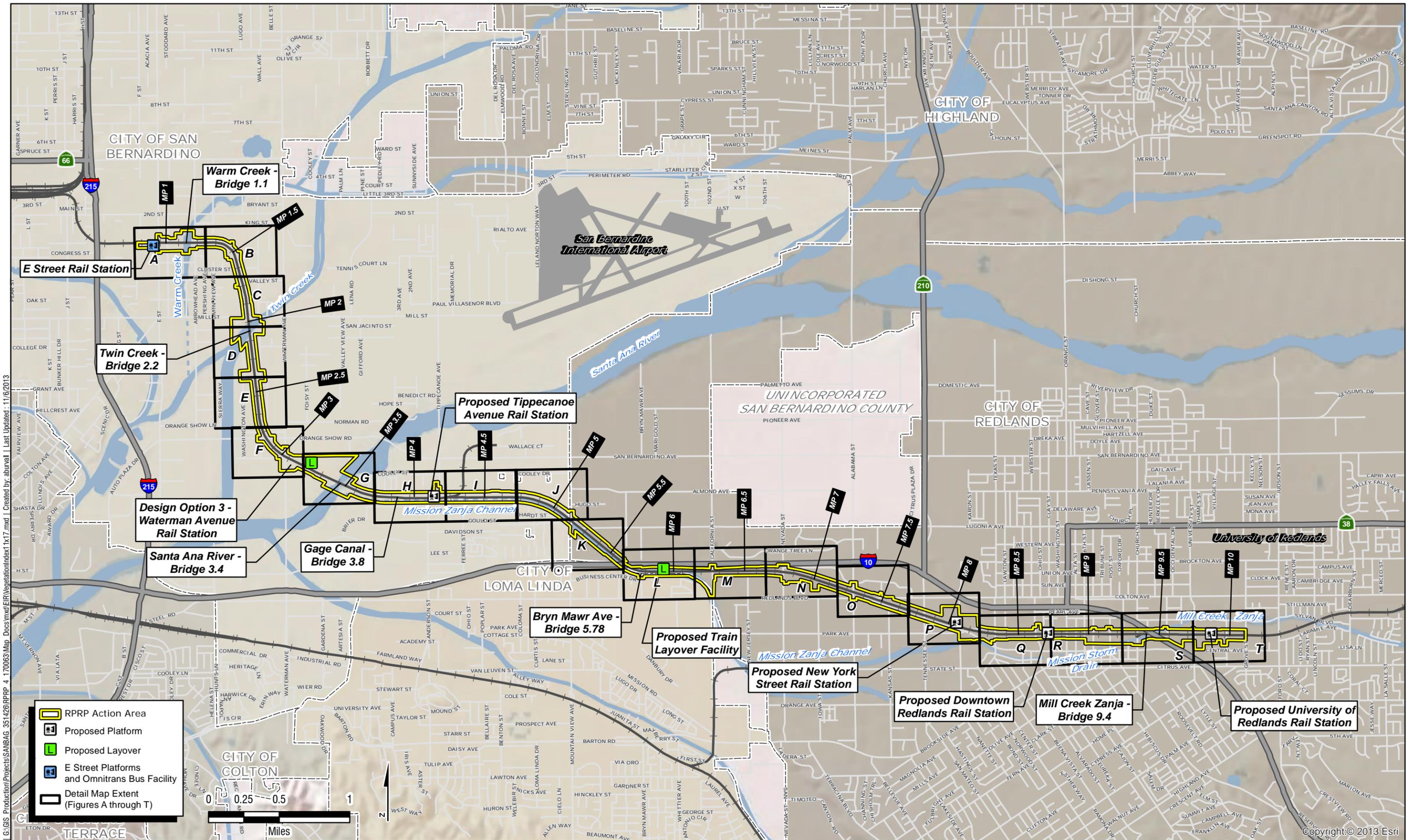
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RPRP Action Area Detail – MP 9.4 to MP 10.1
Figure 3 J

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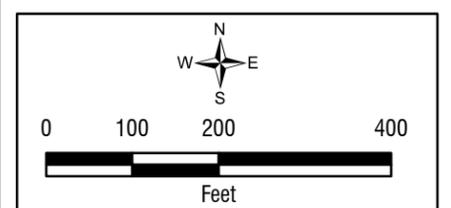
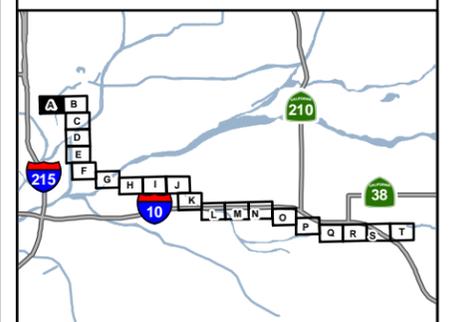
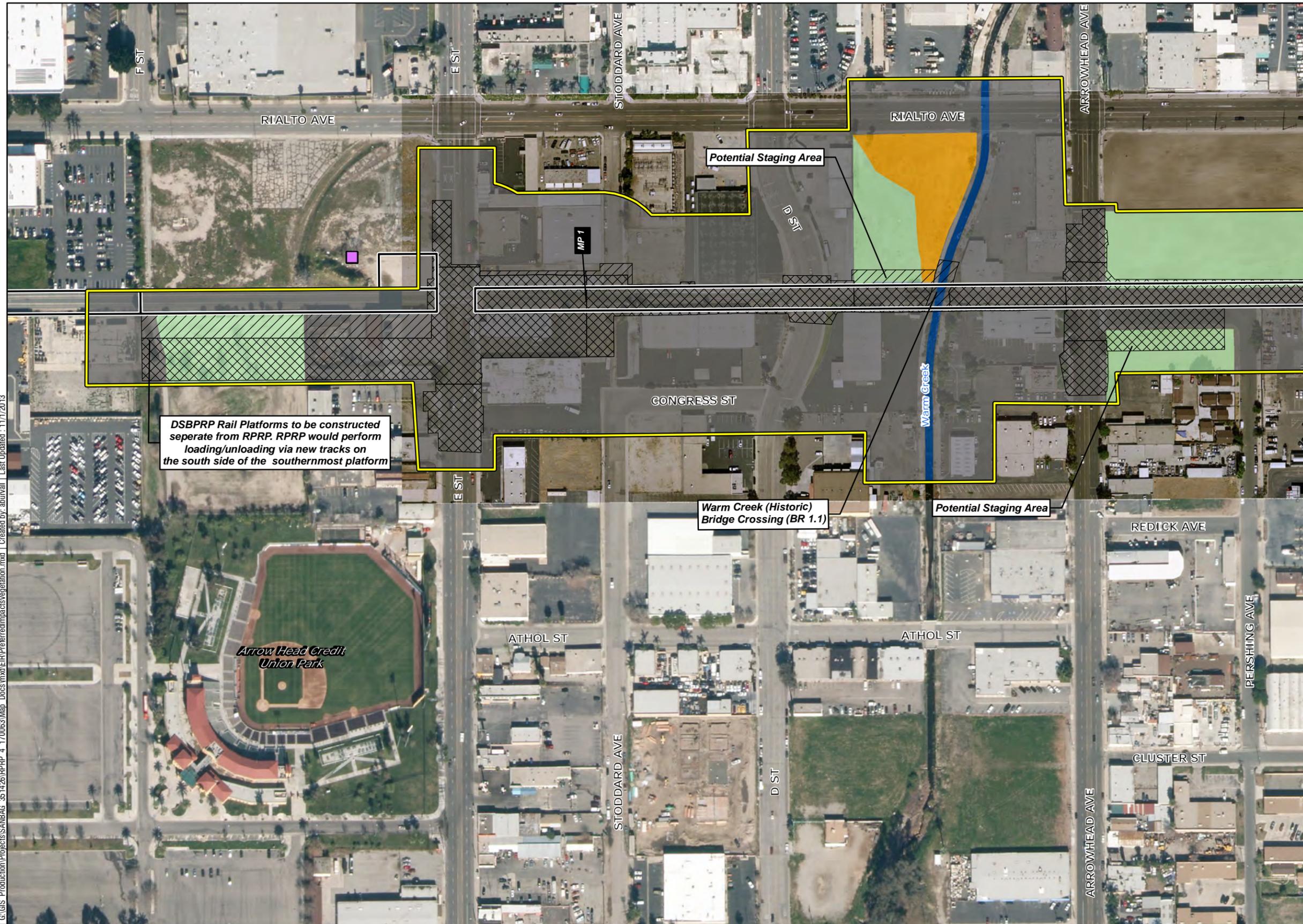


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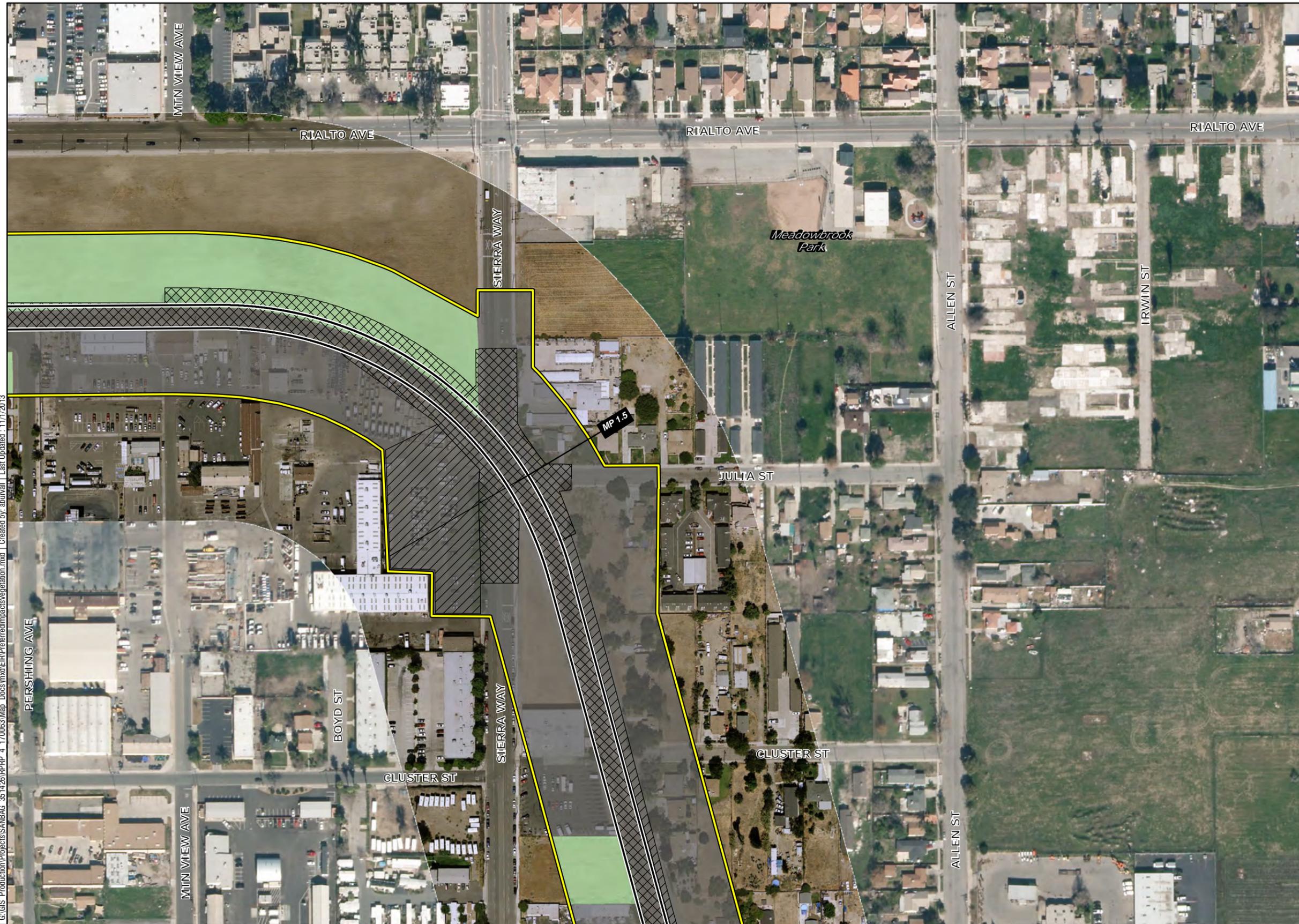


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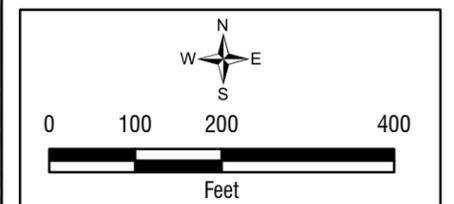
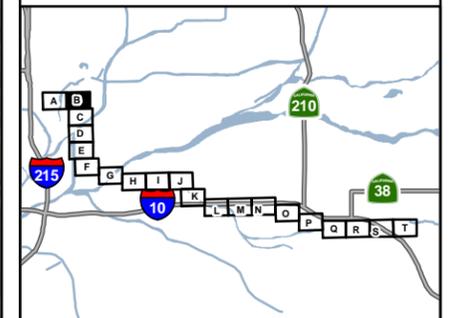
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- RPRP Action Area
- Footprint
 - Permanent Impacts
 - Temporary Impacts
 - Railroad ROW
- Vegetation Community
 - Disturbed Habitat
 - Disturbed Wetland
 - Eucalyptus Woodland
 - Flat-top Buckwheat Scrub
 - Mulefat Scrub
 - Non Jurisdictional Ditch
 - Non-native Grassland
 - NonVegetated Channel
 - Oak Woodland
 - Orchard and Vineyards
 - Southern Willow Scrub
 - Southern Cottonwood Willow Riparian Forest
 - Tamarisk Scrub
 - Urban/Developed
- Species Observation
 - Non-Breeding Season BUOW Observation
 - Least Bell's Vireo
 - Sana Ana River Woolly Star

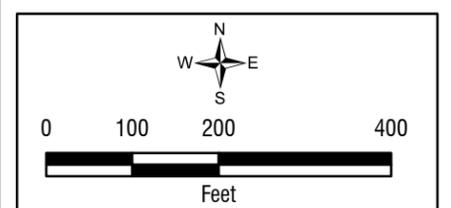
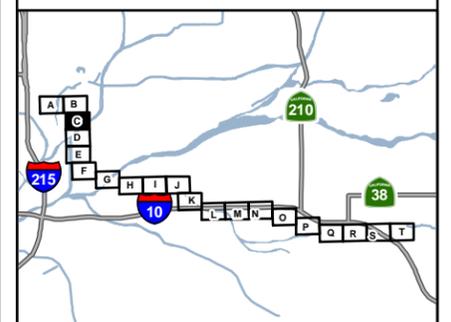


Impacts on Vegetation Communities (Preferred Project)

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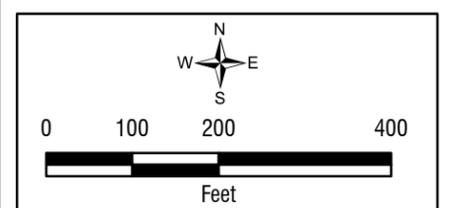
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Impacts on Vegetation Communities (Preferred Project)

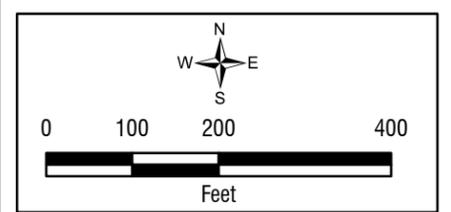
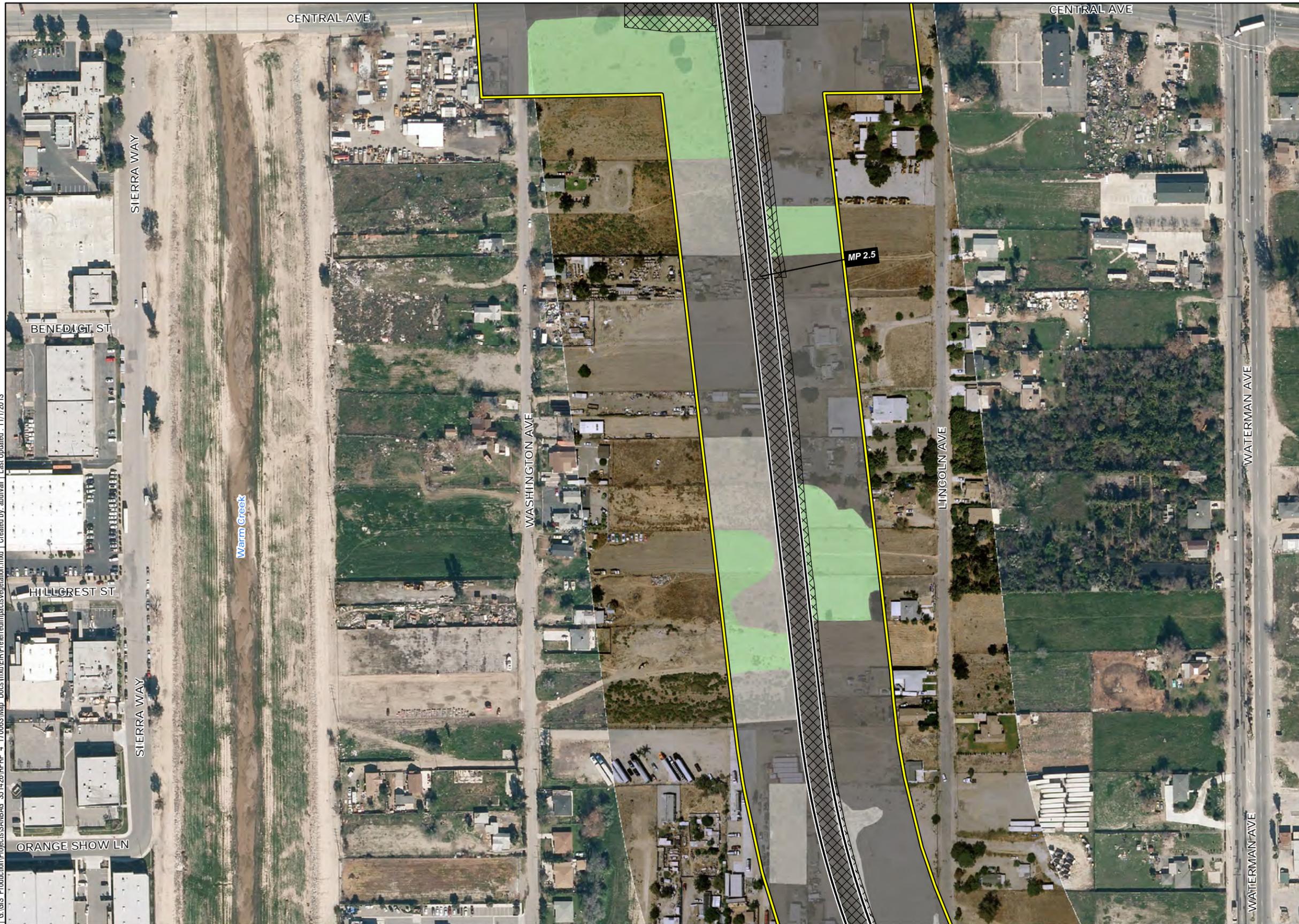
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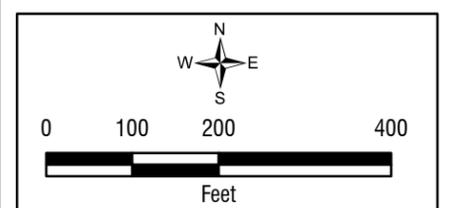
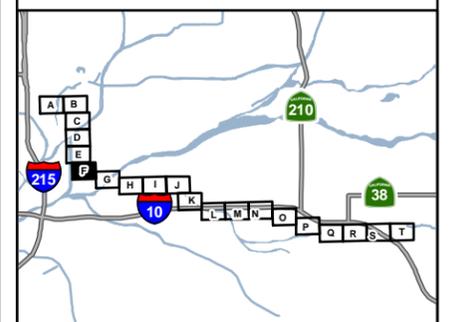


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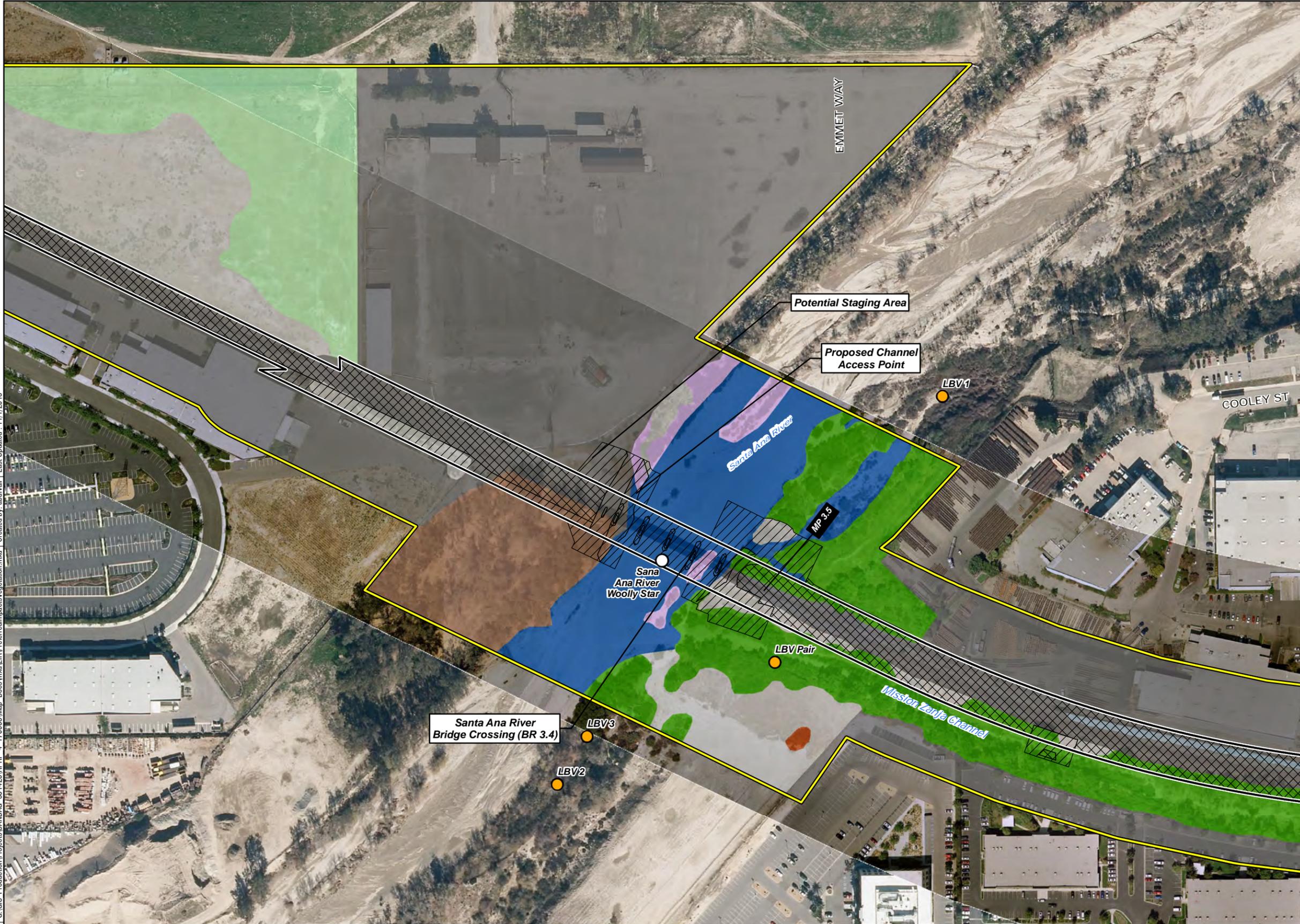


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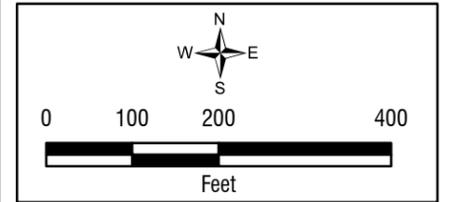
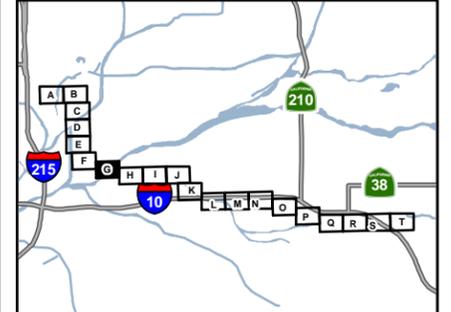


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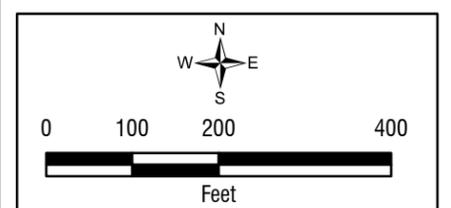
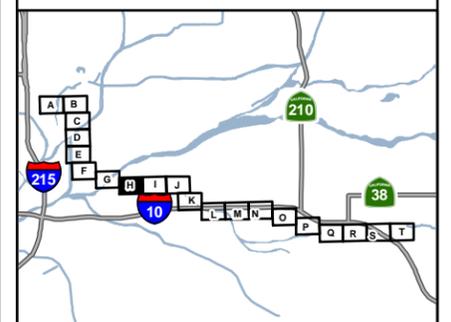
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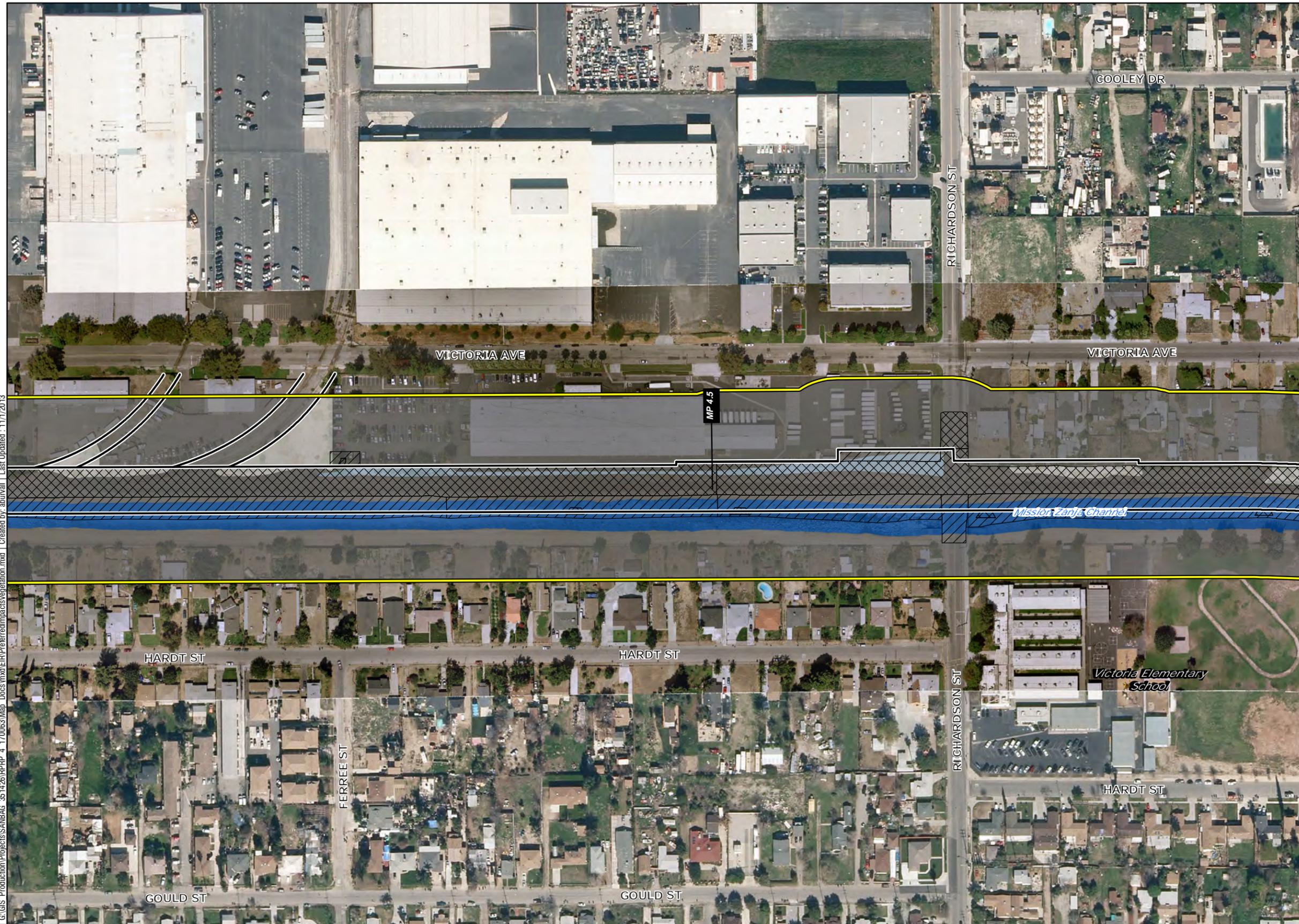
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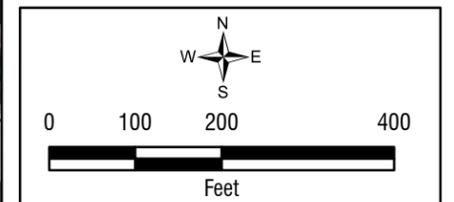
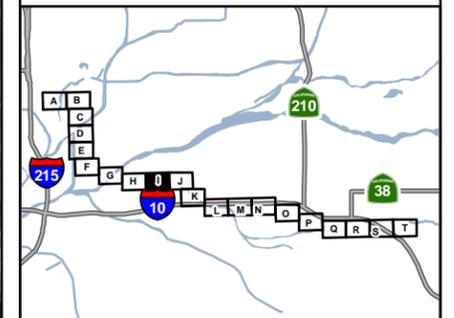
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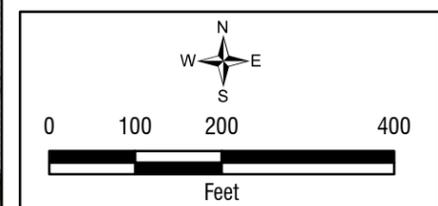
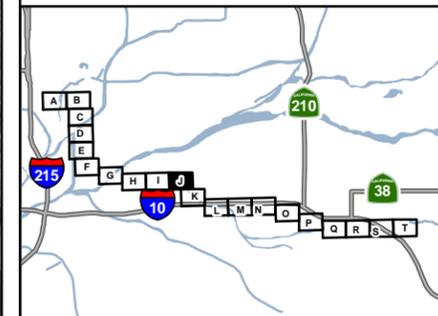


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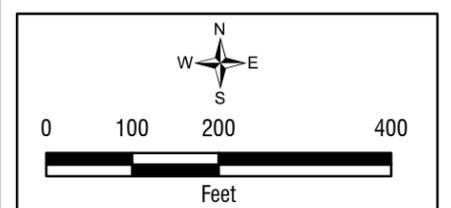


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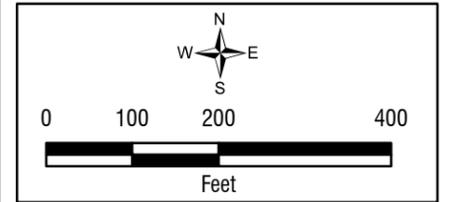
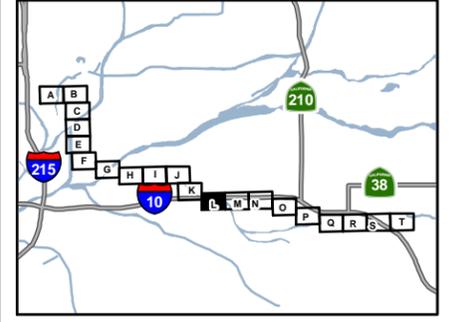
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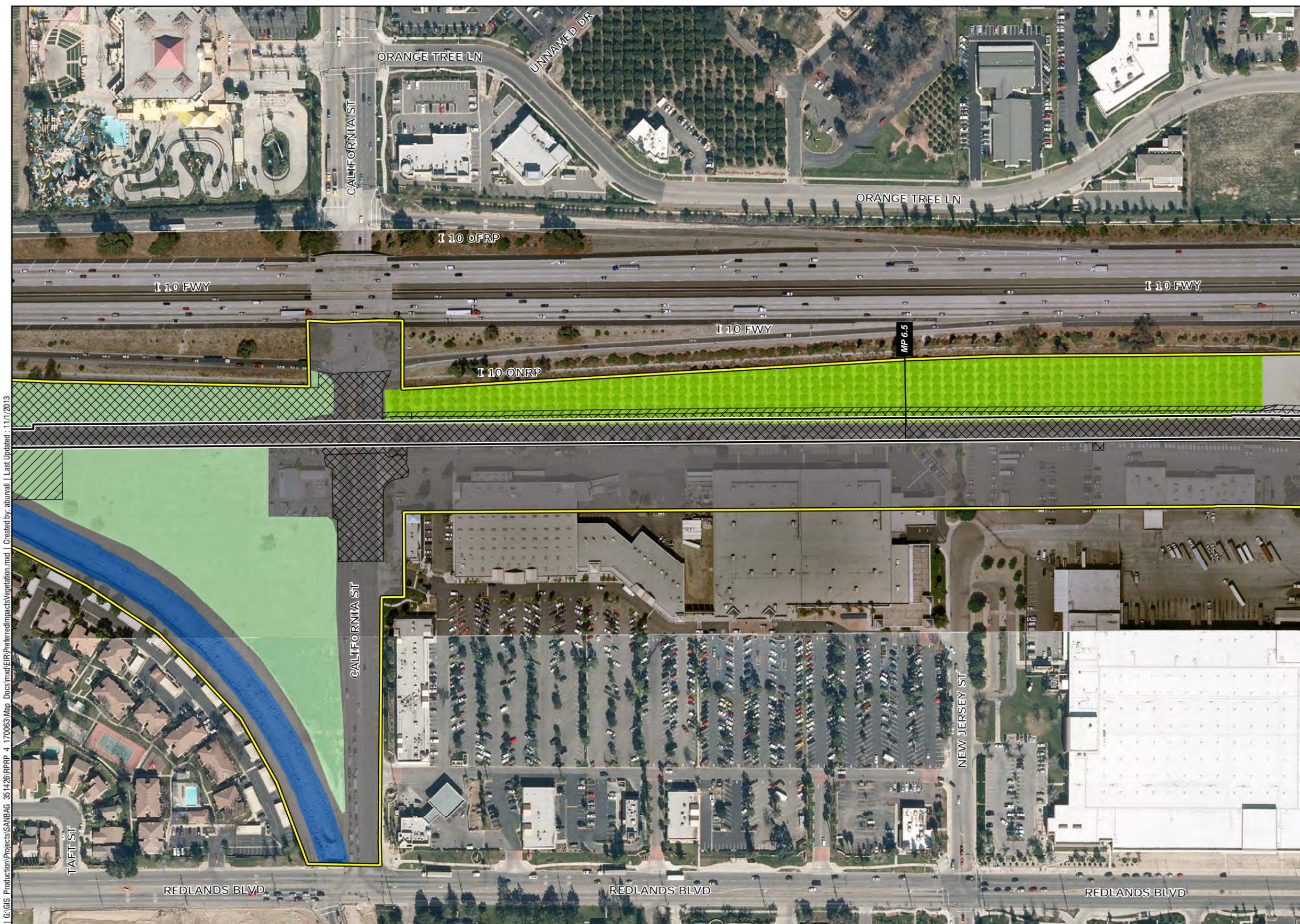
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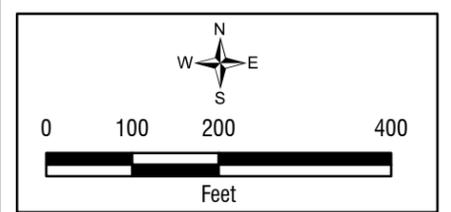
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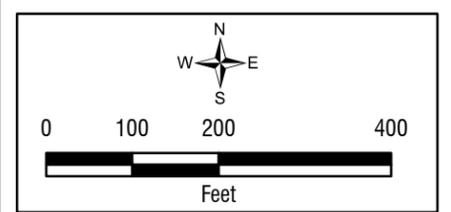
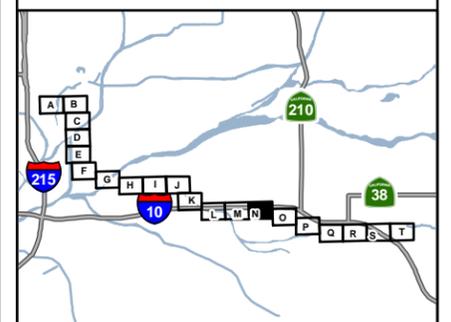
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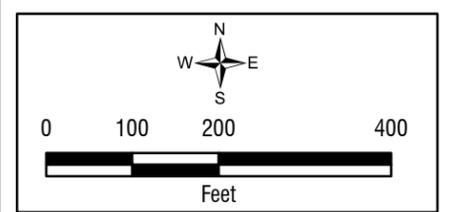
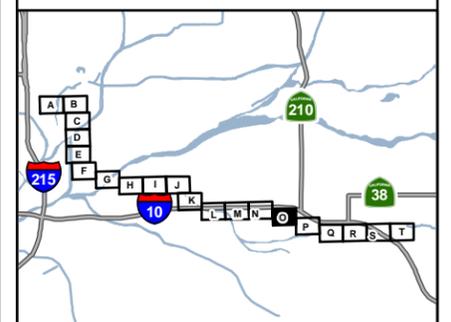
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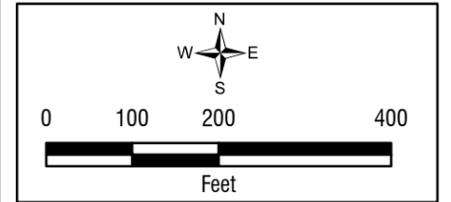


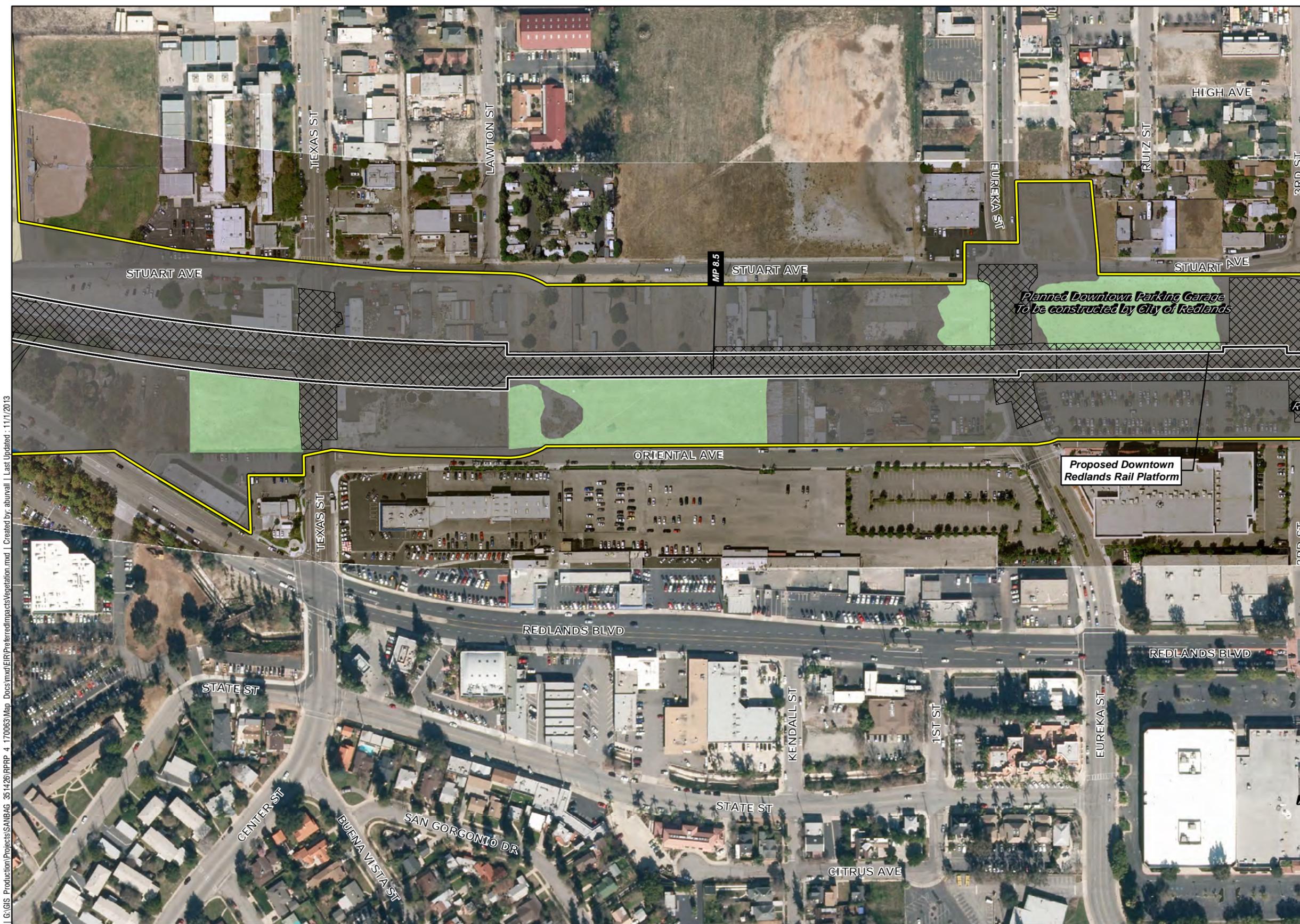
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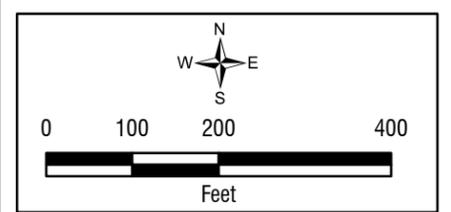
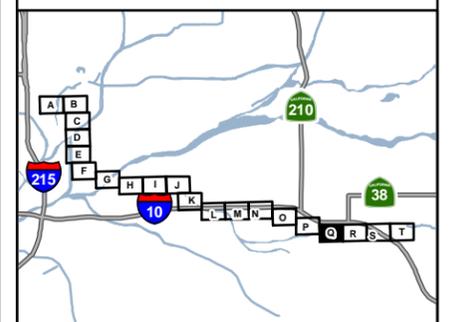


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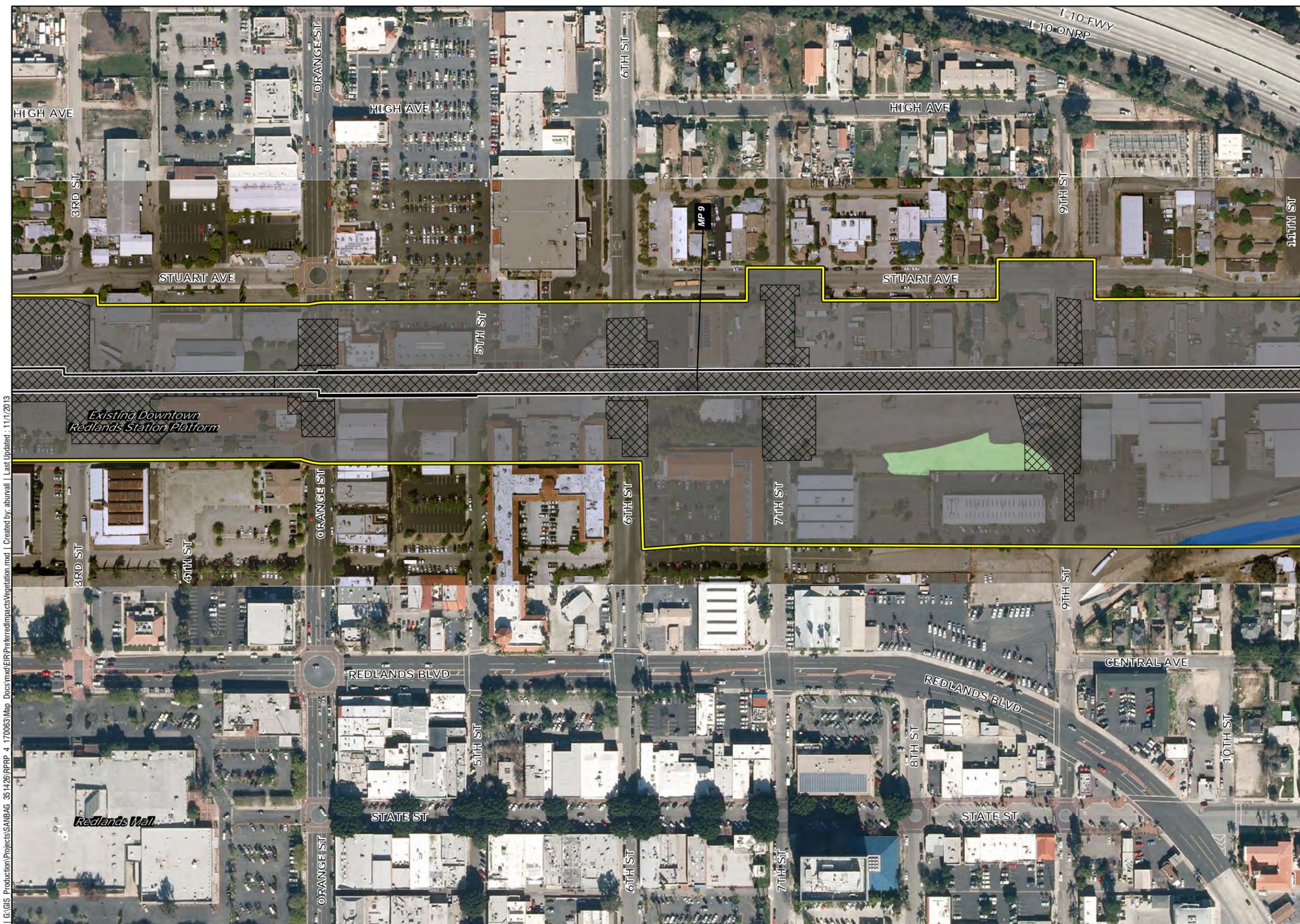




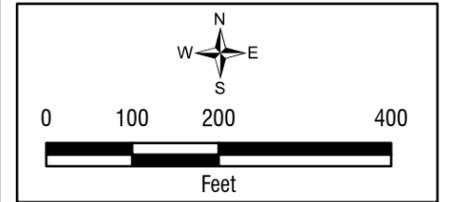
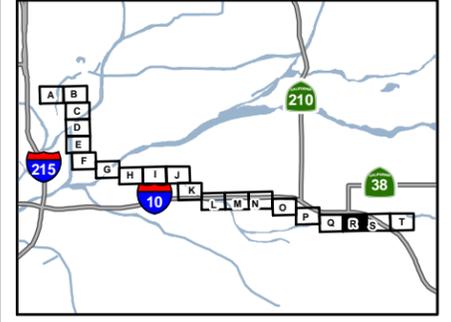
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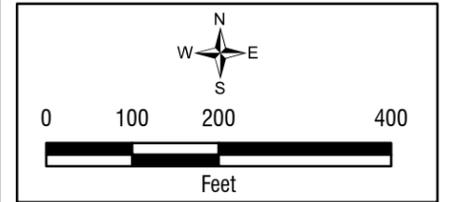
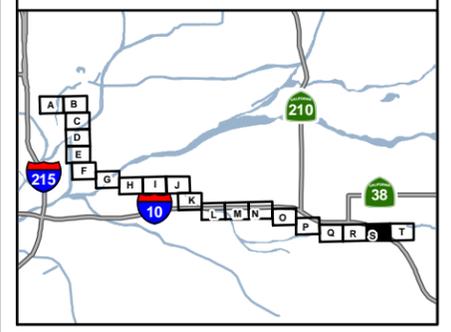
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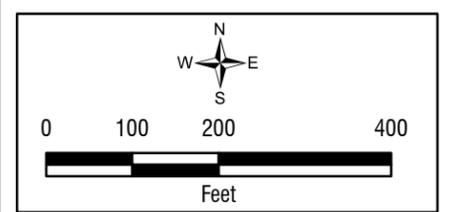
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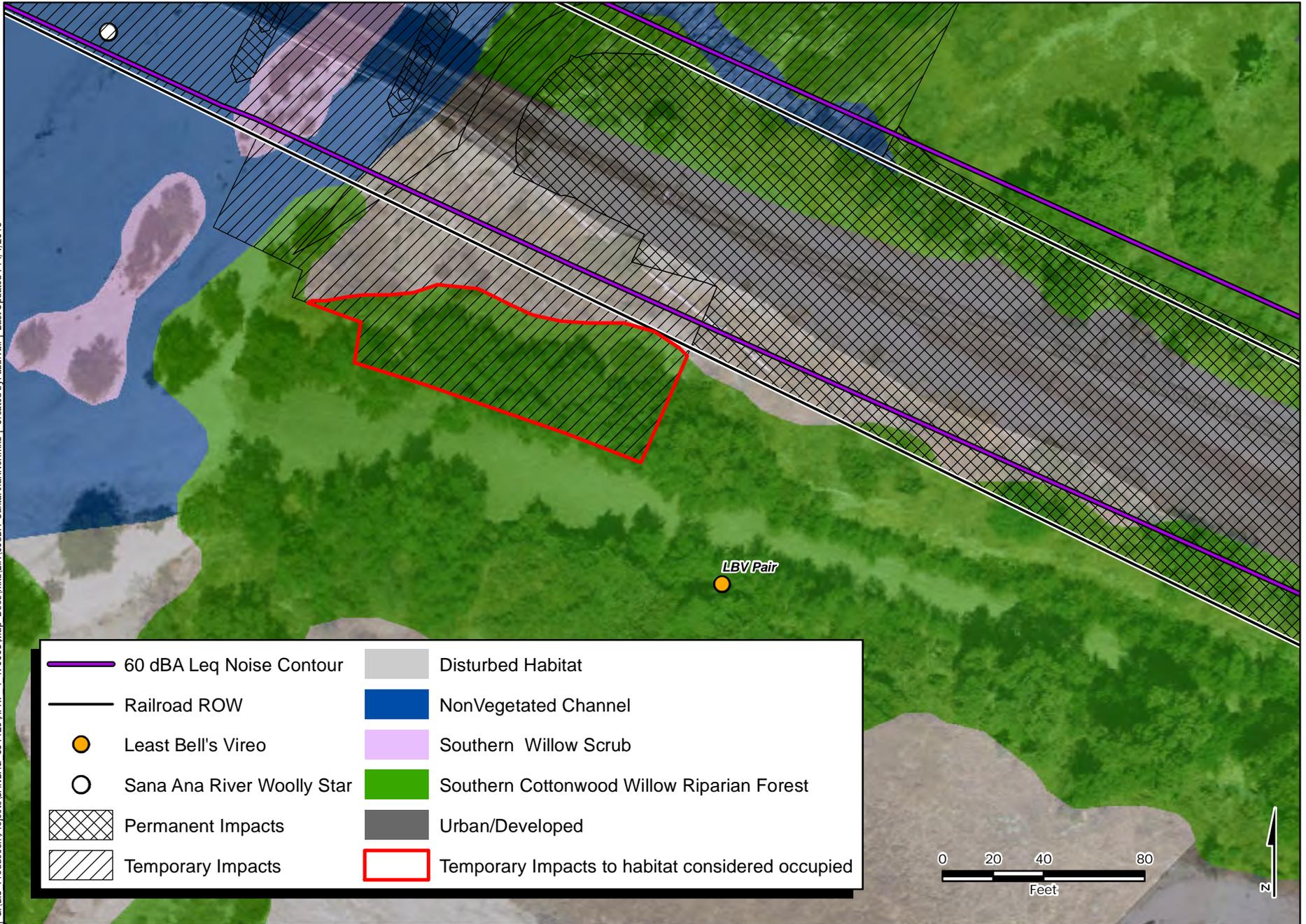


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APPENDIX D

Site Photographs

APPENDIX D Site Photographs



Photograph 1. Representative view of the disturbed habitat along the ROW.



