4.3 BIOLOGICAL ENVIRONMENT

Potential impacts related to endangered or threatened species, sensitive or special status species, to riparian habitat or other sensitive natural community, to federally protected wetlands, to wildlife movement, and confliction with local policies were found to be potentially significant in the Initial Study/NOP prepared for the Riverside-Corona Feeder Pipeline Realignment Project (Appendix A) and is the focus of the following discussion and analysis. Additionally, the project's potential impact on the movement of fish or wildlife and relationship of the project to local policies and ordinances such as the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) and other local policies or ordinances will be discussed.

In addition to the 2005 Certified Program EIR (2005 PEIR) and its reference documents, and other reference documents, the following references were used in the preparation of this section of the SEIR/EIS:

- Brian F. Smith, *Biological Assessment, CEQA, Riverside – Corona Feeder, La Sierra Connection,* Revised December 4, 2009. (Appendix C)
- Brian F. Smith, Biological *Assessment, CEQA, Riverside – Corona Feeder, Clay Street Connection,* Revised December 4, 2009. (Appendix C)
- Brian F. Smith, Biological *Assessment, CEQA, Riverside – Corona Feeder, Proposed Mockingbird Connection,* revised December 4, 2009. (Appendix C)
- Brian F. Smith, *Biological Assessment, CEQA, Riverside – Corona Feeder, Connection to the Central Feeder,* revised December 4, 2009. (Appendix C)
- County of Riverside, *Western Riverside County Multiple Species Habitat Conservation Plan, June 2003. (*Available at the Riverside County Planning Department or at www.rcip.org)
- County of Riverside, *County of Riverside General Plan, Cities of Riverside and Norco Area Plan,* October 2003. (Available at the Riverside County Planning Department or at http:///www.rctlma.org/generalplan/index.html)
- County of Riverside, *County of Riverside General Plan, Jurupa Area Plan,* October 2003. (Available at the Riverside County Planning Department or at http:///www.rctlma.org/generalplan/index.html)
- Glenn Lukos Associates, Inc., *Western Municipal Water District Proposed Riverside-Corona Feeder Realignment Project, Riverside County, California,* May 11, 2009. (Appendix C)
- Glenn Lukos Associates, Inc., *Results of Wintering Season Focused Protocol Surveys, for Western Burrowing Owls (Athene cunicularia hypugaea) for the Central Reach of the Riverside Corona Feeder Pipeline, Riverside County, California,* December, 2008. (Appendix C)
- Glenn Lukos Associates, Inc., *Results of Nesting Season Focused Protocol Surveys, for Western Burrowing Owls (Athene cunicularia hypugaea) for the Central Reach of the*

Riverside Corona Feeder Pipeline, Riverside County, California, May 12, 2009. (Appendix C)

- U.S. Department of Agriculture, Natural Resources Conservation Service, *Soil Survey Geographic (SSURGO) database*. (Available at www.ncgc.usda.gov/gov/products/datasets/ssurgo/index.html)

4.3.1 Setting/Affected Environment

The alignments of the Northern Reach and Central Reach of the Riverside-Corona Feeder Realignment Project as described herein, have primarily shifted from south of the Santa Ana River (Reaches A through D of the 2005 Project Alignment) to just north of it, following the same generally northeast to southwesterly path. The following setting description is based on the report prepared by Glenn Lukos Associates, Inc. The alignment ranges from the Santa Ana River and its adjacent floodplain to developed or disturbed native flatlands with an average elevation of approximately 700 feet above mean sea level at the junction of the Santa Ana River and Van Buren Boulevard to approximately 850 feet above mean sea level at the border of Riverside and San Bernardino counties. The majority of the project alignment consists of residential/urban/exotic habitat types. The project alignment also supports non-native grasslands, freshwater wetlands, riparian habitat, orchards, and field croplands.

The setting descriptions for the Central Feeder Connection, Clay Street Connection, Mockingbird Connection, and La Sierra Pipeline Connection are based on reports prepared by Brian F. Smith and Associates. The Central Feeder project area is gently sloped, with the lowest point located on the west end and the highest point located at the east end. Elevation on the west end is approximately 1,160 feet above mean sea level. Three plant communities occur along the Central Feeder (San Bernardino Avenue) alignment and well field: Urban/developed, non-native grassland, and orchards/vineyards. The Clay Street Connection project area is sloped, with the lowest point at the north end and the highest point located at its south end. Elevations within the project area range from approximately 760 to 800 feet above mean sea level. The Clay Street alignment along Pedley Road and Limonite Avenue is an Urban/Developed plant community. The vegetation within the proposed booster station sites includes urban developed and non-native invasive grasslands. The Mockingbird Connection traverses gently rolling terrain varying in elevation from 1,100 feet above mean sea level at the southern end to 1,000 feet above mean sea level at the northern end. Plant communities along the Mockingbird Connection include urban/developed, Riversidean sage scrub, and orchards. The La Sierra Pipeline Connection project area is located along La Sierra Avenue, upon gentle the slopes north of Lake Mathews. Elevations within the project area range from 859 feet above mean sea level at the southern end to 1,247 feet above mean sea level at the northern end.

The proposed realignment (Study Area[1]) will extend from near the intersection of Waterman Avenue and Orange Show Road in the City of San Bernardino, traversing through portions of the cities of Colton and Rialto and unincorporated San Bernardino County into unincorporated Riverside County along Agua Mansa Road. The alignment then traverses west through

[1] The biological resources study area for the proposed project extends up to 250 feet on either side of the proposed alignments.

unincorporated Riverside County, then south in Clay Street and crosses under the Santa Ana River near Van Buren Boulevard. At the Santa Ana River crossing, the alignment runs immediately parallel to the east side of the Van Buren Boulevard Bridge. South of the Santa Ana River, the proposed realignment enters the City of Riverside, where it continues in a south/southeasterly direction and connects to the approved 2005 Project Alignment near the intersection of Jackson Street and Cleveland Avenue. The Monroe Street alternative alignment begins at the intersection of Colorado Avenue and Jackson Streets and extends northwest to its terminus at the intersection at Cleveland Avenue and Irving Street.

The Central Feeder Connection is located in the San Bernardino Avenue right-of-way between Alabama Street in unincorporated San Bernardino County and Webster Street in the City of Redlands. The Clay Street Connection extends west within Limonite Avenue from the Limonite Avenue/Clay Street intersection, and then north along Pedley Road to 56th Street. The Clay Street Connection includes the construction of a booster station at one of four possible locations (ranging in size from 0.75 acres to 3.56 acres) along the pipeline. The Mockingbird Connection (which includes a reservoir and a related pump station) will extend easterly within Irving Street, south of its intersection with Firethorn Avenue, and then east through pipeline easements to connect to the proposed pump station and reservoir. The pipeline will then extend east within a pipeline easement and then south within Constable Road to the existing Mills Gravity Pipeline easement. At this point, the pipeline will continue west within the pipeline easement and cross under Van Buren Boulevard to connect to WMWD's existing Mockingbird Booster Station. The La Sierra Pipeline Connection extends south from the intersection of La Sierra Avenue and Cleveland Avenue to connect to the existing Mills Gravity Pipeline, located at the intersection of La Sierra Avenue and El Sobrante Road.

Vegetation

The majority of the project area consists of urban residential and commercial development with areas of disturbed non-native grasslands, which occur in undeveloped fields or lots. Six major vegetation types were mapped within the project alignment, including scrub habitats, freshwater wetland habitats, riparian forest/woodland/scrub habitats, grassland habitats, residential/urban/exotic cover types, and grove/orchard cover types. These associations are broken down into sub-associations and outlined in **Table 4.3-A, Summary of Vegetation Types by Alignment**.

Table 4.3-A
Summary of Vegetation Types by Alignment

Vegetation Type	Proposed Alignment	Monroe Alternative Alignment	Central Feeder Connection	Clay Street Connection	Mockingbird Connection	La Sierra Pipeline Connection
Disturbed Riversidean Sage Scrub	---	---	---	---	---	1.7 acres
Riversidean Sage Scrub	7.2 acres	---	---	---	32.4 acres	50.1 acres
Open Water	3.6 acres	---	---	---	---	---
Freshwater Marsh	0.8 acres	---	---	---	---	---
Non-Native Grasslands	147.6 acres	3.0 acres	49.9 acres	12.6 acres	---	5.1 acres
Residential/Urban/Exotic	1,039.0 acres	189.8 acres	186.2 acres	55.4 acres	49.3 acres	52.1 acres
Field Croplands	3.0 acres	3.0 acres	---	---	---	---
Grove/Orchard	3.7 acres	14.9 acres	40.4 acres	---	84.9 acres	---
Southern Willow Scrub	17.3 acres	---	---	---	---	10.2 acres
Mulefat Scrub	0.9 acres	---	---	---	---	---
Total	1,223.1 acres	210.7 acres	276.5 acres	68.0 acres	166.6 acres	119.2 acres

Non-native vegetation types include Non-Native Grasslands, Residential/Urban/Exotic, Field Croplands, and Grove/Orchard. The areas of non-native grassland contain an assemblage of non-native grasses with scattered native shrubs and ruderal vegetation. Portions of the project alignment consist of dry-land agricultural fields, which have been subject to historic and/or recent tilling and planting such as cultivated barley (*Hordeum vulgare*) and cultivated oat (*Avena sativa*). The project alignment also includes areas with active orchards, which have been subject to historic and/or recent tilling and planting or contain mature trees. Predominant crops include citrus trees such orange, lemon, and grapefruit. Residential/urban/exotic vegetated areas do not generally provide suitable habitat for sensitive species. These areas include the following land uses: residential/commercial, roadways/transportation, ornamental plantings, orchard, and areas that have been cleared or graded.

Native vegetation types include Riversidean Sage Scrub, Disturbed Riversidean Sage Scrub, Open Water, Freshwater Marsh, Southern Willow Scrub, and Mulefat Scrub. Riversidean Sage Scrub is designated by the Department of Fish and Game (DFG) and the California Natural Diversity Database (CNDDB) with a Sensitivity of 3.1 "very threatened" (S3.1) and "Occurs in 21 to 80 known locations and/or 10,000 to 50,000 acres of habitat remaining." Riversidean Sage Scrub tends to occur on hilly or rocky portions, often located farther from the road above or behind agricultural fields, developed areas or disturbed areas. The Riversidean Sage Scrub within the project alignment varies in quality due to human disturbance and is characterized by an open growth of native, shrubby vegetation including but not limited to coastal sagebrush (*Artemisia californica*), interior flat-top buckwheat (*Eriogonum fasciculatum var. foliolosum*), brittlebush (*Encelia farinosa*), and Mexican elderberry (*Sambucus mexicana*), with an understory of both

non-native grasses and herbs and native herbaceous vegetation. The Open Water habitat is surrounded by native trees and herbaceous vegetation including but not limited to Fremont cottonwood (*Populus fremonti*), arroyo willow (*Salix lasiolepis*), black willow (*Salix gooddingii*), and mulefat (*Baccharis salicifolia*). The area of Freshwater marsh is located in a constructed detention basin associated with a gravel mining operation and consists mainly of southern cattail (*Typha domingensis*). Southern Willow Scrub communities are designated by the DFG and CNDDB with a Sensitivity of 2.1, "very threatened" (S2.1) and "Occurs in 6 to 20 known locations and/or 2,000 to 10,000 acres of habitat remaining." Southern Willow Scrub is reliant upon the presence of perennial surface or subsurface flows and occurs in various drainage corridors associated with urban development and within the Santa Ana River. The vestigial stands of forest contain dense thickets of willow species dominated by black willow and red willow (*Salix laevigata*), in addition to mule fat, tree tobacco (*Nicotiana glauca*), giant reed (*Arundo donax*), wild grape (*Vitis californica*), and Mexican elderberry (*Sambucus mexicana*), with scattered emergent Fremont cottonwood and western sycamore (*Platanus racemosa*). Mule Fat Scrub occurs in patches within ditches and drainages located in fields or along roadways. The largest occurrence of this association is at the Santa Ana River crossing in the Central Reach of the Study Area. The association is characterized by shrubby scrub including several willow species and riparian herb species and is dominated by mule fat.

Observed species at the Central Feeder connector alignment are members of the Non-Native Grassland, Urban/Developed, and Orchards/Vineyards plant communities and include: red brome (*Bromus madritensis rubens*), wild oat (*Avena fatua*), slender wild oat (*Avena barbata*), Rip-gut brome (*Bromus diandrus*), Bermuda grass (*Cynondon dactylon*), goldentop grass (*Lamarckia aurea*), telegraph weed (*Heterotheca grandiflora*), horseweed (*Conzya canadensis*), sun flower (*Helianthus annuus*), sheep sorrel (*Rumex acestosella*), western ragweed (*Ambrosia psilostachya*), short-pod mustard (*Hirschfeldia incana*), wild cucumber (*Marah fabaceus*), phacelia (Phacelia spp.), fiddleneck (*Amsinckia menziesii*), Jimson weed/sacred datura (*Datura wrightii*), dove weed (*Croton setigerus*), sycamore (*Platanus racemosa*), fan palm (*Washingtonia sp.*), royal palm (*Roystonea spp.*), lime (*Citrus spp.*), orange (*Citrus spp.*), lemon (*Citrus spp.*), eucalyptus (*Eucalyptus spp.*), tree of life (*Ailanthus altissima*), olive (*Olea europaea*), and Russian thistle (*Salsola kali*).

Observed species at the Clay Street connector alignment are members of the Non-Native Grassland and Urban/Developed plant communities and include: red brome (*Bromus madritensis rubens*), wild oat (*Avena fatua*), Rip-gut brome (*Bromus diandrus*), Bermuda grass (*Cynondon dactylon*), telegraph weed (*Heterotheca grandiflora*), horseweed (*Conzya canadensis*), sun flower (*Helianthus annuus*), sheep sorrel (*Rumex acestosella*), western ragweed (*Ambrosia psilostachya*), short-pod mustard (*Hirschfeldia incana*), phacelia (Phacelia spp.), fiddleneck (*Amsinckia menziesii*), Jimson weed/sacred datura (*Datura wrightii*), dove weed (*Croton setigerus*), tree of life (*Ailanthus altissima*), olive (*Olea europaea*), and Russian thistle (*Salsola kali*).

Observed species at the Mockingbird Connection alignment are members of the Urban/Developed, Orchard, and Riversidean Sage Scrub plant communities and include: red brome (*Bromus madritensis rubens*), wild oat (*Avena fatua*), Rip-gut brome (*Bromus diandrus*), telegraph weed (*Heterotheca grandiflora*), horseweed (*Conzya canadensis*), sheep sorrel (*Rumex*

acestosella), western ragweed (*Ambrosia psilostachya*), short-pod mustard (*Hirschfeldia incana*), rock-cress (*Arabis sp*.), fiddleneck (*Amsinckia menziesii*), Jimson weed/sacred datura (*Datura wrightii*), dove weed (*Croton setigerus*), climbing milkweed (*Sarcostemma cyanchoides*), tree tobacco (*Nicotina glauca*), California sage (*Artemisia californica*), white sage (*Salvia mellifera*), tumbleweed (*Salsola kali*), California buckwheat (*Eriogonum fasiculatum*), and fan palm (*Washingtonia sp.*).

Observed species at the La Sierra pipeline connection alignment are members of the Non-Native Grassland, Urban/Developed, Riversidean Sage Scrub, Disturbed Riversidean Sage Scrub, and Southern Willow Scrub plant communities and include: red brome (*Bromus madritensis rubens*), wild oat (*Avena fatua*), Rip-gut brome (*Bromus diandrus*), Bermuda grass (*Cynondon dactylon*), telegraph weed (*Heterotheca grandiflora*), sun flower (*Helianthus annuus*), sheep sorrel (*Rumex acestosella*), western ragweed (*Ambrosia psilostachya*), short-pod mustard (*Hirschfeldia incana*), phacelia (Phacelia spp.), fiddleneck (*Amsinckia menziesii*), Jimson weed/sacred datura (*Datura wrightii*), dove weed (*Croton setigerus*), brittle brush (Encelia farinosa), eucalyptus (*Eucalyptus spp.*), tree tobacco (*Nicotina glauca*), blue elderberry (*Sambucus mexicanus*), California sage (*Artemisia californica*), castor bean (*Ricinus communis*), tumbleweed (*Salsola kali*), myoporum (Myoporum laetum), mulberry (*Morus sp*.), bottlebrush (*Callistemon citrinus*), honeysuckle (*Lonicera sp*.), sycamore (*Plantus occidentalis*), California buckwheat (*Eriogonum fasiculatum*), fan palm (*Washingtonia sp.*), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepsis*), and palo verde (*Parkinsonia sp*.)

Special-Status Plant Species

Plant species of special status include those classified as endangered or threatened, proposed for listing as endangered or threatened, candidates species for listing by a federal (U.S. Fish and Wildlife Service) or state (California Department of Fish and Game) resource agency, or considered a federal Species of Concern. In addition, plants included on Lists 1, 2, 3, or 4 of the California Native Plant Society (CNPS) Inventory are also considered special-status.

The Biological Report by Glenn Lukos identifies one special-status plant species with potential to occur within the Realignment Alternative route: Parry's spineflower and none within the proposed realignment. Five other species were identified as having a low to limited potential to occur on site: California satin tail, chaparral sand-verbena, prairie wedge grass, Robinson's pepper-grass, and smooth tarplant. These species are listed in **Table 4.3-B1, Special Status Plant Species with on site Occurrence Potential** along with their status and relative occurrence potential.

The biological assessments for the Central Feeder Connection, Clay Street Connection, Mockingbird Connection, and La Sierra Pipeline Connection show that, due to lack of suitable habitat, no special-status plant species will be impacted by the these facilities (see **Table 4.3-B2, Special Status Plant Species with On Site Occurrence Potential**).

Table 4.3-B1, Special-Status Plant Species with On Site Occurrence Potential

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment – Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Brand's phacelia *Phacelia stellaris*	Federal: None State: None CNPS: List 1B.1 MSHCP: Not Covered	Coastal dunes and coastal sage scrub with sandy soils. Known to occur in open areas of sage scrub associated with the Santa Ana River floodplain.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.
California bedstraw *Galium californicum ssp. primum*	Federal: None State: None CNPS: List 1B.2 MSHCP: Covered	Chaparral, lower montane coniferous forest in granitic, sandy soils. Local occurrence limited to lower edge of pine belt in shaded areas at 1350-1700m elevation.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.
California Orcutt grass *Orcuttia californica*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Covered	Vernal pools.	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat
California satintail *Imperata brevifolia*	Federal: None State: None CNPS: List 2.1 MSHCP: Not Covered	Chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps (often alkali), and riparian scrub/mesic habitats in wet springs, meadows, streamsides, and flood plains.	Not expected to occur on site due to a lack of suitable habitat.	Limited potential to occur at Santa Ana River crossing.	Not expected to occur on site due to a lack of suitable habitat.
Chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: None State: None CNPS: 1B.1 MSHCP: Not covered	Sandy soils in sage-scrub, chaparral.	Limited Potential to occur on site within areas of suitable habitat.	Limited Potential to occur on site within areas of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Federal: None State: None CNPS: List 1B.1 MSHCP: Covered	Playas, vernal pools, marshes and swamps (coastal salt).	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment – Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Gambel's water cress *Rorippa gambelii*	Federal: FE State: SE CNPS: 1B.1 MSHCP: Not Covered	Marshes and swamps (fresh and brackish)	Presumed extirpated form the region. Not expected to occur on site.	Presumed extirpated form the region. Not expected to occur on site.	Presumed extirpated form the region. Not expected to occur on site.
Horn's milk-vetch *Astragalus hornii var. hornii*	Federal: None State: None CNPS: List 1B.1 MSHCP: Not Covered	Meadows and seeps, salty flats, playas/lake margins, alkaline.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Marsh sandwort *Arenaria paludicola*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Not Covered	Bogs and fens, freshwater marshes and swamps.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.
Mesa horkelia *Horkelia cuneata* ssp. *puberula*	Federal: None State: None CNPS: 1B.1 MSHCP: Not Covered	Occurs in chaparral, cismontane woodland, and coastal scrub.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Parish's desert-thorn *Lycium parishii*	Federal: None State: None CNPS: List 2.3	Sandy to rocky slopes and canyons within coastal sage scrub and Sonoran desert scrub.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Parry's spineflower *Chorizanthe parryi* var. *parryi*	Federal: None State: None CNPS: List 3.2 MSHCP: Covered	Sandy or rocky soils in open habitats of chaparral and coastal sage scrub.	Potential to occur on site within areas of suitable habitat.	Potential to occur on site within areas of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.
Plummer's mariposa lily *Calochortus plummerae*	Federal: None State: None CNPS: List 1B.2 MSHCP: Covered	Granitic, rock soils within chaparral, cismontane woodland, coastal sage scrub, lower montane coniferous forest, and valley and foothill grassland.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment – Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Prairie wedge grass *Sphenopholis obtusata*	Federal: None State: None CNPS: List 2.2 MSHCP: Not covered	Cismontane woodland, wet meadows, streambanks, ponds and seeps/mesic.	Not expected to occur on site due to lack of suitable habitat.	Limited potential to occur at the Santa Ana River crossing.	Not expected to occur on site due to lack of suitable habitat.
Rayless ragwort *Senecio aphanactis*	Federal: None State: None CNPS: List 2.2 MSHCP: Not covered	Drying alkaline flats in coastal sage scrub and cismontane woodland	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.
Robinson's pepper-grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CNPS: 1B.1 MSHCP: Not covered	Occurs in chaparral and coastal scrub.	Low potential to occur on site in scattered coastal sage scrub areas.	Low potential to occur on site in scattered coastal sage scrub areas.	Not expected to occur on site due to a lack of suitable habitat.
Salt marsh bird's beak *Cordylanthus maritimus ssp. maritimus*	Federal: FE State: SE CNPS: List 1B.2	Coastal dune, coastal salt marshes and swamps.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Salt spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CNPS: List 2.2 MSHCP: Covered	Found in alkali springs and marshes within creosote bush scrub, chaparral, yellow pine forest, coastal sage scrub and alkali sink.	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.	Not expected to occur on site due to a lack of suitable habitat.
San Bernadino aster *Symphyotrichum defoliatum*	Federal: None State: None CNPS: 1B.2 MSHCP: Not covered	Occurs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley and foothill grassland (vernally mesic)/near ditches, streams springs.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
San Diego ambrosia *Ambrosia pumila*	Federal: FE State: None CNPS: 1B.1 MSHCP: Covered	Chaparral, coastal sage scrub, valley and foothill grassland, vernal pools. Often in disturbed habitats.	Not expected to occur on site. Study Area is located north of known range for the species.	Not expected to occur on site. Study Area is located north of known range for the species.	Not expected to occur on site. Study Area is located north of known range for the species.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment – Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
San Miguel savory *Satureja chandleri*	Federal: None State: None CNPS: List 1B.2 MSHCP: Covered	Rocky, gabbroic, or metavolcanic soils in chaparral, cismontane woodland, coastal sage scrub, riparian woodland, valley and foothill grassland.	Not expected to occur on site. Due to lack of suitable habitats.	Not expected to occur on site. Due to lack of suitable habitats.	Not expected to occur on site. Due to lack of suitable habitats.
Santa Ana River woollystar *Eriastrum densifolium ssp. santorum*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Covered	Alluvial fan sage scrub, chaparral. Occurring on sandy or rocky soils.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Covered	Sandy soils in alluvial scrub, chaparral, cismontane woodland.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
Smooth tarplant *Centromadia pungens* ssp. *laevis*	Federal: None State: None CNPS: List 1B.1 MSHCP: Covered	Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grasslands, disturbed habitats.	Low potential to occur on site.	Low potential to occur on site.	Not expected to occur on site due to a lack of suitable habitat.
Spreading navarretia *Navarretia fossalis*	Federal: FT State: None CNPS: List 1B.1 MSHCP: Covered	Vernal pools, playas, chenopod scrub, marshes and swamps (assorted shallow freshwater).	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	Federal: None State: None CNPS: List 2.1 MSHCP: Covered	Alkaline soils in meadows and seeps, marshes and swamps, riparian scrub, vernal pools.	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat	Not expected to occur on site due to the lack of suitable habitat

Source: Glenn Lukos Associates, 2008.

Federal
FE = Federally Endangered
FT = Federally Threatened

State
SE = State Endangered
ST = State Threatened

California Native Plant Society (CNPS) Listings
1A = Plants presumed extinct in California
1B = Plants rare, threatened, or endangered in California and elsewhere 2 = Plants rare, threatened or enc
California, but more common elsewhere
3 = Plants about which CNPS needs more information – a "review" list
4 = Plants of limited distribution – a "watch" list

CNPS Threat Code Extensions
.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediac
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

Table 4.3-B2, Special-Status Plant Species with On Site Occurrence Potential

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Central Feeder Connection	Potential for Occurrence On Site: Proposed Clay Street Connection	Potential for Occurrence On Site: Mockingbird Connection	Potential for Occurrence On Site: La Sierra Pipeline Connection
Brand's phacelia *Phacelia stellar is*	Federal: None State: None CNPS: List 1B.1 MSHCP: Not Covered	Coastal dunes and coastal sage scrub with sandy soils. Known to occur in open areas of sage scrub associated with the Santa Ana River floodplain.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.
Marsh sandwort *Arenaria paludicola*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Not Covered	Bogs and fens, freshwater marshes and swamps.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.
Munz's Onion (*Allium munzii*)	Federal: FE State: ST CNPS: List 1B.1 MSHCP: Covered	Heavy clay soil which occur in a band several miles wide and extending from Corona through Temescal Canyon and along the Elsinore Fault Zone to the southwestern foothills of the San Jacinto Mountains.	Not expected to occur on site due to lack of suitable habitat	Not expected to occur on site due to lack of suitable habitat	Not expected to occur on site due to lack of suitable habitat	Not expected to occur on site due to lack of suitable habitat
Nevin's Barberry *Berberis nevinii*	Federal: FE State: SE CNPS: 1B.1 MSHCP: Covered	Found in coarse soils and rocky slopes in chaparral and gravelly wash margins in alluvial scrub.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.	Presumed extirpated from the region. Site also lacks suitable habitat.
Salt Marsh birds-beak *Cordylanthus maritimus maritimus*	Federal: FE State: SE CNPS: 1B.2 MSHCP: Not Covered	Upper tidal zone of salt marsh, alkaline meadows and saline flats	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Central Feeder Connection	Potential for Occurrence On Site: Proposed Clay Street Connection	Potential for Occurrence On Site: Mockingbird Connection	Potential for Occurrence On Site: La Sierra Pipeline Connection
Slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Covered	Sandy soils in alluvial scrub, chaparral, cismontane woodland.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.
San Diego ambrosia *Ambrosia pumila*	Federal: FE State: None CNPS: 1B.1 MSHCP: Covered	Chaparral, coastal sage scrub, valley and foothill grassland, vernal pools. Often in disturbed habitats.	Not expected to occur on site. Study Area is located north of known range for the species.	Not expected to occur on site. Study Area is located north of known range for the species.	Not expected to occur on site. Study Area is located north of known range for the species.	Not expected to occur on site. Study Area is located north of known range for the species.
San Miguel savory *Satureja chandleri*	Federal: None State: None CNPS: List 1B.2 MSHCP: Covered	Rocky, gabbroic, or metavolcanic soils in chaparral, cismontane woodland, coastal sage scrub, riparian woodland, valley and foothill grassland.	Not expected to occur on site. Due to lack of suitable habitats.	Not expected to occur on site. Due to lack of suitable habitats.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitats.
Santa Ana River woollystar *Eriastrum densifolium ssp. santorum*	Federal: FE State: SE CNPS: List 1B.1 MSHCP: Covered	Alluvial fan sage scrub, chaparral. Occurring on sandy or rocky soils.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.	Not expected to occur due to lack of suitable habitat.

Source: Brian F. Smith and Associates, 2009.

Federal
FE = Federally Endangered
FT = Federally Threatened

State
SE = State Endangered
ST = State Threatened

California Native Plant Society (CNPS) Listings
1A = Plants presumed extinct in California
1B = Plants rare, threatened, or endangered in California and elsewhere 2 = Plants threatened or endangered in California, but more common elsewhere
3 = Plants about which CNPS needs more information – a "review" list
4 = Plants of limited distribution – a "watch" list

CNPS Threat Code Extensions
.1 = Seriously endangered in California (over 80% of occurrences threatened / hig and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

Special-Status Wildlife Species

Special-status or sensitive wildlife species include those that are state or federally listed as threatened or endangered, are proposed for listing as threatened or endangered, have been designated as state or federal candidates for listing, state or federal species of concern, or California Fully Protected.

No special status animals were identified within the Central or Northern Reaches during general biological surveys for the proposed RCF realignment project. Although not observed during field studies, several special-status animals have potential to occur on site based on the presence of suitable habitat and/or their known occurrence in the region. The Biological Report by Glenn Lukos identifies sixteen special-status wildlife species with potential to occur within the project alignments: Delhi-sands flower-loving fly, arroyo chub, Santa Ana speckled dace, Santa Ana sucker, burrowing owl, least Bell's vireo, loggerhead shrike, long-eared owl, southwestern willow flycatcher, western yellow billed cuckoo, white-tailed kite, yellow-breasted chat, yellow warbler, American badger, Los Angeles pocket mouse, and San Diego black-tailed jackrabbit. Ten other species were identified as having a low to limited potential to occur on site: coast (San Diego) horned lizard, orange-throated whiptail, Southwestern pond turtle, two-striped garter snake, northern red-diamond rattlesnake, coastal California gnatcatcher, golden eagle, northern harrier, northwestern San Diego pocket mouse, and southern grasshopper mouse. These species are listed in **Table 4.3-C1, Special Status Wildlife Species with On-Site Occurrence Potential** along with their status and relative occurrence potential. Burrowing owls were not observed during the 2008 burrowing owl habitat assessment conducted by Glenn Lukos. However, it was determined that the alignments contained suitable habitat for burrowing owl.

The biological assessments for the Central Feeder Connection, Clay Street Connection, Mockingbird Connection, and La Sierra Pipeline Connection show that the following species have the potential to occur on site: Delhi Sands flower-loving fly, Santa Ana sucker, western yellow-billed cuckoo, coastal California gnatcatcher, least Bell's vireo, western burrowing owl, and Stephens' kangaroo rat (see **Table 4.3-C2, Special Status Wildlife Species with On-Site Occurrence Potential**).

