PHYSICAL ENVIRONMENT

3.13 HYDROLOGY AND FLOODPLAINS

3.13.1 Regulatory Setting

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments,
- Risks of the action,
- Impacts on natural and beneficial floodplain values,
- Support of incompatible floodplain development, and
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent change of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain.

3.13.2 Affected Environment

The following section is based upon the Preliminary Location Hydraulic Study, February 2006, and the Final Location Hydraulic Study, October 2008, both of which are incorporated by reference.

The base 100-year flood boundary is shown on the Federal Emergency Management Agency (FEMA) Floodway Boundary and Floodway Map, panel 06073CO486F, 06073CO487F, and 06073CO488F, effective date June 19, 1997. The 100-year peak discharges used for the study described herein were obtained from the FEMA Flood Insurance Study, San Diego County, California, Volume 1 of 7, revised June 19, 1997. The floodplain in relation to the project is depicted in Figures 3.13-1a, 1b, and 1c at the end of this section.

The project site is located in the Coastal Plains, an area of rolling to steep topography. The elevation ranges from sea level to about 180 meters (590 feet). The River elevations range between 37 meters (121 feet) and 55 meters (180 feet) within the project limits.

The San Luis Rey River is a braided river with a meandering thalweg (the lowest points along the entire length of a streambed) that varies from season to season. The soils in the river basin are Soil Group A which are primarily river wash and sand. These soils have a severe erodibility potential.

The River basin consists of dense vegetation in the overbanks and relatively no vegetation in the thalweg. The river basin becomes quite dense with vegetation when there is little flow in the river. This would lead to the assumption that the higher flows are washing out the vegetation. Therefore, current conditions were used for this study.

The existing floodplain was analyzed using the Hydrologic Engineering Centers River Analysis System (HEC-RAS v3.1.3) and aerial topography. The river bottom appears to have degraded since the previous studies. The flood boundary limits have decreased in the southern portion of the river and increased in the northern portion within the study limits.

3.13.3 Impacts

Combining the two build alternatives, there are seven floodplain encroachments (E1 through E7) (Figure 13.13-2): One is common to both alternatives (E1), four are associated with the Existing Alignment Alternative (E2 through E5), and two are associated with the Southern Alignment Alternative (E6 and E7). All but E2 are longitudinal encroachments. The total floodplain encroachment for the Existing Alignment Alternative is 11.36 hectares (28.08 acres) in size and approximately 400,0000 cubic meters (522,000 cubic yards) in volume. The total floodplain encroachment for the Southern Alignment Alternative is 23.31 hectares (57.61 acres) in size and approximately 1,617,000 cubic meters (2,115,000 cubic yards) in volume.

Encroachment Common to the Existing (Preferred) and Southern Alignment Alternatives

Encroachment 1

This longitudinal floodplain encroachment is, for the most part, common to both the Existing Alignment Alternative and the Southern Alignment Alternative and is located just east of Jeffries Ranch Road, along the northern edge of the proposed SR-76 roadway. The encroachment associated with the former alternative is 0.82 hectare (2.10 acres) in size and the encroachment associated with the latter is 1.01 hectares (2.49 acres). They are a result of the direct roadway encroachment and rock slope protection (RSP) that would be needed to protect the roadway from erosional forces.

Encroachments Associated with the Existing Alignment Alternative (Preferred Alternative)

Encroachment 2

This longitudinal encroachment is located on the west side of the San Luis Rey River at the east side of the proposed bridge for eastbound traffic. This encroachment is for a bridge cone and is 0.40 hectare (1.00 acre) in size.

Encroachment 3

This longitudinal encroachment is located near Via Montellano (Figure 3.13-2). This encroachment is 5.30 hectares (13.02 acres) in size. This encroachment is due to direct roadway encroachment and RSP that must be placed adjacent to the Existing Alignment Alternative in this location.

Encroachment 4

This longitudinal encroachment is located south of the Camino Del Rey/Olive Hill Road intersection (Figure 3.13-2). This encroachment is 0.24 hectare (0.60 acre) in size and is a result of direct roadway encroachment and RSP that must be placed in this location to protect the facility from erosion.

Encroachment 5

This longitudinal encroachment is located between the Camino Del Rey/Olive Hill Road intersection and Sweetgrass Lane (Figure 3.13-2). This encroachment is 4.60 hectares (11.37 acres) in size and is due to the direct roadway encroachment and RSP that must be placed in this location to protect the manufactured slopes.

Encroachments Associated with the Southern Alignment Alternative

Encroachment 6

This longitudinal encroachment is associated with the Southern Alignment Alternative and is located west of Old River Road (Figure 3.13-2). This encroachment is 3.49 hectares (8.62 acres) in size and is due to the direct roadway encroachment and RSP that must be placed in this location.

Encroachment 7

This is a substantial longitudinal encroachment associated with the Southern Alignment Alternative. This encroachment is 19.44 hectares (48.05 acres) in size and is associated with the construction of this build alternative, including its bridges, roadway, side slopes, RSP, and on-site and off-site drainage facilities (Figure 3.13-2).

Encroachment Associated with the No Build Alternative

Encroachment 5

In the Encroachment 5 area, the existing SR-76 roadway is already within the base floodplain and it encroaches upon 2.28 hectares (5.64 acres) of the San Luis Rey River floodplain.

Floodplain Boundary and Water Surface Elevation

For the Existing Alignment Alternative, when compared to the 100-year floodplain, there appears to be no significant increase in the area of the flood boundary or the water surface elevation. No increase in flooding would result from the implementation of this alternative. Refer to the Final Location Hydraulic Study (October 2008) for further information.

The Southern Alignment Alternative physically encroaches into the floodplain and this portion of the proposed highway was modeled as a levee in HEC-RAS. The proposed South Mission Road Bridge, located east of Camino del Rey at River Station (RS) 13152 presents a constriction in the river. This alternative would increase the water surface elevation by as much as 0.94 meter (3 feet) upstream of the bridge. The limits of significant impacts (water surface elevation increase greater than 300 millimeters [1 foot] due to this alternative range west of Dentro De Lomas to South Mission Road from RS 11762 to RS 13617.

The Southern Alignment Alternative would require that cross culverts be used under the highway to convey flow from the creeks to the south of the project to the San Luis Rey River. The impacts from these culverts would be determined in the design phase should this alternative be chosen as the preferred alternative.

Risks of the Action

Both of the alternatives propose considerable longitudinal encroachment into the San Luis Rey River extending from Melrose Drive to South Mission Road.

The hydraulic model of the Existing Alignment Alternative ultimately determined that there would be no more than a 1-foot increase in water surface elevation due to the proposed encroachments. Therefore, the Existing Alignment Alternative does not have any significant risks associated with its implementation.

The HEC-RAS model for the early design of the Southern Alignment Alternative showed an increase in the San Luis Rey water surface elevation of up to 0.9 meter (2.95 feet). The current design of the Southern Alignment Alternative is also expected to increase the water surface elevation up to 0.94 meter (3 feet).

As a part of the risks assessment associated with the Southern Alignment Alternative, the encroachment to Moosa Canyon Creek was also analyzed. A 100-year storm event would have a backwater effect on Moosa Canyon Creek and increase the water surface from elevation 47.6 meters (157 feet) to 48.4 meters (159 feet). With this 0.80-meter (2.62-foot) increase in water surface elevation, the risk associated with the probability of flooding at Moosa Canyon Creek attributable to the Southern Alignment Alternative is considered to be high.

Impacts on Natural and Beneficial Floodplain Values

Existing Alignment Alternative (Preferred Alternative)

The five encroachments associated with the Existing Alignment Alternative impact the following natural and beneficial floodplain values: recreation/parks, water quality, plants and animals, wildlife habitat, wetlands, agriculture, and paleontology.

Southern Alignment Alternative

The three encroachments associated with the Southern Alignment Alternative impact the following natural and beneficial floodplain values: recreation/parks, water quality, plants and animals, wildlife habitat, wetlands, and agriculture.

No Build Alternative

The one existing floodplain encroachment associated with the No Build Alternative is an existing condition and has no impacts to natural and beneficial floodplain values.

Support of Incompatible Floodplain Development

Existing Alignment Alternative (Preferred Alternative)

This alternative would not support incompatible development. No new access and no direct access to the affected floodplains would be provided by the proposed alternatives. Access to the facility would be controlled, and the freeway would cross the river on structures above the floodplain elevation.

Southern Alignment Alternative

This alternative may support incompatible floodplain development. The Southern Alignment Alternative constitutes a longitudinal encroachment into the floodplain from RS 12155 at Moosa Canyon Creek to RS 13095 at Mission Road. This area would receive flow from an unnamed creek and Moosa Creek. The proposed freeway would block the flow from the river thus reducing the extent of flooding for two large portions of the existing floodplain. In turn, this could encourage future development in this area.

3.13.4 Avoidance, Minimization, and/or Mitigation Measures

Avoidance and Minimization Efforts for the Encroachment Common to the Existing (Preferred) and Southern Alignment Alternatives

Encroachment 1

In an effort to minimize this encroachment, the alignment was adjusted to the south, out of the floodplain, as much as practicable and the slopes were reduced from 4:1 (vertical to horizontal) to 2:1. Moving the build alternatives south and completely out of the floodplain at this location would have required the total acquisition of 35 homes on the north side of Ranch View Road, which lies south of SR-76. The removal of these homes and the introduction of SR-76 into the neighborhood would have substantial community impacts and would have resulted in increased noise impacts to the neighborhood. Also south of SR-76, on the hillside slopes, is an area of *ambrosia pumila* (San Diego ambrosia), a federally endangered plant, and coastal sage scrub, which is habitat for the state listed threatened *Polioptila californica californica* (coastal California gnatcatcher). Avoiding Encroachment 1 would have required large slope cuts, which would have adversely impacted the above-mentioned species. Hindering minimization efforts with design solutions is the existing Marron mitigation site, which is located immediately north of SR-76 and in the floodplain. Avoidance of this site was required, which, as a result, dictated the design and placement of the proposed alternatives, including the portion with Encroachment 1. Lastly, there is a San Diego Gas and Electric (SDG&E) 76 centimeter (30 inch), high-pressure gas line that crosses under SR-76 at this location. Avoiding Encroachment 1 would have required the relocation of the gas line, which would have required large areas of trenching in an environmentally sensitive area and the temporary disruption of gas service to large portions of San Diego County.

Avoidance and Minimization Efforts for the Encroachments Associated with the Existing Alignment Alternative (Preferred Alternative)

Encroachment 2

Spanning the San Luis Rey River without floodplain encroachment is not possible due to the bridge weight associated with concrete box-girder bridges; a one-span concrete bridge is not possible. In an effort to minimize this encroachment, the preferred bridge footing would be a cast-in-place concrete hole (CIDH) system. Preliminary design depicts a CIDH diameter of 3.0 meters (12 feet). An alternative footing system would be a 10-meter by10-meter (30-foot by 30-foot) pile footing, which would have greater direct impacts within the river.

Encroachment 3

There are several constraints that hindered the avoidance of Encroachment 3 and dictated where the alignment should be placed. To the south, the existing San Luis Rey River Bridge is a controlling feature (as mentioned above) in terms of alignment geometry. To the north and on

both sides of the existing SR-76, there are historic properties, which are also Section 4(f) resources, that required complete avoidance. The alignment in this area, therefore, had to tie into the existing bridge at one end and avoid the historic properties at the other. These constraints necessitated pushing the Existing Alignment Alternative towards the east and into the floodplain. Pushing the Existing Alignment Alternative roadway north would have increased community impacts, displaced additional businesses, and increased visual impacts due to the cut slopes that would have been required, and would have adversely impacted coastal sage scrub, the habitat for the coastal California gnatcatcher.

A design variation even farther northward was explored. This was the Groves Variation and it had two options: the Bridge Option and the At-Grade Option. Under the Bridge Option, the Existing Alignment Alternative would have traveled up and over the large hill (Groves Hill) adjacent to SR-76 and southwest of Olive Hill Road and bridged Olive Hill Road. For this option to function, a standard urban diamond interchange would have been required to tie into the bridge over Olive Hill Road. This option was eliminated from further study and withdrawn from consideration based upon engineering and environmental factors. The Bridge Option could not have been built to state and FHWA geometric standards unless the Thoroughbred Lane intersection and direct access to the Bonsall Village Center were eliminated and an alternative to provide access was incorporated into the option. In addition to adding to the project's schedule, the additional bridgework, earthwork, and commercial property acquisition would have substantially increased its cost. This option would have dramatically altered the community nature of downtown Bonsall, would have had impacts to biological resources beyond those of the Existing Alignment Alternative, and would have impacted historic properties and used Section 4(f) resources avoided by the Existing Alignment Alternative.

Under the At-Grade Option, the Existing Alignment Alternative would have cut through Groves Hill and constructed at-grade intersections at Via Montellano, Olive Hill Road, and South Mission Road. This option was eliminated from further study and withdrawn from consideration based upon engineering and environmental factors. Cutting through the Groves Hill would have generated 2.2 million cubic meters (3.0 million cubic yards) of excess fill material, the excavation of which substantially adding to the project's cost. The cut slopes produced by cutting into the Groves Hill would have created a visual impact and would have likely been unplantable, thus requiring extensive and ongoing maintenance and architectural treatment. In addition, this option would have impacted historic properties and used Section 4(f) resources avoided by the Existing Alignment Alternative.

In an effort to minimize this encroachment, slopes would be designed at 2:1 rather than the flatter 4:1.

Encroachment 4

This encroachment is due to the need to avoid historic properties, which are also Section 4(f) resources, in this area. As the alignment moves north into this encroachment area, it had to push slightly east (out into the floodplain) to avoid the first historic property and then swing back to

avoid the second historic property and also tie into the existing SR-76/Olive Hill Road intersection. In an effort to minimize this encroachment, slopes would be designed at 2:1 rather than the flatter 4:1.

Encroachment 5

Avoiding the encroachment in this area would require the alignment to move north, which would adversely impact the community by potentially displacing residents and businesses between Olive Hill Road and South Mission Road, specifically in the Bonsall Village and River Valley Shopping Center. This would have likely resulted in substantial controversy. In an effort to minimize this encroachment, the roadway geometry was optimized without compromising safe highway design standards.

Avoidance and Minimization Efforts for the Encroachments Associated with the Southern Alignment Alternative

Encroachment 6

Avoiding this encroachment would have required pushing the alignment to the east; this would have adversely affected a historic property, which is also a Section a 4(f) resource, and also required the use of a planned park, also a Section 4(f) resource. In an effort to minimize this encroachment, slopes would be designed at 2:1 rather than the flatter 4:1.

Encroachment 7

Avoiding this substantial encroachment by moving the alignment to the east, out of the floodplain, would have required the total acquisition of approximately 50 homes along Old River Road and would have displaced the Bonsall Elementary School, the community center, and the Bonsall Community Church, all of which would have adversely impacted the community of Bonsall and its cohesion. In an effort to minimize this encroachment, the roadway geometry was optimized without compromising safe highway design standards.

Avoidance, Minimization, and/or Mitigation Measures for the Impacts on Natural and Beneficial Floodplain Values

The avoidance, minimization, and/or mitigation measures for recreation can be found in Section 3.3.4, for water quality in Section 3.14.4, for wildlife in Section 3.23.4, for wildlife habitat in Sections 3.20.4 and 3.24.4, for plants in Section 3.22.4, for wetlands in Section 3.21.4, for agriculture in Section 3.5.4, for paleontology in Section 3.16.4, and for community cohesion in Section 3.6.4.

Avoidance, Minimization, and/or Mitigation Measures for the Impacts on the Floodplain Elevation

As a means of offsetting potential floodplain impacts, standard engineering practices would be used, where feasible, to facilitate drainage.