Photograph 2. View of Twin Creek looking to the southwest.
Soil pit #3 is on north side of creek and soil pit #4 is on the south side.
The soil pit areas are disturbed wetland.



Photograph 3. View of eucalyptus woodland habitat along the southwestern side of the Santa Ana River.



Photograph 4. Mission Zanja Creek flowing into Santa Ana River. Disturbed habitat in the foreground and southern willow scrub habitat in the background. Northerly view.



Photograph 5. Northerly view of Warm Creek a non-vegetated channel.



Photograph 6. View of oak woodland looking north.



Photograph 7. Southern willow scrub looking easterly.



Photograph 8. Representative view of urban/developed habitat.



Photograph 9. Southeast side overflow of Santa Ana River.
Northerly view.



Photograph 10. Northerly view of Mission Zanja Creek.



Photograph 11. Mill Creek Zanja. Northwesterly view.



Photograph 12. Non-jurisdictional feature.



Photograph 13. Soil pit #1.



Photograph 14. Overview of soil pit #1 location.



Photograph 15. Overview of soil pit #2 location.



Photograph 16. Manufactured earthen berm separating the storm water runoff (soil pits #1 and #2) from Zanja Channel.



Photograph 17. North side of Twin Creek. Location of soil pit #3.

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APPENDIX E

Least Bell's Vireo Report

SANBAG
Redlands Passenger Rail Project
Least Bell's Vireo Survey Report

October 2012

Prepared for
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, California 92410

Prepared by
HDR Engineering, Inc.
8690 Balboa Avenue, Suite 200
San Diego, California 92123

ONE COMPANY | *Many Solutions*SM



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Appendices

Appendix A Observed Avian Species

Appendix B Site Photographs

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1.0 EXECUTIVE SUMMARY

This report details the results of a focused least Bell's vireo (*Vireo bellii pusillus*; LBV) survey for the proposed Redlands Passenger Rail Project (project). The project would include the development of new railroad infrastructure along an approximate nine mile section rail corridor owned by SANBAG and would include the development of five stations consisting of boarding platforms with supporting amenities, parking and pedestrian access improvements, train layover/storage facilities with storage tracks, a vehicle wash, ancillary facilities, grading and drainage improvements, railroad signal improvements, replacement or improvements to five existing bridge structures and approximately two dozen at-grade highway-rail crossings.

2.0 SURVEY AND SITE DESCRIPTION

The survey area is located in the City of San Bernardino and within the San Bernardino South U.S. Geological Survey 7.5-minute quadrangle (Figures 1 and 2). The RPRP would involve the implementation rail improvements along the Redlands Corridor to facilitate commuter rail service between the City of San Bernardino and the University of Redlands in the City of Redlands. Figure 1 depicts the project location. A portion of the project area occurs within the Santa Ana River (SAR), which supports suitable nesting and foraging habitat for the federally endangered LBV. In summary, three non-mated males and one nested pair of LBV were observed within the survey area from April 16, 2012-July 5, 2012 (Figure 3).

3.0 PURPOSE OF STUDY

The purpose of the study is to determine if suitable habitat for LBV exists within the survey area, and if so, to conduct a presence/absence survey for the state and federally endangered LBV per the United States Fish and Wildlife Service (USFWS) protocol (USFWS 2001).

4.0 LEAST BELL'S VIREO STATUS AND BIOLOGY

The LBV is a federally and state of California listed endangered species. The species is small, averaging about 4.75 inches in length, with faint wing bars, an eye-ring or stripe, and is typically grey to light olive in color. A distinguishing characteristic of LBV is the flicking and bobbing of their relatively long tails (Sibley 2000). The species has a life span of up to seven years (USFWS 1998).

Historically the species was known to breed from as far south as San Fernando, Baja California to as far north as Tehama County in northern California (CDFG 2006). Currently, the LBV breeding range has been restricted to Southern California, with large breeding populations in Riverside and San Diego Counties. Small breeding populations are found in Santa Barbara and Ventura counties, and in northern Baja California, Mexico (CDFG 2006).

LBV generally occur in southern arroyo willow riparian forest and southern willow scrub habitats during the breeding season. Plant species associated with these habitats are Fremont cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), black willow (*Salix gooddingii*), willow shrubs (*Salix spp.*), and mulefat (*Baccharis salicifolia*). LBV winter in southern Baja California, Mexico, where they will occupy a variety of habitats including: mesquite scrub within arroyos, palm groves, and hedgerows bordering agricultural and residential areas (Kus 2002).

LBV generally conceal their nests in dense foliage and within one meter of the ground. Early to mid-successional riparian habitat is typically used for nesting by LBV because it supports the dense shrub cover required for nest concealment as well as a structurally diverse canopy for foraging (Kus 2002). LBV nests are typically constructed out of small pieces of bark, leaf fragments, pieces of soft plants, spider webs and other materials. LBV prefer to forage in lower to mid level canopy heights for bugs, beetles, moths, grasshoppers, and caterpillars.

The major threat to LBV populations has been nest parasitism by the brown-headed cowbird (BHC) (*Molothrus ater*) and loss of habitat due to animal grazing and human development. Due to aggressive conservation efforts, the status of the LBV is stable to increasing (CDFG 2006).

5.0 SURVEY METHODS AND LIMITATIONS

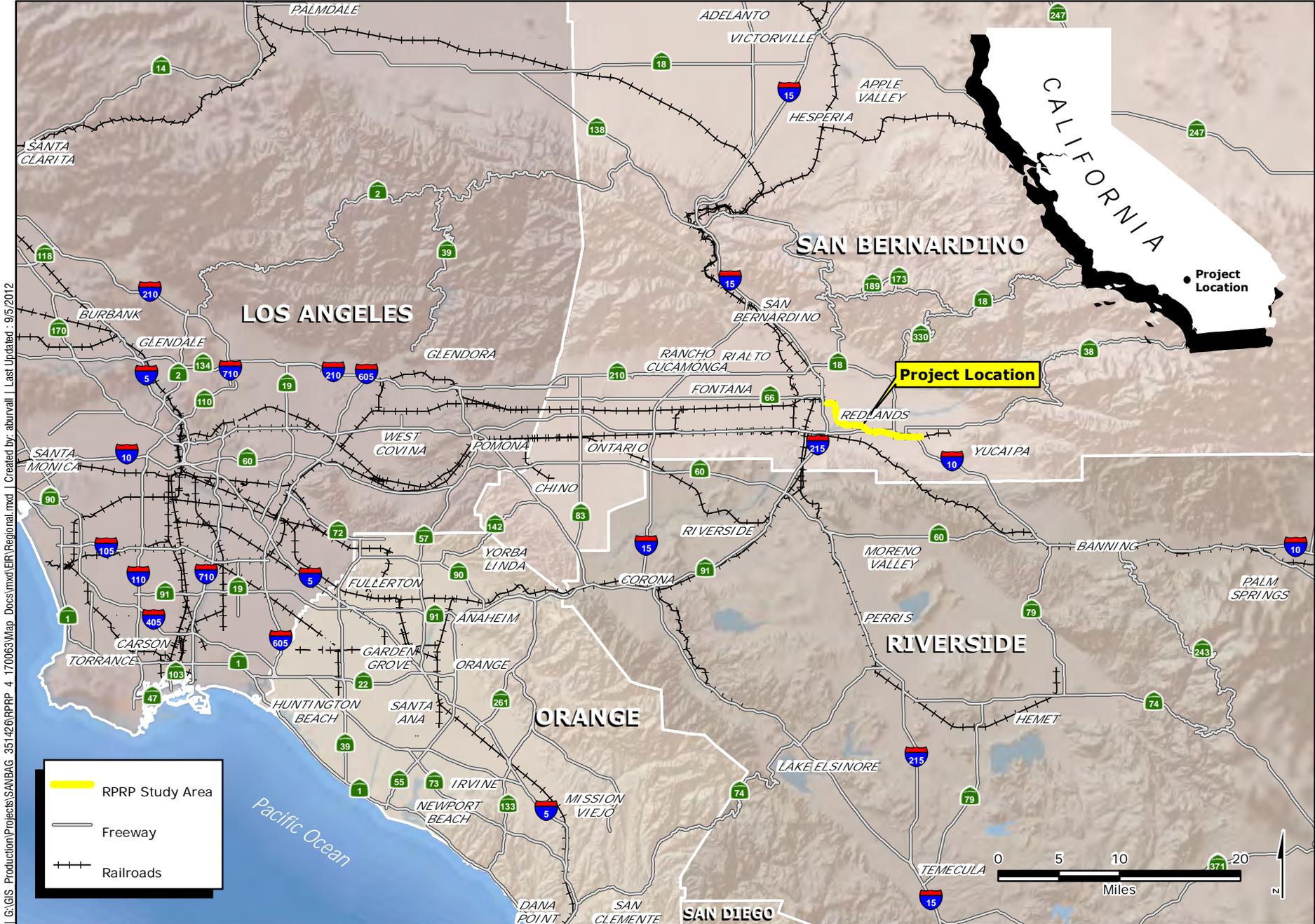
5.1 HABITAT ASSESSMENT

Prior to initiating protocol presence/absence surveys, vegetation communities within the survey area were assessed for suitability for LBV. Fourteen distinct vegetation communities occur within the 533.88-acre survey area (Figure 3, Table 1). Of the 14, two communities support habitat suitable for LBV nesting and foraging (Southern Cottonwood Willow Riparian Forest [SCWRF], Southern Willow Scrub [SWS]).

Table 1. Existing Vegetation within the Project Survey Area

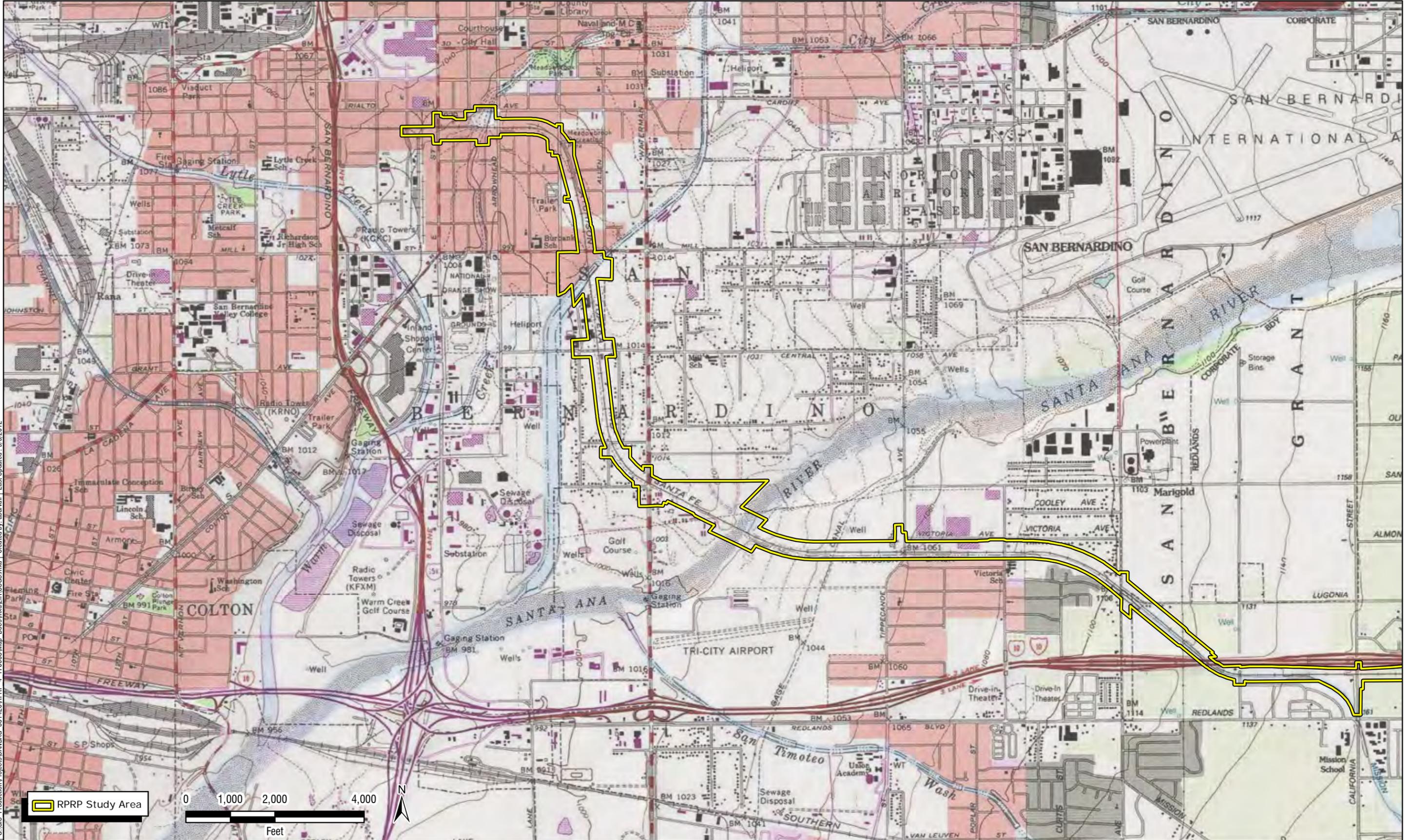
Vegetation Communities	Survey Area Acreage
Disturbed Habitat	24.54
Disturbed Wetland	0.02
Eucalyptus Woodland	2.78
Flat-top Buckwheat Scrub (disturbed)	0.91
Mulefat Scrub	0.04
Non-Jurisdictional Ditch	1.31
Non-Native Grassland	61.90
Non-Vegetated Channel	29.22
Oak Woodland	9.62
Orchard and Vineyards	5.28
Southern Cottonwood Willow Riparian Forest	8.27
Southern Willow Scrub	0.64
Tamarisk Scrub	0.47
Urban/Developed	388.88
Total	533.88

Southern Cottonwood Willow Riparian Forest (SCWRF) is generally a tall, open, broadleaved winter-deciduous riparian forests dominated by Fremont cottonwood (*Populus fremontii*) and several willow species (*Salix* spp). This habitat occurs in sub-irrigated and frequently overflowed lands along rivers and streams. The dominant species require moist, bare mineral soil for germination and establishment. The understory is generally vegetated by herbaceous and viney species such as sedges (*Carex* sp.), grape (*Vitis* sp.), and introduced wetland species. Within the survey area, southern cotton wood riparian (SCWRF) occurs primarily within the western portion of Mission Zanja Channel and within the SAR.

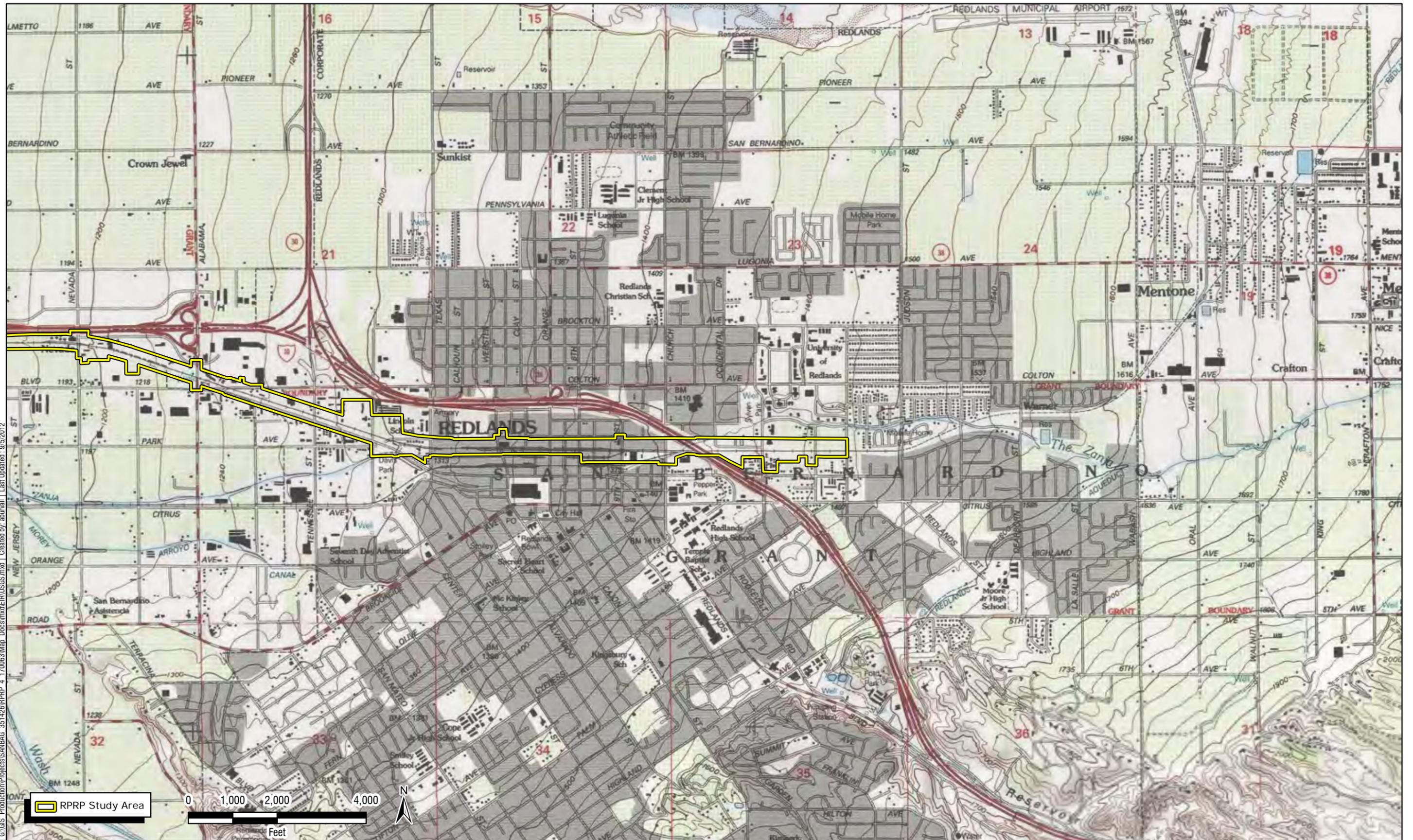


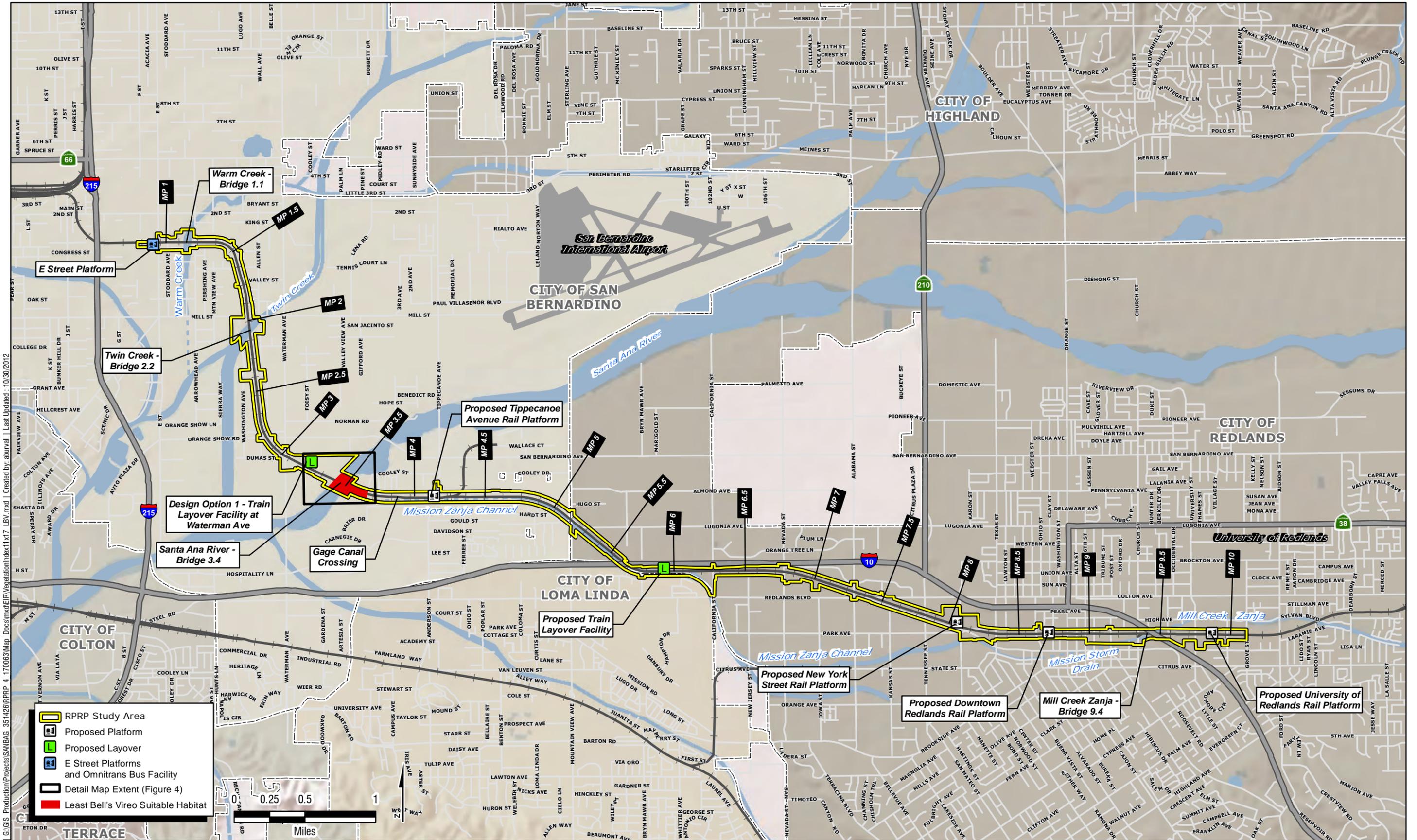
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Least Bell's Vireo Habitat Assessment and Survey Result Overview

Southern willow scrub (SWS) generally consists of a dense thicket of various willow species (*Salix* spp.). This habitat occurs in loose, sandy alluvium near stream channels and is frequently flooded. The habitat is limited by the dense thicket of willows and frequent flooding which impacts the development of an understory. Within the survey area, SWS occurs as small patches within the SAR.

5.3 SURVEY METHODOLOGY

In accordance with the USFWS presence/absence survey protocols for the LBV (USFWS 2001), all appropriate riparian habitat located within the survey area was surveyed during each site visit. Within the nine-mile alignment, suitable habitat only occurs within the Santa Ana River (SAR) portion of the project. The survey was conducted by HDR biologists Allegra Simmons, Aaron Newton, and Glenn Lukos Associates (GLA) biologist Jeff Ahrens. Each of the eight focused survey visits were conducted at an interval of no less than 10 calendar days and between April 10 and July 31. LBV were identified through visual and audible observations. Locations, activity, and number of individuals were noted during the site visits. In addition, all avian species observed were noted (Appendix A). All accessible portions of the survey area with appropriate habitat were surveyed on foot to allow for direct visual observation the habitat (Figure 3). Surveyors walked slowly and methodically during normal weather conditions conducive to bird activity (winds less than 15 mph, no rain and temperatures less than 95 F).

The protocol presence/absence surveys were conducted during morning hours (between 0530 and 1100 hours) under clear to morning overcast skies (0-80% cloud cover), with air temperatures between 59 and 87 degrees Fahrenheit, and with winds between 0 and 4 miles per hour (Table 2).

Table 2. Survey Dates, Times and Climatic Conditions

Surveyors	Survey Date	Times	Skies (% cloud cover)		Temperature		Winds (mph)
			Start	End	Start	End	
Allegra Simmons, Aaron Newton	4/16/2012	0820-1100	0	0	63°F	75°F	1-2
Allegra Simmons, Aaron Newton	4/27/2012	0730-1023	80	10	59°F	77°F	0-2
Allegra Simmons, Aaron Newton	5/08/2012	0756-1050	0	0	65°F	87°F	0-4
Jeff Ahrens	5/21/2012	0615-0950	0	0	65	82	0-1
Jeff Ahrens	6/01/2012	0600-0925	0	0	63	73	0-1
Jeff Ahrens	6/11/2012	0620-0945	0	0	63	70	1-2
Jeff Ahrens	6/25/2012	0530-0855	0	0	53	62	1-3
Jeff Ahrens	7/05/2012	0555-0900	20	20	59	70	1-2

6.0 SURVEY RESULTS

A diverse assemblage of 48 avian species was observed during the survey (Appendix A). These species are expected to occur within the urban and riparian habitat in the survey area. A common threat to LBV, brown-headed cowbirds (BHC) was not observed on site during the surveys. Other sensitive species observed during the surveys include the yellow warbler (*Setophaga petechia*), a California

Species of Concern, and an individual of Santa Ana River woolly-star (*Eriastrum densifolium* spp. *sanctorum*), which is federally endangered (Figure 3).

The USFWS protocol surveys included eight survey sessions conducted between April 16, 2011 and July 5, 2012 (Table 2). During the surveys, three individual male LBV and one pair were detected. Of these, Table 3 is a summary of each survey session.

Table 3. LBV Observations

Survey Date	LBV Observed
4/16/2012	1
4/27/2012	2
5/08/2012	1
5/21/2012	0
6/01/2012	4
6/11/2012	3
6/25/2012	3
7/05/2012	3

The following is a summary of each survey session. LBV locations referenced below can be found on Figure 3b.

On **April 16, 2012**, a single male LBV (LBV 1) was detected vocalizing in the SCWARF along the northeastern portion of the SAR; the location of the vocalization was approximately 600 feet northeast of Bridge 3.4.

On **April 27, 2012**, two separate males were detected vocalizing repeatedly in different locations. The first single male LBV (LBV 1) was heard calling/observed at 0843 hours, approximately 800 feet north of Bridge 3.4, along the east side of the SAR in the SWS. The male was followed south for approximately 200 feet as he continued calling. It is likely this is the same male (LBV 1) observed on April 16, 2012.

The second single male LBV (LBV2) was detected vocalizing repeatedly approximately 500 feet south of Bridge 3.4 along the east bank of the SAR around 0930 hours. LBV 2 was observed using the SCWARF along the river banks and the upper floodplain area up to adjacent parking lot.

On **May 8, 2012**, one male LBV (LBV 1) was detected vocalizing approximately 800 feet north of Bridge 3.4 in the SAR along the northeast bank within the SWS. He was observed for a short period of time before he flew off and ceased calling. This is likely the same male that was observed on April 16 and 27, 2012.

On **May 21, 2012** no LBV were observed during the survey effort.

On **June 1, 2012**, four LBV were detected during surveying activities. The first LBV (LBV 1) was observed approximately 500 feet to the northeast of the project site and is in the same location/territory as initially observed on April 16, 2012. The second LBV (LBV 3) was observed approximately 400 feet to the southeast of the Bridge 3.4 within the SCWARF (Figure 3). The third

and fourth LBV detected was a pair (LBV Pair) exhibiting nesting behavior and was observed approximately 150 feet south of the railroad in the lower portion of Mission Zanja Creek and within the limits of the survey area.

On **June 11, 2012**, three LBV were detected. A male LBV (LBV 2) was detected approximately 600 feet south of the project site. The male arrived from the south and was noted as countering singing with another LBV (LBV 3), then returned to the south out of the LBV survey area. The other two observed LBV were in the same locations as previously observed LBV, one to the north in the SCWRF (LBV 1) and one to the south in the willow riparian forest (LBV 3).

On **June 25, 2012**, three LBV were observed separately in previously detected locations. The pair that was first detected on June 1, 2012 (LBV pair) was spotted in the same location/territory. The other LBV (LBV 3) was detected to the south in the same willow riparian forest.

On **July 5, 2012**, three LBV were detected in previously observed and documented locations. The first LBV (LBV 3) was observed 400 to the south of Bridge 3.4 and the second and third LBV observed was the breeding pair (LBV Pair) that was first observed on June 1, 2012.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Breeding and non-breeding LBV were documented within the portion of the survey area located in the SAR. Implementation of the proposed project would temporarily and permanently impact nesting and foraging habitat (SWS and SCWARF) for LBV. HDR recommends the following measures to minimize and/or avoid impacts to nesting and foraging LBV:

- (1) Construction activities within or immediately adjacent to LBV habitat should occur outside of the breeding season for the species (February 15 – September 15).
- (2) Should construction within the breeding season be unavoidable, a pre-construction nesting survey may be required.
- (3) The federal Endangered Species Act (ESA) defines and lists *species* as “endangered” or “threatened” and provides regulatory protection for the listed species. The federal ESA provides a program for conservation and recovery of threatened and endangered species. It also ensures the conservation of designated critical habitat that the USFWS has determined is required for the survival and recovery of these listed species. Section 9 of the federal ESA prohibits the “Take” of species listed by USFWS as threatened or endangered. *Take* is defined as: “...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct.” In recognition that *Take* cannot always be avoided, Section 10(a) of the federal ESA includes provisions for *Take* that is incidental to, but not the purpose of, otherwise lawful activities. Section 10(a)(1)(B) permits (incidental take permits) may be issued if *Take* is incidental and does not jeopardize the survival and recovery of the species.

Should *Take* of LBV be unavoidable as a result of project implementation, Section 10 consultation with USFWS may be required.

- (4) The results identified in the survey report are generally considered valid for one year. Should implementation of the proposed project occur beyond this period, additional protocol-level surveys may be required by the wildlife agencies.
- (5) Please note that mitigation would be established during consultation with the wildlife agencies.

8.0 REFERENCES

- California Department of Fish and Game. 2006. *California's Plants and Animal: Least Bell's Vireo*. Habitat Conservation Planning Branch.
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- Sibley, A. 2000. National Audubon Society *The Sibley Guide to Birds*. Alfred A. Knopf, New York.
- U.S. Fish and Wildlife Service. 1998. Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service, Portland, OR. 139p.
- U.S. Fish and Wildlife Service. 2001. Least Bell's Vireo Survey Guidelines.

APPENDIX A
Observed Avian Species

Appendix A Inventory of Avian Species Observed

Common Name	Scientific Name	Status
Ciconiiformes		
<i>Ardeidae</i>		
Green Heron	<i>Butorides virescens</i>	-
Galliformes		
<i>Odontophoridae</i>		
California Quail	<i>Callipepla californica</i>	-
Falconiformes		
<i>Cathartidae</i>		
Turkey Vulture	<i>Cathartes aura</i>	-
<i>Accipitrinae</i>		
Cooper's Hawk	<i>Accipiter cooperii</i>	-
Red-tailed Hawk	<i>Buteo jamaicensis</i>	-
Charadriiformes		
<i>Charadriidae</i>		
Killdeer	<i>Charadrius vociferus</i>	-
Columbiformes		
<i>Columbidae</i>		
Rock pigeon	<i>Columbia livia</i>	-
Eurasian collared dove	<i>Streptopelia decaocto</i>	-
Mourning Dove	<i>Zenaida macroura</i>	-
Apodiformes		
<i>Trochilidae</i>		
Allen's hummingbird	<i>Selasphorus sasin</i>	-
Anna's Hummingbird	<i>Calypte anna</i>	-
Black-chinned hummingbird	<i>Archilochus alexandri</i>	-
Piciformes		
<i>Picidae</i>		
Northern Flicker	<i>Colaptes auratus</i>	-
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	-
Passeriformes		
<i>Ptilonotidae</i>		
Phainopepla	<i>Phainopepla nitens</i>	-
<i>Tyrannidae</i>		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	-
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	-
Black Phoebe	<i>Sayornis nigricans</i>	-
Say's phoebe	<i>Sayornis saya</i>	-
Western Kingbird	<i>Tyrannus verticalis</i>	-
Cassin's kingbird	<i>Tyrannus vociferans</i>	-

Least Bell's Vireo Survey Report

Common Name	Scientific Name	Status
<i>Vireonidae</i>		
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	FE
Warbling Vireo	<i>Vireo gilvus</i>	-
<i>Corvidae</i>		
American crow	<i>Corvus brachyrhynchos</i>	-
Common Raven	<i>Corvus corax</i>	-
<i>Hirundinidae</i>		
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	-
Barn swallow	<i>Hirundo rustica</i>	-
<i>Aegithalidae</i>		
Bushtit	<i>Psaltriparus minimus</i>	-
<i>Troglodytidae</i>		
Bewick's Wren	<i>Thryomanes bewickii</i>	-
House Wren	<i>Troglodytes aedon</i>	-
<i>Regulidae</i>		
Ruby-crowned Kinglet	<i>Regulus calendula</i>	-
<i>Timaliidae</i>		
Wrentit	<i>Chamaea fasciata</i>	-
<i>Mimidae</i>		
Northern mockingbird	<i>Mimus polyglottos</i>	-
<i>Sturnidae</i>		
European Starling	<i>Sturnus vulgaris</i>	-
<i>Parulidae</i>		
Yellow Warbler	<i>Dendroica petechia</i>	SSC
Yellow-rumped Warbler	<i>Dendroica coronata</i>	-
Common Yellowthroat	<i>Geothlypis trichas</i>	-
Orange-crowned Warbler	<i>Oreothlypis celata</i>	-
Wilson's Warbler	<i>Wilsonia pusilla</i>	-
<i>Emberizidae</i>		
Song Sparrow	<i>Melospiza melodia</i>	-
California Towhee	<i>Melospiza crissalis</i>	-
Spotted Towhee	<i>Pipilo maculatus</i>	-
<i>Cardinalidae</i>		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	-
Western tanager	<i>Piranga ludoviciana</i>	-
<i>Icteridae</i>		
Bullock's oriole	<i>Icterus bullockii</i>	-
Hooded Oriole	<i>Icterus cucullatus</i>	-
<i>Fringillidae</i>		
<i>Carduelinae</i>		
House Finch	<i>Carpodacus mexicanus</i>	-
Lesser goldfinch	<i>Spinus psaltria</i>	-

SSC = State Species of Concern, FE = Federally Endangered, FT = Federally Threatened

APPENDIX B
Site Photographs

APPENDIX B

Site Photographs



Photograph 1. View of SWS within the Mission Zanja Creek.
View looking east.



Photograph 2. View looking north of the project site at the SWS along the eastern side of the Santa Ana River.



Photograph 3. The SCWRF in the Mission Zanja Creek from the ROW. View looking to the east.



Photograph 4. The SCWRF in the Mission Zanja Creek from the ROW. View looking to the southwest towards the Santa Ana River.

APPENDIX F

Southwest Willow Flycatcher Report

GLENN LUKOS ASSOCIATES

Regulatory Services



August 13, 2012

Susie Tharratt
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, California 92011

SUBJECT: Submittal of Report for the Southwestern Willow Flycatcher at the Redlands Passenger Rail Project Located in the City of Redlands; San Bernardino County, California

Dear Ms. Tharratt:

This letter report summarizes the methodology and findings of surveys conducted for the federally-listed endangered southwestern willow flycatcher (*Empidonax traillii extimus*) ("SWIFL") conducted by Glenn Lukos Associates, Inc. (GLA) for the above-mentioned site in San Bernardino County, California. GLA was retained by HDR Engineering, Inc. to determine the presence or absence of the southwestern willow flycatcher at the property (hereinafter referred to as the "Project Site").

INTRODUCTION

The SWIFL is a small, migratory songbird, which inhabits riparian habitats throughout southern California and is one of four subspecies of willow flycatcher (WIFL) currently recognized. It was officially designated as a state-endangered species on January 2, 1991 and federally designated as endangered on March 29, 1995. The SWIFL measures about 5.75 inches (15 cm) in length, and weighs only about 0.4 ounces (12 g). Overall, it is roughly the size of a small sparrow. Both sexes look alike. Its appearance is overall greenish or brownish gray above, with a white throat that contrasts with a pale olive breast. The belly is pale yellow. Two white wing bars are visible, but the eye ring is faint or absent. The upper mandible is dark, and the lower mandible light (USGS). It closely resembles the other races of willow flycatcher, and several other species of the *Empidonax* genus, particularly the closely related Alder flycatcher (*Empidonax alnorum*). The SWIFL is generally the palest in coloration of the WIFL subspecies (Unitt 1987), but this difference in color is extremely subtle and is not recommended as a reliable way to distinguish between the subspecies in the field (Hubbard 1999).

Susie Tharratt
U.S. Fish and Wildlife Service
August 13, 2012
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The SWIFL breeds in relatively dense riparian habitats in all or parts of seven southwestern states, from near sea level to over 2,000 m (6,100 ft). More specifically, the SWIFL breeds in riparian habitats along rivers, streams, or other wetlands, where relatively dense growths of trees and shrubs are established, near or adjacent to surface water or underlain by saturated soil (McCabe 1991). Common tree and shrub species comprising nesting habitat include willow (*Salix* sp.), boxelder (*Acer negundo*), tamarisk (*Tamarix ramosissima*), and Russian olive (*Eleagnus angustifolia*) (USFWS 2002).

Habitat characteristics such as plant species composition, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary across the subspecies range. However, regardless of the plant species composition or height, occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases this dense vegetation occurs within the first 3-4 m (10-13 ft) above ground. These dense patches are often interspersed with small openings, open water or marsh, or shorter/sparser vegetation creating a mosaic that is not uniformly dense (USFWS 2002). The SWIFL winters in Mexico and Central America and northern South America (Phillips 1948, Gorsiki 1969, McCabe 1991, Koronkiewicz et al. 1998, Unitt 1999).

SITE LOCATION AND DESCRIPTION

The Project Site is located in the City of Redlands, San Bernardino County, California and can be found on the U.S. Geological Survey 7.5' San Bernardino South quadrangle [dated 1967 and photorevised in 1980] in unsectioned areas of Township 1 South, Range 4 West [Exhibits 1 and 2 – Regional and Vicinity Map]. The WIFL surveys were conducted within a portion of the Project Site located north of South Waterman Avenue and south of East Orange Show Road.

The survey area included the Santa Ana River, approximately 91 meters (300 feet) on both sides of the railroad bridge crossing and also included Zanja Channel, which parallels the railroad corridor from the confluence of the Santa Ana River east approximately 0.65 kilometers (0.4 miles) to where the riparian vegetation terminates at a concrete spillway [Exhibit 3 – Survey Area Map]. The Santa Ana River within the survey area is approximately 170 meters wide (558 feet) and consists primarily of fine sandy substrate and includes areas supporting vegetated sandy terraces and islands. Zanja Channel is an un-improved trapezoidal earthen channel that is approximately 36 meters (118 feet) in width. Elevation of the Project Site is approximately 314 meters (1030 feet) above mean sea level. A detailed description of the riparian habitat surveyed is provided below.

VEGETATION

The riparian habitat surveyed within the Santa Ana River and Zanja Channel is comprised primarily of southern cottonwood willow riparian forest and southern willow scrub. In general, the riparian habitat is mature and consists of a sandy substrate. Portions of the Santa Ana River are unvegetated or support newer growth caused by seasonal scouring. Surface water or saturated soils were not detected within the Santa Ana River. The western half of Zanja channel supported dense riparian willow vegetation within a narrow sandy streambed. The eastern half of the channel was more open, supporting more cottonwoods than willows. A small central portion of Zanja channel exhibited surface water. The height of the riparian vegetation within the survey area ranged between 4.6 meters (15 feet) to 16.7 meters (55 feet), but averaged between 10.7 meters (30 feet) to 12.2 meters (40 feet).

Dominant riparian vegetation within the survey area includes arroyo willow (*Salix lasiolepis*), Fremont's cottonwood (*Populus fremontii* ssp. *fremontii*), red willow (*Salix laevigata*), Gooding's willow (*Salix goodingii*), sandbar willow (*Salix exigua*), yellow willow (*Salix lasiandra* ssp. *lasiandra*), and mule fat (*Baccharis salicifolia*).

Additional plants detected on site include western ragweed (*Ambrosia psilostachya*), mugwort (*Artemisia douglasiana*), common sunflower (*Helianthus annuus*), telegraph weed (*Heterotheca grandiflora*), prickly lettuce (*Lactuca serriola*), cocklebur (*Xanthium strumarium*), salt cedar (*Tamarix ramosissima*), wild grape (*Vitis girdiana*), California rose (*Rosa californica*), wild radish (*Raphanus sativus*), annual yellow sweetclover (*Melilotus indicus*), white sweetclover (*Melilotus albus*), common sow-thistle (*Sonchus oleraceus*), Lamb's quarters (*Chenopodium album*), alkali heliotrope (*Heliotropium curassavicum*), Canadian horseweed (*Conyza canadensis*), black mustard (*Brassica nigra*), California buckwheat (*Eriogonum fasciculatum*), dwarf nettle (*Urtica urens*), cheeseweed (*Malva parviflorus*), Russian thistle (*Salsola tragus*), tocolote (*Centaurea melitensis*), blue gum (*Eucalyptus globulus*), shortpod mustard (*Hirschfeldia geniculata*), London rocket (*Sisymbrium irio*), chia (*Salvia coumbariae*), yerba santa (*Eriodictyon californicum*) and horehound (*Marrubium vulgare*).

METHODOLOGY

Protocol surveys for the SWIFL were performed in all areas of suitable habitat on site. Surveys were conducted in accordance with the 2010 U.S. Fish and Wildlife Service (USFWS) guidelines¹, which stipulate that for Projects, five surveys (divided into three survey periods)

¹ *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher*, prepared by the USGS.

shall be conducted in all areas of suitable habitat. One survey was conducted during the first survey period (May 15 to May 31). Two surveys were conducted during the second survey period (June 1 to June 24), and two surveys were conducted during the third survey period (June 25 to July 17).

GLA biologist Jeff Ahrens (TE052159-3) conducted the protocol surveys on May 21, June 1, June 11, June 25, and July 5, 2012. All surveys were conducted during the morning hours and were completed before 10:30 A.M. No surveys were conducted during extreme weather conditions (i.e., winds exceeding 15 miles per hour, rain, or temperatures in excess of 95°F). All areas of suitable habitat were surveyed on foot by walking slowly and methodically. Taped vocalizations primarily using the willow flycatcher’s main contact call “fitz-bew” was used to elicit responses from WIFLs that might be present on site. The detection of WIFLs on site was based on both sight and call.

Weather conditions during the surveys were conducive to a high level of bird activity. Temperatures ranged from approximately 53 ° to 82° Fahrenheit. Wind speeds ranged from one to three miles per hour (mph) during the surveys. Table 1 summarizes the survey dates and weather conditions recorded at the Project site.

Table 1. Summary of Survey Dates and Weather Conditions for the Redlands Passenger Rail Project

Date	Start Time	End Time	Permitted Surveyor	Temp °F, (start/end)	Wind Speed (MPH) (start/end)	% Cloud Cover (start/end)
5/21/12	0615	0950	JA	65 - 82	1 - 1	Clear
6/01/12	0600	0925	JA	63 - 73	1 - 1	Clear
6/11/12	0620	0945	JA	63 - 70	2 - 1	Clear
6/25/12	0530	0855	JA	53 - 62	1 - 3	Clear
7/5/12	0555	0900	JA	59 - 70	2 - 2	20 - 20

JA – Jeff Ahrens

RESULTS

No WIFLs were detected within the Project Site during the focused surveys. One least Bell’s vireo (*Vireo bellii pusillus*) (LBV) pair exhibiting nesting behavior was detected within Zanja Channel near the confluence with the Santa Ana River. In addition, three unmated LBVs were detected outside of the survey area. LBV 1 was an unmated male that was detected on June 1, 11, 25, and July 5, 2012) approximately 132 meters (433 feet) south of the railroad crossing. LBV 2 was presumed to be an unmated male that was detected on June 1 and June 11, 2012

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U.S. Fish and Wildlife Service
August 13, 2012
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approximately 162 meters (531 feet) north of the railroad crossing. LBV 3 was a male that was observed briefly counter singing with LBV 1 on June 11, 2012 and proceeded to fly south and was not detected again. LBV 3 was approximately 170 meters (559 feet) south of the railroad crossing.