Table 4.3-C1, Special-Status Wildlife Species with On-Site Occurrence Potential

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
INVERTEBRATES					
Delhi-sands flower-loving fly *Raphiomidas terminatus abdominalis*	Federal: FE State: None CDFG: None MSHCP: Covered	Fine, sandy soils, often associated with wholly or partially consolidated dunes referred to as the "Delhi" series. Vegetation consists of a sparse cover, including California buckwheat, California croton, deerweed, and evening primrose.	Potential to occur on site within areas of suitable habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
Riverside fairy shrimp *Streptocephalus woottoni*	Federal: FE State: None CDFG: None MSHCP: Covered with special svey requirements.	Restricted to deep seasonal vernal pools, vernal pool-like ephemeral ponds, and stock ponds.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
Vernal pool fairy shrimp *Branchinecta lynchi*	Federal: FT State: None CDFG: None MSHCP: Covered with special survey requirements.	Restricted to seasonal vernal pools. Prefers cool-water pools that have low to moderate dissolved solids.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
FISH					
Arroyo chub *Gila orcutti*	Federal: None State: None CDFG: CSC MSHCP: Covered	Found in slow-moving or backwater sections of warm to cool (10-24C) streams with mud or sand substrates. Depths are typically greater than 40 cm.	Potential to occur on site within tributaries to and within the Santa Ana River.	Potential to occur on site within tributaries to and within the Santa Ana River.	Not expected to occur on site due to lack of habitat.
Santa Ana speckled dace *Rhinichthys osculus*	Federal: None State: None CDFG: CSC MSHCP: Not Covered	Occurs in the headwaters of the Santa Ana and San Gabriel Rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temperatures of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	Potential to occur on site within tributaries to Santa Ana River.	Potential to occur on site within Santa Ana River. CNDDB record at Santa Ana River crossing.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None CDFG: CSC MSHCP: Covered	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Potential to occur on site within tributaries to the Santa Ana River. Portions of site also located within Federally-designated critical habitat.	Potential to occur on site within the Santa Ana River. CNDDB record at Santa Ana River crossing. Site also located within Federally-designated critical habitat.	Not expected to occur on site due to lack of habitat.
REPTILES					
Coast (San Diego) horned Lizard *Phrynosoma coronatum* (*blainvillii* population)	Federal: None State: None CDFG: CSC MSHCP: Covered	Chaparral and coastal sage scrub	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.
Northern red-diamond rattlesnake *Crotalus exsul*	Federal: None State: None CDFG: CSC MSHCP: Covered	Habitats with heavy brush and rock outcrops, including coastal sage scrub and chaparral.	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.
Orange-throated whiptail *Cnemidophorus hyperythrus*	Federal: None State: None CDFG: CSC MSHCP: Covered	Coastal sage scrub, chaparral, non-native grassland, oak woodland, and juniper woodland.	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.
Southwestern pond turtle *Actinemys marmorata pallida*	Federal: None State: None CDFG: CSC MSHCP: Covered	Prefers streams, large rivers, slow-moving sloughs, and quiet waters. Aquatic habitats with adequate vegetative cover and exposed banks are preferred, but significant time is spent on upland terrestrial habits as well. Abundant basking sites and cover necessary, including logs, rocks, submerged vegetation, and undercut banks.	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Two-striped garter snake *Thamnophis hammondii*	Federal: None State: None CDFG: CSC MSHCP: Not Covered	Generally found around pools, creeks, cattle tanks, and other water sources, often in rocky areas, in oak woodland, chaparral, brushland, and coniferous forest.	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.
BIRDS					
Burrowing owl *Athene cunicularia*	Federal: FSC State: None CDFG: CSC MSHCP: Covered, site occurs within the burrowing owl survey area.	Shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Potential to occur on site within suitable habitat.		Potential to occur on site within suitable habitat.
Coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: None CDFG: CSC MSHCP: Covered	Low elevation coastal sage scrub and coastal bluff scrub.	Low potential to occur on site within sage scrub patches.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
Golden eagle *Aquila chrysaetos*	Federal: None State: None CDFG: FP MSHCP: Covered	In southern California, occupies grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nests on rock outcrops and ledges.	Low potential to occur on site for foraging. No nesting habitat on site.	Low potential to occur on site for foraging. No nesting habitat on site.	Not expected to occur on site due to lack of habitat.
Least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE CDFG: None MSHCP: Covered with special survey requirements.	Dense riparian shrubbery, preferably where flowing water is present.	Potential to occur on site within suitable habitat.	Potential to occur on site within suitable habitat. CNDDB record at Santa Ana River crossing. Site located within Federally-designated critical habitat.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Loggerhead shrike *Lanius ludovicianus*	Federal: FSC State: None CDFG: CSC MSHCP: Covered	Forages over open ground within areas of short vegetation, pastures with fence rows, old orchards, mowed roadsides, cemeteries, golf courses, riparian areas, open woodland, agricultural fields, desert washes, desert scrub, grassland, broken chaparral and beach with scattered shrubs.	Potential to occur on site.	Potential to occur on site.	Potential to occur on site.
Long-eared owl *Asio otus*	Federal: None State: None CDFG: CSC MSHCP: Covered	Inhabit dense vegetation close to grasslands, as well as open forests shrub lands from sea level up to 2000 m elevation. They are common in tree belts along streams of plains and even desert oases. They can also be found in shelterbelts, small tree groves, thickets surrounded by wetlands, grasslands, marshes and farmlands.	Not expected to occur on site due to lack of habitat.	Potential to occur on site within suitable habitat associated with the Santa Ana River.	Not expected to occur on site due to lack of habitat.
Northern harrier (nesting) *Circus cyaneus*	Federal: None State: None CDFG: CSC MSHCP: Covered	Found mainly in open habitats such as fields, savannas, meadows, marshes, upland prairies, and desert steppe. Also occur in agricultural areas and riparian zones. Densest populations are found in large expanses of undisturbed, open habitats with dense, low vegetation.	Low potential to occur on site.	Low potential to occur on site.	Not expected to occur on site due to lack of habitat.
Southwestern willow flycatcher *Empidonax traillii extimus*	Federal: FE State: SE CDFG: None MSHCP: Covered with special survey requirements.	Breeds in dense riparian habitats along rivers, streams, or other wetlands.	Not expected to occur on site due to lack of habitat.	Potential to occur on site. Site located in the vicinity of federally-designated critical habitat.	Not expected to occur on site due to lack of habitat.
Tricolored blackbird (nesting colony) *Agelaius tricolor*	Federal: FSC State: None CDFG: CSC MSHCP: Covered	Found in cattail or tule marshes; forages in fields and farms.	Potential to forage on site, but site does not support suitable nesting habitat.	Potential to forage on site, but site does not support suitable nesting habitat.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Western yellow billed cuckoo *Coccyzus americanus*	Federal: Candidate State: SE CDFG: None MSHCP: Covered	Prefers moist thickets, willows, overgrown pastures, and orchards.	Not expected to occur on site due to lack of habitat.	Potential to occur on site.	Not expected to occur on site due to lack of habitat.
White-tailed kite (nesting) *Elanus leucurus*	Federal: FSC State: None CDFG: CFP MSHCP: Covered	Usually found in open groves, river valleys, marshes and grasslands. Preference for perching and nesting and open ground.	Potential to occur on site.	Potential to occur on site	Not expected to occur on site due to lack of habitat.
Yellow-breasted chat *Icteria virens*	Federal: None State: None CDFG: CSC MSHCP: Covered	Restricted to woodland edges and dense riparian thickets in dry, open habitats. Dense cover is important for foraging. Found frequently in farms, overgrown fields and abundant thickets.	Potential to occur on site.	Potential to occur on site.	Not expected to occur on site due to lack of habitat.
Yellow warbler *Dendroica petechia*	Federal: None State: None CDFG: CSC MSHCP: Covered	Preferred habitats include edges of marshes and swamps, willow-lined streams, leafy bogs, thickets, orchards, farmlands, forest edges, and suburban yards and gardens.	Potential to occur on site.	Potential to occur on site	Not expected to occur on site due to lack of habitat.
MAMMALS					
American badger *Taxidea taxus*	Federal: None State: None CDFG: CSC MSHCP: Covered	Prefer to live in dry, open grasslands, fields, and pastures. Found from high alpine meadows to sea level.	Potential to occur on site.	Potential to occur on site.	Not expected to occur on site due to lack of habitat.
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	Federal: None State: None CDFG: CSC MSHCP: Covered with special survey requirements.	Fine, sandy soils in coastal sage scrub and grasslands.	Potential to occur on site within suitable habitat near the Santa Ana River. CNDDB record occurs within the Study Area in San Bernardino County.	Low potential to occur on site within suitable habitat near the Santa Ana River.	Not expected to occur on site due to lack of habitat.
Northwestern San Diego pocket mouse *Chaetodipus fallax*	Federal: None State: None CDFG: CSC MSHCP: Covered	Coastal sage scrub, sage scrub/grassland ecotones, and chaparral.	Low potential to occur on site within suitable habitat .	Low potential to occur on site within suitable habitat near the Santa Ana River.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None CDFG: CSC MSHCP: Not Covered	Occurs in a variety of arid areas in Southern California including pine-juniper woodlands, desert scrub, palm oasis, desert wash and desert riparian. Associated with rocky areas and high cliffs.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.	Not expected to occur on site due to lack of suitable habitat.
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Federal: FE State: None CDFG: CSC MSHCP: Covered	Typically found in Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and floodplains, and along washes with nearby sage scrub.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Federal: None State: None CDFG: CSC MSHCP: Covered	Occupies a variety of habitats, but is most common among shortgrass habitats. Also occurs in sage scrub, but needs open habitats.	Potential to occur on site.	Potential to occur on site.	Not expected to occur on site due to lack of habitat.
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: None State: None CDFG: CSC MSHCP: Covered	Found in a variety of shrub and desert habitats, primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
Southern grasshopper mouse *Onychomys torridus ramona*	Federal: None State: None CDFG: CSC MSHCP: Not Covered	Found in low arid scrub and semi-scrub vegetation. Use open areas and microhabitats dominated by gopher mounds and burrows.	Low potential to occur on site within suitable habitat.	Low potential to occur on site within suitable habitat.	Not expected to occur on site due to lack of habitat.
Stephens' kangaroo rat *Dipodomys stephensi*	Federal: FE State: ST CDFG: None MSHCP: Covered	Open grasslands or sparse shrublands with less than 50% vegetation cover during the summer and sandy or sandy loam soils.	Site occurs outside of known range.	Site occurs outside of known range.	Site occurs outside of known range.
Western mastiff bat *Eumops perotis californicus*	Federal: None State: None CDFG: CSC MSHCP: Covered	Lower and upper Sonoran desert scrub near cliffs, preferring the rugged rocky canyons with abundant crevices.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Realignment - Northern Reach	Potential for Occurrence On Site: Proposed Realignment – Central Reach	Potential for Occurrence On Site: Monroe Street Alternative
Source: Glenn Lukos Associates, 2008 **Nesting-Birds** are considered special-status only when nesting. **Wintering-Birds** only occur in Southern California during the winter; they do not nest in Southern California. **Federal** FE – Federally Endangered FT – Federally Threatened FPT – Federally Proposed Threatened **FSC – Federal Species of Concern** S-Sensitive (USDA Forest Service)			**State** SE – State Endangered ST – State Threatened **CDFG** CSC – California Species of Concern CFP – California Fully-Protected Species		

Table 4.3-C2, Special-Status Wildlife Species with On Site Occurrence Potential

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Central Feeder Connection	Potential for Occurrence On Site: Proposed Clay Street Connection	Potential for Occurrence On Site: Mockingbird Connection	Potential for Occurrence On Site: La Sierra Pipeline Connection
INVERTEBRATES						
Delhi-sands flower-loving fly *Raphiomidas terminatus abdominalis*	Federal: FE State: None CDFG: None MSHCP: Covered	Fine, sandy soils, often associated with wholly or partially consolidated dunes referred to as the "Delhi" series. Vegetation consists of a sparse cover, including California buckwheat, California croton, deer weed, and evening primrose.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
FISH						
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None CDFG: CSC MSHCP: Covered	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
REPTILES						
Sierra Madre yellow-legged frog *Rana mucosa*	Federal: FE State: None CDFG: CSC MSHCP: Not covered	Sunny riverbanks, meadow streams, isolated pools, lake boarders, and rocky stream courses. Can be found in ponds, tarns, lakes, and streams at moderate to high elevations.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Central Feeder Connection	Potential for Occurrence On Site: Proposed Clay Street Connection	Potential for Occurrence On Site: Mockingbird Connection	Potential for Occurrence On Site: La Sierra Pipeline Connection
BIRDS						
Bald Eagle *Haliaeetus leucocephalus*	Federal: Delisted State: SE CDFG: None MSHCP: Covered	Most bald eagle nests are built in dominant ponderosa or sugar pine trees, within a mile of a lake, reservoir, or stream.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat
Burrowing owl *Athene cunicularia*	Federal: FSC State: None CDFG: CSC MSHCP: Covered, site occurs within the burrowing owl survey area.	Short grass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Potential to occur on site within suitable habitat.	Potential to occur on site within suitable habitat.	Sign observed on site. Potential to occur on site within suitable habitat	Not expected to occur on site due to lack of habitat
Coastal California gnatcatcher *Polioptila californica*	Federal: FT State: None CDFG: CSC MSHCP: Covered	Low elevation coastal sage scrub and coastal bluff scrub.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat.	High probability of occurrence on site within suitable habitat	Not expected to occur on site due to lack of habitat.
Least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE CDFG: None MSHCP: Covered with special survey requirements.	Dense riparian shrubbery, preferably where flowing water is present.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat.
Southwestern willow flycatcher *Empidonax traillii extimus*	Federal: FE State: SE CDFG: None MSHCP: Covered with special survey requirements.	Breeds in dense riparian habitats along rivers, streams, or other wetlands.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.

Species Name	Status	Habitat Requirements	Potential for Occurrence On Site: Proposed Central Feeder Connection	Potential for Occurrence On Site: Proposed Clay Street Connection	Potential for Occurrence On Site: Mockingbird Connection	Potential for Occurrence On Site: La Sierra Pipeline Connection
Western yellow billed cuckoo *Coccyzus americanus*	Federal: Candidate State: SE CDFG: None MSHCP: Covered	Prefers moist thickets, willows, overgrown pastures, and orchards.	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat	Not expected to occur on site due to lack of habitat.
MAMMALS						
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Federal: FE State: None CDFG: CSC MSHCP: Covered	Typically found in Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and floodplains, and along washes with nearby sage scrub.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.
Stephens' kangaroo rat *Dipodomys stephensi*	Federal: FE State: ST CDFG: None MSHCP: Covered	Open grasslands or sparse shrublands with less than 50% vegetation cover during the summer and sandy or sandy loam soils.	Not expected to occur on site due to lack of habitat.	Not expected to occur on site due to lack of habitat.	High probability of occurrence on site within suitable habitat. Evidence of kangaroo rats observed on site; however, species could not be determined	Not expected to occur on site due to lack of habitat.

Source: Brian F. Smith and Associates, 2009

Nesting-Birds are considered special-status only when nesting.
Wintering-Birds only occur in Southern California during the winter; they do not nest in Southern California.

Federal

FE – Federally Endangered
FT – Federally Threatened
FPT – Federally Proposed Threatened
FSC – Federal Species of Concern
S-Sensitive (USDA Forest Service)

State

SE – State Endangered
ST – State Threatened

CDFG

CSC – California Species of Concern
CFP – California Fully-Protected Species

4.3.2 Summary of the 2005 Project Alignment Certified Program EIR for the Riverside-Corona Feeder Project

2005 Alignment Design Considerations/Avoidance

Segments of the proposed RCF 2005 Alignment Alternative that extend across the Santa Ana River and other watered areas are planned to include jack and boring underneath the waterways where feasible. This would avoid impacts to the waterways, associated riparian vegetation, and habitat for sensitive species. The majority of pipelines will be constructed within the existing roadways, where feasible, thus avoiding impacts to biological resources which may be located adjacent to the roads such as habitats for Stephens' kangaroo rat, Delhi sands flower-loving fly, and coastal California gnatcatcher.

2005 Alignment Potential Significant Impacts/Environmental Consequences

Biological Resources were addressed in Section II-3 (pp. II-3-1 through II-3-23) of the 2005 Certified Program EIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment), which are hereby incorporated by reference. The following discussion is a summary of the Biological Resources section of the 2005 PEIR:

Threshold: *Have substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations or by the CDFG or the USFWS.*

The 2005 Project Alignment was found to have potential direct impacts to: Santa Ana River woolly-star, slender-horned spineflower, arroyo southwestern toad, least Bell's vireo, southwestern willow flycatcher, San Bernardino kangaroo rat, and Santa Ana sucker Critical Habitat; and less than significant impacts to white-tailed kite, coastal California gnatcatcher, bald eagle, and Stephens' kangaroo rat. Through implementation of **MM Bio 1 – 5** impacts to special status species were considered less than significant.

Threshold: *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS.*

Sensitive riparian habitat was identified in several locations along the 2005 Project Alignment including southern willow scrub and mule-fat scrub. Where the proposed project alignment crossed under the Santa Ana River, the vegetation community was characterized by dense riparian thickets dominated by arroyo willow and red willow. At the west side of Van Buren Boulevard, the floodplain of Mockingbird Canyon Creek supported southern willow sage scrub and mule-fat scrub. South of the Corona Landfill, a minor unnamed drainage supported a degraded version of the above vegetation communities. Degraded mule-fat scrub was also present where the proposed project crosses the Springbrook Wash along the Gage Canal siphon, south of Spring Street in the City of Riverside. Due to the low quality of the Southern Willow

Scrub and Mule-fat Scrub habitats along the 2005 Project Alignment, it was found that impacts to these communities would be less than significant.

A narrow band of Riversidean sage scrub was identified adjacent to the 2005 Project Alignment on the steep south bank of Springbrook drainage at the crossing location. It was found that the Riversidean sage scrub in this area was severely limited by its relative isolation and the presence of citrus orchards adjacent to the north, non-native grassland adjacent to the south, and industrial and residential development to the west and northwest. Impacts were therefore considered less than significant.

The proposed extraction of water prior to boring activities at the Santa Ana River where groundwater levels are high was found to potentially result in significant impacts to the health of existing riparian communities, the magnitude of which was determined to depend on the seasonal timing of the activities. Additionally, if undertaken, open trench methods were found to have the potential to impact the Springbrook Wash. Trenching activities would involve temporary physical disturbance to the Santa Ana River channel and removal of existing riparian vegetation within the construction footprint. Impacts to the riparian community from trenching activities were considered significant. This is discussed further on page II-3-16 of the 2005 PEIR. Through implementation of mitigation measures **MM Bio 6, 7, and 10** potential impacts to riparian habitat and other sensitive communities were reduced to less than significant levels.

Threshold: *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

A formal delineation for either state or federal wetland jurisdiction was not conducted for the 2005 PEIR due to the programmatic level of the project and analysis. However, United States Army Corp of Engineers (ACOE) "waters of the United States" per Sections 401-404 of the Federal Clean Water Act and "streambeds" per Section 1600-1603 of the California Fish and Game Code (CDFG) were observed along the 2005 Project Alignment including the Santa Ana River and Springbrook Wash.

Micro-tunneling and boring were identified as the preferred method of crossing all jurisdictional areas. However, if determined not feasible, open trenching would be utilized. While micro-tunneling techniques, in themselves, would result in no direct impacts to wildlife or vegetation, dewatering was determined to have potential adverse impacts to the riparian vegetation communities, the magnitude of which would depend on the seasonal timing of the activities. Impacts due to micro-tunneling were anticipated to be minor and temporary, possibly involving stress, desiccation, and potential defoliation. These impacts were considered self-correcting once normal hydrology resumed. Open trenching techniques, if utilized, were determined to likely result in adverse impacts to the Santa Ana River, a river that is in the jurisdiction of the CDFG, ACOE, and California Regional Water Quality Control Board (WQCB), its tributaries, other drainages, and jurisdictional riparian vegetation along the 2005 Project Alignment. Trenching activities for pipeline installation would result in excavation activities within the river channel, within federally protected "waters of the United States."

Micro-tunneling and boring activities under the Santa Ana River and all other drainages were found to have the potential to result in the leakage of construction-related materials and subsequently degrade sub-surface flows and/or surface flows, which may result in significant impacts to the existing riparian habitat. Through implementation of mitigation measures **MM Bio 6** through **14**, potential impacts to wetlands and other jurisdictional features were reduced to less than significant levels.

Threshold*: Interfere substantially with the movement of any resident or migratory fish or wildlife species; or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery.*

According to the 2005 PEIR, most of the 2005 Project Alignment and surrounding lands were geographically located in highly degraded areas resulting from industrial and residential development. However, the 2005 Project Alignment was found to traverse across several local wildlife corridors.

It was found that due to the existing patterns of urbanization and very limited wildlife habitat within the 2005 Project Alignment vicinity, the subsurface nature of the proposed pipeline, and the small footprint of the construction zone, impacts on the movement of any resident or migratory fish or wildlife species or on established native resident or migratory wildlife corridors were expected to be less than significant.

Threshold: *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Most of the jurisdictions along the project alignment, including the Cities of San Bernardino, Colton, Riverside, and Corona and the County of Riverside, have policies regulating the removal of or injury to trees and other landscaping. However these policies protect trees as an aesthetic resource rather than a biological resource. These policies are discussed further within the Aesthetics section of the 2005 PEIR (Section VIII.A).

Threshold: *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.*

The 2005 Project Alignment is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Area. Western Municipal Water District (WMWD) is not a permittee of the MSHCP however WMWD has the option of participating in the MSHCP as a Special Participating Entity in order to obtain incidental take coverage under the Plan for impacts to listed species and/or habitat. If WMWD decides to participate, impacts to protected species covered by the MSHCP would be mitigated through compliance with the MSHCP.

If WMWD chooses not to participate in the MSHCP, any impacts to protected species as a result of the proposed project will need to be mitigated through the "regular" channels of the resource agencies including the potential need to secure a "take" permit or authorization from the U.S. Fish and Wildlife Service.

It was determined in the 2005 PEIR that the 2005 Project Alignment project extends through primarily developed, urban areas, and areas are not included in a Criteria Area Cell under the MSHCP. Therefore, the project will not conflict with the MSHCP, regardless of whether or not WMWD decides to participate in the MSHCP.

As there were no other HCP's that the proposed project would conflict with, impacts were considered less than significant.

2005 Project Alignment Mitigation Measures

The following Mitigation Measures were adopted in the 2005 PEIR to reduce potentially significant impacts related to biological resources:

MM Bio 1: In Reach A, the dewatering activities should take place during the period from October 1 through the end of February. This is within the season when the dominant plant species of these riparian communities are dormant. Dewatering outside of this period would subject these communities to stress, desiccation, and potential defoliation. In addition, adherence to this suggested schedule avoids the generally accepted breeding chronology for nesting by the least Bell's vireo and southwestern willow flycatcher in southern California (USFWS b, Sogge *et al.*), obviating the need for focused surveys that may be required, due to the project's potential to have significant noise impacts to these two listed migratory species. This suggested schedule also avoids the breeding season of the federally listed arroyo toad, generally regarded as mid-March through July 1 (USFWS c), thereby avoiding potential impacts to this species as well. Impacts to the arroyo toad during the breeding season would be direct, including physical damage to mature individuals and interference with breeding activities. Should it not be feasible to adhere to this schedule, additional mitigation measures are required, as specified below.

MM Bio 2: Should the construction occur during the breeding season for the arroyo toad (March 15 – July 1), a protocol-level survey shall be conducted at the Santa Ana River (Reach A), to determine presence/absence. If the arroyo toad is found to be present in the vicinity of Reach A, incidental take permits (through either Section 7 or Section 10) shall be applied for. The survey reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 3: Should construction occur during the breeding season for the least Bell's vireo or southwestern willow flycatcher (March 15 through September 15), protocol-level surveys shall be conducted prior to construction at the following locations: the Santa Ana River (Reach A), Spring Brook wash (Reach B), the riparian vegetation along the Mockingbird Canyon alignment (Reach E), and the drainage located south of the Corona Landfill (Reach H). Should any of these species be detected, a temporary noise barrier shall be used during construction, at the appropriate location(s), in coordination with CDFG and the USFWS. The noise barrier shall attenuate noise levels to 60 dBA or less at the edge of breeding habitat. If surveys indicate these species are not present, this measure will not be required. Protocol-level surveys reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 4: Should construction occur during the breeding season for the coastal California gnatcatcher (March 15 through September 15), a protocol-level survey shall be conducted prior

to construction at Spring Brook wash (Reach B), in the vicinity of the proposed project. Should coastal California gnatcatcher be detected, a temporary noise barrier shall be used during construction, at the appropriate location(s), in coordination with CDFG and the USFWS. The noise barrier shall attenuate noise levels to 60 dBA or less at the edge of breeding habitat. These protocol-level survey reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 5: In addition to use of the temporary noise barrier, a qualified on site noise monitor (approved by the local jurisdiction and WMWD) shall be present during all construction activities conducted near habitat that has been identified in the surveys to host the arroyo toad, least Bell's vireo, southwestern willow flycatcher, or coastal California gnatcatcher. The noise monitor shall ensure, through on site noise meter readings, that the temporary barriers are effective at reducing construction noise to 60 dBA or less. If 60 dBA is exceeded, the noise monitor shall work with the Contractor to make adjustments in the barriers or construction activities to reduce noise to 60 dBA or less.

MM Bio 6: Construction staging areas shall be located outside of riparian areas and away from (to the greatest distance feasible) riparian areas.

MM Bio 7: Construction activities adjacent to riparian and/or wetland areas shall be minimized where feasible. If open cut trenching is used in the Spring Brook drainage crossing instead of boring, direct loss of wetlands may occur and permits and mitigation will be required. Such mitigation may include restoration on site, removal of invasive species, or off-site purchase. See **MM Bio 8**, below.

MM Bio 8: A formal jurisdictional delineation for potential State and Federal wetland impacts will be conducted at Reaches A and B.

MM Bio 9: A project-wide 1602 Streambed Alteration Agreement prepared in accordance with CDFG requirements shall be secured by WMWD as the jurisdictional delineation warrants and shall include mitigation measures that are sufficient to reduce direct and indirect impacts to riparian habitat to a level below significant. The Agreement may include some or all of the following:

- Avoid impacts where possible by shifting the project location or construction timing.
- Minimize impacts.
- Remove invasive species.
- Purchase off-site habitat credits.
- Create and/or restore natural communities.
- Avoid sensitive habitats by placing construction staging areas as far away from them as is feasible.
- Limit construction activity to daylight hours to minimize potential impacts related to artificial lighting.
- Require the presence of a qualified biological monitor during all construction activities that are within or near sensitive habitats and areas that have been identified to host the arroyo toad, least Bell's vireo, southwestern willow flycatcher, coastal California gnatcatcher, Stephens' kangaroo rat, or San Bernardino kangaroo rat.

MM Bio 10: An ACOE Section 404 permit shall be secured as the jurisdictional delineation warrants. The Nation-wide Section 404 Permit will apply to the project for linear utility projects. The Corps may require the implementation of measures similar to those listed for the Section 1602 Streambed Alteration Agreement as part of the Section 404 Permit approval process. Implementation of these measures will mitigate potential impacts to the bed and banks of the Santa Ana River and any other jurisdictional drainage.

Should open-trenching techniques be utilized to install the pipeline across the Santa Ana River, consultation with the US Fish and Wildlife Service will be initiated to determine whether or not the proposed project would result in significant impacts to Critical Habitat for the Santa Ana sucker. If warranted incidental take permits (through Section 7) shall be applied for. The US Fish and Wildlife Service shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 11: In conjunction with the ACOE Section 404 Permit, a Section 401 Water Quality Certification from the California Regional Water Quality Control Board shall be secured.

MM Bio 12: Any discharge into navigable waters, or "waters of the United States" shall also comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act. Compliance with these provisions shall result in certification from the Regional Board that verifies that the project complies with all water quality standards.

MM Bio 13: California State Water Resources Control Board (SWRCB) dewatering Permits, submitted for dewatering activities associated with all boring and micro-tunneling, will be required and may specify typical mitigation measures required in a dewatering permit:

- Characterize the quality of the water that will be discharged
- Treat water to be discharged to SWRCB standards prior to discharge
- Delineate extent of contamination
- Specify contaminants
- Identify beneficial uses
- Identify treatment

MM Bio 14: Should open-trenching techniques be utilized to install the pipeline across the Santa Ana River, a protocol-level survey shall be conducted at the Santa Ana River (Reach A), to determine presence/absence of the Santa Ana River woolly-star and slender-horned spineflower within the construction footprint. If Santa Ana River woolly-star or slender-horned spineflower are found to be present in the footprint, incidental take permits (through Section 7) shall be applied for. The survey reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

2005 Project Alignment Determination of Significance under CEQA

The certified EIR prepared for the 2005 Project Alignment found that with implementation of Mitigation Measures **MM Bio 1** through **14**, impacts to biological resources would be less than significant.

4.3.3 Analysis of the Riverside-Corona Feeder Project Realignment Alternatives

Relation Realignment Alternatives to the 2005 Project Alignment Alternative

The impacts and findings discussed in the 2005 PEIR related to biological resources are applicable to both the 2005 Project Alignment and the project Realignment Alternative and Realignment Alternative with Additional Connections, as appropriate. The Realignment Alternatives substitute a new alignment for that portion of the 2005 Project Alignment identified as Reaches A, B, C, and D in the 2005 PEIR. The analysis of biological resources contained within the 2005 PEIR does not specifically address the proposed realignment. However, the analysis conducted in this section of the SEIR/EIS is provided to make the 2005 PEIR adequate for the entire Riverside-Corona Feeder Project under CEQA and to cover all alignments and facilities for purposes of NEPA.

Thresholds of Significance

Western Municipal Water District has not established local CEQA significance thresholds as described in Section 15064.7 of the State CEQA Guidelines. However, WMWD's "Environmental Checklist" for the subject project (see Appendix A of this document) indicates that impacts to biological resources may be considered potentially significant if the project would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game, or the U.S. Fish and Wildlife Service.
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U. S. Fish and Wildlife Service.
- have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Related Regulations

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) prohibits "take" (harm or harassment [including to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct] of individuals of a protected species and, under certain circumstances, the destruction of habitat) of a Federally listed Endangered or Threatened species and will require incidental take permits or authorization through Section 7 Consultation. If the Federal action agency (USBR) determines that a project may adversely affect a listed species or designated critical habitat, formal consultation with the USFWS is required. The determination of whether or not the proposed action would be likely to jeopardize the species or adversely modify its critical habitat is contained in the biological opinion. If a jeopardy or adverse modification determination is made, the biological opinion must identify any reasonable and prudent alternatives that could allow the project to move forward.

California Endangered Species Act

California Endangered Species Act (Fish and Game Code 2050 et seq.) (CESA) establishes that it is the policy of the state to conserve, protect, restore, and enhance Threatened or Endangered species and their habitats. CESA mandates that state agencies should not approve projects which would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. CESA requires state lead agencies to consult with the Department of Fish and Game (CDFG) during the CEQA process to avoid jeopardy to threatened or endangered species. CESA prohibits any person from taking or attempting to take a species listed as endangered or threatened (Fish and Game Code Section 2080). Section 2080 provides the permitting structure for CESA. The "take" of a state listed endangered or threatened species or candidate species will require incidental take permits as authorized by the CDFG.