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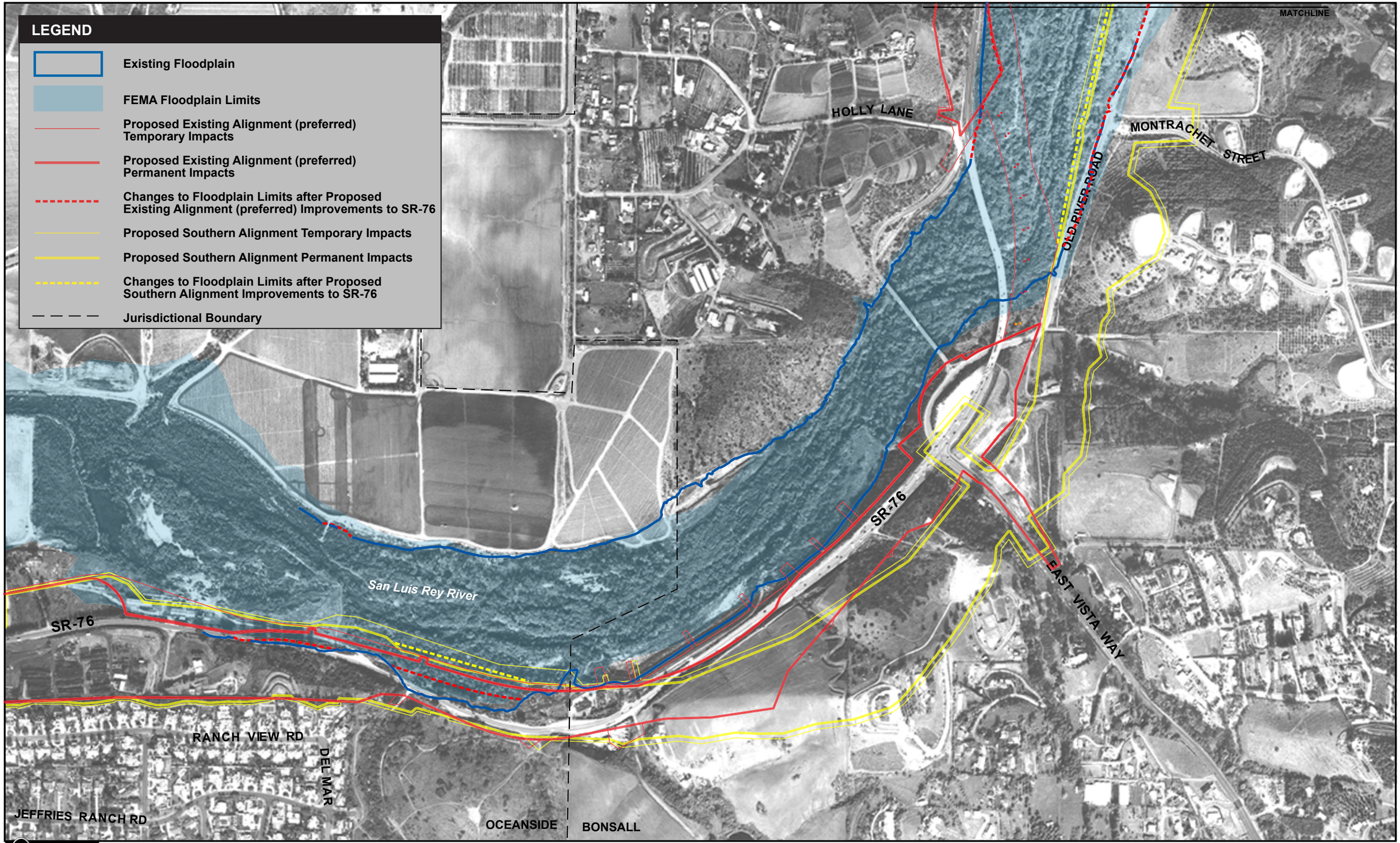
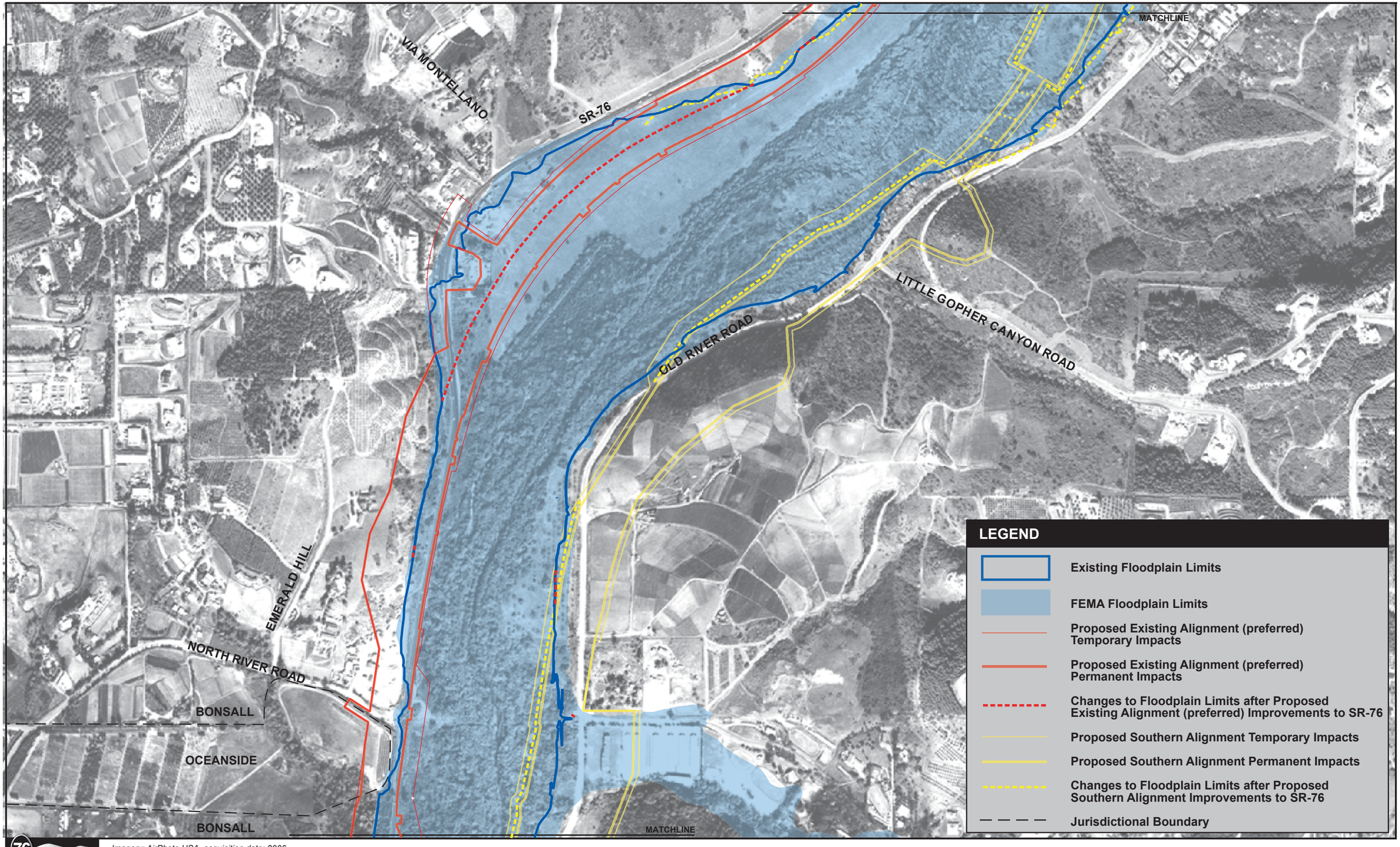


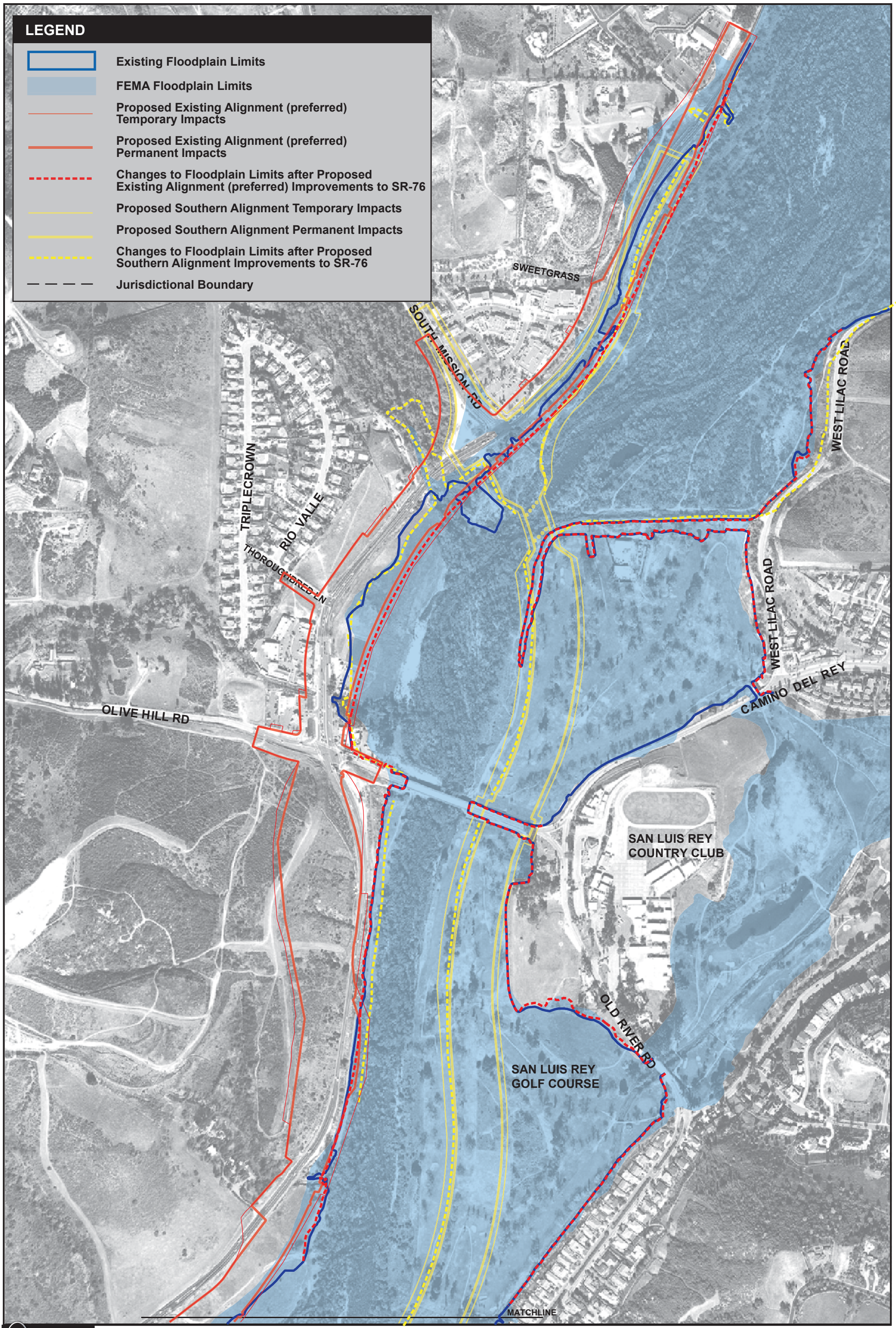
Imagery: AirPhoto USA, acquisition date: 2006

Figure 3.13-1a
Floodplain Map
with Existing Alignment and Southern Alignment Alternatives



Imagery: AirPhoto USA, acquisition date: 2006

Figure 3.13-1b
Floodplain Map
with Existing Alignment (preferred) and Southern Alignment Alternatives



Imagery: AirPhoto USA, acquisition date: 2006

State Route 76 Corridor

Figure 3.13-1c
Floodplain Map
with Existing Alignment (preferred) and Southern Alignment Alternatives

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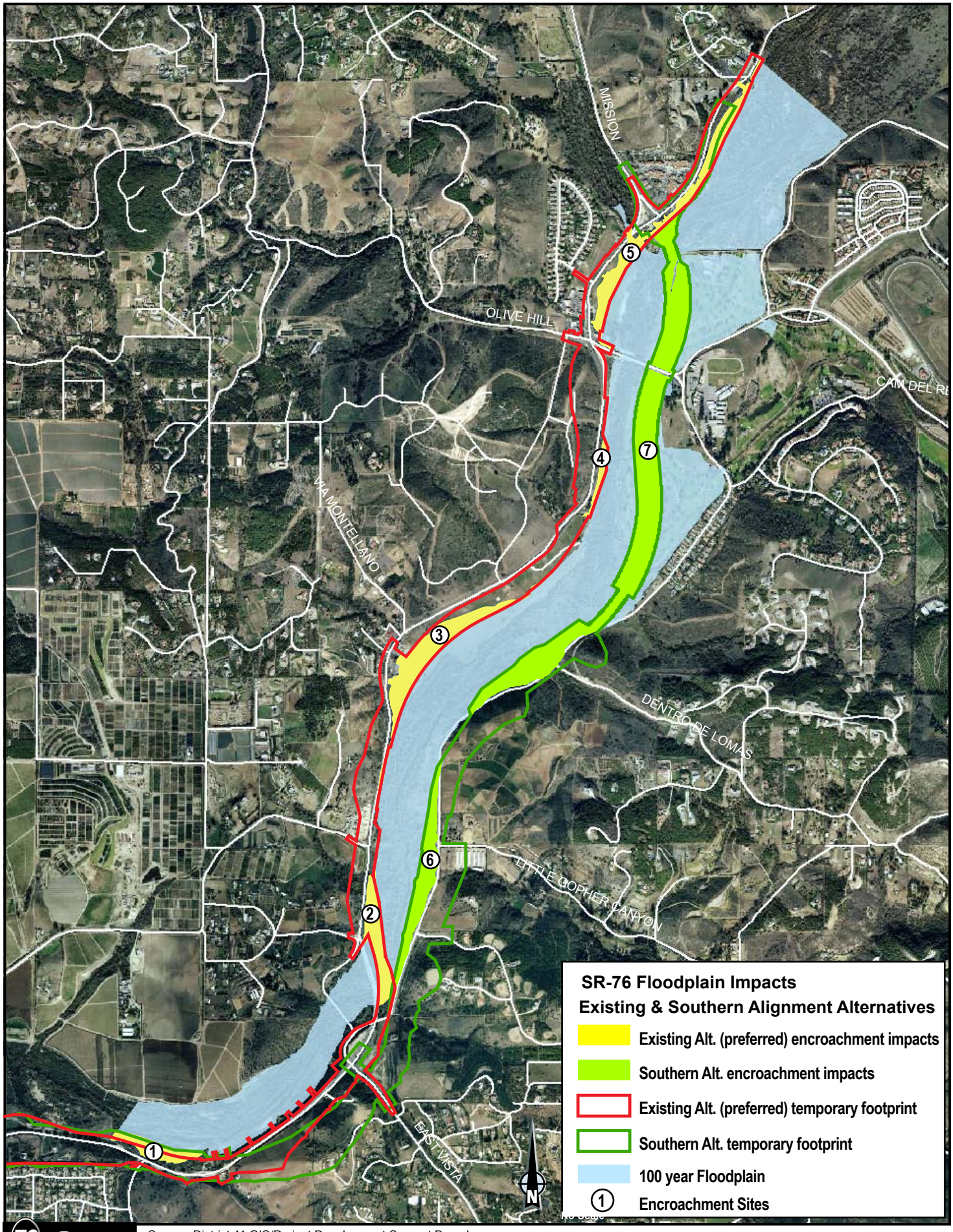

Source: District 11 GIS/Project Development Support Branch

State Route 76 Corridor

Figure 3.13-2
Floodplain Encroachments

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3.14 WATER QUALITY AND STORM WATER RUNOFF

3.14.1 Regulatory Setting

Section 401 of the Clean Water Act (CWA) requires water quality certification from the State Water Resources Control Board (SWRCB) or from a Regional Water Quality Control Board (RWQCB) when the project requires a CWA Section 404 permit. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers to discharge dredged or fill material into waters of the U.S.

Along with CWA Section 401, CWA Section 402 establishes the NPDES permit for the discharge of any pollutant into waters of the U.S. The federal Environmental Protection Agency has delegated administration of the NPDES program to the SWRCB and nine RWQCBs. The SWRCB and RWQCBs also regulate other waste discharges to land within California through the issuance of waste discharge requirements under authority of the Porter-Cologne Water Quality Act.

The SWRCB has developed and issued a statewide NPDES permit to regulate storm water discharges from all Caltrans activities on its highways and facilities. Caltrans construction projects are regulated under the statewide permit, and projects performed by other entities on Caltrans right-of-way (encroachments) are regulated by the SWRCB's statewide General Construction Permit. All construction projects over 0.41 hectare (1 acre) require a Storm Water Pollution Prevention Plan (SWPPP) to be prepared and implemented during construction. Caltrans activities less than 0.41 hectare (1 acre) require a Water Pollution Control Program.

3.14.2 Affected Environment

A Water Quality Report was completed in August 2007 and is incorporated by reference into this document. The receiving waterbody for the proposed project is the San Luis Rey River, which is located in the San Luis Rey hydrologic area, which includes Hydraulic Units 903.11 and 903.12 (Figure 3.14-1). Drainage in the project area is through the river and its associated tributaries including one unnamed creek. Surface water within the project study area flows year-round in the river and from the various tributary creeks. The project would cross these permanently flowing waterways and the floodplain. The current alignment of SR-76 is a longitudinal encroachment along the San Luis Rey River with portions extending into the floodplain. The project proposes to construct bridges, box culverts, or soft bottom culverts over the waterways impacted by project activities.

Bonsall Creek and Ostrich Creek are located along the Existing Alignment Alternative and these creeks drain south into the San Luis Rey River. Moosa Canyon Creek, Little Gopher Canyon Creek, and the unnamed creek are located along the Southern Alignment Alternative and these creeks drain north into the river.

One of the water quality objectives, imposed by Porter Cologne and established by the regional board, is to protect beneficial uses of all downstream water bodies. Existing beneficial uses in the San Luis Rey hydrologic area include Agricultural Supply; Industrial Service Supply; Rare, Threatened, and Endangered Species; Water Contact Recreation; Non-Contact Water Recreation; Warm Freshwater Habitat; and Wildlife habitat.

The San Luis Rey River is on the 2006 CWA Section 303(d) List of Water Quality Limited Segments. The waters on the list do not meet water quality standards. The law requires for waters on the list that priority rankings be established for the development of action plans, called Total Maximum Daily Loads (TMDLs), to improve the water quality. There are no effluent limits for this water body; however, the San Diego RWQCB has been working to assign Total Maximum Daily Loads (TMDLs) for the constituents of concern on this impaired water body. The 2006 CWA Section 303(d) List of Water Quality Limited Segments describes the impairments, potential sources, and TMDL priority for the San Luis Rey River as shown in Table 3.14-1 along with the other impaired water bodies located within Hydrologic Units 903.11 and 903.12.

Table 3.14-1
TMDLs and 303(d) Listed Waterbodies in Hydrologic Units 903.11 and 903.12

Name	Pollutant/ Stressor	Potential Source	TMDL Priority	Estimated Size Affected	Comments
Guajome Lake	Eutrophic	Nonpoint/Point Source	Low	13 ha (33 ac)	
San Luis Rey Hydrologic Unit	Bacteria Indicators	Nonpoint/Point Source	Low	0.79 km (0.49 mi)	Impairment located at San Luis Rey River Mouth
San Luis Rey River	Chloride	Unknown Nonpoint Source	Low	30.5 km (19 mi)	Impairment located at lower 21 km (13 mi)
		Unknown Point Source			
		Urban Runoff/Storm Sewers			
San Luis Rey River	Total Dissolved Solids	Agriculture-Storm Runoff	Low	30.5 km (19 mi)	
		Flow Regulation/ Modification			
		Golf Course Activities			
		Industrial Point Sources			
		Natural Sources			
		Surface Mining			
		Unknown Nonpoint Source			
		Unknown Point Source			
		Urban Runoff/Storm Sewers			

These water conditions are present within the SR-76 Melrose Drive to South Mission Road project area and the South Mission to I-15 project limits, since both projects are located downstream of the impairment locations.

3.14.3 Impacts

The proposed project would have a variety of water quality effects. With the inclusion of Best Management Practices (BMPs), the project would not substantially affect the water quality on the area either on a short-term basis or a long-term basis.

Existing (Preferred) and Southern Alignment Alternatives

The proposed project would add additional surface paving area, change the existing two-lane facility to a four-lane facility, and potentially increase total or peak runoff discharges. New construction may have an effect on downstream channel stability through changes in the rate and volume of runoff; the sediment load due to changes in the land surface; and other hydraulic changes from stream and/or creek encroachments, crossings, or realignment.

The existing paved width is approximately 7.3 meters (24 feet) with wider sections at the intersections. The proposed paved width, including shoulders and lanes, would be 25 meters (82 feet) wide, with wider sections at the intersections. A large portion of the alignment is located along the current alignment, reducing the overall increase in impervious surfaces.

Measures that attempt to mimic the natural conditions, to the maximum extent practicable, and to improve the water quality would be implemented. Water coming from off-site would not commingle with water coming from on-site to ensure that roadway runoff is treated to the maximum extent possible. In addition, this would allow for point source issues to be easily identified. The standard practice of BMP implementation and the proposed use of bioswales and biostrips using native species would result in no impacts to existing water quality.