One individual Santa Ana River wooly star (*Eriastrum densifolium sanctorum*) was detected on June 11, 2012 within the Santa Ana River, immediately south of the railroad crossing. Other sensitive species detected within or close proximity to the Project Site include the yellow warbler (*Setophaga petechia*). Brown-headed cowbirds (*Molothrus ater*) were not detected during the focused surveys.

Exhibits 3 and 4 depict the survey area, LBV (and dates detected) and Santa Ana River wooly star locations on aerial and topographic maps, respectively. Data sheets are included at the end of the report. A compendium listing all avian species detected during the focused surveys is included at the end of the report.

If you have any questions regarding the methodology or findings of this report, please contact me at (949) 837-0404, ext 40.

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

GLENN LUKOS ASSOCIATES, INC.



Jeff Ahrens
Biologist

TE 052159-3

Permit #

8/13/12

Date

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APPENDIX A

AVIAN COMPENDIUM

The avian compendium lists bird species identified on the Site.

* = non-native species

ODONTOPHORIDAE

Callipepla californica

Quails and Bobwhites

California Quail

ARDEIDAE

Butorides virescens

Hérons and Egrets

green heron

CATHARTIDAE

Cathartes aura

New World Vultures

turkey vulture

ACCIPITERIDAE

Accipiter cooperii

Buteo jamaicensis

Hawks, Old World Vultures and Harriers

Cooper's hawk

red-tailed hawk

CHARADRIIDAE

Charadrius vociferus

Plovers And Relatives

killdeer

COLUMBIDAE

* *Columbia livia*

* *Streptopelia decaocto*

Zenaida macroura

Pigeons and Doves

rock pigeon

Eurasian collared dove

mourning dove

TROCHILIDAE

Archilochus alexandri

Calypte anna

Selasphorus sasin

Hummingbirds

black-chinned hummingbird

Anna's hummingbird

Allen's hummingbird

PICIDAE

Colaptes auratus

Picoides nuttallii

Woodpeckers and Wrynecks

northern flicker

Nuttall's woodpecker

TYRANNIDAE

Empidonax difficilis

Myiarchus cinerascens

Sayornis nigricans

Sayornis saya

Tyrannus vociferans

Tyrant Flycatchers

Pacific-slope flycatcher

ash-throated flycatcher

black phoebe

Say's phoebe

Cassin's kingbird

VIREONIDAE

Vireo bellii pusillus

CORVIDAE

Corvus brachyrhynchos

Corvus corax

HIRUNDINIDAE

Stelgidopteryx serripennis

Hirundo rustica

AEGITHALIDAE

Psaltriparus minimus

TROGLODYTIDAE

Thryomanes bewickii

Troglodytes aedon

MIMIDAE

Mimus polyglottos

PTILOGONATIDAE

Phainopepla nitens

STURNIDAE

* *Sturnus vulgaris*

PARULIDAE

Geothlypis trichas

Oreothlypis celata

Setophaga petechia

EMBERIZIDA

Melospiza melodia

Melospiza crissalis

Pipilo maculatus

CARDINALIDAE

Pheucticus melanocephalus

Piranga ludoviciana

ICTERIDAE

Icterus bullockii

Vireos

least Bell's vireo

Jays, Magpies and Crows

American crow

common raven

Swallows

northern rough-winged swallow

barn swallow

Bushtit

bushtit

Wrens

Bewick's wren

house wren

Mockingbirds and Thrashers

northern mockingbird

Silky-flycatchers

phainopepla

Starlings and Allies

European starling

Wood Warblers and Relatives

common yellowthroat

orange-crowned warbler

yellow warbler

Emberizines

song sparrow

California towhee

spotted towhee

Cardinals, Grosbeaks, and Allies

black-headed grosbeak

western tanager

Blackbirds, Orioles, and Allies

Bullock's oriole

Icterus cucullatus

hooded oriole

FRINGILLIDAE

Spinus psaltria

Carpodacus mexicanus

Finches

lesser goldfinch

house finch

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: Redlands Passenger Rail Project State: CA County: San Bernardino
 USGS Quad Name: San Bernardino South Elevation: ~308 (meters)
 Creek, River, or Lake Name: Santa Ana River + Zanja Channel

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? Yes X No
 Survey Coordinates: Start: E 474843.36 N 3770435.32 UTM Datum: 83 (See instructions)
 Stop: E 475531.89 N 3770325.68 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

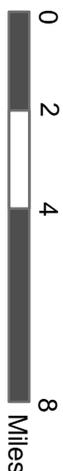
****Fill in additional site information on back of this page****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, <i>Diorhabda</i> spp.]). If <i>Diorhabda</i> found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s): <u>Jeff Ahrens</u>	Date: <u>5/21/12</u> Start: <u>0615</u> Stop: <u>0950</u> Total hrs: <u>3hr, 35m</u>	-	-	-	-	<u>No WIFL Detected</u>				
Survey # 2 Observer(s): <u>Jeff Ahrens</u> <u>Jason Fitzgibbon</u>	Date: <u>6/1/12</u> Start: <u>0600</u> Stop: <u>0925</u> Total hrs: <u>3hr, 25m</u>	-	-	-	-	" "				
Survey # 3 Observer(s): <u>Jeff Ahrens</u>	Date: <u>6/11/12</u> Start: <u>0620</u> Stop: <u>0945</u> Total hrs: <u>3hr, 25m</u>	-	-	-	-	" "				
Survey # 4 Observer(s): <u>Jeff Ahrens</u>	Date: <u>6/25/12</u> Start: <u>0530</u> Stop: <u>0855</u> Total hrs: <u>3hr, 25m</u>	-	-	-	-	" "				
Survey # 5 Observer(s): <u>Jeff Ahrens</u>	Date: <u>7/5/12</u> Start: <u>0555</u> Stop: <u>0900</u> Total hrs: <u>3hr, 5m</u>	-	-	-	-	" "				
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: <u>11hr, 5m</u>		Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes <u> </u> No <u> </u> If yes, report color combination(s) in the comments section on back of form and report to USFWS.				
		0	0	0	0					

Reporting Individual: Jeff Ahrens Date Report Completed: 8/13/12
 US Fish & Wildlife Service Permit #: TE 052159-3 State Wildlife Agency Permit #: SCP 5820/Mou

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Source: ESRI World Street Map



REDLANDS PASSENGER RAIL PROJECT
Regional Map

GLENN LUKOS ASSOCIATES

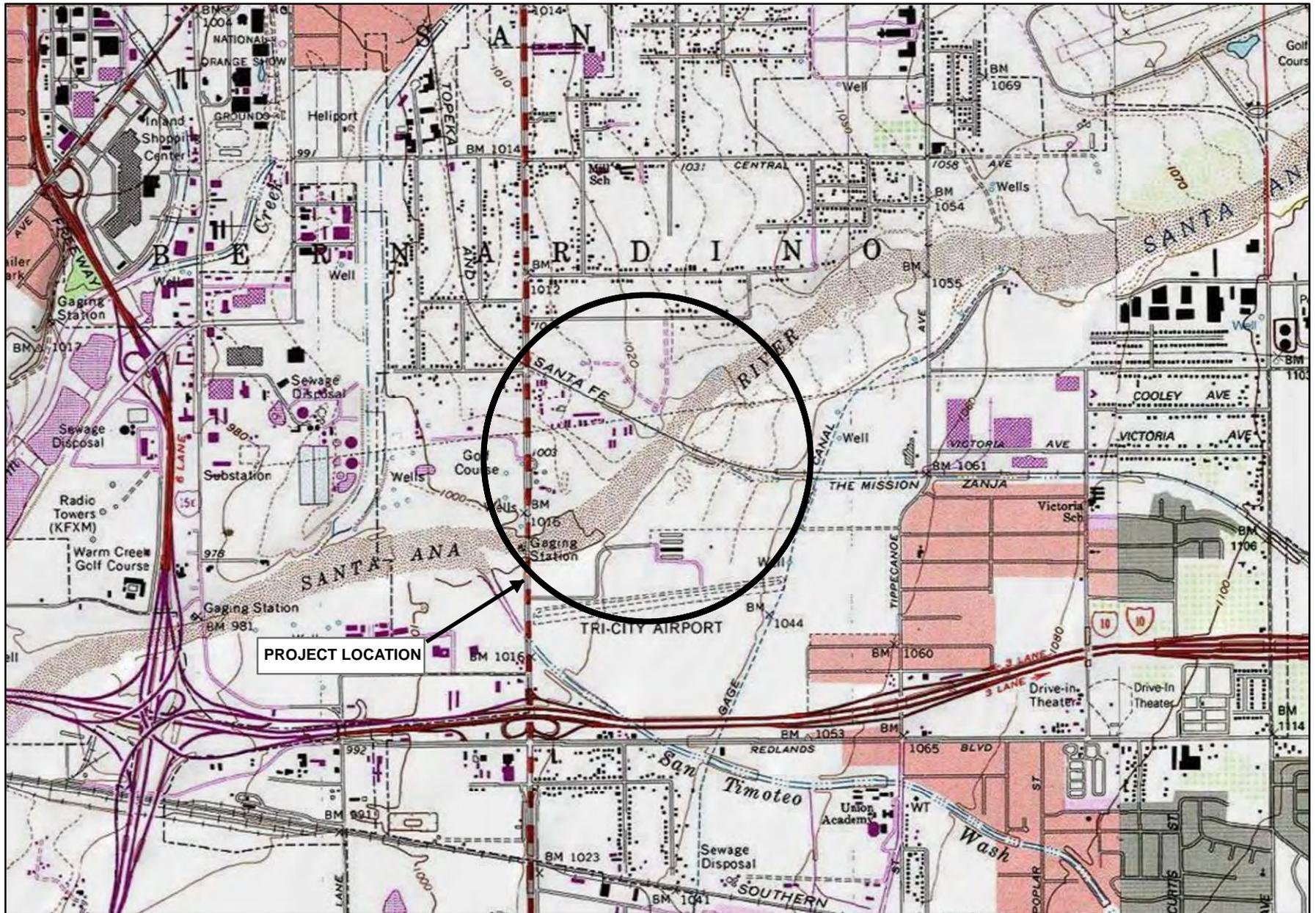


Exhibit 1

Adapted from USGS San Bernardino South, CA quadrangle



0
1,000
2,000
4,000
Feet



REDLANDS PASSENGER RAIL PROJECT

Vicinity Map

GLENN LUKOS ASSOCIATES

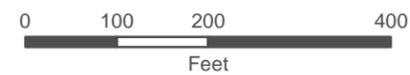


Exhibit 2



Legend

- Limits of Survey Area
- Unmated LBV 3 (June 11)
- Unmated LBV 1 (June 1, 11, 25 & July 5)
- ▲ LBV Pair (June 1, 25 & July 5)
- Unmated LBV 2 (June 1 & 11)
- Santa Ana River Woolly Star



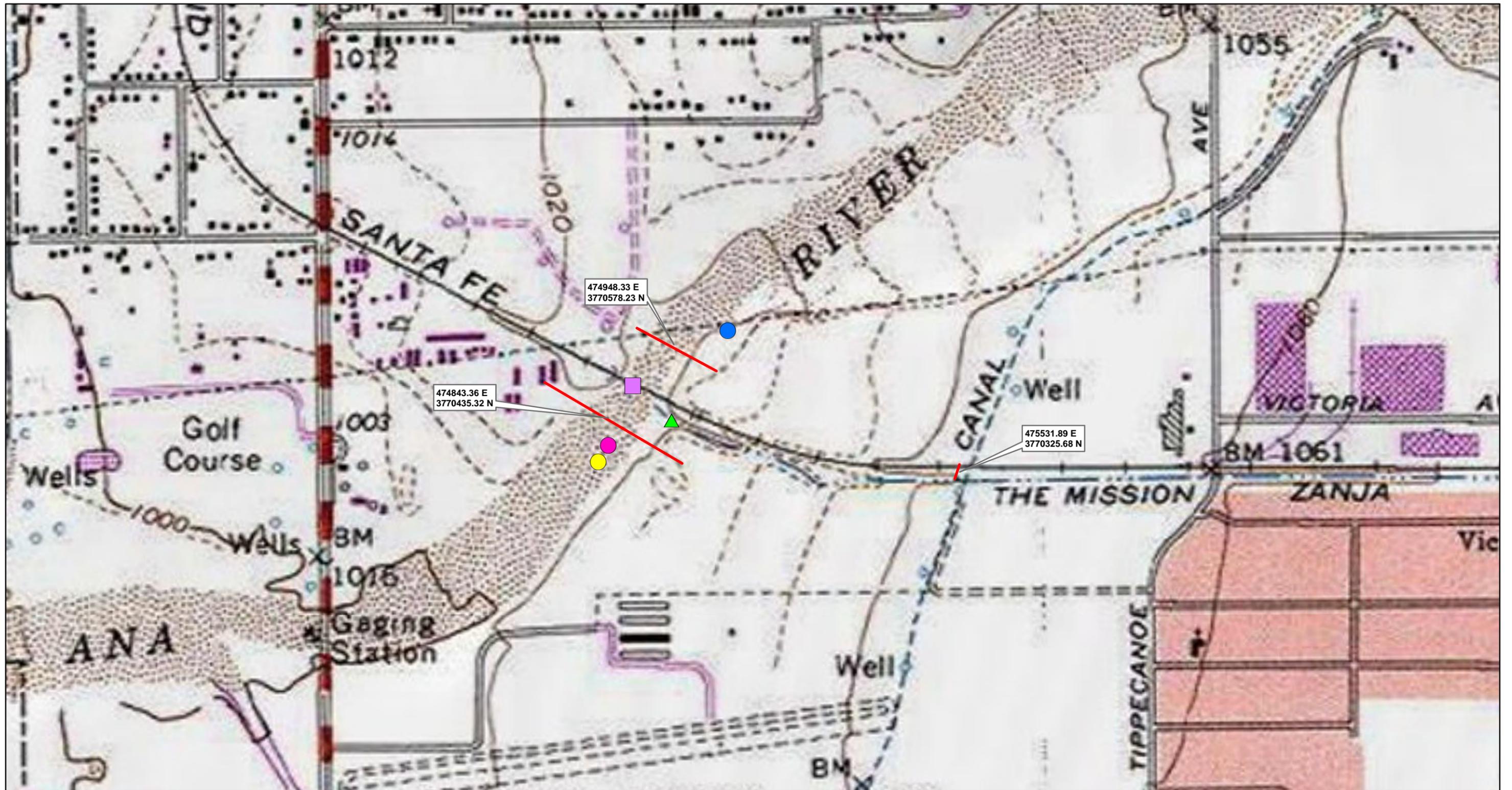
REDLANDS PASSENGER RAIL PROJECT
 Southwestern Willow Flycatcher Survey Area Aerial Map

GLENN LUKOS ASSOCIATES



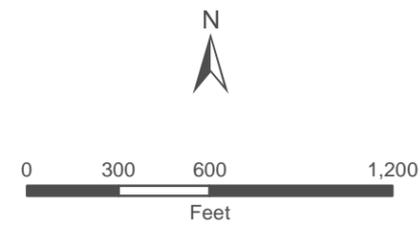
Exhibit 3

X:\0363-THE REST\1038-1WIFL\1038-1GIS\1038-1WIFL Aerial.mxd
 July 20, 2012



Legend

- Limits of Survey Area
- Unmated LBV 1 (June 1, 11, 25 & July 5)
- Unmated LBV 2 (June 1 & 11)
- Unmated LBV 3 (June 11)
- ▲ LBV Pair (June 1, 25 & July 5)
- Santa Ana River Wooly Star



REDLANDS PASSENGER RAIL PROJECT
 Southwestern Willow Flycatcher Survey Area USGS Map

GLENN LUKOS ASSOCIATES





Photograph 1: View looking south at the southern bank of the Santa Ana River at the confluence with Zanja Channel, from beneath the railroad bridge crossing.



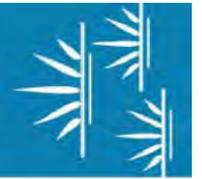
Photograph 2: View looking southwest at the Santa Ana River, north (upstream) of the railroad bridge crossing.



Photograph 3: View looking east within Zanja Channel, near the confluence with the Santa Ana River.



Photograph 4: View looking east within Zanja Channel, approximately 300 meters east of the confluence with the Santa Ana River.



GLENN LUKOS ASSOCIATES

Exhibit 5

REDLANDS PASSENGER
RAIL PROJECT

Site Photographs

APPENDIX G

San Bernardino Kangaroo Rat Report

San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*)
Habitat Assessment & Focused Survey Report
for the
Redlands Passenger Rail Project at the Santa Ana River Crossing

Located within an unsectioned portion of T1S, R4W, San Bernardino Base and
Meridian, U.S. Geological Survey – San Bernardino South Quadrangle,
City of San Bernardino, San Bernardino County, California

Prepared for:

HDR Engineering, Inc.
3230 El Camino Real Suite 200
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Contact Person: Ingrid Eich
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Phone Number: (714) 730-2389

Prepared by:

Tom Dodson & Associates (TDA)
2150 North Arrowhead Avenue
San Bernardino, California 92405
Contact Person: Shay Lawrey
Phone Number: (909) 882-3612

Certification: I hereby certify that the statements furnished herein, and in the attached exhibits present data and information required for this Biological Survey to the best of my ability, and the facts, statements, and information presented are true and correct to the best of my knowledge and belief. This report was prepared in accordance with professional requirements and recommended protocols issued in (USFWS permit No. TE-094308-0)



Shay Lawrey, Ecologist/Regulatory Specialist

August, 2012

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- Table 2. Survey dates, weather conditions, and moon phases
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- Figure 1. Regional Location Map
- Figure 2. Location Map
- Figure 3. SBKR Critical Habitat within Subject Property
- Figure 4. SBKR Survey Areas & Trapline Locations

PHOTOS *(located at the end of the document)*

1 Executive Summary

The San Bernardino County Associated Governments (SANBAG) proposes to construct the Redlands Passenger Rail Project (Project) which consists of rail improvements along the Redlands Corridor to facilitate commuter rail service between the City of San Bernardino, at E Street and the University of Redlands in the eastern portion of the City of Redlands. Project construction includes demolition and replacement of the existing track, installation of new continuously welded rail on concrete ties and new ballast and sub-ballast sections throughout the rail corridor, and replacement or retrofitting of bridge crossings. Construction of the proposed Project would begin in 2015 and would proceed generally from the west of E Street to the SAR and similarly from the SAR east to Cook Street.

One bridge crossing to be replaced is the bridge structure at the Santa Ana River. A steel beam bridge will be constructed in replacement of the existing structure. Construction access/staging would occur from the north end of the western bank. If flow is present during construction, a temporary diversion of water may be required. The diversion may consist of a temporary bypass using a pipe, flume, excavated channel, or alternative method that temporarily reroutes water around the construction area. Work zone isolation at the SAR may be required through the installation of a cofferdam and/or construction work pads within the wet area.

The existing bridge and bridge piers would be removed prior to installation of new bridge piers and the proposed design would accommodate Santa River Trail Phase III along the western bank. A debris containment system will be installed under the bridge to catch any falling debris from the demolition activities. Construction at the SAR may involve limited dredging of material from the channel bed and/or excavation along the adjacent banks. These activities could also include the placement of fill including concrete and riprap. The new bridge will be up to 365 feet in length and will result in approximately 3.61 acres of temporary disturbance to the Santa Ana River channel bed/banks.

For this project HDR Engineering, Inc. (HDR) prepared a biological constraints analysis in October 2010. Based on that analysis, HDR determined that potentially suitable habitat for the San Bernardino kangaroo rat (*Dipodomys merriami parvus*) [SBKR] exists in the Project area. In 2012, HDR contracted Tom Dodson & Associates (TDA) to conduct a focused SBKR habitat assessment of the alignment and conduct follow-on trapping surveys if required. On May 8, 2012, TDA Biologist, Shay Lawrey conducted a habitat suitability assessment for SBKR along the entire alignment. Ms. Lawrey found that the area surrounding the SAR bridge crossing was the only area along the alignment suitable for SBKR. Since this area warranted follow-on surveys, Ms. Lawrey conducted a focused trapping survey between May 18 and May 23, 2012.

No SBKR were trapped over the course of the 5-night protocol survey. Therefore, SBKR are considered absent from the site. Due to the absence of SBKR on site, there is no risk of impacting SBKR directly by implementing this project. However, the project site is mapped within critical habitat (CH) designated by the U.S. Fish and Wildlife Service (USFWS) for SBKR. This project has a federal nexus via permitting and funding, therefore project-related impacts to CH must be addressed through formal consultation with the USFWS.

2 Location and Setting

The SBKR study area is located at the existing SAR rail road bridge crossing, north of Interstate 10 (I-10) freeway and Carnegie Drive, east of Waterman Avenue, south and southeast of Orange Show Road, and west of Tippecanoe Avenue in the City of San Bernardino, California (Figures 1-4). The study area can also be found on the U.S. Geological Survey (USGS) – San Bernardino South quadrangle, 7.5 Minute Series topographic map within an unsectioned portion of Township 1 South and Range 4 West.

The local area climate is semi-arid, with an average annual temperature of 67°F and a range from 25-110°F. The rainy season begins in November and continues through March, with the quantity and frequency of rain varying from year to year. The average annual rainfall is approximately 18.1 inches. The general vicinity of the subject property consists of open space, vacant land, Eucalyptus groves, and commercial uses.

3 Methods

3.1 Research

A literature review was also conducted to examine data gathered from various biological surveys previously conducted in the vicinity of the Project area. The literature review included a review of standard field guides and texts on sensitive and non-sensitive biological resources, as well as the following sources:

- ❖ *Natural Environmental Study (NES) prepared for the SART Phase III Project by Tom Dodson & Associates for the County of San Bernardino Regional Parks Department;*
- ❖ *San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*) Presence/Absence Trapping Studies San Bernardino International Airport South Drainage Channel, San Bernardino, California prepared by Natural Resources Assessment, Inc., May 2012.*
- ❖ *Presence/Absence Trapping Studies for the San Bernardino Kangaroo Rat Santa Ana River Trails Phase III Tippecanoe Avenue to Orange Show Road City of San Bernardino, San Bernardino County, California Prepared by ENVIRA, March 2011.*
- ❖ *General Biological Assessment & Focused Survey Report for the Mountain View Avenue Extension & Widening Project prepared by Tom Dodson & Associates, 2008.*

3.2 SBKR Habitat Assessment

On May 8, 2012 TDA biologist, Shay Lawrey walked the alignment to visually assess the site conditions. During the site walk over, Ms. Lawrey looked for burrows, tail drags, tracks, and scat indicative of kangaroo rats. She also looked at the soil type and level of friability as well as habitat type and habitat structure.

3.3 SBKR Trapping Survey

Ms. Lawrey has a decade of experience with SBKR and is a biologist permitted (USFWS permit number TE 094308-0) by the USFWS to trap and handle SBKR. Ms. Lawrey conducted the focused live-trapping surveys between May 18 and May 23, 2012 according to protocols established for the SBKR. The protocol calls for five consecutive nights of trapping, when the animal is active above ground at night.

During the trapping session, a total of 100 traps (five trap lines consisting of 20 traps) were set. The trap lines consisted of 12-inch, Sherman live traps placed 10 meter apart. Traps were placed in suitable habitat areas, concentrating on locating traps in areas containing sandy soils, relatively free of debris and containing suitable vegetation. Areas with kangaroo rat/small mammal sign (scat, burrows, tail drags) were also targeted. Each trap was baited with a mixture of bird seed and rolled oats placed at the back of the traps. The traps were set at dusk each night and inspected once during the night and at dawn each morning. All animals were identified and released unharmed at the point of capture. Daily notes included weather conditions such as temperature, wind speed, cloud cover, precipitation and moon phase. Site characteristics such as soils, topography, the condition of the plant communities, and evidence of human use of the site were also noted.

4 Results

4.1 Research

Despite its location in the middle of a dense urban area, the SAR floodplain maintains considerable habitat value. In addition to the fundamental flood control and water-related functions of the SAR, this watercourse serves as a wildlife habitat linkage, corridor, and buffer in an urban context, linking habitats that are separated by development and providing wildlife dispersal and migration pathways. The floodplain also buffers plants and wildlife from surrounding human disturbance. For these and other reasons the habitats in SAR floodplain, and by default the SBKR study area, support a high level of natural resource diversity and richness. Table 1 below provides a list of sensitive species with a potential to occur in the vicinity of the SAR bridge crossing and information as to the presence of suitable habitat and/or CH.

Table 1: Listed, Proposed Species, and Critical Habitat Potentially Occurring or Known to Occur in the Project Area at the SAR.

Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
Plants					
bristly sedge	<i>Carex comosa</i>	CNPS 2.1	Marshes and swamps.	A	Grows along lake margins and wet places which are absent.
California bedstraw	<i>Galium californicum ssp. primum</i>	CNPS 1B	Chaparral, lower montane coniferous forest.	A	Grows in shade of trees and shrubs at the lower edge of the pine belt, in pine forest-chaparral ecotone.
California satintail	<i>Imperata brevifolia</i>	CNPS 2.1	Coastal scrub, chaparral, riparian scrub, mojavean scrub, meadows and seeps (alkali).	HP	Marginal habitat present. Species not found during survey.

Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
Gambel's water cress	<i>Nasturtium gambelii</i>	FE/ST	Marshes and swamps.	A	Found in freshwater and brackish marshes at the margins of lakes and along streams, in or just above the water level.
Horn's milk-vetch	<i>Astragalus hornii</i> var. <i>hornii</i>	CNPS1B	Meadows and seeps, playas.	A	Grows along lake margins, alkaline sites which are absent.
Los Angeles sunflower	<i>Helianthus nuttallii</i> ssp. <i>parishii</i>	CNPS 1A	Marshes and swamps (coastal salt and freshwater). Historical from southern California.	A	Marsh/swamp habitat is not present.
marsh sandwort	<i>Arenaria paludicola</i>	FE/SE/ CNPS1B	Marshes and swamps.	A	No dense mats of typha, juncus, scirpus, etc. and no freshwater marsh.
mesa horkelia	<i>Horkelia cuneata</i> ssp. <i>puberula</i>	CNPS 1B	Chaparral, cismontane woodland, coastal scrub.	HP	Suitable habitat present but this species is not documented in the local vicinity of the Project and was not found during survey.
Nevin's barberry	<i>Berberis nevinii</i>	FE/SE	Chaparral, cismontane woodland, coastal scrub, riparian scrub.	A	Preferred steep, north-facing slopes are absent from site.
Parish's gooseberry	<i>Ribes divaricatum</i> var. <i>parishii</i>	CNPS 1A	Riparian woodland.	HP	Suitable habitat present. Species not observed during survey.
Parish's desert-thorn	<i>Lycium parishii</i>	CNPS 2.3	Coastal scrub, sonoran desert scrub.	HP	Suitable habitat present. Species not observed during survey.
Parish's bush-mallow	<i>Malacothamnus parishii</i>	CNPS 1A	Chaparral, coastal sage scrub.	HP	Suitable habitat present. Species not observed during survey.
Parry's spineflower	<i>Chorizanthe parryi</i> var. <i>parryi</i>	CNPS 1B	Coastal scrub, chaparral.	HP	Suitable habitat present. Species not observed during survey.
Plummer's mariposa-lily	<i>Calochortus plummerae</i>	CNPS 1B	Coastal scrub, chaparral, grassland, lower montane coniferous forest.	HP	Suitable habitat present. Species not observed during survey.
Pringle's monardella	<i>Monardella pringlei</i>	CNPS 1A	Coastal scrub.	HP	Suitable habitat present. Species not observed during

Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
					survey.
Robinson's pepper-grass	<i>Lepidium virginicum</i> var. <i>robinsonii</i>	CNPS 1B	Chaparral, coastal scrub.	HP	Suitable habitat present. Species not observed during survey.
Salt Spring checkerbloom	<i>Sidalcea neomexicana</i>	CNPS 2.2	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane forest.	A	Species requires alkali springs and marshes which are absent from site.
salt marsh bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>maritimus</i>	FE/SE	Coastal salt marsh, coastal dunes.	A	Limited to the higher zones of the salt marsh habitat
San Bernardino aster	<i>Symphotrichum defoliatum</i>	CNPS 1B	Meadows and seeps, marshes and swamps, coastal scrub, cismontane woodland, lower montane coniferous forest, grassland.	A	Requires vernal mesic grassland, ditches, streams and springs. Species not observed during SBKR survey or HDR focused plant surveys.
Santa Ana River woollystar	<i>Eriastrum densifolium</i> ssp. <i>sanctorum</i>	FE/SE	Coastal scrub, chaparral.	HP	Suitable habitat present. Species was observed approx. 150 meters outside of the Project boundaries.
slender-horned spineflower	<i>Dodecahema leptoceras</i>	FE/SE	Chaparral, coastal scrub (alluvial fan sage scrub).	HP	Suitable habitat present. Species documented in local vicinity, but not observed within study area during focused survey.
smooth tarplant	<i>Centromadia pungens</i> ssp. <i>laevis</i>	CNPS 1B	Valley and foothill grassland, chenopod scrub, meadows, playas, riparian woodland.	A	Grows in alkali meadow, alkali scrub which is absent.

Fish

arroyo chub	<i>Gila orcuttii</i>	SSC	Los Angeles basin south coastal streams.	A	Project abuts dry sandy river habitat. This species occurs in slow water stream sections with mud or sand bottoms.
Santa Ana sucker	<i>Catostomus santaanae</i>	FT	Endemic to Los Angeles basin south coastal streams.	A/ CH	Nearest location is d/s of La Cadena at the Rialto Drain. CH in Project alignment

Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
Santa Ana speckled dace	<i>Rhinichthys osculus ssp. 3</i>	SSC	Headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles river system.	A	Requires permanent flowing streams with summer water temps of 17-20 c.

Reptiles & Amphibians

coast (San Diego) horned lizard	<i>Phrynosoma coronatum (blainvillii population)</i>	SSC	Inhabits coastal sage scrub and chaparral in arid and semi-arid climate conditions	HP	Species observed in vicinity.
northern red-diamond rattlesnake	<i>Crotalus ruber ruber</i>	SSC	Chaparral, woodland, grassland, & desert areas from coastal San Diego County to the eastern slopes of the mountains.	A	Occurs in rocky areas & dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.
orange-throated whiptail	<i>Aspidoscelis hyperythra</i>	SSC	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats.	HP	Prefers washes & other sandy areas with patches of brush & rocks. Species not observed during general biological surveys, but note that focused herpetological surveys were not conducted.
Sierra Madre yellow-legged frog	<i>Rana muscosa</i>	FE	Federal listing refers to populations in the San Gabriel, San Jacinto & San Bernardino mountains only.	A	Always encountered within a few feet of water.
silvery legless lizard	<i>Anniella pulchra pulchra</i>	SSC	Sandy or loose loamy soils under sparse vegetation.	A	Soil moisture is essential. They prefer soils with a high moisture content. Soils on site are dry.

Birds

burrowing owl	<i>Athene cunicularia</i>	SSC	Open, dry annual or perennial grasslands, deserts & scrublands characterized by low-growing vegetation.	HP	Suitable habitat present adjacent to trail alignment between Orange Show Road and California Street. Species or evidence
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Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
					such as feathers, castings, white wash or burrows were not observed during any of the field work including focused surveys conducted by HDR
coastal California gnatcatcher	<i>Poliophtila californica californica</i>	FT	Obligate, permanent resident of coastal sage scrub below 2500 ft in southern California.	A	Species not observed in local vicinity for over 10 years. RAFSS is not the preferred habitat of this species.
least Bell's vireo	<i>Vireo bellii pusillus</i>	FE/SE	Summer resident of southern California in riparian habitat in vicinity of water or in dry river bottoms; below 2000 ft.	P	Observed during survey.
loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, & riparian woodlands, desert oases, scrub & washes.	P	Suitable habitat present and species observed.
southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE/SE	Riparian woodlands in southern California.	P/CH	Portions of the Project are mapped within CH. Species is observed in Project area near Waterman Avenue.
yellow-breasted chat	<i>Icteria virens</i>	SSC	Summer resident; inhabits riparian thickets of willow & other brushy tangles near watercourses.	HP	Suitable habitat present. Species observed in local vicinity.
western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FC/SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	A	Nests in riparian jungles of willow. Habitat is not suitable for this species.
yellow warbler	<i>Dendroica petechia brewsteri</i>	SSC	Riparian plant associations. Prefers willows, cottonwoods, aspens, sycamores, & alders for nesting & foraging.	HP	Suitable habitat present. Species not seen during survey, but note focused avian surveys were not conducted.

Mammals

American badger	<i>Taxidea taxus</i>	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous	HP	Suitable habitat present and species documented in vicinity.
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Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
			habitats, with friable soils.		
Los Angeles pocket mouse	<i>Perognathus longimembris brevinasus</i>	SSC	Lower elevation grasslands & coastal sage communities in and around the Los Angeles basin.	P	Suitable habitat present and species documented in vicinity. Species not observed during survey.
northwestern San Diego pocket mouse	<i>Chaetodipus fallax fallax</i>	SSC	Coastal scrub, chaparral, grasslands, sagebrush, etc. In western San Diego co.	P	Suitable habitat present. Species observed in vicinity and found during survey.
pallid bat	<i>Antrozous pallidus</i>	SSC	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting.	A	No suitable roosting sites.
pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	SSC	Variety of arid areas in southern California; pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian	A.	Species found in rocky areas with high cliffs
San Bernardino kangaroo rat	<i>Dipodomys merriami parvus</i>	FE	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains.	P/CH	Project area mapped within CH. Species was observed during survey and is documented in Project area.
Stephens' kangaroo rat	<i>Dipodomys stephensi</i>	FE/ST	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover.	A	Out of species range.
San Diego black-tailed jackrabbit	<i>Lepus californicus bennettii</i>	SSC	Open shrub / herbaceous & tree / herbaceous edges.	HP	Suitable habitat present. Species not observed during survey.
San Diego desert woodrat	<i>Neotoma lepida intermedia</i>	SSC	Coastal scrub of southern California from San Diego county to San Luis Obispo county.	P	Suitable habitat present. Species documented in vicinity and observed during survey.
southern grasshopper mouse	<i>Onychomys torridus ramona</i>	SSC	Desert areas, especially scrub habitats with friable soils for digging.	HP	Suitable habitat present. Species observed in vicinity.

Common Name	Scientific Name	Status	General Habitat	Habitat Present / Absent	Rationale
			Prefers low to moderate shrub cover.		
western mastiff bat	<i>Eumops perotis californicus</i>	SSC	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral etc.	A	No suitable habitat on site. Roosts in crevices in cliff faces, high buildings, & tunnels.
western yellow bat	<i>Lasiurus xanthinus</i>	SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats.	HP	Suitable habitat present.

Insects

Delhi Sands flower-loving fly	<i>Rhaphiomidas terminatus abdominalis</i>	FE	Found only in areas of the Delhi sands formation in southwestern San Bernardino & northwestern Riverside counties.	A	Requires fine, sandy soils, often with wholly or partly consolidated dunes & sparse vegetation.
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Coding of Terms: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is, or may be present. The species may be present. Present [P] - the species is present. Critical Habitat [CH] - Project footprint is located within a designated CH unit, but does not necessarily mean that appropriate habitat is present.

Status: Federal Endangered (FE); Federal Threatened (FT); Federal Proposed (FP, FPE, FPT); Federal Candidate (FC), Federal Species of Concern (FSC); State Endangered (SE); State Threatened (ST); Fully Protected (FP); State Rare (SR); State Species of Special Concern (SSC); California Native Plant Society (CNPS) 1A- presumed extinct in California, 1B - Rare, Threatened or Endangered in California and elsewhere, 2 - Rare, Threatened or Endangered in California but more common elsewhere, 3 - Plants for which more information is needed, 4 - Plants with a limited distribution.

Of the species listed in the table above, four (4) sensitive small mammal species have a high potential for presence in the vicinity of the trapping survey area including the SBKR, San Diego pocket mouse, Los Angeles pocket mouse, and San Diego desert woodrat. Specific species background information for these four small mammals is provided for reference below. Please note that only the SBKR requires specific survey protocols to establish presence or absence. These specific survey protocols are required for areas where impacts may occur to the sensitive species or their occupied habitat. The remaining species are usually identified through casual observation while trapping for targeted species.

SBKR - The SBKR is one of several kangaroo rat species in its range. The Dulzura (*Dipodomys simulans*), the Pacific kangaroo rat (*Dipodomys agilis*) and the Stephens kangaroo rat (*Dipodomys stephensi*) occur in areas occupied by the San Bernardino kangaroo rat, but these other species have a wider habitat range. The habitat of the San Bernardino kangaroo rat is described as being confined to primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than aeolian (wind) processes. Burrows are dug in loose soil, usually near or beneath shrubs. The SBKR is one of three subspecies of the Merriam's kangaroo rat. The Merriam's

kangaroo rat is a widespread species that can be found from the inland valleys to the deserts. The subspecies known as the San Bernardino kangaroo rat, however, is confined to inland valley scrub communities, and more particularly, to scrub communities occurring along rivers, streams and drainage. Most of these drainages have been historically altered as a result of flood control efforts and the resulting increased use of river resources, including mining, off-road vehicle use and road and housing development. This increased use of river floodplain resources has resulted in a reduction in both the amount and quality of habitat available for the San Bernardino kangaroo rat. The past habitat losses and potential future losses prompted the emergency listing of the San Bernardino kangaroo rat as an endangered species (U.S. Fish and Wildlife Service, 1998a). Robust populations of SBKR are documented approximately 1 mile upstream of the study area. According to recent surveys conducted in the vicinity of the Project, SBKR have recently (2010 and 2012) been located approximately 0.25 mile upstream of the SAR crossing.

Northwestern San Diego Pocket Mouse - The northwestern San Diego pocket mouse prefers habitat similar to that preferred by the SBKR. The northwestern San Diego pocket mouse occurs in open, sandy areas in the valleys and foothills of southwestern California. The range of this species extends from Orange County to San Diego County, and includes Riverside and San Bernardino counties. This mouse is a California Species of Special Concern (CSC) whose historical range has been reduced by urban development and agriculture. CSC designation of species is based on a series of publications prepared by the CDFG on declining species of mammals, birds, fishes, and amphibians and reptiles. The publications were intended to focus attention on declining wildlife in California, species that are not currently listed but may merit listing under the California Endangered Species Act (CESA). Some of the species identified in these documents have been subsequently listed, or are provided protection under provisions in the California Endangered Species Act (CEQA). Others have remained on the CSC list, and have not been elevated to a greater status of protection. The reasons are many, including a lack of understanding on the specific numbers of individuals and populations, the habitats occupied by the species, and the threats to those habitats.

Los Angeles Pocket Mouse -The Los Angeles (LA) pocket mouse is one of two pocket mice found in this area of San Bernardino County. Both the Los Angeles pocket mouse and the San Diego pocket mouse occupy similar habitats, but the San Diego pocket mouse has a wider range extending south into San Diego County. The habitat of the Los Angeles pocket mouse is described as being confined to lower elevation grasslands and coast sage scrub habitats, in areas with soils composed of fine sands (Williams, 1986). The present known distribution of this species extends from Rancho Cucamonga east to Morongo Valley and south to the San Diego County border. LA pocket mouse forages in open ground and underneath shrubs. Pocket mice in general dig burrows in loose soil, although this has not been completely documented for this subspecies. The LA pocket mouse is listed as a California Species of Special Concern by the California Department of Fish and Game (CDFG).

San Diego Desert Woodrat -The desert woodrat is a relatively wide-ranging species extending along the coast of California from south of San Francisco through to the border with Baja California. This species also occurs in the Central Valley and the deserts of southern California and extends along the desert side of the Sierra Nevada into southeastern Oregon. The coastal race of the desert woodrat, the San Diego desert

woodrat, prefers scrub habitats such as coastal sage scrub, chaparral and alluvial fan sage scrub. It is more common in areas with rock piles and coarse sandy to rocky soils throughout coastal southern California. The range of this species extends from just south of Sacramento and the San Francisco area to the border with Baja California. The coastal subspecies of the widespread *Neotoma lepida* is listed as a CSC; its historical range has been impacted by the conversion of scrub habitats into residential, commercial and industrial use.

4.2 SBKR Habitat Assessment

After visually assessing the entire alignment and researching background information relative to SBKR occurrences, Ms. Lawrey determined that the only location in the Project alignment supporting suitable habitat for SBKR occurs at the existing SAR rail road bridge crossing. The soils here are very friable and consist of Psamments and fluvents (young alluvial deposits with little or no soil formation) and Soboba Stony Loamy sand. The type and structure of the habitat here are also consistent with SBKR occupation. Current surveys have been positive for SBKR 0.25 mile upstream of the existing SAR rail road bridge crossing between Orange Show Road and Tippecanoe Avenue. The rest of the Project alignment did not display any habitat characteristics or diagnostic sign indicative of potential SBKR occupation, nor did the records indicate SBKR presence. Therefore, the SBKR analysis area became focused at the existing SAR rail road bridge crossing.

4.2.1 Observed Habitats

Riversidean Alluvial Fan Sage Scrub RAFSS - Expansive blocks of RAFSS habitat exist within the Santa Ana River. RAFSS is a rare and sensitive plant community that is adapted to the harsh conditions of flooding. It grows on sandy, rocky alluvium deposited by streams that experience infrequent episodes of flooding. The dominant habitat type found within the SBKR study area includes RAFSS (Holland community code 32720). RAFSS is a Mediterranean shrubland community that dominates washes, floodplains, and alluvial fans in southern California. Because alluvial fan sage scrub is characterized by its diversity, it can also be described as an intermediate between chaparral and sage scrub habitats, in that all three vegetation communities share similar floral components. However, the distinguishing factor is that alluvial fan sage scrub undergoes periodic scouring from frequent flooding events, creating three seral stages; pioneer, intermediate, and mature.

The SBKR study area contains disturbed intermediate RAFSS. This habitat generally occurs between the active flood channels and terraces of the Santa Ana River and is subjected to infrequent flooding events. Species composition onsite includes scalebroom (*Lepidospartum squamatum*), California buckwheat, brittlebush, matchweed (*Gutierrezia californica*), broom matchweed (*Gutierrezia sarothrae*), telegraph weed (*Heterotheca grandiflora*), coastal goldenbush (*Isocoma menziesii*), interior goldenbush (*Ericameria linearifolia*), hairy yerba santa (*Eriodictyon trichocalyx*), California sagebrush (*Artemisia californica*), Coastal prickly pear (*Opuntia littoralis*), valley cholla (*Opuntia parryi*), shrubby butterweed (*Senecio flaccidus*), and Our Lord's candle (*Yucca whipplei*). Soils are mainly gravelly, coarse alluvium with approximately 50 percent vegetative cover.

California Buckwheat Alluvial Fan Association - The California Buckwheat Alluvial Fan Association (CBAFA) described by Gordon and White (1994) is a type of RAFSS in which California buckwheat is dominant. It is another alluvial scrub found adjacent to major floodplains and is found in the SBKR survey area. Species present onsite typical of this community included California buckwheat as a dominant species, as well as brittlebush, California matchweed, deerweed, and occasional hairy yerba santa and scalebroom. Vegetative cover is moderate and soils are characterized as loose, coarse alluvia. In the SBKR study area, this community is primarily associated with previously disturbed areas up on the upper terraces adjacent to the bridge abutments.

Ruderal - Ruderal, non-native vegetation has successfully colonized the outskirts of the SBKR study area. Non-native cover is very high. Typical vegetation observed onsite consists of weedy non-native species such as wild oat (*Avena* sp.), shortpod mustard (*Hirschfeldia incana*), ripgut grass (*Bromus diandrus*), foxtail chess (*Bromus madritensis* ssp. *rubens*), tocalote (*Centaurea melitensis*), red-stemmed filaree (*Erodium cicutarium*), and horehound (*Marrubium vulgare*).

Riparian - In addition to the rich RAFSS habitat community found within the SBKR study area, patches of riparian habitat occur along the banks. This riparian habitat is in various seral stages and generally consists of tall, multilayered, open canopy riparian woodland. The characteristic vegetative species within this riparian habitat include; Fremont cottonwood (*Populus fremontii*), black willow (*Salix goodingii*), sandbar willow (*S. hindsiana*), and mule fat (*Baccharis salicifolia*). This riparian woodland has emerged with a complex canopy structure of varying layers of trees, shrubs, herbs and vines. The overstory within Mission Creek and at its confluence with the SAR averages over 35 ft in height.

The habitat within the study area is favorable for foraging, nesting, burrowing, and wildlife movement.

4.2.2 Commonly Observed Plants and Wildlife

Common native perennial floral species present in the SBKR study areas include chamise, California juniper, California buckwheat, deerweed, white sage, and California sagebrush. Common native annual species include wreath plant (*Stephanomeria virgata* ssp. *virgata*), slender buckwheat (*Eriogonum gracile*), California sun cup (*Camissonia bistorta*), California croton (*Croton californicus*), telegraph weed, and prickly cryptantha (*Cryptantha muricata*).

Common wildlife species seen and/or heard during the SBKR surveys include a number of local reptiles, birds, and mammals. Common reptiles encountered were the coastal western whiptail (*Cnemidophorus tigris*), western fence lizard (*Sceloporus occidentalis*), and side-blotch lizard (*Uta stansburiana*). Approximately 15 bird species were detected. Common birds included black phoebe (*Sayornis nigricans*), northern mockingbird (*Mimus polyglottos*), rock wren (*Salpinctes obsoletus*), and western kingbird (*Tyrannus verticalis*). Excluding the small mammals captured during trapping, three mammals species were seen including the California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audobonii*), and coyote (*Canis latrans*).

4.3 SBKR Trapping Surveys

Based on the suitable site conditions at the existing SAR rail road bridge crossing and known locations of SBKR in the nearby vicinity, it was determined that trapping studies were warranted. No limitations or constraints were identified that could influence the survey results. Surveys were conducted during the appropriate season, in good weather conditions, by a qualified biologist who followed all pertinent protocols. Weather conditions were clear and cool with calm winds. Table 2 below shows the tabulated weather data as it relates to the surveys.

Table 2. Survey dates, weather conditions, and moon phases

Survey Dates	%Cloud Cover	Wind (BFT)	Overnight Low Temp (°F)	Precipitation	Moon Phase
05/18	50	2	57	None	Waxing cresant
05/19	50	2	58	None	Waxing cresant
05/20	20	2	57	None	New moon
05/21	10	1	60	None	Waning cresant
05/22	0	2	63	None	Waning cresant
05/23	0	1	60	None	Waning cresant

Sign of various small mammals were observed within the areas of the trap lines and five (5) native rodent species were trapped in the SBKR survey area. No animals were marked as part of this survey so determining unique individuals versus recaptured individuals was not possible. The term “trap night” is used to relay how many individuals, per species were caught over the 5-night session. Each trap is counted as a trap night, so with 100 traps surveyed over five nights there was a total of 500 trap nights in the survey area. There were 143 captures over the five night trapping period.

Table 3. Species captured within the Phase 1 SBKR Survey Area

Species	Trap Nights
Dulzura Kangaroo Rat (<i>Dipodomys simulans</i>)	5
desert wood rat (<i>Neotoma lepida</i>)	10
cactus mouse (<i>Peromyscus eremicus</i>)	25
deer mouse (<i>Peromyscus maniculatus</i>)	75
San Diego pocket mouse (<i>Chaetodipus fallax fallax</i>)	28

(Phylogenetic listing per Jameson & Peters, California Mammals, 1988)

5 Conclusions

The trapping results show that SBKR do not currently occupy this area of the SAR. No SBKR were trapped over the course of the 5-night trapping survey. Given the absence of SBKR within the analysis area, there is no risk of taking individuals of this species in conjunction with implementing the proposed project. Although the project will not likely result in the loss of a federally listed species it may affect critical habitat. This project has a federal nexus, via permitting and funding, therefore project-related impacts to CH must be addressed through formal consultation with the USFWS.