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code Sections 3503, 3503.5, and 3800 prohibit the take, possession, or destruction of any birds, their nests or eggs. Although the majority of the Realignment Alternatives consist of urban residential and commercial development certain common and special-status bird species, especially raptors, may utilize the site for breeding and/or seasonal foraging. The proposed project will be required to comply with the MTBA and California Fish and Game Code, which prohibits the take of migratory and native bird species or their nests considered to utilize the site.

Federal Clean Water Act

Pursuant to Section 404 of the Clean Water Act, the United States Army Corps of Engineers (ACOE) regulates discharges of dredged and/or fill material into waters of the United States. "Waters of the United States" are defined in ACOE regulations at 33 C.F.R. Part 328.3(a). Navigable waters of the United States are those waters of the United States that are navigable in the traditional sense. Waters of the United States is a broader term than navigable waters of the

United States and includes adjacent wetlands and tributaries to navigable waters of the United States and other waters where the degradation or destruction of which could affect interstate or foreign commerce.

California Fish and Game Code

The California Department of Fish and Game (CDFG), under Section 1600 of the Fish and Game Code, regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream, or lake, which supports fish or wildlife. CDFG defines a stream, including creeks and rivers, as "a body of water that flows at least periodically or intermittently through a bed or channel having surface or subsurface flow that supports or has supported riparian vegetation." Lakes under the jurisdiction of CDFG may also include man-made features.

Stephens' Kangaroo Rat Habitat Conservation Plan

Portions of the alternative alignments are located within the boundary of the adopted Habitat Conservation Plan (HCP) for the endangered Stephens' kangaroo rat (SKR) implemented by the Riverside County Habitat Conservation Agency (RCHCA). The SKR HCP mitigates impacts from development on the SKR by establishing a network of preserves and a system for managing and monitoring them. Through implementation of the SKR HCP, more than $45 million has been dedicated to the establishment and management of a system of regional preserves designed to ensure the persistence of SKR in the plan area. This effort has resulted in the permanent conservation of approximately 50% of the SKR-occupied habitat remaining in the HCP area. Through direct funding and in-kind contributions, SKR habitat in the regional reserve system is managed to ensure its continuing ability to support the species.

Riverside County Integrated Plan (RCIP), Multiple Species Habitat Conservation Plan (MSHCP)

The MSHCP serves as a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP), pursuant to Section (a)(1)(B) of the federal Endangered Species Act of 1973, as well as a Natural Communities Conservation Plan (NCCP) under the State NCCP Act of 2001. The plan "encompasses all unincorporated Riverside County land west of the crest of the San Jacinto mountains to the Orange County line, as well as the jurisdictional areas of the Cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning Beaumont, Calimesa, Perris, Hemet, and San Jacinto." The overall biological goal of the MSHCP is to conserve covered species and their habitats, as well as maintain biological diversity and ecological processes while allowing for future economic growth within a rapidly urbanizing region.

Federal and state wildlife agencies approved permits required to implement the MSHCP on June 22, 2004. Implementation of the plan will conserve approximately 500,000 acres of habitat, including land already in public or quasi-public ownership and about 153,000 acres of land in private ownership that will be purchased or conserved through other means. The money for purchasing private land will come from development mitigation fees as well as state and federal funds.

The MSHCP includes a program for the collection of development mitigation fees, policies for the review of projects in areas where habitat must be conserved, and policies for the protection of riparian areas, vernal pools, and narrow endemic plants. It also includes a program for performing plant, bird, reptile, and mammal surveys.

The intent of the MSHCP is to ensure the survival of a range of plants and animals and avoid the cost and delays of mitigating biological impacts on a project-by-project basis. It would allow the incidental take of currently listed species and their habitat from development and covered improvement projects. It would also allow the incidental take of species that might be listed in the future. The MSHCP could be used as mitigation and permitting for incidental take associated with this project if WMWD applied to participate as a "Participating Special Entity" (PSE) with respect to this project under the MSHCP.

Design Considerations/Avoidance

Segments of the proposed RCF Realignment Alternative and Realignment Alternative with Additional Connections that extend across the Santa Ana River and other watered areas are planned to include jack and boring underneath the waterways where feasible. This would avoid impacts to the waterways, associated riparian vegetation, and habitat for sensitive species. The La Sierra Pipeline Connection will be constructed within the existing roadway all work, including staging areas and spoil storage, will occur within the existing roadway. This will avoid impacts to Stephens' kangaroo rat and California gnatcatcher habitat.

Potential Significant Impacts/Environmental Consequences

Threshold*: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U. S. Wildlife Service.*

Project-related impacts can occur in two forms, direct and indirect. Direct impacts are considered to be those that involve the loss, modification, or disturbance of plant communities, which in turn, directly affect the flora and fauna of those habitats. Direct impacts also include the destruction of individual plants or wildlife, which may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and population stability.

Other impacts, such as loss of foraging habitat, can occur, although these areas or habitats are not directly removed by project development; i.e., indirect impacts. Indirect impacts can also involve the effects of increases in ambient levels of noise or light, unnatural predators (i.e., domestic cats and other non-native animals), competition with exotic plants and animals, and increased human disturbance such as hiking and dumping of green waste on site. Indirect impacts may be associated with the subsequent day-to-day activities associated with project usage, such as increased traffic use, permanent concrete barrier walls or chain link fences, exotic ornamental plantings that provide a local source of seed, etc., which may be both short-term and long-term in their duration. These impacts are commonly referred to as "edge effects" and may result in a

slow replacement of native plants by exotics, and changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundances in habitats adjacent to project sites.

Special-Status Plant Species

According to the Biological Report prepared by Glenn Lukos, several special-status plant species were found to have limited potential to occur within the Northern or Central Reaches of the proposed RCF realignment including California satintail, chaparral sand-verbena, Parry's spineflower, prairie wedge grass, Robinson's pepper-grass, and smooth tarplant. No potential for special status plant species would occur within the Monroe Alternative Alignment.

The California satintail and prairie wedge grass were determined to have limited occurrence potential at the proposed Santa Ana River crossing. The chaparral sand-verbena was identified as having limited occurrence potential within areas containing sandy soils in sage-scrub, and chaparral. The Parry's spineflower was determined to have the potential to occur within areas containing sandy or rocky soils in open habitats of chaparral and coastal sage scrub. Robinson's pepper grass was determined to have low potential to occur on site in scattered coastal sage scrub areas. Smooth tarplant was identified as having low occurrence potential and would be located in areas with alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grasslands, and disturbed habitats.

Potential impacts to California satintail and Prairie wedge grass will be avoided through design considerations. Jack and bore construction will be used for pipeline installation across the Santa Ana River. Due to the disturbed nature of the pipeline and alignment and the limited area of linear construction impact, the proposed project is not anticipated to result in a significant loss of habitat for Chaparral sand-verbena, Parry's spineflower, Robinson's pepper-grass, and smooth tarplant. To further identify the potential direct impacts to these species (number of plants and/or area impacted), focused surveys are required for these species during their flowering season and prior to construction. If these plants occur within the construction footprint, impacts to these species may be considered significant. However, with implementation of **MM Bio 15**, impacts to special status plant species are considered **less than significant**.

The biological assessments for the Central Feeder Connection, Clay Street Connection, Mockingbird Connection, and La Sierra Pipeline Connection show that due to lack of suitable habitat, no special-status plant species will be impacted by the proposed project.

Special-Status Wildlife Species

No special-status animal species were observed within the proposed RCF realignment during field studies; however, 26 special-status animal species have the potential to occur within the study areas. The Monroe Alternative Alignment has no potential to support special status fish, reptiles, and mammals.

The proposed RCF realignment would consist mainly of temporary construction impacts. After construction, the disturbed area would be returned to level soil conditions and be allowed to return to its natural state. Within the alignment, American badger, if present, would only use the

alignment area for foraging. The area would represent a very small proportion of the badgers foraging range, and the temporary loss of habitat during construction would be considered **less than significant**. The San Diego black-tailed jackrabbit was not observed during the habitat assessments. According to the Biological Report, if black-tailed jackrabbit are present, the species is present only in very low densities; and, potential temporary impacts to occupied habitat during project implementation would be considered **less than significant**.

Southern grasshopper mouse, northwestern San Diego pocket mouse, and Los Angeles pocket mouse have potential to occur within the seven acres of Riversidean Sage Scrub habitat along the project alignment (Northern and Central Reaches). If those species are not present or occupied habitat is avoided, impacts would be less than significant. If present, potential impacts to Los Angeles pocket mouse and northwestern San Diego pocket mouse may be significant without mitigation. With implementation of **MM Bio 16a and 16b**, potential impacts to northwestern San Diego pocket mouse and Los Angeles pocket mouse are considered **less than significant**.

Stephens' kangaroo rats (SKR) have the potential to occur within grasslands of the Mockingbird Tank Site project area. Due to presence of suitable habitat, focused surveys for SKR were conducted in December 2009. Based on the trapping results, SKR occur on portions of the site, and there will be direct impacts to SKR as a result of project implementation. All of Lot 20 (within which the Mockingbird tank and pump station would be built) and related pipeline construction are located within occupied SKR habitat. The occupied habitat within Lot 20 and the proposed pipeline totals 6.4 acres. The total occupied habitat within the APE equals 13.8 acres however not all of this area will be disturbed by the project, indirect effects could result.

If occupied habitat is avoided, impacts would be less than significant. If present, potential impacts to SKR may be significant without mitigation. With implementation of **MM Bio 23**, potential impacts to SKR are considered **less than significant**.

The proposed RFC realignment contains suitable habitat for burrowing owl. However, no burrowing owls were identified within the proposed RCF realignment or within the Monroe Alternative Alignment. Due to the disturbed nature of the pipeline alignment and the limited area of linear construction impact, the Realignment Alternative is not anticipated to result in a significant loss of habitat for burrowing owl. Wintering season and nesting season focused protocol surveys were conducted in suitable burrowing owl habitat within the Central Reach in December 2008 and in March and April 2009 by Glenn Lukos Associates, Inc. No burrowing owls were observed during these survey efforts in the project alignment or 500-foot buffer area. Potential burrows were identified but did not contain diagnostic sign of burrowing owl. Although burrowing owls were not observed during these survey efforts, construction activities could adversely impact burrowing owls if they establish active nests within the project alignment prior to construction. Construction noise and activity may disrupt normal breeding and nesting patterns or activities of this species. **MM Bio 17** is required to reduce potential impacts from the project construction on burrowing owls to **less than significant** levels.

Burrowing owl has the potential to occur within suitable habitat adjacent to and/or within the footprints of the Central Feeder Connection, Clay Street Connection, and Mockingbird Connection project areas. Due to the disturbed nature of the pipeline alignment and the limited

area of linear construction impact, installation of the pipeline is not anticipated to result in a significant loss of habitat for burrowing owl. However, construction of the Mockingbird Tank and Clay Street Booster Station could result in the loss of foraging and burrow habitat, a potentially significant impact. Sign (pellets and suitable burrows) of burrowing owl presence was observed by the Brian F. Smith biologist during the Biological Assessment conducted in October 2009. Due to the presence of suitable habitat, wintering season protocol focused surveys for burrowing owl were conducted by Brian F. Smith and Associates during January and February of 2010. Within the Mockingbird Connection area, suitable habitat was encountered in several locations; however, neither burrowing owls nor evidence of their presence were observed. A nesting season survey (February 1 through August 31) will need to be conducted to confirm the presence/absence of burrowing owls at the Mockingbird Connection site. The Clay Street Connection area showed some marginal burrowing owl habitat; however, due to lack of suitable habitat, only pre-construction surveys would be required for both the Clay Street Connection and the Central Feeder Connection. **MM Bio 17** and **MM Bio 18** are required to reduce potential impacts from the project construction on burrowing owls to **less than significant** levels.

The coastal California gnatcatcher, a federally listed threatened species has the potential to occur in association with approximately seven acres of coastal sage scrub habitat scattered throughout the Northern Reach of the proposed RCF realignment. Coastal California gnatcatcher is not expected to occur within the Central Reach or Monroe Alternative alignments, due to the lack of suitable habitat. The temporary impacts from construction activities or permanent loss of occupied habitat would constitute a take of coastal California gnatcatcher, and would require authorization from USFWS. Any take of coastal California gnatcatcher would be expected to be a significant impact prior to mitigation. In order for the impact to be significant under CEQA, there would have to be a substantial adverse effect, either directly or through habitat modifications, on the coastal California Gnatcatcher. **MM Bio 19 and 24** below and **MM Bio 4 and 5** of the 2005 PEIR are required to reduce potential impacts from the project construction on coastal California gnatcatcher to **less than significant** levels.

The coastal California gnatcatcher also has the potential to occur in association with the Mockingbird Tank Site project area and adjacent to the La Sierra Pipeline Connection alignment. Due to the presence of suitable habitat, focused surveys for coastal California gnatcatcher were conducted in December of 2009 and January of 2010 at the Mockingbird Tank Site. One pair of gnatcatchers was detected in a northern patch of Riversidean sage scrub and the pair was observed on five of the nine visits to the Mockingbird Tank site. The sightings were clustered in an approximately 15 acre area. **MM Bio 4a and 4b, MM Bio 5 and MM Bio 24** below are required to reduce potential impacts from the project construction on coastal California gnatcatcher to **less than significant** levels.

The Delhi sands flower-loving fly is a federally listed endangered species with some potential to occur within the proposed RCF realignment. The Biological Report indicates records of Delhi sands flower-loving fly within the immediate vicinity of the proposed project and the Northern Reach of the alignment supports approximately 70 acres of potentially suitable habitat. The temporary or permanent loss of occupied habitat would constitute a take of Delhi sands flower-loving fly, and would require authorization from USFWS. Any take of Delhi sands flower-loving fly would be expected to be a significant impact prior to mitigation. A focused survey shall be

performed to determine presence or absence of Delhi sands flower-loving fly for suitable areas of the Northern Reach located in San Bernardino County. If the habitat is not occupied by Delhi sands flower-loving fly, then impacts to the species would be less than significant. If the habitat is occupied, take authorization from USFWS would be required. **MM Bio 20a and 20b** below are required to reduce potential impacts from the project construction on Delhi sands flower-loving fly to **less than significant** levels. In Riverside County, the project alignment passes through criteria cells 22 and 55 which include Delhi sands suitable for DSF habitat. Compliance with the MSHCP and payment of MSHCP fees will mitigate to a level of less than significant within this portion of Riverside County.

The least Bell's vireo is a federally-listed endangered species that is known to occur within the Santa Ana River (Central Reach) and has some potential to occur in association with southern willow scrub scattered throughout the proposed RCF realignment (Northern Reach). The majority of potentially suitable habitat is associated with the Santa Ana River crossing. The Central Reach traverses federally-designated critical habitat at the Santa Ana River. Potential impacts to least Bell's vireo will be avoided through design considerations. Jack and bore construction will be used for pipeline installation across the Santa Ana River. The temporary or permanent loss of occupied habitat within the Northern Reach would constitute a take of least Bell's vireo, and would require authorization from USFWS. Any take of least Bell's vireo would be expected to be a significant impact prior to mitigation. Compliance with **MM Bio 3a and 3b,** and **MM Bio 5** would reduce potential impacts from the project construction on least Bell's vireo to **less than significant** levels.

The southwestern willow flycatcher is a federally and state-listed endangered species and has some potential to occur in association with riparian forest scattered throughout the proposed RCF realignment (Northern Reach). The majority of potentially suitable habitat is associated with the Santa Ana River crossing (Central Reach). Potential impacts to southwestern willow flycatcher will be avoided through design considerations. Jack and bore construction will be used for pipeline installation across the Santa Ana River. The temporary or permanent loss of occupied habitat within the Northern Reach would constitute a take of southwestern willow flycatcher, and would require authorization from USFWS. Any take of southwestern willow flycatcher would be expected to be a significant impact prior to mitigation. With compliance with **MM Bio 3a and 3b** and **MM Bio 5**, impacts would be considered **less than significant**.

The Santa Ana sucker, a federally listed threatened species has some potential to occur in association with perennial streambed scattered throughout the Northern and Central Reaches of the proposed RCF realignment. The arroyo chub and Santa Ana speckled dace are also known to occur within the same areas. The Realignment Alternative also traverses federally-designated critical habitat at several locations, of which at least one occurs in San Bernardino County. Potential impacts to these species in the Central Reach will be avoided through design considerations. Jack and bore construction will be used for pipeline installation across the Santa Ana River. The temporary or permanent loss of occupied habitat in the Northern Reach would constitute a take of Santa Ana sucker and would require authorization from USFWS. Any take of Santa Ana sucker or permanent loss of occupied arroyo chub or Santa Ana speckled dace habitat in the Northern Reach would be expected to be a significant impact prior to mitigation. With

compliance with **MM Bio 21a** and **21b,** impacts to sensitive fish species from construction of the northern segment would be considered **less than significant**.

Additionally, construction of the proposed project may result in the discharge of sediment and other construction by-products. This will be minimized however, by compliance with the National Pollutant Elimination System (NPDES) General Construction Permit issued by the State Water Resources Control Board (SWRCB). Coverage under the general construction permit requires that a storm water pollution prevention plan (SWPPP) be prepared prior to construction activities for sites with a disturbance area of one acre or more. The SWPPP will incorporate applicable Best Management Practices (BMPs) to reduce loss of topsoil, substantial erosion, or discharge of polluted runoff associated with project construction. (See **MM Water Qual 1**, Section 4.11.) Compliance with the NPDES General Construction Permit, implementation of the SWPPP(s), and compliance with **MM Water Qual 1** will minimize potential impacts to water quality and therefore potential indirect impacts to special status fish and other wildlife species from construction activities.

The proposed project has the potential to remove vegetation (i.e., trees, shrubs, and ground cover) suitable habitat for nesting migratory birds, including raptors. Impacts to such species are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Mitigation measures, including seasonal avoidance of vegetation removal and/or nesting bird surveys will ensure that migratory birds (and their nests) will not be directly harmed. Impacts to nesting migratory birds are **potentially significant** without mitigation; implementation of **MM Bio 22** will reduce this impact to **less than significant**.

Threshold: *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U. S. Fish and Wildlife Service.*

According to the Biological Report, the Realignment Alternatives have the potential to impact three sensitive habitats as designated by the CDFG. These include southern willow scrub, Riversidean sage scrub, and freshwater marsh. Sensitive habitat types are vegetation communities that support concentrations of sensitive plant or wildlife species, are of relatively limited distribution, or are of particular value to wildlife. Although sensitive habitats are not necessarily afforded legal protection unless they support protected species, potential impacts to them may increase concerns and mitigation suggestions by resources agencies.

The Biological Assessments conducted by Brian F. Smith for the additional facilities show that La Sierra Connection has the potential to impact disturbed Riversidean sage scrub, Riversidean sage scrub, and southern willow scrub communities, and that the proposed Mockingbird Connection has the potential to disturb Riversidean sage scrub community.

The riparian habitats described below provide suitable habitat for several special-status species with potential to occur on site including white-tailed kite, long-eared owl, two-striped garter snake, least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, yellow warbler and yellow-breasted chat.

Southern willow scrub communities are designated by the DFG and CNDDB with a Sensitivity of 2.1 "very threatened" (S2.1) and "Occurs in 6 to 20 known locations and/or 2,000 to 10,000 acres of habitat remaining." The proposed RCF realignment contains approximately 17 acres of southern willow scrub community. As this area is generally located adjacent to the Santa Ana River, and construction methods in this area shall include boring and will avoid disturbing sensitive plant communities; therefore, through project design, impacts to riparian habitat and other sensitive habitat are considered **less than significant**.

Riversidean sage scrub habitat provides suitable habitat for several of the special status species observed on site or with potential to occur on site including chaparral sand-verbena, Parry's spineflower, Robinson's pepper-grass, coastal California gnatcatcher, northern red diamond rattlesnake, San Diego horned lizard, San Diego black-tailed jackrabbit, Stephen's kangaroo rat, San Diego desert woodrat, orange-throated whiptail, Los Angeles pocket mouse, San Diego pocket mouse, and southern grasshopper mouse.

A portion of the proposed RCF realignment consists of Riversidean sage scrub (RSS). RSS quality varies depending upon the level of disturbance with lower functioning areas that are characterized by heavy disturbance and a proportion of non-native dominance resulting from commercial disturbance, off-road vehicle use, or crushing and trash dumping. Riversidean sage scrub is designated by the DFG and CNDDB with a Sensitivity of 3.1 "very threatened" (S3.1) and "Occurs in 21 to 80 known locations and/or 10,000 to 50,000 acres of habitat remaining." The proposed RCF realignment contains approximately 7.2 acres of RSS community. As this area is generally located adjacent to the pipeline alignments which primarily occur in existing roadways, impacts through project design are considered **less than significant**. Portions of the Added Connections contain approximately 82.1 acres of RSS. The loss of RSS with the potential to support sensitive plant and wildlife species is less than significant with implementation of mitigation measures outlined below.

The freshwater wetland habitat described below may provide suitable habitat for several special-status species with potential to occur on site including arroyo chub, Santa Ana speckled dace, Santa Ana sucker, southwestern pond turtle, and two-striped garter snake.

In the proposed RCF realignment, the Coastal and Valley Freshwater Marsh association consists of mainly southern cattail (*Typha domingensis*) located in a constructed detention basin associated with a gravel mining operation. Freshwater Marsh is designated by the DFG and CNDDB with a Sensitivity of 2.1, "very threatened" (S2.1) and "Occurs in 6 to 20 known locations and/or 2,000 to 10,000 acres of habitat remaining." The proposed RCF realignment contains approximately 0.8 acre of Coastal and Valley Freshwater Marsh communities. As this area is generally located adjacent to the Santa Ana River, and construction methods in this area shall include boring, impacts through project design are considered **less than significant**.

Threshold: *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

As discussed in the 2005 PEIR, the Santa Ana River at the proposed crossing is under the jurisdiction of the CDFG, ACOE, and Regional Water Quality Control Board (RWQCB). Tunneling techniques, in themselves, will result in no direct impacts to wildlife or vegetation.
The Biological Report indicates the proposed RCF realignment contains streambeds and associated riparian habitat that support wildlife under the jurisdiction of CDFG, waters of the United States under the jurisdiction of the ACOE and RWQCB. The Added Connections do not contain wetlands. To minimize impacts to wetland habitats, implementation of **MM Bio 6 through 13** of the 2005 PEIR shall be implemented. With mitigation impacts to wetlands are considered **less than significant**.

Threshold: *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

As described in the 2005 PEIR, most of the proposed project site and surrounding lands are geographically located in areas that are highly degraded from industrial and residential development. However, the project will traverse across several local wildlife corridors including the Santa Ana River crossing.

Due to the existing patterns of urbanization within the project vicinity that exhibit very limited wildlife habitat, the subsurface nature of the proposed pipeline, and the small footprint of the construction zone, impacts on the movement of any resident or migratory fish or wildlife species or on established native resident or migratory wildlife corridors are expected to be less than significant.

Threshold: *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

The proposed RCF realignment will not conflict with findings regarding local policies or ordinances discussed in the 2005 PEIR.

The City of Riverside General Plan 2010 contains a policy that recognizes and protects trees because of their cultural or historic importance. This policy is discussed further in the Cultural Resources and Aesthetics sections of this Supplemental EIR (Sections 4.1 and 4.4).

Most of the jurisdictions along the project alignment, including the cities of San Bernardino, Colton, Riverside, and the county of Riverside, have policies regulating the removal of or injury to trees and other landscaping. However, these policies protect trees as an aesthetic resource rather than a biological resource. These policies are discussed further under Aesthetics (Section 4.1).

Threshold: *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.*

The proposed RCF realignment will not conflict with findings regarding local policies or ordinances discussed in the 2005 PEIR.

Riverside County has prepared and approved the Multiple Species Habitat Conservation Plan (MSHCP) which was designed to protect 146 species and their associated habitats throughout Western Riverside County, including its 14 member Cities. The Riverside county portion of the proposed project is located within the jurisdiction of the MSHCP, but WMWD is not a permitee under the MSHCP.

The MSHCP is set up by defining Criteria Area Cells roughly based on 160 acre squares. These Criteria Area Cells were established because they contain habitat and resources to support some of the 146 MSHCP protected species. The goal of the MSHCP is to conserve 153,000 acres of land in these Criteria Area Cells throughout the County and cities within Riverside County. If a proposed development project is located within a Criteria Area Cell, then the Regional Conservation Authority (RCA) (set forth by the MSHCP) will review the proposed development, the site resources, and any biological data pertaining to the site. If the RCA determines that the proposed development site supports protected species and/or their habitat, they may offer to purchase the property as inclusion in the overall conservation area under the MSHCP. Additionally, all development projects within the County of Riverside, or within any of the 14 cities of the County, shall be required to pay an MSHCP mitigation fee which will set aside money for the purchase of additional lands for conservation.

As a water district, Western Municipal Water District (WMWD) has the option of participating as a "participating special entity" in the MSHCP.

The proposed RCF realignment extends through primarily developed, urban areas; those areas are not included in a Criteria Area Cell under the MSHCP. Therefore, the project will not conflict with the MSHCP, regardless of whether or not WMWD decides to participate in the MSHCP.

The project is located within the Habitat Conservation Plan (HCP) for the Stephens' kangaroo rat (SKR) in Western Riverside County, California and associated fee area. However, WMWD is not a permittee subject to the SKR HCP, and the project is not located within a core reserve area of the plan. Adoption of the project will not conflict with the SKR HCP.

Since there are no other HCPs applicable to the proposed RCF realignment and the project will not conflict with the MSHCP; impacts are considered **less than significant**.

Realignment Alternatives Proposed Mitigation Measures/Minimization

An Environmental Impact Report is required to describe feasible mitigation measures which could minimize significant adverse impacts (State CEQA Guidelines, Section 15126.4). Mitigation measures were evaluated for their ability to eliminate or reduce the potential significant adverse impacts related to biological resources to below the level of significance.

*As described above, mitigation measures **MM Bio 1, MM Bio 3** through **MM Bio 12, and MM Bio 14** set forth in the 2005 PEIR are still applicable to the proposed project RCF Pipeline Realignment Alternatives (as updated based on current studies and to include Realignment). Mitigation measure **MM Bio 2** is applicable only to the 2005 Project Alignment crossing of the Santa Ana River (within Reach A), which is replaced with the new alignment of the Central Reach of the proposed RCF realignment. Because this SEIR/EIS contains a Stormwater/Water Quality section which was not a part of the 2005 Project Alignment PEIR, potential construction impacts associated with dewatering activities are addressed by **MM Water Qual 1** in Section 4.11 which replaces **MM Bio 13**. Mitigation measures have been added by this SEIR/EIS to address potential impacts related to the construction of the proposed Realignment Alternative pipeline and/or the Realignment Alternative with Added Connections, as applicable to reflect USBR consultation with USFWS under Section 7 of the Endangered Species Act, and possible PSE status for WMWD under the MSHCP.*

MM Bio 1: In Reach A or Central Reach crossings of the Santa Ana River, the dewatering activities shall take place during the period from October 1 through the end of February. This is within the season when the dominant plant species of these riparian communities are dormant. Dewatering outside of this period could subject these communities to stress, desiccation, and potential defoliation. In addition, adherence to this suggested schedule avoids the generally accepted breeding chronology for nesting by the least Bell's vireo and southwestern willow flycatcher in southern California (USFWS b, Sogge *et al.*), obviating the need for focused surveys that may be required, due to the project's potential to have significant noise impacts to these two listed migratory species. This suggested schedule also avoids the breeding season of the federally listed arroyo toad, generally regarded as mid-March through July 1 (USFWS c), thereby avoiding potential impacts to this species as well. Impacts to the arroyo toad during the breeding season would be direct, including physical damage to mature individuals and interference with breeding activities. Should it not be feasible to adhere to this schedule, additional mitigation measures are required, as specified below.

MM Bio 2: Should the construction occur during the breeding season for the arroyo toad (March 15 – July 1), a protocol-level survey shall be conducted at the Santa Ana River (Reach A), to determine presence/absence. If the arroyo toad is found to be present in the vicinity of Reach A, incidental take permits (through either Section 7 or Section 10) shall be applied for. The survey reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 3a: Should construction occur during the breeding season for the least Bell's vireo (LBV) or southwestern willow flycatcher (SWWF) (March 15 through September 15), protocol-level surveys shall be conducted prior to construction at the following locations: the Santa Ana River (Reach A or Central Reach), Spring Brook wash (Reach B), the riparian vegetation along the Mockingbird Canyon alignment (Reach E), potentially suitable habitat in the Northern Reach (as identified in the Glenn Lukos Associates, Inc. 2008 report), and the drainage located south of the Corona Landfill (Reach H); or presence can be assumed. If surveys document the presence of LBV and SWWF, impacts to LBV and SWWF would be mitigated below the level of significance when occupied riparian forest/woodland/scrub is fenced and direct impacts are avoided and construction within 500 feet of occupied habitat occurs only between September 15th and March 15th to avoid indirect impacts to nesting LBV. If avoidance is not feasible, a temporary noise barrier shall be used during construction, at the appropriate location(s), in coordination with CDFG and the USFWS. The noise barrier shall attenuate noise levels to 60 dBA or less, at the edge of breeding habitat. If surveys indicate that these species are not present, this measure will not be required. Additional or alternative measures to avoid or minimize adverse project effects to LBV and SWWF, as identified by the USFWS in Section 7 Consultation, shall be implemented.

MM Bio 3b: For the Santa Ana River (Central Reach), Spring Brook wash (Reach B), the riparian vegetation along the Mockingbird Canyon alignment (Reach E), potentially suitable habitat in the Northern Reach in Riverside County (as identified in the Glenn Lukos Associates, Inc. 2008 report), and the drainage located south of the Corona Landfill (Reach H) potential adverse effects to LBV and SWWF will be reduced to less than significant levels with WMWD participation in the MSHCP as a Participating Special Entity (PSE) and payment of MSHCP mitigation fees. If WMWD does not participate in the MSHCP as a PSE, compliance with **MM Bio 3a** in Riverside County is required.**MM Bio 4a:** Should construction occur during the breeding season for the coastal California gnatcatcher (March 15 through September 15), a protocol-level survey shall be conducted prior to construction at Spring Brook wash (Reach B) and the Northern Reach (within Riverside County as identified in the Glenn Lukos Associates, Inc. 2008 report), in the vicinity of the proposed project; or presence can be assumed. Focused presence/absence surveys consist of either 1) six surveys conducted no less than one week apart between March 15 and June 30 or 2) nine surveys conducted no less than two weeks apart during the remainder of the year. Surveys must be conducted by a biologist who holds the appropriate Section 10(a)(1)(A) permit. Surveys in which the species is not detected are considered valid for one year and should be repeated within one year of work commencing.