Drainage swales are proposed to run the length of the project along both sides of the alignment. Exceptions to this would be at intersections, across bridges and structures, the median area and a few locations where adjacent development or environmentally sensitive areas make installation prohibitive. In these locations, swales could not be accommodated. Bioswales would be located within the flow line of the drainage swales. The appropriate distance upstream from the inlet would be considered for each bioswale, which would be planted with native plants to maximize removal of pollutants from roadway runoff. Biostrips would run along the edge of the road in the same areas as the drainage swales so water flowing from the road would flow across the biostrip. Figure 2.1-2 illustrates projected runoff flow directions from the proposed project. The detailed design process may adjust the locations of the inlets and bioswales and biostrips. As part of final design, a Storm Water Data Report (SWDR) would be prepared to identify specific locations for identified BMPs. As proposed, the facility would treat 65 to 70 percent of the newly paved surface. Therefore, the treated area would approximately equal the net incrase in paved areas, and no increase in untreated runoff from current conditions is anticipated.

BMPs are designed and implemented to reduce the discharge of pollutants from the storm drain system to the maximum extent practicable (MEP) for post-construction runoff. Construction performance standards used to control discharge of pollutants from regulated construction projects would be achieved by employing best conventional technology (BCT) and best available technology (BAT). The proposed project would use a combination of Technology-based Pollution Prevention, Construction, and Treatment, to be defined in detail in the SWDR. For the operational phase, maintenance BMPs that meet the required standards would be implemented.

The proposed project may have potential short-term impacts to water quality during construction activities due to soil disturbance. Potential pollutants of concern include vehicle fluids, oil, trash, and debris, which would require construction BMPs to prevent runoff into any local water body. Construction BMPs would be implemented to ensure that the potential for any constituent to discharge to the storm drain or other conveyances are minimized. All six categories of temporary BMPs would be implemented and the contractor would be required to develop and implement a SWPPP, which would incorporate not only BMPs included in the contract plans but additional BMPs selected by the contractor.

No Build Alternative

There are no impacts associated with the No Build Alternative.

3.14.4 Avoidance, Minimization, and/or Mitigation Measures

The project proposes to avoid some of its adverse impacts to the river from cut and fill slopes by using project designs that may move the highway away from the river in some areas. Complete avoidance is not practicable.

BMPs would be implemented to address water quality impacts during the planning, design, construction, operation, and maintenance stages of the proposed project. These would minimize impacts to water quality. The statewide Storm Water Management Plan (SWMP) describes how Caltrans would comply with the provisions of the NPDES Permit (Order 99-06-DWQ). Several design iterations were investigated during project development to minimize impacts to the river and floodplains. As part of the evaluations, pollution prevention, treatment, and construction BMPs were evaluated and would be incorporated into project plans to minimize the potential for nonpermitted discharges.

The SWMP describes the program that Caltrans would implement to reduce the discharge of pollutants to the storm water drainage system that serves the highway and highway-related properties, facilities, and activities. The SWMP divides the BMPs into separate categories from the planning and design phase to the operational and maintenance phase.

Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures that improve storm water quality after construction is completed.

During the project development process, expected storm water runoff onto the project site would be calculated and where possible appropriate control measures (such as gravel bag berms to stop concentrated flow and sediment) would be implemented to convey concentrated flows around or through the site in a manner that would not cause additional erosion.

Caltrans would implement appropriate measures to ensure that runoff from SR-76 would not adversely increase downstream effects. During the design phase, Caltrans often incorporates additional surface paving, as needed, to enhance the operational safety and functionality of a facility. Any area requiring additional paving would be designed to keep it to a practical minimum to reduce project costs and driver confusion.

Where an increase in paved surfacing leads to an increase in total or peak runoff discharges, a thorough evaluation is performed to determine if any adverse impacts would result. If increased runoff would result in an increased potential for downstream impacts to channels, Caltrans would consider the following:

- Modifications to channel (both natural and man-made) lining materials, including vegetation, geotextile mats, rock and riprap;
- Energy dissipation devices at culvert outlets;
- Smoothing the transition between culvert outlets/headwalls/wing walls and channels to reduce turbulence and scour; and
- Incorporating retention or detention facilities to reduce peak discharges.

Construction Site BMPs

Preservation (to the maximum extent possible) of existing vegetation is recommended to provide erosion and sediment control benefits. Temporary BMPs (soil stabilization, sediment control, wind erosion control, tracking control, non-storm water management, and waste management and materials pollution control) would be implemented to contain both storm water and non-storm water discharges during construction.

Maintenance BMPs

Caltrans' maintenance division performs various maintenance activities on different facilities to ensure safe and usable conditions for the public. Most of the maintenance activities would involve small crews with minimal soil disturbance.

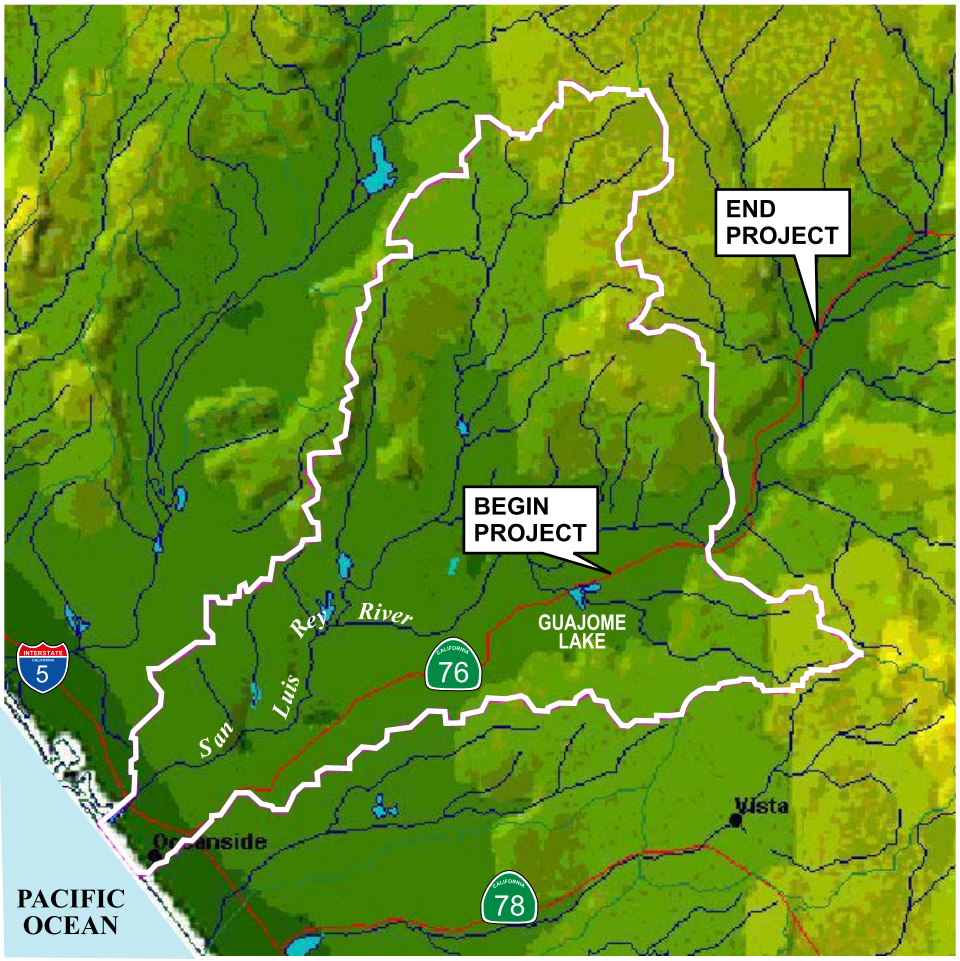
Potential pollutants of concern, which could result from Caltrans maintenance activities, may include petroleum products, sediments, trash and debris, metals, acidic/basic materials, nutrients,

solvents, waste paint, herbicides, pesticides, and others. Many of these potential pollutants can be prevented from being discharged into and via the storm water drainage systems by selecting and implementing BMPs appropriate for the activity being conducted.

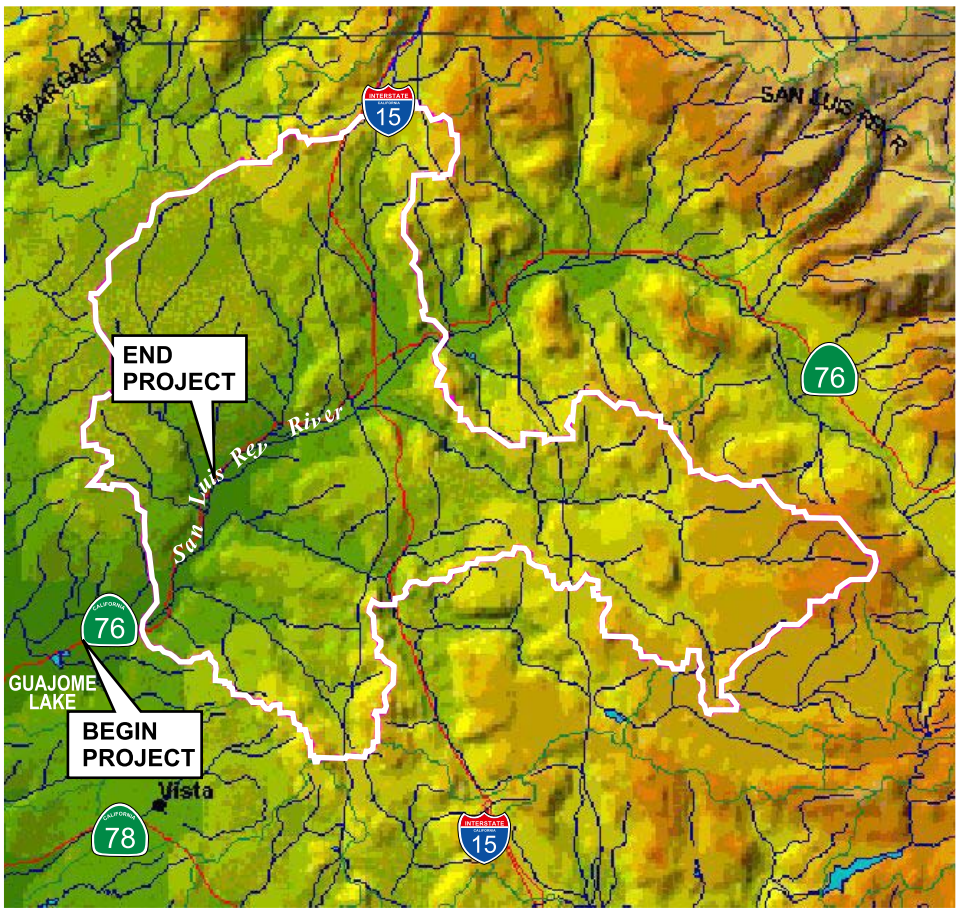
Treatment BMPs

As required by the SWMP, treatment BMPs (biofiltration (strips/swales), infiltration devices, detention devices, traction sand traps, media filters, multi-chamber treatment, wet basins, dry weather flow devices, and gross solid removal devices) must be considered for this project. The approved treatment BMPs above are considered to be technically and fiscally feasible and Caltrans has found them to be constructible, maintainable, and effective at removing pollutants to the maximum extent practicable. Treatment BMP evaluation is required by completing the Storm Water Data Report (SWDR) located in Appendix E of the Project Planning and Design Guide (PPDG). Based on this evaluation, treatment BMPs will be incorporated into the design. Treatment BMPs are chosen based on the impairment of the receiving water body. If biofiltration (strips and/or swales) is chosen, vegetated swales will be incorporated upstream of drain inlets to treat roadway run off. As design progresses, the exact locations will be evaluated to determine if incorporation is feasible based on right-of-way or environmental constraints. Sustainable and environmentally acceptable vegetative growth will be coordinated with the District Erosion Control Specialist, District Biologist and District Landscape Architect to meet the water quality objective as well as provide harmony with the landscape plant palette. Treatment BMP design and implementation would be completed as required by the SWDR. As the project progresses through design, the locations of the treatment BMPs would be further evaluated to determine whether they can be incorporated or rejected due to right-of-way or environmental constraints. Sustainable and environmentally acceptable vegetation would be coordinated with the District Erosion Control Specialist, District Biologist, and District Landscape Architect to meet the water quality objective as well as provide harmony with the landscape plant palette.

Provisions included in TransNet II require the proposed SR-76 project to provide a "Net Benefit." The proposed SR-76 project would implement treatment of runoff from the roadway. If the proposed treatment contributes to water quality improvements in the San Luis Rey River, this may be seen as a Net Benefit.



Hydrologic Unit 903.11



Hydrologic Unit 903.12

Figure 3.14-1
San Luis Rey Hydrologic Areas

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3.15 GEOLOGY AND SOILS

3.15.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under CEQA.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Caltrans' Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. The current policy is to use the anticipated Maximum Credible Earthquake (MCE), from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

3.15.2 Affected Environment

A Preliminary Geotechnical Report, dated December 2006, was prepared for this project and is incorporated by reference. The San Luis Rey River Valley is a broad east-west-trending valley that begins in the granitic hills of the Peninsular Ranges in the east then opens to coastal terraces near the ocean. The floor of the river valley is a flat floodplain ranging from 200 meters (656 feet) to over 1 kilometer (0.6 mile) in width with a river slope less than 0.3 percent. The San Luis Rey River is considered ephemeral and is historically prone to flooding. Numerous small stream valleys are tributaries to the river and cover an area of about 1,463 square kilometers (630 square miles). Construction of the Lake Henshaw Dam in 1923, at the eastern limits of the San Luis Rey River, has caused a considerable decrease in peak storm flows. However, the river flow has become perennial due to upstream irrigation, domestic runoff, and wastewater disposal. The highway cross drainage from tributary streams is currently accomplished through box or buried culverts.

SR-76 is generally located along the edge of the San Luis Rey River floodplain and, in some areas, is within the base floodplain. The roadway slope is mild, with some slopes occasionally approaching 4 percent due to the relatively flat valley bottom.

There are at least 19 soil series found within the project area. Many of the soils are described as having severe erodibility characteristics while several others are described as having high shrink/swell characteristics.

As noted above, the project area lies within the Peninsular Ranges Geomorphic Province of California. Along the proposed project corridor, the terrain is predominately composed of the following geologic units: artificial fill, river valley alluvium, colluvium, sedimentary Santiago Formation, and igneous granitic rock.

Slopes and Site Geology

Natural slopes in the project area range from very gentle to about 1:1 (vertical to horizontal). Locally steeper natural slopes exist where the river has eroded into the southern flank of the valley. Tall natural slopes are generally inclined no steeper than 1:1 but are generally 1:2.5 or flatter. The natural slopes are generally composed of highly weathered granitic rock, residual soils, colluvium, and alluvium. Generally, the residual, colluvial, and alluvial soils are derived from decomposed granitic source material. A few slopes are composed of sedimentary rock. The natural slopes appear stable against deep-seated landslides and erosion. Features consistent with ancient or recent deep-seated landsliding were not observed during the geologic mapping of the project corridor. There is a potential for minor, shallow slope instabilities in the form of rockslides, rockfalls, and rock rollouts originating from steeper cuts and natural slopes. These shallow instabilities can be addressed by engineered slope designs.

Cut slopes along the roadway expose soft sedimentary rock, weathered granitic rock, and colluvium. Cut slopes range from 1:2 (or flatter) to as steep as 1.5:1 (56°) and cut heights range up to 12 meters (39.4 feet). The existing cut slopes are stable; however, exposed colluvial materials frequently exhibit erosional rilling, raveling, and sloughing.

Existing highway fill slopes encroach on the boundaries of the San Luis Rey River floodplain and span the openings of small tributary stream valleys. Fill slopes are generally inclined at about 1:2 and composed of locally derived decomposed granitic soil. The existing fill slopes tend to be no greater than 10 feet in height and are stable.

Natural and anthropogenic earth materials occurring along the project corridor are composed of artificial fills, river valley alluvium, colluvium, sedimentary soft rock of the Santiago Formation, and various types of Granitic rocks. Within the project limits, sandstones, siltstones, and mudstones represent the Eocene Santiago Formation. The granitic rocks range from gabbro to granite and vary from decomposed, extremely weak rock to fresh, very strong rock.

Water

The primary surface water feature is the San Luis Rey River. For most of the year, the San Luis Rey River is a small meandering stream, which can rise and swell in response to significant storms and during extended rainy periods affecting its watershed. Several portions of the existing and proposed highway embankments extend into the base floodplain.

Seismic

San Diego County rides atop the eastern portion of the Pacific Plate, grinding along the edge of the North American Plate, and is characterized by active northwest-trending faults and associated seismicity. Major faults near the proposed project include the San Andreas, San Jacinto, Elsinore, Coronado Banks, and the San Diego Trough Fault Zones. Ground shaking due to nearby and distant earthquakes should be anticipated during the life of the highway facility.

There are no known faults within the project area and ground surface rupture due to faulting is considered unlikely.

Saturated loose sand and silt under strong ground shaking have the potential for the loss of shear strength that may lead to soil liquefaction, which is a major concern for the stability of bridges due to the potential for lateral spreading near the abutments.

3.15.3 Impacts

Existing (Preferred) and Southern Alignment Alternatives

For roadways and slopes, cut slopes may have heights as high as 35 meters (114 feet) while fill slopes may be as high as 14 meters (46 feet). Cut slopes in the weathered granitic rock developed at slope ratios steeper than 1:2 may require some form of rockfall protection. Generally, this need increases with increasing cut slope ratios.

Groundwater would not adversely affect the proposed project. Groundwater that may be encountered along portions of the proposed project includes the subsurface water that occurs adjacent to creeks, streams, and the San Luis Rey River, as well as subsurface water contained within the river valley's soils and fractured rock.

Structure and embankment foundation elements would be chosen and designed based upon the specific site conditions. Foundation design would consider bearing capacity, settlement, liquefaction, lateral spread, corrosivity, scour, and constructability. Construction operations would implement measures to temporarily preclude the entrance of groundwater into excavations and to prevent groundwater from adversely affecting foundations and their construction. The actual measures implemented would be site/operation specific and typically are at the option of the contractor. Typical methods used to control groundwater include visqueen-lined diversion channels, pipe-lined diversion channels, sheet piling, coffer dams, localized water table draw-down facilitated by pump arrays and/or well points, cutoff walls, and/or underdrains.

Drilled shafts would be developed through the use of casings or with the use of slurries composed of bentonite or polymer drilling fluids. Drilling fluids simultaneously preclude subsurface water from entering a drilled shaft and stabilize shaft walls. Drilling fluids are contained within a closed circuit system, which precludes release to surface waters and facilitates reuse of the drill fluids. Upon completion of the work, drill fluids would be pumped into tankers and transported to appropriate disposal facilities.

Reinforced concrete structures and culvert design would be appropriate to site conditions. Conditions conducive to soil loss (by scour or piping) from around and beneath structure footings would be minimized through appropriate type-selection and design. The use of burrito drains (under-drains) and filter fabrics would be used to preclude the piping of soils and to provide drainage paths for subsurface water. At locations where foundation soils are observed to resist compaction efforts due to the development of transient hydrostatic pressures (pumping

soils) the soils would either be overexcavated, drained, and/or bridged by drainage blankets and/or geotextiles.