5.1 San Bernardino Kangaroo Rat Critical Habitat

The USFWS is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and their habitats by enforcing Federal wildlife laws, administering the ESA, managing migratory bird populations, restoring nationally significant fisheries, and conserving wildlife habitat. The USFWS listed the SBKR as endangered on September 24, 1998 (63 FR 51005) and designated CH for this species on April 23, 2002 (67 FR 19812). On January 10, 2011 the Court rejected the USFWS's 2008 revised SBKR CH designation (FR 73, No. 202). As a result of this decision, this project is subject to the SBKR CH that was designated by the USFWS in 2002 (67 FR 19812).

The 2002 CH designation for the SBKR encompasses 33,295 acres of land in Riverside and San Bernardino counties, California. CH is defined in section 3(5)(A)(i) of the ESA, in part, as *“areas occupied by the species at the time of listing and containing those physical and biological features (Primary Constituent Elements (PCEs)) that are essential to the conservation of the species, and that may require special management considerations or protection. General requirements include, but are not limited to: space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species”*.

The areas designated as CH for SBKR are identified in four separate units. The four units are within the geographical range of the SBKR and support the habitat the species requires for foraging, sheltering, reproduction, rearing of young, dispersal, and genetic exchange. This project falls within the Santa Ana River CH Unit (Unit 1), located in San Bernardino County. Unit 1 encompasses approximately 8,935 ac, and includes the SAR and portions of City, Plunge, and Mill Creeks. It is bounded by Seven Oaks Dam to the northeast. Although Seven Oaks Dam impedes sediment transport and reduces the magnitude, frequency, and extent of flood events, the system still retains partial fluvial dynamics because contributions from Mill Creek and other tributaries are not impeded by a dam or debris basin. This unit contains upland refugia and tributaries that are occupied by the species, active hydrological channels, floodplain terraces, and areas of habitat immediately adjacent to floodplain terraces. The functions and values of the SBKR CH within Unit 1 include: (1) Soil series consisting predominantly of sand, loamy sand, sandy loam, or loam; (2) Alluvial fan sage scrub and associated vegetation, such as coastal sage scrub and chamise chaparral, with a moderately open canopy; (3) River, creek, stream, and wash channels; alluvial fans; floodplains; floodplain benches and terraces; and historic braided channels that are subject to dynamic geomorphological and hydrological processes typical of fluvial systems within the historical range of the San Bernardino kangaroo rat; and (4) Upland areas proximal to floodplains with suitable habitat.

The Project area at the SAR is mapped within Unit 1 of designated SBKR CH. The CH within this portion of the Project area, specifically within the SAR between Waterman

Avenue and Orange Show Road, contains some PCEs for SBKR, is marginally suitable for SBKR and provides connectivity to large blocks of occupied habitat.

The new bridge will be up to 365 feet in length and will result in approximately 1.45 acres of impact including 0.84 acres of temporary disturbance and 0.61 acres of permanent disturbance to SAR channel bed/banks within SBKR CH. Temporary impacts to 0.84 acres and permanent impacts to 0.61 acres of the 8,935 acres of CH designated within Unit 1 will not result in an adverse modification of the CH designated in this unit. Furthermore, this Project will not change the hydrologic processes in any way that will contribute to further loss of PCEs elements identified for SBKR within the SAR.

5.2 Jurisdictional Waters & Regulatory Issues

The SAR is a jurisdictional river system characterized by active meander zones (within man-made levees) with quickly changing sedimentation and accretion patterns and a broad natural floodplain that frequently floods in the winter and spring. Construction of the Project may result in temporary and permanent alteration and fill of jurisdictional waters. Impacts to jurisdictional waters usually require regulatory approvals from the one or more of the following regulatory agencies: U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), and/or CDFG.

Based on the projected impacts gathered from current documentation, the Project may require a Clean Water Act (CWA) Section 404 permit, CWA Section 401 Certification, and CDFG Code Section 1602 Streambed Alteration Agreement. Further, critical habitat (CH) has also been designated over parts of the Project area for the federally listed SWWF and Santa Ana sucker as well as SBKR. Below is a discussion the regulations and corresponding regulatory agency for which this project may need to consult.

Clean Water Act (CWA)- The CWA is the principal federal law that governs pollution in the nation's lakes, rivers, and coastal waters. Originally enacted in 1972 as a series of amendments to the Federal Water Pollution Control Act of 1948, the Act was last amended in 1987. The overriding purpose of the CWA is to "restore and maintain the chemical, physical and biological integrity of the nation's waters." The statute employs a variety of regulatory and non-regulatory tools to eliminate the discharge of pollutants into the nation's waters and achieve water quality that is both "swimmable and fishable".

Under Section 404 of the CWA, the Corps has primary federal responsibility for administering regulations that concern the discharge of dredged or fill material into waters of the U.S. (including wetlands). Waters of the U.S. (WoUS) are defined as: "*All waters used in interstate or foreign commerce; all interstate waters including interstate wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent and ephemeral streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, where the use, degradation, or destruction of which could affect interstate commerce; impoundments of these waters; tributaries of these waters; or wetlands adjacent to these waters*" (Section 404 of the CWA; 33 CFR 328).

The limit of the Corps jurisdiction for non-tidal waters (including non-tidal perennial and intermittent watercourses and tributaries to such watercourses) in the absence of

adjacent wetlands is defined by the ordinary high water mark. The ordinary high water mark (OHWM) is defined as: *“The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas* (Section 404 of the CWA; 33 CFR 328). Wetlands are defined as: *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions”* (Section 404 of the CWA; 33 CFR 328).

Porter-Cologne Water Quality Control Act (Porter-Cologne)- Porter-Cologne is the principal State law that governs water protection efforts in California. Porter-Cologne establishes the State Water Resources Control Board (SWRCB) and each of the nine RWQCBs as the principal state agencies for coordinating and controlling water quality in California. The RWQCB typically regulates discharges of dredged or fill material into WoUS pursuant to Section 401 of the CWA, however, they also have regulatory authority over waste discharges into Waters of the State, which may be isolated, under Porter-Cologne. In the absence of a nexus with the Corps, the RWQCB requires the submittal of a Waste Discharge Requirement (WDR) application, which must include a copy of the project Storm Water Pollution Prevention Plan (SWPPP) and a copy of the project Water Quality Management Plan (WQMP), otherwise called a Standard Urban Stormwater Management Plan (SUSMP). The RWQCB’s role is to ensure that disturbances in the stream channel do not cause water quality degradation.

California Fish and Game Code (FGC) - Sections 1600 to 1616 of the California FGC require any person, state, or local government agency or public utility to notify the CDFG before beginning any activity that will substantially modify a river, stream, or lake. If it is determined that the activity could substantially adversely impact an existing fish and wildlife resource, then a Lake or Streambed Alteration Agreement is required.

Like the Corps and RWQCB, the CDFG also regulates discharges of dredged or fill material. The regulatory jurisdiction of CDFG is much broader however, than Corps or RWQCB jurisdictions. CDFG regulates **all** activities that substantially alter streams and lakes and their associated habitats. The CDFG, through provisions of the FGC Sections 1601-1603 is empowered to issue agreements for any substantial alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams (and rivers) are defined by the presence of a channel bed and banks. The CDFG typically extends the limits of their jurisdiction laterally beyond the channel banks for streams that support riparian vegetation. In these situations the outer edge of the riparian vegetation is generally used as the lateral extent of the stream and CDFG jurisdiction. CDFG regulates wetland areas only to the extent that those wetlands are a part of a river, stream, or lake as defined by CDFG.

California Endangered Species Act (CESA) - The CDFG administers the California Endangered Species Act (CESA). The State of California considers an endangered species one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management, and a rare species is one present in such small numbers

throughout its range that it may become endangered if its present environment worsens. "Rare species" classification applies to California native plants. The State definition of "take" is narrow and specifically refers to the direct loss of a State-listed species.

Provisions within the FGC protect all native birds of prey and their nests (FGC §3503.5), and all non-game birds (other than those not listed as Fully Protected) that occur naturally in the State (§3800). The handful of species, such as the California condor, that are designated by the State as "fully protected" received this rare designation through special legislation. There is no mechanism allowed for CDFG to issue take authorization for a fully protected species. Species of Special Concern is an informal designation used by CDFG for some declining wildlife species that are not proposed for listing as threatened or endangered, such as the burrowing owl. This designation does not provide legal protection, but signifies that these species are recognized as sensitive by CDFG.

Federal Endangered Species Act (ESA) - Special status species are native species that have been afforded special legal protection because of concern for their continued existence. The USFWS enforces the provisions of the federal ESA. Section 9 of the ESA prohibits the "taking" of a listed species by anyone, including private individuals, and state and local agencies. The term "take" under federal law means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. "Take" can include adverse modification of habitats used by a threatened or endangered species during any portion of its life history. Threatened and endangered species on the federal list (50 CFR Sections 17.11 and 17.12) are protected from indirect and/or direct or take. If "take" of a listed species is necessary to complete an otherwise lawful activity, this triggers the need for consultation under Section 7 or Section 10 of ESA. A Biological Opinion with incidental take provisions would be rendered. Pursuant to the requirements of the ESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed species may be present in the study area and whether the proposed project will have a potentially significant impact upon such species.

Under the ESA habitat loss may be considered an impact to the species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species that is proposed for listing under ESA or to result in the destruction or adverse modification of CH proposed to be designated for such species. The term "critical habitat" for a threatened or endangered species refers to the following: specific areas within the geographical range of the species at the time it is listed that contain suitable habitat for the species, which may require special management considerations or protection; and specific areas outside the geographical range of the species at the time it is listed that contain suitable habitat for the species and is determined to be essential for the conservation of the species. Under Section 7 of the ESA, all federal agencies (including USFWS) are required to ensure that any action they authorize, fund, or carry out will not likely jeopardize the continued existence of a listed species or adversely modify their CH.

Pursuant to CEQA, project-related impacts to these species, or their habitats, would be considered significant and require mitigation.

Migratory Bird Treaty Act- Migratory birds are protected under the federal Migratory Bird

Treaty Act (MBTA) of 1918 (16 U.S.C 703-711). The MBTA provides protection for nesting birds that are both residents and migrants whether or not they are considered sensitive by resource agencies. The MBTA prohibits take of nearly all native birds. The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed under 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The direct injury or death of a migratory bird, due to construction activities or other construction-related disturbance that causes nest abandonment, nestling abandonment or forced fledging would be considered take under federal law. The USFWS, in coordination with the CDFG administers the MBTA. CDFG's authoritative nexus to MBTA is provided in FGC Sections 3503.5 which protects all birds of prey and their nests and FGC Section 3800 which protects all non-game birds that occur naturally in the State.

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Figures

Figure 1. Aerial Overview of SBKR Survey Area

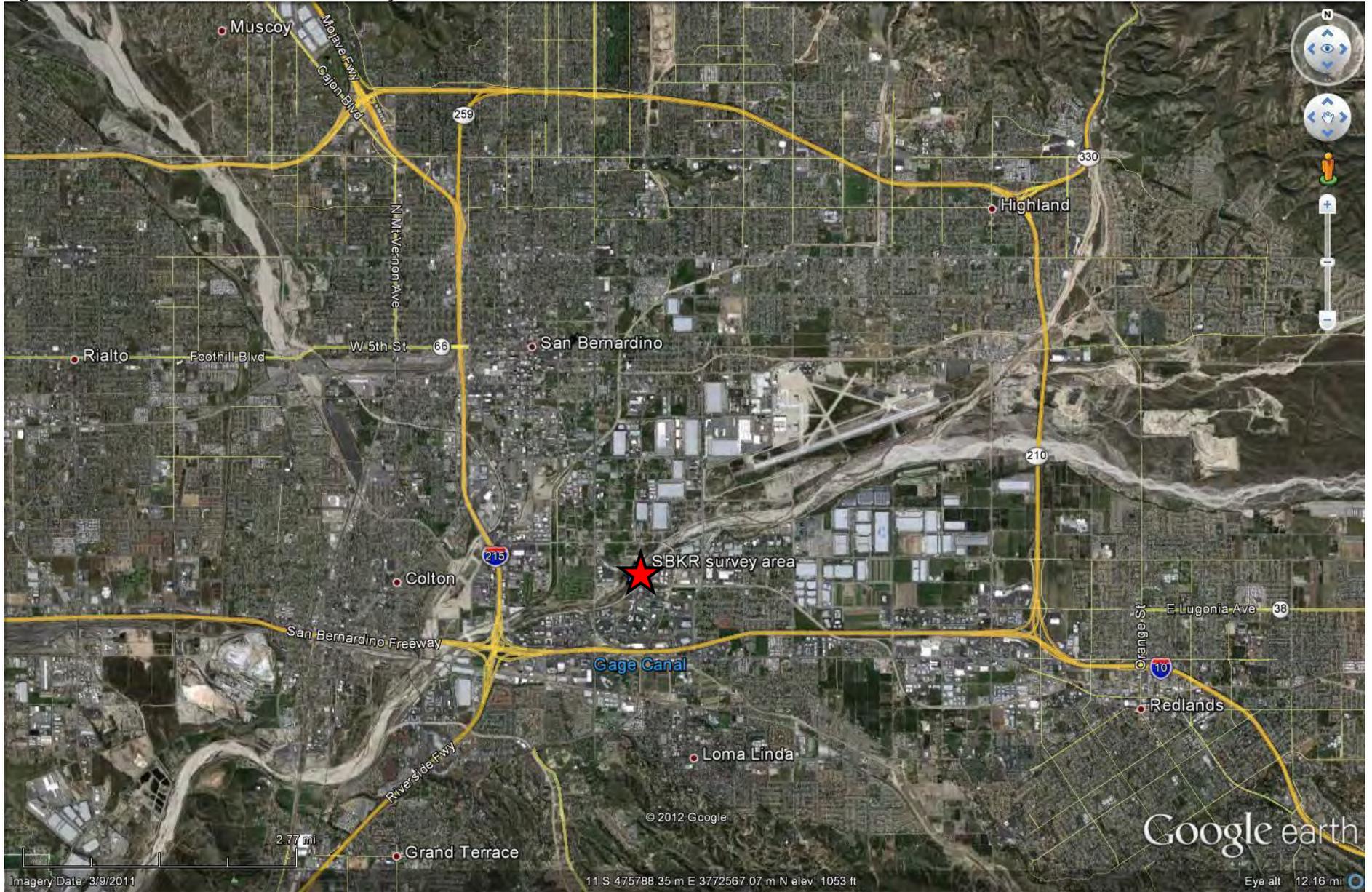


Figure 2. Aerial View of SBKR Survey Area with Critical Habitat Overlay



Figure 3. Aerial View of SBKR Survey Area Site Location



Photos of SBKR Survey Area



Photo 1. Standing on west side of bridge looking north/northeast.



Photo 2. Standing on east side of bridge looking north/northwest.



Photo 3. Standing on north side of SAR as rail road approaches abutment looking southeast.



Photo 4. Standing at Mission Creek confluence with the SAR looking northeast at SAR bridge crossing.

APPENDIX H

Santa Ana Sucker Habitat Evaluation

Santa Ana Sucker Habitat Evaluation

Redlands Passenger Rail Project

5 October 2012



**Santa Ana Sucker Habitat Evaluation
Redlands Passenger Rail Project**

5 October 2012

Prepared for:

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Acronyms

BMP	best management practice
CDFG	California Department of Fish and Game
CIP	cast in place
CISS	concrete in steel shell
cm	centimeter
fps	feet per second
ins	inches
PCE	primary constituent element
PRD	Permit Registration Document
ROW	right-of-way
RPRP	Redlands Passenger Rail Project
SANBAG	San Bernardino Association of Governments

SCRRA Southern California Regional Railroad Authority
SWPPP Storm Water Pollution Prevention Plan
USFWS U.S. Fish and Wildlife Service

1 Introduction

The Redlands Passenger Rail Project (RPRP) would implement rail improvements along the Redlands Corridor to facilitate commuter rail service between the City of San Bernardino and the University of Redlands in the City of Redlands. One part of this project is to remove and replace the existing rail bridge over the Santa Ana River. This report evaluates habitat for the Santa Ana sucker (*Catostomus santaanae*) in this segment of the river and the potential for impacts from construction and operation of the project on this species and its designated critical habitat.

2 Project Description

The RPRP would involve implementation of rail improvements along the Redlands Corridor to facilitate commuter rail service between the City of San Bernardino and the University of Redlands in the City of Redlands. The Project would include 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 9-mile project corridor would be constructed to 50 feet in width, sufficient to support a parallel maintenance road. This would require demolition and replacement of the existing track. These improvements would adhere to standards established by the BNSF Railway 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.

The Project would be constructed within an existing railroad right-of-way (ROW) owned by the San Bernardino Associated Governments (SANBAG), which averages 50 to 100 feet in width except in portions of downtown Redlands where the ROW is less than 40 feet wide. The rail improvements would also include the construction of a new train signaling and communications system.

The Project would require the replacement or retrofitting of up to six structural crossings to facilitate the loading requirements of the Metrolink trains and track foundation. Five of the six structural crossings consist of existing bridge structures, including the Santa Ana River crossing (Bridge 3.4). That existing Santa Ana River bridge would be replaced, at the same location, with a new steel beam bridge up to 365 feet long. The work would temporarily affect up to 0.84 acre and permanently affect up to 0.61 acre of Santa Ana River bed and banks (Figure 1). Construction of this crossing would take approximately nine months.

Construction access/staging would occur from the north end of the western bank. Access to the eastern bank would occur via construction of a temporary bridge crossing (earthen fill) from the west (see Figure 1). Existing bridge and bridge piers (support structures = bents) would be removed following installation of the new bridge piers. The new bridge would have up to five bents placed within the river channel compared to three (plus one at each bank) at the existing bridge, and the piers would be longer to support a second future rail track (see Figure 2). The new structural supports would be constructed behind an encircling temporary cofferdam of sheet piles or similar method, such as the use of Concrete in Steel Shell (CISS) piles, depending on contractor preference. The foundation would consist of reinforced concrete supported by bored and cast-in-place (CIP) pilings, with conventional reinforced CIP concrete piers extending up to the bridge deck. In the event that water is present in the river, it would be diverted around the work area. Best management practices (BMPs) as detailed in the project Storm Water Pollution Prevention Plan (SWPPP) will be implemented to ensure that construction materials, including concrete, do not come in contact with the river water. To minimize the potential for debris to fall into the Santa Ana River 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 downstream.

Erosion, sedimentation, and hazardous materials spills or leakage from construction vehicles is also considered a potential impact to water quality. To address these issues, the project will require the contractor to conduct vehicle refueling within the staging/assembly area, a minimum of 50 feet from wetland areas. The project will include preparation of a SWPPP as well as other Permit Registration Documents (PRDs) by the project engineer or contractor. The SWPPP will identify BMPs to address potential short-term impacts and post-construction (long-term) measures to be implemented for the

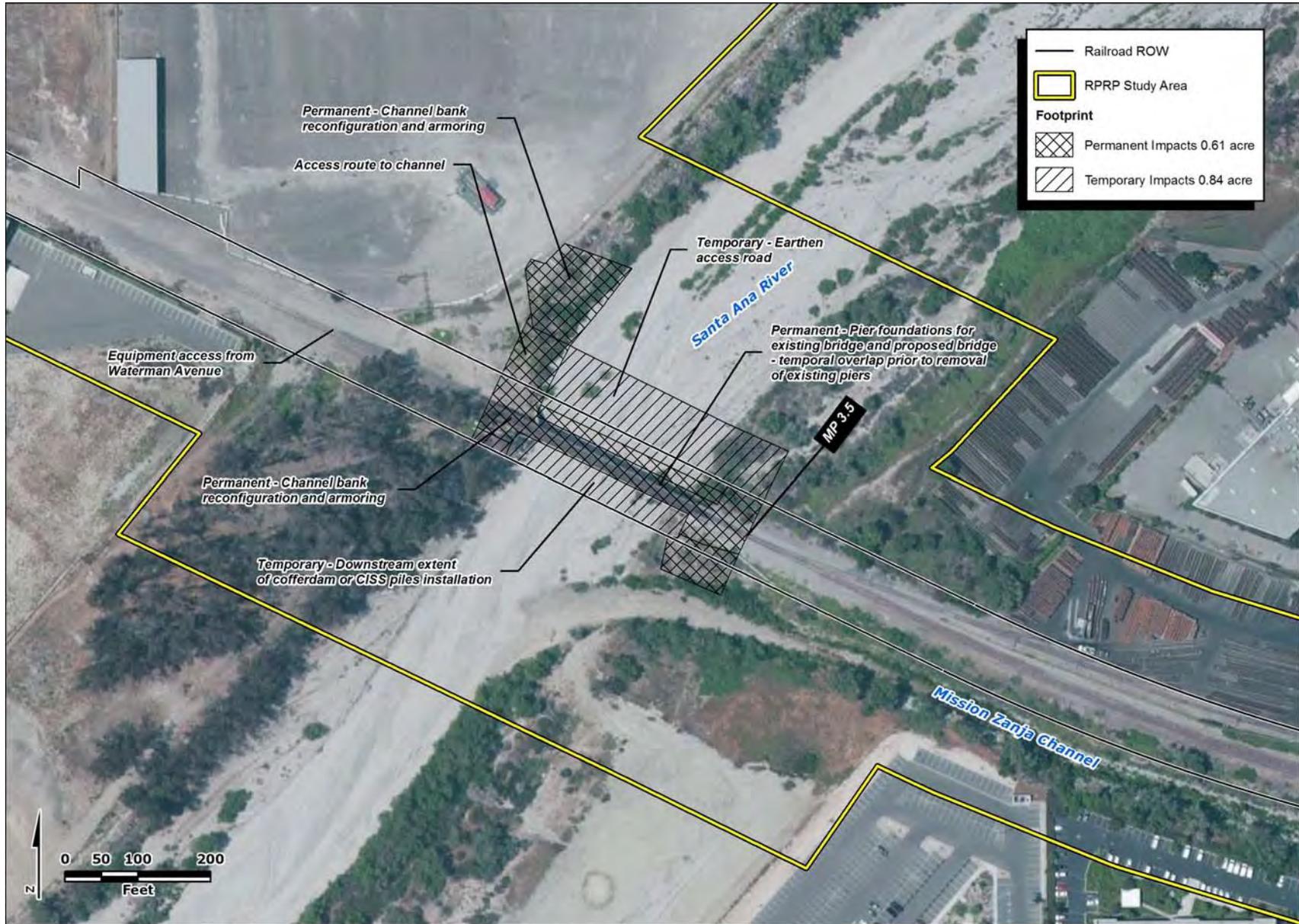


Figure 1 RPRP Footprint SAR Bridge 3.4

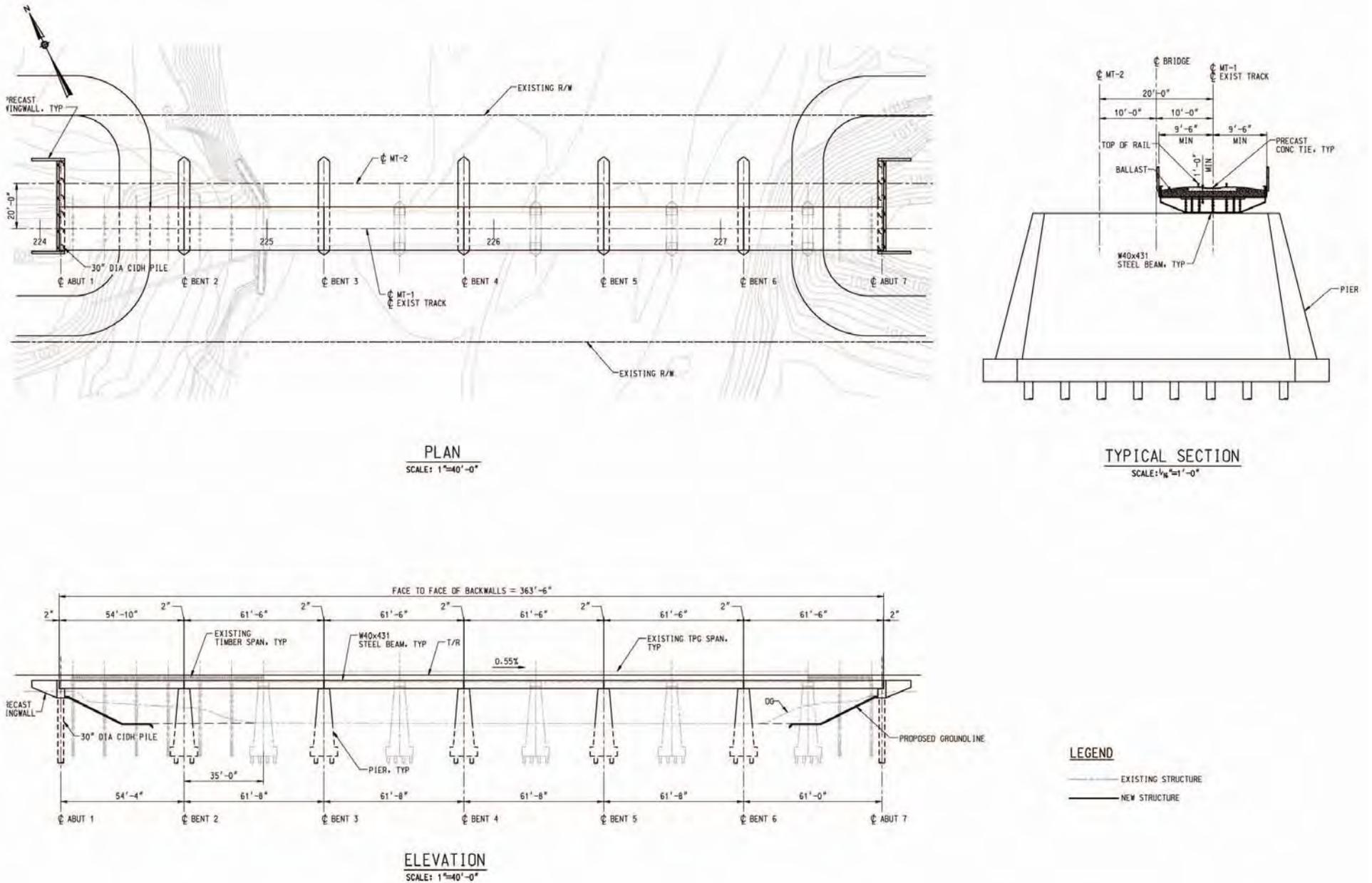


Figure 2 RPRP Bridge 3.4 Plan

project. Stormwater pollution prevention BMPs included as a part of the SWPPP would be implemented in accordance with the California Stormwater Construction Handbook (latest edition) and the Construction General Permit Order no. 2009-0009-DWQ. Construction could also involve limited dredging of material from the channel bed and/or excavation along the adjacent banks. These activities could also include the placement of fill including concrete and riprap. To minimize construction activity in the river channel, the structural improvements would be constructed in two or more increments to minimize disturbance to the channel bottom and allow for the safe passage of water flow. A similar approach would be employed for the removal of any existing structures.

If flow is present during construction, temporary diversion of water may be required. The diversion may consist of a temporary bypass using a pipe, flume, excavated channel, or alternative method that temporarily reroutes water around the construction area. The method would ultimately be at the discretion of the construction contractor. Surface water diversion BMPs would be required to prevent or reduce mingling of construction-related runoff with upstream non-construction-related runoff so as to prevent the introduction of sediment, nutrients, pesticides, and/or other pollutants to local waterways during construction.

Operation of the RPRP would involve trains every 30 minutes in the peak periods and every hour in the off-peak period. This would translate to 25 average daily round trips along the alignment during weekdays. Maintenance of the rail ROW is currently the responsibility of BNSF, which is the current operator of the rail line. This includes routine maintenance of the track and track ties, grade crossings, and communication system. Vegetation management and weed abatement would also be required along the ROW. A contractor hired by SANBAG would conduct all maintenance activities and inspections, including those for the Santa Ana River Bridge, in accordance with SCRRA/Metrolink and BNSF standard practices.

3 Santa Ana Sucker Description

3.1 Status

The Santa Ana sucker was federally listed by the U.S. Fish and Wildlife Service (USFWS) as a threatened species on April 12, 2000 (65 FR 19686, USFWS 2004). In California, it is listed as a species of special concern (California Department of Fish and Game (CDFG) 2011).

3.2 Species Description

The Santa Ana sucker, a member of the sucker family of fishes (Catostomidae), is a small, short-lived fish generally less than 6.3 inches (ins) (16 centimeters (cm)) in length; however, they have been collected at lengths up to 8 ins (20.3 cm) (Russell 2010, as cited in USFWS 2012). Santa Ana suckers have downward oriented mouths with fleshy, protrusible lips and jaws with cartilaginous scraping edges which allow them to suck up small invertebrates, algae, detritus, diatoms, fish eggs, and other organic matter for food (Moyle 2002, USFWS 2004). Coloration is typically silvery-white on the belly and dark gray on the sides and back, with irregular dorsal blotches on the sides and faint patterns of pigmentation arranged in lateral stripes (Moyle 2002).

The Santa Ana sucker is usually found in permanent pools and runs of small to medium size (less than 7 meters in width), and in water ranging in depth from a few centimeters to greater than a meter (USFWS 2004). The preferred substrate for this species includes gravel, rubble, and boulder and is generally coarse; although, individuals have been found in streams with sand/mud substrates (USFWS 2004). Flow throughout the habitat is described as slight to swift; some populations occur in streams that are subject to periodic and severe flooding (USFWS 2004). This species prefers overhanging riparian plants for shelter, and does not require streamside cover when larger, deeper holes and riffles are present for refuge (USFWS 2004).

Santa Ana sucker spawning may occur between mid-March and early-July, with peak activity usually in April (Moyle 2002). Spawning habitat typically consists of gravelly-riffles. The fertilized eggs adhere to the substrate and hatch within 30 days. Females are very fecund and can produce between 4,423 and 16,151 eggs (USFWS 2004). The high fecundity of the Santa Ana sucker, in combination with early sexual maturity and a protracted spawning period allows this species to quickly repopulate streams following periodic flood events that could decimate populations (Moyle 1976 as cited in USFWS 2000). Santa Ana suckers in the Santa Clara River generally mature during their second summer and die at the end of their third summer although some individuals have been observed to survive through a fourth or even fifth summer (Moyle 2002, Drake 1988 as cited in USFWS 2012).

3.3 Distribution

Historically, the Santa Ana sucker was native to the rivers and larger streams of the Los Angeles Basin (Los Angeles, San Gabriel, and Santa Ana river drainages) in Los Angeles, Orange, Riverside, and San Bernardino counties (USFWS 2000). There are very few records of the historic range of this species, but it is presumed that Santa Ana suckers ranged from near the Pacific Ocean to the uplands of the Los Angeles and San Gabriel river systems and at least up to the San Bernardino National Forest boundary in the Santa Ana River (Swift et. al. 1993 as cited in USFWS 2000).

Currently, native noncontiguous populations of Santa Ana suckers occur in the Santa Ana River, lower Big Tiguanga Creek in the Los Angeles River drainage, and East, West, and North forks of the San Gabriel River (USFWS 2012). A small population is located in the Santa Clara River, although it is believed that this is an introduced population (USFWS 2004). In the Santa Ana River, Santa Ana suckers are found in the lower river and its tributaries from Prado Dam to near California State Highway 90 and in the middle

river and its tributaries from south of La Cadena Drive, where wastewater discharges provide perennial flow, to Prado Dam. It is believed that the Santa Ana sucker has lost approximately 70 percent of its historical native range in the Santa Ana River watershed and 75 percent of its historic range overall (USFWS 2000).

3.4 Critical Habitat

On December 14, 2010 (75 FR 77962–78027, USFWS 2010), critical habitat was revised for Santa Ana sucker, designating critical habitat in Los Angeles, Orange, Riverside, and San Bernardino counties, California. The designated critical habitat includes approximately 9,331 acres (3,776 hectares) of Federal, State, and private lands. Three units were designated (Unit 1: Santa Ana River, Unit 2: San Gabriel River, and Unit 3: Big Tujunga Creek, a tributary to Los Angeles River). Designated areas that were occupied by the Santa Ana sucker at the time of listing contain the physical and biological features essential to the conservation of Santa Ana sucker and may require special management considerations or protection. Additionally, certain areas have been designated critical habitat that are outside areas occupied by the Santa Ana sucker at the time of listing that are essential for conservation of the species. These areas are essential because they contribute to the maintenance of the physical and biological features within the occupied critical habitat by providing sources of water and coarse sediments necessary to maintain all life stages of the Santa Ana sucker (USFWS 2012).

The primary constituent elements (PCEs) for the Santa Ana sucker are:

1. A functioning hydrological system within the historical geographic range of the species that experiences peaks and ebbs in water volume (naturally or regulated) that encompasses areas that provide or contain sources of water and coarse sediment necessary to maintain all life stages, including adults, juveniles, larvae, and eggs.
2. Stream channel substrate with a mosaic of loose sand, gravel, cobbles, and boulders in a series of riffles, runs, pools, and shallow sandy stream margins necessary to maintain various life states of the species.
3. Water depths greater than 1.2 ins (3 cm) and bottom water velocities greater than 0.01 feet per second (0.03 meters/second).
4. Clear or only occasionally turbid water.
5. Water temperatures less than 88°F (30°C).
6. Instream habitat that includes food sources (e.g., phytoplankton, zooplankton, and aquatic invertebrates) and associated vegetation (e.g., aquatic emergent plants and adjacent riparian vegetation) that provides shading to reduce water temperature, shelter during periods of high water velocity, and protective cover from predators.
7. Areas within perennial stream courses that may be periodically dewatered, but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

All occupied designated critical habitat units contain these PCEs in the appropriate quantity and spatial arrangement essential to conservation of the species.

The proposed project is located near the upstream edge of Unit 1, Subunit 1B, in an area that is not currently occupied due to the barrier to upstream movement at La Cadena Drive. This subunit was considered occupied at the time of listing and provides sources of water (PCE 1) and coarse sediment (PCE 2) for downstream occupied habitat (USFWS 2010). Because the project site is not currently occupied, PCEs 3-7 do not apply.

4 Project Site Evaluation

4.1 Description of site

The existing rail bridge over the Santa Ana River is located about mid way between the East Orange Show Road (upstream) and South Waterman Avenue (downstream) road crossings, and is approximately 0.9 mile downstream of Tippecanoe Avenue. The active river channel is approximately 250 feet wide at the rail crossing but wider upstream and narrower downstream. Flow is intermittent at this location and results from storm runoff during the rainy season and releases from Seven Oaks Dam in the dry season prior to fall/winter rains. The remainder of the time the channel is dry.

Substrate at the project site is primarily sand with some coarser material mixed in. Sand dominates the river bed downstream to the Prado Basin. Course materials (gravel and cobbles) from upstream sources pass through the project area during larger runoff events when water velocity is high enough to transport them.

A number of barriers to upstream fish movement occur downstream of the project site. These include grade control structures at the I-10 freeway crossing and La Cadena Drive. Downstream distance to occupied habitat from the project site is approximately 2.25 miles.

The river banks support a mix of native and non-native shrubs and trees.

4.2 Critical habitat functions

As noted above, the project area is within critical habitat Unit 1, Subunit 1B in an area that is not currently occupied by the species but provides transit of water (PCE 1) and coarse materials (PCE 2) downstream to occupied habitat. The existing rail bridge supports do not appear to substantially affect water or sediment transport downstream to occupied habitat based on hydraulic modeling which shows that the water surface elevation would be 1017.3 feet with a velocity of 15.6 feet per second (fps) at the bridge during a 100-year flow event (HDR 2012). The existing bridge has three supporting piers in the river channel, another one on the south bank, and a wingwall on the north bank (Figure 2). The piers are 6.5 feet wide and approximately 25 feet long (oriented parallel to river flow). The small area taken up by the piers is less than 9 percent of the river width from base of bank to base of bank. It is even less for bank-full width.

5 Potential for Project Effects

5.1 Construction

Construction of the new bridge would result in disturbances within the river channel and on the banks related to access, installation of temporary cofferdam(s) or CISS piles, dredging in the river bed and/or excavation along the banks, and removal of the cofferdam(s) or CISS piles when construction is completed. Dredging and/or excavation of the river banks under the bridge to widen the channel would have the potential to cause suspension of fine sediments if the work occurs in flowing water or the disturbed soils later are exposed to flowing water before those soils are stabilized. Cofferdam or CISS pile installation activities would temporarily disturb the river bed and would isolate a small amount of the bed from flows since the work could be conducted during at least some periods of flow. These small disturbances would not adversely affect water or sediment transport downstream. The temporary cofferdam(s) or CISS piles would isolate construction activities, including pouring of concrete, from the waterway. Therefore, construction-related impacts on turbidity and suspension of sediments would be limited to the actual installation and removal of the temporary cofferdam(s) or CISS piles, with removal more likely to suspend sediments than installation. Removal of the existing bridge support structures in and adjacent to the river channel would have similar effects on sediment suspension. Their removal would allow water to pass through those locations.

Construction of a temporary earthen fill access road down the west bank and across the river to the east bank would place sediments within the river channel that could be eroded by river flows during the work period, when the road is present. If any flow is present or becomes present during the work, portions of the fill could be washed downstream. Driving equipment across that flow would suspend sediments and have the potential to wash pollutants off the equipment into the water. The source of earthen material used and duration that the road is in place would determine the potential for and type of sediments that could be suspended and carried downstream with effects as described below.

Diversion of flow away from specific work areas, such as bank excavation or support structure construction, would have the potential to result in temporary suspension of sediment as the diversion is put in place and then when it is removed. Operation of the diversion could also cause sediment suspension if adequate energy dissipation is not included at the discharge location.

Sediments suspended during low-flow periods would primarily be sand and silt that would rapidly settle before reaching occupied Santa Ana sucker habitat. Sediments suspended by construction activities during higher flows would add a small increment to the suspended sediment load caused by the higher velocity water that would not adversely affect occupied habitat downstream. Construction of the cofferdam(s) or CISS piles would normally be limited to the period between April and September, and is expected to take approximately four weeks, when river flows are relatively low, resulting in little to no transport of fine sediment downstream to occupied habitat.

Leaks of fuel, hydraulic fluid, and/or lubricants from equipment working in or above the river channel, although unlikely, have a potential to contaminate dry or moist river bed sediments when no flow is present. This contamination, if not cleaned up immediately, could be transported downstream during higher flow events to occupied Santa Ana sucker habitat. Leaks into flowing water would be transported downstream and could reach occupied habitat.

5.2 Operations

The new bridge supports are not anticipated to alter sediment and water transport downstream. Each would be the same width as the existing piers but approximately 20 feet longer (parallel to flow). The river channel under the new bridge would be widened, particularly on the north side, so that the five new piers

would be in the channel. Hydraulic modeling shows that, relative to the existing bridge, the new bridge would result in a slightly lower water surface elevation and velocity during a 100-year flow event (HDR 2012). Thus, the new bridge would not impede water transport under the bridge. The new bridge would not change water surface elevation downstream of the bridge and thus would not affect water or sediment transport downstream.

The new armoring along the reconfigured west bank would add a small amount of turbidity to river flows during initial runoff events after construction is completed that wash fines on the rock surfaces off into the river and/or when higher flows contact the new rock and wash off the fine sediments adhering to the rock surface. The input of sediment would be temporary and would add a negligible amount to the existing sediment load during such runoff events with no adverse effects on occupied habitat downstream.

Operation of the trains at an average of 25 round trips per day would have the potential to contribute small amounts of pollutants, such as lubricants and fine metal/plastic particles from normal wear of moving parts (e.g., wheels and brakes) under the train, to the river through dry fallout or rainfall runoff from the train/bridge. These could add to pollutants downstream in occupied habitat during runoff events that transport water and sediments downstream. The quantities of these pollutants are expected to be small, particularly if the trains are regularly maintained and cleaned. Maintenance activities for the track and bridge also have the potential to introduce pollutants into the river in a similar manner.

6 Recommended Protection Measures

The following measures are recommended to minimize the potential for effects of the project on Santa Ana sucker critical habitat and downstream occupied habitat.

1. Provide environmental training for all construction workers that discusses the Santa Ana sucker, its critical habitat, and protection of habitat and water quality.
2. Include in the SWPPP measures for immediate cleanup of spilled or leaked pollutants within the river channel, energy dissipation for diversion outflows, and monitoring/maintenance of BMPs during construction.
3. Place culverts under temporary access road fill sized to pass maximum anticipated low flows in the river, and remove temporary access road fill (and culverts) prior to any expected higher river flows that could wash out that road.
4. Monitor during construction activities in the river channel to ensure that pollutants are not introduced into the river sediments or water.
5. Maintain and clean rail cars to minimize the amount of lubricants and metal/plastic particles from normal wear that could fall into the river channel as the trains cross the bridge.
6. Provide environmental training to bridge/rail maintenance personnel that includes BMPs to use to prevent pollutants from entering the river.

7 References

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APPENDIX I

**Hydrology and Hydraulics Report
for Bridge 3.4**

SANBAG Redlands Passenger Rail Project

Job Name: Hydraulic Impact Analysis – Santa Ana River Bridge 3.4
Job Number: 170063
Client: SANBAG
Consultant: HDR Engineering, Inc.

This report and the analysis and design calculations contained herein have been prepared under the supervision of the following Registered Civil Engineer:

Mark Seits, P.E.
CA 41103

August 2012
Date

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1. Purpose

The rail from historic Warm Creek (that portion of Warm Creek that was not combined with East Twin Creek and Warm Creek Improvements) to Mill Creek Zanja is proposed to be improved as part of the Redlands Passenger Rail Project (RPRP) (see Exhibit 1). This report covers the hydraulic impacts for AT&SF Bridge 3.4 (Bridge 3.4), which is a railroad crossing over Santa Ana River. The improvements are proposed to reconstruct the bridge from its existing freight-only operation to current standards required for regular passenger rail operations. As part of this project, recommendations, including hydraulic analysis, are being provided to assist in this process.

The purpose of the hydraulic modeling is to: (1) to analyze the existing hydraulic condition of the Santa Ana River to establish current conditions considering Federal Emergency Management Agency (FEMA) models and updated site conditions; (2) evaluate the hydraulic impact on the rail from proposed Bridge 3.4; and (3) evaluate the potential hydraulic impacts of proposed Bridge 3.4 on the proposed passenger rail.

2. Background

The RPRP will design a double track alignment for passenger and freight service from the proposed San Bernardino Transit Center east to the University of Redlands. The Redlands Corridor Strategic Plan (RCSP) was developed by San Bernardino Associated Governments (SANBAG) to address the transportation needs of the Redlands Corridor, assess the capability of transit service and multimodal improvements to meet mobility needs, and describe a course of action to implement transit service in the Redlands Corridor in a cost-effective manner. The first phase of the RCSP calls for the development of a passenger rail service operating between the San Bernardino Transit Center and the University of Redlands, a distance of approximately nine miles. Exhibit 1 shows the overall project.

The general hydraulic modeling approach was to initially review hydraulic models from FEMA to examine flooding conditions in the Santa Ana River reach with Bridge 3.4. Exhibit 2 shows the limits of the analysis. A revised hydraulic model was developed of the project area based on the additional information obtained to model existing and proposed conditions through the bridge and to evaluate the relative changes in water surface for a 100-year flood. The proposed bridge will be designed per structure, constructability, and geotechnical and hydraulic issues.

The Santa Ana River model reach in this study is located between River Mile (RM) 28.3 to RM 29.64, from approximately 1,660 feet downstream of AT&SF Bridge 3.4 to 700 feet upstream of Tippecanoe Avenue (see Exhibit 2). Total reach length is approximately 7,000 feet. The reach is a soft-bottom channel with riprap side slopes. Figure 1 shows Bridge 3.4 downstream face in the Santa Ana River. Figure 2 shows the rail on existing Bridge 3.4. Hydraulic analyses are required to evaluate the existing and proposed bridges to determine if they meet current design requirements. There are three structures in the reach, as shown below in Table 1.

Table 1: Structures in Santa Ana River Reach

Structure	Approximate Location (RM)
AT&SF Railroad Bridge 3.4	28.62
Orange Show Road	29.06
Tippecanoe Avenue	29.51

The existing effective FEMA model for the Santa Ana River was obtained and used as the base model. The model was revised based upon information contained in the WRC (2003) report prepared to model proposed river trail improvements. Modeling of the Santa Ana River and Bridge 3.4 was conducted using the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center River Analysis System (HEC-RAS v4.1) program. All reference topography is based on the NGVD 1929 datum.

The standard freeboard criteria selected for the bridge (in the following priority) are shown below. For this project, because the 50-year flow rate is not available, only the 100-year flow rate was evaluated.

1. 100-year water surface elevation below low chord;
2. 100-year energy grade line (EGL) elevation below top of subgrade and 50-year water surface [hydraulic grade line (HGL)] elevation below low chord;
3. 50-year water surface (HGL) elevation below low chord; and
4. No increase of water surface elevations within project area.



Figure 1: Santa Ana River, AT&SF Bridge 3.4 Downstream Face

A draft FEMA “no rise” certificate is included within this report. Bridge 3.4 is within a FEMA floodway and therefore this certification is required to document that no change to 100-year base flood elevation will occur due to bridge replacement.

This report presents hydraulic analysis results; however, it does contain some assumptions and approximations. Prior to 100% design, the assumptions and approximations made within this report should be verified. Primarily, these include the proposed bridge geometry.



Figure 2: Existing AT&SF Bridge 3.4

3. Hydrology

The 100-year flowrate for the Santa Ana River tabulated in the San Bernardino County Flood Insurance Study (FIS) is 113,000 cfs upstream of Warm Creek. The 100-year Santa Ana River flow rate contained in the effective FEMA model and in the WRC report and model are less. The flowrate of 113,000 cfs is believed to be the flowrate before the construction of Seven Oaks dam upstream of the reach. The 100-year flowrate in Santa Ana River FEMA and WRC model are the same and are verified with “Santa Ana River Trail Hydraulic Design and Analysis” and “Santa Ana River Mainstream Project, Feature Design Memorandum No. 2” reports. The 100-year flowrates in the FEMA model are shown in Table 2 and indicate a flow change location just downstream of Bridge 3.4. The 100-year discharge at Bridge 3.4 is 33,000 cfs and was used for this evaluation.

Table 2: Hydrology - Flowrates

Channel Reach (River Mile)	100-Year Flood Discharge (cfs)
RM 27.91 to RM 28.57	36,500
RM 28.58 to RM 33.27	33,000
Note: Flowrates are in cubic feet per second (cfs)	

4. Hydraulic Modeling

4.1 Modeling Overview

Hydraulic modeling was conducted using the USACE HEC-RAS (v.4.1) program. The existing FEMA effective model was available in HEC-2 format for the Santa Ana River reach. The FEMA effective models were broken into several reaches. Bridge 3.4 is located in the reach from River Mile (RM) 28.30 to 29.64, which covers from downstream of Bridge 3.4 to upstream of Tippecanoe Bridge. The HEC-2 model was originally modeled in July 1987, then revised in January 1990. There are two structures in the model – Bridge 3.4 and Tippecanoe Bridge. Bridge 3.4 is located at RM 28.615.