If surveys document absence of CAGN no additional avoidance or minimization measures are required. If surveys document the presence of CAGN impacts to CAGN would be mitigated below the level of significance when occupied coastal sage scrub is fenced and direct impacts are avoided and construction within 500 feet of occupied habitat occurs only between September 1 and February 15 to avoid indirect impacts to nesting CAGN. If avoidance is not feasible, a temporary noise barrier shall be used during construction, at the appropriate location(s), in coordination with CDFG and the USFWS. The noise barrier shall attenuate noise levels to 60 dBA or less at the edge of breeding habitat. Additional or alternative measures to avoid or minimize adverse project effects to CAGN, as identified by the USFWS in Section 7 Consultation, shall be implemented.

MM Bio 4b: For the Spring Brook wash crossing (Reach B) and Northern Reach of the project alignment in Riverside County potential adverse effects to CAGN will be reduced to less than significant levels with WMWD participation in the MSHCP as a PSE and payment of MSHCP mitigation fees. If WMWD does not participate in the MSHCP as a PSE, compliance with **MM Bio 4a** in Riverside County is required.

MM Bio 5: In addition to the use of the temporary noise barrier, a qualified on site noise monitor (approved by the local jurisdiction and WMWD) shall be present during all construction activities conducted near habitat that has been identified in the surveys to host the arroyo toad, least Bell's vireo, southwestern willow flycatcher, or coastal California gnatcatcher. The noise monitor shall ensure through on site noise meter readings that the temporary barriers are effective at reducing construction noise to 60 dBA or less. If 60 dBA is exceeded, the noise monitor shall work with the Contractor to make adjustments in the barriers or construction activities to reduce noise to 60 dBA or less.

MM Bio 6: Construction staging areas shall be located outside of riparian areas and away from (to the greatest distance feasible) riparian areas.

MM Bio 7: Construction activities adjacent to riparian and/or wetland areas shall be minimized where feasible. If open cut trenching is used in the Spring Brook drainage crossing**s** or Central Reach instead of boring, direct loss of wetlands may occur and permits and mitigation will be required. Such mitigation may include restoration on site, removal of invasive species, or off-site purchase. See **MM Bio 8** below.

MM Bio 8: A formal jurisdictional delineation for potential State and Federal wetland impacts will be conducted at Reaches A and B or the Northern Reach.

MM Bio 9: A project-wide 1602 Streambed Alteration Agreement prepared in accordance with CDFG requirements shall be secured by WMWD as the jurisdictional delineation warrants and shall include mitigation measures that are sufficient to reduce direct and indirect impacts to riparian habitat to a level below significant. The Agreement may include some or all of the following:

- Avoid impacts where possible by shifting the project location or construction timing.
- Minimize impacts.
- Remove invasive species.
- Purchase off-site habitat credits.
- Create and/or restore natural communities.
- Avoid sensitive habitats by placing construction staging areas as far away from them as is feasible.
- Limit construction activity to daylight hours to minimize potential impacts related to artificial lighting.
- Require the presence of a qualified biological monitor during all construction activities that are within or near sensitive habitats and areas that have been identified to host the arroyo toad, least Bell's vireo, southwestern willow flycatcher, coastal California gnatcatcher, Stephens' kangaroo rat, or San Bernardino kangaroo rat.

MM Bio 10: An ACOE Section 404 permit shall be secured as the jurisdictional delineation warrants. The Nation-wide Section 404 Permit will apply to the project for linear utility projects. The Corps may require the implementation of measures similar to those listed for the Section 1602 Streambed Alteration Agreement as part of the Section 404 Permit approval process. Implementation of these measures will mitigate potential impacts to the bed and banks of the Santa Ana River and any other jurisdictional drainage.

Should open-trenching techniques be utilized to install the pipeline across the Santa Ana River, consultation with the U.S. Fish and Wildlife Service will be initiated to determine whether or not the proposed project would result in significant impacts to Critical Habitat for the Santa Ana sucker. If warranted incidental take permits (through Section 7) shall be applied for. The U.S. Fish and Wildlife Service shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat.

MM Bio 11: In conjunction with the ACOE Section 404 Permit, a Section 401 Water Quality Certification from the California Regional Water Quality Control Board shall be secured.

MM Bio 12: Any discharge into navigable waters, or "waters of the United States" shall also comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act. Compliance with these provisions shall result in certification from the Regional Board that verifies that the project complies with all water quality standards.

MM Bio 14: If WMWD does not participate in the MSHCP as a PSE and should open-trenching techniques be utilized to install the pipeline across the Santa Ana River, a protocol-level survey shall be conducted at the Santa Ana River (Reach A or Central Reach), to determine presence/absence of the Santa Ana River woolly-star, slender-horned spineflower, Chaparral sand-verbena, Parry's spineflower, Robinson's pepper-grass, smooth tarplant, prairie wedge grass, and /or California satintail, within suitable habitat in the construction footprint. If one or more of these plant species are found to be present in the footprint, incidental take permits (through Section 7) shall be applied for. The survey reports shall identify further measures to be taken to avoid or minimize adverse project effects to the protected species and their habitat. If WMWD does participate in the MSHCP as a PSE, a focused Narrow Endemic Plant Species Survey Area (NEPSSA) survey shall be conducted within suitable habitat in the project alignments (Central and Northern Reach and Reach H, La Sierra Pipeline, and Clay Street Connection).

MM Bio 15: In San Bernardino County focused surveys shall be conducted within potentially suitable habitat for _ Chaparral sand-verbena, Parry's spineflower, Robinson's pepper-grass, and smooth tarplant within the Central Reach and for Parry's spineflower, Robinson's pepper-grass, and smooth tarplant within the Northern Reach (as identified in the Glenn Lukos Associates, Inc. 2008 report) by a qualified biologist during the flowering season of these species and prior to construction activities. If special status plant species are found to be present in the footprint, further measures as recommended by a qualified biologist shall to be taken to avoid or minimize adverse project effects to these species and their habitat.

MM Bio 16a: In San Bernardino County focused surveys shall be conducted within potentially suitable habitat for northwestern San Diego pocket mouse and Los Angeles pocket mouse in the Northern Reach (as identified in the Glenn Lukos Associates, Inc. 2008 report) by a qualified biologist during the appropriate season of these species and prior to construction activities. If

these species are found to be present in the footprint, occupied habitat shall be fenced and avoided. If occupied habitat cannot be avoided further measures as recommended by a qualified biologist and in consultation with the California Department of Fish and Game shall to be taken to avoid or minimize adverse project effects to these species and their habitat.

MM Bio 16b: In Riverside County potential adverse effects to northwestern San Diego pocket mouse and Los Angeles pocket mouse in the Northern and Central Reaches (as identified in the Glenn Lukos Associates, Inc. 2008 report) will be reduced to less than significant levels with WMWD participation in the MSHCP as a PSE and payment of MSHCP mitigation fees. If WMWD does not participate in the MSHCP as a PSE, compliance with **MM Bio 16a** within Riverside County is required.

MM Bio 17: If WMWD does not participate in the MSHCP as a PSE a pre-construction presence/absence surveys for western burrowing owl (BUOW) shall be conducted in suitable habitat along the Northern and Central Reaches and Monroe Alternative (as identified in the Glenn Lukos Associates, Inc. 2008 report). Surveys shall be conducted within 30 days prior to disturbance and in accordance with the California Department of Fish and Game and California Burrowing Owl Consortium guidelines. Take of active nests shall be avoided. Passive exclusion (use of one way doors and collapse of burrows) will occur if owls are present outside of the nesting season. (The nesting season is February 1 through August 31). If WMWD does participate in the MSHCP as a PSE, a focused survey for burrowing owl following current survey protocol (approved by RCA) shall be conducted in suitable habitat along the Northern and Central Reaches and Monroe Alternative (as identified in the Glenn Lukos Associates, Inc. 2008 report).

MM Bio 18: To offset the loss of burrowing owl foraging and burrow habitat from construction of the Mockingbird Tank and Clay Street Pump Station, a minimum of 6.5 acres of foraging habitat per pair or unpaired resident bird, shall be acquired and permanently protected if WMWD does not participate in the MSHCP as a PSE. The protected lands shall be adjacent to occupied burrowing owl habitat and at a location acceptable to CDFG. The project sponsor shall provide funding for long-term management and monitoring of the protected lands. The monitoring plan shall include success criteria, remedial measures, and an annual report to CDFG. Acquisition and protection of mitigation property shall be conducted in accordance with the CDFG Staff Report on Burrowing Owl Mitigation, October 17, 1995 and/or consultation with CDFG. If WMWD does participate in the MSHCP as a PSE, to offset the loss of occupied burrowing owl habitat conservation of habitat shall be provided in accordance with Species Accounts, Burrowing Owl Objective 5 and payment of MSHCP mitigation fees.

MM Bio 19: In San Bernardino County within potentially suitable habitat in the Northern Reach (as identified in the Glenn Lukos Associates, Inc. 2008 report), presence of this species can be assumed or focused coastal California gnatcatcher (CAGN) surveys are required following United States Fish and Wildlife (USFWS) protocol. Focused presence/absence surveys consist of either 1) six surveys conducted no less than one week apart between March 15 and June 30 or 2) nine surveys conducted no less than two weeks apart during the remainder of the year. Surveys must be conducted by a biologist who holds the appropriate Section 10(a)(1)(A) permit. Surveys in which the species is not detected are considered valid for one year and should be repeated within one year of work commencing.

If surveys document absence of CAGN no additional avoidance or minimization measures are required. If surveys document the presence of CAGN impacts to CAGN would be mitigated below the level of significance when occupied coastal sage scrub is fenced and direct impacts are avoided and construction within 500 feet of occupied habitat occurs only between September 1 and February 15 to avoid indirect impacts to nesting CAGN. If avoidance is not feasible additional measures to avoid or minimize adverse project effects to CAGN, as identified by the USFWS in Section 7 Consultation, shall be implemented.

MM Bio 20a: In San Bernardino County within potentially suitable habitat for Delhi sands flower-loving fly (DSF) in the Northern Reach of the project alignment (as identified in the Glenn Lukos Associates, Inc. 2008 report) focused surveys shall be conducted following USFWS protocol by a qualified biologist who holds the appropriate Section 10(a)(1)(A) permit. Presence/absence surveys consist of bi-weekly surveys from August 1 to September 20 for a two-year period within areas of suitable habitat. If surveys document the presence of DSF impacts to DSF would be mitigated below the level of significance when occupied habitat is fenced and direct impacts are avoided. If avoidance is not feasible additional measures to avoid or minimize adverse project effects to DSF and their habitat, as identified by the USFWS in Section 7 Consultation, shall be implemented. The additional measures may include, but not be limited to, some or all of the following:

- Avoid impacts where possible by shifting the project location or construction timing.
- Maintain construction sites in sanitary conditions at all times.
- Avoid sensitive habitats by placing construction staging areas as far away from them as is feasible.
- Place extracted, surplus, suitable Delhi sands in current DSF conservation areas/banks.

MM Bio 20b: For the northern reach of the project alignment in Riverside County potential adverse effects to DSF will be reduced to less than significant levels with WMWD participation in the MSHCP (including compliance with Species Accounts, Delhi Sands flower-loving fly Objective 1B) as a PSE and payment of MSHCP mitigation fees. If WMWD does not participate in the MSHCP as a PSE, compliance with **MM Bio 20a** is required.

MM Bio 21a: In San Bernardino County within potentially suitable habitat for the Santa Ana sucker (SAS) in the Central and Northern Reach of the project alignment (as identified in the Glenn Lukos Associates, Inc. 2008 report) focused surveys shall be conducted following USFWS protocol by a qualified biologist who holds the appropriate Section 10(a)(1)(A) permit. Focused surveys for SAS shall also include presence/absence of arroyo chub and Santa Ana speckled dace. If surveys document the presence of SAS impacts to SAS would be mitigated below the level of significance when occupied habitat is fenced and direct impacts are avoided and Best Management Practices ensure that no change in water quality will occur during or after construction. If surveys document absence of SAS, arroyo chub, and Santa Ana speckled dace no additional avoidance or minimization measures are required. If avoidance is not feasible additional measures to avoid or minimize adverse project effects to SAS and their habitat, as identified by the USFWS in Section 7 Consultation, shall be implemented. The additional measures may include, but not be limited to, some or all of the following:

- Avoid impacts where possible by shifting the project location or construction timing.

- Construction sites should be maintained in sanitary conditions at all times.
- Avoid sensitive habitats by placing construction staging areas as far away from them as is feasible.

Implementation of the mitigation measures for SAS would be expected to reduce potentially significant impacts to arroyo chub and Santa Ana speckled dace below a level of significance.

MM Bio 21b: For the Central and Northern Reaches of the project alignment in Riverside County, potential adverse effects to SAS will be reduced to less than significant levels with WMWD participation in the MSHCP as a PSE and payment of MSHCP mitigation fees. If WMWD does not participate in the MSHCP as a PSE, compliance with **MM Bio 21a** is required.

MM Bio 22: The removal of potential nesting vegetation of sensitive bird species will be conducted outside of the nesting season (February 1 to August 31) to the extent that this is feasible. If vegetation must be removed during the nesting season, a qualified biologist will conduct a nesting bird survey of potentially suitable nesting vegetation prior to removal. Surveys will be conducted no more than three (3) days prior to scheduled removals. If active nests are identified, the biologist will establish buffers around the vegetation containing the active nest (500 feet for raptors and 200 feet for non raptors). The vegetation containing the active nest will not be removed, and no grading will occur within the established buffer, until a qualified biologist has determined that the nest is no longer active (i.e., the juveniles are surviving independent from the nest). If clearing is not conducted within three days of a negative survey, the nesting survey must be repeated to confirm the absence of nesting birds.

MM Bio 23: Temporary impacts from construction activities and permanent impacts from development of the Mockingbird Tank site on occupied Stephens' kangaroo rat habitat will be mitigated through payment of the Riverside County Stephens' Kangaroo Rat Habitat Conservation Plan (SKR HCP) Mitigation Fees.

MM Bio 24: Section 7 Consultation with USFWS or participation in the MSHCP as a Participating Special Entity (PSE) shall be completed for temporary impacts (both direct and indirect) from construction activities and permanent impacts from development of the Mockingbird Tank site on occupied California gnatcatcher habitat. Mitigation for the loss of occupied habitat will be achieved by acquisition of replacement habitat at a 1:1 ratio that is biologically equivalent to the property being disturbed, as agreed upon by USFWS or compliance with the MSHCP and payment of MSHCP mitigation fees.

Realignment Alternatives Determination of Significance under CEQA

Based on the biological resource evaluations prepared by Glenn Lukos Associates and Brian F. Smith and Associates (Appendix C), and after the mitigation measures, avoidance, and minimization approaches identified above are implemented, potential adverse impacts associated with special-status species; both plant and wildlife, as well as special-status communities/habitats, will be reduced to a **less than significant** level.

4.3.4 No Project/Action Alternative

The No Project/Action Alternative will have no affect on sensitive species or habitats because nothing will be built.

4.4 CULTURAL RESOURCES/PALEONTOLOGY

Potential impacts related to the destruction of a unique paleontological resource or unique geologic feature were found to have less than significant impacts in the Initial Study/NOP prepared for the this project in 2008 (Appendix A). The foci of this discussion are archaeological resources, historical resources, and unknown human remains, and the project's potential to alter those resources through construction and operation of the revised alignment. A summary of the Cultural Resources section of the 2005 Certified Program EIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment) is included in the following discussion.

In addition to the 2005 PEIR and its reference documents, and other reference documents, the following references were used in the preparation of this section of the SEIR/EIS:

- Brian F. Smith & Associates, *A Cultural Resource Report for the Central Feeder Connection Element of the Riverside Corona Feeder Project, San Bernardino, California,* September 24, 2009; revised April 5, 2010. (Appendix E)
- Brian F. Smith & Associates, *A Cultural Resource Report for the Clay Street Connection Element of the Western Municipal Water District's Riverside-Corona Feeder Project, Riverside, California,* September 24, 2009; revised April 5, 2010. (Appendix E)
- Brian F. Smith & Associates, *A Cultural Resource Report for the La Sierra Pipeline Element of the Western Municipal Water District's Riverside Corona Feeder Project, Riverside, California,* September 24, 2009; revised April 5, 2010. (Appendix E)
- Brian F. Smith & Associates, *A Cultural Resource Report for the Mockingbird Connection Element of the Western Municipal Water District's Riverside Corona Feeder Project, Riverside, California,* December 3, 2009; revised March 30, 2010. (Appendix E)
- Brian F. Smith & Associates, *Paleontological Resource Assessment, Clay Street Connection (Pedley) and Central Feeder Connection (Redlands), Riverside-Corona Feeder Project, Riverside and San Bernardino Counties, California,* September 15, 2009. (Appendix E)
- Brian F. Smith & Associates, *Paleontological Resource Assessment, La Sierra Avenue Pipeline Alignment, Riverside-Corona Feeder Project, Lake Mathews-Arlington Mountain area, Riverside County, California,* September 15, 2009. (Appendix E)
- Brian F. Smith & Associates, *Paleontological Resource Assessment, Mockingbird Connection, Riverside-Corona Feeder Project, Arlington Heights, Riverside, and adjacent unincorporated Riverside County, California,* September 15, 2009. (Appendix E)
- Statistical Research Inc., *Cultural Resources Assessment of the Riverside-Corona Feeder Alternative Alignments, San Bernardino and Riverside Counties, California,* April 2009. (Appendix E)
- City of Colton, *Final Preliminary General Plan for the City of Colton*, May 5, 1987. (Available at www.ci.colton.ca.us/CD_Plan.html, accessed on July 31, 2009.)

- City of Corona Community Development Department, *City of Corona General Plan*, March 17, 2004. (Available at http://www.discovercorona.org/index.cfm?section=City%20Departments&page=Community%20Development&cat=Planning%20Division&viewpost=2&ContentId=315, accessed on July 31, 2009.)
- City of Rialto, *Municipal Code*, March 31, 1992. (Available at http://www.municode.com/Resources/gateway.asp?pid=16575&sid=5, accessed on July 31, 2009.)
- City of Riverside Planning Department, *General Plan 2025*, November, 2007. (Available at www.riversideca.gov/planning/cityplans.asp, accessed on December 28, 2008.)
- City of San Bernardino Development Services Department, Division of Planning, *San Bernardino General Plan*, November 1, 2005. (Available at www.ci.san-bernardino.ca.us/depts/devserv/planning/default.asp, accessed on December 28, 2008.)
- County of Riverside, *Riverside County Integrated Project General Plan*, *County of Riverside*, Adopted October 7, 2003. (Available at www.rctlma.org/genplan/default.aspx, accessed on December 28, 2008.)
- County of San Bernardino Land Use Services Department, *San Bernardino 2007 General Plan*, March 13, 2007. (Available at www.sbcounty.gov/landuseservices/general_plan/Default.asp, accessed on December 29, 2008.)

The above referenced *Cultural Resources Assessments and Paleontological Assessments* are archaeological surveys of the proposed Riverside-Corona Feeder Realignment and includes fieldwork which involved an intensive pedestrian survey of all accessible portions of a 100 foot-wide (30 m) corridor on either side of the area of potential effects (APE).

4.4.1 Setting/Affected Environment

The project alternatives are located within the boundaries of the cities of Colton, Corona, Grand Terrace, Redlands, Rialto, Riverside, and San Bernardino, and unincorporated areas of the counties of Riverside and San Bernardino.

The 2005 Project Alignment Alternative Includes Reaches A though H, with Reach A starting in San Bernardino and Reach H ending in Corona. The majority of this alternative is located within the City of Riverside (Reaches B through H).

The proposed Riverside-Corona Feeder Realignment Alternative separated into two portions referred to as the Northern Reach and the Central Reach, plus generally Reaches E through H of the 2005 Project Alignment. The Northern Reach will span from the intersection of Waterman Avenue and Orange Show Road in the City of San Bernardino to the intersection of Limonite Avenue and Clay Street in unincorporated Riverside County. The Central Reach will span from the intersection of Limonite Avenue and Clay Street in unincorporated Riverside County to connect to the approved Riverside-Corona Feeder alignment near the intersection of Jackson Street and Cleveland Street in the City of Riverside. The project also proposes an optional

alignment on a portion of the Central Reach. The optional alignment would change the proposed realignment between the intersection of Jackson Street and Colorado Avenue, in the City of Riverside, and the intersection of Cleveland Avenue and Irving Street, in the City of Riverside.

The Realignment Alternative with Additional Connections (Preferred Alternative) includes all the facilities of the Realignment Alternative plus four additional facilities that include: the Central Feeder Connection, the Clay Street Connection, the Mockingbird Connection and the La Sierra Pipeline Connection.

Native American Cultural History

The RCF alignments are located in an area of uncertain ethnographic occupancy. To the north and east were the Serrano, who occupied the San Bernardino Valley and Mountains. To the east were the Cahuilla, whose territory encompassed the San Gorgonio Pass, San Jacinto Mountains, and Colorado Desert. The Luiseño lived to the south, and the Gabrielino extended westward from the Jurupa area to the Pacific Coast. Some ethnographic studies have attributed the project area to the Gabrielino, another shows it extending from Serrano territory on the north to Gabrielino territory on the south, and yet another shows it extending from Serrano territory on the north to Luiseño territory on the south. Finally, the area is also sometimes shown in Cahuilla territory, although this may reflect presence of Cahuillas from the San Jacinto Mountains who moved into the San Bernardino Valley and Riverside areas during historical times to work in agriculture and as domestic help.

Aboriginally, all were hunters and gatherers who utilized both large and small game, as well as numerous plant resources, for food. Large animals such as deer, pronghorn, and mountain sheep were hunted with bow and arrows, while smaller animals such as rabbits, hares, and various rodents were taken with throwing sticks, nets, and snares. Piñon nuts and acorns from several species of oak formed the staples of the diet, supplemented by yucca stalks and flowers, seeds from holly-leaved cherries, chia and other sages, fruits and berries, and roots, tubers, and greens.

The ethnohistoric settlement pattern consisted of permanent villages located in proximity to reliable sources of water, and within range of a variety of floral and faunal food resources, which were exploited from temporary camp locations surrounding the main village. There is some suggestion in the ethnographic record that a Gabrielino village known as Hurungna, for which the later Jurupa Rancho was named, was located along the Santa Ana River in the vicinity of the project's river crossing. However, well-documented ethnographic village sites are otherwise absent in the project area, possibly as a result of early disruption of native culture in the area by Spanish mission activities.

Today, the descendants of the Native American groups from the project region are affiliated with the San Manuel Band of Mission Indians in Highland, the Soboba Band of Mission Indians in San Jacinto, and the Pechanga Band of Mission Indians in Temecula.

History of the Area – Post-European Context

The historical era in San Bernardino and Riverside counties can be divided into three distinct periods: the Spanish Mission period, the Mexican Rancho period, and the American period.

The Spanish Mission period in San Bernardino and Riverside counties can be defined by the Spanish exploration of the area beginning in 1769 and the establishment of the San Diego Presidio and the Missions San Diego, San Luis Rey, and San Juan Capistrano. The establishment of missions progressed to the north eventually reaching the larger, inland valleys. San Gabriel Mission was established in the heart of the Los Angeles Basin in 1771 and served as a staging area for local exploration and settlement in the years that followed.

In 1774, the expedition of San Bautista de Anza crossed the Santa Ana River in the Colton-Riverside area on its way to the San Gabriel Mission. The priest serving the expedition, Father Francisco Garcés, noted in his journal an Indian village, or ranchería, near the river. The ranchería was later identified as Jurupa, located at a constriction in the Santa Ana River now known as the Riverside or Pedley Narrows. Following several expeditions to find a suitable location for an asistencia, or mission outpost in the San Bernardino Valley, in 1810, Father Francisco Dumetz established a small capilla (chapel) on high ground between what is now Colton and the community of Urbita Springs at Bunker Hill. With the chapel established, called Politana, Dumetz began the work of missionizing the local Serranos. In 1818, Leandro Serrano, Riverside County's first European resident, obtained permission from the padres at Mission San Luis Rey to take five leagues of land in Temescal Valley.

In 1821, Mexico successfully fought for independence from Spain. The subsequent Secularization Act of 1833 marked the end of the Mission period and the return of the secularized mission lands to Mexico's citizenry in the form of land grants or "ranchos."

The Mexican Rancho period (1821 – 1848) began subsequent to the dismantling of the mission system throughout California in the mid-1830s. Following the abandonment of the San Bernardino asistencia, the valley was left to its half-missionized Indian inhabitants and occasional desert marauders. This situation began to change in the last years of the 1830s as private land owners were given grants of land to take over the cattle ranching begun by the mission clergy.

In Riverside County, the first land grant was to Leandro Serrano who established Rancho Temescal. In San Bernardino County, the first land grant carved out of the holdings of the San Bernardino Rancho was made to Juan Bandini in 1838. Known as the Jurupa Grant, its 32,000 acres were situated along the Santa Ana River, primarily on the north and west side, between Slover Mountain to the north and a point just north of the Chino Hills to the south.

The Mexican Rancho period ended in 1848 as the Mexican War, which had been raging for nearly two years, came to a close. After Mexico was defeated and the Treaty of Guadalupe Hidalgo was signed in 1848, California was ceded to the United States, ushering in the American Period (1848 – present).

The effects of California's statehood in 1850 were twofold. For the rancheros, the end of the Rancho period was met with financial ruin. The validity of the land grants issued by Mexican governors was questioned by the Land Commission. Many of the rancheros never officially gained their land patents. With the flood of new settlers, the American period was marked by unprecedented growth and industry. In San Bernardino and Riverside counties, increased settlement, the growth of commercial resource extraction, and the development of transportation occurred during the American period.

In 1893, the California legislature formed Riverside County out of 6,044 square miles of San Diego County and 590 square miles of San Bernardino County; the project area was formerly part of San Diego County. Citrus orchards occupied the hilly sections within reach of the canal system, while stock raisers and grain farmers spread across the eastern plains to Perris and beyond. Dry farmers settled north and east of the project area by the early 1890s in the area now known as Woodcrest.

The area of the proposed realignment does not represent an area with a Native American or post-European cultural history that is different than that described in the 2005 PEIR.

Buried Sites-Sensitivity Analysis

Because much of the pedestrian survey corridor within the Area of Potential Impacts (APE) was obscured or partially obscured by pavement and landscaping, soils and geologic maps were examined to evaluate the potential for buried cultural resources. To evaluate the potential for buried sites, the thickness of deposits overlying potential cultural materials as well as mineral composition were taken into consideration. Soils types with a low potential for buried sites were typically shallow or, based on mineral composition, primarily clay-based or derived from basic igneous rock (i.e. gabbros and basalts). Soil types that were deep and well-drained were characterized as having high potential for buried sites, whereas areas with moderate potential had soil types that were deep and poorly-drained, or shallow and well-drained.

Based on soil and geologic characteristics, the project area was divided into four main areas of low, moderate, and high potential for buried sites. It should be noted, however, that areas where cultural resources are recorded within the APE of the proposed alignments are considered to have high potential for buried cultural resources. (See **Table 4.4-A, Potential for Finding Buried Archaeological Sites**.)

Table 4.4-A, Potential for Finding Buried Archaeological Sites

	Potential		
Reach/Area	Low	Moderate	High
Northern Reach			
Within San Bernardino and Colton	X		
Remainder of Northern Reach (esp. Agua Mansa Road)			X
Central Reach			
Limonite Avenue/Clay Street		X	
South of Santa Ana River along Van Buren Blvd. to North of Jackson/Colorado Intersection	X		
South of Jackson/Colorado Intersection and Santa Ana River Crossing			X
Additional Connections			
Central Feeder Connection	X		
Clay Street Connection		X	
La sierra Pipeline and Mockingbird Connections			X

Based on soil and geologic characteristics, the Northern Reach of the Realignment Alternatives project area is identified as having primarily low and high potential for buried sites. The portion of the project area within the cities of San Bernardino and Colton has low potential, whereas the remaining portion of the Northern Reach, particularly along Agua Mansa Road, has a high potential for buried sites.

Based on soil and geologic characteristics, low, moderate, and high potential for buried sites characterizes the Central Reach of the Realignment Alternatives project area. Moderate potential is identified along much of Limonite Avenue and Clay Street, whereas low potential is identified south of the Santa Ana River crossing along Van Buren Boulevard to just north of the intersection between Jackson Avenue and Colorado Avenue. From this intersection south, the Arlington area of Riverside is characterized as having a high potential for buried sites, as well as the Santa Ana River crossing and areas where previously identified cultural resources are located within the survey corridor.

The four connections to other regional facilities (Central Feeder Connection, Clay Street Connection, Mockingbird Connection and La Sierra Pipeline) that are part of the Realignment Alternative with Additional Connections would also be characterized as having low, moderate, and high potential for buried sites. Central Feeder Connection has low potential. The Clay Street Connection has a moderate potential for buried sites; while the La Sierra Pipeline and the Mockingbird Connection have a high potential.

Cultural Resources Known in the Project Vicinity – San Bernardino County

With respect to the portions of the Realignment Alternatives within San Bernardino County, a minimum of eight-eight cultural resource properties have been recorded within a one-mile radius of the pipeline route; twelve of which are located within the 100-foot-wide field survey corridor. However, there are no sites located within the area that would be subject to ground-disturbing activities. Additionally, physical evidence of three of the sites could not be located during field

surveys: CA-SBR-6101H (Union Pacific Railroad), CPHI-SBR-21 (San Bernardino-Sonora Road), and P-36-015221 (Agua Mansa town site). They may be present underground or previously destroyed.

Sections of the Realignment Alternatives would pass beneath CA-SBR-6847H ("The Old Kite Route" or Atchison Topeka & Santa Fe Railway) and CA-SBR-6859H (Riverside Canal).

Forty-one pending prehistoric and historic-period resources that appear in literature or map reviews are also within the one-mile radius; four of which are reported to be within the area subject to ground-disturbing activities. However, none of these historical-period resources were located during the field survey for this project, or from field surveys in previous studies of the area.

Cultural Resources Known in the Project Vicinity – Riverside County

For the Riverside County portion of the proposed Realignment Alternatives, over two hundred cultural resource properties have been located within a one-mile radius of the pipeline route; fourteen of which are located within the 100-foot-wide field survey corridor. Two of the sites are historical-period residences (P-33-11033 and P-33-13974) and are not within the area that would be subject to ground-disturbances. A third site, CA-RIV-8513H (features associated with sand quarrying activities) is also not within the immediate project area and would not be subject to disturbance.

The Realignment Alternatives cross the right-of-way of P-33-11361 (Victoria Avenue) and crosses the historic alignment of CA-RIV-4791H (Riverside Lower Canal) in Jackson Street, as well as in the alternate Monroe Street alignment. The Jackson Street crossing is not visible and may occur underground or has been destroyed. The Canal at Monroe Street is above-ground and intact and would be within the area of ground-disturbing activities if the Monroe Street alternative is chosen. In addition, a section of the Realignment Alternatives would pass beneath CA-RIV-4495H (Riverside Upper Canal) in Jackson Street or Monroe Street.