Site corrosivity characteristics would be evaluated during the geotechnical design investigation. Concrete-mix design and culvert selection would be based upon site conditions.

Addressing the different components of the proposed project with these design features would minimize the affect of groundwater on the project.

Conversely, the project would not adversely affect groundwater. The same measures used to dewater excavations and facilitate construction would also isolate ground and surface waters from construction activities that could compromise water quality. Dewatering activities would occur in compliance with General Waste Discharge requirements and NPDES Permit requirements (Order No. R9-2008-0002, NPDES No. CAB 919002). BMPs would be implemented to mitigate and control construction activity impacts. BMPs would include desilting basins, silt fences, filter fabrics, trench drains, provisions to prevent equipment from entering or crossing water bodies, specified cleanout and equipment staging locations, and any necessary water treatment.

Finally, to the extent possible, construction staging would include provisions to avoid working in areas affected by seasonal (rainy season) high-water to further protect water quality

Existing Alignment Alternative (Preferred Alternative)

The San Luis Rey River Bridge was constructed in 1990 and is an eight span, prestressed concrete, continuous, multiple box, beam bridge. The bridge is founded on footings and piles that extend through alluvium and eventually into granitic rock foundation material. The existing bridge would be maintained with construction of a parallel structure to accommodate eastbound traffic. Settlement and scour are potential design concerns at this location. Groundwater may impact foundation elements.

The Bonsall Creek Bridge was constructed in 1925 and was widened in 1981 and again in 2002. The bridge is a double cell, reinforced concrete box (RCB). The bridge is located where river alluvium overlays granitic bedrock. This bridge would be modified and lengthened. Settlement and scour are design concerns at this location and groundwater may impact the bridge's foundation elements.

The Ostrich Farm Creek Bridge was constructed in 1925 and was widened in 1977. It is a four cell RCB. Based upon surface mapping, this bridge is founded on alluvium over granitic bedrock. A new bridge would be constructed in this location. Settlement and scour are potential design concerns at this location and groundwater may impact foundation elements.

Southern Alignment Alternative

The Little Gopher Canyon Creek Bridge is a single span, reinforced T-Beam structure and its foundations appear to be founded on granitic rock. A new bridge would be constructed to the west of the existing structure. The new bridge foundations would be on level grade upon weathered granitic rock. Settlement and scour are potential design concerns at this location and groundwater may impact foundation elements.

A new bridge, the Moosa Canyon Creek Bridge, is proposed to cross Moosa Canyon Creek. The new abutments and bents would be within the base floodplain and placed in river deposits over granitic rock. Settlement and scour are potential design concerns at this location and groundwater may impact foundation elements.

A new bridge, the South Mission Road Bridge, is proposed that would connect South Mission Road and the current SR-76 roadway. The new abutments and bents would be within the base floodplain and would be placed within river deposits over granitic rock. Settlement and scour are potential design concerns at this location and groundwater may impact foundation elements.

No Build Alternative

The No Build Alternative would not modify or reconstruct any bridge structures within the proposed project corridor. This alternative would not impact groundwater nor would it cause additional settlement or scour conditions since no new bridges would be constructed. Regular maintenance of the structures, roadway, and drainage facilities would continue.

3.15.4 Avoidance, Minimization, and/or Mitigation Measures

Steep slopes may require rock fall mitigation, which may include additional set back area near the traveled way, rock bolts, slope drapes, or rock fall barriers.

If potentially liquefiable materials such as loose saturated sand and silts are encountered, a liquefaction analysis would be performed to evaluate the potential for liquefaction at the site.

Seismic settlement may exert a down drag force on pile foundations and adjacent structures. The magnitude of the settlement should be estimated and foundation mitigation would be considered on a case-by-case basis for the various bridge foundations.

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3.16 PALEONTOLOGY

3.16.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized or funded projects. (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1935 [20 USC 78].

Under California law, paleontological resources are protected by CEQA; the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309; and Public Resources Code Section 5097.5.

3.16.2 Affected Environment

A Paleontological Report was prepared for this project dated October 2005 and it is incorporated by reference. Paleontological resources (i.e., fossils) are the remains and/or traces of prehistoric plant and animal life. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits (rock formations) within which they were originally buried. For the purposes of this report, paleontological resources can be thought of as including not only the actual fossil remains but also the collecting locations and the geologic formations containing those locations.

Existing Conditions

The research and published geologic maps indicate that the proposed project area is underlain by geologic units, including undivided tonalite of Cretaceous age, undivided granidiorite of Cretaceous age, tonalite of Couser Canyon (Cretaceous age), Santiago Formation of Eocene age, active alluvial floodplain deposits of late Holocene age, and active wash/stream deposits of late Holocene age. No evidence was found during the field survey that the Santiago Formation lies under the proposed project area but it does occur just west of the project limits and would not be impacted by project activities. Unfossiliferous tonalite, granidiorite, recently deposited floodplain, and stream channel deposits are too young to contain fossils; however, these geologic units lie under the project area. Pleistocene-age older alluvium is not mapped as occurring within the proposed project area; however, it was observed during the field survey.

The paleontological resources within the proposed project area contain exposed older alluvial deposits along SR-76. The older alluvial deposits in that geologic unit have the potential to contain paleontological resources. Older alluvial deposits were also identified as occurring just along SR-76 at Bonsall but could not be verified due to coverage by existing commercial construction. It is also possible that project excavations could impact previously unrecognized older alluvial sediments that may be along the San Luis Rey River valley.

During the records search of the San Diego Natural History Museum (SDNHM), site records indicate that 15 previously recorded fossil collecting locations occur within a 3.2-kilometer (2-mile) radius of the proposed project. Twelve were discovered in older alluvium of the late Pleistocene age within the proposed project area. Fossils collected from these locations include bones, teeth of extinct capybara, horse, mammoth, and mastodon. Discovery of fossils just to the west of the proposed project, within the San Luis Rey River valley, and at other locations in San Diego County, indicates a high potential for fossil occurrences in this type of older alluvial deposits.

3.16.3 Impacts

Direct impacts to paleontological resources occur when earthwork, such as mass grading operations, cut into the geological formations in which fossils are buried. These direct impacts are in the form of physical destruction of fossil remains. Since fossils are the remains of prehistoric animal and plant life, they are considered nonrenewable resources.

Existing (Preferred) and Southern Alignment Alternatives

Older Alluvial Deposits

These are types of sedimentary rocks formed of coarse-grained, gravelly sandstone; pebble and cobble conglomerate; and claystone, which occur along the margins of many of the larger coastal valleys in San Diego County.

Older alluvial deposits, which have the potential to contain fossils, were observed near the western end of the project along the common alignment for both the Existing and Southern Alignment Alternatives.

Along the Existing Alignment Alternative, the proposed project crosses older alluvium deposits that have been mapped near Bonsall.

The Southern Alignment Alternative does not appear to cross older alluvium and is not anticipated to impact older alluvium. Impacts could be minimized by implementation of the mitigation measures listed below.

Active Alluvial Floodplain and Wash/Stream Deposits

The floor of modern stream drainages in San Diego County are poorly consolidated alluvial sediments of relatively recent age. These types of rock consist of poorly consolidated clay, silt, sand, and gravel, which were laid down by seasonal streams.

No adverse impacts on paleontological resources are anticipated to occur as the result of excavations in younger (Holocene age) alluvial deposits (engineering stations 180 to 185).

Undivided Tonalite, Undivided Granidiorite, and Tonalite of Couser Canyon

These are types of igneous rock of the Cretaceous age that are part of the northern end of the Peninsular Ranges Batholith. These rocks formed from molten magma deep within the earth's crust at high pressures and high temperatures and are not expected to contain paleontological resources.

No adverse impacts on paleontological resources are anticipated to occur as the result of project excavations in igneous rock units.

No Build Alternative

The No Build Alternative would not impact any paleontological deposits.

3.16.4 Avoidance, Minimization, and/or Mitigation Measures

A qualified paleontologist would be at the preconstruction meeting to consult with the grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues. A qualified paleontologist is defined as an individual with an M.S. or Ph.D. in paleontology or geology who is familiar with paleontological procedures and techniques, who is knowledgeable in the geology and paleontology of San Diego County, and who has worked as a paleontological mitigation project supervisor in the county for at least 1 year.

A paleontological monitor would be on-site on a full-time basis during the original cutting of previously undisturbed deposits of moderate paleontological resource sensitivity (older alluvial deposits) to inspect exposures for contained fossils (between Melrose Drive to just east of Jeffries Ranch Road in Oceanside and at Bonsall). Because there is also the possibility that previously unrecognized older alluvial deposits could occur, the paleontological monitor would spot-check the project corridor for occurrences of older alluvium during grading. The paleontological monitor would work under the direction of a qualified paleontologist. A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials.

When fossils are discovered, the paleontologist (or paleontological monitor) would recover them. In most cases this fossil salvage can be completed in a short period of time. However, some fossil specimens (such as a complete large mammal skeleton) may require an extended salvage period. In these instances the paleontologist (or paleontological monitor) would be allowed to temporarily direct, divert, or halt grading to allow recovery of fossil remains in a timely manner. Because of the potential for the recovering of small fossil remains, such as isolated mammal teeth, it may be necessary to set up a screen-washing operation on the site.

Fossil remains collected during monitoring and salvage would be cleaned, repaired, sorted, and cataloged as part of the mitigation program.

Prepared fossils, along with copies of all pertinent field notes, photos, and maps would be deposited (as a donation) in a scientific institution with permanent paleontological collections such as the SDNHM. Donation of fossils would be accompanied by financial support for initial specimen storage.

A final summary report would be completed that outlines the results of the mitigation program. This report would include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, and significance of recovered fossils.

3.17 HAZARDOUS WASTE/MATERIALS

3.17.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as "Superfund," is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety & Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of RCRA, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

3.17.2 Affected Environment

A Hazardous Waste Report was prepared for this project, dated October 2006, and is incorporated by reference.

Existing (Preferred) and Southern Alignment Alternatives

The Zwierstra Dairy was used as a dairy approximately 10 years ago. Hazardous waste studies indicated that there are isolated pockets of total petroleum hydrocarbons in shallow soil less than 4 feet deep. There is also undocumented fill and debris piles on-site. Pesticides were detected in a soil sample. Groundwater contained limited concentrations of methyl tertiary butyl ether (MTBE).

The Marron mitigation parcel was subject to hazardous waste investigations in 2002. Prior to being a mitigation site, this parcel was used as a gravel facility. Petroleum hydrocarbons were detected in shallow subsurface soil with concentrations up to 2,200 milligrams per kilogram. Some of the petroleum hydrocarbon impacted soil was removed during construction of the mitigation site but some remains.

Existing Alignment Alternative (Preferred Alternative)

Investigations at J.J. Automotive indicated that this facility has been used as an auto repair/sales facility since the 1990s. Petroleum hydrocarbons were detected in shallow soil in the vicinity of the auto repair area. Approximately 306 cubic meters (400 cubic yards) of this soil is within the alignment's footprint. Due to subsurface conditions, groundwater was not encountered nor sampled.

Investigations at Argo Stone and Supply Company indicated the presence of an aboveground diesel storage tank with some associated, shallow, diesel-impacted soil in the vicinity of the tank. Groundwater contained concentrations of MTBE that were below regulatory standards. Pesticides do not appear to be of concern.

Background investigations demonstrated that the ARCO service station located at SR-76 and Olive Hill Road is listed by the County of San Diego Department of Environmental Health as having an open, leaking underground storage tank case. MTBE was detected in soil and groundwater beneath this parcel. Further investigations indicated a low potential for encountering MTBE in soil and groundwater within the existing state right-of-way.

The parcel on the northeast corner of SR-76 and the Camino Del Rey/Olive Hill Road intersection has two dispenser islands, associated fill ports, and underground storage tank(s) on-site. Information received from the Site Assessment and Mitigation Program at the San Diego County of Environmental Health indicates that the underground storage tanks have never been permitted nor used, and are not listed on government agency hazardous waste data sheets. Therefore, encountering petroleum hydrocarbon impacts to soil and/or groundwater is not anticipated. The underground storage tanks would be removed, upgraded, or replaced in accordance with federal, state, and local regulations prior to construction.

Southern Alignment Alternative

Beyond the Zwierstra Dairy and the Marron mitigation parcel, which are common to both build alternatives, records searches and field investigations did not locate additional sites with hazardous waste or materials, the use of underground or aboveground storage tanks or dispenser islands, or soil areas with pesticide concentrations exceeding regulatory standards.

3.17.3 Impacts

Existing (Preferred) and Southern Alignment Alternatives

Both of the build alternatives would impact the Zwierstra Dairy and therefore the impacted soil and undocumented fill and debris piles.

Both of the build alternatives avoid the Marron mitigation parcel. In the unforeseen circumstance that the contamination associated with this site is impacted by either alternative, the measures outlined in Section 3.17.4 below would be followed.

Existing Alignment Alternative (Preferred Alternative)

This alternative would impact approximately 306 cubic meters (400 cubic yards) of the contaminated soil on the J.J. Automotive parcel.

This alternative would impact the contaminated soil and the storage tanks associated with the Argo Stone and Supply Company.

This alternative avoids the ARCO service station but investigations indicated a low potential for encountering MTBE in soil and groundwater within the existing state right-of-way.

This alternative would directly impact the parcel on the northeast corner of SR-76 and the Camino Del Rey/Olive Hill Road intersection with the dispenser island, fill ports, and underground storage tank(s). The tanks are not on any government agency record lists and therefore have a low potential for petroleum hydrocarbon impacts to soil and groundwater.

No Build Alternative

The No Build Alternative would not impact any areas with potentially contaminated soils.

3.17.4 Avoidance, Minimization, and/or Mitigation Measures

Impacted sites identified above could not be avoided by the project without resulting in additional impacts to other resources, such as sensitive archaeological, Section 4(f), and biological resources.

Existing (Preferred) and Southern Alignment Alternatives

Zwierstra Dairy: The petroleum hydrocarbon-impacted soils from this site would require chemical characterization and subsequent disposal or reuse as fill material prior to construction or mitigation. The undocumented fill and debris piles on-site would require further chemical characterization prior to construction or mitigation to determine the potential for reuse or the proper disposal method. If the undocumented fill material is left in place, further characterization would not be necessary. If dewatering is performed at this parcel, an NPDES permit would be required for discharge of water (Order No. R9-2008-0002, NPDES No. CAG919002). The preliminary estimate for hazardous waste cleanup of this parcel is approximately $50,000.

29750 Mission Road: If contaminated soil is encountered, it should be further characterized, followed by an evaluation to determine if it can be reused or disposed. The preliminary estimate for hazardous waste cleanup of this parcel should contamination be encountered is approximately $20,000.

A Health and Safety Plan would be required for working with the impacted soils at the above referenced locations.

Existing Alignment Alternative (Preferred Alternative)

J.J. Automotive: The petroleum hydrocarbon-impacted soil should be removed from the auto repair area to render this parcel clean with regard to hazardous waste issues or materials. This soil may be disposed at a Class II or III landfill, or reused as fill material beneath the proposed roadway with approval and under permit from the RWQCB. The preliminary estimate for hazardous waste cleanup of this parcel is approximately $50,000.

Argo Stone and Supply Company: The shallow, diesel-impacted soil in the vicinity of the tank would require cleanup prior to construction. The aboveground storage tank should be removed and properly disposed prior to construction. If dewatering is performed on this parcel, an NPDES permit would be required (Order No. R9-2008-0002, NPDES No. CAG919002) for discharge of water. The preliminary estimate for hazardous waste cleanup of this parcel is approximately $50,000.

ARCO service station: avoidance of groundwater is recommended. If groundwater is encountered, sampling (for petroleum hydrocarbons and MTBE), treatment, and/or proper disposal would be required under an NPDES permit (Order No. R9-2008-0002, NPDES No. CAG919002). The preliminary estimate for hazardous waste cleanup of this parcel is approximately $50,000.

Parcel on the northeast corner of SR-76 and the Camino Del Rey/Olive Hill Road intersection: Avoidance of this parcel is recommended. If this parcel is impacted for widening activities, the tanks should be removed in accordance with federal, state, and local regulations prior to

construction. The preliminary estimate for hazardous waste cleanup of this parcel is approximately $40,000 to $60,000.

A Health and Safety Plan would be required for working with the impacted soils at the above referenced locations.

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3.18 AIR QUALITY

3.18.1 Regulatory Setting

The Clean Air Act as amended in 1990 is the federal law that governs air quality. Its counterpart in California is the California Clean Air Act of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2).

Under the 1990 Clean Air Act Amendments, the USDOT cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the State Implementation Plan (SIP) for achieving the goals of the Clean Air Act requirements. Conformity with the Clean Air Act takes place on two levels—first, at the regional level and second, at the project level. The proposed project must conform at both levels to be approved.

Regional level conformity in California is concerned with how well the region is meeting the standards set for CO, NO_2, O_3, and PM. California is in attainment for the other criteria pollutants. At the regional level, RTPs are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization, such as SANDAG for San Diego County and the appropriate federal agencies, such as FHWA, make the determination that the RTP is in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the RTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project level also requires "hot spot" analysis if an area is "nonattainment" or "maintenance" for CO and/or PM. A region is a nonattainment area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called maintenance areas. Hot spot analysis is essentially the same, for technical purposes, as CO or PM analysis performed for NEPA and CEQA purposes. Conformity does include some specific standards for projects that require a hot spot analysis. In general, projects must not cause the CO standard to be violated, and in nonattainment areas the project must not cause any increase in the number and severity of violations. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

3.18.2 Affected Environment

Meteorology and Climate

The proposed project is located in the San Diego Air Basin (SDAB), which is coincident with San Diego County. The climate of San Diego County is characterized by warm, dry summers and mild, wet winters. One of the main determinants of the climate is a semipermanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-pressure storms are brought into the region, causing widespread precipitation. In San Diego County, the months of heaviest precipitation are November through April, averaging about 23 to 35 centimeters (9 to 14 inches) annually. The mean temperature is 16.7 degrees Celsius (62 degrees Fahrenheit) and the mean maximum and mean minimum temperatures are 24.4 and 8.9 degrees Celsius (76.0 and 48.1 degrees Fahrenheit), respectively.

The Pacific High also influences the wind patterns of California. The predominant wind directions are westerly and west-southwesterly during all four seasons, and the average annual wind speed is 9.0 kilometers per hour (5.6 miles per hour).

A common atmospheric condition known as a temperature inversion affects air quality in San Diego. During an inversion, air temperatures get warmer rather than cooler with increasing height. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific High comes into contact with cooler marine air. The boundary between the layers of air represents a temperature inversion that traps pollutants below it. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality.