The original HEC-2 model does not include the Orange Show Bridge. Also, bridge piers were modeled as one pier with the total pier width in the HEC-2 model. WRC Consulting Services prepared “Santa Ana River Trail, Alabama Street to Waterman Avenue, Hydraulic Design and Analysis” in 2003 and updated the original effective model. The WRC model reach ranges from RM 26.98 to 33.37. There are three models in the WRC report:

- **Model 1** – Original FEMA effective HEC-2 model prepared by the USACE.
- **Model 2** – Converted Model 1 to the HEC-RAS format, added an additional bridge at Orange Show Road, revised bridge pier data to match existing, and added channel geometry from RM 28.10 to 29.51 based on as-built plan data.
- **Model 3** – Prepared from Model 2 for the proposed trail ramps and removed them from flow conveyance.

Only a hard copy of the WRC report was available. Digital copies of the HEC-RAS models described in the report were not available. Since the report has tabulation of the HEC-RAS input and output data, HDR first converted the effective FEMA HEC-2 model to HEC-RAS format, then revised the HEC-RAS model per the WRC report Model 2 input data printout to duplicate Model 2. The bridge pier widths were revised based on the as-built/survey data in the WRC report. This HEC-RAS model was then used to address the impact of the proposed improvements to Bridge 3.4. The 100-year flowrate was used to compare between the existing bridge and the proposed condition to see if the proposed condition has any hydraulic impacts.

4.2 Model Inputs

4.2.1 FEMA Effective Model

The effective HEC-2 model was obtained from FEMA. The original model was run with the HEC-2 (v.1991) program. The model files were provided by FEMA. Model results are shown on FEMA Flood Insurance Rate Map (FIRM) panel 06071C8684H. See Exhibit 4: FEMA FIRM 06071C8684H.

4.2.2 Duplicate Effective Model (HEC-2)

The HEC-2 model provided by FEMA was run by HDR using the HEC-2 (1991) program. The results run by HDR match the FEMA Effective model results. As explained, Model 1 in the WRC report is the same model as the Duplicate Effective Model prepared by the U.S. Army Corps of Engineers.

4.2.3 Corrected Effective Model (HEC-RAS)

The Duplicate Effective model was imported to HEC-RAS (v4.1). Minor discrepancies are explained by the differences between the HEC-2 (1991) and HEC-RAS (v4.1) programs. The Corrected Effective Model was developed based on the information available in WRC report. Model 2 in WRC report added an additional bridge model at Orange Show Road, added channel geometry from River Mile (RM) 28.10 to 29.51, and revised pier data at all bridges.

As explained, the WRC HEC-RAS model was not available, but the input and output of the HEC-RAS model were contained in the WRC report. The HEC-RAS model HDR created was intended to duplicate the WRC Model 2. The results between the duplicated HEC-RAS model and the output from the WRC report were compared. The results agreed and the differences are within 0.01 feet. Some modeling detail notes include:

- Manning's n values were kept the same as in the effective FEMA model (overbank=0.075, channel=0.04).
- Ineffective flow areas were added to cross-sections as needed.
- The bridges were modeled using the Highest Energy Answer for low flow and the pressure/weir option for high flow.
- The downstream boundary condition used known water surface, it was kept from the HEC-2 model.
- The model was run under subcritical flow conditions.
- Note that the water surface just upstream of Bridge 3.4 is approximately 4 feet higher than the Duplicated Effective model, and it dissipates upstream of Bridge 3.4. The discrepancy is due to the HEC2 and HEC-RAS program.

- Note that several cross sections downstream of Bridge 3.4 and one cross section upstream do not have enough ground geometry to contain the water in the cross section. Geometry revisions were not made to these cross sections.

4.2.4 Existing Conditions Model (HEC-RAS)

WRC completed survey and as-built plans review for Bridge 3.4. The actual pier width is 6.5 feet compared to 7.6 feet used in WRC Model 2 and in the Corrected Effective HEC-RAS model. The pier width was adjusted to 6.5 feet and this revised model was named the Existing Conditions Model. The pier width for Orange Show Rd and Tippecanoe Ave Bridge were not changed. The actual pier width for Orange Show Rd Bridge and Tippecanoe Ave Bridge is 1.6 feet. Considering 2 feet debris on each side of the pier, the resulting pier width is approximately the same as in WRC Model 2. The Existing Conditions Model was used to evaluate the hydraulics for the existing and proposed conditions. In summary:

- Existing bridge geometry was kept the same for all bridges, except the pier width was for Bridge 3.4 was corrected to 6.5 feet per WRC survey/as-built review.
- Per the discussion in the FIS, the Santa Ana River has medium debris potential. Since Bridge 3.4 pier size is over six feet, pier debris accumulation was not applied following typical procedures used by the Los Angeles District USACE.

4.2.5 Proposed Condition Bridge Model (HEC-RAS)

Proposed condition channel geometry and modeling approach for Bridge 3.4 are identical to the existing conditions bridge model for all cross sections outside of the bridge area. A total of two bridge alternatives were analyzed. The alternatives were taken from the design plans. Bridge alternative plans can be found at Exhibit 5. The model was modified as following:

- Two alternatives were proposed for Bridge 3.4 replacement. Proposed conditions for Bridge 3.4 were taken from the design plans.
- For Alternative 1, the proposed design includes a W40X431 steel beam with five piers. The total span is 363.5 feet. The abutments were assumed to be sloped at a 2:1 inclination to meet grade at the channel bottom. Bridge profile was assumed to be 5.775' steel beam with concrete tie, subgrade and rails.
- For Alternative 2, the proposed design includes a W21X62 steel beam with three piers. The total span is 360.2 feet. The abutments were assumed to be sloped at a 2:1 inclination to meet grade at the channel bottom. Bridge profile was assumed to be 4.271' steel beam with concrete tie, subgrade and rails.
- The proposed condition survey was based on NAVD 88 vertical datum. The Corpscon program was used to convert elevations in NAVD 88 to NGVD 29. The conversion relationship of NAVD 88 – NGVD 29 = 2.5 feet was used based on the proposed bridge location (N34.07515, W117.2721).

4.3 Model Results

Table 3 shows the Existing Conditions Model hydraulic results for Cross Section 28.62 upstream of Bridge 3.4. Figure 3 shows the profile of the existing AT&SF Bridge. Figure 4 shows the cross section view of the existing Bridge 3.4 and Figure 5 shows the cross-section view of the Alternative 1 bridge. The Alternative 2 bridge is generally similar to Alternative 1. The model exhibits for the existing and proposed condition profile and cross sections can be found in Attachment 1.

Table 3: Existing Conditions Model Results for Cross-Section 28.62 (Upstream of Bridge 3.4)

	100-Year
WSE	1017.29 ft
EGL	1018.86 ft
VCH	10.07 ft/s
WSE = water surface elevation, EGL = energy grade line elevation, VCH = main channel average velocity. All elevations are NGVD 1929.	

The results obtained from 100-year flow rate analysis of Bridge 3.4 are shown in Table 4. Full hydraulic model results are shown in Attachment 2 (Hydraulic Analysis Results).

Table 4: AT&SF Bridge 3.4 (28.615) Hydraulic Results

		Existing Bridge	Alternative 1	Alternative 2
100-Yr event	WSE	1017.3 ft	1017.0 ft	1016.5 ft
	EGL	1018.9 ft	1018.3 ft	1017.9 ft
	Velocity	15.6 ft/s	11.7 ft/s	11.3 ft/s
	Froude #	0.82	0.68	0.65
WSE = water surface elevation; EGL = energy grade line elevation; VCH = main channel average velocity; All elevations are NGVD 1929.				

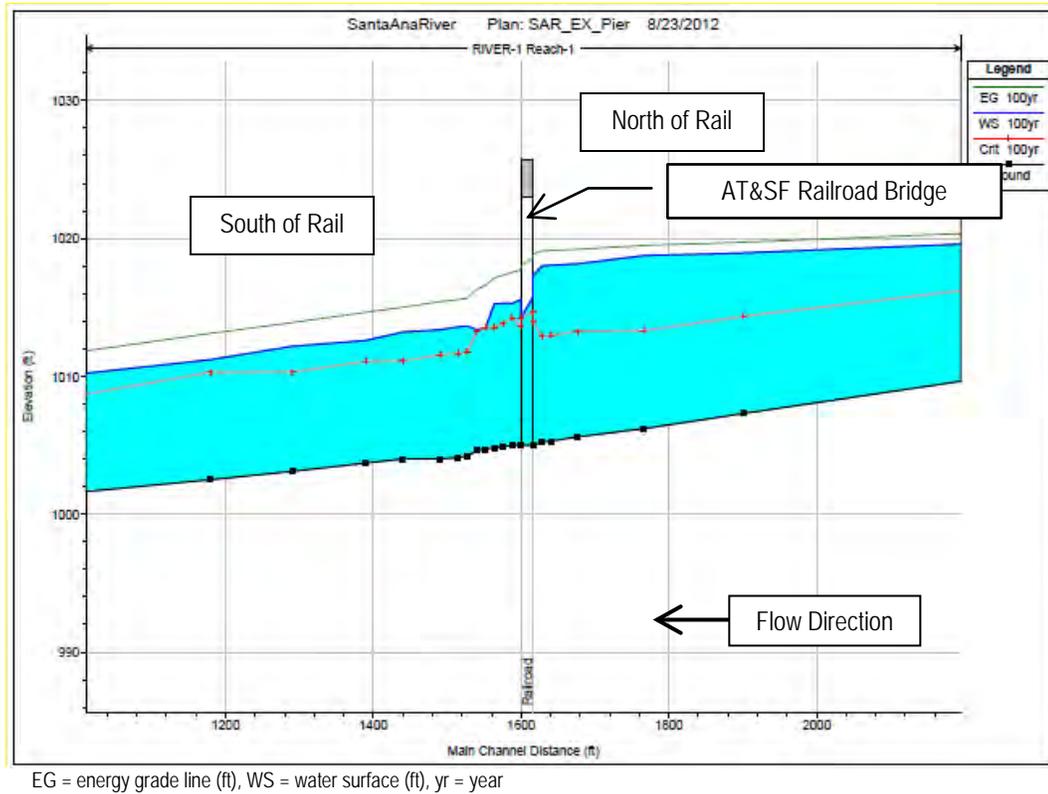


Figure 3: Profile of Existing Condition

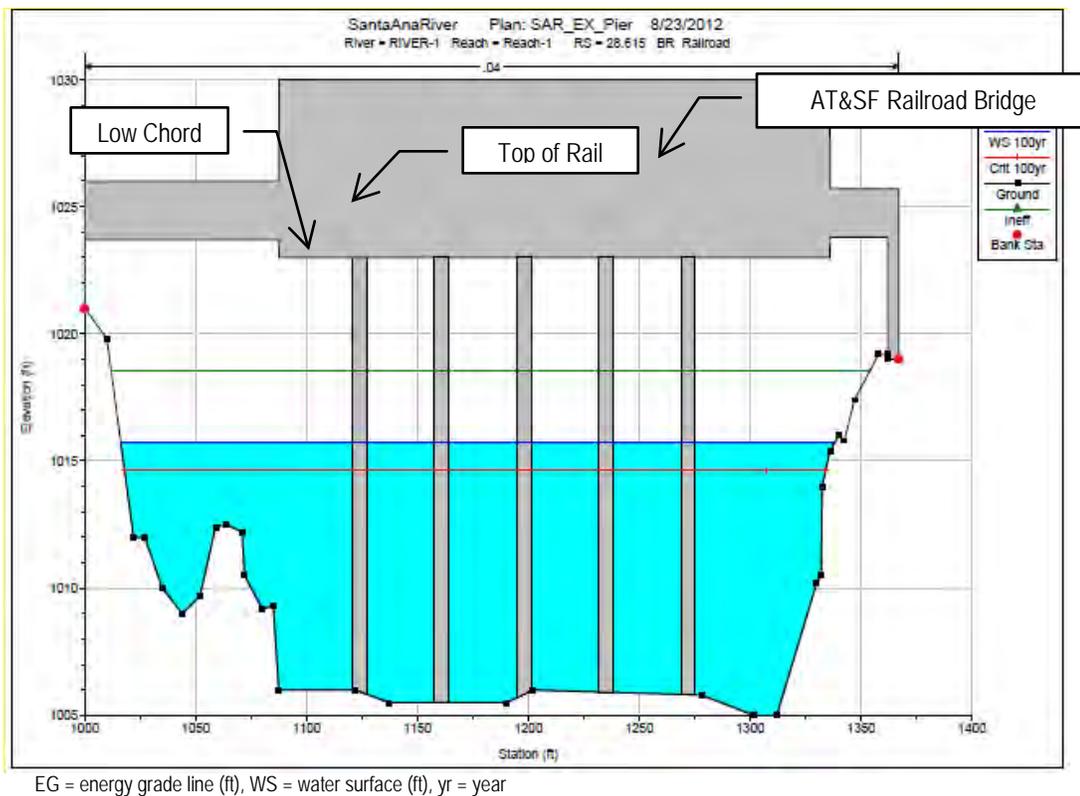


Figure 4: Cross-Section of Existing Conditions Upstream of Bridge 3.4

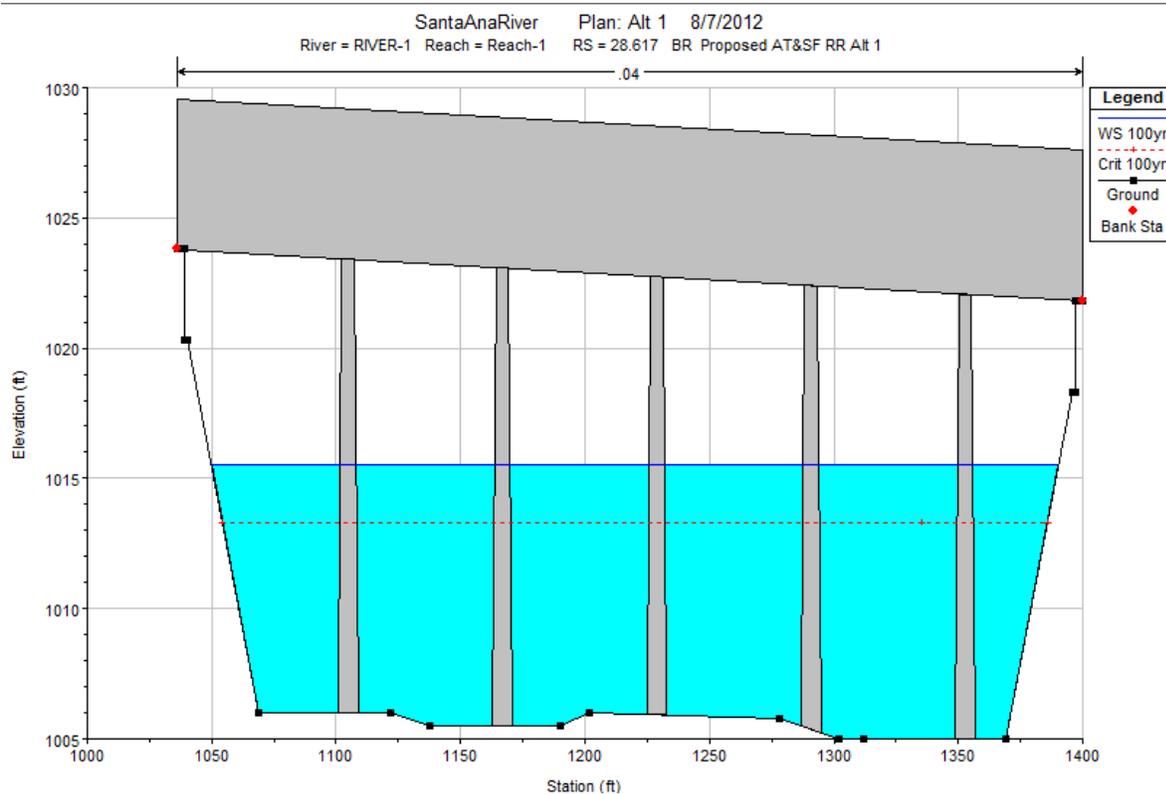


Figure 5: Cross-Section of Proposed Conditions Upstream Face of Bridge 3.4 (Alt 1)

The freeboard criteria selected for the bridge (in the following priority) are presented below in Table 5 and Table 6 for Alternative 1 and Alternative 2, respectively. Meeting 100 year criteria and therefore meeting 50-year by default. The alternatives meet all criteria.

Table 5: Hydraulic Freeboard Criteria (Alternative 1)

Criterion	Standard	Proposed Model Results	Criterion Met?
1. 100-yr WSE < Low Chord	Low Chord = 1021.81	100-yr WSE = 1017.0	Yes
2. 100-yr EGL < Top of SBGD	Top of SBGD = 1025.08	100-yr EGL = 1018.31	Yes
3. Proposed WSE ≤ Existing WSE	Existing 100-yr WSE = 1017.3	Proposed 100-yr WSE = 1017.0	Yes
WSE = water surface elevation (ft); EGL = energy grade line elevation (ft); SBGD = subgrade. All elevations are NGVD 1929.			

Table 6: Hydraulic Freeboard Criteria (Alternative 2)

Criterion	Standard	Proposed Model Results	Criterion Met?
1. 100-yr WSE < Low Chord	Low Chord = 1023.23	100-yr WSE = 1016.5	Yes
2. 100-yr EGL < Top of SBGD	Top of SBGD = 1025	100-yr EGL = 1017.91	Yes
3. Proposed WSE ≤ Existing WSE	Existing 100-yr WSE = 1017.3	Proposed 100-yr WSE = 1016.5	Yes
WSE = water surface elevation (ft); EGL = energy grade line elevation (ft); SBGD = subgrade. All elevations are NGVD 1929.			

The results of the hydraulic analysis upstream and downstream of the Bridge 3.4 are shown in Table 7. For Alternative 1 and 2, it shows no rise in the study reach.

Table 7: Hydraulic Analysis Results (ft, NGVD29)

River Station	FEMA Effective	Corrected Effective	Revised Existing	Proposed Alt1	Proposed Alt2	Alt1-Existing	Alt2-Existing
29.01	1025.27	1025.01	1025.01	1025.01	1025.01	0	0
28.95	1024.34	1023.97	1023.97	1023.97	1023.97	0	0
28.84	1023.16	1021.56	1021.52	1021.40	1021.38	-0.12	-0.14
28.737	1022.57	1019.80	1019.68	1019.14	1018.93	-0.54	-0.75
28.673	1022.27	1019.11	1018.95	1018.18	1017.83	-0.77	-1.12
28.647	1022.18	1018.92	1018.75	1017.92	1017.54	-0.83	-1.21
28.63	1021.92	1018.36	1018.16	1017.13	1016.6	-1.03	-1.56
28.624	1021.84	1018.26	1018.05	1017.00	1016.46	-1.05	-1.59
28.622	1021.81	1018.22	1018.01				
28.62	1021.63	1017.57	1017.29				
28.615				Railroad Bridge			
28.61	1015.58	1015.58	1015.58				
28.608	1015.30	1015.28	1015.28	1015.28	1015.28	0	0
28.606	1015.32	1015.29	1015.29	1015.29	1015.29	0	0
28.604	1015.30	1015.27	1015.27	1015.27	1015.27	0	0
28.602	1013.49	1013.52	1013.52	1013.52	1013.52	0	0
28.6	1013.41	1013.38	1013.38	1013.38	1013.38	0	0
28.597	1013.67	1013.65	1013.65	1013.65	1013.65	0	0
28.595	1013.61	1013.59	1013.59	1013.59	1013.59	0	0
28.59	1013.38	1013.37	1013.37	1013.37	1013.37	0	0
28.58	1013.22	1013.21	1013.21	1013.21	1013.21	0	0

5. Conclusions

Using the data and resources available, the hydraulic conditions for both existing and proposed conditions were modeled for Bridge 3.4. The results of the modeling indicate that the proposed

bridge improvements result in a slightly lower water surface and velocity; the proposed bridge will meet freeboard criteria. A draft FEMA “No-Rise” Certificate was completed for the proposed bridge. It will be finalized after the preferred alternative is selected.

6. References

Federal Emergency Management Agency (FEMA). 1987. FEMA Effective Model for Santa Ana River. HEC-2 format.

Federal Emergency Management Agency. 2008. Flood Insurance Study, San Bernardino County, California.

Federal Emergency Management Agency. 2008. San Bernardino County Flood Insurance Study.

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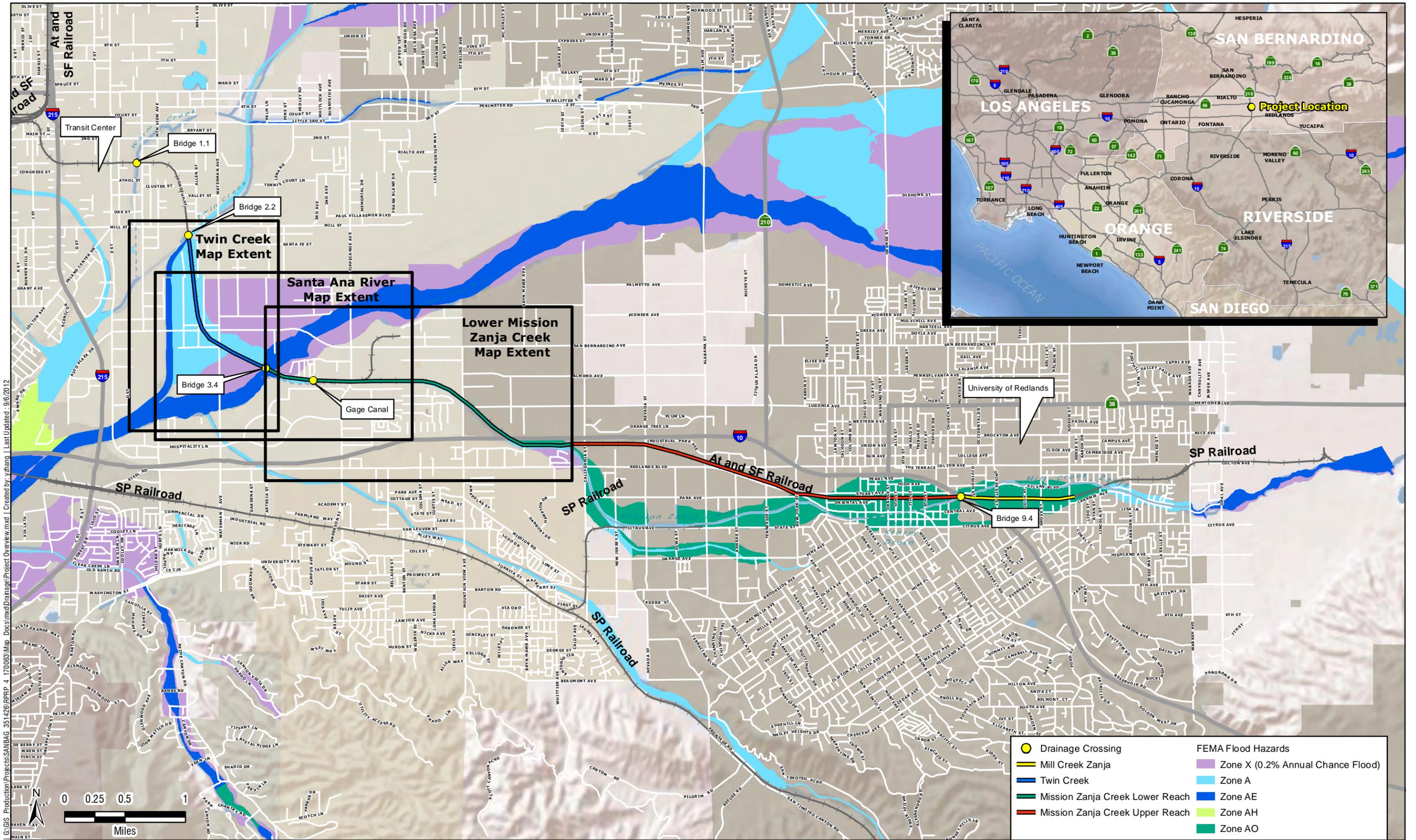
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U.S. Army Corps of Engineers (USACE). 1991. Santa Ana River Mainstream Project, CA. Feature Design Memorandum No. 2, Seven Oaks Dam Floodway Delineation (including 500-Year and Seven Oaks Dam Failure Floodplains) Report and Plates.

U.S. Army Corps of Engineers. 2010. HEC-RAS v.4.1 User’s Manual and Technical Reference Manual

WRC Consulting Services, Inc. 2003. Santa Ana River Trail, Alabama Street to Waterman Avenue, Hydraulic Design and Analysis.

Exhibit 1: RPRP Project Overview



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Exhibit 2: Santa Ana River Reach Limits



Exhibit 3: Modeling Overview–Cross-Sections

Exhibit 3 – Modeling Overview – Cross Sections

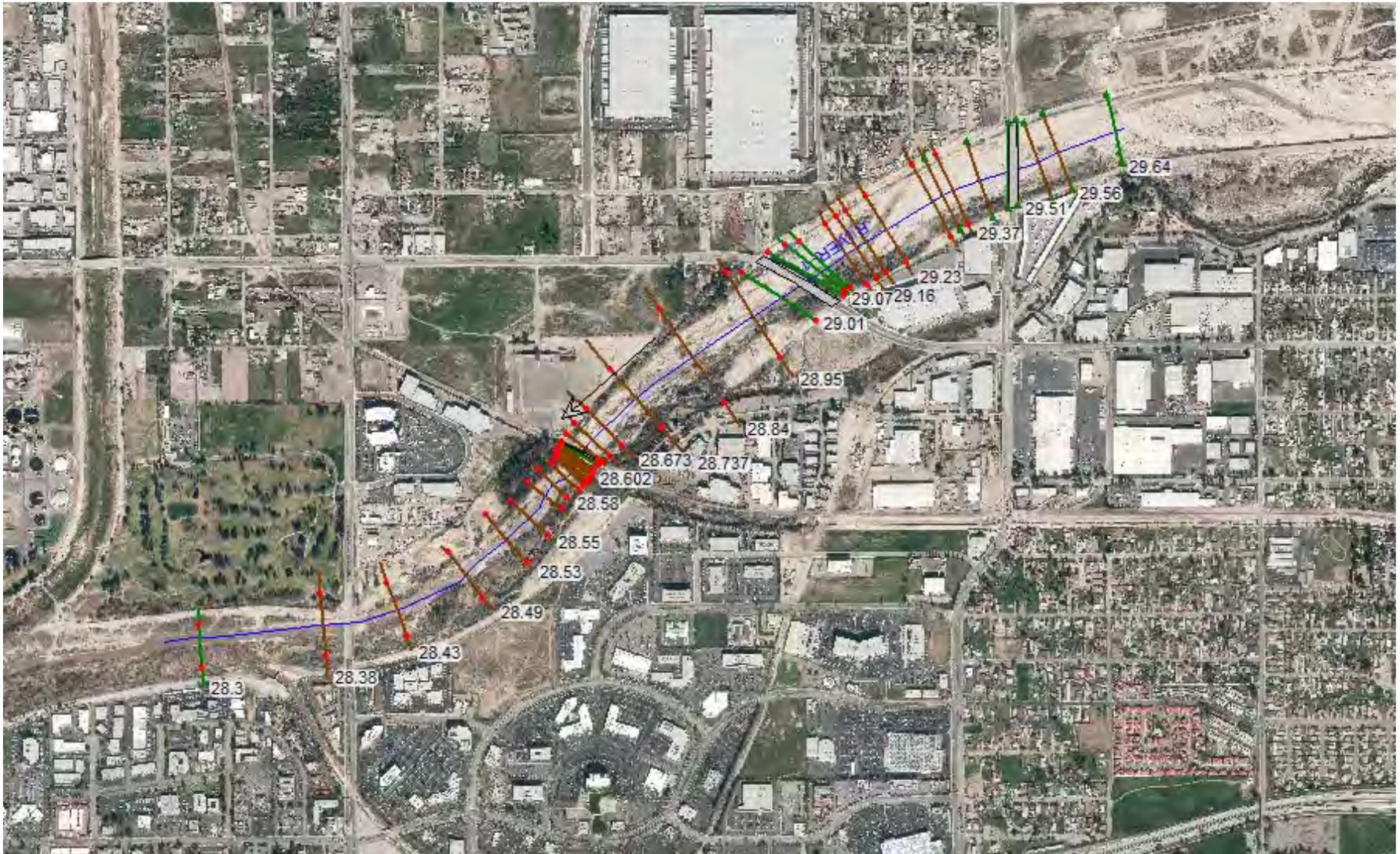
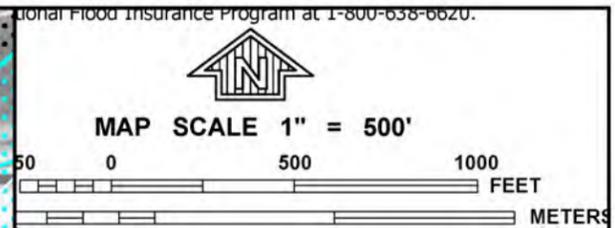
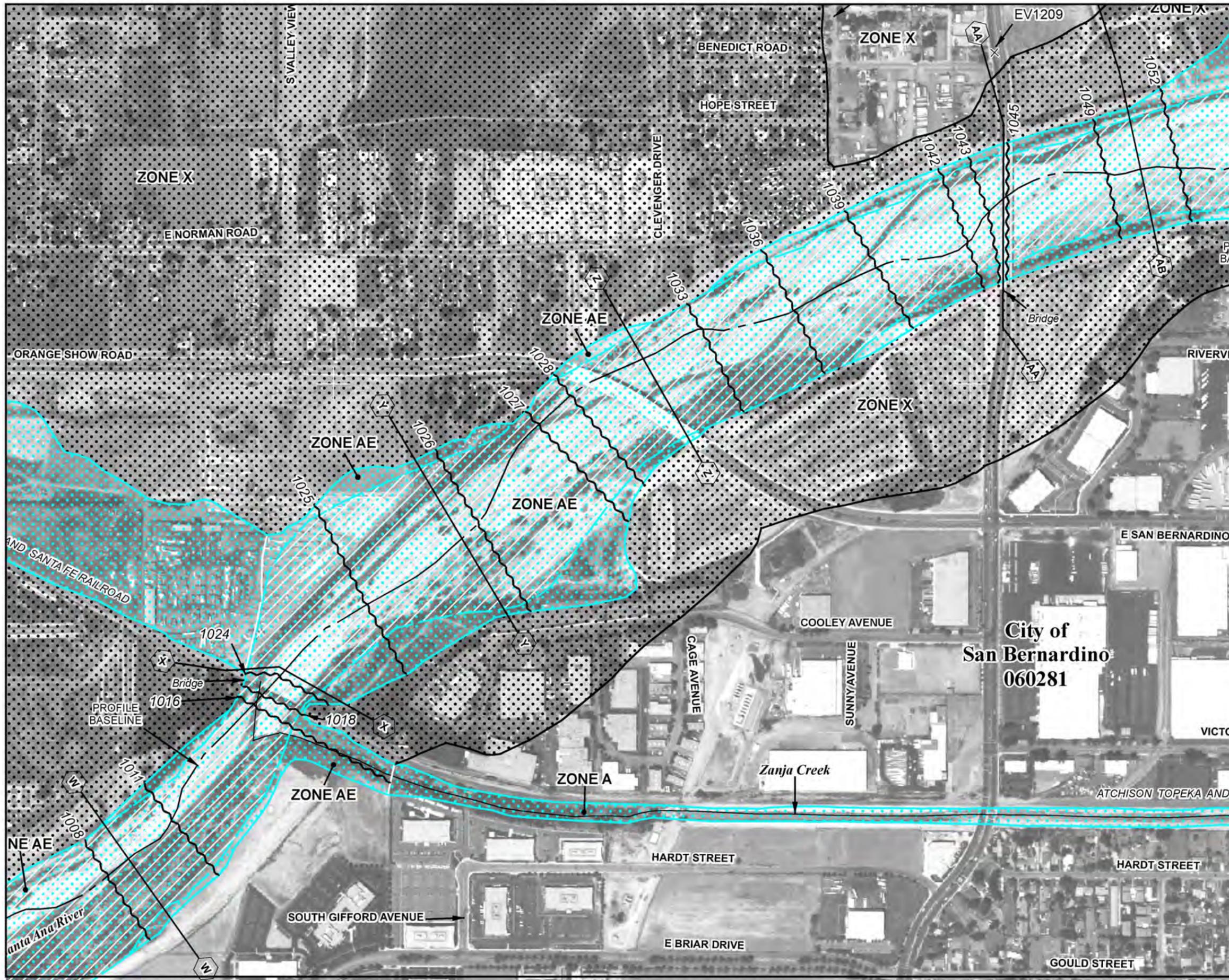


Exhibit 4: FEMA FIRM 06071C Panel 8684H



PANEL 8684H

FIRM
FLOOD INSURANCE RATE MAP

SAN BERNARDINO
COUNTY,
CALIFORNIA
AND INCORPORATED AREAS
PANEL 8684 OF 9400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOMA LINDA, CITY OF	065042	8684	H
SAN BERNARDINO, CITY OF	060281	8684	H

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

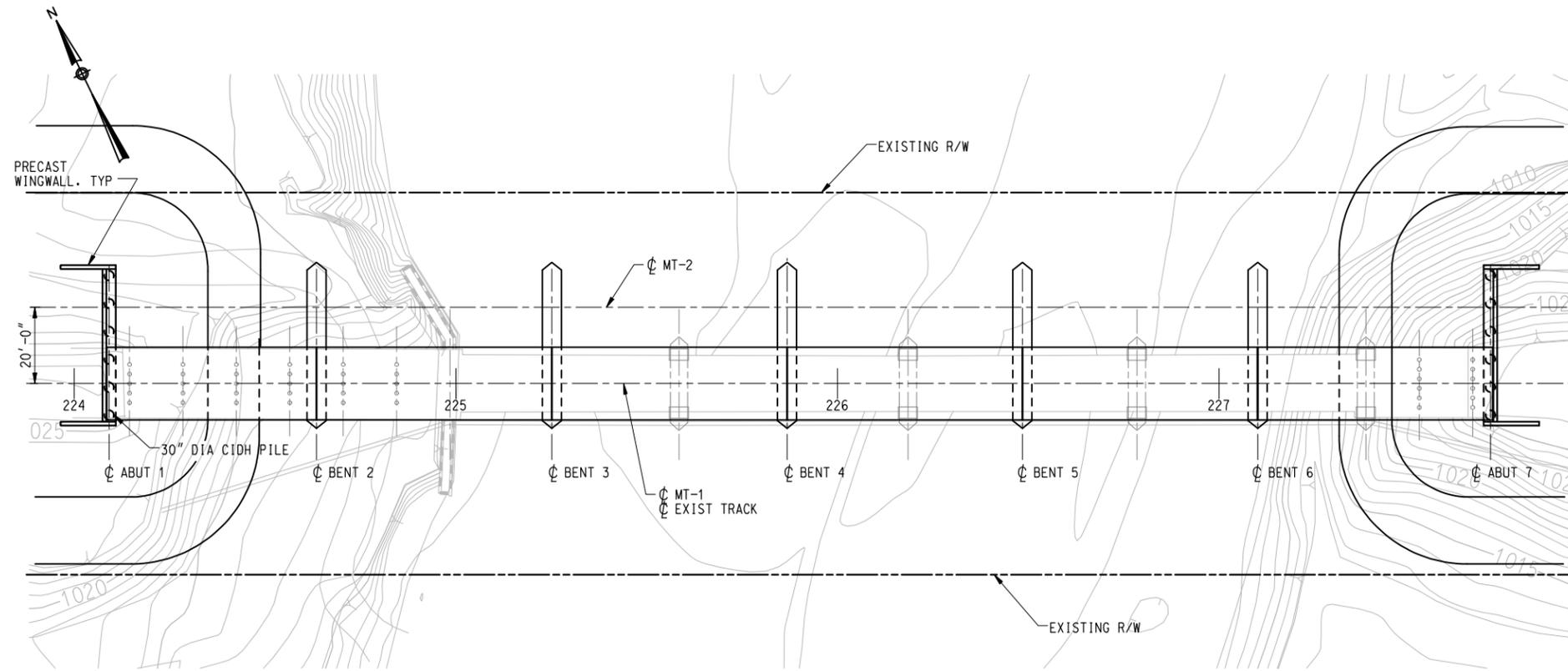
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MAP REVISED
AUGUST 28, 2008

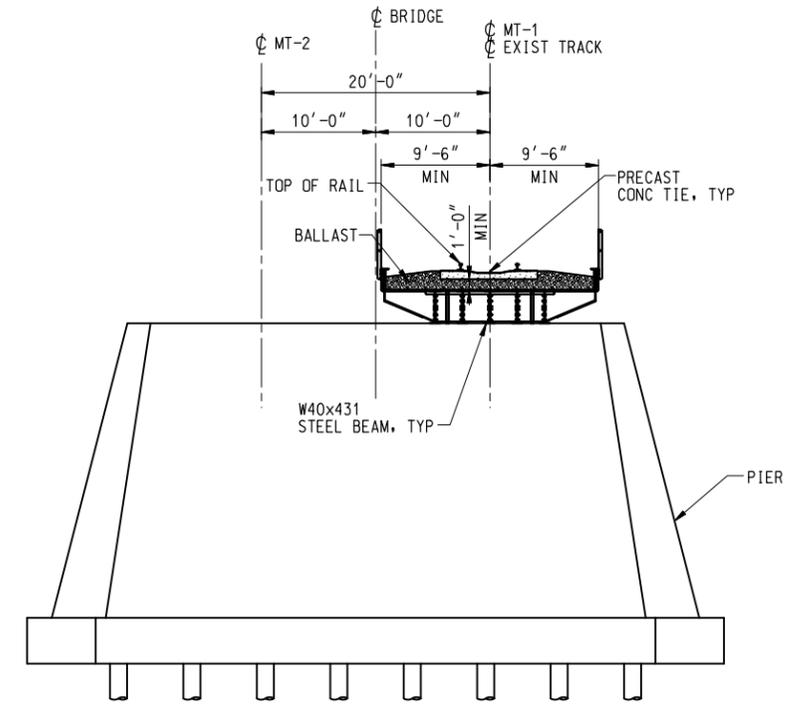
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

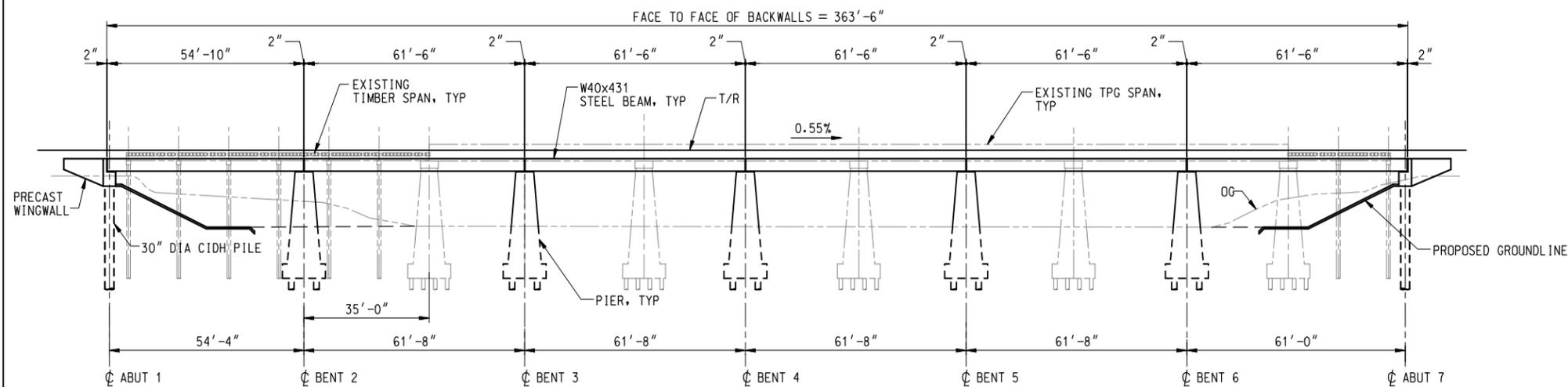
Exhibit 5: Proposed Bridge Alternative Plans



PLAN
SCALE: 1"=40'-0"



TYPICAL SECTION
SCALE: 1/16"=1'-0"



ELEVATION
SCALE: 1"=40'-0"

LEGEND

- EXISTING STRUCTURE
- NEW STRUCTURE

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ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602



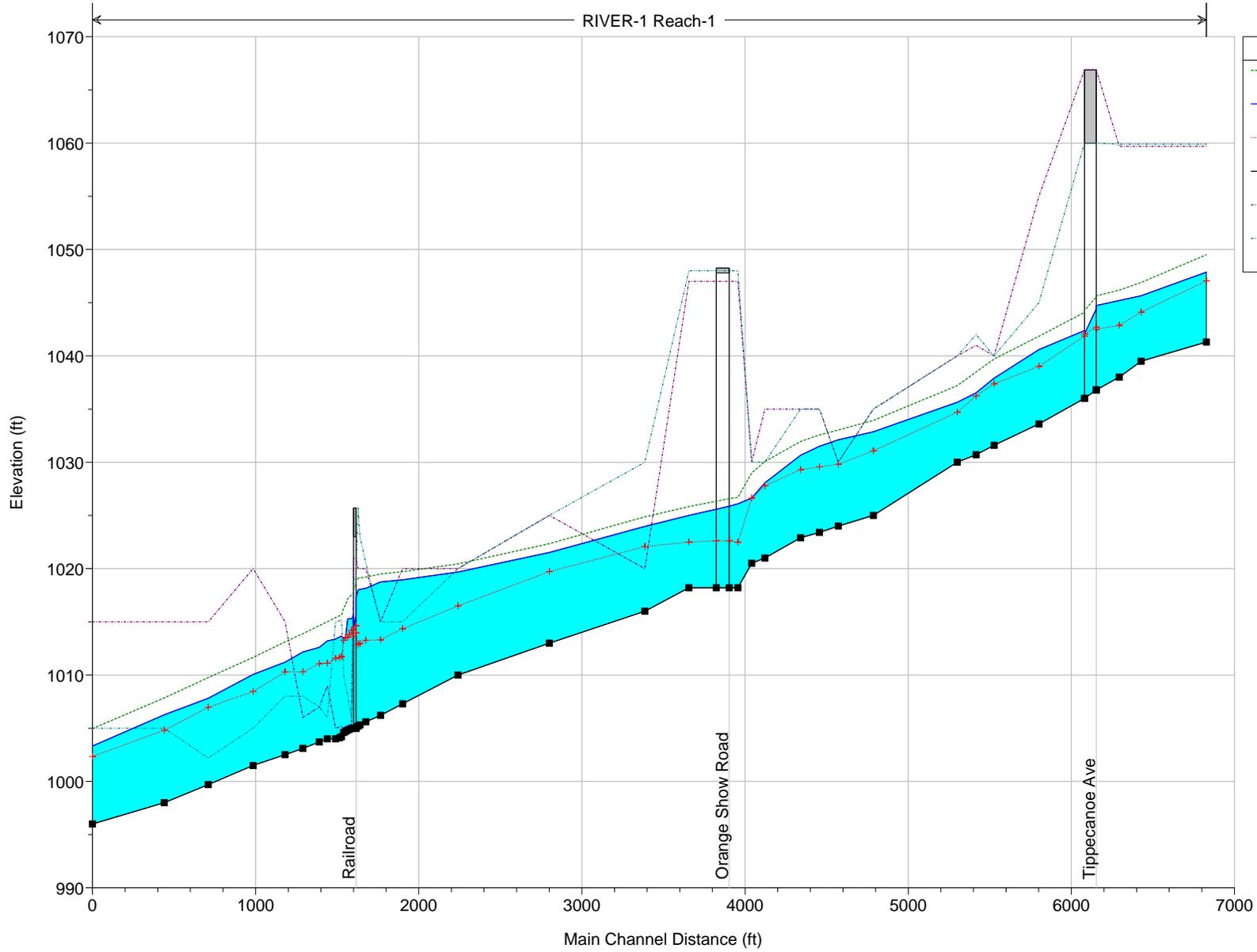
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REDLANDS PASSENGER RAIL PROJECT**
BRIDGE 3.4
ALTERNATIVE 1

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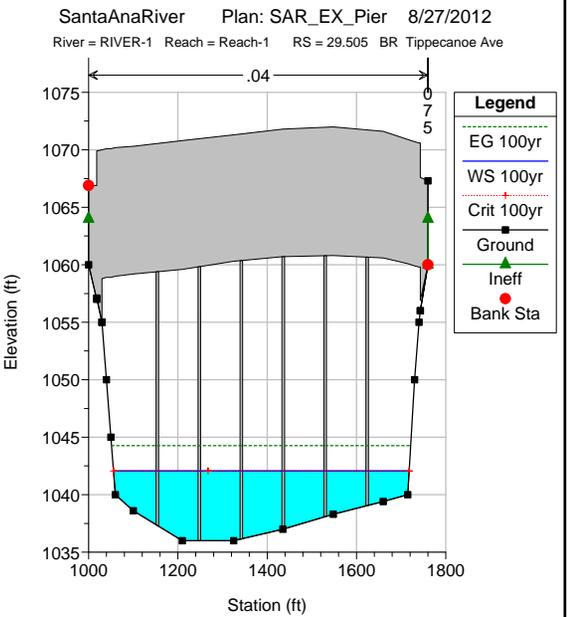
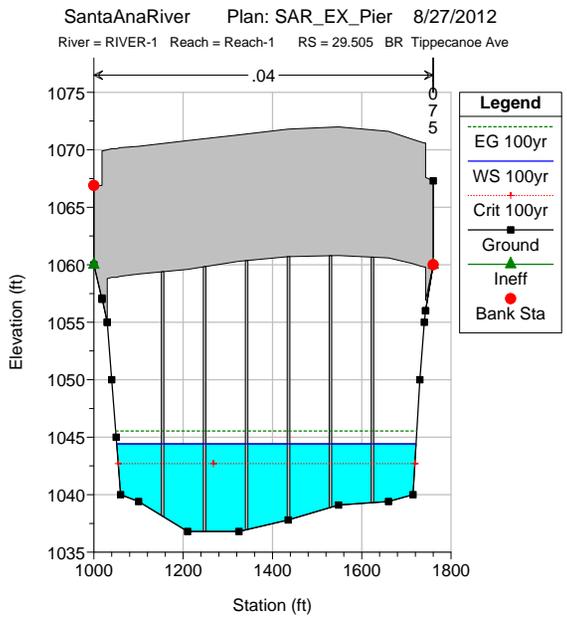
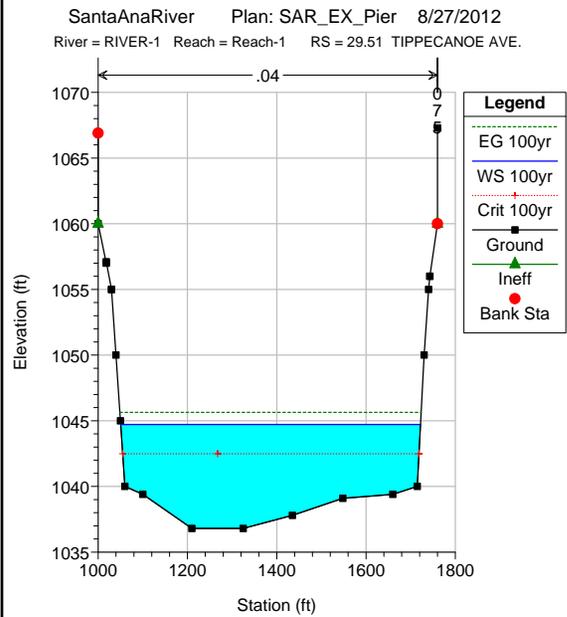
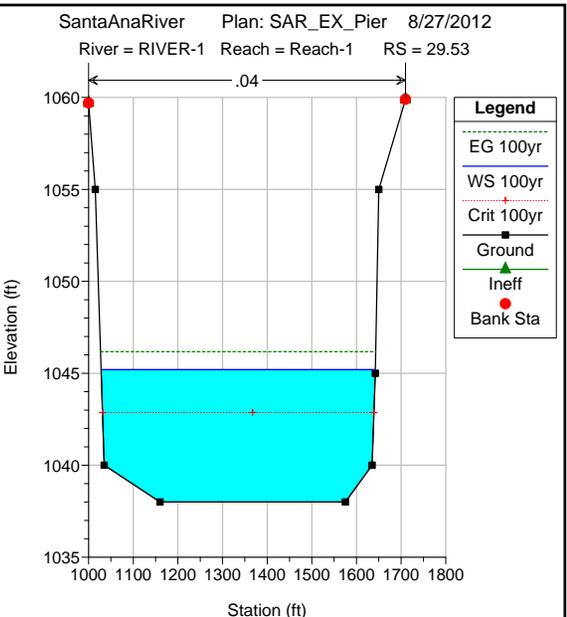
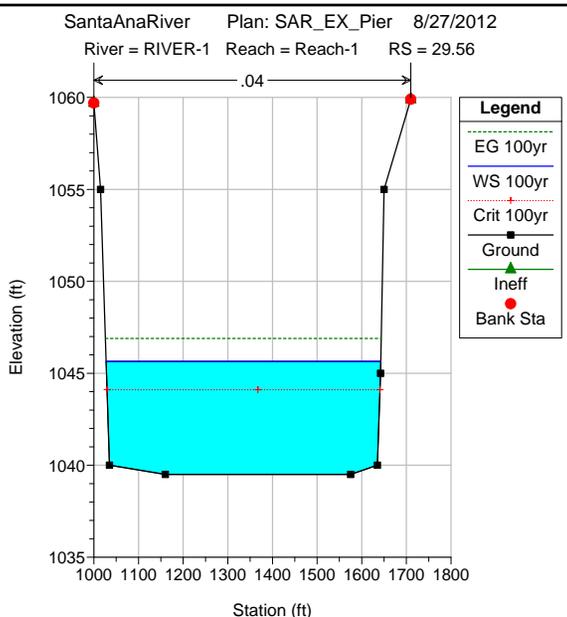
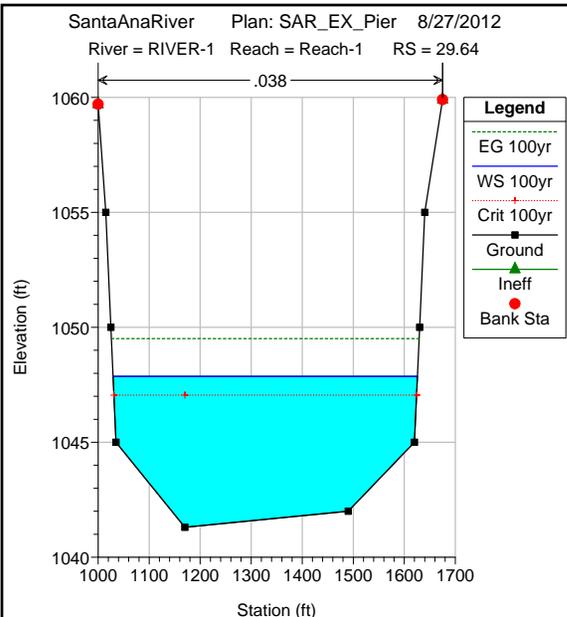
Attachment 1 - HEC-RAS Modeling Exhibits