Field Survey Findings of Newly Recorded Cultural Resources

In addition to known sites within the project area, twelve previously unrecorded sites (five in San Bernardino County and seven in Riverside County) were located during field surveys. Five are not located in the project area of ground disturbance; yet, three others are in the area of ground disturbance for the Monroe Alternative: RCF-5 (remnants of former citrus orchard irrigation system), RCF-6 (Monroe Street Canal) and RCF-7 (Monticello Street Canal).

4.4.2 Summary of 2005 Certified Program EIR for Riverside-Corona Feeder Project

Design Considerations/Avoidance

The proposed and alternative alignments for the 2005 Project Alternative are primarily located within street rights-of-way. Since the exact location of this alternative's pipeline within any given street will be determined as construction documents are prepared, it is not known whether the pipe will impact historical and archaeological resources. The proposed project includes boring under the Gage Canal to avoid that historic resource and to limit disruption of water distribution through the canal.

Potential Significant Impacts/Environmental Consequences

Cultural Resources were addressed in Section II-4 (pp. II-4-1 through II-4-8) of the 2005 Certified Program EIR (2005 PEIR) for the 2005 Project Alignment, which are hereby incorporated by reference. The 2005 PEIR analyzed historic resources, and both Non-Native American and Native American archaeological resources, but did not analyze paleontological resources because the Initial Study prepared for that EIR identified project specifications (repeated as original **MM Cult 4**) which addressed potential adverse paleontological impacts.

Additionally, the Phase I Cultural Resources Investigation prepared for the 2005 Project Alignment by McKenna et al. in March 2003 determined that "The paleontological overview reported that no fossil localities have been reported for this area, but there are some locations within the general area that may be fossil bearing. The likelihood of identifying fossil resources in this area is extremely LOW and, therefore McKenna et al. concludes that paleontological resources will not be impacted by the proposed project." (PEIR, Appendix E, p. 35) Nevertheless, mitigation measure **MM Cult 4**, below, was adopted to mitigate potential impacts to paleontological resources discovered during construction of the 2005 Project Alignment.

The following discussion is a summary of the Cultural Resources section of the 2005 PEIR:

Threshold: *The proposed project would result in significant impacts if it causes a substantial adverse change in the significance of a historical resource as defined in California Code of Regulations § 15064.5.*

The 2005 Project Alignment would have bisected, or lied within the immediate vicinity of a total of five historic sites including: CA-RIV-4768H and CA-SBR-7168H (Gage Canal), CA-RIV-4791H (Riverside Lower Canal), CA-RIV-3832H (AT&SF Railroad Alignment), CA-RIV-9774 (Southern Pacific Railroad) and P-33-11361 (Victoria Avenue - listed in the National Register of Historic Places since 2000). In addition, palm rows and citrus trees within the California Citrus State Historic Park and other streets in the City of Riverside Greenbelt area would be affected.

The 2005 PEIR found that impacts to the Riverside Canal would be avoided because the alignment paralleled the canal. Impacts related to AT&SF Railroad and the Southern Pacific

Railroad were found to be less than significant due to ineligibility for listing on both the state and federal levels.

The relative significance of the historic Gage Canal where the 2005 Project Alignment crossed in the cities of Colton and Grand Terrace could not be established at the time of writing the 2005 Certified EIR. In Riverside County, the 2005 Project Alignment would cross under the Gage Canal at a point where the Canal is open and intact, rendering protection from adverse impacts necessary and potentially significant without mitigation.

Impacts to the landscaping along Victoria Avenue, as well as other landscaping within the Riverside Greenbelt and California Citrus State Historic Park, were found to be potentially significant without mitigation.

Threshold: *The proposed project would cause a substantial adverse change in the significance of an archaeological resource as defined in California Code of Regulations §15064.5.*

The 2005 PEIR determined that the proposed project would not impact known archaeological resources, yet it was also determined that the project area has a moderate likelihood of containing unknown archaeological resources. In addition, the 2005 PEIR acknowledges that there are areas where native soils may be exposed, such as at the Santa Ana River crossing, Springbrook Wash, and in the Mockingbird Canyon area. Therefore the project could affect those unknown resources during construction and operation, especially in those areas, and impacts were considered significant without mitigation.

Threshold: *The proposed project would result in a significant impact if it disturbs any human remains, including those interred outside of formal cemeteries.*

Investigation by the California Native American Heritage Commission (NAHC) determined that the project area did not include the known presence of Native American burial sites. It was also determined that there is a low potential for the discovery of unknown remains. However, since human remains may become uncovered unexpectedly during construction, impacts were considered significant without mitigation.

2005 Project Alignment Mitigation Measures

The following Mitigation Measures were adopted in the 2005 PEIR to reduce potentially significant impacts related to cultural resources:

MM Cult 1: In order to reduce potential significant impacts to historic and non-Native American archaeological and historic resources, full time archaeological monitoring during excavations shall be conducted in sensitive areas (e.g., near the Santa Ana River crossing), within undeveloped areas along the project alignment, near Riverside Highland Water facility site thought to be in the vicinity of Barton Road (north of Palm Avenue), at the Gage Canal crossing in the cities of Riverside and Grand Terrace, at the Railroad crossings (AT&SF Railroad Alignment and Southern Pacific Railroad), the Riverside Canal, at Victoria Avenue and Irving Street. The extent and duration of the archaeological monitoring shall be determined by a

qualified archaeologist once the construction schedule is defined for each reach of project construction. In the event of an accidental discovery, the archaeological monitor will comply with State CEQA Guidelines section 15064.5.

MM Cult 1a: If non-Native American archaeological or historic resources are discovered, the local jurisdiction and land owner where the resources are found will be notified by WMWD. Depending on the nature of the resource, appropriate mitigation and monitoring will be developed by WMWD in conjunction with all affected parties and the on-site archaeologist, and may include such things as:

- Documentation, removal, and curation at a local museum, federal repository, or other appropriate steward agency.
- Documentation and retention in place.
- Further detailed archaeological studies to determine the nature and extent of the find.
- Retention by the land owner.
- Other measures agreed upon by the parties involved.

MM Cult 2: In response to comments from local tribes and to be sensitive to the cultural heritage of the tribes that have claimed an interest in the project area, the archaeological monitoring program shall be executed in conjunction with the tribes to assist in determining which areas of the project alignment are in sensitive locations where undisturbed soils will be excavated. Such areas will include, at a minimum: the Santa Ana River (San Bernardino County) and Springbrook Wash (Riverside County and City) crossings, and a natural area near Irving and Firethorn Streets (Mockingbird Canyon area) in the City of Riverside.

Prior to grading, WMWD shall contact the Native American Heritage Commission (NAHC) to determine the Most Likely Descendent (MLD) within any given Reach where the pipeline is to be constructed. WMWD shall enter into a pre-excavation agreement for one paid monitor with the Native American tribe identified by the NAHC as the MLD for each Reach of project construction where undisturbed native soils will be affected and sensitive resources are likely. In the event of an accidental discovery, the archaeological monitor will comply with State CEQA Guidelines section 15064.5.

To respond to the expressed desire of each tribe to monitor construction in sensitive areas and in the spirit of interagency cooperation, the Pechanga, Ramona, and San Manuel shall be notified by WMWD prior to excavation activities.

MM Cult 3: To ensure the proper disposition of cultural resources of interest to the tribes uncovered during excavation for the installation of the RCF Project, WMWD shall seek input from the tribes to develop a plan for such dispersal that encompasses the tribes' desired treatment and disposition of Native American cultural resources, including human remains. After considering the tribes' input and recommendations, WMWD shall approve and finalize such a plan prior to grading. WMWD shall agree to present the plan and encourage land owners to follow the plan if cultural resources of interest to the tribes are found on land not owned by WMWD.

MM Cult 4: If fossils are identified during excavation, a qualified paleontologist shall be contacted and permitted to recover and evaluate the find(s) in accordance with current standards and guidelines.

MM Cult 5: If human remains are uncovered at any time, all activities in the area of the find shall be halted by WMWD or its contractor and the County Coroner shall be notified immediately pursuant to CA Health & Safety Code Section 7050.5 and CA PRC Section 5097.98. If the Coroner determines that the remains are of Native American origin, the Native American Heritage Commission (NAHC) shall be notified by the Coroner. The NAHC will determine and notify the Most Likely Descendent (MLD). The MLD shall be allowed to inspect the site of the discovery. The MLD shall complete the inspection and make recommendations for treatment within 24 hours of notification by the NAHC.

MM Cult 5a: If a sacred site is encountered within the project alignment, WMWD will work with the tribes to avoid the site, if feasible.

MM Cult 6: Plants and trees removed or damaged by the proposed project shall be replaced pursuant to the standards and requirements of each jurisdiction within which the loss or damage occurs.

MM Cult 7: The location of all existing trees, palms, and other landscaping shall be noted on the construction drawings that will be prepared for this project to facilitate review and proper permitting by the affected jurisdiction.

MM Cult 8: If construction activities that require digging are located closer than eight feet from a mature palm, a certified arborist shall evaluate the specific palm(s) to determine if the palm can remain in place, be relocated successfully or if project redesign may be warranted. If the palm must be removed, replacement shall be pursuant to the requirements of the jurisdiction within which the palm(s) is/are located.

MM Cult 9: If construction activities that require digging are located closer than thirty feet from the drip line of a mature tree, a certified arborist shall evaluate the specific tree(s). The arborist will recommend the course of action most likely to preserve the tree including but not limited to trimming to help with stability, no action and the tree remains in place as is, project redesign, or the means to achieve a successful relocation. If the tree must be removed, replacement shall be commensurate with the size and age of the tree being removed, pursuant to the requirements of the jurisdiction within which the tree(s) is/are located, and in no case shall replacement trees be less than 24-inch box size trees.

2005 Project Alignment Determination under CEQA

The 2005 PEIR prepared for the 2005 Project Alignment found that with the implementation of Mitigation Measures **MM Cult 1 through 9**, impacts to historical resources and to previously unknown potentially-significant archaeological and paleontological resources would be less than significant.

4.4.3 Analysis of the Riverside-Corona Feeder Project Realignment Alternatives

Relation of the Realignment Alternatives to the 2005 Project Alignment

The impacts and findings discussed in the 2005 PEIR related to cultural resources are applicable to both the 2005 Project Alignment and the Realignment Alternatives for Reach H. The Realignment Alternatives will substitute a new alignment for that portion of the 2005 Project Alignment identified as Reaches A, B, C, and D in the 2005 PEIR which is referenced as the Northern and Central Reaches.

The analysis of cultural resources contained within the 2005 PEIR does not specifically address the proposed realignment for Reaches E. F and G, however Reaches E, F, and G were re-evaluated and Reaches F and G were refined slightly in 2007, as analyzed in the *Final Environmental Impact Report for the La Sierra Avenue Water Transmission Pipeline Project* (SCH: 2006101152) which was certified by WMWD on February 20, 2008 (Reaches E, F, and G 2008 Refinement EIR), attached as Appendix J. This refined alignment for Reaches F and G will remain consistent with the 2008 Refinement EIR under both realignment alternatives evaluated herein.

The analysis conducted in this section of the Supplemental EIR is provided to make the 2005 Project Alignment PEIR adequate for the entire Riverside-Corona Feeder Realignment Alternatives. This SEIR with the Reaches E, F, and G 2008 Refinement EIR will provide CEQA analysis for the entire length of the project.

Thresholds of Significance

Western Municipal Water District (WMWD) has not established local CEQA significance thresholds as described in Section 15064.7 of the State CEQA Guidelines. However, WMWD's "Environmental Checklist" for the subject project (see Appendix A of this document) indicates that impacts to cultural resources may be considered potentially significant if the project would:

- cause a substantial adverse change in the significance of a historical resource as defined in California Code of Regulations Section 15064.5.
- cause a substantial adverse change in the significance of an archaeological resource pursuant to California Code of Regulations Section 15064.5.
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- disturb any human remains, including those interred outside of formal cemeteries.

Related Regulations

Historical and otherwise cultural resources are defined and handled by federal, state, and local laws and guidelines. There are specific criteria for determining whether prehistoric sites or objects are significant and thus protected by law. Federal and state significance criteria generally focus on the integrity and uniqueness of the resource, its relationship to similar resources, and its potential to contribute information important to scholarly research. Some resources that do not meet federal significance criteria may be considered significant by state criteria. The laws and regulations seek to mitigate project impacts on significant prehistoric and historical-period resources.

Federal Regulations

National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their undertaking on historic properties and Native American sites of religious or cultural significance. Section 106 would apply to the proposed project if federal agencies are involved in the development, or if federal money is used. The Section 106 process requires consultation with Native America representatives, local agencies, and the State Historic Preservation Officer. If in the future this project is awarded federal funds, the official NEPA process and Section 106 will be required.

Secretary of the Interior's Standards for the Treatment of Cultural Landscapes

The Secretary of the Interior is responsible for establishing professional standards and providing advice on the preservation of cultural resources listed in or eligible for listing in the National Register of Historic Places. In 1992, the Standards were revised so that they could be applied to all historic resource types included in the National Register of Historic Places – buildings, structures, sites, objects, districts, and landscapes. This new, modified version addresses four treatments: preservation, rehabilitation, restoration, and reconstruction. The Guidelines for the Treatment of Cultural Landscapes illustrate how to apply these four treatments to cultural landscapes in a way that meets the Standards.

State Regulations

Public Resources Code 5097.98

California Senate Bill 297 (1982) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the Native American Heritage Commission to resolve disputes regarding the disposition of such remains. It has been incorporated into Section 15064.5(e) of the CEQA Guidelines.

Health and Safety Code Section 7052 and 7050.5

Section 7052 of the California Health and Safety Code states that disturbance of Indian cemeteries is a felony. There are no known Indian cemetery sites within the project area. Section 7050.5 of the California Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are found to be Native American, the coroner must contact the California Native American Heritage Commission.

California Environmental Quality Act (CEQA)

Sections 21083.2 and 21084.1 of CEQA deal with the definition of an historical resource, unique archeological resource, and non-unique archaeological resource. Section 21083.2 directs the lead agency to determine whether the project may have a significant effect on unique archaeological resources. If the lead agency determines that the project may have a significant effect on unique archaeological resources, the environmental impact report shall address the issue of those resources. Section 21084.1 directs the lead agency to determine whether the project may have a significant effect on historical resources, irrespective of the fact that these historical resources may not be listed or determined to be eligible for listing in the California Register of Historic Resources, a local register of historical resources, or they are not deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1.

Regarding the proper criteria of historical significance, the State CEQA Guidelines (Section 15064.5) mandate that a resource shall be considered by the lead agency to be "historically significant" if the resource is listed in, or determined to be eligible, by the State Historical Resources Commission, for listing in the California Register of Historical Resources; is included in a local register of historical resources; or meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code, § 5024.1, Title 14 CCR, Section 4852).

A resource may be listed in the California Register if it meets any of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California history and cultural heritage.
- Is associated with the lives of persons important in our past.
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5(b) of the California Code of Regulations states that a substantial adverse change in the significance of an historical resource means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired when a project:

(A) Demolishes or materially alters, in an adverse manner, those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or

(B) Demolishes or materially alters, in an adverse manner, those physical characteristics that account for its inclusion in a local register of historical resources, pursuant to section 5020.1(k) of the Public Resources Code, or its identification in an historical resources survey, meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

(C) Demolishes or materially alters, in an adverse manner, those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources, as determined by a lead agency for purposes of CEQA.

Pursuant to Section 15064.5(c) of the State CEQA Guidelines, when a project will impact an archaeological site, the lead agency is first required to determine whether the site is an "historical resource." It is considered to be an "historical resource" if the resource is listed in, or determined to be eligible, by the State Historical Resources Commission, for listing in the California Register of Historical Resources; is included in a local register of historical resources; or meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code, § 5024.1, Title 14 CCR, Section 4852).

Section 15064.5(c)(4) states that: "If an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process."

Local Regulations

San Bernardino County

General Plan Policies CO 3.1 to 3.5 describes programs to ensure that the County will preserve and promote its historic and prehistoric cultural heritage.

City of San Bernardino

General Plan Policy 3.6.4 requires that an environmental review be conducted on all applications including grading, earth-moving, building, or demolition permit applications, or for archaeological resources discovered during construction, and for sites designated as archaeologically significant in order to ensure that the sites are preserved and protected.

City of Colton

The City of Colton General Plan's Cultural Resources Preservation Element establishes goals and policies intended to identify, protect and preserve Colton's cultural and historic resources and to educate the public on the importance of these processes. The Cultural Resources Preservation Element also identifies Ordinance No. 0-11-87 as an existing regulation directly related to the goals and policies contained in the general plan element. Ordinance No. 0-11-87, known as the "Historic and Scenic Preservation Ordinance of the City of Colton" establishes rules and regulations governing the designation, preservation, and perpetuation of historic and scenic properties. This Ordinance authorizes the Historic and Scenic Preservation Commission to make recommendations, decisions, and determinations concerning the designation, preservation, protection, enhancement, and perpetuation of historic and cultural resources in the City of Colton.

City of Corona

The Historic Resources section of the City of Corona's General Plan contains goals and policies which address the protection and sustainability of the City's historic resources. Corona General Plan policies consultation with a qualified archaeologist and application of appropriate mitigation if archaeological resources are found during construction (Policy 4.3.3) and consultation with a qualified paleontologist and mitigation if paleontological resources are found during construction (Policy 4.3.7). Compliance with applicable laws is required if human remains are uncovered during construction (Policy 4.3.8).

City of Redlands

The City of Redlands Historic and Scenic Preservation Commission was established in 1976 to advise the City Council regarding designation and protection of historic resources. In 1985, the first Historic and Scenic Preservation Element of the General Plan was prepared and adopted. An ordinance adopted in 1986 strengthened the protection of resources by allowing the Commission to deny demolition, except in cases of proven hardship, and to designate without owner consent. Chapter 7 of the City of Redlands General Plan contains policies to ensure the preservation of cultural, historical, archaeological and paleontological resources within the city. Open Space Policies 7.30a, 7.30b, 7.30c, 7.30d, 7.30.e, and 7.30f are applicable.

City of Rialto

Municipal Code Chapter 18.71, "Historical Preservation" establishes a historic preservation board that is charged with development of a historic preservation design manual, recommending the designation of landmarks and historic districts, and maintaining a list of nominated resources and a register of all local landmark resources. A certificate of appropriateness is required for new construction on the site of a designated historic resource or in a historic district.

Riverside County

Chapter 5 of the Riverside County General Plan contains policies that are intended to ensure the preservation of cultural, historical, archaeological, paleontological, geological, and educational resources in the County. Open Space Policies 19.2, 19.3, 19.4, 19.8, 19.9, and 19.10 are

applicable to this property. These policies include: a review process, institution of mitigation measures, paleontological monitoring, and filing of reports documenting the significance of findings on the site.

City of Riverside

General Plan 2025 includes objectives and policies within a Historic Preservation Element; the purpose of which is to "provide guidance in developing and implementing activities that ensure that the identification, designation and protection of cultural resources are part of the city's community planning, development and permitting processes." Pursuant to Policy HP-1.1, the "City shall promote the preservation of cultural resources to ensure that citizens of Riverside have the opportunity to understand and appreciate the City's unique heritage." Additionally, Policy HP-1.4 states that the "City shall protect natural resources such as geological features, heritage trees, and landscapes in the planning and development review process and in park and open space planning."

Unique Archaeological Resources Criteria

CEQA requires the lead agency to consider whether the project will have a significant effect on unique archaeological resources and to avoid unique archaeological resources when feasible or mitigate any effects to less-than-significant levels (Public Resources Code [PRC] 21083.2). As used in CEQA:

> A unique archaeological resource means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> a) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
> b) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
> c) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Design Considerations/Avoidance

Segments of the Realignment Alternatives have been designed to avoid potential project impacts to historic resources by requiring construction at certain canal and railway crossings (UPRR and Rancho Avenue, Riverside Canal and Agua Mansa Road, Riverside Canal and Jackson Street and Monroe Street and Riverside Canal) to be completed using jack-and-bore construction techniques, rather than traditional surface trenching.

Potential Significant Impacts/Environmental Consequences

Threshold: *The proposed project would cause a substantial adverse change in the significance of a historical resource as defined in California Code of Regulations, Section 15064.5.*

"A substantial adverse change in the significance of a historical resource" is defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired. The proposed realignment and the Monroe Street alternative would cross, or be within the immediate vicinity of five known historic resources:

- CA-SBR-6847H ("The Old Kite Route" or Atchison Topeka & Santa Fe Railway)
- CA-SBR-6859H (Riverside Canal)
- P-33-11361 (Victoria Avenue)
- CA-RIV-4791H (Riverside Lower Canal)
- CA-RIV-4495H (Riverside Upper Canal)

Crossing number 8 as shown in **Table 3.0-2, Summary of Major Pipeline Crossings North to South,** within the Northern Reach would consist of tunneling under CA-SBR-6847H (the AT&SF Old Kite Route railway), which at this point is inoperative and overgrown with vegetation. The proposed Realignment Alternatives and the Monroe Street option would come within 100-feet of CA-SBR-6847H at two other locations: along W. North St. (near South 6th Street) and along Monroe Street (between Lincoln Avenue and Indiana Avenue). However, the railroad crossings at these locations occur above ground within overpasses and will not be affected by the proposed project.

The proposed Realignment Alternatives would cross CA-SBR-6859H (Riverside Canal) at Agua Mansa Road near Slover Mountain and the Rialto Channel. Crossing number 9, as shown in **Table 3.0-2, Summary of Major Pipeline Crossings North to South,** of the Northern Reach would consist of tunneling the Realignment Alternatives under CA-SBR-6859H (Riverside Canal), thus resulting in complete avoidance of the cultural resource through project design.

Construction of the Realignment Alternatives would impact P-33-11361 (Victoria Avenue) at the intersection of Jackson Street or at the intersection of Monroe Street if the Monroe Alternative is used. Victoria Avenue is listed in the National Register of Historic Places due to its role as a defining element of Riverside's historic citrus landscape with regard to community planning and development. The Mediterranean-derived landscape bordering the avenue and its original alignment are defining features, rather than its original road construction materials. Thus, the landscaping along Victoria Avenue is a sensitive resource, the loss of which would be considered significant both aesthetically and historically (see Section 4.1, Aesthetics).

The proposed Realignment Alternatives would cross CA-RIV-4791H (Riverside Lower Canal) at either Jackson Street or Monroe Street. The Canal is not visible where the Realignment Alternatives would cross at Jackson Street, and may occur below ground or has been destroyed. The Canal at Monroe Street where the Realignment Alternatives' Monroe Street option would

cross is above-ground and intact, as evidenced by a concrete-lined gravity-flow canal and culvert. Impacts would be significant to the Canal if either Jackson Street or Monroe Street for the Realignment Alternatives is chosen and traditional trenching techniques are used.

The proposed Realignment Alternatives would cross CA-RIV-4495H (Riverside Upper Canal) at Jackson Street or Monroe Street, if the Monroe Alternative is chosen. The Canal is visible on the west sides of the streets, blocked by chain link fencing. At Crossing number 19 (Jackson Street) and Crossing number Alt. 21 as shown in **Table 3.0-2, Summary of Major Pipeline Crossings North to South,** within Central Reach tunneling techniques would be used to construct the pipeline beneath the Canal.

Three previously unrecorded sites that were located during a field survey are in the area of ground disturbance for the Monroe Alternative:

- RCF-5 (remnants of former citrus orchard irrigation system)
- RCF-6 (Monroe Street Canal)
- RCF-7 (Monticello Street Canal)

RCF-5 is located on an empty 15-acre parcel at the intersection of Irving Street and Cleveland Avenue. The citrus grove that once covered the lot was likely established in the early or mid-1900s. Most of the irrigation system is gone except for some remnants along the western edge, adjacent to Irving Street and the southern corner. It includes a weir box, several flow control pipes, valve controls, and standpipes. Also, rows of California pepper trees border the parcel. Considering that the citrus grove has been removed, as well as most of the irrigation system, RCF-5 lacks overall integrity of location, setting, and association. Impacts from construction in Irving Street and Cleveland Avenue are therefore less than significant.

RCF-6 is a fenced, concrete-lined canal running north-south within Monroe Street, dividing the street from Magnolia Avenue to just south of California Avenue. This Canal appears on the 1942 USGS Riverside 15-minute quadrangle map originally as a storm drain ditch and later in 1957, was improved by the city as adjacent residential developments were constructed. Prior to the extensive improvements made in 1957, the original ditch was likely associated with the historic citrus industry of the Arlington area. The subsequent improvements to the Canal reflect the rapid residential developments that occurred within the City of Riverside following World War II. Based on the association with this post-WWII urban expansion in Arlington's history, this Canal may be eligible for listing in the National Register of Historic Places and the California Register of Historical Resources. If traditional trenching techniques are used for the Monroe Alternative, the Canal would be adversely impacted.

RCF-7 is a concrete-lined trapezoidal Canal beneath Colorado Avenue at the intersection of Monticello Avenue where the Realignment Alternatives' Monroe Street option would bisect. The Canal drains into Hole Lake and was likely improved as it's seen today ca. 1956. Like RCF-6, this Canal is associated with the rapid urban expansion that occurred in Arlington's history following WWII. Therefore, it may be eligible for listing in the National Register of Historic Places and the California Register of Historical Resources, and would be significantly impacted by the Monroe Alternative if traditional trenching techniques are used.

Three previously unrecorded sites that were located during a field survey of the area of potential effect for the Central Feeder Connection component of the Realignment Alternative with Additional Connections (Preferred Alternative):

- CFC-1 (Historic House Foundation)
- CFC-2 (Historic Structure - The Crown Jewel Citrus Packing Plant)
- CA-SBR-9991H – Historic landscape, Mexican Fan Palm historic alignments

CFC-1 is a historic house foundation with associated agricultural irrigation features. The foundation is located on the southwest corner of the intersection of Nevada Street and San Bernardino Avenue. The foundation measures approximately 100 feet by 35 feet and is located in the southwest corner of the proposed boundaries of the well field location. A few surface artifacts were identified around the foundation and in the associated orange groves, which have been removed. The relationship between the artifacts and structure is unclear, as it appears the land has been used for dumping intermittently over the years.

CFC-2 is the Old Crown Jewel packinghouse that has been partially converted into the Packing House Christian Academy. The structure is located on the southwest corner of the intersection of Alabama Street and San Bernardino Avenue. The building measures approximately 180 feet by 80 feet and is situated in the southeast corner of the proposed boundaries of the well field location. The exterior appears to maintain much of its original composition. The packinghouse appears to have been constructed sometime in the early 1900s. Although it is clear some modifications have been made on the west end of the structure, they appear to be historic additions. No surface artifacts were identified around the structure or in the open field directly south of the property.

At this time, the precise location of individual new wells has not been established. Therefore the potential impacts upon CFC-1 and CFC-2 by the Central Feeder Connection component of the Realignment Alternative with Additional Connections (Preferred Alternative) can be avoided by the placement of new wells outside of the area of potential effect for these historic resources. This avoidance will be accomplished through implementation of mitigation measure **MM Cult 11**.

CA-SBR-9991H is comprised of rows of tall Mexican Fan Palms that line portions of Nevada Street and San Bernardino Avenue within the project are. These trees are considered part of the locally culturally significant rural historic landscape. The palm alignments are considered to be "heritage trees" by the County of San Bernardino. These heritage trees are also considered to be aesthetic/visual resources and are addressed in Section 4.1 (Aesthetics/Visual) of this SEIR/EIS. The potential impact of the Central Feeder Connection component of the Realignment Alternative with Additional Connections (Preferred Alternative) can be mitigated to less than significant levels through implementation of mitigation measures **MM Aes 2** and **MM Aes 3**, as set forth in Section 4.1.

Due to the relative sensitivity of the project area, the proposed construction may result in potentially significant impacts upon historical resources; however, mitigation measures **MM**

Cult 1, MM Cult 1a, and **MM Cult 6** through **MM Cult 13**, listed below, will ensure the project's potential to cause a substantial adverse change in the significance of historical resource as defined in California Code of Regulations, Section 15064.5 are mitigated to a less than significant level.

Threshold: *The proposed project would cause a substantial adverse change in the significance of an archaeological resource pursuant to California Code of Regulations, Section 15064.5.*

The proposed project will not impact known archaeological resources. Based on the results of the California Historical Resources Information System (CHRIS) records searches, as well as buried-sites sensitivity analysis, there is a high potential for encountering buried cultural resources within the Realignment Alternatives' area. The results of the San Bernardino Archaeological Information Center (SBAIC), records search indicate numerous previously recorded cultural resources along Agua Mansa Road within the 100-foot-wide survey corridor, including the town site of Agua Mansa, a historical road, and numerous irrigation ditches and canals. An examination of soils and geologic maps for this area, coupled with the presence of numerous previously recorded resources, indicate that there is a high potential for buried cultural resources. Other areas where previously and newly recorded sites have been identified within the APE, as well as the Santa Ana River crossing and the southernmost section of the Realignment Alternatives' Central Reach have also been identified as having high to moderate potential for buried cultural resources.

Due to the expected presence of unknown archaeological resources within the project area, the project may result in an adverse change in the significance of an archaeological resource; however, mitigation measures **M Cult 1, MM Cult 2, MM Cult 3,** and **MM Cult 5a**, listed below, will ensure the project's potential to cause a substantial adverse change in the significance of archaeological resource pursuant to California Code of Regulations, Section 15064.5 are mitigated to a less than significant level.

Threshold: *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.*

No known paleontologic resources have been previously recorded by the San Bernardino County Museum within the Realignment Alternatives project area. Paleontologic remains, however, have been identified approximately three to five miles northwest of the project area. These remains included extinct mammoth, mastodon, bison, camel, and saber-toothed cat.

The proposed Realignment Alternatives are located on surface exposures of Pliocene or early Pleistocene age sedimentary rock units, and alluvial and alluvial fan deposits, that have the high potential to contain significant paleontologic resources. Although not within the project area, paleontologic resources have been previously identified within these sediments in Riverside and San Bernardino counties. Surface exposures of Holocene eolian and alluvial deposits are also reported within the project area. These young sediments, however, have a low potential for containing paleontologic resources.
Three of the four connections to other regional facilities that are part of the Realignment Alternative with Additional Connections (Clay Street Connection, Mockingbird Connection and

La Sierra Pipeline) are located either partially or completely within areas with a high potential to contain paleontological resources. The Central Feeder Connection is located on surface exposures of Holocene alluvial deposits and therefore has a low potential for containing paleontologic resources.