The applicable regional transportation plans are the 2030 San Diego Regional Transportation Plan 2007 update, and the *2006 Regional Transportation Improvement Program* (2007 RTIP), through Amendment 14. The USDOT made a finding of conformity through Amendment 9 to the 2006 RTIP and the 2007 RTP on December 10, 2007. The project is listed in Table 6.1 of the 2030 RTP, 2007 update. Transnet Early Action Project Descriptions, as SR-76 (Melrose to South Mission Road), Widen from two lanes to four lanes. The project is listed on page 29 of the original 2006 RTIP under project listings, on page 14 of Amendment 1 to the 2006 RTIP, and on page 12 of Amendment 2 to the 2006 RTIP. In all instances, the project is identified as CAL29, SR-76 Middle. The project description is "Melrose Ave to Mission Rd (South) - widen from 2 to 4 lanes (DEMO ID: CA603; HPP No: 2719)." Amendments 3 through 5 did not address or change the proposed project. Project design concept and scope are consistent with the project description in the above RTP and RTIP. Consistent with this, FHWA found that the Conformity Determination for the SR-76 Melrose to South Mission Road Highway Improvement Project conforms to the SIP in accordance with 40 CFR Part 93 on June 4, 2008 (Appendix I).

As shown in Table 3.18-1 below, SDAB currently meets the federal standards for all criteria pollutants except O_3 and meets state standards for all criteria pollutants except O_3, $PM_{2.5}$, and PM_{10}. Formal redesignation by the U.S. Environmental Protection Agency (EPA) as an O_3 attainment area for the 1-hour standard occurred on July 28, 2003, and a maintenance plan was approved. On April 15, 2004, the EPA issued the initial designations for the 8-hour O_3 standard, and the SDAB is classified as "basic" nonattainment. Basic is the least severe of the six degrees of O_3 nonattainment. The San Diego Air Pollution Control District (SDAPCD) submitted the San Diego 8-hour O_3 attainment plan as part of the SIP, which was approved by the California Air Resources Board (ARB) on May 24, 2007, and is awaiting federal approval. The SDAB currently falls under a federal maintenance plan for CO, following a 1998 redesignation as a CO attainment area. The SDAB is currently classified as a state "serious" O_3 nonattainment area and a state nonattainment area for particulate matter equal to or less than 10 microns (PM_{10}) and particulate matter equal to or less than 2.5 microns ($PM_{2.5}$).

Table 3.18-1
Air Quality Designations for San Diego Air Basin

Pollutant	SDAB Attainment Status	
	Federal	State
Ozone – 8-hour	Nonattainment – Basic Subpart 1	Nonattainment
Carbon Monoxide	Attainment/Maintenance	Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment

Ambient air pollutant concentrations in the SDAB are measured at 10 air quality monitoring stations operated by the SDAPCD. The SDAPCD air quality monitoring station that represents the project area, climate, and topography in the SDAB is the Escondido – East Valley Parkway monitoring station, located at 600 East Valley Parkway, Escondido, approximately 21.5 kilometers (13.4 miles) east of the project area. This station monitors CO, nitrogen oxides (NO_X), O_3, $PM_{10,}$ and $PM_{2.5}$. Monitoring data for sulfur oxides (SO_X) were taken from the San Diego 12th Avenue monitoring station for 2004 and the San Diego Beardsley Street monitoring station for 2005 and 2006. These monitoring stations were the closest to the proposed project, and therefore provide the best available data. Table 3.18-2 summarizes the excess of standards and the highest pollutant levels recorded at this station for the years 2003 to 2005.

On March 10, 2006, the USEPA published a final rule that establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed from local air quality impacts in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. Based on that rule, the USEPA and FHWA published *Transportation Conformity guidance for qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (PM guidance). While the SDAB is not a federally designated $PM_{2.5}$ and PM_{10} nonattainment or maintenance area, it is designated as a State nonattainment area for both pollutants. Thus, to meet State requirements, the proposed project is assessed using the procedure outlined in the PM Guidance.

Table 3.18-2
Ambient Air Quality Summary – Escondido Monitoring Station

Pollutant Standards	2004	2005	2006
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	5.3	5.9	5.7
Maximum 8-hour concentration (ppm)	3.61	3.10	3.61
Number of Days Standard Exceeded			
NAAQS 1-hour (≥35 ppm)	0	0	0
CAAQS 8-hour (≥20 ppm)	0	0	0
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
Maximum 1-hour concentration (ppm)	0.080	0.076	0.071
Annual Average (ppm)	0.018	0.017	0.017
Number of Days Standard Exceeded			
CAAQS 1-hour	0	0	0
Sulfur Dioxide (SO_X)			
Maximum 24-hour concentration (ppm)	0.008	0.005	0.009
National annual average concentration (ppm)	0.004	0.003	0.004
Number of Days Standard Exceeded			
NAAQS 24-hour (>0.14 ppm)	0	0	0
CAAQS 24-hour (>0.04 ppm)	0	0	0
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.099	0.095	0.108
Maximum 8-hour concentration (ppm)	0.086	0.079	0.096
Number of Days Standard Exceeded			
NAAQS 1-hour (>0.12 ppm)	0	0	0
CAAQS 1-hour (>0.09 ppm)	2	1	3
NAAQS 8-hour (>0.08 ppm)	2	0	2
Particulate Matter (PM_{10})			
National maximum 24-hour concentration ($\mu g/m^3$)	57	42.0	51.0
National second highest 24-hour concentration ($\mu g/m^3$)	42.0	38.0	43.0
State maximum 24-hour concentration ($\mu g/m^3$)	58.0	42.0	42.0
State second highest 24-hour concentration ($\mu g/m^3$)	42.0	39.0	41.0
National annual average concentration ($\mu g/m^3$)	27.5	23.9	24.1
State annual average concentration ($\mu g/m^3$)	27.3	23.9	24.2
Number of Days Standard Exceeded			
NAAQS 24-hour (>150 $\mu g/m^3$)	0	0	0
CAAQS 24-hour (>50 $\mu g/m^3$)	1	0	1
Particulate Matter ($PM_{2.5}$)			
Maximum 24-hour concentration ($\mu g/m^3$)	67.3	43.1	40.6
Second highest 24-hour concentration ($\mu g/m^3$)	48.7	41.3	34.7
Third highest 24-hour concentration ($\mu g/m^3$)	41.1	39.5	31.8
Fourth highest 24-hour concentration ($\mu g/m^3$)	40.5	36.9	31.6
National annual average concentration ($\mu g/m^3$)	14.1	*	11.5
State annual average concentration ($\mu g/m^3$)	14.1	*	11.5
Number of Days Standard Exceeded			
NAAQS 24-hour (>65 $\mu g/m^3$)	1	0	0

*data unavailable

The PM guidance document describes a qualitative hot spot analysis method that does not involve dispersion modeling. This qualitative $PM_{2.5}$ and PM_{10} hot spot analysis method involves a more streamlined review of local factors such as local monitoring data near a proposed project location.

The $PM_{2.5}$ and PM_{10} hot spot analysis method in the March 2006 Guidance involves two steps: determining whether or not a project is a "project of concern" and, if it is a "project of concern" preparation of a qualitative (emission analysis only) but more detailed analysis of the project.

The PM Guidance defines the following types of projects as projects of air quality concern:

- New or expanded highway project that have a significant number of or significant increase in diesel vehicles;
- Projects affecting intersections that are Level-of-Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D,E, or F, because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals, and transfer points, that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals, and transfer points, that significantly increase the number of diesel vehicles congregating at a single location; and,
- Projects in, or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

A significant volume for a new highway or expressway is defined as an annual average daily traffic (AADT) volume of 125,000 or more, and a significant number of diesel vehicles is defined as 8 percent or more of that total AADT or more than 10,000 truck AADT. A significant increase in diesel truck traffic is normally considered to be approximately 10%.

The proposed improvements to SR-76 between Melrose Avenue and South Mission Road would increase the capacity of SR-76. The existing 2005 AADT volume is 37,700. The design year (2030) AADT volumes without the project is 52,000 vehicles. The estimated design year AADT volume of 72,000 vehicles would be less than the threshold of 125,000 ADT.

The existing diesel fuel truck percentage on SR-76 within the project limits is 6.5 percent of AADT, which is below the threshold of 8 percent. While the proposed project would result in an increase in the ratio of trucks in the volumes, estimated design year (2030) truck AADT would remain below 10,000 and the increase in truck volumes comparing the no-build and build alternatives would be less than 10%.

The nearest air quality monitoring site that provides PM_{10} and $PM_{2.5}$ background information is Escondido-East Valley Parkway, about 21.5 km (13.4 mi) away in a downwind direction. The site indicates that the project area meets the current Federal PM_{10} and $PM_{2.5}$ standards of 150 ug/m3 (PM_{10}, 24 hours), 35 ug/m3 ($PM_{2.5}$, 24 hours), and 15 ug/m3 ($PM_{2.5}$, annual). The most recent monitoring data for that site are included in Table 3.18-2.

The proposed project is located in an attainment area for Federal PM_{10} and $PM_{2.5}$ standards, and in a nonattainment area of State PM_{10} and $PM_{2.5}$ standards. Based on screening using U.S. EPA PM Guidance, the proposed project is not a Project of Air Quality Concern because it does not meet the criteria due to relatively low total/truck AADT, truck percentage, and increase in truck volumes comparing the Build and No Build Alternatives. The proposed project is improving traffic operations by smoothing traffic flow. The proposed project is therefore in conformance for Federal PM_{10} and $PM_{2.5}$ standards and is unlikely to increase the frequency or severity of any existing exceedences regarding the non-attainment of state PM_{10} and $PM_{2.5}$ standards.

3.18.3 Impacts

This section is based upon the June 2007 Air Quality Analysis, a separate technical study prepared for this project. It is incorporated by reference.

Existing (Preferred) and Southern Alignment Alternatives

Permanent and temporary impacts for the Existing and Southern Alignment Alternatives are the same because the analysis required for this assessment is done on a regional rather than site-specific scale. As such, modifications to the alignment do not change the overall assessment of the project area. The following assessment characterizes both the Existing and Southern Alignment Alternatives.

Local Air Quality

The Transportation Conformity Rules require a statement that "federal projects must not cause or contribute to any new localized CO or PM_{10} violations or increase the frequency or severity of any existing CO or PM_{10} violations in CO and PM_{10} nonattainment and maintenance areas."

The CO portion of the requirement applies to the proposed project because the SDAB is a federal CO maintenance area. The PM_{10} portion does not apply; the SDAB is not a federal PM_{10} nonattainment or maintenance area. The air quality analyses of projects included in the RTP and RTIP do not include the analyses of local CO impacts; these must be addressed at a project level.

The SDAB was redesignated as a CO attainment area subsequent to the passage of the 1990 Clean Air Act amendments. Continued attainment has been verified with the SDAPCD. In areas meeting those conditions, in accordance with the CO Protocol, only projects that are likely to worsen air quality necessitate further analysis. Projects that worsen air quality are defined as those that:

- substantially increase the percentage of vehicles in cold start mode, defined as an increase in the number of vehicles operating in cold start mode of 2 percent or more;

- substantially increase traffic volumes, defined as an increase in volume in excess of 5 percent; and

- worsen traffic flow, defined for intersections as increasing average delay at signalized intersections operating at Level of Service (LOS) E or F.

These criteria are evaluated when comparing Build and No Build scenarios.

The proposed project would not generate traffic but would accommodate future traffic volumes by providing increased efficiency via expanded capacity. Therefore, it may be presumed that the proposed project would not measurably increase traffic volume or the percentage of vehicles in cold start mode.

Two intersections, SR-76 and South Mission Road and SR-76 and Melrose Avenue, were chosen for further evaluation due to their potential to create LOS E or F conditions in the horizon year (2030). In 2030, under Alternative 2, the SR-76 and South Mission Road intersection would operate at LOS E during the AM peak period and LOS F during the PM peak period. In 2030, under the No Build Alternative, the SR-76 and Melrose Avenue intersection would operate at LOS D during the AM and PM peak periods, and under Alternatives 1 and 2, the intersection would operate at LOS D during the AM peak period and LOS E during the PM peak period. Therefore, a CO hot spot analysis was prepared for these intersections.

The Protocol provides a screening procedure to estimate future local CO concentrations at congested intersections for comparison with federal and state standards. The procedure is applicable to sensitive receptors located from 3 to 50 meters (10 to 164 feet) from the edge of the roadway. The nearest sensitive receptors to the intersections of SR 76 and South Mission Road and SR-76 and Melrose Avenue, are pedestrians walking along sidewalks in the project area. No residential receptors are within 244 meters (800 feet) of the SR-76 and South Mission Road intersection. The nearest residential receptors to the SR-76 and Melrose Avenue intersection are approximately 45.7 meters (150 feet) from the center of the intersection and as close as 10.7 meters (35 feet) north of the edge of SR-76. For purposes of this analysis, the receptors are located on the sidewalks. The results of the CO assessment are summarized in Table 3.18-3.

Table 3.18-3
CO Concentrations 2030 (1-Hour and 8-Hour Concentrations, ppm)

Intersection	No Build Alternative		Existing Alignment Alt		Southern Alignment Alt	
	AM	PM	AM	PM	AM	PM
1-Hour CO Concentrations						
SR-76 and South Mission Road	6.8	7.3	7.1	7.3	7.2	7.3
SR-76 and Melrose Drive	6.7	6.7	6.9	7.0	6.9	7.0
Federal standard	35					
State standard	20					
8-Hour CO Concentrations						
SR-76 and South Mission Road	4.8	5.1	5.0	5.1	5.0	5.1
SR-76 and Melrose Drive	4.7	4.7	4.8	4.9	4.8	4.9
Federal standard	9					
State standard	9.0					

As indicated in Table 3.18-3, the proposed project's future traffic conditions would not lead to any exceedances of these thresholds during the AM or PM peak periods at either of the analyzed intersections. According to the traffic information provided by Caltrans, while other intersections in the area may also operate at LOS E or F, they would operate more efficiently with the proposed project than without, i.e., less delay time at intersections, which would represent a decrease in the potential for harmful build-up of CO at project intersections. Therefore, the proposed project would not result in or contribute to any significant local CO impacts due to future operations.

Mobile Source Air Toxics

In addition to CO, Mobile Source Air Toxics (MSAT) emissions are of local concern. MSATs are compounds emitted from highway vehicles and non-road equipment. In February 2006, FHWA issued Interim MSAT Guidance to advice when and how to analyze MSAT in the NEPA process for highways. However, EPA currently recommends following the March 2007 report entitled "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process." FHWA and EPA are currently undergoing mediation on the FHWA Interim Guidance. Evaluating the environmental and health impacts from MSATs on a proposed highway project may involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in

occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems (South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein).

Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants.

This document provides a qualitative assessment of MSAT emissions relative to the various alternatives and has acknowledged that all the project alternatives may result in increased exposure to MSAT emissions in certain locations.

It is possible to qualitatively assess the levels of future MSAT emissions under the project. A qualitative analysis cannot identify and measure health impacts from MSATs, but it can give a basis for identifying and comparing the potential differences among MSAT emissions-if any-from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

The amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternatives is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to the MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT under each of the Alternatives are approximately the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives.

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control

measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The proposed project would increase east-west roadway capacity on SR-76 between South Mission Road and Melrose Avenue, thereby providing relief to currently congested arterial roadways. The amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, for the Existing and Southern Alignment Alternatives, and the No Build Alternative, assuming that other variables such as fleet mix are the same. The VMT estimated for the Existing and Southern Alignment Alternatives is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This slight increase in VMT would lead to higher MSAT emissions for the Existing and Southern Alignment Alternatives along the SR-76 corridor, with a corresponding decrease in MSAT emissions along the roadways in the network that lose traffic to SR-76. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds. According to the ARB EMFAC2002 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases.

With respect to through traffic, that is, traffic that does not originate or terminate in the project area, the VMT for the Existing and Southern Alignment Alternatives could be more or less than for the No Build Alternative depending on whether this widened roadway results in shorter or longer travel distance for the drivers attracted to this route in order to avoid other congested roadways. An increase in VMT could mean MSATs under the Existing and Southern Alignment Alternatives would probably be higher than the No Build Alternative in the study area. There could also be localized differences in MSAT emissions from indirect sources of the project such as associated access traffic, evaporative MSATs (e.g., benzene) from parked cars, and diesel particulate matter from delivery trucks.

Because estimated VMT for the Existing and Southern Alignment Alternatives is approximately the same, it is expected there would be no appreciable difference in overall MSAT emissions between these alternatives. Also, regardless of the alternative, emissions in the design year would likely be lower than present levels as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great, even after accounting for an average national annual VMT growth, that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Operation of this widened section of SR-76 would lead to higher MSAT emissions along the alignment, with a corresponding decrease in MSAT emissions along the roadways in the network that lose traffic to this route. Emissions along the new roadway in future years would likely be lower than initial levels as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may

differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great, even after accounting for an average national annual VMT growth, that MSAT emissions in the study area are likely to decrease in the future in nearly all cases.

The additional travel lanes proposed as part of the Existing Alignment Alternative would have the effect of moving traffic somewhat closer to nearby homes, schools, and businesses. Where portions of the Southern Alignment Alternative follow the existing alignment, the effect would be the same as for the Existing Alignment Alternative. Where portions of the Southern Alignment Alternative follow the proposed new southern route, traffic would be moved farther from receptors along the existing alignment and closer to receptors along the new alignment. Therefore, under the Existing and Southern Alignment Alternatives, there may be localized areas where ambient concentrations of MSATs could be somewhat higher than the No Build Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No Build Alternative cannot be accurately quantified due to the inherent deficiencies of current models.

The Air Quality Analysis contains the proposed project intersection LOS analysis. The analysis contained in Appendix B of the Air Quality Analysis indicates the proposed project would not result in a CO hot spot and is not likely to result in adverse effects to local air quality.

Temporary Impacts

The principal criteria pollutants emitted during construction would be PM_{10} and $PM_{2.5}$. The source of the pollutants would be fugitive dust created during clearing, grubbing, excavation, and grading; demolition of structures and pavement; vehicle travel on paved and unpaved roads; and material blown from unprotected graded areas, stockpiles, and haul trucks. "Fugitive" is a term used in air quality analysis to denote emission sources that are not confined to stacks, vents, or similar paths. Generally, the distance that particles drift from their source depends on their size, emission height, and wind speed. About 50 percent of fugitive dust is made up of relatively large particles, greater than 100 microns in diameter. These particles are responsible for the reduced visibility often associated with construction, as well as the nuisance caused by the deposition of dust on vehicles, and in exterior areas used by people for recreation and business. Given their relatively large size, these particles tend to settle within 6 to 9 meters (20 to 30 feet) of their source. Small particles, less than 100 microns in diameter, can travel nearly 100 meters (330 feet) before settling to the ground, depending on wind speed. These smaller particles also contribute to visibility and nuisance impacts, and include PM_{10} and $PM_{2.5}$, which are potential health hazards.

An additional important source of pollutants during construction would be the engine exhaust from construction equipment. The principal pollutants of concern would be NO_X and volatile organic compounds (VOC) emissions that would contribute to the formation of O_3, which is a regional nonattainment pollutant.