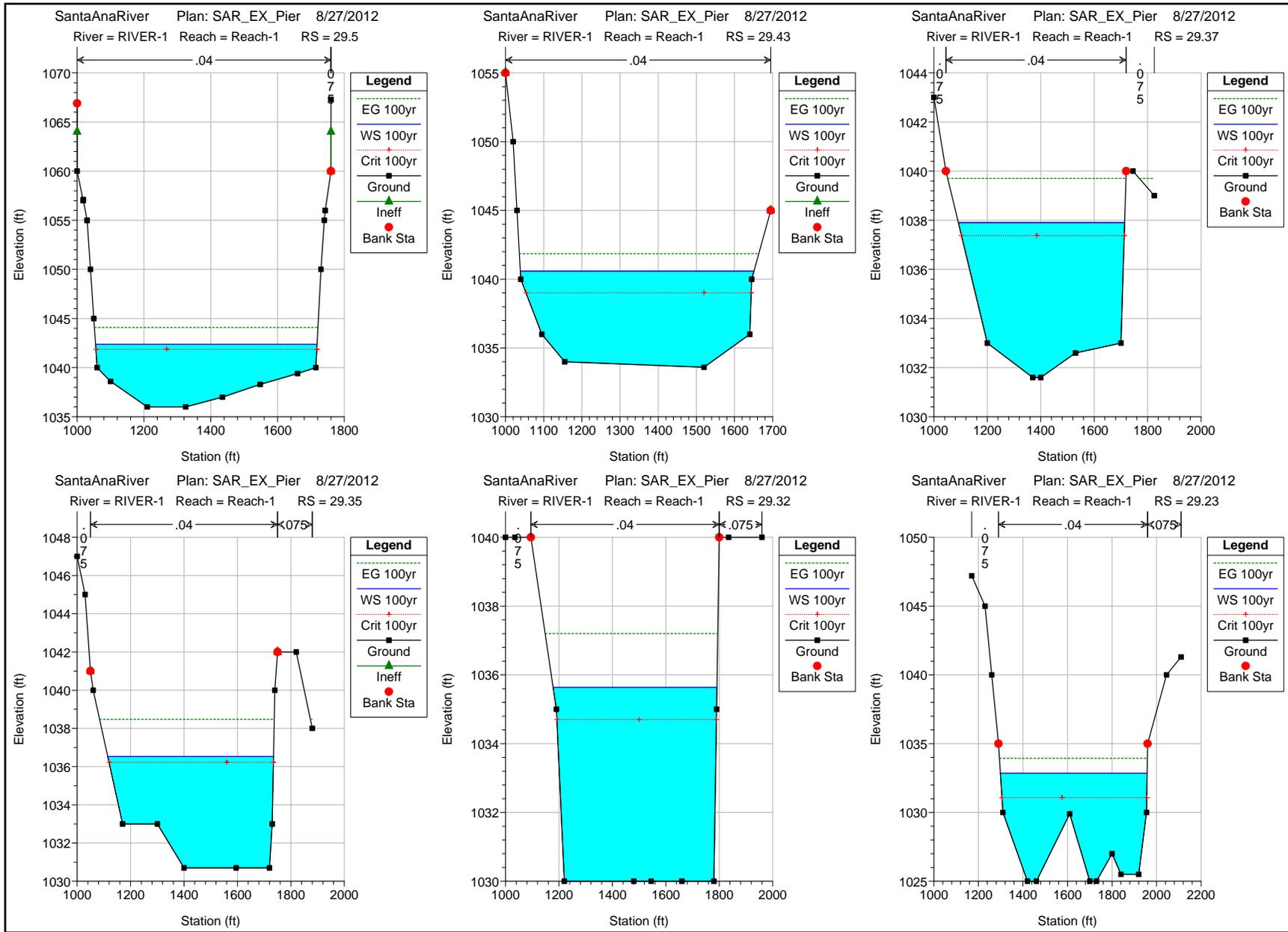
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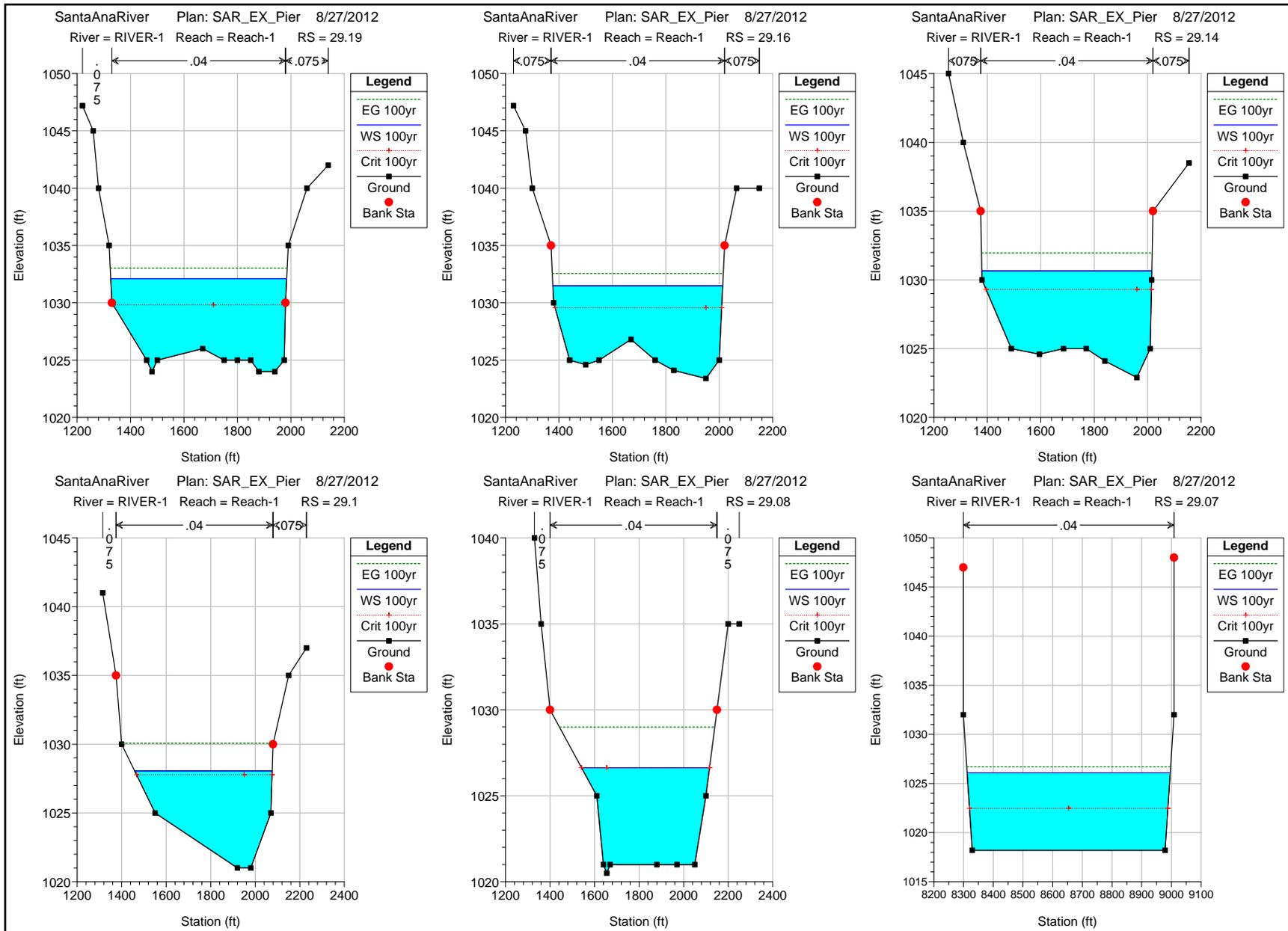
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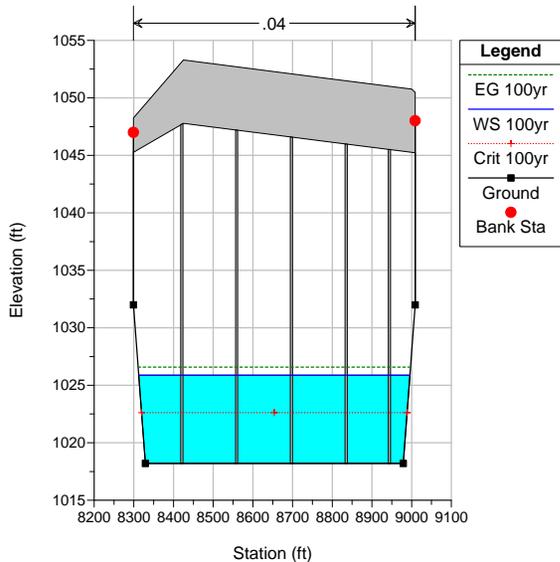
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WS 100yr	(solid blue line)
Crit 100yr	(dotted red line with + markers)
Ground	(solid black line with square markers)
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ROB	(dotted blue line)



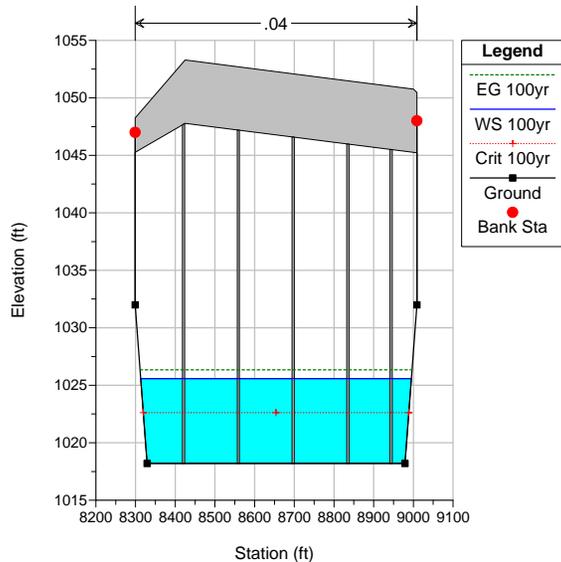




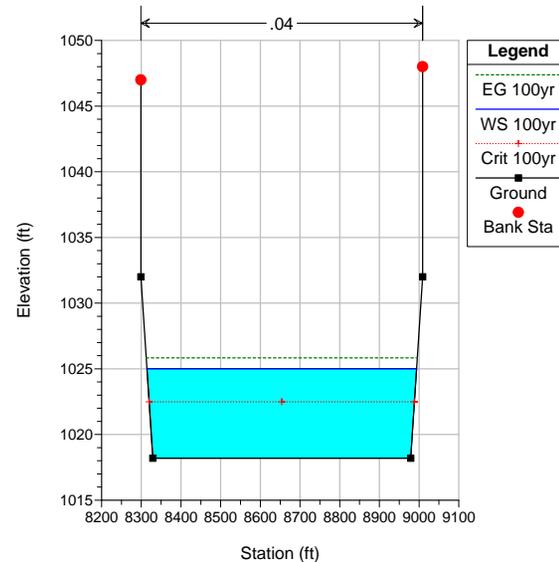
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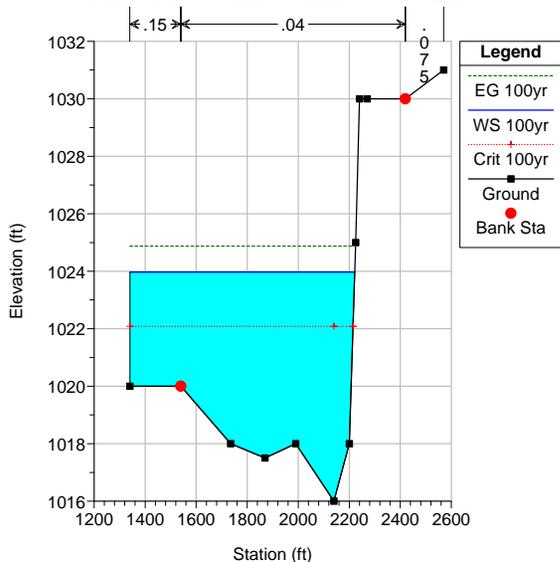
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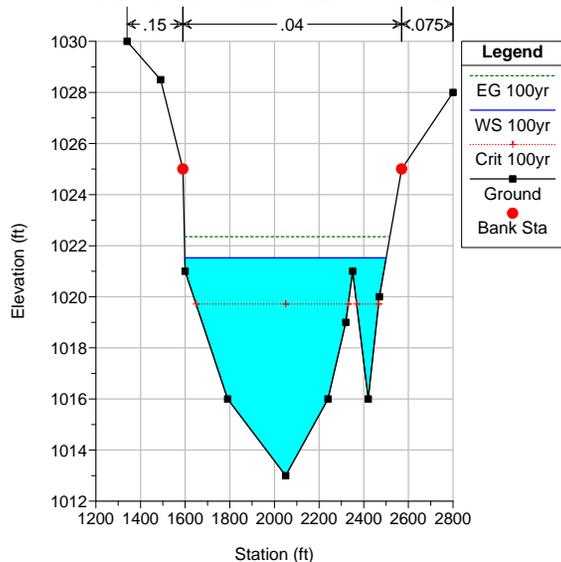
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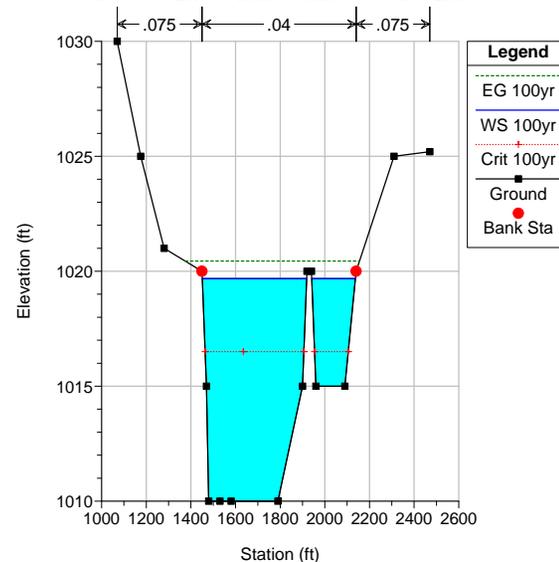
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 River = RIVER-1 Reach = Reach-1 RS = 28.95

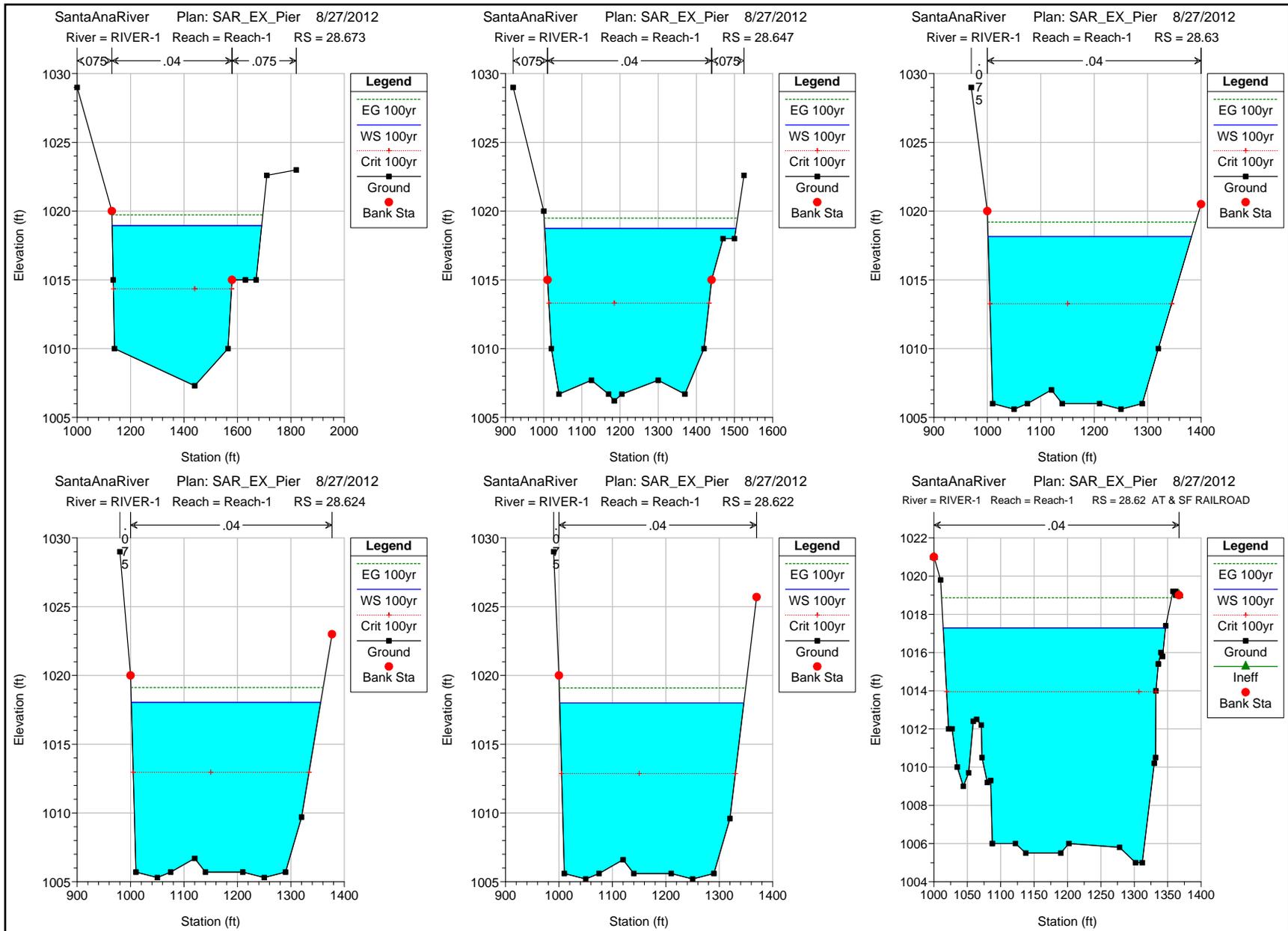


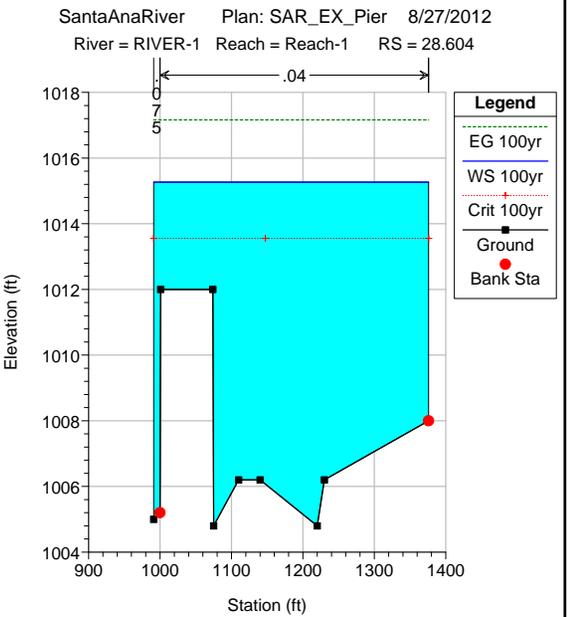
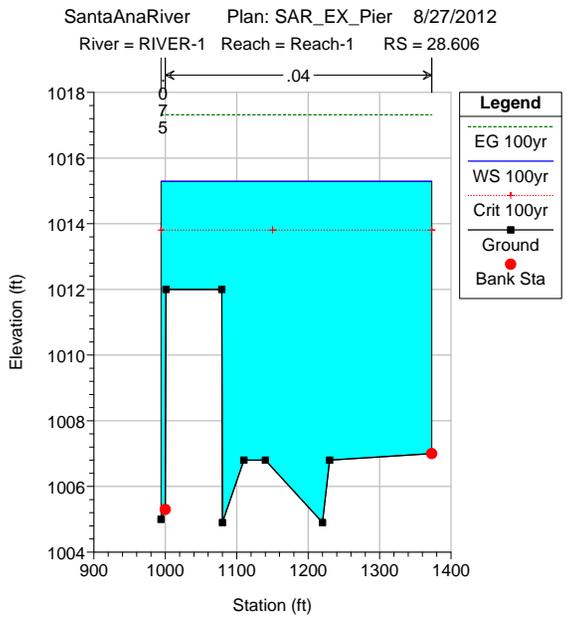
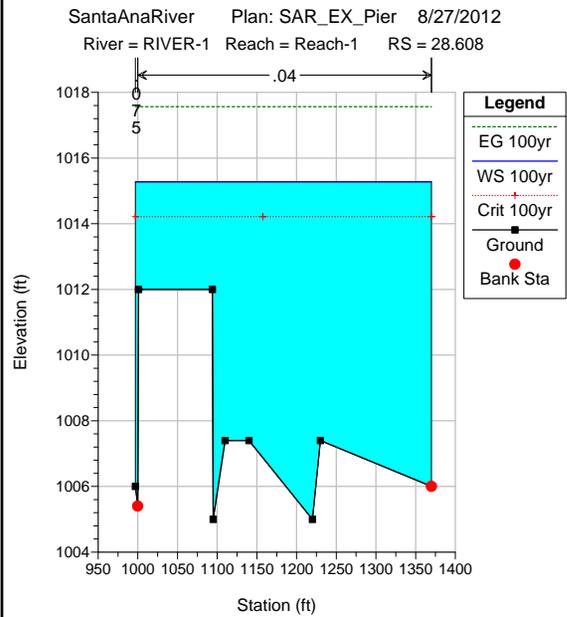
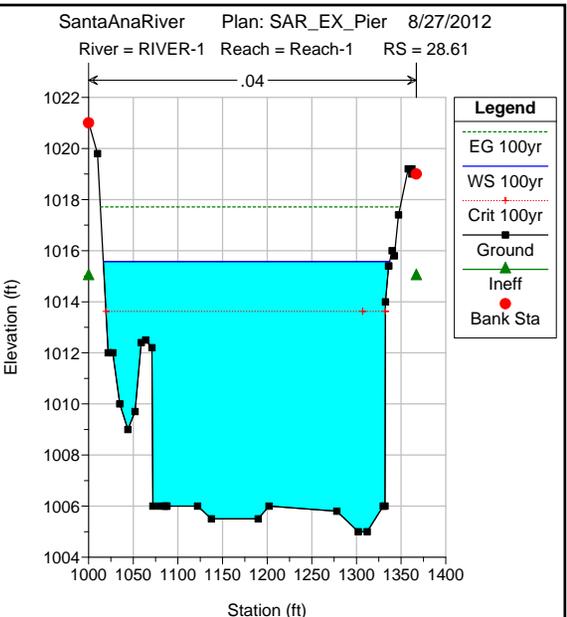
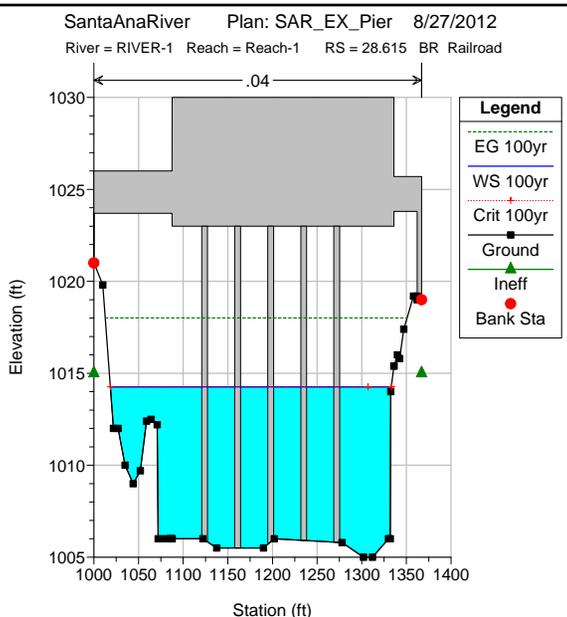
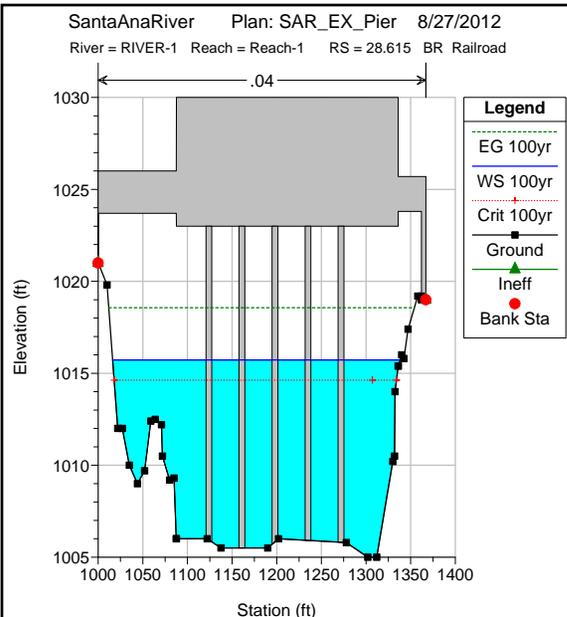
SantaAnaRiver Plan: SAR_EX_Pier 8/27/2012
 River = RIVER-1 Reach = Reach-1 RS = 28.84

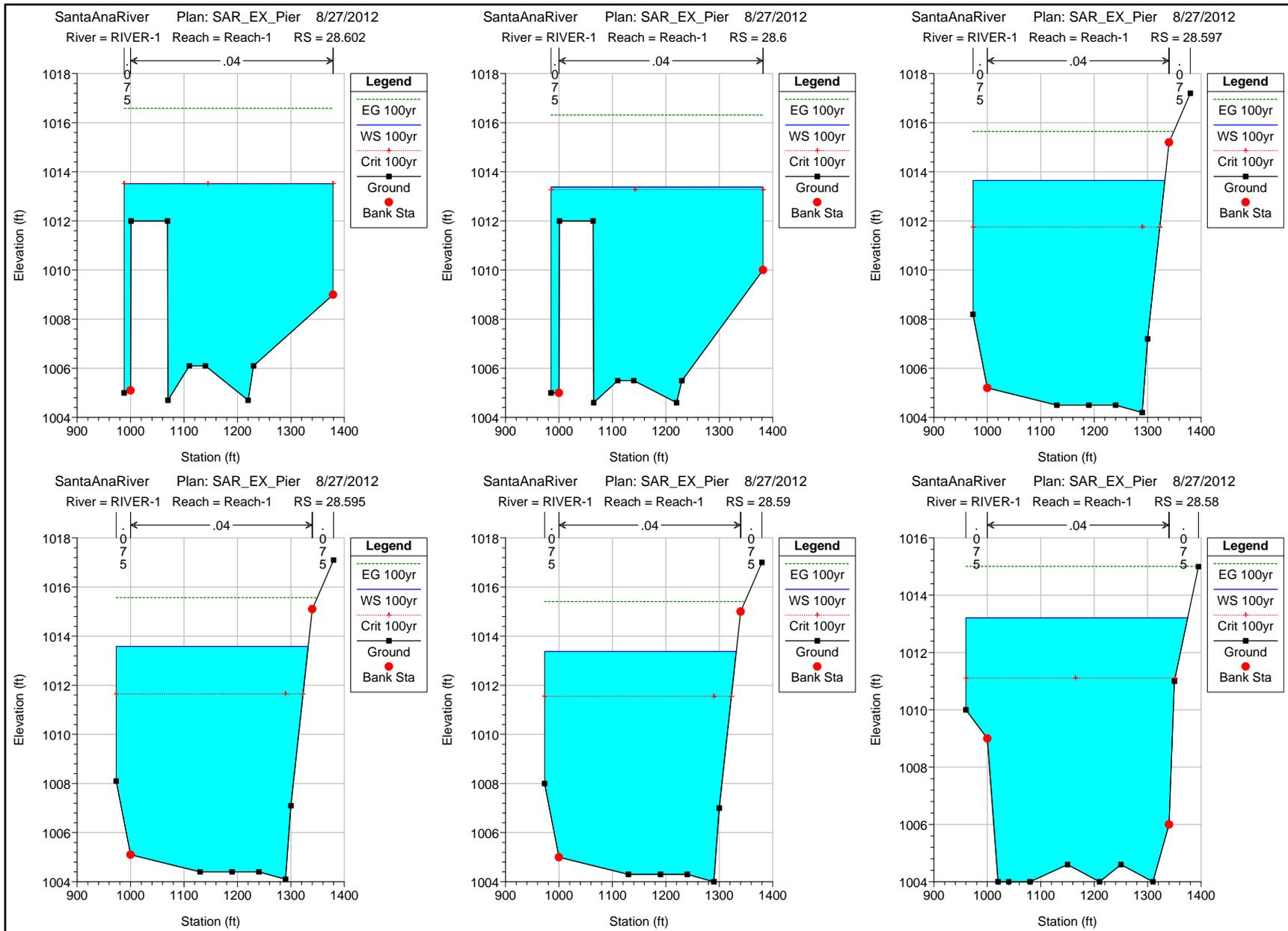


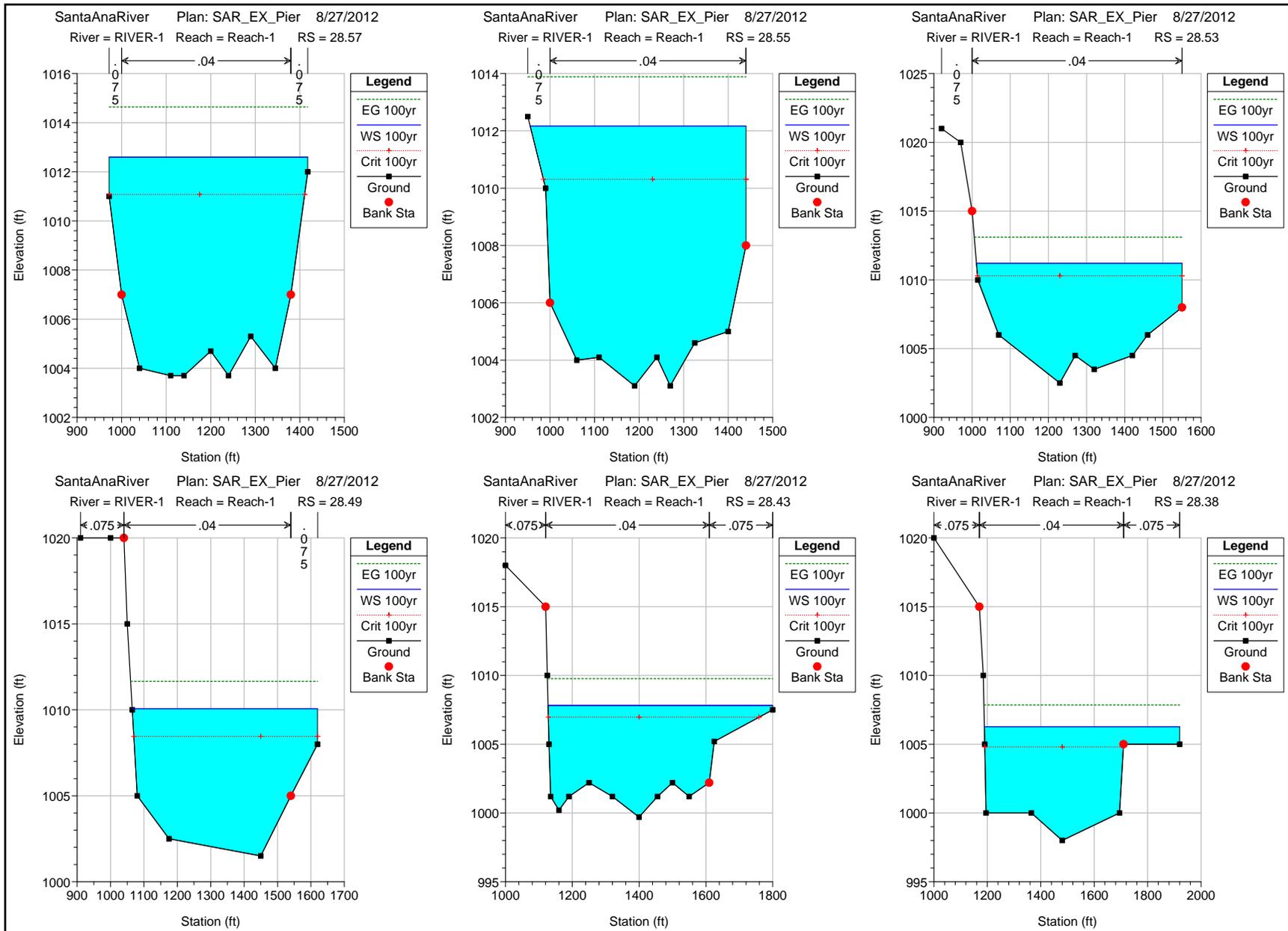
SantaAnaRiver Plan: SAR_EX_Pier 8/27/2012
 River = RIVER-1 Reach = Reach-1 RS = 28.737





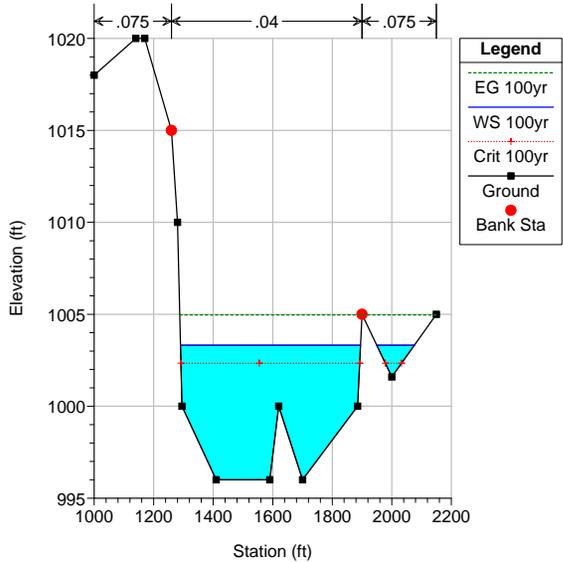






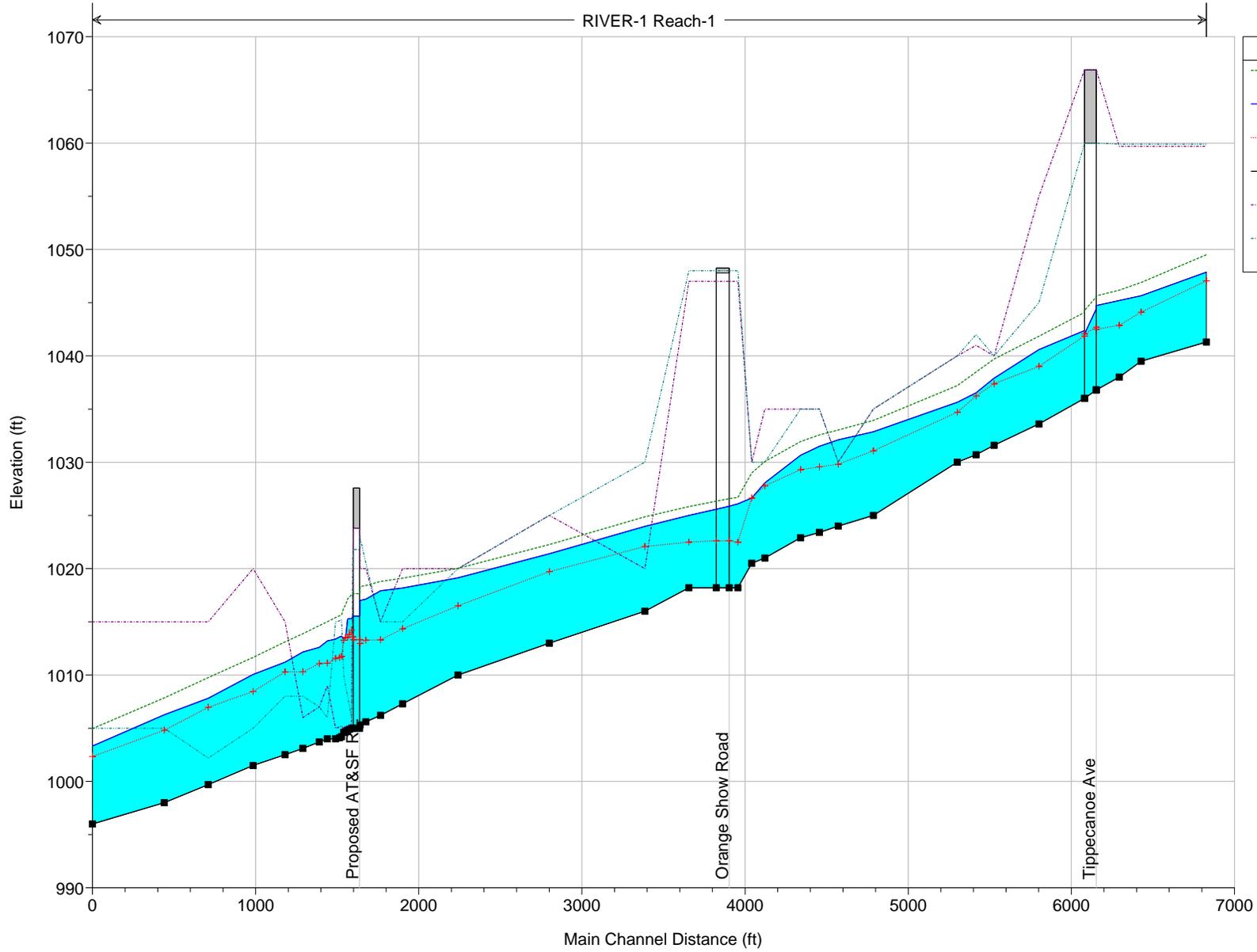
SantaAnaRiver Plan: SAR_EX_Pier 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 28.3

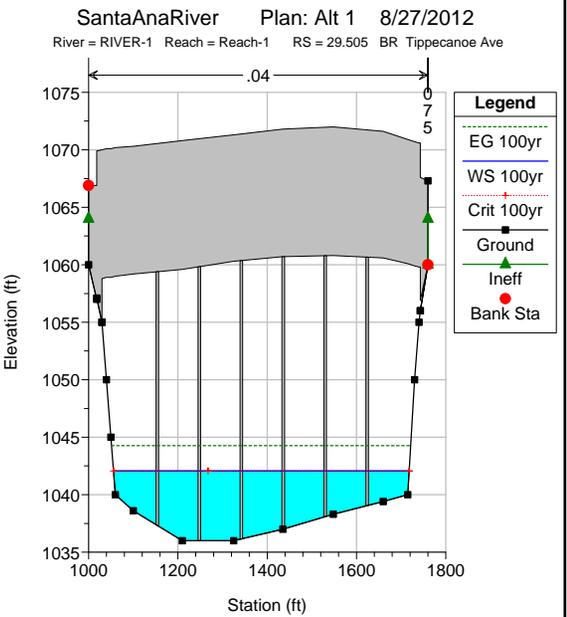
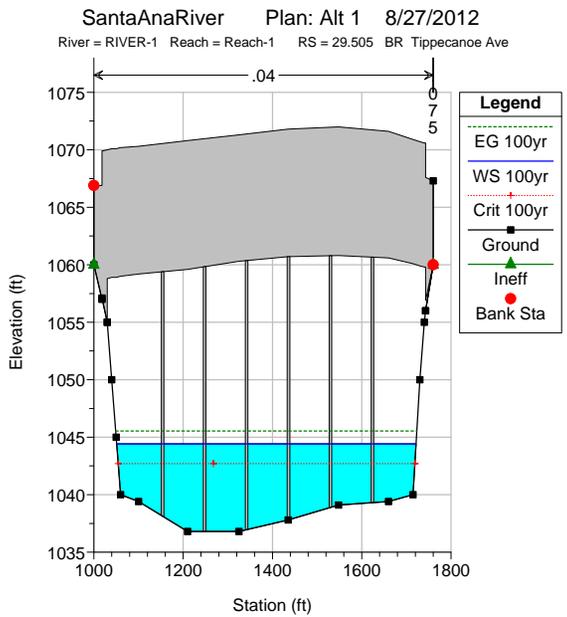
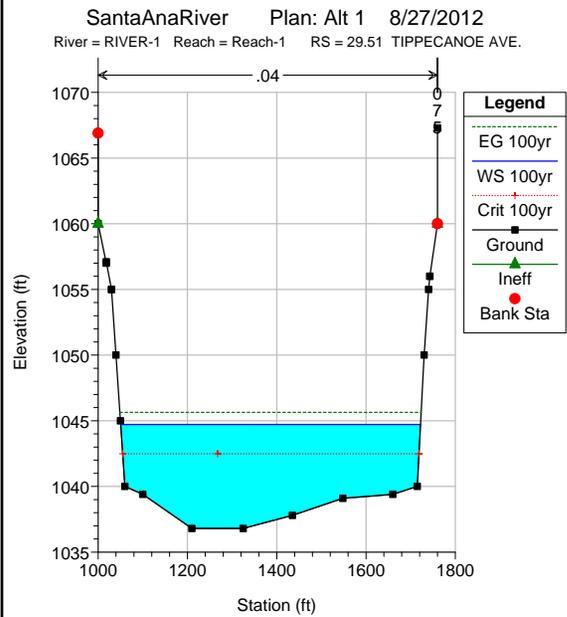
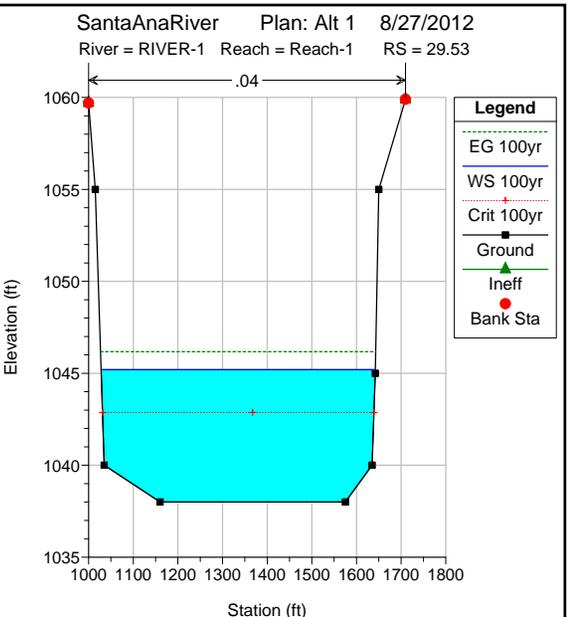
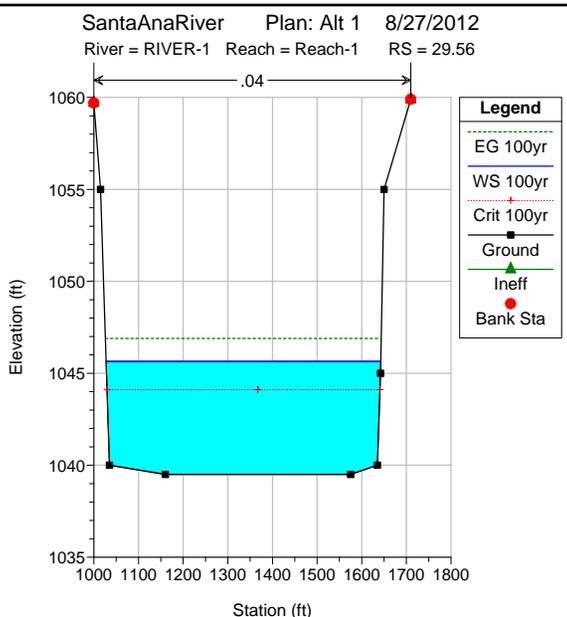
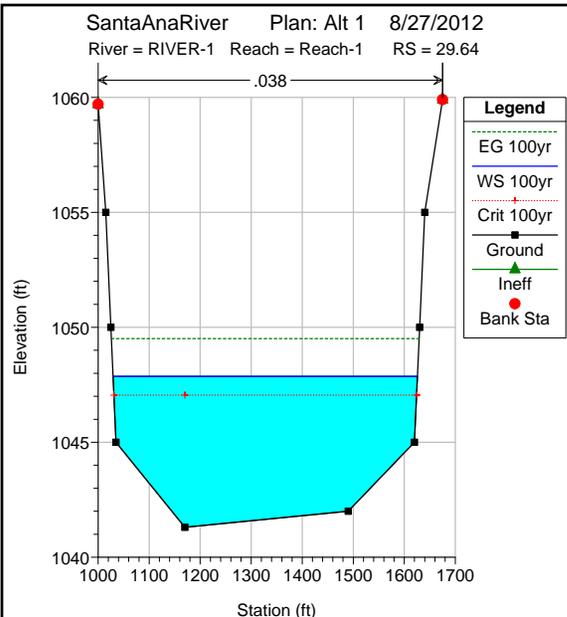