Due to the presence of surface exposures of Pleistocene age sedimentary rock units, and alluvial and alluvial fan deposits, characterized as having a high potential for containing paleontologic resources, there is a potential that construction of some segments of the Realignment Alternatives may uncover paleontological resources. In the event that construction activities uncover paleontological resources, the below-listed mitigation measure **MM Cult 4** will reduce the project's potential to directly or indirectly destroy a unique paleontological resource or site to **less than significant levels**.

Threshold: *The proposed project would disturb any human remains, including those interred outside of formal cemeteries.*

The California Native Heritage Commission investigated the possibility for any Native American cultural resources within the Riverside Corona Feeder project area and has indicated that it has no record of the presence of any known Native American sacred sites within the project and/or in the immediate project area. Nevertheless, as described above, the Northern Reach of the project area is identified as having primarily low and high potential for buried sites. The portion of the project area within the cities of San Bernardino and Colton has low potential, whereas the remaining portion of the Northern Reach, particularly along Agua Mansa Road, has a high potential for buried sites.

Along the Central Reach of the project there is moderate potential for buried sites along much of Limonite Avenue and Clay Street, whereas low potential is identified south of the Santa Ana River crossing along Van Buren Boulevard to just north of the intersection between Jackson Avenue and Colorado Avenue. From this intersection south, the Arlington area of Riverside is characterized as having a high potential for buried sites, as well as the Santa Ana River crossing and areas where previously identified cultural resources are located within the survey corridor.

Although there is no known specific potential for adverse environmental impacts to human remains, including those interred outside of a formal cemetery, human remains may be uncovered at any time. However, in the unlikely event that suspected human remains are uncovered during construction, all activities in the vicinity of the remains shall cease and the contractor shall notify the County Coroner immediately pursuant to CA Health & Safety Code Section 7050.5 and CA RPC Section 5097.98. Therefore, impacts are considered **less than significant.**

Realignment Alternatives Proposed Mitigation Measures/Minimization

An Environmental Impact Report is required to describe feasible mitigation measures which could minimize significant adverse impacts (CEQA Guidelines, Section 15126.4). Mitigation measures were evaluated for their ability to eliminate or reduce the potential significant adverse impacts related to historical and archaeological resources to below the level of significance.

As described above, mitigation measures MM Cult 1 through MM Cult 9 were set forth in the 2005 Certified Final Program EIR and are still applicable to the proposed RCF Pipeline Realignments. Mitigation measures ***MM Cult 2a, MM Cult 4a, and MM Cult 10*** *through* ***13*** *have been added by this SEIR/EIS to address potential impacts. Mitigation measures CULT-1 through CULT-3 are mitigation measures established in the Reaches E, F, and G 2008 Refinement EIR. The measures below mitigate the same issues and provide a consolidated approach to mitigation for all the project alternatives. Thus, the MMs below indicate which measures from the "CULT" list are addressed by that MM. For example,* ***MM Cult 1*** *and* ***MM Cult 2*** *shall be used in lieu of CULT-3 which deals with archaeological monitoring.*

MM Cult 1: (CULT-3) In order to reduce potential significant impacts to historic and non-Native American archaeological and historic resources, full-time archaeological monitoring during excavations shall be conducted in sensitive areas (e.g., near the Santa Ana River crossing), within undeveloped areas along the project alignment, near Riverside Highland Water facility site thought to be in the vicinity of Barton Road (north of Palm Avenue), at the Gage Canal crossing in the cities of Riverside and Grand Terrace, at the Railroad crossings (AT&SF Railroad Alignment and Southern Pacific Railroad), the Riverside Canal, at Victoria Avenue and Irving Street. The extent and duration of the archaeological monitoring shall be determined by a qualified archaeologist once the construction schedule is defined for each reach of project construction. In the event of an accidental discovery, the archaeological monitor will comply with State CEQA Guidelines section 15064.5.

MM Cult 1a: (CULT-1) If non-Native American archaeological or historic resources are discovered, the local jurisdiction and land owner where the resources are found will be notified by WMWD. Depending on the nature of the resource, appropriate mitigation and monitoring will be developed by WMWD in conjunction with all affected parties and the on-site archaeologist, and may include such things as:

- Documentation, removal, and curation at a local museum, federal repository or other appropriate steward agency.
- Documentation and retention in place.
- Further detailed archaeological studies to determine the nature and extent of the find.
- Retention by the land owner.
- Other measures agreed upon by the parties involved.

MM Cult 2: (CULT-3) In response to comments from local tribes and to be sensitive to the cultural heritage of the tribes that have claimed an interest in the project area, the archaeological monitoring program shall be executed in conjunction with the tribes to assist in determining which areas of the project alignment are in sensitive locations where undisturbed soils will be excavated. Such areas will include, at a minimum: the Santa Ana River (San Bernardino County) and Springbrook Wash (Riverside County and City) crossings, and a natural area near Irving and Firethorn Streets (Mockingbird Canyon area) in the City of Riverside.

Prior to grading, WMWD shall contact the Native American Heritage Commission (NAHC) to determine the Most Likely Descendent (MLD) within any given Reach where the pipeline is to be constructed. WMWD shall enter into a pre-excavation agreement for one paid monitor with the Native American tribe identified by the NAHC as the MLD for each Reach of project construction where undisturbed native soils will be affected and sensitive resources are likely. In the event of an accidental discovery, the archaeological monitor will comply with State CEQA Guidelines section 15064.5.

To respond to the expressed desire of each tribe to monitor construction in sensitive areas and in the spirit of interagency cooperation, the Pechanga, Ramona, and San Manuel shall be notified by WMWD, prior to excavation activities.

MM Cult 2a: Additional tribes responded during the archaeological surveys performed for the Realignment Alternatives. To respond to the expressed desire of these additional tribes to monitor construction in sensitive areas and/or be consulted if finds are made, and in the spirit of interagency cooperation, the Morongo Band of Mission Indians, Soboba Band of Luiseno Indians and Gabrieleno/Tongva San Gabriel Band of Mission Indians shall be notified by WMWD, prior to excavation activities.

MM Cult 3: (CULT-1) To ensure the proper disposition of cultural resources of interest to the tribes uncovered during excavation for the installation of the RCF Project, WMWD shall seek input from the tribes to develop a plan for such dispersal that encompasses the tribes' desired treatment and disposition of Native American cultural resources, including human remains. After considering the tribes' input and recommendations, WMWD shall approve and finalize such a plan prior to grading. WMWD shall agree to present the plan and encourage land owners to follow the plan if cultural resources of interest to the tribes are found on land not owned by WMWD.

MM Cult 4: If fossils are identified during excavation, a qualified paleontologist shall be contacted and permitted to recover and evaluate the find(s) in accordance with current standards and guidelines.

MM Cult 4a: Prior to site grading, a pre-grading meeting between a qualified paleontologist and the excavation and grading contractor shall be held to outline the procedures to be followed when buried materials of potentially significant paleontological resources have been inadvertently discovered during earth-moving operations. Should construction/development activities uncover paleontological resources, work shall be moved to other parts of the project site and a qualified paleontologist shall be contacted to determine the significance of these resources. If the find is determined to be significant, temporary avoidance or other appropriate measures shall be implemented. Appropriate measures would include that a qualified paleontologist be permitted to recover and evaluate the find(s) in accordance with current

standards and guidelines. Any significant fossil remains recovered in the field shall be prepared, identified, catalogued, curated, and accessioned into the fossil collections of the San Bernardino County Museum, or another museum repository complying with the Society of Vertebrate Paleontology standard guidelines; and the qualified paleontologist or qualified designee shall prepare a final report presenting an inventory and describing the scientific significance of any fossil remains accessioned into the museum repository. The report shall comply with the Society of Vertebrate Paleontology standard guidelines for assessing and mitigating impacts on paleontological resources and shall be submitted to Western Municipal Water District and the museum repository.

MM Cult 5: (CULT-2) If human remains are uncovered at any time, all activities in the area of the find shall be halted by WMWD or its contractor and the County Coroner shall be notified immediately pursuant to CA Health & Safety Code Section 7050.5 and CA PRC Section 5097.98. If the Coroner determines that the remains are of Native American origin, the Native American Heritage Commission (NAHC) shall be notified by the Coroner. The NAHC will determine and notify the Most Likely Descendent (MLD). The MLD shall be allowed to inspect the site of the discovery. The MLD shall complete the inspection and make recommendations for treatment within 24 hours of notification by the NAHC.

MM Cult 5a: If a sacred site is encountered within the project alignment, WMWD will work with the tribes to avoid the site, if feasible.

MM Cult 6: Plants and trees removed or damaged by the proposed project shall be replaced pursuant to the standards and requirements of each jurisdiction within which the loss or damage occurs.

MM Cult 7: The location of all existing mature trees, palms and other landscaping shall be noted on the construction drawings that will be prepared for this project to facilitate review and proper permitting by the affected jurisdiction. Generally, a mature wood tree is considered to have a diameter of 8-10 inches or more at 4 ½ feet off the ground. A palm tree is considered to be mature at 25 feet or more in height. Citrus trees are mature when commercial levels of fruit-bearing occur at about 5 to 7 years.

MM Cult 8: If construction activities that require digging are located closer than eight feet from a mature palm (over 25 feet in height) , a certified arborist shall evaluate the specific palm(s) to determine if the palm can remain in place, be relocated successfully, or if project redesign may be warranted. If the palm must be removed, replacement shall be pursuant to the requirements of the jurisdiction within which the palm(s) is/are located.

MM Cult 9: If construction activities that require digging are located closer than thirty feet from the drip line of a mature wood tree, a certified arborist shall evaluate the specific tree(s). The arborist will recommend the course of action most likely to preserve the tree including but not limited to trimming to help with stability, no action and the tree remains in place as is, project redesign, or the means to achieve a successful relocation. If the tree must be removed, replacement shall be commensurate with the size and age of the tree being removed, pursuant to the requirements of the jurisdiction within which the tree(s) is/are located, and in no case shall replacement trees be less than 24-inch box size trees.

MM Cult 10: In order to reduce impacts to historical resources along the Monroe Alternative route, jack-and-bore tunneling or a similar technique that does not impact a surface feature shall be used instead of traditional trenching techniques. This would protect impacts to features such as the Riverside Upper Canal (CA-RIV-4495H), Riverside Lower Canal (CA-RIV-4791H), RCF-6, and RCF-7.

MM Cult 11: In order to reduce impacts to historical resources associated with the Realignment Alternative with Additional Connections, new wells constructed as part of the Central Feeder Connection, shall be not be placed within the footprint of the historic house foundation site located on the southwest corner of the intersection of Nevada Street and San Bernardino Avenue or within the footprint of the Old Crown Jewel packinghouse site (Packing House Christian Academy) located on the southwest corner of the intersection of Alabama Street and San Bernardino Avenue.

MM Cult 12: Prior to construction and if the Monroe Street Alternative route is for the Central Reach is selected, P-33-17542 and P-22-17543 must be evaluated for NRHP or CRHR eligibility and the appropriate mitigation measures developed and implemented, if needed. Mitigation measures could include such things as:

- avoidance,
- modified construction techniques, or
- documentation and removal.

MM Cult 13: If the local jurisdiction where mature trees and landscaping are being removed does not have standards or tree replacement requirements, WMWD shall install 15 gallon trees or larger at a 1:1 replacement ratio and other landscaping similar to what was removed or damaged.

Realignment Alternatives Determination of Significance under CEQA

As stated in the 2005 PEIR, impacts to historical resources and to previously unknown archaeological and paleontological resources would be less than significant after incorporating mitigation measures **MM Cult 1** through **MM Cult 13**. The 2005 PEIR remains adequate to address potential impacts related to cultural resources and the mitigation measures contained therein, as described above, will be applicable to the proposed project. With the implementation of **MM Cult 4 and 4a**, potential impacts related to unique paleontological resources would mitigated to **less than significant** impacts.

With implementation of mitigation measures **MM Cult 1** through **MM Cult 13** impacts to cultural, historical, and yet unknown archaeological and paleontological resources will be **less than significant**.

4.4.4 No Project/Action Alternative

Under the No Action Alternative, no physical changes to the environment would occur. The proposed facilities would not be constructed, and existing WMWD facilities and sources of water would continue to be operated as under current conditions. Potential effects related to cultural resources/paleontology would be avoided.

4.5 ENERGY

This section describes the potential impacts on energy resources that could result from the operation of the project. Potential impacts related to criteria air pollutant and greenhouse gas concentrations are contained in Section 4.2 of this SEIR/EIS.

In addition to the 2005 Certified Program EIR (2005 PEIR) and its reference documents, and other reference documents, the following references were used in the preparation of this section of the SEIR/EIS:

- California Energy Commission, *County Electricity Deliveries by NAICS*, 2007. (Available at www.ecdms.energy.ca.gov/utilbynaicselec.aspx, accessed on December 4, 2009.)
- Western Municipal Water District, *Final Environmental Impact Report, La Sierra Water Transmission Pipeline Project*, certified February 20, 2008. (Appendix J)
- Western Municipal Water District, *Updated Integrated Regional Water Management Plan Report*, May 2008. (Available at http://www.wmwd.com/pdfs/IRWMP_updated08.pdf, accessed on September 22, 2010.) (WMWD IRWMP)

4.5.1 Setting/Affected Environment

Facilities that require energy during the operation of the project include electrically driven pump/booster stations and wells. Electricity to operate these pumps and wells will be purchased by WMWD from various electricity providers, including SCE and City of Riverside, depending on the location of the pump or well.

Imported water is supplied to WMWD by Southern California Metropolitan Water District (MWD) from the State Water Project and Colorado River Aqueduct. Based on California energy commission reports, it is estimated that 3,236 kW-hr would be required to extract one acre foot of water from the State Water Project and 2,000 kW-hr would be required to extract one acre foot of water from the Colorado River Aqueduct.[1]

Southern California Edison Company (SCE) is the primary distribution provider for electricity in the project area. SCE provides service to customers within a 50,000 square mile area of central, coastal, and Southern California, including Riverside and San Bernardino counties.

SCE derives its electricity from a variety of sources (see **Table 4.5-A, SCE Energy Resources**). The largest single source of electrical power is generated from natural gas plants (46%); 19% comes from nuclear sources, followed by eligible renewables, such as geothermal, wind and solar (16%). Coal burning plants and large hydroelectric generators made up 12% and 7% of the

[1] County of Riverside, The Villages of Lakeview Final Environmental Impact Report No. 471, SCH 2006071095, Annotated Draft EIR, page 5.3-78, certified March 23, 2010.

power mix in 2008, but these sources were projected to be cut further in 2009. As of April 2010, SCE had not yet published its actual 2009 power mix. The total electricity consumption for 2007 within the SCE planning area was 100,470.271108 (million) kWh or 1.005 x 10^{14} GWh.

The City of Riverside Public Utilities (RPU) provides electricity to customers within the city, which is where the Mockingbird Connection pump and the Sterling Street pump are located. In 2008-2009, RPU provided 2145 kWh (million) to 106,145 meters including residential, commercial, and industrial customers. RPU's sources[2] of this power vary, as shown in **Table 4.5-B, RPU Energy Resources**.

Table 4.5-A
SCE Energy Resources

Energy Resources	***2008 Actual Power Mix***	***2009 Projected Power Mix***
Eligible Renewables	16%	16%
Biomass & Waste	1%	2%
Geothermal	9%	9%
Small Hydroelectric	2%	1%
Solar	1%	1%
Wind	3%	3%
Coal	12%	10%
Large Hydroelectric	7%	5%
Natural Gas	46%	51%
Nuclear	19%	18%
Other	0%	<1%
TOTAL	**100%**	**100%**

Source: Southern California Edison, *Customer Connection, Power Content Label*, April 2009.

[2] City of Riverside Public Utilities, *Financial Report*, 2008-2009.

Table 4.5-B
RPU Energy Resources

Energy Resources	*2008 Actual Power Mix*	*Projected Power Mix*
Eligible Renewables	2%	13%
Biomass & Waste	<1%	<1%
Geothermal	1%	13%
Small Hydroelectric	0%	<1%
Solar	<1%	<1%
Wind	1%	<1%
Coal	33%	54%
Large Hydroelectric	18%	6%
Natural Gas	42%	11%
Nuclear	5%	16%
Other	0%	<1%
TOTAL	**100%**	**100%**

Source: Riverside Public Utilities, *2010 First Quarter Project Power, Purchases, Power Content Label*. (Available at *http*://www.riversideca.gov/utiltities/elec-powerlabelcontent.asp accessed on 4/30/10.

The total estimated electricity consumption reported by the California Energy Commission during 2007 within Riverside County and San Bernardino County for agriculture and water pumps used by utilities, such as those proposed by the project alternatives, was 1,115,629 megawatt-hours (MWh). The total electricity consumption in Riverside/San Bernardino County is 30,149,990 (MWh). Water pumped for utilities and agriculture accounts for approximately 3.7 percent of the total electricity consumption in Riverside/San Bernardino County.

4.5.2 Summary of 2005 Project Alignment Certified Program EIR for Riverside-Corona Feeder Project

Energy usage, other than as it related to air quality, was not addressed in the 2005 PEIR.

4.5.3 Analysis of the Riverside-Corona Feeder Project Alternatives

The following discussion evaluates the potential energy impacts associated with the 2005 Project Alignment Alternative, the Realignment Alternative and the Realignment Alternative with Additional Connections (Preferred Alternative). The No Project/Action Alternative would use no energy.

Thresholds of Significance

Western Municipal Water District has not established local CEQA significance thresholds as described in Section 15064.7 of the State CEQA Guidelines, and Western Municipal Water District's "Environmental Checklist" for the subject project (see Appendix A of this document) does not include questions associated specifically with energy use. The CEQA Guidelines state that the environmental analysis "shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy." (Title 14 CCR Section 15126.4(a)(1)). The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. Appendix F of the CEQA Guidelines is used as a basis for the following thresholds and indicates that impacts related to energy may be considered potentially significant if the project would:

- cause a substantial increase in the use of fossil fuels such as coal, natural gas and oil
- result in an adverse effect on local and regional energy supplies and energy resources.

Design Considerations/Avoidance

The goal of conserving energy implies the wise and efficient use of energy. The conjunctive use aspects of the project result in a reduced reliance on imported water which avoids energy use to transport water from outside the local region in keeping with the WMWD IRWMP.

The Sterling Hydroelectric Station, which will be constructed as part of the Realignment Alternative and Realignment Alternative with Additional Facilities will generate electricity. As part of the Realignment Alternative with Additional Facilities, the Clay Street and Mockingbird Connection pump station locations may also have the capability of a hydroelectric station to generate electricity. However, because no design work has been completed at this time the possible electricity generation at these pump stations has not been analyzed herein although it may further reduce energy consumption.

Potential Significant Impacts/Environmental Consequences

Threshold: *The project would cause a substantial increase in the use of fossil fuels such as coal, natural gas and oil.*

2005 Project Alignment Alternative

The energy-consuming components of the 2005 Project Alignment Alternative consist of a 2,500 horsepower (hp) pump station designed to lift water from the City of Riverside's Waterman Pipeline into the 2005 Project Alignment which operates at an hydraulic gradient line (HGL) of 1250±, and up to twenty (20) 350 HP x 2,200 gallons per minute (GPM) new or existing groundwater production wells to be located within the San Bernardino Basin Area.

The proposed pump station (referred to as the 2005 Project Pump Station in this Section) would be constructed within the City of San Bernardino on a vacant lot near the intersection of Orange Show Road and Waterman Avenue. The exact locations of the existing and/or proposed wells have not yet been determined, although the general location of the 2005 Project Alignment well field is shown in **Figure 3.0-2**. **Table 4.5-C** shows the electrical consumption from the facilities included as part of the 2005 Project Alignment Alternative.

Table 4.5-C
2005 Project Alignment Alternative Electricity Usage

Facility	Hp	Quantity	MWh/year Consumed
2005 Project Pump Station	2,500	1	10,183.50
2005 Project Well Field	350	5	9,450.00
	TOTAL (MWh/Yr)		**19,633.50**

Note: 2005 Project Alignment –Pump Station assumed to operate at 62% capacity 24 hours a day 365 days per year. Five (5) of the 20 total wells assumed to operate at any one time to meet operating requirements at 7,200 hours per year. 750 watt-hours (Wh) per horsepower was used as the conversion factor.

The estimated annual electricity consumption from the 2005 Project Alignment Alternative is approximately 19,664 MWh per year. This estimated level of consumption represents approximately 1.76 percent of the electricity used in San Bernardino and Riverside counties by utilities for agriculture and water pumps (0.065 percent of the total electricity consumed in Riverside/San Bernardino counties).

The increase in electricity consumption from the 2005 Project Alignment Alternative is not expected to result in adverse impacts to the existing power supply, simply on the basis that energy to be used by the project would be a very small fraction of overall electrical usage in the area and the relevant power suppliers have given no indication that there would be a problem meeting the needs of the project. The 2005 Project Alignment does not cause a substantial increase in energy consumed compared to regional use for similar purposes or consumption in the region as a whole, therefore, it does not result in a substantial increase in the use of fossil fuels such as coal and natural gas which are used to produce the power; less than significant impacts will result.

Realignment Alternative

The energy-consuming components of the Realignment Alternative include the pump station and well field analyzed in the 2005 Project Alignment Alternative and also consists of a new pump station and hydroelectric station to be located near WMWD's Arlington Desalter. These facilities are referred to as the Sterling Pump Station and Sterling Hydroelectric Station. The pump station specifications are shown in **Table 4.5-D, Sterling Pump Station Facility**, below (Table 2-1 of the Draft Environmental Impact Report La Sierra Water Transmission Pipeline Project, attached as Appendix J, herein). Due to its elevated position in relation to the Mills Treatment Plant, a hydroelectric station will be housed within the same building as the pump station and will convert potential energy to electricity, as shown in **Table 4.5-E, Sterling Hydro Station** (Table 2-2 of the Draft Environmental Impact Report La Sierra Water Transmission Pipeline Project).

Table 4.5-D

STERLING PUMP STATION FACILITY

Location	On Sterling Avenue or extension of Sterling Avenue at Pierce St near the Arlington Desalter at 11615 Sterling Street
Foot Print	70 feet x 100 feet
Pump Lift	570 feet (from approx. 680 ft to 1250 ft USGS hydraulic grade line)
Horsepower at 75% efficiency	4000 horsepower at 45 cubic feet per second at 570 feet of lift

Table 4.5-E

STERLING HYDRO STATION

Location	Near the Arlington Desalter at 11615 Sterling Street
Foot Print	70 feet x 100 feet
Available Energy for Conservation	300 feet
Kilowatts Generated at 35% efficiency	265 kw at 30 cubic feet per second at 300 feet of head

The Sterling Pump Station is anticipated to run only a few weeks per year while the Mills Water Treatment Plant is out of service for maintenance (Page 2-2 of the Draft Environmental Impact Report La Sierra Water Transmission Pipeline Project). The Sterling Hydroelectric Station is assumed to operate only 6 months a year. **Table 4.5-F** shows the electrical consumption from the facilities included as part of the Realignment Alternative.

Table 4.5-F
Realignment Alternative Electricity Usage

Facility	Hp	Quantity	MWh/year Consumed
2005 Project Pump Station	2,500	1	10,183.50
2005 Project Well Field	350	5	9,450.00
Sterling Pump Station*	4,000	1	1,339.20
TOTAL CONSUMPTION (MWh/Yr)			**20,972.70**
	Drop (feet)	**Kilowatts per hour generated @ 35% efficiency**	**MWh/year Generated**
Sterling Hydroelectric Station[1]	300	265	*+ 1,113.00*
TOTAL CONSUMPTION LESS GENERATED AMOUNT (MWh/Yr)			**19,859.70**

Note: Pump Station assumed to operate at 62% capacity 24 hours a day. Wells assumed to operate 7,200 hours per year. 750 watt-hours per horsepower was used.
Sterling Pump Station assumed to operate at 62% capacity for 24 hours per day.
*30 days used instead of 365 days as the Sterling Pump Station will only run a few weeks a year while the Mills Water Treatment Plant is out of service for maintenance.
[1] Sterling Hydroelectric station is anticipated to run approximately 25 weeks a year.

As shown in the table above, the Realignment Alternative is estimated to consume approximately 20,973 MWh per year. The Sterling Hydroelectric Station is estimated to generate 1,113 MWh per year for a net consumption under this alternative of 19,860 MWh per year. This estimated level of consumption represents approximately 1.78 percent of the electricity used in San Bernardino and Riverside counties by utilities for agriculture and water pumps (0.066 percent of the total electricity consumed in Riverside/San Bernardino counties).

The increase in electricity consumption from the 2005 Project Alignment Alternative is not expected to result in adverse impacts to the existing power supply. Due to the electricity generated by the Sterling Hydroelectric Station, the electricity consumption from the Realignment Alternative is similar to the electricity consumption from the 2005 Project Alignment Alternative, with a difference of only an additional 226 MWh per year. The Realignment Alternative does not cause a substantial increase in energy consumed compared to the 2005 Project Alignment Alternative, nor to existing baseline conditions, regional use for similar purposes, or consumption in the region as a whole, therefore, it does not result in a substantial increase in the use of fossil fuels such as coal and natural gas which are used to produce the power; **less than significant** impacts will result.

Realignment Alternative with Additional Facilities (Preferred Alternative)

The energy-consuming components of the Realignment Alternative with Additional Facilities (Preferred Alternative) are the same as those described previously under the Realignment Alternative, but also include two more pump stations which will operate year-round. The Clay Street Connection includes the construction of a booster station with pumps to allow water to flow in either direction. This pump station is estimated to require approximately 2,400 hp. The Mockingbird Connection includes a related pump station which is estimated to require approximately 3,000 hp. Both the Clay Street and Mockingbird Connection pump station locations may also have the capability of hydroelectric Generation similar to the Sterling Pump Station. However, because no design work has been completed at this time the possible electricity generation at these pump stations has not been included although it may reduce the energy consumption from this alternative.

The Central Feeder Connection would connect up to five new or existing groundwater production wells located within the San Bernardino Basin Area (exact locations not determined) into the San Bernardino Valley Municipal Water District's Central Feeder Pipeline. This will not represent a change in energy consumption from the other alternatives because it is assumed that only five (5) wells of the 20 possible wells associated with RCF operations will be used at any one time to meet operating requirements. These wells are assumed to operate with similar power needs as the well field under the 2005 Project Alignment Alternative.

The energy consumption from the all of the facilities in the Preferred Alternative is shown in **Table 4.5-G**.

Table 4.5-G
Realignment Alternative with Additional Facilities (Preferred Alternative) Electricity Usage

Facility	Hp	Quantity	MWh/year Consumed
2005 Project Pump Station	2,500	1	10,183.50
Wells[2]	350	5	9,450.00
Sterling Pump Station[1]	4,000	1	1,339.20
Clay Street Pump Station	2,400	1	9,776.16
Mockingbird Pump Station	2,800	1	11,405.52
	TOTAL CONSUMPTION (MWh/Yr)		42,154.38
	Drop (feet)	**Kilowatts per hour generated @ 35% efficiency**	**MWh/year Generated**
Sterling Hydroelectric Station[3]	300.00	265	*+ 1,113*
TOTAL ENERGY CONSUMED LESS GENERATED AMOUNT (MWh/Yr)			**41,041.38**

Note: Pump Station assumed to operate at 62% capacity 24 hours a day. Wells assumed to operate 7,200 hours per year. 750 watt-hours per horsepower was used. Sterling Pump Station assumed to operate at 62% capacity for 24 hours per day.
[1] 30 days used instead of 365 days as the Sterling Pump Station will only run a few weeks a year while the Mills Water Treatment Plant is out of service for maintenance.
[2] It is assumed that only five (5) wells of the 20 possible wells associated with RCF operations will be used at any one time to meet operating requirements
[3] Sterling Hydroelectric station is anticipated to run approximately 25 weeks a year.
Realignment Alternative with Additional Connections – Clay Street and Mockingbird Pump Stations assumed to operate at 62% capacity for 24 hours per day. Wells assumed to operate 8 hours per day.

The electricity demand for the Preferred Alternative is approximately 41,041 MWh per year which includes the reduction in power consumption due to the generation of 1,113 MWh from the Sterling Hydroelectric Station. The annual electricity consumption is approximately double that consumed under the Realignment Alternative due to the additional facilities (Mockingbird, and Clay Street pump stations). The estimated increase in the use of electricity under the Preferred Alternative would be approximately 3.68 percent of the electricity used in San Bernardino and Riverside Counties by utilities for agriculture and water pumps (0.14 percent of the total energy use of San Bernardino and Riverside Counties).

Other measures were considered to reduce power consumption. The CAPCOA White Paper on CEQA and Climate Change (CAPCOA) "identifies existing and potential mitigation measures that could be applied to projects during the CEQA process to reduce a project's GHG emissions." Although most suggested mitigation measures do not relate to a project of this nature, a couple of the CAPCOA mitigation measures may help reduce the energy use by the project. CAPCOA MM E-1 regarding high-efficiency pumps requires the use of high-efficiency pumps. WMWD currently uses pumps with high efficiency motors and selects the optimal pump to use for the application (i.e. location, hydrology, size, purpose, etc.). This results in low energy use for the application. The "most energy efficient pump" may be a motor that is rated as more energy efficient than the pump that is selected, but it may not be able to move enough water (not have enough horsepower) or it may not be suited for the particular hydraulic conditions. The

project will use pumps that are as energy efficient as possible without sacrificing performance related to the achievement of the project objectives, as required by **MM Air 5**.

CAPCOA MM E-5 regarding an on-site renewable energy system, requires that a project provide onsite renewable energy system(s). Nonpolluting and renewable energy potential includes solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, projects may take advantage of net metering with the local utility. In addition to the onsite hydro generation of the project and to further reduce energy and thereby GHG impacts, the installation of solar panels to generate energy was also considered. To reduce consumption due to all non-pumping related energy, solar generation is required for lights, timers, landscape irrigation systems, etc. pursuant to **MM Air 6**. However, the installation of the panels on a scale large enough to run the pumps would be infeasible due to the lack of roof space on the buildings housing the pump stations (pumps are removed/serviced through roof access). Land areas adjacent to the pump station buildings are minimized so as not to cause other impacts, such as ground disturbance at the Mockingbird pump station site which would affect biological resources, and the lack of land area prevents the installation of solar panels.

Regarding wind power, there are several factors to consider when determining feasibility. The main supply-side barriers to wind farm development are siting, permitting, resource adequacy, and noise and visual impacts according to survey results published in a CEC study[3]. The most important issue with wind power is resource adequacy (i.e., strong winds). To find adequate winds in Riverside County, wind power systems are located in open areas such as the areas near Whitewater and Desert Hot Springs, rather than within urbanized areas. Noise and visual impacts can also restrict wind power development near residential areas. Residential is particularly sensitive to both noise and aesthetic impacts. The pipeline portions of the project are located mostly in streets which would not allow for wind turbines. The well fields and pump station sites are located in areas adjacent to existing residences and/or commercial development. These combined factors make small wind power infeasible for the project.