Federal conformity regulations require analysis of construction impacts for projects when construction activities would last for more than 5 years. The proposed project would last less than 5 years; therefore, no quantitative estimates of regional construction emissions have been made.

No Build Alternative

The No Build Alternative would not alter the existing highway. Traffic conditions are poor on the highway and this situation would worsen with forecasted vehicle traffic increases in the future. As the future conditions worsen with increased traffic, contributions of regional and local emissions would also worsen. The unimproved highway under the No Build Alternative would result in adverse effects to regional and local air quality.

3.18.4 Avoidance, Minimization, and/or Mitigation Measures

For temporary construction impacts, the following measures would be incorporated into the proposed project to minimize the emission of fugitive dust, PM_{10}, and $PM_{2.5}$ during construction:

1. Minimize land disturbance.
2. Use watering trucks to minimize dust; watering should be sufficient to confine dust plumes to the project work areas.
3. Suspend grading and earth moving when wind gusts exceed 40 kilometers per hour (25 miles per hour) unless the soil is wet enough to prevent dust plumes.
4. Stabilize the surface of inactive stockpiles.
5. Limit vehicular paths on unpaved surfaces and stabilize any temporary roads.
6. Minimize unnecessary vehicular and machinery activities.
7. Street sweeping would be conducted where sediment is tracked from the job site onto paved roads and would be performed immediately after soil-disturbing activities occur or off-site tracking of material is observed.
8. Revegetate disturbed land, including vehicular paths created during construction to avoid future off-road vehicular activities.
9. Remove unused material.

Additionally, it is recommended that the following measure be incorporated into the proposed project to minimize exposure to diesel particulate emissions during construction:

1. Locate construction equipment and truck staging and maintenance areas as far as feasible and nominally downwind of schools, active recreation areas, and other areas of high population density.

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3.19 NOISE

3.19.1 Regulatory Setting

NEPA of 1969 and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project shall have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. The rest of this section shall focus on the NEPA-23 CFR 772 noise analysis; please see Chapter 4 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

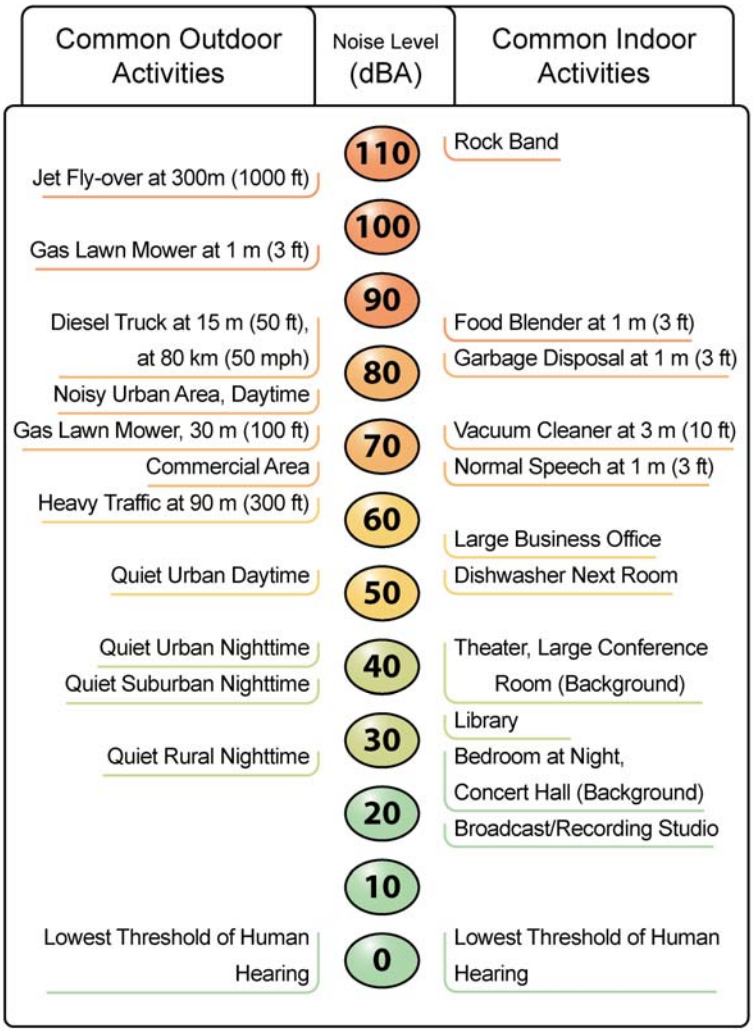
For highway transportation projects with FHWA involvement (and Caltrans, as assigned), the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur (see Table 3.19-1). The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA [A-weighted decibels]) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA 23 CFR 772 analysis.

Table 3.19-1
Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, dBA $L_{eq(h)}$	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Table 3.19-2 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities. In accordance with Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, August 2006*, a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

Table 3.19-2
Noise Levels for Common Activities



If it is determined that the project would have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

Caltrans' 1998 *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include residents acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978, and the cost per benefited residence.

3.19.2 Affected Environment

As identified in the January 2007 Noise Study Report that was prepared for this project, and is incorporated by reference, the land uses adjacent to the project corridor are residential, commercial, and undeveloped areas.

Noise measurement sites are locations where noise measurements are taken to determine existing noise levels and to verify or calibrate computer noise models. These sites are chosen as being representative of similar sensitive sites in the area. Locations that are expected to receive the greatest noise impacts are generally chosen. Noise measurements were mainly conducted in frequent outdoor human-use areas. The sensitive receptors for the Existing Alignment Alternative are listed within the "Location" column in Table 3.19-3 and within the "Location" column in Table 3.19-4 for the Southern Alignment Alternative, those in bold are those receptors where the noise increase due to the proposed build alternatives approaches or exceeds the NAC. The sensitive receptors are depicted on Figures 3.19-1 through 3.19-8.

Table 3.19-3
Sensitive Receptors and Noise Impact - Existing Alignment Alternative

Receptor	Location	Existing Noise Levels[1,2] $L_{eq(h)}$, dBA	Project Build without Barrier $L_{eq(h)}$, dBA
R 1	508 Edgewater Avenue, Oceanside	59 M, ST10	60
R 2	509 Pacesetter Street, Oceanside	59 M, ST11	60
R 3*	543 Pacesetter Street, Oceanside	52 M, ST9	54
R 4*	540 Pacesetter Street, Oceanside	48 M, ST8	54
R 5	509 Pacesetter Street, Oceanside	56 E	57
R 6	5612 Boot Way, Oceanside	61 E	64
R 7	5618 Boot Way, Oceanside	60 M, ST3, CAL	65
R 8	5624 Boot Way, Oceanside	56 E	61
R 8A	5634 Boot Way, Oceanside	56 E	60
R 9	5648 Boot Way, Oceanside	57 E	62
R 9A	1468 Sundance Way, Oceanside	58 E	65
R 10*	1444 Melrose Drive - Unit 1, Oceanside	64 M, ST2, 3	62
R 11*	1448 Melrose Drive - Unit 7, Oceanside	60 M, ST1, 3	58
R 12*	Pool Area - Silverado Drive, Oceanside	55 M, ST5	59
R 13	**1471 Saddle Way, Oceanside**	**60 M, ST4, CAL**	**67**
R 14	**1474 Saddle Way, Oceanside**	**60 E**	**67**
R 15	**1483 Chaparral Way, Oceanside**	**61 E**	**68**
R 16	1476 Chaparral Way, Oceanside	63 M, ST6	65
R 17	1476 Chaparral Way, Oceanside	62 E	64
R 18	5735 Jeffries Ranch Road, Oceanside	65 E	67
R 19	5744 Jeffries Ranch Road, Oceanside	49 E	56
R 20	1509 Surrey Court, Oceanside	54 M, ST7	61
R 21	5808 Ranch View Road, Oceanside	54 M, ST12	62
R 22	5818 Ranch View Road, Oceanside	51 M, ST13, CAL	60
R 23	5822 Ranch View Road, Oceanside	52 M, ST29, CAL	61
R 24*	5837 Ranch View Road, Oceanside	51 M, ST14	51
R 25	5842 Ranch View Road, Oceanside	53 E	58
R 26	5858 Ranch View Road, Oceanside	48 M, ST15	53
R 27	5862 Ranch View Road, Oceanside	49 M, ST15A, CAL	52
R 28	5878 Ranch View Road, Oceanside	50 M, ST16	53
R 29	5822 Ranch View Road, Oceanside	50 M, ST17	53
R 30	6046 Mission Road, Oceanside	53 E	56
R 31	**29750 Mission Road, Bonsall**	**63 M, ST30**	**72**
R 32	30141 Old River Road, Bonsall	60 M, ST31	64
R 33	Lot #18 Au Bon Climat Court, Bonsall	57 E	61
R 34	30626 Emerald Hill Road, Bonsall	47 E	58
R 35	**30626 Emerald Hill Road, Bonsall**	**57 M, ST32**	**68**
R 36	30572 Emerald Hill Road, Bonsall	51 E	62
R 37	O. H. Kruse Grain and Milling, Bonsall	79 M, ST18A, 5	54
R 38	Fireside Antiques Mall, Bonsall	71 M, ST18, 4	57
R 39	5867 Via Montellano, Bonsall	68 M, ST19, 4	60
R 40	30940 Mission Road, Bonsall	61 E, 4	57

Receptor	Location	Existing Noise Levels[1,2] $L_{eq(h)}$, dBA	Project Build without Barrier $L_{eq(h)}$, dBA
R 41	30950 Mission Road, Bonsall	62 [E, 4]	58
R 42*	30960 Mission Road, Bonsall	59 [E, 4]	55
R 43*	30964 Mission Road, Bonsall	57 [E, 4]	53
R 44*	5853 Via Montellano, Bonsall	62 [M, ST19A, 4]	58
R 45	5848 Via Montellano, Bonsall	63 [E, 4]	59
R 46	31302 Mission Road, Bonsall	61 [E]	63
R 47	31302 Mission Road, Bonsall	56 [E]	58
R 49	Bonsall Village Center, Bonsall	72 [M, ST20, 4]	66
R 50	Bonsall Village Center, Bonsall	74 [M, ST22, 4]	65
R 51	5496 Triple Crown Drive, Bonsall	60 [E, 4]	57
R 52	5448 Triple Crown Drive, Bonsall	61 [M, ST23, 4]	58
R 53	5418 Triple Crown Drive, Bonsall	60 [E, 4]	57
R 54	5946 Thoroughbred Lane, Bonsall	61 [M, ST24, CAL]	61
R 55	6054 Rio Valle Road, Bonsall	61 [M, LT3, CAL]	64
R 56	6038 Rio Valle Drive, Bonsall	56 [M, ST25]	64
R 57	5980 Rio Valle Drive, Bonsall	55 [E]	63
R 58	5968 Rio Valle Drive, Bonsall	51 [M, ST26, CAL]	55
R 59	5956 Rio Valle Drive, Bonsall	49 [E]	53
R 60	**5425 Mission Road, Bonsall**	**73 [M, ST26A, CAL, 4]**	**70**
R 61	**River Village Shopping Center, Bonsall**	**72 [M, ST27, CAL]**	**74**

Receptors in bold are those receptors where the noise increase approaches or exceeds the NAC.

Notes:

1 $L_{eq(h)}$ are A-weighted, measured noise levels in decibels.

2 M - Measured noise level; STxx, LTxx or CALxx - measurement site number; E - Calculated using future "Build," "No-Build," and measured data.

3 Existing noise levels are higher than predicted due to the traffic on Melrose Drive that has not been added to the model.

4 Existing noise levels are higher than predicted because the 2030 alignment is further from receptors than existing alignment.

5 Existing noise levels are higher than predicted at this receptor because the 2030 alignment is further from receptors than existing alignment and the receptor is now shielded by a building.

* Non first-row receptor

Table 3.19-4
Sensitive Receptors and Noise Impact - Southern Alignment Alternative

Receptor	Location	Existing Noise Levels [1,2] $L_{eq(H)}$, dBA[a]	Project Build Without Barrier $L_{eq(H)}$, dBA[3]
R 1	508 Edgewater Avenue, Oceanside	59 M, ST10	59
R 2	509 Pacesetter Street, Oceanside	59 M, ST11	59
R 3*	543 Pacesetter Street, Oceanside	52 M, ST9	54
R 4*	540 Pacesetter Street, Oceanside	48 M, ST8	53
R 5	509 Pacesetter Street, Oceanside	56 E	57
R 6	5612 Boot Way, Oceanside	61 E	64
R 7	5618 Boot Way, Oceanside	60 M, ST3, CAL	65
R 8	5624 Boot Way, Oceanside	56 E	61
R 8A	5634 Boot Way, Oceanside	56 E	60
R 9	5648 Boot Way, Oceanside	57 E	62
R 9A	1468 Sundance Way, Oceanside	58 E	65
R 10*	1444 Melrose Drive - Unit 1, Oceanside	64 M, ST2, 3	61
R 11*	1448 Melrose Drive - Unit 7, Oceanside	60 M, ST1, 3	58
R 12*	Pool Area - Silverado Drive, Oceanside	55 M, ST5	59
R 13	**1471 Saddle Way, Oceanside**	**60 M, ST4, CAL**	**67**
R 14	**1474 Saddle Way, Oceanside**	**59 E**	**66**
R 15	**1483 Chaparral Way, Oceanside**	**61 E**	**68**
R 16	1476 Chaparral Way, Oceanside	63 M, ST6	64
R 17	1476 Chaparral Way, Oceanside	63 E	64
R 18	**5735 Jeffries Ranch Road, Oceanside**	**65 E**	**67**
R 19	5744 Jeffries Ranch Road, Oceanside	49 E	56
R 20	1509 Surrey Court, Oceanside	54 M, ST7	61
R 21	5808 Ranch View Road, Oceanside	54 M, ST12	62
R 22	5818 Ranch View Road, Oceanside	51 M, ST13, CAL	60
R 23	5822 Ranch View Road, Oceanside	52 M, ST29, CAL	61
R 24*	5837 Ranch View Road, Oceanside	51 M, ST14	51
R 25	5842 Ranch View Road, Oceanside	52 E	58
R 26	5858 Ranch View Road, Oceanside	48 M, ST15	52
R 27	5862 Ranch View Road, Oceanside	49 M, ST15A, CAL	52
R 28	5878 Ranch View Road, Oceanside	50 M, ST16	52
R 29	5822 Ranch View Road, Oceanside	50 M, ST17	53
R 30	6046 Mission Road, Oceanside	53 E	56
R 31	**806 Tushak Ranch Road, Bonsall**	**54 E**	**66**
R 32	30219 Au Bon Climat Court, Bonsall	50 E	60
R 32A	**Lot #18 Au Bon Climat Court, Bonsall**	**51 E**	**68**
R 33	Lot #20 Au Bon Climat Court, Bonsall	50 E	60
R 33A	**Lot #19 Au Bon Climat Court, Bonsall**	**51 E**	**67**
R 34	30307 Old River Road, Bonsall	54 E	64
R 35	**30505 Old River Road, Bonsall**	**59 M, ST33**	**69**
R 35A*	30505 Old River Road, Bonsall	54 E	64
R 36	31089 Old River Road, Bonsall	49 E	57

Receptor	Location	Existing Noise Levels [1,2] $L_{eq(H)}$, dBA[a]	Project Build Without Barrier $L_{eq(H)}$, dBA[3]
R 37	31110 Old River Road, Bonsall	55 M, LT4	63
R 38	31134 Old River Road, Bonsall	54 E	62
R 39	31156 Old River Road, Bonsall	53 E	61
R 40	31174 Old River Road, Bonsall	52 E	60
R 41	31194 Old River Road, Bonsall	51 E	59
R 42	31226 Old River Road, Bonsall	48 E	56
R 42A	31428 Old River Road, Bonsall	53 E	56
R 43	31524 Old River Road, Bonsall	61 E	64
R 44	Bonsall Elementary School, Bonsall	57	60
R 45	San Luis Rey Downs Golf Resort, Bonsall	59 M, ST34	62
R 46	**5425 Mission Road, Bonsall**	**73 M, ST26A, 5**	**69**
R 47	5980 Rio Valle Drive, Bonsall	54 E	61
R 48	5968 Rio Valle Drive, Bonsall	51 M, ST26	57
R 49	5956 Rio Valle Drive, Bonsall	50 E	56
R 50	**River Village Shopping Center, Bonsall**	**72 M, ST27**	**72**

Receptors in bold are those receptors where the noise increase approaches or exceeds the NAC.
Notes:
1 $L_{eq(h)}$ are A-weighted, measured noise levels in decibels.
2 M - Measured noise level; STxx, LTxx or CALxx - measurement site number; E - Calculated using future "Build," "No-Build," and measured data.
3 Existing noise levels are higher than predicted due to the traffic on Melrose Drive that has not been added to the model.
4 Existing noise levels are higher than predicted because the 2030 alignment is further from receptors than existing alignment.
5 Existing noise levels are higher than predicted at this receptor because the 2030 alignment is further from receptors than existing alignment and the receptor is now shielded by a building.
* Non first-row receptor

3.19.3 Impacts

Existing Alignment Alternative (Preferred Alternative)

The predicted peak-hour noise levels for the future year 2030 were employed for impact analysis. The majority of the receptor locations where the predicted future noise levels approach or exceed the NAC are located near Melrose Drive. The Existing Alignment Alternative would impact four multi-family residences, three single-family residences, and one commercial center.

During construction, noise may temporarily dominate the noise environment in the area of construction activities. Caltrans' Standard Specifications require that noise generated during construction should comply with federal, state, and local regulations and that all equipment should be fitted with adequate mufflers according to the manufacturers' specifications. Construction equipment is expected to generate noise levels ranging from 74 to 85 dBA at a distance of 15 meters (50 feet), which would be further reduced at a rate of about 6 dBA per doubling of distance. No adverse noise impacts are anticipated because construction would be short-term, intermittent, and dominated by local traffic noise, and construction activities would be conducted in accordance with the Caltrans' Standard Specifications.

Southern Alignment Alternative

The Southern Alignment Alternative would impact six single-family residences, three multi-family residences, and one commercial center.

The noise impacts associated with the construction of the Existing Alignment Alternative noted above are identical to those of the Southern Alignment Alternative.

No Build Alternative

The No Build Alternative would not build additional traffic lanes or reconfigure intersections and would not increase noise levels for residential, commercial, or recreational uses along the SR-76 corridor and no abatement measures would be necessary.