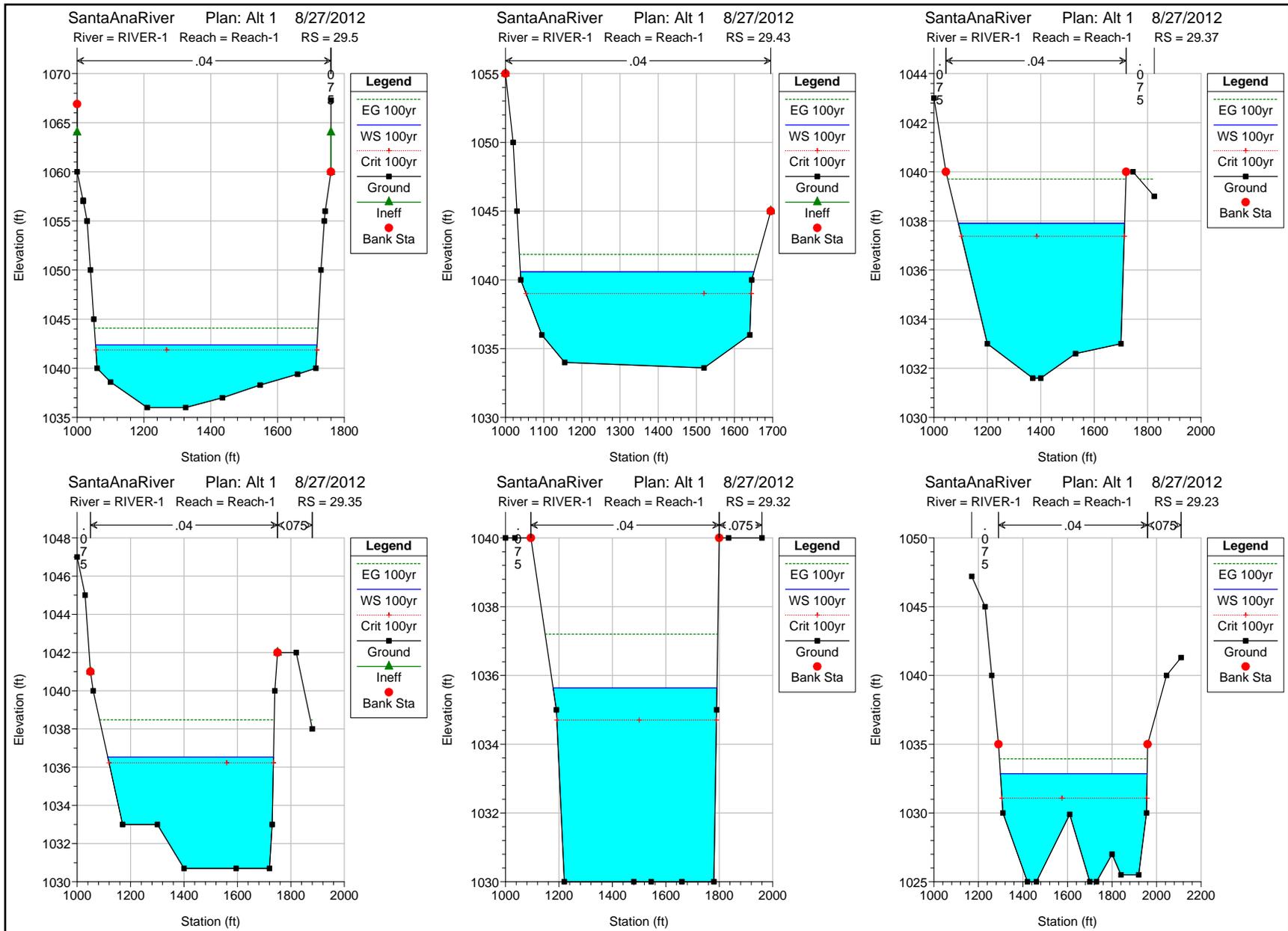
SantaAnaRiver Plan: Alt 1 8/27/2012

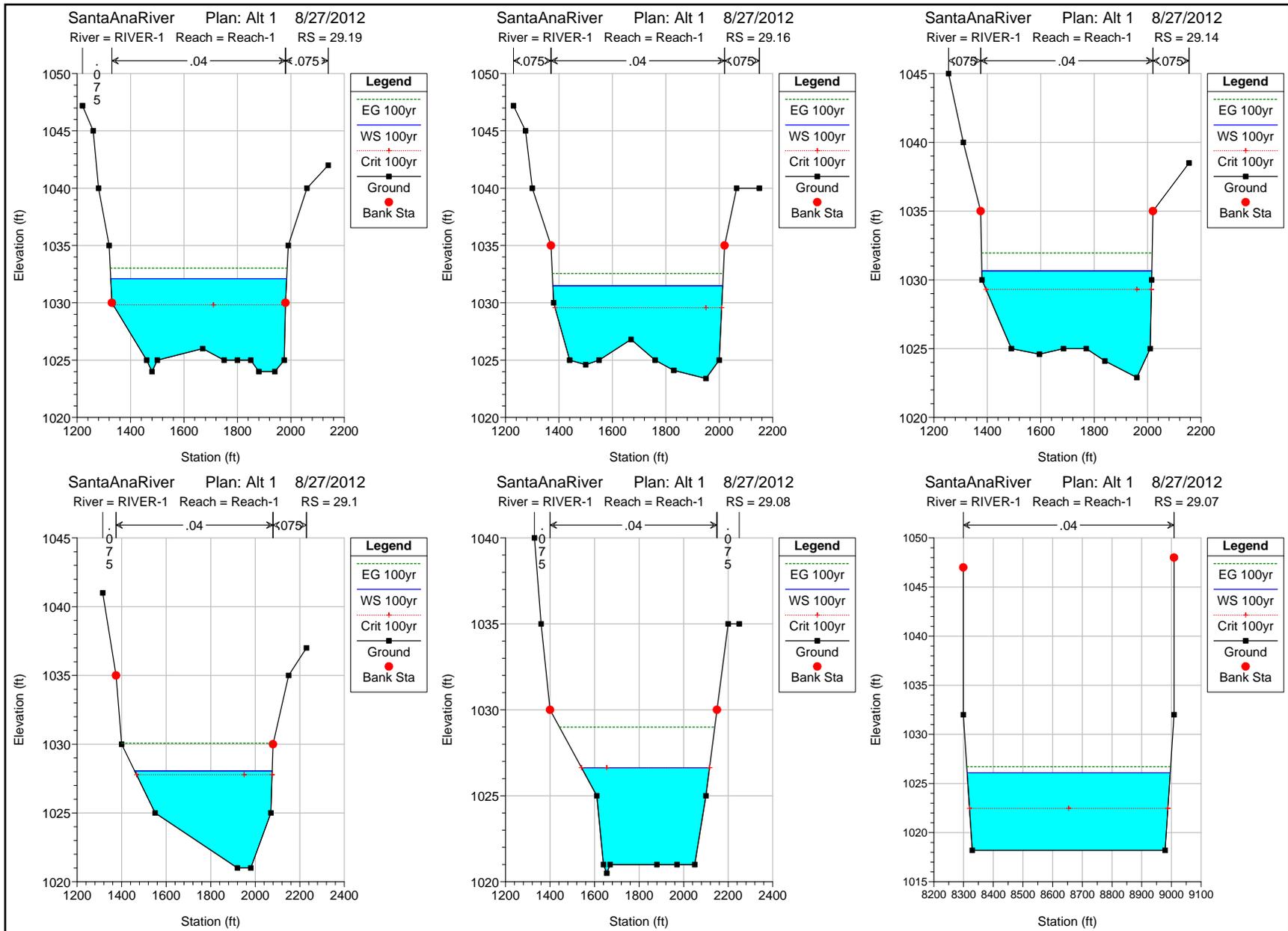
RIVER-1 Reach-1



Legend	
EG 100yr	Green dotted line
WS 100yr	Blue solid line
Crit 100yr	Red dashed line with plus markers
Ground	Black solid line with square markers
LOB	Purple dotted line
ROB	Cyan dotted line

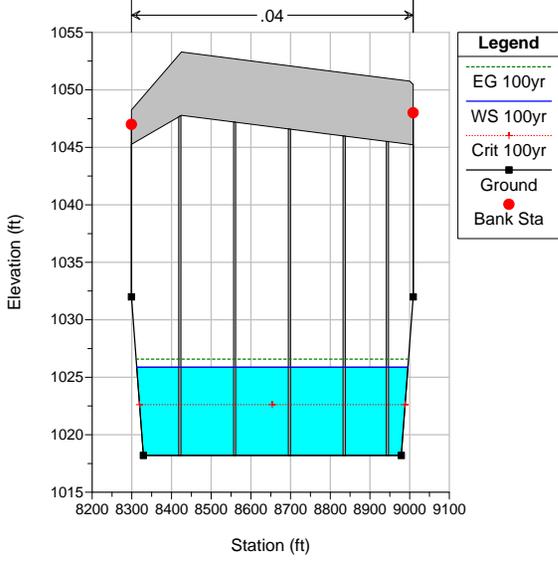






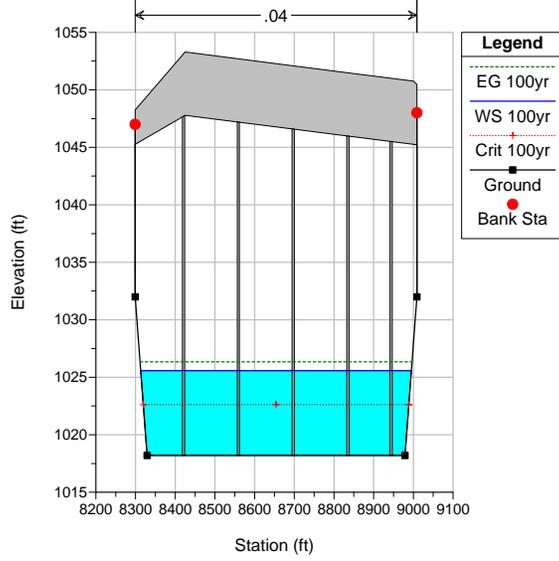
SantaAnaRiver Plan: Alt 1 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.06 BR Orange Show Road



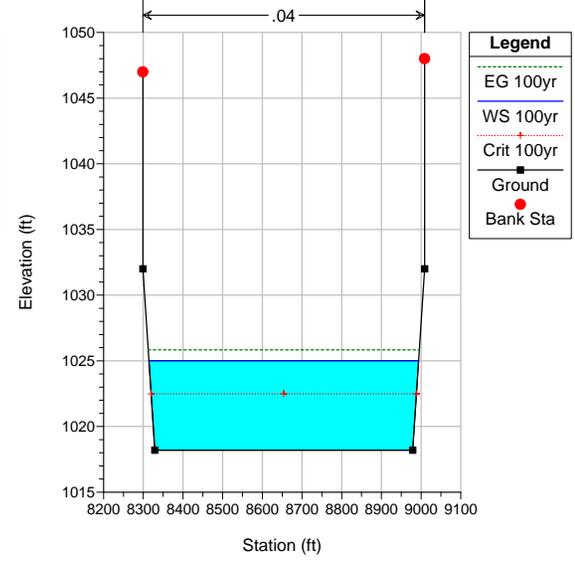
SantaAnaRiver Plan: Alt 1 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.06 BR Orange Show Road



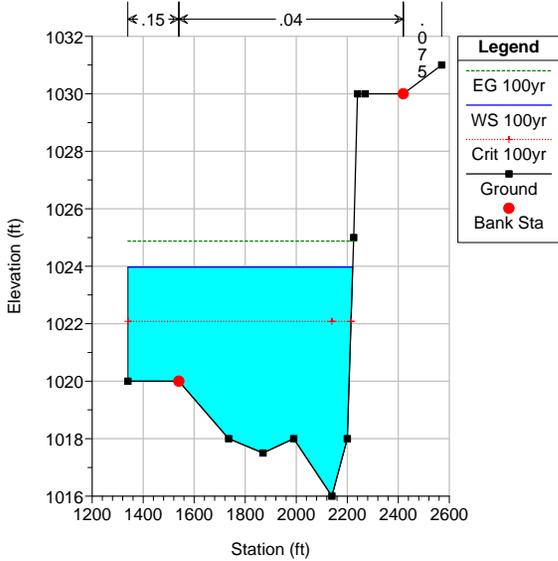
SantaAnaRiver Plan: Alt 1 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.01



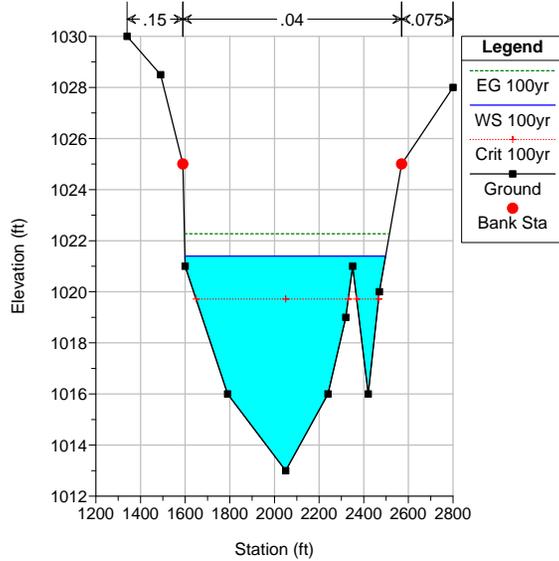
SantaAnaRiver Plan: Alt 1 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 28.95



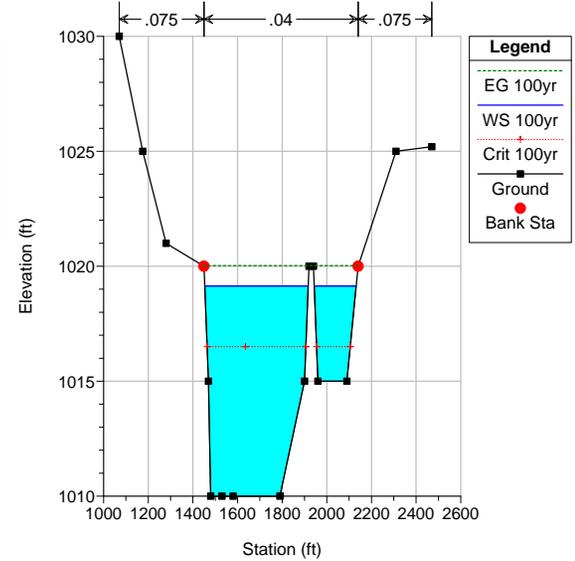
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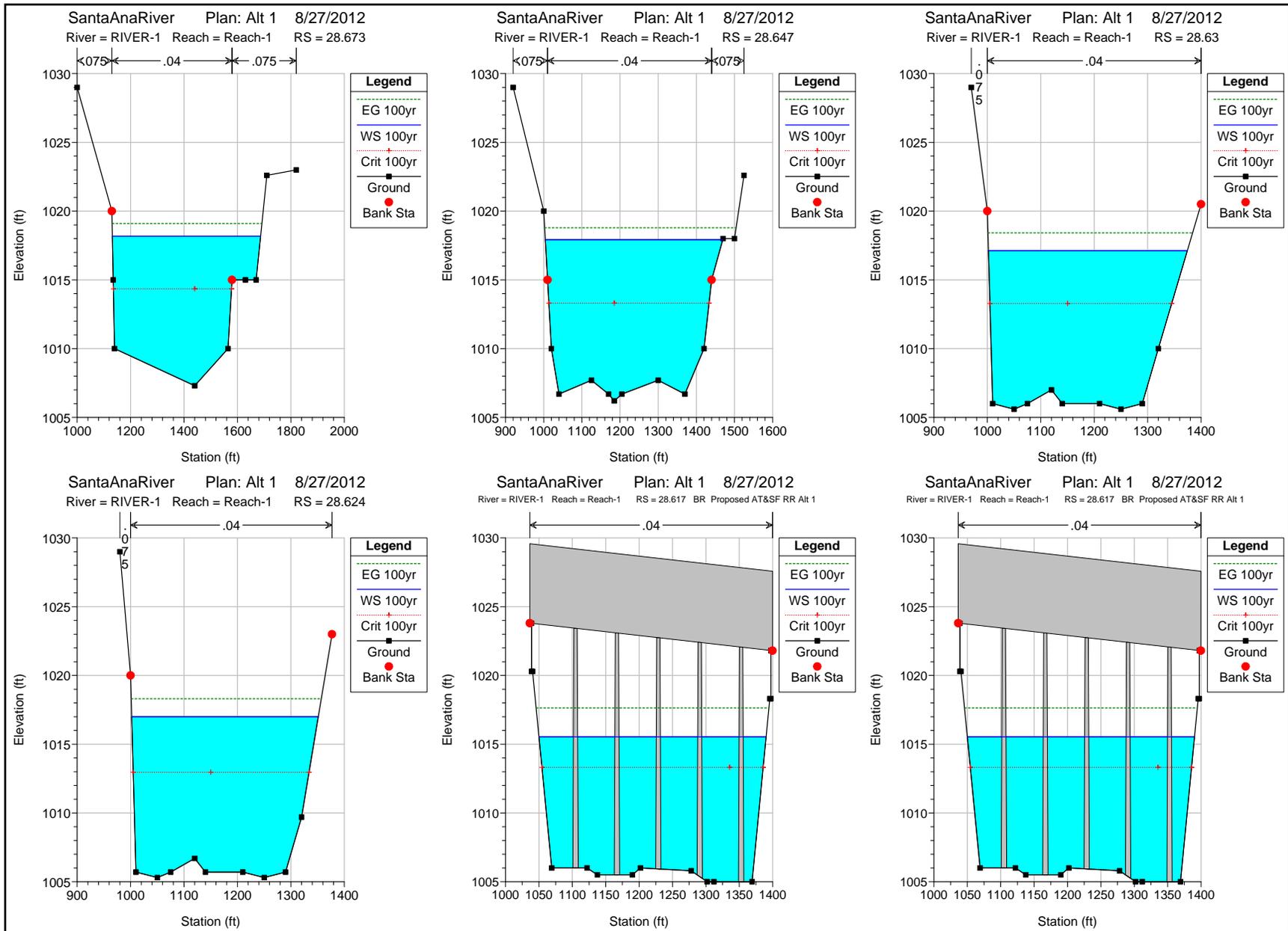
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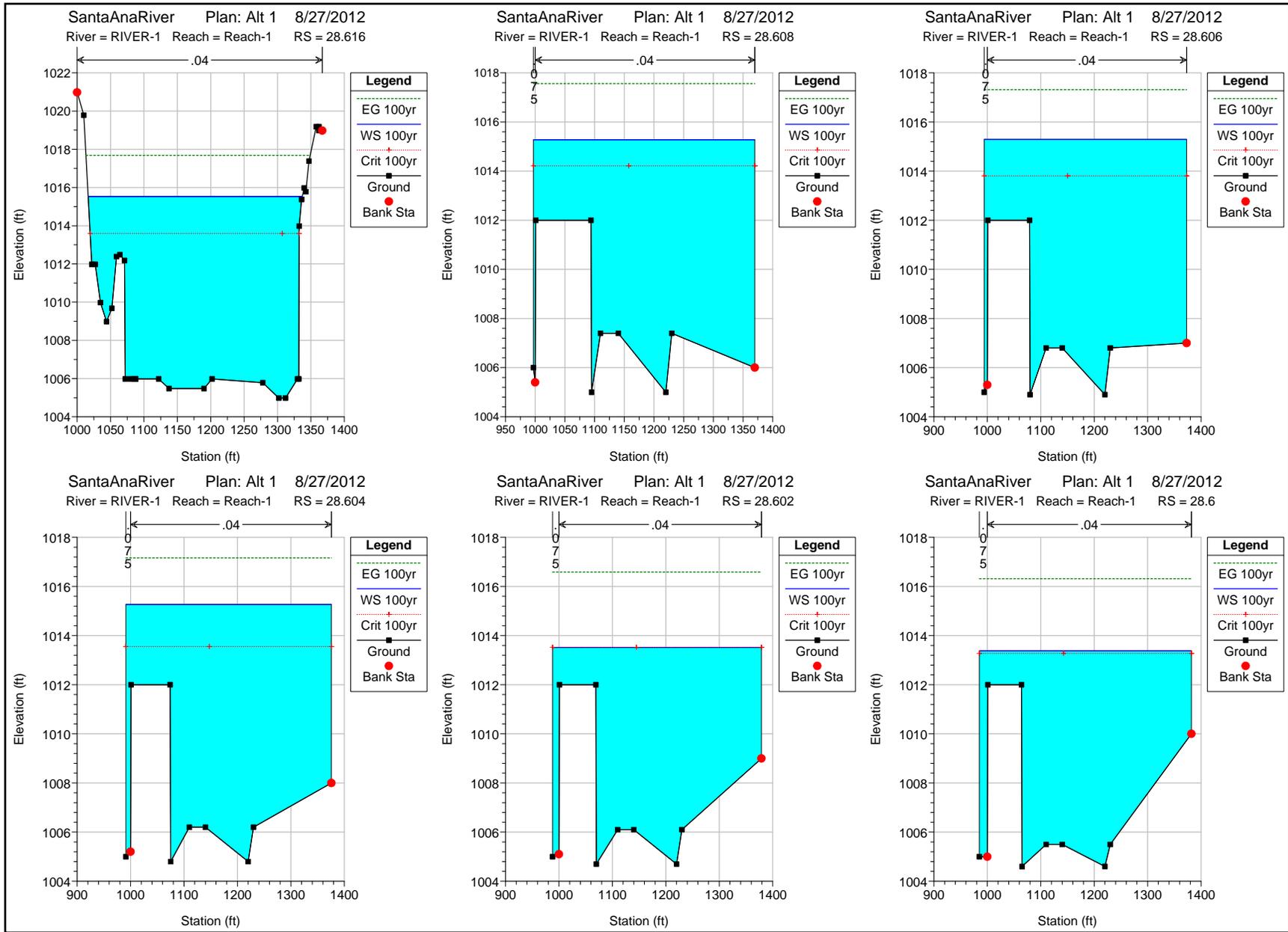


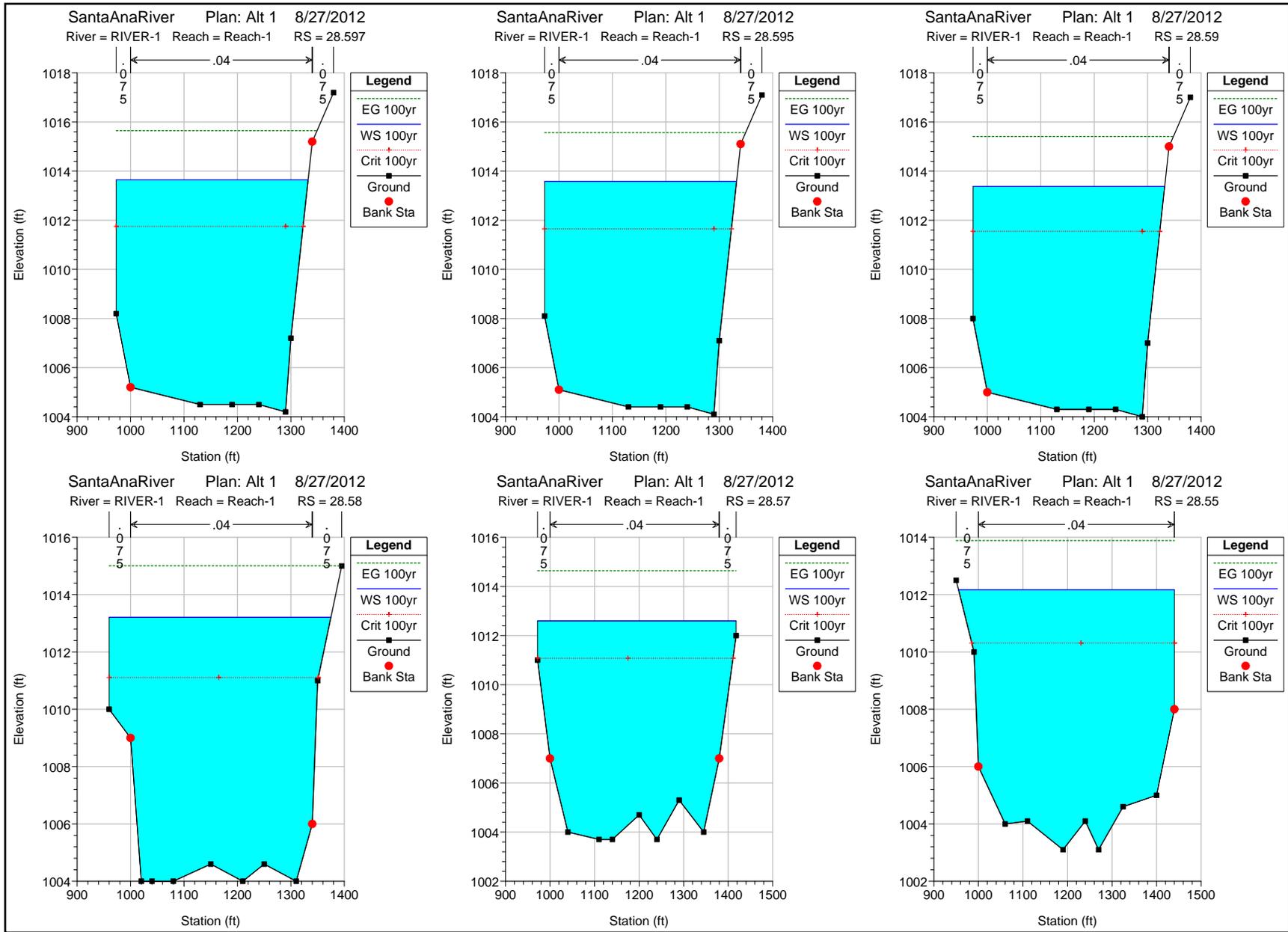
SantaAnaRiver Plan: Alt 1 8/27/2012

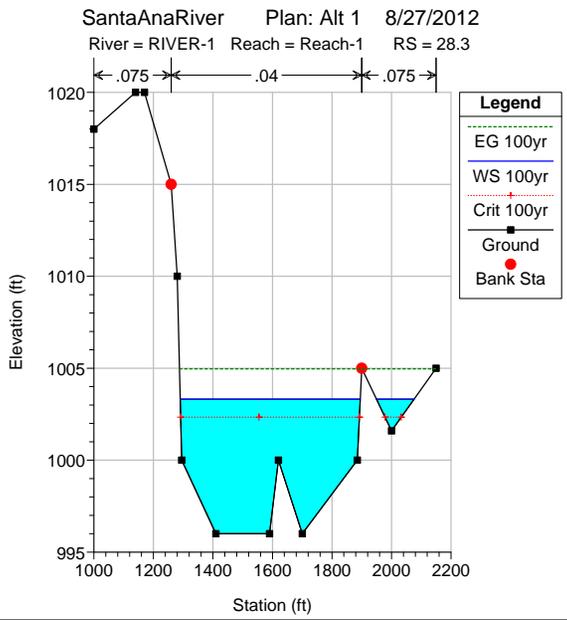
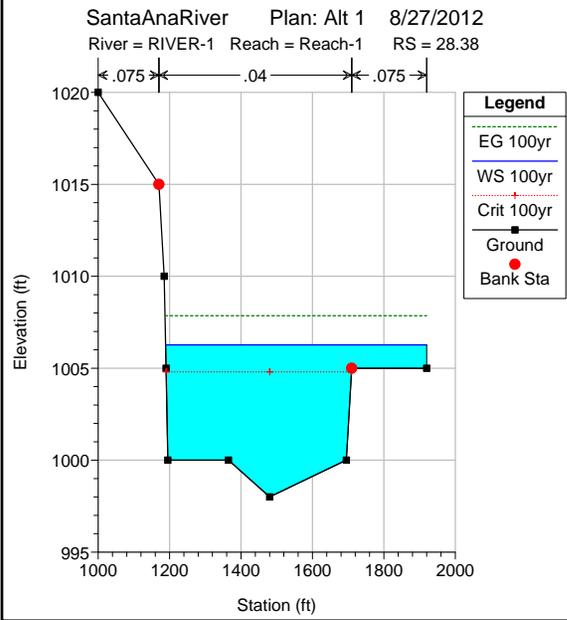
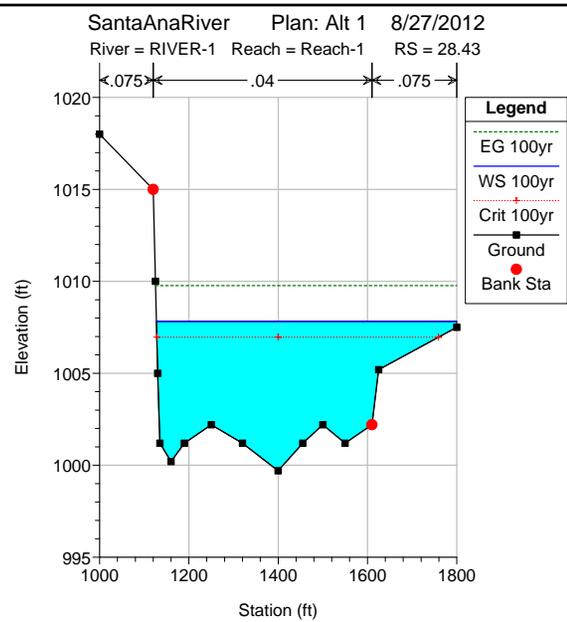
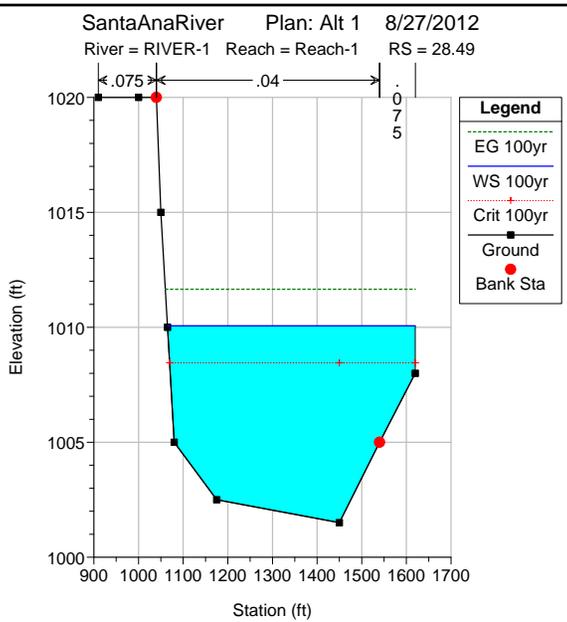
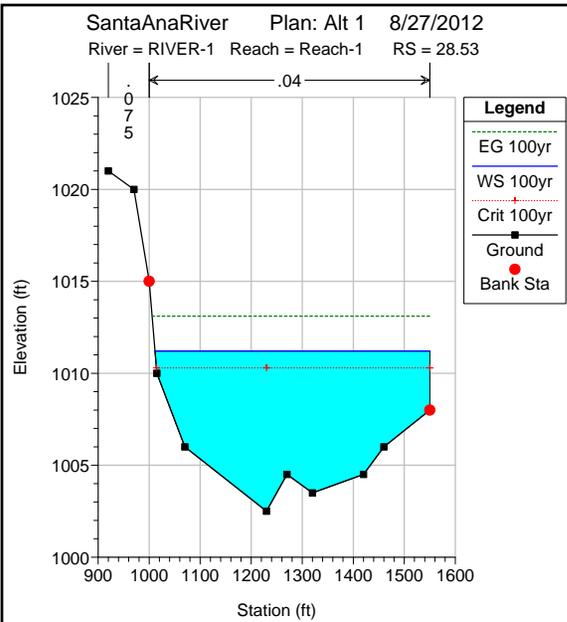
River = RIVER-1 Reach = Reach-1 RS = 28.737





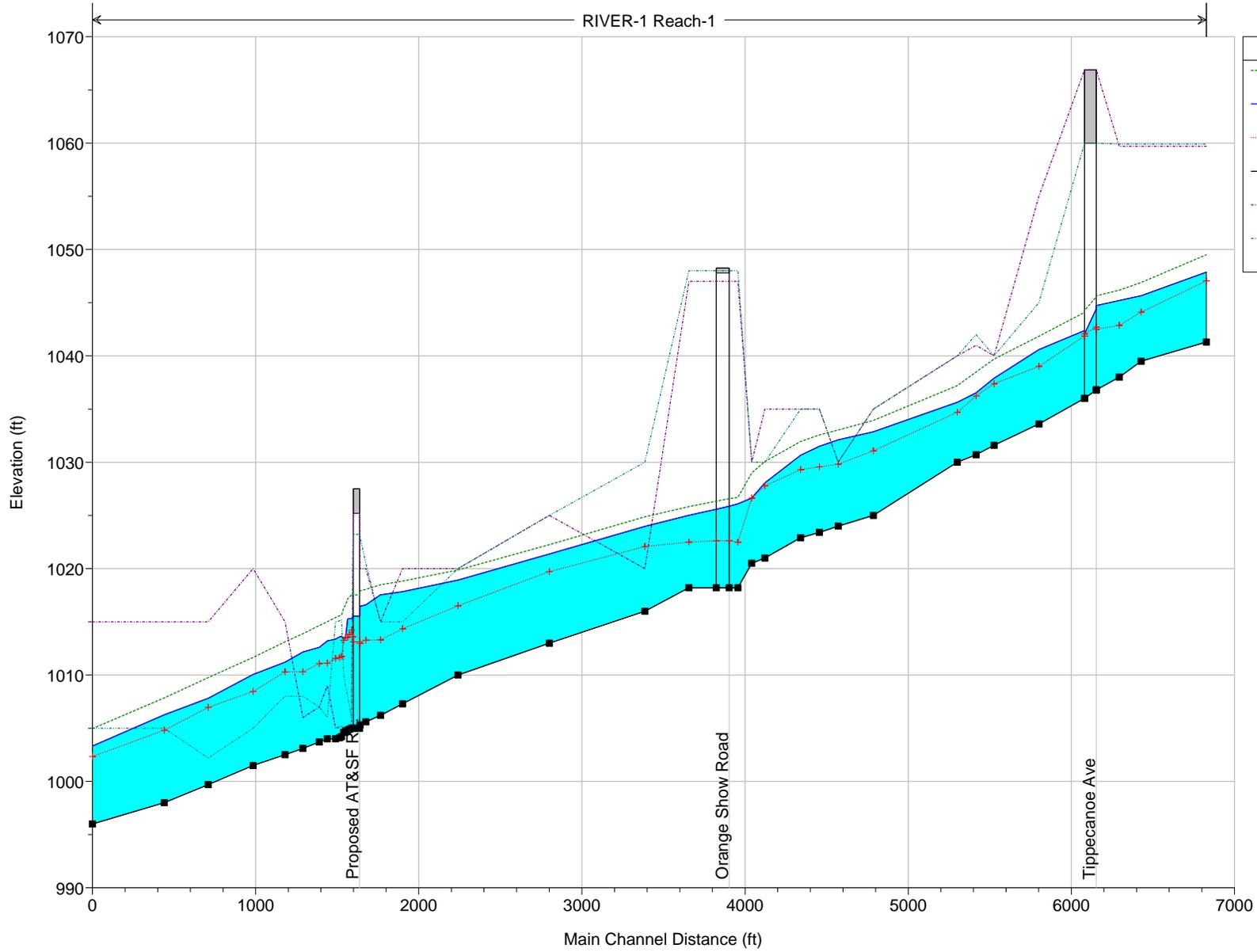




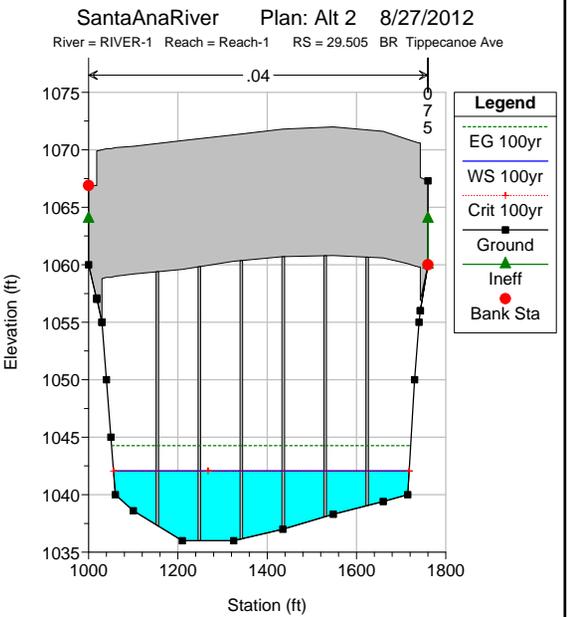
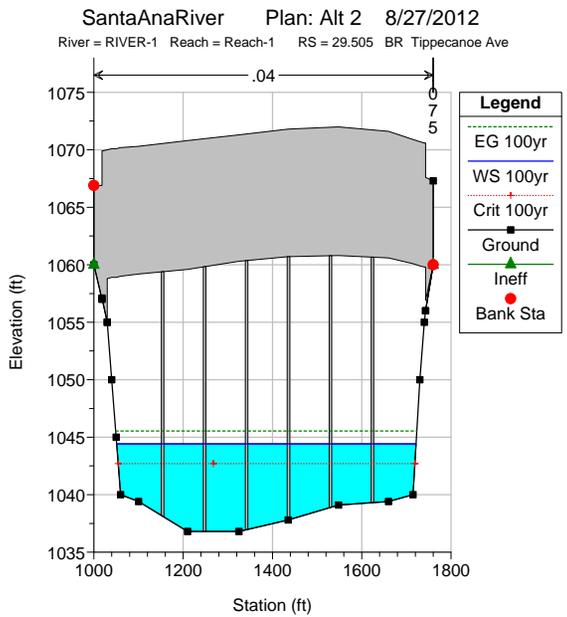
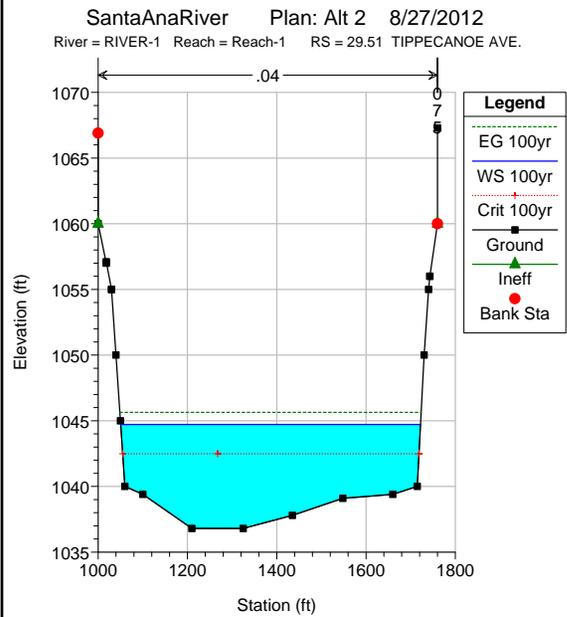
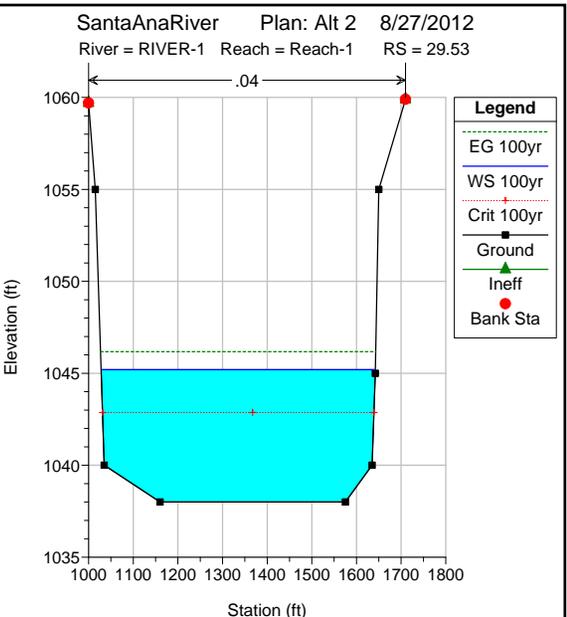
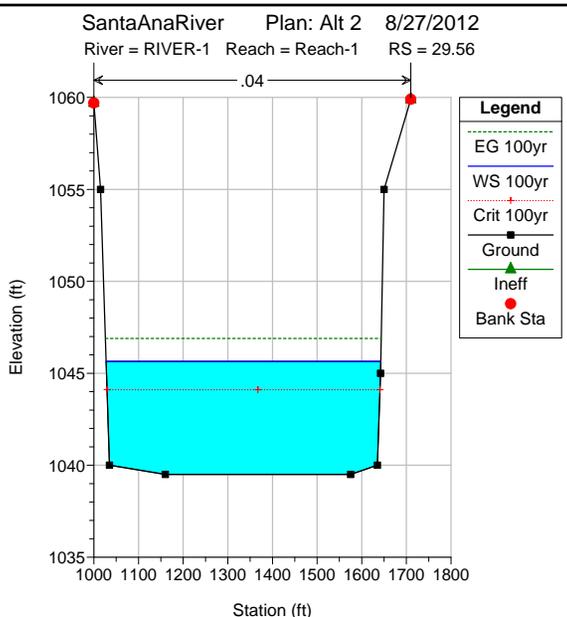
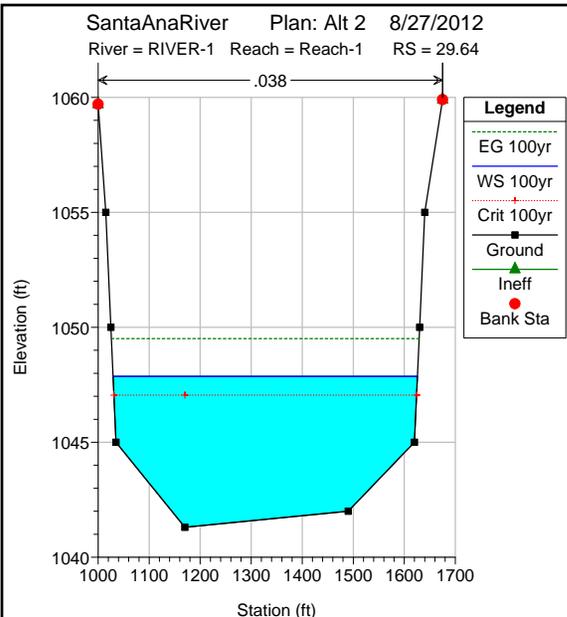


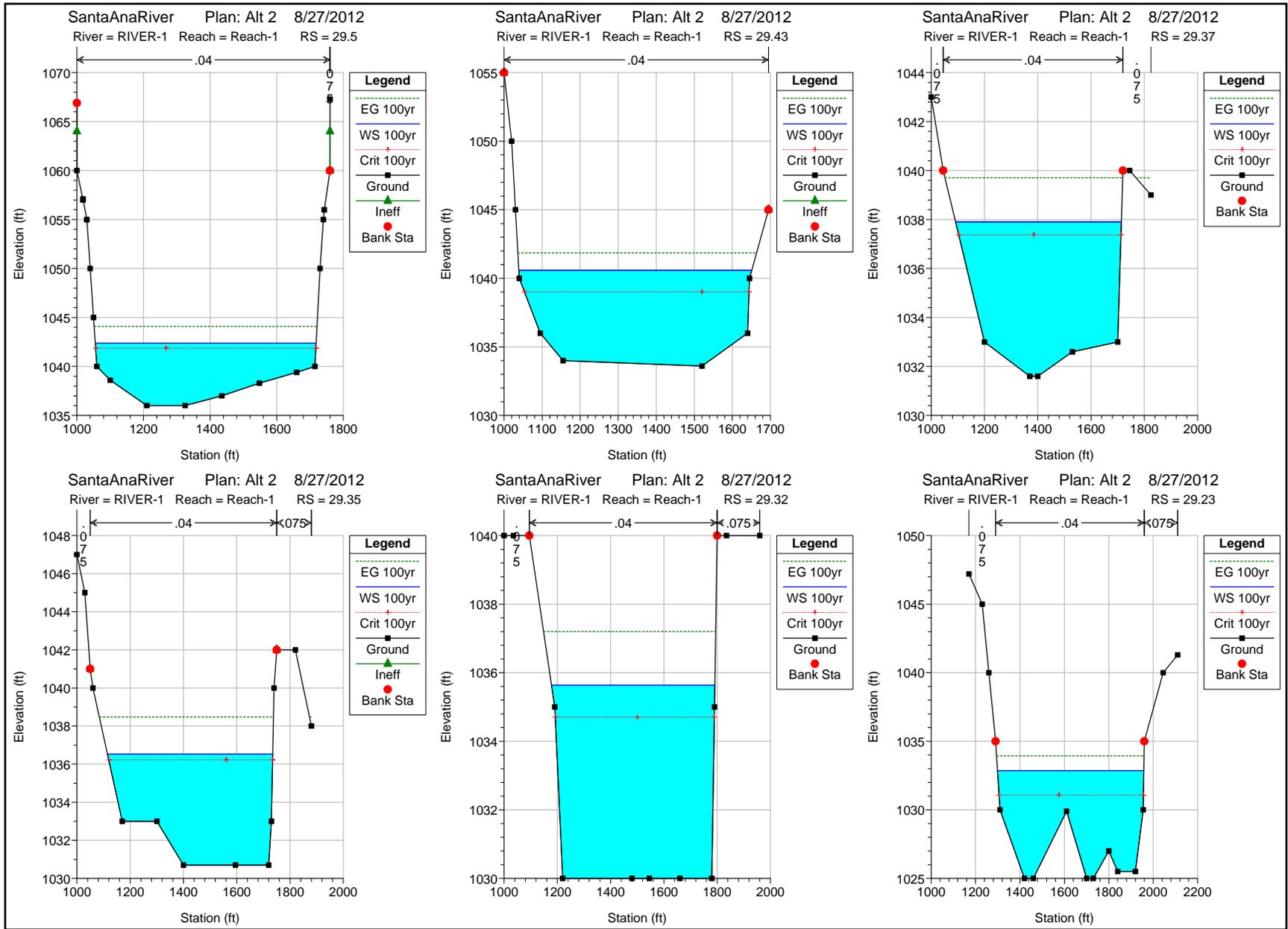
SantaAnaRiver Plan: Alt 2 8/27/2012

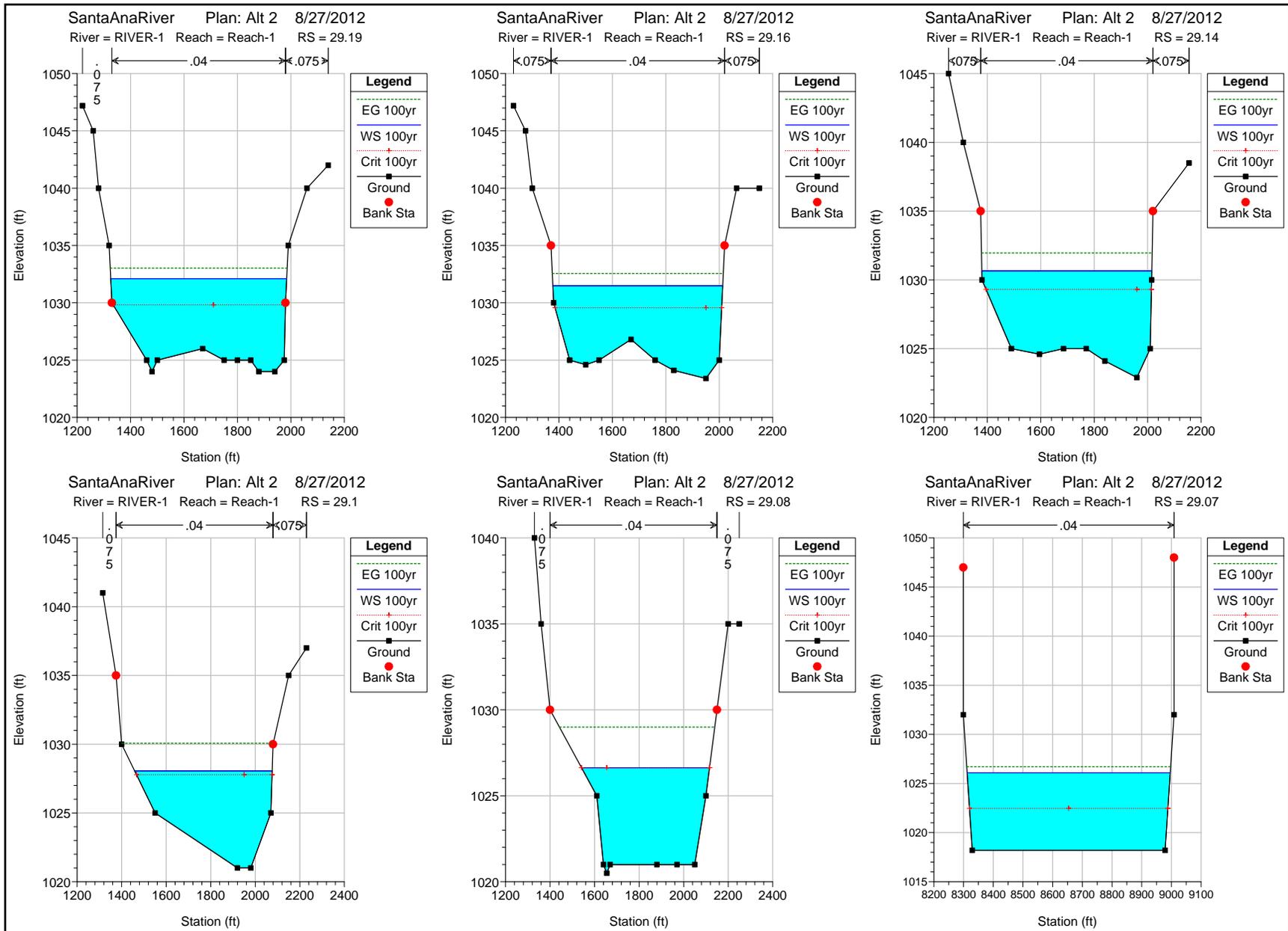
RIVER-1 Reach-1



Legend	
EG 100yr	(Green dashed line)
WS 100yr	(Blue solid line)
Crit 100yr	(Red dashed line with + markers)
Ground	(Black solid line with square markers)
LOB	(Purple dotted line)
ROB	(Cyan shaded area)