According to another report for the CEC[4], there are no geothermal projects or prospects in Riverside County with the nearest resources in Imperial County and one site in Ventura County.

Therefore, on-site renewable wind or geothermal energy generation is not feasible for this project, but these systems are part of the strategy for GHG emissions reductions that will be achieved by the energy sector in the fulfillment of AB 32. Once electricity providers increase their use of renewable energy, a greater proportion of the energy provided to the proposed project will be made up of renewable energy and there will be a further reduction in the project's projected energy-related GHG emissions.

On-site generated biogas is not feasible for a project of this nature. Biogas technology is more appropriate for projects that produce and store large quantities of biomass such as wastewater

[3] Chapter 5, Market Barriers of the *Emerging Renewables Program Small Wind Incentives Study* consultant report for the CEC, July 2009. (CEC 300-2009-003). Available at www.energy.ca.gov//publications/

[4] Figure 1 of the *New Geothermal Site Identification and Qualification* consultant report for the CEC, Public Interest Energy Research Program. April 2004 (P500-04-051). Available at http://www.energy.ca.gov/pier/project_reports/500-04-051.html

treatment plants, landfills, and animal manure from dairy farms[5]. However, landfill gas capture and reuse is currently being developed by the California Air Resources Board (CARB) and the California Integrated Waste Management Board (CIWMB). Once electricity that is generated by biogas facilities becomes available, that energy will feed the transmission grid and will be available for use by the proposed project.

Interruptible service programs were also considered but rejected as infeasible. Western currently has two pump stations on interruptible rate schedules, the Inline Pump Station and Oleander Pump Station. The In-Line Pump Station is strictly a non-potable water supply pump station, and the Oleander Pump Station has both non-potable and potable pumping capability, with the potable pumps used as redundant capacity for the 1837 pressure zone. If these stations were off-line for a short time, there would not be an issue for the potable system. The purpose of the RCF is to improve the reliability of WMWD's potable water supply; to reduce possible water shortages during dry years or times of the year; to reduce dependence upon the direct delivery of imported water during dry year conditions; to improve groundwater quality; to deliver available imported water to its customers; and to contribute to the Upper Santa Ana Watershed effort to become drought-proof and self-sufficient. If the potable water pumping stations associated with the RCF project were selected to be offline as part of a power interruption program, this could jeopardize WMWD's ability to supply potable water when needed or to move water into other parts of the regional system to assist with drought protection efforts. Due to this risk, this type of mitigation was not considered feasible for this project.

While this is a substantial increase compared to the other two alternatives with respect to the energy used for pumping, it still represents a very small amount compared to comparable uses and electricity use in the region as a whole therefore, it does not result in a substantial increase in the use of fossil fuels such as coal and natural gas which are used to produce the power; **less than significant** impacts will result. However, to further minimize consumption, mitigation measures **MM Air 5** and **6**, and **MM Energy 1** shall be implemented for the Realignment Alternative with Additional Facilities (Preferred Alternative).

Threshold: *The project would result in an adverse effect on local and regional energy supplies and energy resources.*

As presented above, the level of consumption by any of the alternatives is small, substantially less than one (1) percent of total consumption in the two-county region. The implementation of MM Energy 1, and MM Air 5 and 6 will reduce the projected level of consumption of the Preferred Alternative further. Neither the City of Riverside nor SCE commented on possible shortages in electricity supplies with respect to the proposed project during the NOP/NOI comment period. Based on the varied sources and level of power supplies available to SCE and City of Riverside, and WMWD's implementation of its IRWMP, it is anticipated that the estimated levels of consumption will result in a less than significant adverse effect on local and regional energy supplies and energy.

[5] http://www.oregon.gov/ENERGY/RENEW/Biomass/biogas.shtml

Realignment Alternatives Proposed Mitigation Measures/Minimization

Although not a significant increase in energy use, to minimize consumption, the following minimization measure shall be implemented pursuant to NEPA for the Realignment Alternative with Additional Facilities (Preferred Alternative). Since no adverse impacts to energy use were identified, no mitigation is required under CEQA.

MM Energy 1: Hydroelectric generating stations shall be constructed as part of the Mockingbird and Clay Street Connections pump station facilities.

The Realignment Alternative with Additional facilities includes the Sterling hydroelectric station, which will convert the potential energy of an elevated water supply to electricity. With incorporation of **MM Energy 1**, hydroelectric energy will also be generated at the Mockingbird and Clay Street pump stations. Mitigation measures **MM Air 5** and **6** also require measures to reduce consumption and generate power. This generation of electricity by the project contributes to meeting the energy conservation goals of decreasing reliance on fossil fuels and increasing reliance on renewable energy sources.

4.5.4 No Project/Action Alternative

Since no construction or operations of the project would occur, no potential energy usage impacts would result.

4.6 GROUNDWATER LEVELS

Potential impacts related to the potential to deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted), or cause undesirably high groundwater levels in the area of the San Bernardino "Bunker Hill" Basin Area were found to be less than significant in the Initial Study/NOP prepared for this project (Appendix A). In response to the Initial Study/NOP, comment letters from the City of San Bernardino Municipal Water Department and the City of Colton raised concerns over the issue of potentially significant impacts related to groundwater levels. Therefore, the focus of the following analysis is the potential impacts related to whether the proposed project will deplete groundwater supplies or interfere substantially with groundwater recharge. A summary of the Groundwater Levels section of the 2005 Certified Program EIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment) is included in the following discussion.

In addition to the 2005 PEIR and its reference documents, and other reference documents, the following references were used in the preparation of this section of the SEIR/EIS:

- Geoscience Support Services, Inc., *Sensitivity to Prolonged Dry Base Period and Land Subsidence Modeling Riverside-Corona Feeder Project Conjunctive Use Scenarios*, prepared for Western Municipal Water District, March 12, 2010. (Appendix F) (2010 Geoscience)
- Geoscience Support Services, Inc., *Groundwater Modeling of Riverside-Corona Feeder Project Conjunctive Use Scenarios*, prepared for Western Municipal Water District, October 23, 2009. (Appendix F) (2009 Geoscience)
- Western-San Bernardino Watermaster, *Annual Report of the Western-San Bernardino Watermaster for Calendar Year 2007*, August 1, 2008. (Available at http://webserver.sbvmwd.com/imgs/reports/wsbwm_ar_2007.pdf, accessed on August 2, 2009.) (WSBWM a).
- Chino Basin Watermaster, *Chino Basin Optimum Basin Management Program, State of the Basin Report 2006* prepared by Wildermuth Environmental, Inc., July 2007. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 30, 2008.) (OBMP 2006 State of the Basin Report)
- Chino Basin Watermaster, *Optimum Basin Management Program, Draft Phase I Report*, prepared by Wildermuth Environmental, Inc., August 19, 1999. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on August 11, 2009.) (OBMP)
- Chino Basin Watermaster and Inland Empire Utilities Agency, *Chino Basin Dry-Year Yield Program Modeling Report, Volume III*, prepared by Wildermuth Environmental, Inc., July 2003. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 19, 2009.) (DYYP)

- Chino Basin Watermaster, *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program Expansion, Project Development Report, Volume I,* prepared by Black & Veatch., December 2008. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 19, 2009.) (DYYP Expansion)
- California Department of Water Resources, *Final State Water Project Delivery Reliability Report 2007,* August 2008. (Available at http://baydeltaoffice.water.ca.gov/swpreliability/, accessed on December 5, 2009.) (DWR Reliability Report)
- Metropolitan Water District of Southern C*alifornia, Final Groundwater Assessment Study; Report Number 1308, Chapter 4 – Groundwater Basin Reports*, September 2007. Available at http://www.mwdh2o.com/mwdh2o/pages/yourwater/supply/groundwater/gwas.html, accessed on August 21, 2009.)
- San Bernardino Municipal Water District and WMWD, *Santa Ana River Water Right Applications for Supplemental Water Supply Final EIR,* certified January 2007. (Available at WMWD) (Water Right EIR)
- Chino Basin Watermaster, *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program Expansion, Project Development Report, Volume IV (CEQA Mitigated Negative Declaration/Initial Study),* prepared by Black & Veatch in association with Tom Dotson & Associates. December 2008. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 19, 2009.) (DYYP Expansion MND/IS)
- Inland Empire Utilities Agency, *Final Subsequent EIR for the IEUP Peace II Project,* September 25, 2010. (Available at http://www.ieua.org/news_reports/notices.html, accessed on October 20, 2010) (SEIR 2010)
- San Bernardino Valley Municipal Water District, *Regional Water Facilities Master Plan Draft EIR, SCH No. 1999091073*, October 13, 2000. (Available at WMWD) (SBVMWD 2000)

4.6.1 Setting/Affected Environment

In addition to the discussion of groundwater below, see also a general discussion of water rights and background issues in Section 2.1, Background, and analysis of groundwater quality in Section 4.7.

Groundwater Generally

Groundwater is found underground in cracks and spaces in soil, sand and rocks. The area where water fills these spaces is called the saturated zone. The top of this zone is called the water table. The water table may be only a foot below the ground's surface or it may be hundreds of feet down. The water table may rise or fall depending on many factors. Heavy rains or melting snow may cause the water table to rise, or an extended period of dry weather or excessive groundwater extraction (pumping) may cause the water table to fall. Groundwater supplies are naturally replenished, or recharged, by rain and snow melt. Groundwater can also be artificially recharged

utilizing water from other sources including water imported from other geographic areas and recycled water.

Groundwater is stored in and moves slowly through layers of soil, sand and rocks called aquifers. The speed at which groundwater flows, depends upon the slope of the water table, upon the size of the spaces in the soil or rock and how well the spaces are connected. Aquifers typically consist of gravel, sand, sandstone, or fractured rock, like limestone. These materials are permeable because they have large connected spaces that allow water to flow through. Where the water table meets the surface, water in aquifers emerges naturally through a spring or through discharges into lakes and streams.

Groundwater can also be extracted through mechanical means by drilling a well into the aquifer. A well is a perforated pipe in the ground that fills with groundwater. This water then can be brought to the surface by a pump. Pumping water from a well or a group of wells in any particular area, may cause a drop in groundwater levels, locally or regionally, depending upon the amount of water extracted.

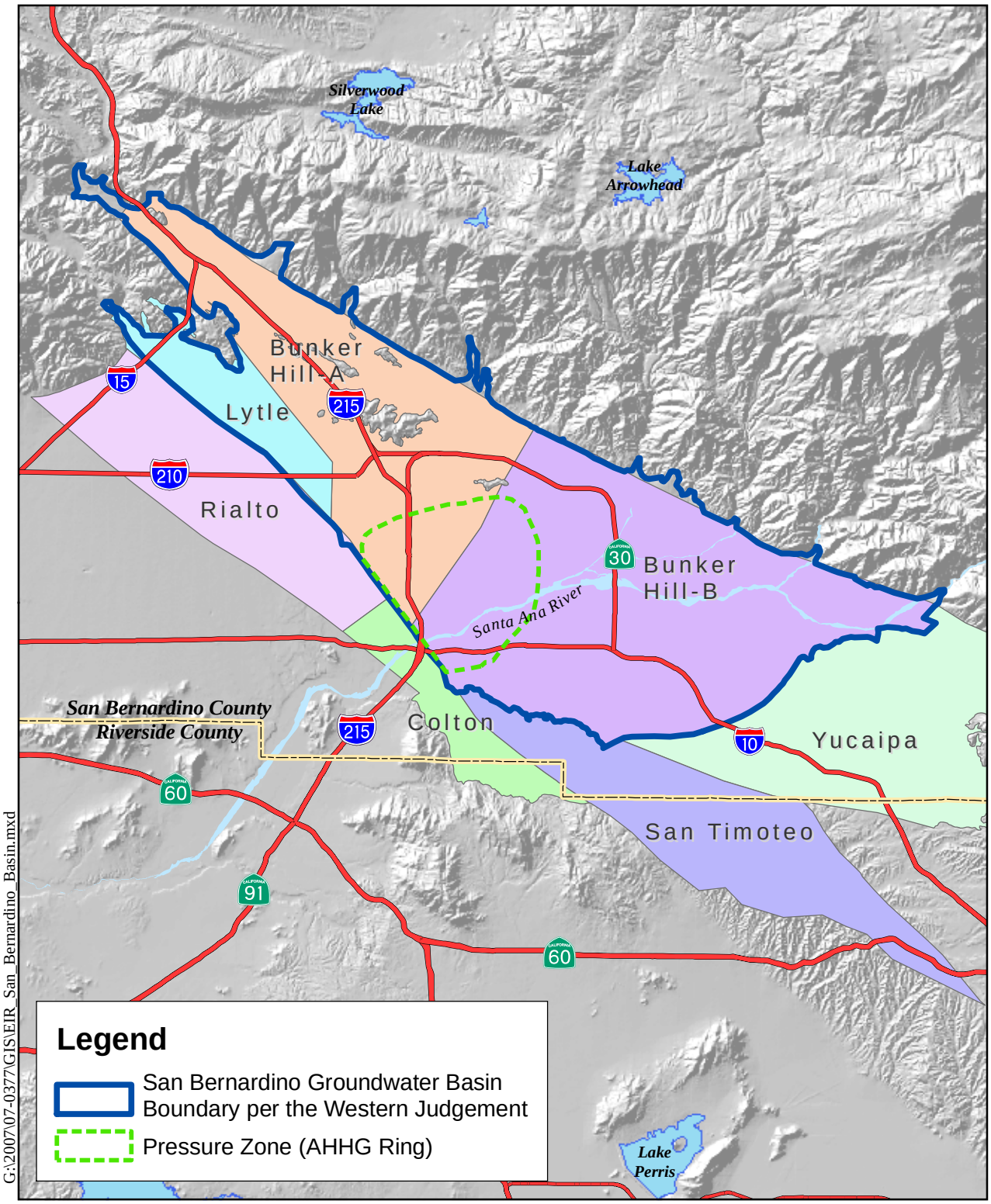
San Bernardino Groundwater Basin

Characteristics of the San Bernardino Groundwater Basin

The San Bernardino Groundwater Basin (Basin Area, aka Bunker Hill Basin) is a sediment-filled trough situated between the San Andreas and San Jacinto Faults in the upper part of the Santa Ana River Basin near the base of the San Bernardino Mountains. This aquifer is divided into four primary sub-basins including: Lytle Sub-basin, Bunker Hill Sub-basin A, Bunker Hill Sub-basin B and the Bunker Hill Pressure Zone (**Figure 4.6-1, San Bernardino Groundwater Basin**). The Bunker Hill Pressure Zone is also referred to as the Area of Historic High Groundwater (AHHG). Groundwater within the Bunker Hill Basin generally flows west from recharge areas along the base of the San Bernardino Mountains towards the Bunker Hill Pressure Zone. Historically, groundwater discharged as upward flow to a freshwater marshland adjacent to the San Jacinto Fault (near Interstate 215), as flow rising into Warm Creek, or as underflow to the Rialto-Colton Basin through permeable materials in the vicinity of the Santa Ana River. After 1945, increased ground water pumping near the San Jacinto Fault caused the water table to fall and the marshland became dry. Since then, water levels have increased and been routinely within 10 feet of land surface in some areas. (SBVMWD 2000)

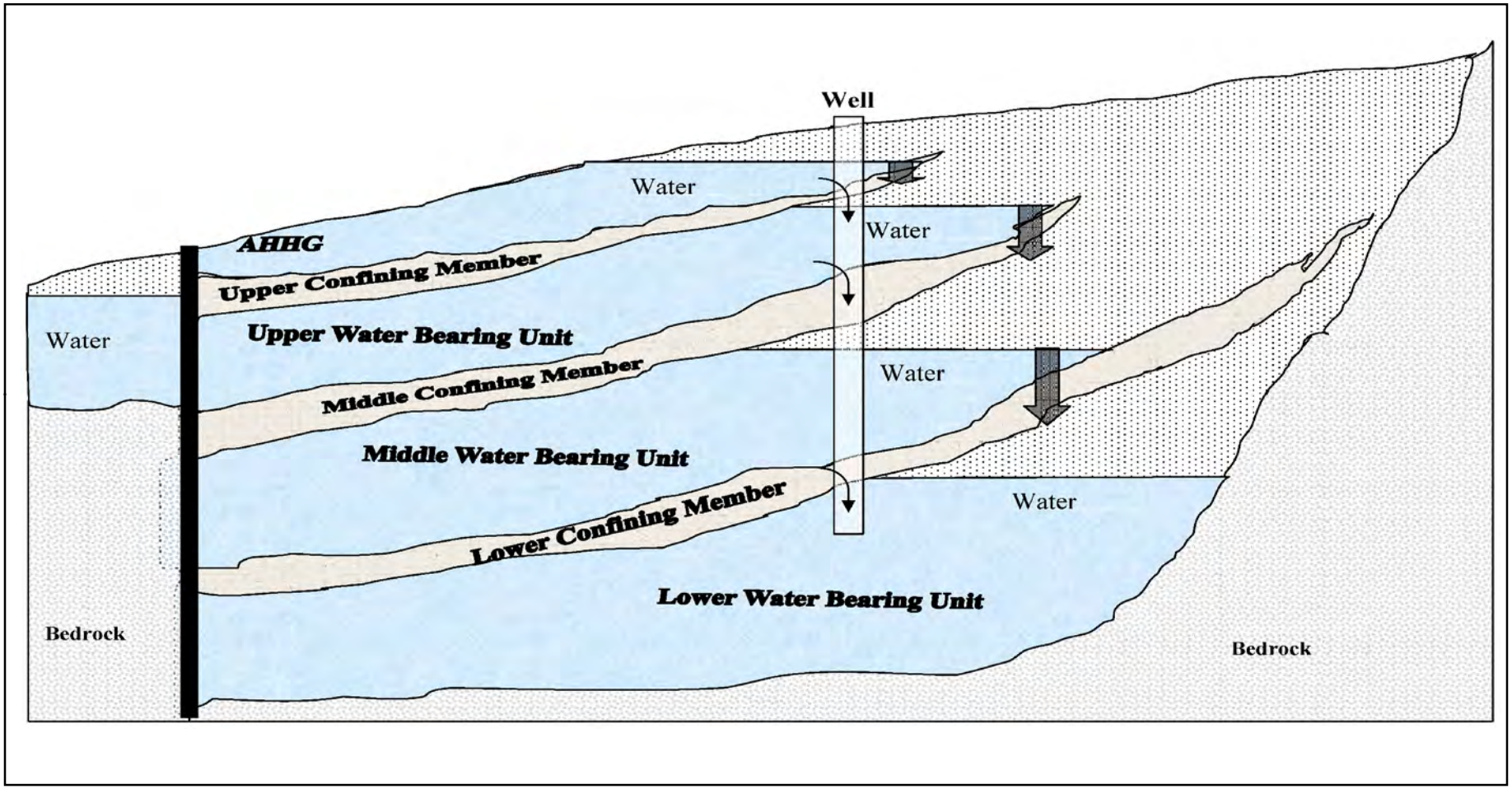
As illustrated in **Figure 4.6-2, Cross Sectional View of the San Bernardino Groundwater Basin**, the Basin Area is also divided vertically by horizontal layers of impermeable soil and rock materials. These materials are referred to as "confining members." In general, the basin is divided by two confining members creating the upper water-bearing unit, the middle water-bearing unit and the lower water-bearing unit. The upper and middle water-bearing units provide most of the water to municipal and agricultural wells in the Basin Area. The middle confining member is as much as 300 feet thick in the AHHG, but thins and becomes less effective toward the margins of the basin at the base of the mountains[1].

[1] San Bernardino Valley Municipal Water District, Regional Water Facilities Master Plan Water Quality Study. Prepared by Camp Dresser & McKee. May 1996 (As referenced in the 2005 Program EIR.) Final EIR certified February 2001, SCH No. 1999091073.



Source: Western Municipal Water District

Figure 4.6-1
San Bernardino Groundwater Basin



Source: 2005 Program EIR, Figure II-5b

Figure 4.6-2
Cross Sectional View of the San Bernardino Groundwater Basin

Historic Groundwater Levels

The storage capacity of the Basin Area is estimated to be about 5,976,000 acre feet[2]. Historically the amount of groundwater in storage in the Basin Area has varied widely in response to natural hydrologic conditions. There have been prolonged periods of below-average recharge and prolonged periods of above-average recharge. Historic high groundwater levels were recorded between 1915 and 1920. This period was followed by a decline in water levels until 1935. From 1935 to 1945 water levels rose to near the 1915–1920 levels. Water levels declined between 1945 and 1969, resulting in a decline in storage of about 750,000 ac-ft. In 1970, water levels began to rise again and peaked around 1984. Between 1984 and 1991 water levels declined in the basin an average of 80 feet, resulting in a decline in storage of about 430,000 ac-ft.[3] Heavy rains recorded in 1993 raised water levels throughout the Basin Area. From 1993 to 2000, the Bunker Hill Basin Pressure Zone, the Redlands area of the Bunker Hill Basin and the southern portion of the Lytle Creek Basin all had significant recoveries in groundwater levels. The groundwater levels in Yucaipa have dropped slightly since 1991 and most of the other areas in the Basin Area have generally remained the same since 1991[4].

The San Bernardino Valley Municipal Water District has divided the Bunker Hill Basin into nine sub-areas to monitor and assess water levels. Two or three representative wells (index wells) were selected in each of these sub-areas. Historical data was compiled for these representative wells including high and low water levels. The index wells and the historic high and low water levels are shown on **Figure II-5c**of the 2005 PEIR (Appendix B of this SEIR/EIS document).

In general, lower storage conditions tend to reduce concerns about water levels being too high in the AHHG but cause pumping problems for wells located up slope from the AHHG. High storage conditions have the opposite effect. Water agencies in the Basin Area have generally agreed on an approach whereby water levels in the forebay areas should be stabilized at acceptable elevations by management of recharge of local and imported water while water levels in the AHHG should be controlled to acceptable elevations by pumping, including, when necessary, pumping in excess of local water supply needs. The proposed project would help to implement that approach.

Groundwater Recharge

"Recorded recharge of natural runoff in the San Bernardino Groundwater Basin Area has been as high as 373,000 ac-ft per year (1969). The estimated average annual recharge of the Basin Area by water from local sources is about 165,000 acre-feet per year."[5] In addition to recharge of natural runoff and other local sources, the Basin Area receives recharge of imported State Water

[2] San Bernardino-San Gorgonio Water Resources Management Investigation. CA DWR December 1986. (As referenced in the 2005 Program EIR.)
[3] San Bernardino Valley Municipal Water District. Regional Water Facilities Master Plan, Final Draft. Reference Documents. Prepared by Camp Dresser & McKee. August 15, 1995. (As referenced in the 2005 Program EIR.)
[4] San Bernardino Valley Municipal Water District groundwater records provided by Bob Tincher. 2000. (As referenced in the 2005 Program EIR.)
[5] Bulletin No. 104-5: Meeting Water Demands in the Bunker Hill-San Timoteo Area. CA DWR December 1970. (As referenced in the 2005 PEIR, pg II-5-6.)

Project water. The San Bernardino Valley Municipal Water District and various cooperating entities have the ability to recharge the Basin Area through water spreading at various locations in the project area. Historically the basin has been directly recharged with up to 32,426 ac-ft per year[6] of State Water Project water.

Groundwater Extraction

The Basin Area serves as the primary source of water supply in the San Bernardino Valley. As summarized on page 57 of the Annual Report of the Western-San Bernardino Watermaster for Calendar Year 2007, total groundwater extraction in the entire basin averaged 248,120 acre feet per year for the 5-year period between 2002 and 2006. Wells within the project area are numerous and widely dispersed.

Production of groundwater from the Basin Area as well as recharge with imported water have been regulated since 1969 pursuant to a court judgment that was entered in the case of *Western Municipal Water District of Riverside County, et al., vs. East San Bernardino County Water District, et al*., Riverside County Superior Court No. 78426 (Western Judgment). As a group, the plaintiffs named in the Western Judgment pumped an average of 63,660 acre-feet per year and all of the water users other than plaintiffs pumped an average of 184,460 acre-feet per year. (WSBWM a). The Western Judgment (and stipulated judgments in general) require the maintenance of a safe yield from the basin. As stated above, water agencies in the Basin Area have generally agreed on an approach that is implemented under the Western Judgment whereby water levels in the forebay areas should be stabilized at acceptable elevations by management of recharge of local and imported water while water levels in the AHHG are controlled to acceptable elevations by pumping, including, when necessary, pumping in excess of local water supply needs. The proposed project would help to implement that approach.

Subsidence

Ground subsidence is a process characterized by downward displacement of surface material caused by natural phenomena such as removal of underground fluids (oil or water), natural consolidation, or dissolution of underground minerals. It may also be caused by phenomena such as settlement of underground mines. Subsidence can range from small or local collapse to broad regional lowering of the earth's surface. Susceptible areas are predominantly valleys filled with unconsolidated relatively fine-grained sediments including sand, silty sand and clayey silt. Organic-rich layers may also be present. While subsidence may occur throughout a susceptible valley, displacement and fissures typically occur at or near the valley margins. Fissure location often corresponds to a subsurface shallowing of the alluvium-bedrock contact or other differences in the subsurface conditions. Fissures may also occur along other existing planes of weakness such as faults.

Land subsidence as a result of groundwater or other subsurface fluid withdrawal, has been recognized in many parts of California. In all cases, the measured subsidence is a function of excessive lowering of groundwater levels in areas where a significant portion of the subsurface

[6] San Bernardino-San Gorgonio Water Resources Management Investigation. CA DWR December 1986. (As referenced in the 2005 PEIR.)

consists of very fine-grained sediments (i.e., clay). In many cases, subsidence can be correlated with areas that historically were flowing artesian (i.e. the groundwater level was at or above the land surface) (2010 Geoscience).

Land subsidence due to declining groundwater levels has historically been reported in the San Bernardino Basin Area (Basin Area). These reports show that there was an average annual subsidence ranging from 0.015 ft/yr to 0.04 ft/yr during the period from 1944 to 1956. During the period from 1944 to 1969, at least one foot of subsidence had occurred in the Pressure Zone near the Raub well field and immediately north of Loma Linda between the San Jacinto and Loma Linda faults (2010 Geoscience).

Chino Groundwater Basin

The RCF Realignment Alternatives will also provide access to/from the Chino Groundwater Basin ("Chino Basin") in San Bernardino/Riverside counties via connections to Jurupa Community Services District facilities.

Characteristics of the Chino Groundwater Basin

The Chino Groundwater Basin (Chino Basin) consists of about 235 square miles of the upper Santa Ana River watershed. **Figure 4.6-3, Chino Basin Boundaries and OBMP Management Zones,** illustrates the boundary of the Chino Basin as it is legally defined in the 1978 stipulated Judgment in the case of *Chino Basin Municipal Water District vs. the City of Chino et* al. (Chino Basin Judgment). The purpose of the Chino Basin Judgment is to establish and maintain a safe yield for the Chino Basin. **Figure 4.6-3** also shows the hydrologic boundary of the basin, which is slightly different from the adjudicated boundary. The Chino Basin is an alluvial valley that is relatively flat from east to west and slopes from the north to the south at a one to two percent grade. Valley elevation ranges from about 2,000 feet in the foothills to about 500 feet near Prado Dam. The Chino Basin is bounded:

- on the north by the San Gabriel Mountains and the Cucamonga Basin;
- on the east by the Rialto-Colton Basin, Jurupa Hills, and the Pedley Hills;
- on the south by the La Sierra area and the Temescal basin; and
- on the west by the Chino Hills, Puente Hills, and the Pomona and Claremont Basins.

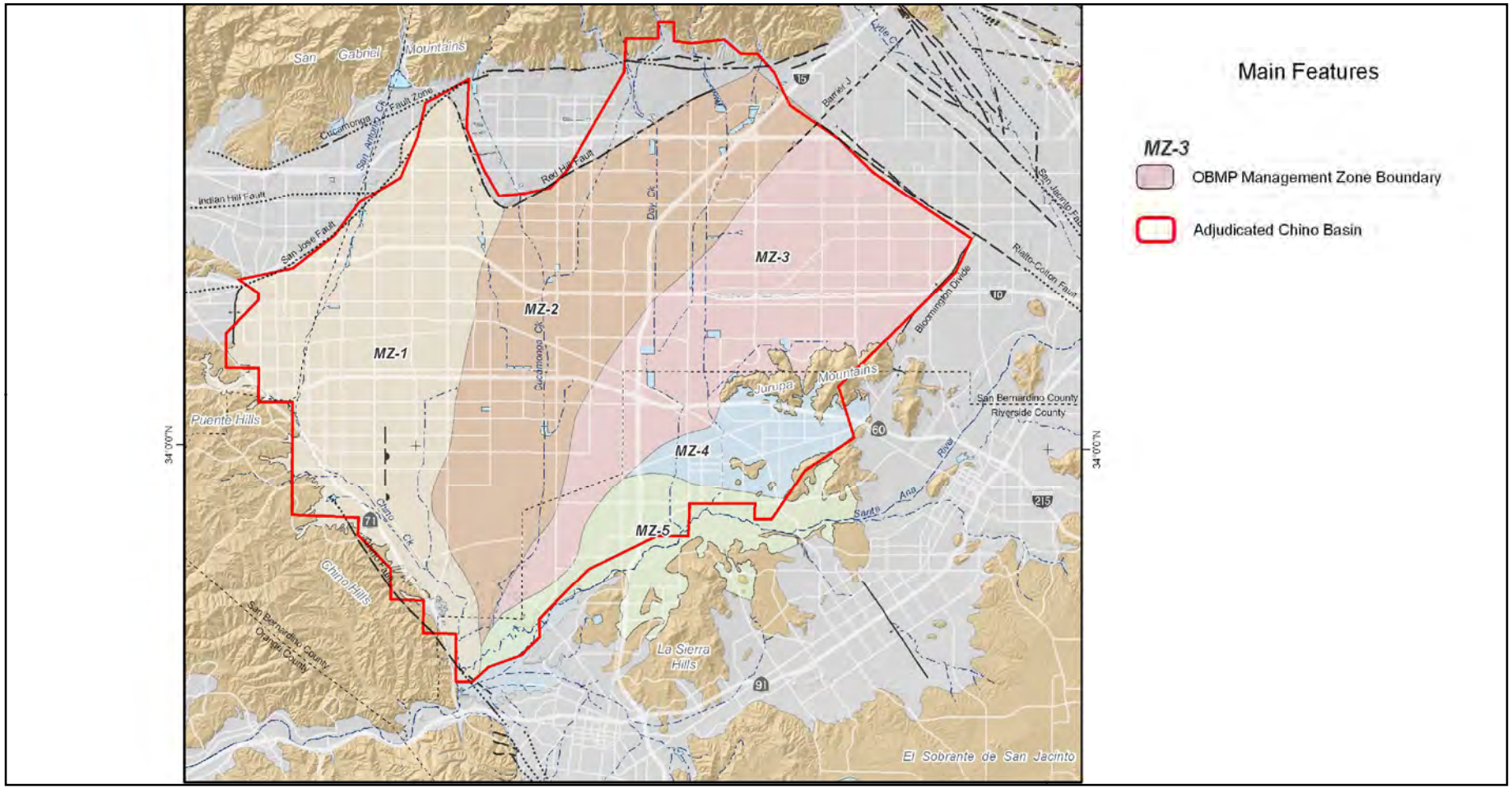
The Chino Basin is one of the largest groundwater basins in southern California with about 5,000,000 acre-feet of water in storage and an unused storage capacity of about 1,000,000 acre-feet. Cities and other water supply entities produce groundwater for all or part of their municipal and industrial supplies and about 300 to 400 agricultural users produce groundwater from the basin. The Chino Basin is an integral part of the regional and statewide water supply system. Prior to 1978, the basin was in overdraft. After 1978, the basin has been operated as described in the Chino Basin Judgment through the implementation of the *Optimum Basin Management Program*. (OBMP, p. 2-1)

Historic Groundwater Levels

While considered one basin from geologic and legal perspectives, the Chino Basin has been divided into five management zones. Each management zone has a unique hydrology, and water resource management activities that occur in one management zone have limited impact on the other management zones.