3.19.4 Avoidance, Minimization, and/or Mitigation Measures

The Noise Study prepared for this document provided barrier recommendations to abate the noise impacts (Table 3.19-5). All noise barriers were analyzed as sound walls. An analysis with barrier heights ranging from 2.4 meters (8 feet) to 4.9 meters (16 feet) was conducted for impacted noise sensitive areas. Within the Noise Study, all recommended barrier heights and locations were designed to provide a minimum 5 dBA reduction in noise. In addition, all the barriers met or exceeded the minimum barrier heights required to cut the line-of-sight from each receptor to the exhaust stack of heavy trucks. The six proposed noise barriers were found to be preliminarily feasible in the Noise Study and were carried forward into the next stage of analysis.

Table 3.19-5
Noise Prediction with Barrier Heights

Receptor and Location	Project Build without Barrier $L_{eq(h)}$, dBA	Noise Prediction with Barrier $L_{eq(h)}$				
		2.4 m (8 ft)	3.0 m (10 ft)	3.7 m (12 ft)	4.3 m (14 ft)	4.9 m (16 ft)
R13-1471 Saddle Way	67	63	61	60	59	59
R14-1474 Saddle Way	67	61	61	60	59	59
R15-1483 Chaparral Way	68	62	61	60	60	59
R18-5735 Jeffries Ranch Road	67	58	57	56	55	55
R35-30505 Old River Road	69	65	65	64	64	63
R60-5425 Mission Road	70	66	65	65	63	63

Working off the preliminary results of the Noise Study, the April 2007 Preliminary Noise Abatement Decision Report (NADR), which is incorporated by reference, was prepared to evaluate the feasibility and reasonableness of measures to abate traffic noise impacts.

The feasibility of a noise abatement measure is an engineering consideration. A minimum noise reduction of 5 dBA must be achieved for the proposed measure to be considered feasible. The determination of reasonableness is more subjective and requires common sense and good judgment. The overall reasonableness is determined by considering a multitude of factors (such as cost, absolute noise levels, noise level change, and abatement benefits) and a final decision is determined after environmental impacts and public input are considered.

Existing Alignment Alternative (Preferred Alternative)

The Existing Alignment Alternative would require the acquisition of 29750 Mission Road (Receptor 31) and the area of frequent human use associated with 30626 Emerald Hill Road (Receptor 35). As a result, abatement was not considered for these receptors. The River Village Shopping Center (Receptor 61) is a commercial center and therefore abatement was not considered for this receptor per Caltrans protocol.

Noise barrier S138 was considered along the eastbound side of SR-76 and is represented by receptors R-13 to R-15. The considered noise barrier extended for approximately 219 meters (719 feet) and was 3.0 meters (10 feet) in height. The wall would benefit four multi-family residences and is considered feasible. The reasonable total cost allowance for this barrier is $152,000.00. The estimated cost without temporary construction easements and permanent easements would be $460,342.00. The estimated cost with construction easements only would be $558,892.00. The estimated cost with all easements would be $1,337,437.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S138 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S138. Construction of noise barrier S138 is not recommended.

Noise barrier S140 was considered along the eastbound side of SR-76 and is represented by receptor R18. The considered noise barrier extended for approximately 43 meters (141 feet) and was 2.4 meters (8 feet) in height. The wall would benefit one single-family residence and is considered feasible. The reasonable total cost allowance for this barrier is $38,000.00. The estimated cost without temporary construction easements and permanent easements would be $77,485.00. The estimated cost with construction easements only would be $96,835.00. The estimated cost with all easements would be $246,518.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S140 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S140. Construction of noise barrier S140 is not recommended.

Noise barrier S207 was considered along the westbound side of SR-76 and is represented by receptor R60. The considered noise barrier extended for approximately 167 meters (548 feet) and was 3.7 meters (12 feet) in height. The wall would benefit one single-family residence and is considered feasible. The reasonable total cost allowance for this barrier is $46,000.00. The estimated cost without temporary construction easements and permanent easements would be $417,217.00. The estimated cost with construction easements only would be $492,367.00. The estimated cost with all easements would be $1,104,589.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S207 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S140. Construction of noise barrier S207 is not recommended.

Southern Alignment Alternative

The Southern Alignment Alternative would require the acquisition of 806 Tushak Ranch Road (Receptor 31), Lot#18 Au Bon Climat Court (Receptor 32A), and Lot#19 Au Bon Climat Court (Receptor 33A). As a result, abatement was not considered for these receptors. Abatement measures for 313021 Mission Road (Receptor 46) was not considered because this receptor is used as a calibration point for the existing highway traffic and is not necessarily representative of the area of frequent human use. If the Southern Alignment Alternative is selected, the main source of traffic noise would be from local traffic; however, abatement measures constructed would be ineffective. The River Village Shopping Center (Receptor 61) is a commercial center and therefore abatement was not considered for this receptor per Caltrans protocol.

Noise barrier S138 was considered along the eastbound side of SR-76 and is represented by receptors R-13 to R-15. The considered noise barrier extended for approximately 219 meters (719 feet) and was 3.0 meters (10 feet) in height. The wall would benefit four multi-family residences and is considered feasible. The reasonable total cost allowance for this barrier is $152,000.00. The estimated cost without temporary construction easements and permanent easements would be $460,342.00. The estimated cost with construction easements only would be $558,892.00. The estimated cost with all easements would be $1,337,437.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S138 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S138. Construction of noise barrier S138 is not recommended.

Noise barrier S140 was considered along the eastbound side of SR-76 and is represented by receptor R18. The considered noise barrier extended for approximately 43 meters (141 feet) and was 2.4 meters (8 feet) in height. The wall would benefit one single-family residence and is considered feasible. The reasonable total cost allowance for this barrier is $38,000.00. The estimated cost without temporary construction easements and permanent easements would be $77,485.00. The estimated cost with construction easements only would be $96,835.00. The estimated cost with all easements would be $246,518.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S140 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S140. Construction of noise barrier S140 is not recommended.

Noise barrier S176 was considered along the eastbound side of SR-76 and is represented by receptor R35. The considered noise barrier extended for approximately 150 meters (492 feet) and was between 4.3 meters (14 feet) and 4.9 meters (16 feet) in height. The wall would benefit one single-family residence and is considered feasible. The reasonable total cost allowance for this barrier is $48,000.00. The estimated cost without temporary construction easements and permanent easements would be $460,385.00. The estimated cost with construction easements only would be $527,885.00. The estimated cost with all easements would be $1,101,095.00. All of these amounts are above the reasonable allowance. Construction of noise barrier S176 is feasible but not reasonable due to the estimated construction cost being higher than the total cost allowance for noise barrier S176. Construction of noise barrier S176 is not recommended.

Construction Impacts

All equipment should have sound-control devices no less effective than those provided on the original equipment and no equipment should have an un-muffled exhaust.

As directed by a Caltrans Resident Engineer, the contractor should implement appropriate additional noise abatement measures, including changing the location of stationary construction equipment, turning off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

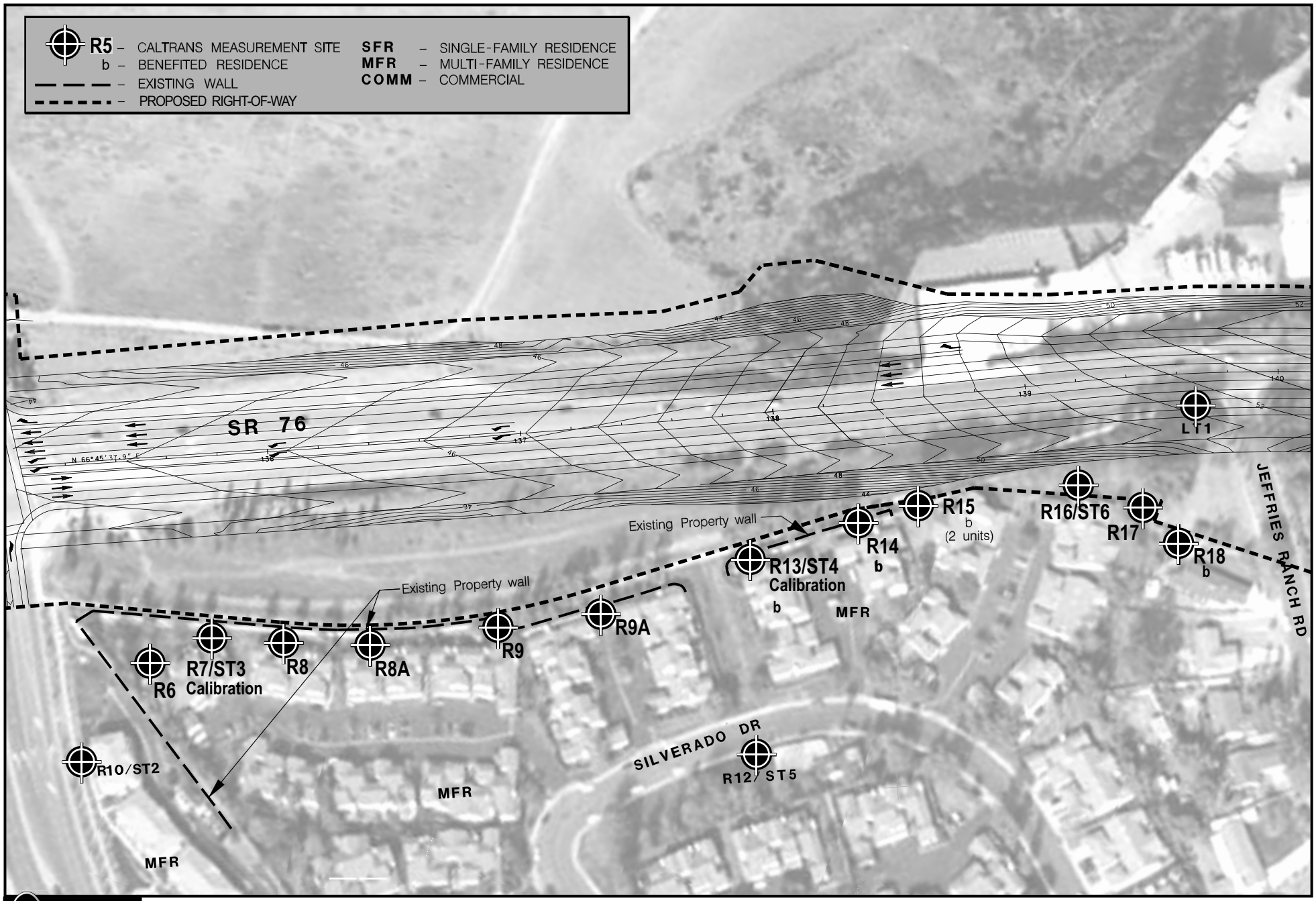
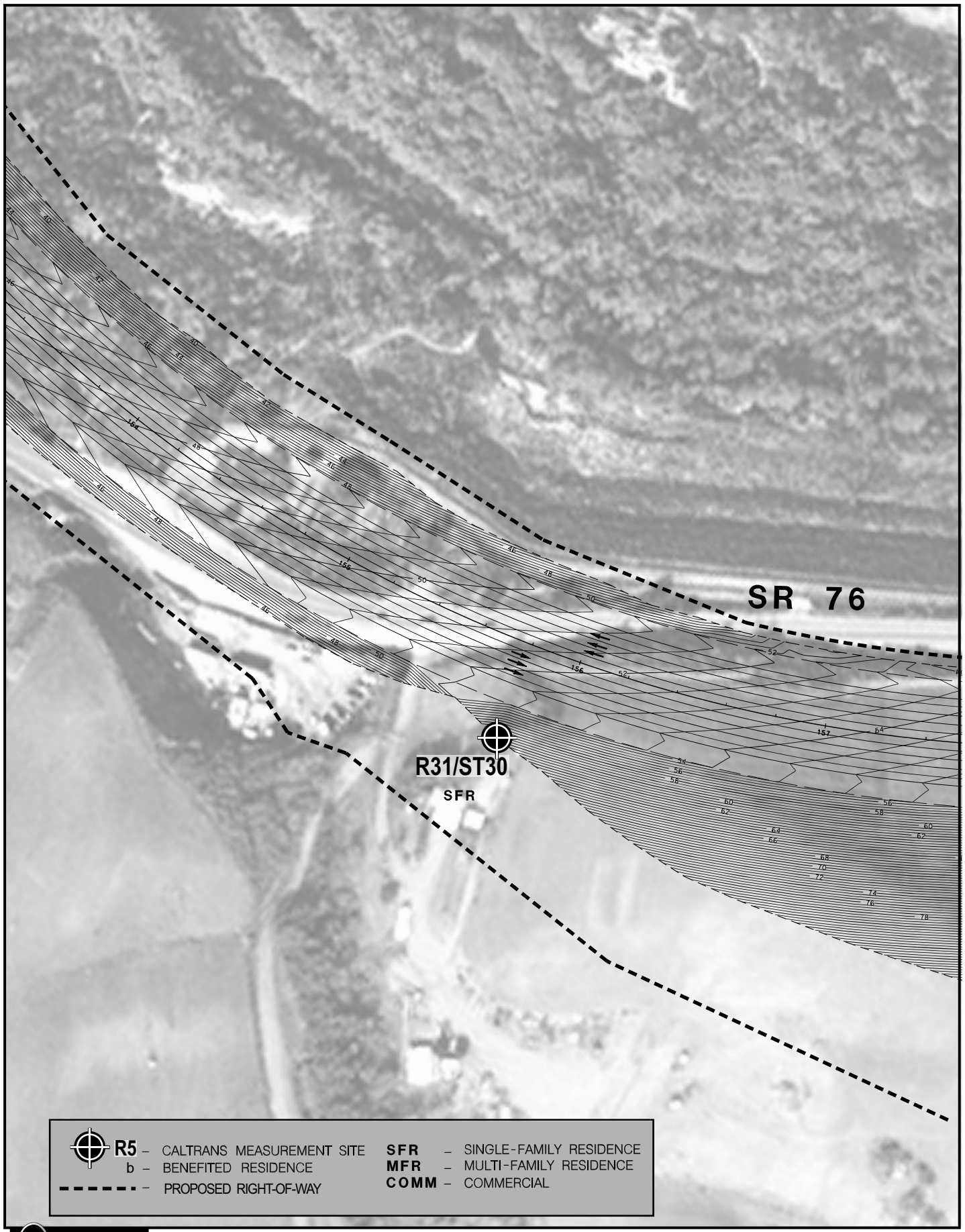


Figure 3.19-1
Noise Receptor Sites and Soundwalls
Existing and Southern Alignment Alternatives



Source: Parsons

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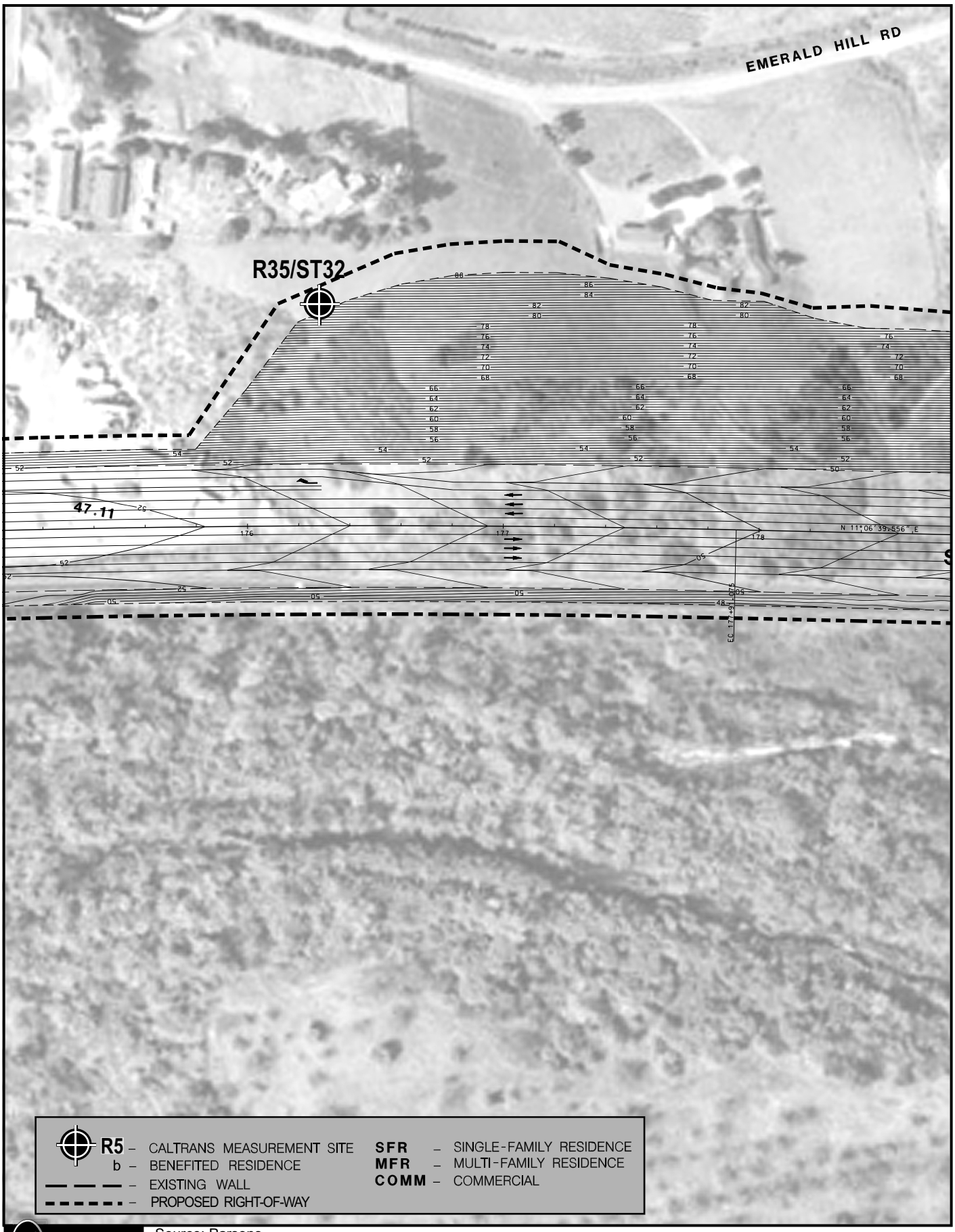
1:2000 meters