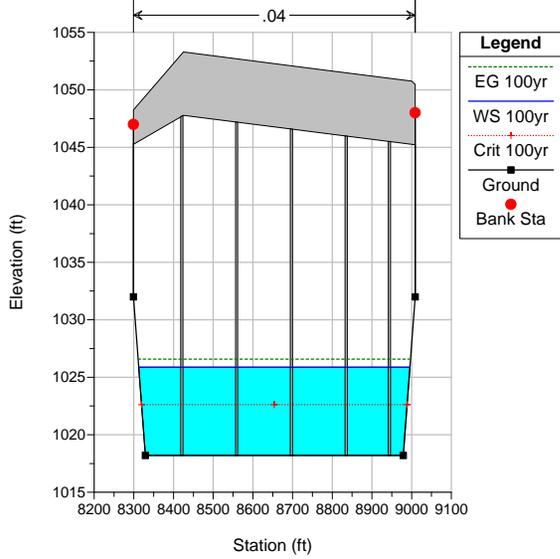






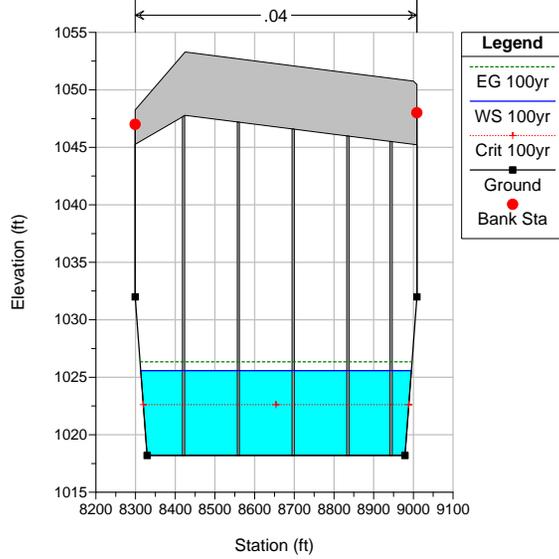
SantaAnaRiver Plan: Alt 2 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.06 BR Orange Show Road



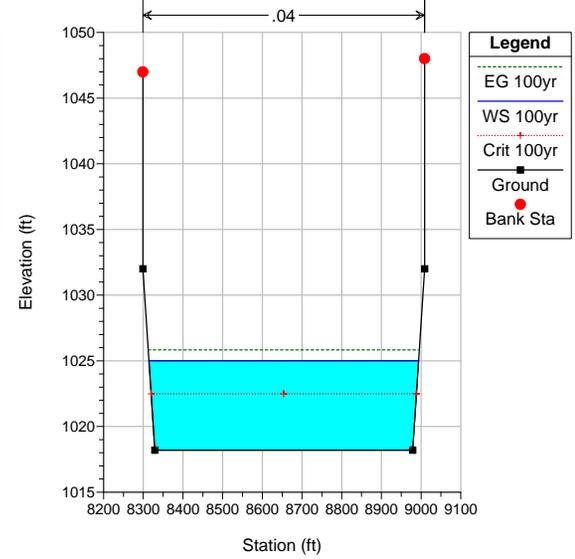
SantaAnaRiver Plan: Alt 2 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.06 BR Orange Show Road



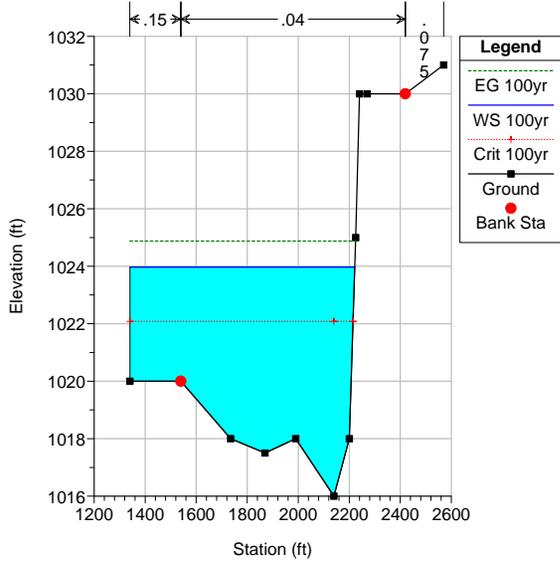
SantaAnaRiver Plan: Alt 2 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 29.01



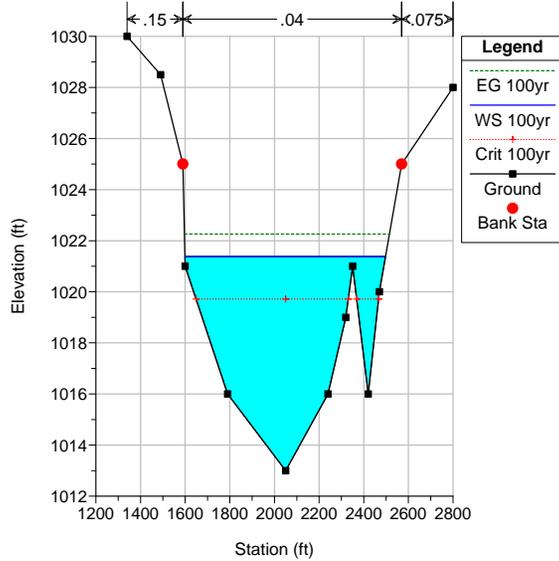
SantaAnaRiver Plan: Alt 2 8/27/2012

River = RIVER-1 Reach = Reach-1 RS = 28.95



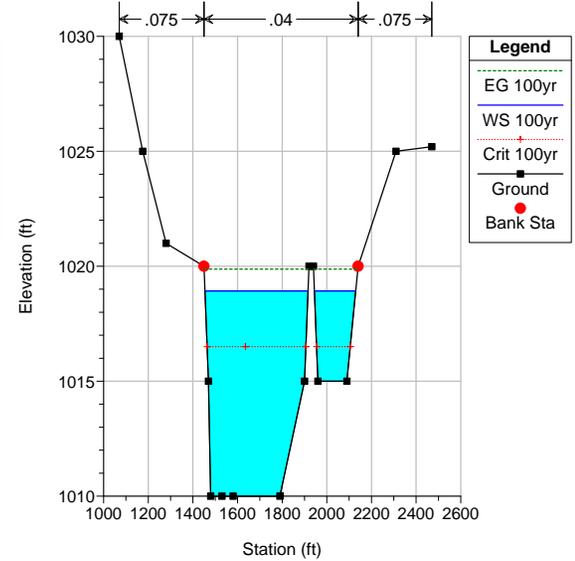
SantaAnaRiver Plan: Alt 2 8/27/2012

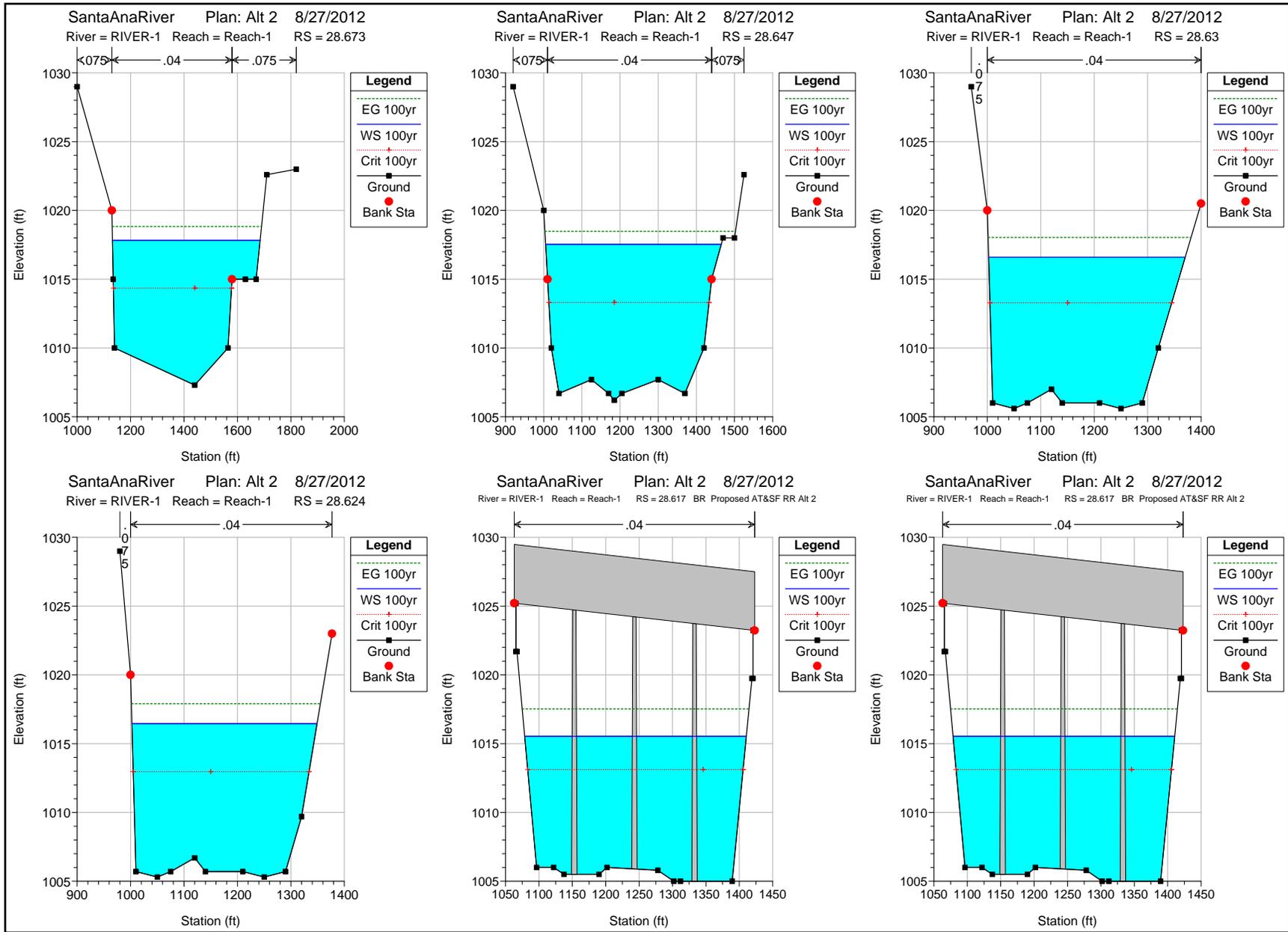
River = RIVER-1 Reach = Reach-1 RS = 28.84

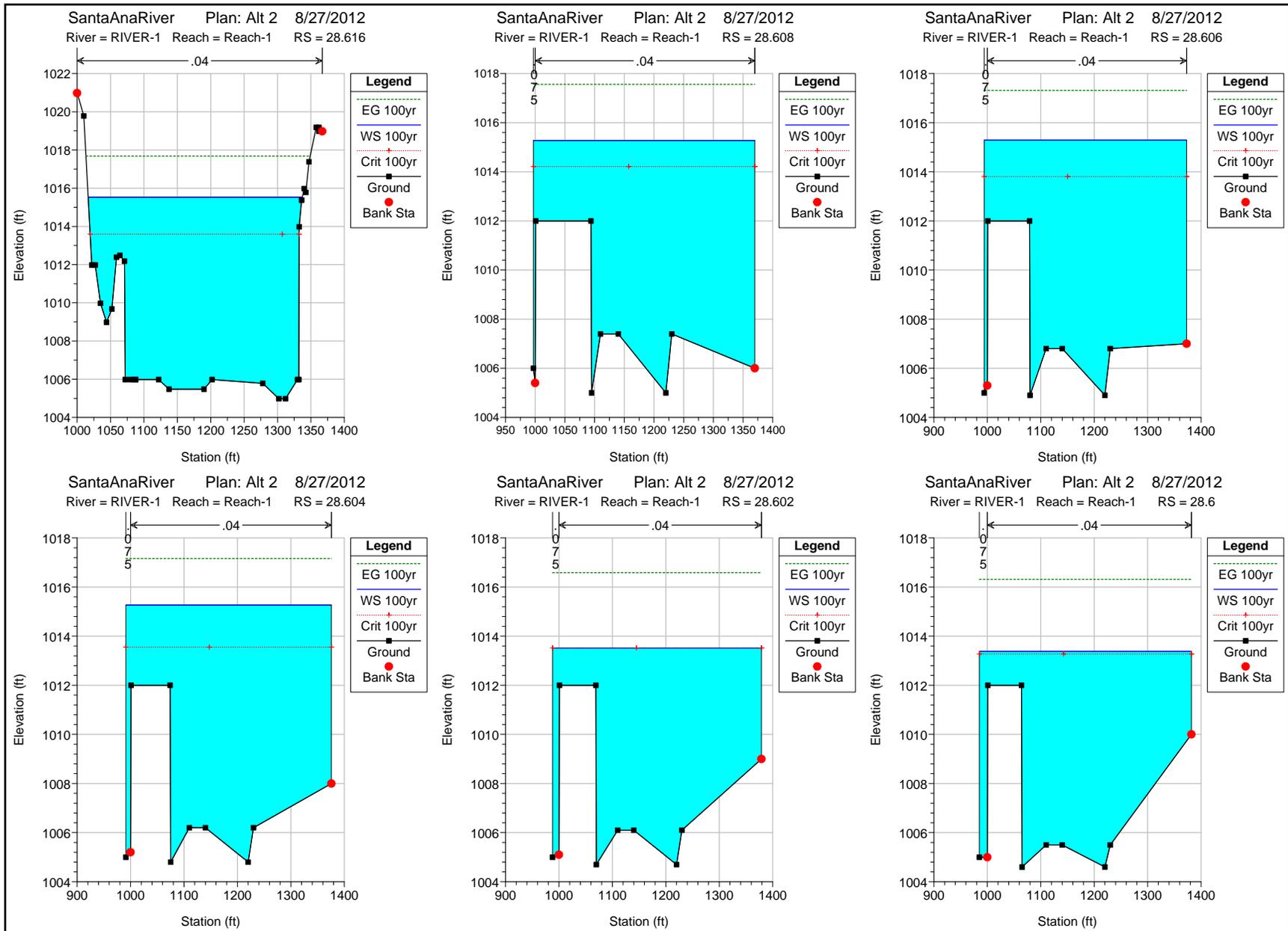


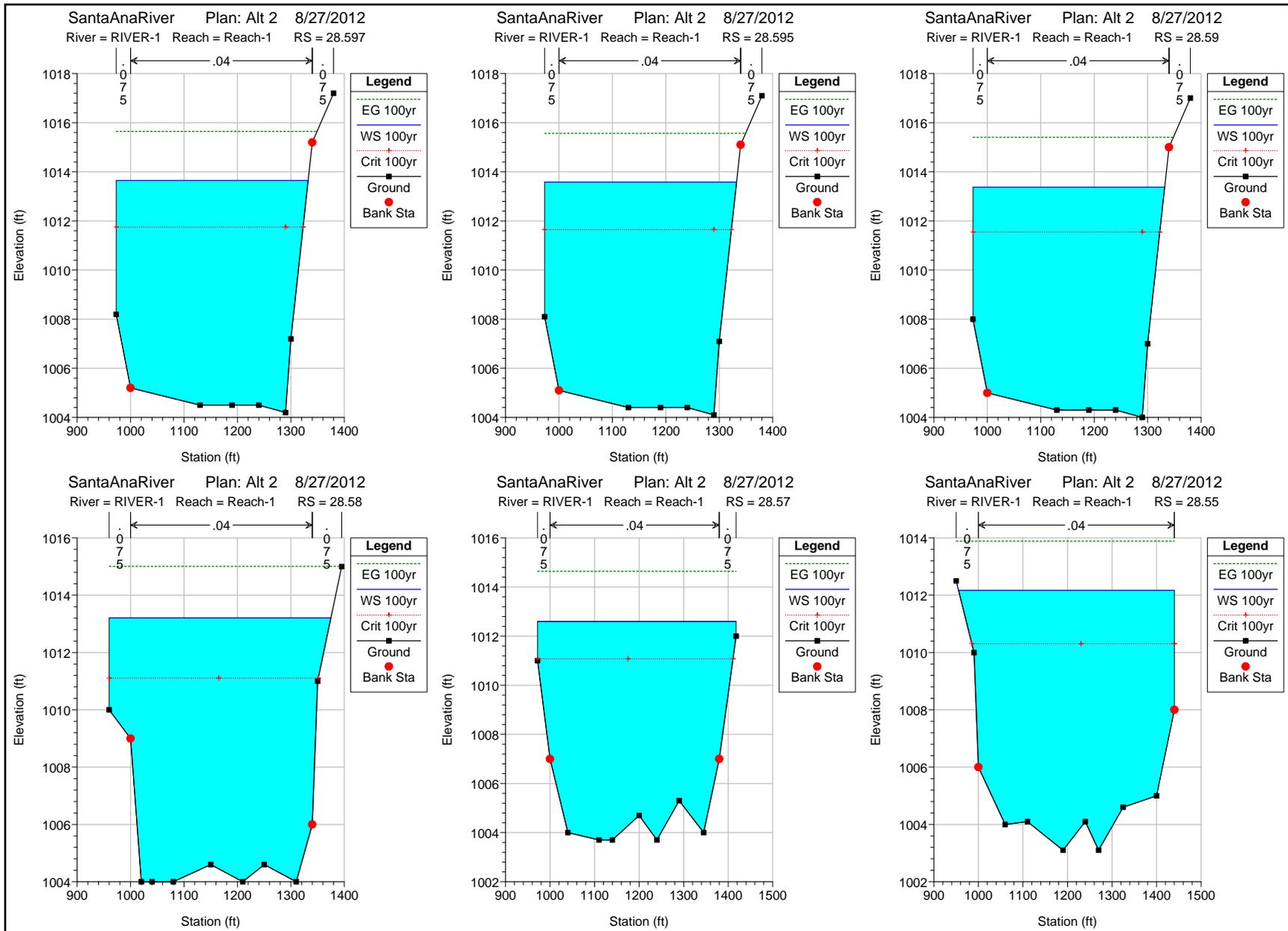
SantaAnaRiver Plan: Alt 2 8/27/2012

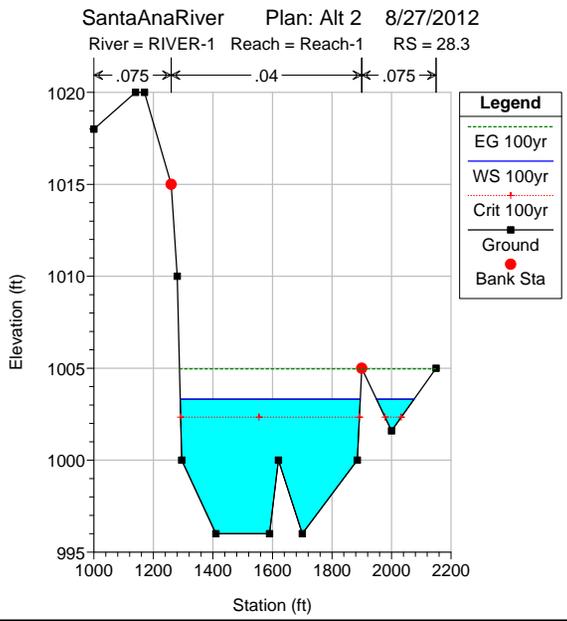
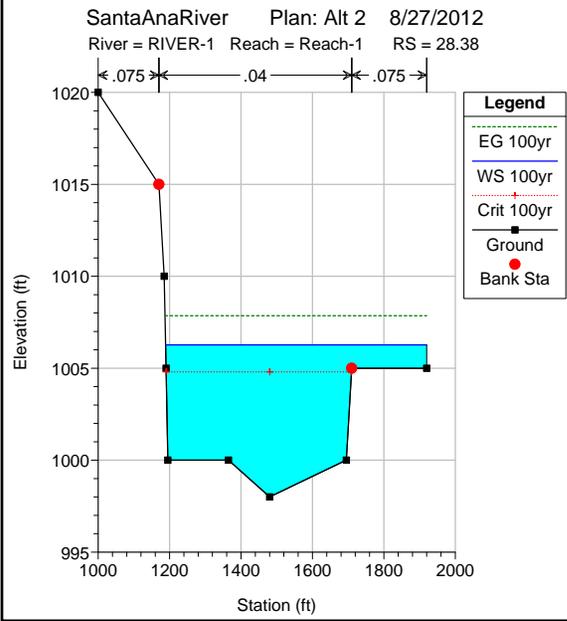
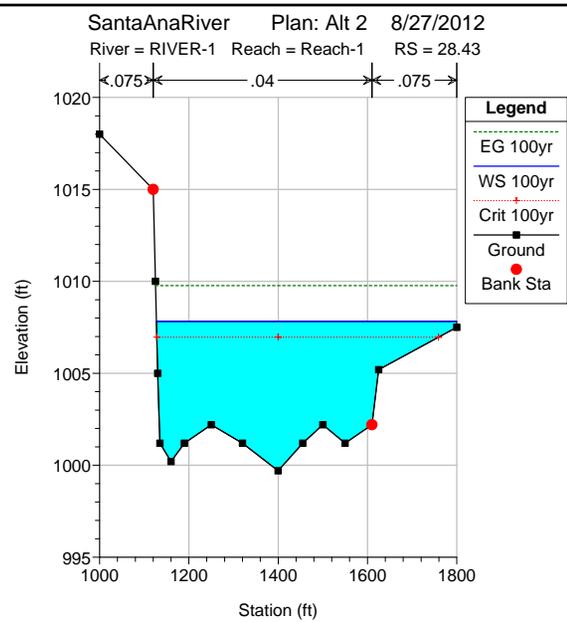
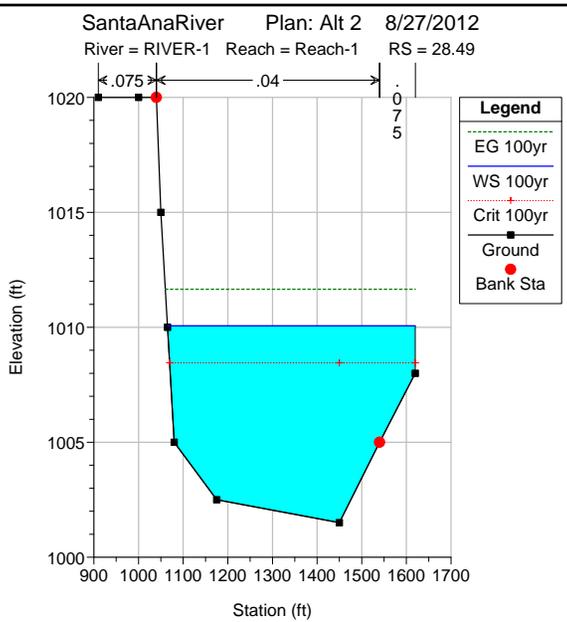
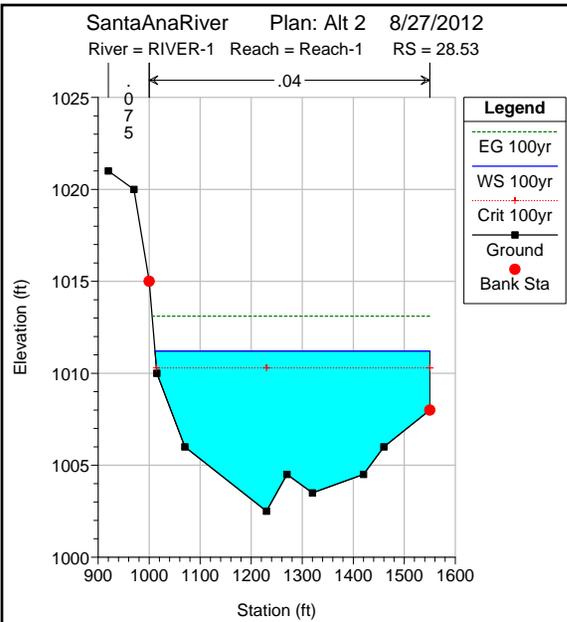
River = RIVER-1 Reach = Reach-1 RS = 28.737











Attachment 2 – Hydraulic Analysis Results

HEC-RAS Plan: Model2_Pier River: RIVER-1 Reach: Reach-1 Profile: 100yr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	29.64	100yr	33000.00	1041.30	1047.87	1047.05	1049.51	0.007337	10.27	3212.01	596.48	0.78
Reach-1	29.56	100yr	33000.00	1039.50	1045.65	1044.11	1046.89	0.005383	8.95	3685.31	615.05	0.64
Reach-1	29.53	100yr	33000.00	1038.00	1045.20	1042.87	1046.17	0.003551	7.91	4171.84	614.09	0.53
Reach-1	29.51	100yr	33000.00	1036.80	1044.73	1042.49	1045.64	0.003619	7.68	4295.97	671.54	0.54
Reach-1	29.505		Bridge									
Reach-1	29.5	100yr	33000.00	1036.00	1042.38	1041.88	1044.09	0.009995	10.48	3149.66	663.33	0.85
Reach-1	29.43	100yr	33000.00	1033.60	1040.59	1039.01	1041.85	0.005416	9.00	3666.62	612.09	0.65
Reach-1	29.37	100yr	33000.00	1031.60	1037.91	1037.38	1039.71	0.010051	10.77	3065.04	622.62	0.86
Reach-1	29.35	100yr	33000.00	1030.70	1036.52	1036.23	1038.48	0.011479	11.22	2942.21	620.41	0.91
Reach-1	29.32	100yr	33000.00	1030.00	1035.64	1034.70	1037.20	0.007815	10.04	3287.56	613.41	0.76
Reach-1	29.23	100yr	33000.00	1025.00	1032.86	1031.07	1033.93	0.004581	8.31	3972.50	659.31	0.60
Reach-1	29.19	100yr	33000.00	1024.00	1032.10	1029.82	1033.03	0.003548	7.74	4273.08	658.40	0.53
Reach-1	29.16	100yr	33000.00	1023.40	1031.49	1029.57	1032.56	0.004358	8.30	3974.96	635.97	0.59
Reach-1	29.14	100yr	33000.00	1022.90	1030.66	1029.30	1031.96	0.006036	9.15	3606.95	636.31	0.68
Reach-1	29.1	100yr	33000.00	1021.00	1028.06	1027.78	1030.07	0.011944	11.37	2901.58	617.95	0.92
Reach-1	29.08	100yr	33000.00	1020.50	1026.64	1026.64	1028.99	0.014144	12.32	2679.49	575.14	1.01
Reach-1	29.07	100yr	33000.00	1018.20	1026.09	1022.48	1026.70	0.001888	6.27	5264.22	684.31	0.40
Reach-1	29.06		Bridge									
Reach-1	29.01	100yr	33000.00	1018.20	1025.01	1022.49	1025.83	0.003092	7.29	4526.32	679.60	0.50
Reach-1	28.95	100yr	33000.00	1016.00	1023.97	1022.08	1024.88	0.004038	7.78	4876.25	881.32	0.56
Reach-1	28.84	100yr	33000.00	1013.00	1021.52	1019.72	1022.35	0.004526	7.31	4514.60	901.79	0.58
Reach-1	28.737	100yr	33000.00	1010.00	1019.68	1016.50	1020.44	0.002620	7.00	4710.99	662.94	0.46
Reach-1	28.673	100yr	33000.00	1007.30	1018.95	1014.35	1019.72	0.001729	7.15	4907.83	559.71	0.40
Reach-1	28.647	100yr	33000.00	1006.20	1018.75	1013.31	1019.49	0.001421	6.92	4857.34	501.55	0.37
Reach-1	28.63	100yr	33000.00	1005.60	1018.16	1013.27	1019.21	0.002177	8.23	4011.19	380.83	0.45
Reach-1	28.624	100yr	33000.00	1005.30	1018.05	1012.97	1019.12	0.002062	8.32	3966.54	354.41	0.44
Reach-1	28.622	100yr	33000.00	1005.20	1018.01	1012.87	1019.09	0.002027	8.36	3945.54	344.72	0.44
Reach-1	28.62	100yr	33000.00	1005.00	1017.29	1013.96	1018.86	0.003619	10.07	3276.05	332.82	0.57
Reach-1	28.615		Bridge									
Reach-1	28.61	100yr	33000.00	1005.00	1015.58	1013.62	1017.71	0.005847	11.72	2815.08	320.75	0.70
Reach-1	28.608	100yr	33000.00	1005.00	1015.28	1014.21	1017.56	0.008124	12.15	2736.49	373.00	0.79
Reach-1	28.606	100yr	33000.00	1004.90	1015.29	1013.81	1017.32	0.006773	11.46	2918.43	379.00	0.73
Reach-1	28.604	100yr	33000.00	1004.80	1015.27	1013.55	1017.16	0.006161	11.10	3028.83	385.00	0.70
Reach-1	28.602	100yr	33000.00	1004.70	1013.52	1013.52	1016.58	0.014065	14.16	2383.33	391.00	1.02
Reach-1	28.6	100yr	33000.00	1004.60	1013.38	1013.27	1016.31	0.013357	13.88	2439.56	397.00	0.99
Reach-1	28.597	100yr	33000.00	1004.20	1013.65	1011.75	1015.65	0.005597	11.48	2985.02	359.23	0.70
Reach-1	28.595	100yr	33000.00	1004.10	1013.59	1011.65	1015.57	0.005512	11.42	2999.57	359.43	0.69
Reach-1	28.59	100yr	33000.00	1004.00	1013.37	1011.55	1015.41	0.005752	11.58	2959.12	358.87	0.71
Reach-1	28.58	100yr	33000.00	1004.00	1013.21	1011.11	1015.01	0.004741	10.86	3203.66	414.82	0.65
Reach-1	28.57	100yr	36500.00	1003.70	1012.60	1011.08	1014.64	0.005922	11.56	3312.57	446.00	0.71
Reach-1	28.55	100yr	36500.00	1003.10	1012.17	1010.31	1013.89	0.005260	10.55	3523.03	484.69	0.66
Reach-1	28.53	100yr	36500.00	1002.50	1011.21	1010.29	1013.11	0.007996	11.07	3298.01	538.62	0.79
Reach-1	28.49	100yr	36500.00	1001.50	1010.06	1008.46	1011.66	0.005396	10.25	3752.26	555.18	0.67
Reach-1	28.43	100yr	36500.00	999.70	1007.82	1006.96	1009.77	0.007633	11.31	3477.09	672.82	0.78
Reach-1	28.38	100yr	36500.00	998.00	1006.27	1004.80	1007.86	0.005885	10.18	3806.98	731.27	0.69
Reach-1	28.3	100yr	36500.00	996.00	1003.32	1002.34	1004.96	0.007384	10.31	3632.37	731.41	0.75

HEC-RAS Plan: Alt 1 River: RIVER-1 Reach: Reach-1 Profile: 100yr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	29.64	100yr	33000.00	1041.30	1047.87	1047.05	1049.51	0.007337	10.27	3212.01	596.48	0.78
Reach-1	29.56	100yr	33000.00	1039.50	1045.65	1044.11	1046.89	0.005383	8.95	3685.31	615.05	0.64
Reach-1	29.53	100yr	33000.00	1038.00	1045.20	1042.87	1046.17	0.003551	7.91	4171.84	614.09	0.53
Reach-1	29.51	100yr	33000.00	1036.80	1044.73	1042.49	1045.64	0.003619	7.68	4295.97	671.54	0.54
Reach-1	29.505		Bridge									
Reach-1	29.5	100yr	33000.00	1036.00	1042.38	1041.88	1044.09	0.009995	10.48	3149.66	663.33	0.85
Reach-1	29.43	100yr	33000.00	1033.60	1040.59	1039.01	1041.85	0.005416	9.00	3666.62	612.09	0.65
Reach-1	29.37	100yr	33000.00	1031.60	1037.91	1037.38	1039.71	0.010051	10.77	3065.04	622.62	0.86
Reach-1	29.35	100yr	33000.00	1030.70	1036.52	1036.23	1038.48	0.011479	11.22	2942.21	620.41	0.91
Reach-1	29.32	100yr	33000.00	1030.00	1035.64	1034.70	1037.20	0.007815	10.04	3287.56	613.41	0.76
Reach-1	29.23	100yr	33000.00	1025.00	1032.86	1031.07	1033.93	0.004581	8.31	3972.50	659.31	0.60
Reach-1	29.19	100yr	33000.00	1024.00	1032.10	1029.82	1033.03	0.003548	7.74	4273.08	658.40	0.53
Reach-1	29.16	100yr	33000.00	1023.40	1031.49	1029.57	1032.56	0.004358	8.30	3974.96	635.97	0.59
Reach-1	29.14	100yr	33000.00	1022.90	1030.66	1029.30	1031.96	0.006036	9.15	3606.95	636.31	0.68
Reach-1	29.1	100yr	33000.00	1021.00	1028.06	1027.78	1030.07	0.011944	11.37	2901.58	617.95	0.92
Reach-1	29.08	100yr	33000.00	1020.50	1026.64	1026.64	1028.99	0.014144	12.32	2679.49	575.14	1.01
Reach-1	29.07	100yr	33000.00	1018.20	1026.09	1022.48	1026.70	0.001888	6.27	5264.47	684.31	0.40
Reach-1	29.06		Bridge									
Reach-1	29.01	100yr	33000.00	1018.20	1025.01	1022.49	1025.83	0.003091	7.29	4526.74	679.61	0.50
Reach-1	28.95	100yr	33000.00	1016.00	1023.97	1022.08	1024.88	0.004034	7.78	4877.91	881.33	0.56
Reach-1	28.84	100yr	33000.00	1013.00	1021.40	1019.72	1022.27	0.004909	7.50	4400.13	898.93	0.60
Reach-1	28.737	100yr	33000.00	1010.00	1019.14	1016.50	1020.03	0.003320	7.58	4355.59	651.03	0.52
Reach-1	28.673	100yr	33000.00	1007.30	1018.18	1014.35	1019.10	0.002269	7.78	4479.21	554.89	0.45
Reach-1	28.647	100yr	33000.00	1006.20	1017.92	1013.31	1018.79	0.001846	7.49	4447.87	465.05	0.41
Reach-1	28.63	100yr	33000.00	1005.60	1017.13	1013.28	1018.42	0.002956	9.10	3624.66	372.27	0.51
Reach-1	28.624	100yr	33000.00	1005.30	1017.00	1012.96	1018.31	0.002792	9.17	3598.19	349.19	0.50
Reach-1	28.617		Bridge									
Reach-1	28.616	100yr	33000.00	1004.98	1015.53	1013.59	1017.68	0.005895	11.75	2807.58	320.56	0.70
Reach-1	28.608	100yr	33000.00	1005.00	1015.28	1014.21	1017.56	0.008124	12.15	2736.49	373.00	0.79
Reach-1	28.606	100yr	33000.00	1004.90	1015.29	1013.81	1017.32	0.006773	11.46	2918.43	379.00	0.73
Reach-1	28.604	100yr	33000.00	1004.80	1015.27	1013.55	1017.16	0.006161	11.10	3028.83	385.00	0.70
Reach-1	28.602	100yr	33000.00	1004.70	1013.52	1013.52	1016.58	0.014065	14.16	2383.33	391.00	1.02
Reach-1	28.6	100yr	33000.00	1004.60	1013.38	1013.27	1016.31	0.013357	13.88	2439.56	397.00	0.99
Reach-1	28.597	100yr	33000.00	1004.20	1013.65	1011.75	1015.65	0.005597	11.48	2985.02	359.23	0.70
Reach-1	28.595	100yr	33000.00	1004.10	1013.59	1011.65	1015.57	0.005512	11.42	2999.57	359.43	0.69
Reach-1	28.59	100yr	33000.00	1004.00	1013.37	1011.55	1015.41	0.005752	11.58	2959.12	358.87	0.71
Reach-1	28.58	100yr	33000.00	1004.00	1013.21	1011.11	1015.01	0.004741	10.86	3203.66	414.82	0.65
Reach-1	28.57	100yr	36500.00	1003.70	1012.60	1011.08	1014.64	0.005922	11.56	3312.57	446.00	0.71
Reach-1	28.55	100yr	36500.00	1003.10	1012.17	1010.31	1013.89	0.005260	10.55	3523.03	484.69	0.66
Reach-1	28.53	100yr	36500.00	1002.50	1011.21	1010.29	1013.11	0.007996	11.07	3298.01	538.62	0.79
Reach-1	28.49	100yr	36500.00	1001.50	1010.06	1008.46	1011.66	0.005396	10.25	3752.26	555.18	0.67
Reach-1	28.43	100yr	36500.00	999.70	1007.82	1006.96	1009.77	0.007633	11.31	3477.09	672.82	0.78
Reach-1	28.38	100yr	36500.00	998.00	1006.27	1004.80	1007.86	0.005885	10.18	3806.98	731.27	0.69
Reach-1	28.3	100yr	36500.00	996.00	1003.32	1002.34	1004.96	0.007384	10.31	3632.37	731.41	0.75

HEC-RAS Plan: Alt 2 River: RIVER-1 Reach: Reach-1 Profile: 100yr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	29.64	100yr	33000.00	1041.30	1047.87	1047.05	1049.51	0.007337	10.27	3212.01	596.48	0.78
Reach-1	29.56	100yr	33000.00	1039.50	1045.65	1044.11	1046.89	0.005383	8.95	3685.31	615.05	0.64
Reach-1	29.53	100yr	33000.00	1038.00	1045.20	1042.87	1046.17	0.003551	7.91	4171.84	614.09	0.53
Reach-1	29.51	100yr	33000.00	1036.80	1044.73	1042.49	1045.64	0.003619	7.68	4295.97	671.54	0.54
Reach-1	29.505		Bridge									
Reach-1	29.5	100yr	33000.00	1036.00	1042.38	1041.88	1044.09	0.009995	10.48	3149.66	663.33	0.85
Reach-1	29.43	100yr	33000.00	1033.60	1040.59	1039.01	1041.85	0.005416	9.00	3666.62	612.09	0.65
Reach-1	29.37	100yr	33000.00	1031.60	1037.91	1037.38	1039.71	0.010051	10.77	3065.04	622.62	0.86
Reach-1	29.35	100yr	33000.00	1030.70	1036.52	1036.23	1038.48	0.011479	11.22	2942.21	620.41	0.91
Reach-1	29.32	100yr	33000.00	1030.00	1035.64	1034.70	1037.20	0.007815	10.04	3287.56	613.41	0.76
Reach-1	29.23	100yr	33000.00	1025.00	1032.86	1031.07	1033.93	0.004581	8.31	3972.50	659.31	0.60
Reach-1	29.19	100yr	33000.00	1024.00	1032.10	1029.82	1033.03	0.003548	7.74	4273.08	658.40	0.53
Reach-1	29.16	100yr	33000.00	1023.40	1031.49	1029.57	1032.56	0.004358	8.30	3974.96	635.97	0.59
Reach-1	29.14	100yr	33000.00	1022.90	1030.66	1029.30	1031.96	0.006036	9.15	3606.95	636.31	0.68
Reach-1	29.1	100yr	33000.00	1021.00	1028.06	1027.78	1030.07	0.011944	11.37	2901.58	617.95	0.92
Reach-1	29.08	100yr	33000.00	1020.50	1026.64	1026.64	1028.99	0.014144	12.32	2679.49	575.14	1.01
Reach-1	29.07	100yr	33000.00	1018.20	1026.09	1022.48	1026.70	0.001887	6.27	5264.80	684.31	0.40
Reach-1	29.06		Bridge									
Reach-1	29.01	100yr	33000.00	1018.20	1025.01	1022.49	1025.84	0.003090	7.29	4527.07	679.61	0.50
Reach-1	28.95	100yr	33000.00	1016.00	1023.97	1022.08	1024.88	0.004032	7.78	4878.72	881.33	0.56
Reach-1	28.84	100yr	33000.00	1013.00	1021.38	1019.72	1022.26	0.004972	7.53	4382.58	898.49	0.60
Reach-1	28.737	100yr	33000.00	1010.00	1018.93	1016.50	1019.88	0.003660	7.82	4217.89	646.36	0.54
Reach-1	28.673	100yr	33000.00	1007.30	1017.83	1014.35	1018.83	0.002585	8.10	4286.54	552.71	0.48
Reach-1	28.647	100yr	33000.00	1006.20	1017.54	1013.31	1018.48	0.002098	7.79	4271.11	460.47	0.44
Reach-1	28.63	100yr	33000.00	1005.60	1016.60	1013.28	1018.04	0.003497	9.62	3429.44	367.88	0.56
Reach-1	28.624	100yr	33000.00	1005.30	1016.46	1012.96	1017.91	0.003304	9.68	3408.88	346.47	0.54
Reach-1	28.617		Bridge									
Reach-1	28.616	100yr	33000.00	1004.98	1015.53	1013.59	1017.68	0.005895	11.75	2807.58	320.56	0.70
Reach-1	28.608	100yr	33000.00	1005.00	1015.28	1014.21	1017.56	0.008124	12.15	2736.49	373.00	0.79
Reach-1	28.606	100yr	33000.00	1004.90	1015.29	1013.81	1017.32	0.006773	11.46	2918.43	379.00	0.73
Reach-1	28.604	100yr	33000.00	1004.80	1015.27	1013.55	1017.16	0.006161	11.10	3028.83	385.00	0.70
Reach-1	28.602	100yr	33000.00	1004.70	1013.52	1013.52	1016.58	0.014065	14.16	2383.33	391.00	1.02
Reach-1	28.6	100yr	33000.00	1004.60	1013.38	1013.27	1016.31	0.013357	13.88	2439.56	397.00	0.99
Reach-1	28.597	100yr	33000.00	1004.20	1013.65	1011.75	1015.65	0.005597	11.48	2985.02	359.23	0.70
Reach-1	28.595	100yr	33000.00	1004.10	1013.59	1011.65	1015.57	0.005512	11.42	2999.57	359.43	0.69
Reach-1	28.59	100yr	33000.00	1004.00	1013.37	1011.55	1015.41	0.005752	11.58	2959.12	358.87	0.71
Reach-1	28.58	100yr	33000.00	1004.00	1013.21	1011.11	1015.01	0.004741	10.86	3203.66	414.82	0.65
Reach-1	28.57	100yr	36500.00	1003.70	1012.60	1011.08	1014.64	0.005922	11.56	3312.57	446.00	0.71
Reach-1	28.55	100yr	36500.00	1003.10	1012.17	1010.31	1013.89	0.005260	10.55	3523.03	484.69	0.66
Reach-1	28.53	100yr	36500.00	1002.50	1011.21	1010.29	1013.11	0.007996	11.07	3298.01	538.62	0.79
Reach-1	28.49	100yr	36500.00	1001.50	1010.06	1008.46	1011.66	0.005396	10.25	3752.26	555.18	0.67
Reach-1	28.43	100yr	36500.00	999.70	1007.82	1006.96	1009.77	0.007633	11.31	3477.09	672.82	0.78
Reach-1	28.38	100yr	36500.00	998.00	1006.27	1004.80	1007.86	0.005885	10.18	3806.98	731.27	0.69
Reach-1	28.3	100yr	36500.00	996.00	1003.32	1002.34	1004.96	0.007384	10.31	3632.37	731.41	0.75

Attachment 3 – Engineering “No Rise” Certificate

NATIONAL FLOOD INSURANCE PROGRAM
ENGINEERING "NO-RISE" CERTIFICATE

SITE INFORMATION

Community	San Bernardino Associated Governments (SANBAG)	County	San Bernardino County
Applicant	SANBAG	Date	08/30/12
Address	1170 W. 3 rd St, San Bernardino, CA 92410	Engineer	Mark Seits, P.E., HDR Engineering, Inc.
Telephone	909-884-8276	Address	8690 Balboa Ave, Suite 200, San Diego, CA 92123
	Santa Ana River Bridge 3.4	Telephone	858-712-8312
Site Address/ Location	N34.07515 and W117.2721, California Coordinate System 1983 (ft), Zone 5	Township	
		Section	

PROJECT INFORMATION

Description of Development:	New bridge development with ties, subgrade and rails.
Type of Development:	Filling <input type="checkbox"/> Grading <input checked="" type="checkbox"/> Excavation <input checked="" type="checkbox"/> Minor Improv <input type="checkbox"/> Substantial Improv <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Other <input type="checkbox"/>

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

NFIP map(s) and panel(s) affected:	FIRM Map Number- 06071C8684H
Effective date of map:	August 28, 2008
Base Flood Elevation (feet):	FEMA Effective ; Revised Existing <u>1017.6</u> ; Proposed <u>1017</u>
Name of flooding source:	Santa Ana River

CERTIFICATION

This is to certify that I am a duly qualified Professional Engineer licensed to practice in the State of California. I further certify that the attached engineering data supports the fact the proposed development in the floodway described above will not create any increase in the base flood elevations (100-year flood), floodway elevations and the floodway widths on Santa Ana River at published cross sections listed in the Flood Insurance Study for the above community dated August 28, 2008 and will not create any increase to the base flood elevations (100-year flood), floodway elevations and the floodway widths at unpublished cross-section in the vicinity of the proposed development.

Mark Seits, P.E. CERTIFIER'S NAME HDR Engineering, Inc. COMPANY NAME  SIGNATURE	CA 41103 LICENSE NUMBER August 30, 2012 DATE	
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Attachment 4 – Digital Information (CD)