Figure 3.19-2
Noise Receptor Site
Existing Alignment Alternative



76 State Route 76 Corridor

Source: Parsons

0 m 50 m 100 m

1:2000 meters

Figure 3.19-3
Noise Receptor Site
Existing Alignment Alternative

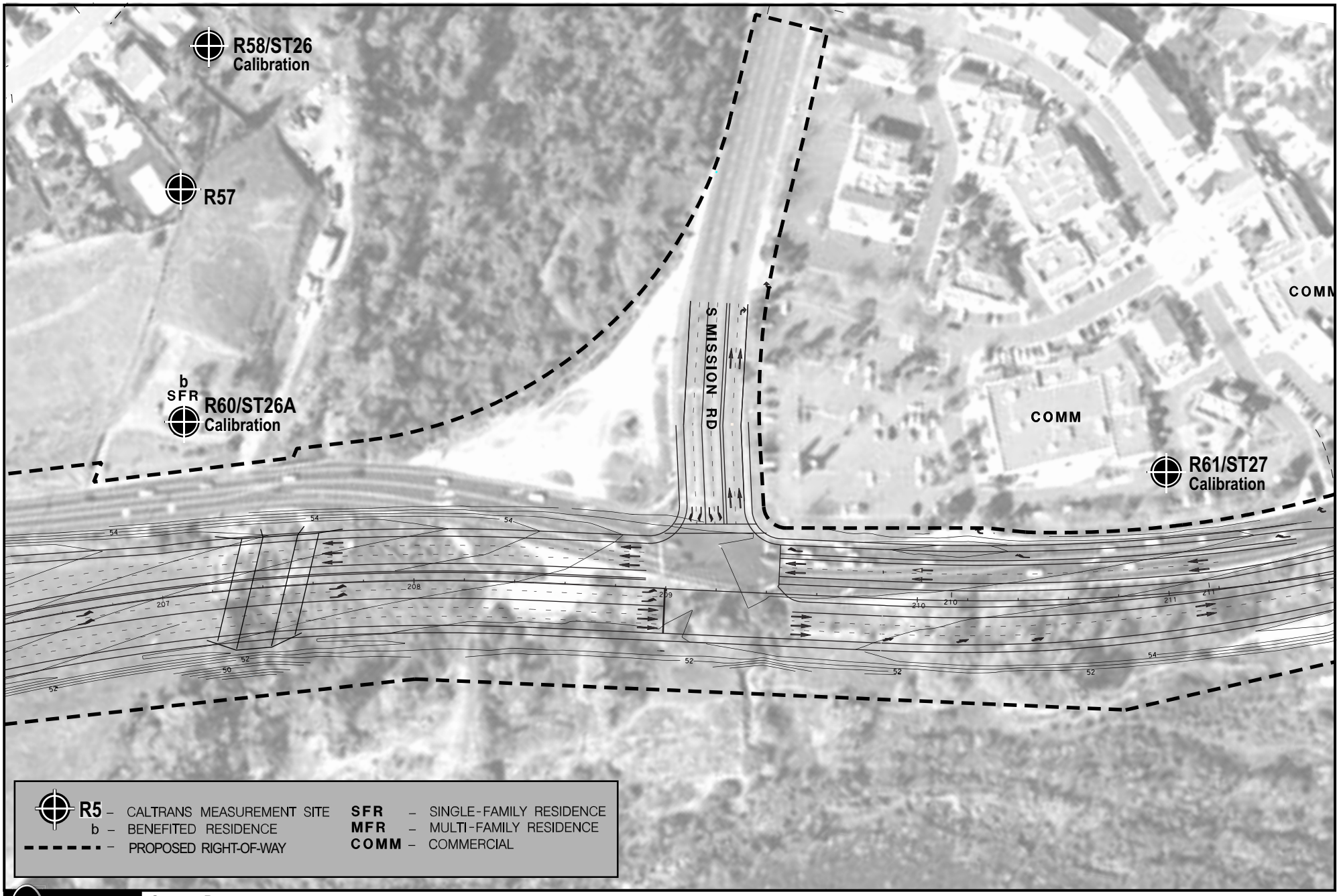
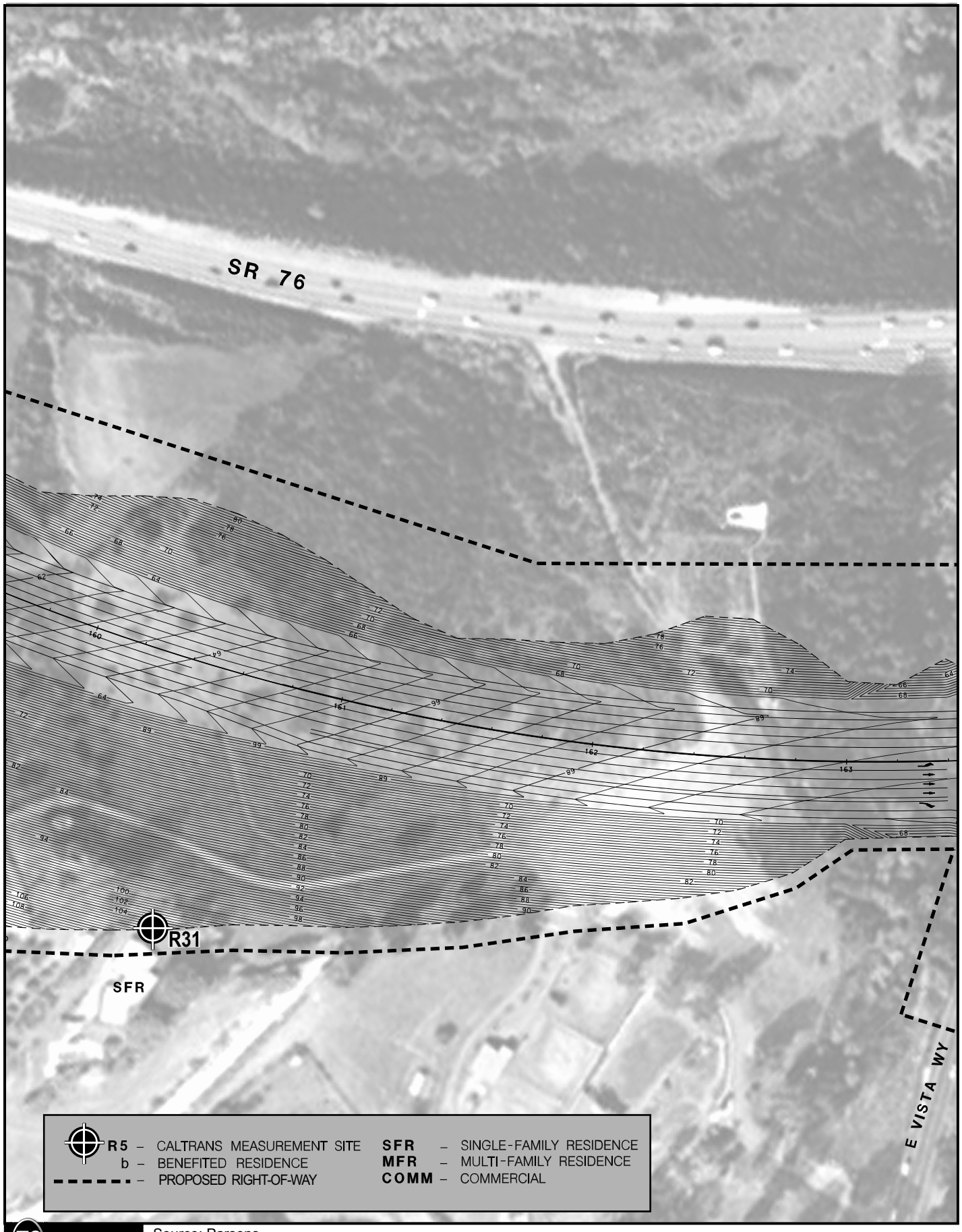


Figure 3.19-4
Noise Receptor Sites
Existing Alternative

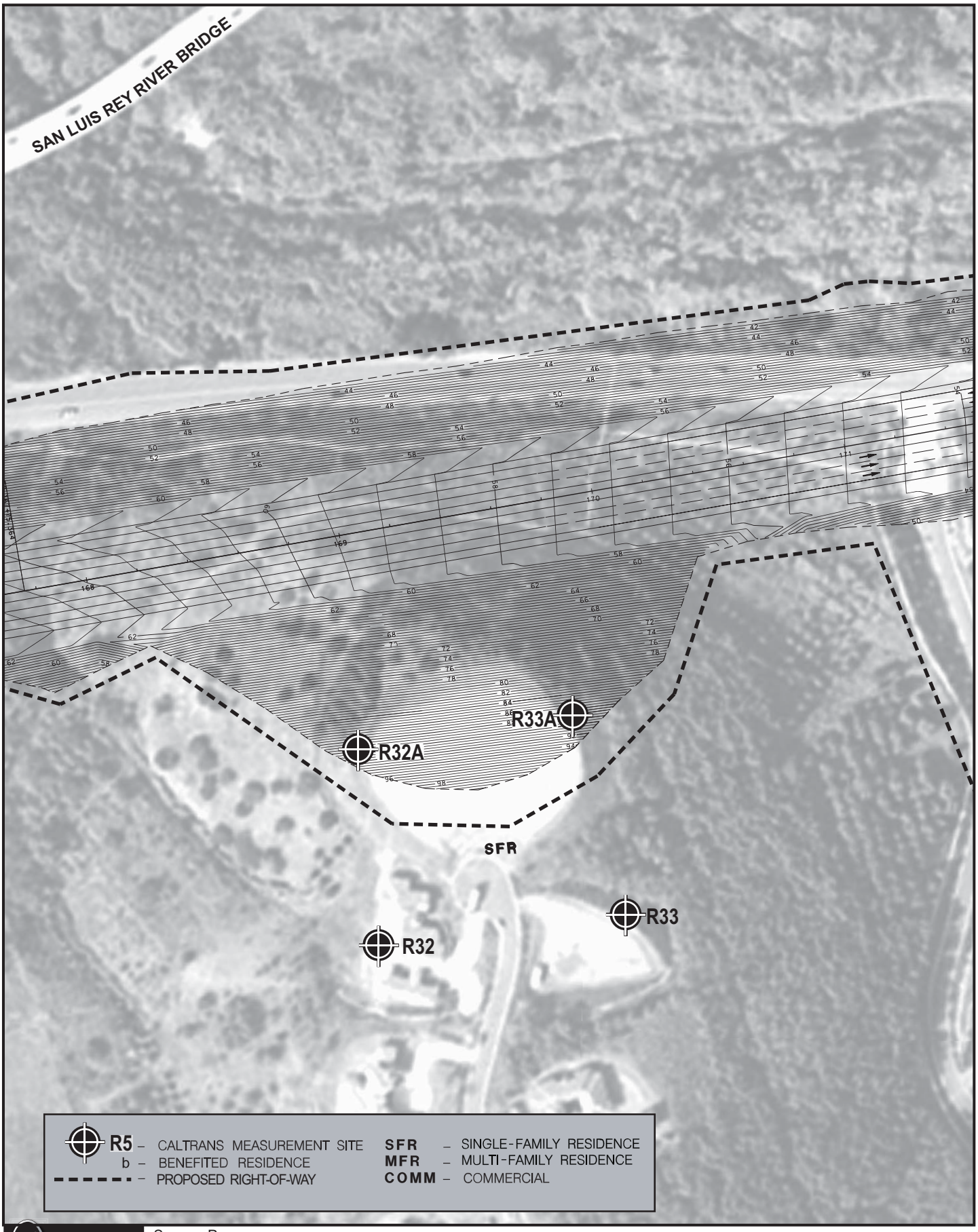


Source: Parsons

0 m 50 m 100 m

1:2000 meters

Figure 3.19-5
Noise Receptor Site
Southern Alignment Alternative



Source: Parsons

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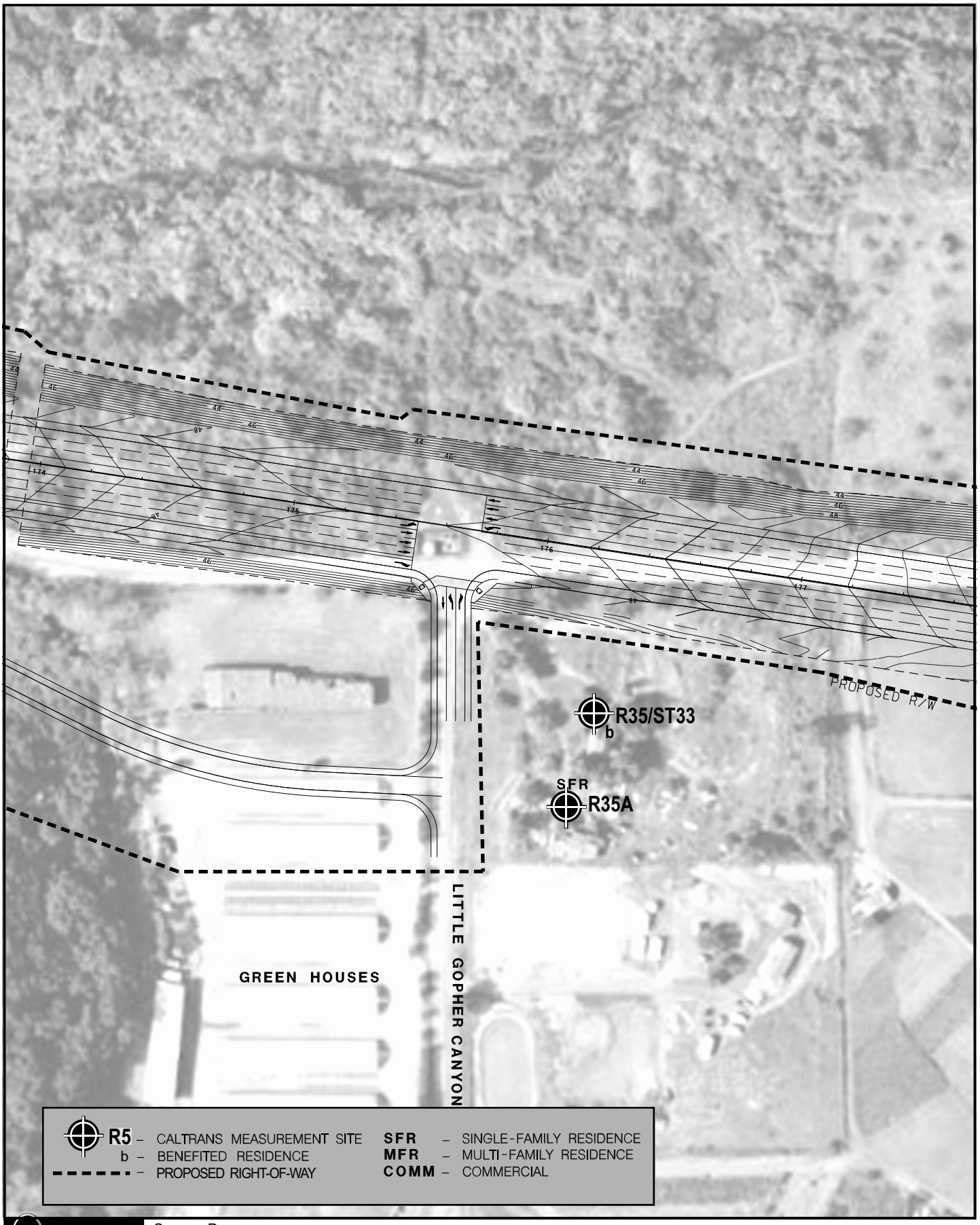
1:2000 meters

Figure 3.19-6
Noise Receptor Sites
Southern Alignment Alternative



76 State Route 76 Corridor

Source: Parsons

0 m 50 m 100 m

1:2000 meters

Figure 3.19-7
Noise Receptor Sites
Southern Alignment Alternative

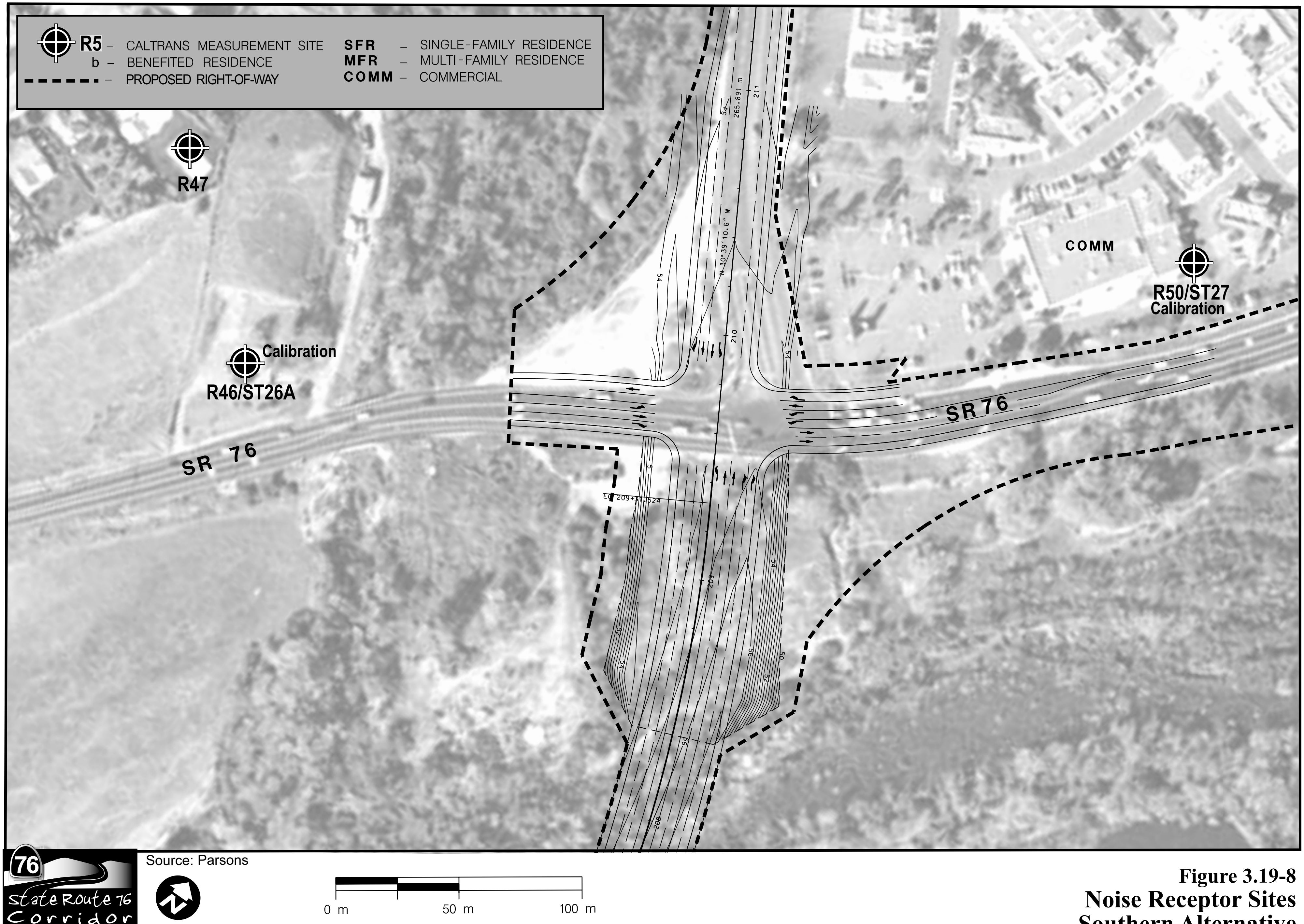


Figure 3.19-8
Noise Receptor Sites
Southern Alternative

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