- **Management Zone 1 (MZ-1).** Prior to the Chino Basin Judgment, the northern half of MZ-1 experienced overdraft, as water levels declined by as much as 200 feet from 1945 to 1977. After the Chino Basin Judgment, water levels recovered, especially during the 1978 to 1983 wet period. During the ten-year period of 1992 to 2002, water levels in MZ-1 were relatively stable with a slight decline in the dry years (1998 to 2002). During the same ten-year period, water levels in the deep aquifer-system within the southern half of MZ-1 fluctuated seasonally by up to 250 feet, but stayed relatively stable within this range over the ten-year period.
- **Management Zone 2 (MZ-2).** Prior to the Chino Basin Judgment, MZ-2 was in overdraft with water levels in the central portion of MZ-2 showing a decline of as much as 130 feet during the period of 1930 to 1977 and water levels in the southern half of MZ-2 showing a decline of as much as 80 feet during the same period. Water levels showed little or no response to wet years until 1978. After the Chino Basin Judgment, water levels increased slightly in the central portion of MZ-2 (10 to 20 feet) until about 1990. This post-Chino Basin Judgment increase was probably due to the combination of 1978 to 1983 wet period, reduction in overdraft following the implementation of the Chino Basin Judgment, the start of artificial replenishment with imported water in the San Sevaine and Etiwanda basins, and the increased use of imported surface water. During the ten-year period of 1992 to 2002, water levels in the central portion declined slightly (10 to 20 feet), even during and after the 1993-1998 wet period. During the same ten-year period, water levels in the southern half of MZ-2 declined by about 20 feet, with most of this decline occurring since 1999.
- **Management Zone 3.** Prior to the Chino Basin Judgment, the eastern portion of MZ-3 was in overdraft as water levels declined by as much as 70 feet during the period of 1930 to 1977. During the same period, the central portion of MZ-3 was in overdraft as water levels declined by as much as 75 feet and the southern portion of MZ-3 was in overdraft as water levels declined by about 20 feet. Water levels showed little or no response to wet years. After the Chino Basin Judgment, water levels at these wells increased slightly (20 to 30 feet) until about 1990. This post-Chino Basin Judgment increase was probably due to the combination of the 1978 to 1983 wet period, the reduction in overdraft following the implementation of the Chino Basin Judgment, and the increased use of imported surface water. During the ten-year period of 1992 to 2002, water levels in the eastern portion of MZ-3 were relatively stable but declined slightly (10 to 20 feet) since about 1998. During the same period, water levels in the central portion remained relatively stable, but water levels in the southern portion of MZ-3 declined by about 10-30 feet, with most of this decline occurring since 1999.

- **Management Zone 4.** Prior to the Chino Basin Judgment, MZ-4 was in slight overdraft as water levels declined by about 20 feet during the period of 1945 to 1977. After the Chino Basin Judgment, water levels at these wells increased slightly (~10 feet) and have remained relatively stable and have continued to follow precipitation trends closely.
- **Management Zone 5.** Prior to the Chino Basin Judgment, MZ-5 was in slight overdraft as water levels declined in some wells by about 25 feet during the period of 1953 to 1977. After the Chino Basin Judgment, water levels at these wells recovered to their 1953 levels during the 1978 to 1983 wet period. After the Chino Basin Judgment, water levels were relatively stable but have declined slightly (by 10 feet or less) since 2000. (DYYP, pp. 2-11 through 2-13)



Source: Chino Basin Dry Yield Program Expansion, 2008.

Figure 4.6-3
Chino Basin Boundaries and OBMP Management Zones

Groundwater Recharge

The sufficiency of the Chino Basin includes the availability of recharge water and recharge capacity for purposes of maintaining the safe yield of the Chino Basin consistent with the OBMP and Chino Basin Judgment. Recharge water includes imported water supplied by the Metropolitan Water District of Southern California (MWD), recycled water and stormwater. The OBMP addresses the use of recharge water, including projections with respect to availability and recharge capacity. See the discussion section below entitled, "State Water Project."

Since 2000, total stormwater recharge in the Chino Basin has averaged approximately 3,700 acre-feet per year; with total storm water recharge during 2004 – 05 being approximately 1,400 acre-feet and during 2005 – 06 being approximately13,000 acre-feet. State Water Project (SWP) water for artificial recharge is currently available to the region from MWD. MWD delivers SWP water into the Chino Basin from the Rialto Pipeline, flowing from east to west across the northern half of the Chino Basin. During fiscal years 2004 – 05 and 2005 – 06, total SWP recharge in the Chino Basin was approximately 12,300 and 34,600 acre-feet, respectively. The aggregate average SWP water recharge that has occurred since the OBMP was implemented is approximately 12,300 acre-feet per year. During fiscal years 2004-05 and 2005-06, total recycled water recharge in the Chino Basin was approximately 160 and 1,300 acre-feet, respectively. The aggregate average recycled water recharge that has occurred since the OBMP was implemented is approximately 440 acre-feet per year. The total supplemental water recharge, consisting of imported and recycled waters was approximately 12,500 acre-feet during fiscal year 2004 – 05 and 36,000 acre-feet during fiscal year 2005 – 06. The aggregate average supplemental water recharge that has occurred since the OBMP was implemented is approximately 12,800 acre-feet per year (OBMP 2006 State of the Basin Report, pp. 3-6, 3-7.)

State Water Project

Subsequent to the completion of the 2005 PEIR, events have transpired that have the potential to affect the availability and reliability of imported State Water Project (SWP) supplies from the Metropolitan Water District of Southern California (MWD) which may be used to recharge the Basin Area as part of the RCF project. As discussed below, such factors include potential reductions in exports from the Sacramento-San Joaquin Delta (Delta), dry hydrologic conditions, potential regulatory and emergency constraints on the use of water conveyance facilities, water quality issues, and short and long term climatic change.

New U.S. Fish and Wildlife Service (FWS) Biological Opinion (B.O.) for Delta Smelt and Related Litigation Matters

The delta smelt is a small fish that resides in the Delta and is protected under the state and federal Endangered Species Acts. In August 2007, in the case of *NRDC v. Kempthorne*, the U.S. District Court for the Eastern District of California invalidated the 2005 B.O. prepared by FWS to examine the effects of SWP and Central Valley Project (CVP) operations on the delta smelt, and ordered FWS to prepare a new B.O. (*Natural Resources Defense Council v. Kempthorne, et al.*, USDC Case No. 05-CV-1207-OWW.). On December 14, 2007, the District Court issued an

Interim Remedial Order and Findings of Fact and Conclusions of Law requiring the SWP and CVP to operate according to certain specified criteria (Interim Remedies) until the new B.O. was prepared. The operating restrictions were tied to various factors occurring in the Delta, such as prevailing hydrologic conditions and migratory and reproductive status of the delta smelt. On December 15, 2008, the FWS issued a new B.O. According to information published the California Department of Water Resources (DWR), which owns and operates the SWP, the new B.O. has the potential to reduce SWP deliveries from the Delta in nearly the same manner as the Interim Remedies. DWR has estimated that under average water year conditions, the most likely result of the new B.O. is a one percent increase in the amount of available SWP supplies in comparison to the Interim Remedies, although a worst-case scenario could result in a 13 percent decrease in available supplies. Under dry water year conditions, DWR states the most likely result of the new B.O. is the same type of potential restrictions as set forth in the Interim Remedies, although restrictions could possibly increase by 21 percent under a worst-case scenario. As with the Interim Remedies, potential water supply restrictions under the new B.O. are dependent on various factors that cannot be predicted with a high degree of certainty, including hydrologic conditions, migratory and reproductive patterns of delta smelt, and other factors affecting delta smelt abundance in the Delta. Due to a number of alleged scientific and other deficiencies in the new B.O., water agencies holding contracts to receive SWP supplies from DWR filed complaints in the Federal District Court for the Eastern District of California challenging the B.O. (*The Consolidated Delta Smelt Cases*.) Because delta smelt are also protected under state law, the California Department of Fish and Game issued a "consistency determination" which essentially provides state authorization for SWP and CVP operations to the extent those operations occur pursuant to the FWS B.O. This regulatory decision has been challenged in state court. These litigation matters challenging the validity of the new B.O. give rise to the possibility that SWP delivery reductions as set forth by the Interim Remedies could be put back in place pending final legal resolution of the new B.O. In light of these various factors, the degree to which SWP deliveries may be reduced under the new B.O. for delta smelt remains difficult to forecast, although DWR and other agencies have estimated potential delivery reductions as discussed below in DWR's Draft 2009 SWP Delivery Reliability Report.

California Department of Fish and Game (CDFG) Incidental Take Permit for Longfin Smelt and Related Litigation Matters

Another factor having the potential to affect the availability and reliability of SWP supplies is regulatory action related to the longfin smelt, a small pelagic fish species that resides in the Delta and other areas along the West Coast and which is protected under the California Endangered Species Act. On February 29, 2009, CDFG issued Incidental Take Permit No. 2081-2009-001-03 (Permit) to DWR which imposes terms and conditions on the ongoing and long-term operation of SWP facilities in the Delta for the protection of longfin smelt. The operating restrictions under the Permit are based in large part on the restrictions imposed on the SWP by the new FWS B.O. for delta smelt (see above). As with the FWS B.O., potential water supply restrictions under the Permit are dependent on various factors that cannot be predicted with a high degree of certainty, including hydrologic conditions in the Delta region, migratory and reproductive patterns of longfin smelt, and other factors affecting longfin smelt abundance in the Delta. DWR has not indicated whether any particular reductions in SWP exports are likely to result from the Permit. Due to a number of alleged scientific and other deficiencies in the

Permit, an organization of water agencies holding contracts to receive SWP supplies from DWR has challenged the Permit in Sacramento County Superior Court. (*State Water Contractors v. California Dept. of Fish and Game, et al.*, Sac. Sup. Ct. Case No. 34-2009-80000203.) That case has brought CDFG's ability to enforce the Permit into question. In light of the foregoing factors, potential reductions in SWP supplies resulting from the Permit for longfin smelt remains difficult to forecast at this time.

New National Marine Fisheries Service (NMFS) Biological Opinion (B.O.) Salmon/Anadromous Species and Related Litigation Matters

Additional factors having the potential to affect the availability and reliability of SWP supplies are new regulatory restrictions and related litigation concerning anadromous fish species in the Delta, including, winter and spring-run salmon, steelhead trout and green sturgeon that are protected by the Endangered Species Act. In April 2008, in the case of *PCFFA v. Gutierrez*, the U.S. District Court for the Eastern District of California invalidated the 2004 B.O. prepared by NMFS to examine the effects of SWP and CVP operations on protected anadromous species in the Delta, and ordered NMFS to prepare a new B.O. (*Pacific Coast Federation of Fishermen's Associations, et al. v. Gutierrez, et al*., Case No. 1:06-CV-00245-OWW-GSA.) The court determined that additional water supply restrictions to protect anadromous species were not required beyond those that were already required under the Interim Remedies for the protection of delta smelt (see above). On June 4, 2009, NMFS issued a new B.O. regarding the effects of SWP and CVP operations on protected salmon, steelhead, green sturgeon, and resident killer whales. According to information published by DWR, NMFS has calculated that the B.O. has the potential to reduce SWP deliveries from the Delta by 7 percent in addition to the potential reductions under the delta smelt B.O. (above), while DWR estimated that average annual reductions to SWP deliveries could be closer to 10 percent beyond the restrictions imposed under the FWS B.O. for delta smelt. As with the FWS B.O. for delta smelt, potential water supply restrictions under the NMFS B.O. are dependent on various factors that cannot be predicted with a high degree of certainty, including hydrologic conditions in the Delta region, migratory and reproductive patterns of protected anadromous fish, and other factors affecting the abundance of those species in the Delta. In June 2009, legal challenges were filed against the NMFS B.O. in the United States District Court for the Eastern District of California alleging, among other things, that the water supply restrictions set forth in the B.O. are in violation of the federal Endangered Species, the federal Administrative Procedures Act, and other laws. (*The Consolidated Salmonid Cases*.) Because the anadromous species are also protected under state law, the California Department of Fish and Game issued a "consistency determination" which essentially provides state authorization for SWP and CVP operations to the extent those operations occur pursuant to the NMFS B.O. This regulatory decision has been challenged in state court. These litigation matters call into question whether the water supply restrictions in the B.O. can be imposed against the SWP. For these and other reasons, the degree to which SWP deliveries may be reduced under the new NMFS B.O. remains difficult to forecast, although DWR and other agencies have estimated potential delivery reductions as discussed below in DWR's Draft 2009 SWP Delivery Reliability Report.

California Drought Conditions

In February 2009, the Governor of the State of California declared a state of emergency due to prevailing statewide drought conditions, evidenced by low reservoir storage and estimated snowpack water content at that time. Since then, statewide hydrologic conditions have improved, although the state of emergency declaration has not been lifted. In March 2010, DWR announced that both manual and electronic readings indicate that water content in California's mountain snowpack was 107 percent of normal and stated that the "readings boost our hope that we will be able to increase the State Water Project allocation by this spring to deliver more water to our cities and farms." Among these readings, DWR reported that electronic sensor readings showed northern Sierra snow water equivalents at 126 percent of normal for that date, central Sierra at 93 percent, and southern Sierra at 109 percent.[7] As of June 30, 2010, California's hydrologic conditions were as follows: statewide precipitation was 110 percent of average; statewide runoff was 90 percent of average to date; and key historical average statewide reservoir storage was at 100 percent, with two of the state's largest reservoirs, Lake Shasta (CVP) and Lake Oroville (SWP), respectively storing 115 percent and 92 percent of their historical averages.[8]

Draft 2009 SWP Delivery Reliability Report

In January 2010, DWR released its Draft SWP Delivery Reliability Report (DWR Report). According to the DWR Report, the long-term average delivery of contractual amounts of SWP Table A supply is projected to be 60 percent under current (2009) and future (2029) conditions. (DWR Report, pp. 32, 39.) Within that long-term average, SWP Table A deliveries can range from 7 percent (single dry year) to 68 percent (single wet year) of contractual amounts under current conditions, and from 11 percent (single dry year) to 97 percent (single wet year) of contractual amounts under future conditions. (DWR Report, pp. 32-33, 40.) Under future conditions, contractual amounts during multiple-dry year periods are projected to range from 32 to 38 percent. (DWR Report, p. 40.) The analyses provided in the DWR Reliability Report are based upon 82 years of historical records for rainfall, snowpack and runoff that have been adjusted to reflect the availability of water at the source, the ability to convey water from the source to the desired points of delivery, and the magnitude of demand for the water. (DWR Report, p. 7.) Of key importance, the studies, data and conclusions set forth in the DWR Report expressly assume and account for current facility and institutional limitations, including water quality, fishery protections, export curtailments and other requirements under State Board Water Rights Decision 1641 and the new FWS and NMFS Biological Opinions (see above), as well as potential effects of Delta levee failures and other seismic or flood events. (See, e.g., DWR Report, pp. 7-12, 17-23, 25-28, Appendices A, A-1, A-2, B.)

In addition, the long-term SWP delivery reliability analyses in the DWR Report incorporate assumptions to account for potential supply shortfalls related to global climate change factors. (Ibid.) Global climate change is another factor that could have potential impacts to the availability and reliability of imported water supplies. Long-term climatic changes resulting from increases in air temperature may lead to changes in the timing, amount and form of precipitation

[7] http://www.water.ca.gov/news/newsreleases/2010/030310snow.pdf
[8] http://cdec.water.ca.gov/cgi-progs/reports/EXECSUM

- rain or snow, changes in runoff timing and volume, effects of sea level rise on Delta water quality, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. The DWR Report accounts for potential effects of future climate change on SWP deliveries using 12 future climate projections at mid-century and end-of-century analysis periods. (See, e.g., DWR Report, pp. 8-9, Appendices A-B.) Moreover, the DWR Report assumes that these regulatory and institutional restrictions will remain in place over the next 20-year period and that no actions to improve the Delta will occur. Thus, the DWR Report represents an ultra-conservative projection of SWP delivery reliability, particularly in light of the fact that many actions and processes are underway pursuant to the Bay Delta Conservation Plan, Delta Vision, and new state laws to improve Delta governance and conveyance, and improve the availability of reliability of SWP supplies.

Development of Delta Plan and Delta Flow Criteria Pursuant to New State Laws

In November 2009, the California Legislature enacted SBX7 1 as one of several bills passed as part of a State comprehensive water package related to water supply reliability, ecosystem health, and the Delta. SBX7 1 became effective on February 3, 2010 and adds Division 35 to the California Water Code (commencing with Section 85300). This division is referred to as the Sacramento-San Joaquin Delta Reform Act of 2009. Among other things, the Act creates the Delta Stewardship Council (Council) as an independent agency of the state. (Wat. Code § 85200.) SBX7 1 also amends the California Public Resources Code to specify changes to the Delta Protection Commission and create the Delta Conservancy. (Pub. Res. Code §§ 29702-29780.) The Act directs the Council to develop a comprehensive management plan for the Delta by January 1, 2012 (the Delta Plan) and to first develop an Interim Plan that includes recommendations for early actions, projects, and programs for the Delta. (See generally, Second Draft Interim Plan, Prepared for Consideration by the Delta Stewardship Council, p. 1.) In addition to these and other requirements, SBX7 1 requires the State Water Resources Control Board (State Board) to develop flow criteria for the Delta ecosystem necessary to protect public trust resources, including fish, wildlife, recreation and scenic enjoyment. Beginning in March 2010, the State Board has undertaken a public process to inform its development of flow criteria for the Delta. Potential reductions in SWP supplies, if any, resulting from processes under SBX7 1, or the degree to which those processes may relate to or be coordinated with the regulatory processes being conducted by FWS and NMFS (see above), cannot be determined with any reasonable degree of certainty at this time.

4.6.2 Summary of 2005 Certified Program EIR for Riverside-Corona Feeder Project

Design Considerations/Avoidance

The 2005 Project Alignment did not identify specific locations for wells or recharge spreading; thus allowing for flexibility in operating scenarios to best limit adverse impacts to groundwater. Several well fields (located primarily within the AHHG) and possible spreading grounds were modeled to help understand the relationships of the project to the Basin Area management system.

Potential Significant Impacts/Environmental Consequences

Groundwater Levels were addressed in Section II-5 (pp. II-5-1 through II-5-9) of the 2005 Certified Program EIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment), which are hereby incorporated by reference. The following discussion is a summary of the Groundwater Levels section of the 2005 PEIR:

Threshold: *(1) Substantially depletes groundwater supplies or interferes substantially with groundwater recharge such that there is a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells drops to a level which does not support existing land uses or planned uses for which permits have been granted) or (2) causes undesirably high groundwater levels in the area of historically high groundwater (AHHG).*

The San Bernardino Groundwater Basin serves as the primary source of water supply in the San Bernardino Valley. Total groundwater pumpage in the entire basin averaged 262,082 acre-feet per year between 1996 and 2000. As a group, the plaintiffs named in the Western Judgment pumped an average of 69,752 acre feet per year and all of the water users other than plaintiffs pumped an average of 192,330 acre feet per year[9].

The 2005 Project Alignment includes additional replenishment of State Water Project water in amounts which are substantially less than the historical range of storage fluctuations in the Basin Area. Annual rates of recharge at any time by the proposed project will be limited by State Water Project water availability as well as coordinated efforts to manage the Basin. The replenished water would be extracted by wells located in or near the AHHG at a rate of up to 40,000 ac-ft per year, which is about 15% of the current rates of extraction in the Basin, with actual rates depending upon the need for the water as well as upon Basin Area conditions.

The 2005 Project Alignment is in accordance with the Western Judgment (see page 4.6-25) which provides that extractions may be made in addition to those determined by the Judgment, pursuant to agreement between SBVMWD and WMWD. The Judgment further provides that nothing therein shall preclude SBVMWD, WMWD or any other party from exercising such rights as they may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of underground storage capacity of the Basin Area shall not interfere with any replenishment program of the Basin Area. The Watermaster is charged with the responsibility of administering the Judgment, and all subsequent orders of the Court made pursuant to the Court's continuing jurisdiction. The Watermaster is required to file with the Court annual reports which include, among other information, summaries of extractions by all parties pumping water from the Basin Area, groundwater level measurements, and an accounting of all credits and obligations in the groundwater basin. No significant effects related from the 2005 Project Alignment to groundwater levels are anticipated.

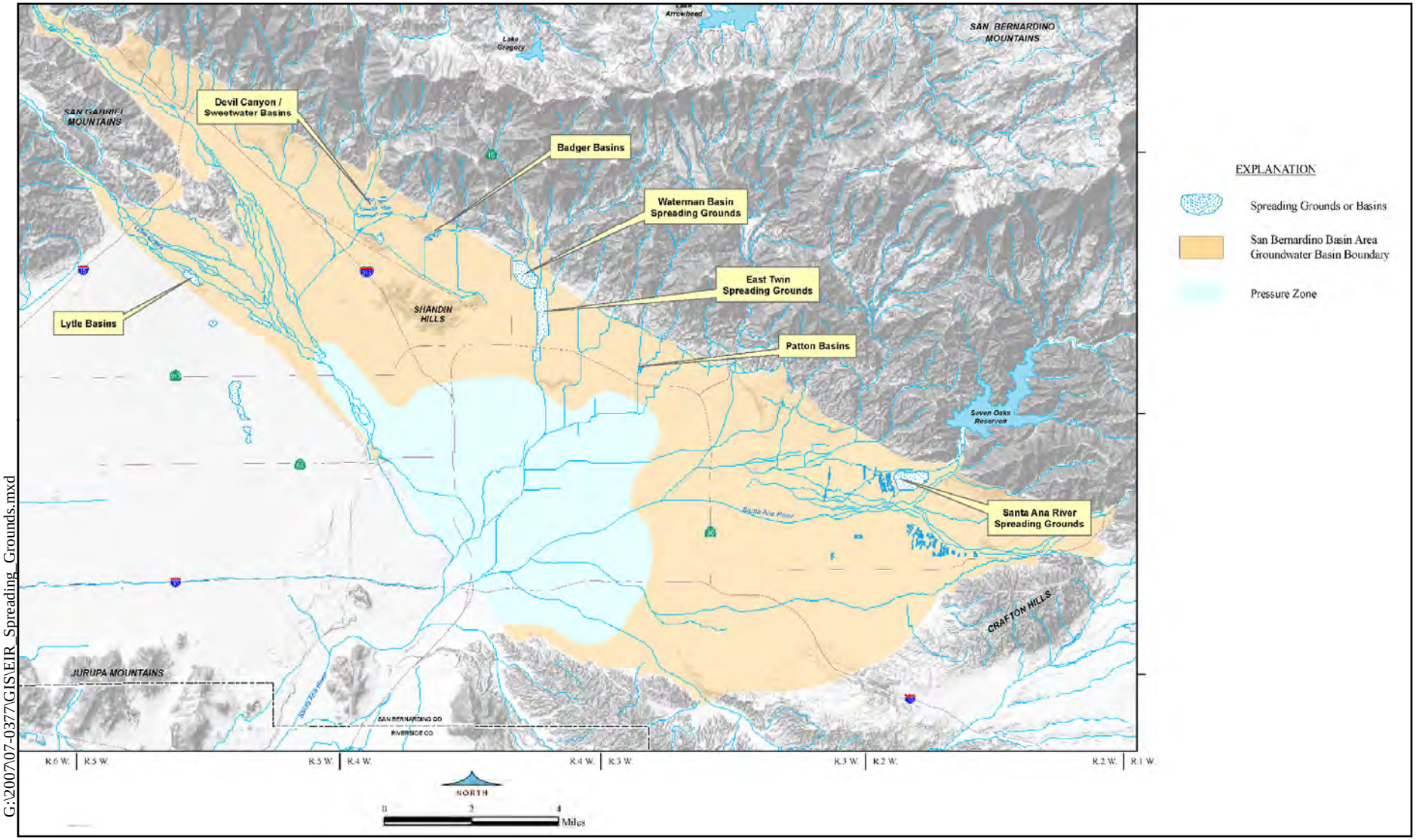
Western Municipal Water District (WMWD) prepared a hydrologic analysis that was added as Appendix F of the 2005 PEIR. The same groundwater flow (MODFLOW), particle tracking

[9] Western-San Bernardino Watermaster Report. 2001 (As referenced in the 2005 PEIR.)

(MODPATH), and solute transport (MT3DMS) models that were used for the analysis in the Muni/Western Santa Ana River (SAR) Water Right Applications DEIR (Water Right EIR) were used to perform these analyses for the 2005 Project Alignment. All modeling assumptions including extraction schedule and new well locations, and replenishment schedules were included in Appendix F of the 2005 PEIR. Generally, modeling was based on historic hydrologic data projected from 2001 through 2039, the same as those for the Water Right DEIR. Extraction and replenishment assumptions are based on a water availability forecast model developed by Metropolitan Water District (MWD) that includes implementation of the MWD Water Surplus and Drought Management Plan (WSDM). Appendix F, Table 1 of the 2005 PEIR, shows the assumed 2005 Project Alignment extraction and replenishment schedule for the Scenario 1 modeling analysis. The schedule was based on the WSDM predictions for change in storage in Diamond Valley Lake, change in storage for State Water project program, and MWD's interruption of replenishment services. Other factors included surplus remaining after WSDM action is taken and hydrology in southern California. This represented an operating scenario for the 2005 Project Alignment that maximized the conjunctive use potential of the project based on a repeat of hydrology for the period 1961 to 2000.

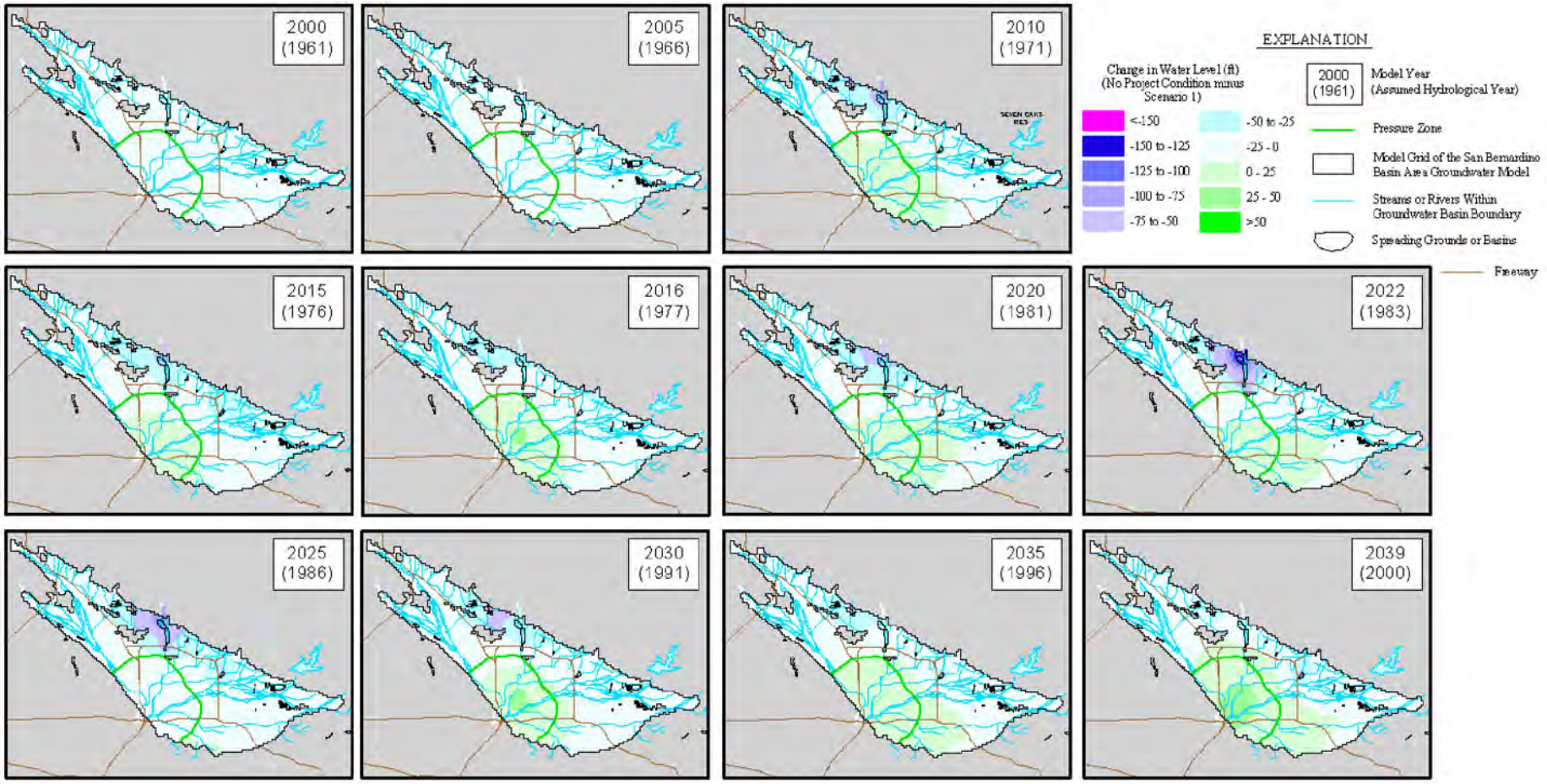
With respect to the groundwater flow model results, the direction of flow and the fluctuations in water level over time were generally the same for this operating scenario as for the No Project condition. However, index well hydrographs (see **Figure 4.6-4, Locations of Spreading Grounds for Artificial Recharge**) show that under the operating scenario analyzed for the 2005 Project Alignment, water levels in the forebay or recharge area tracked generally above the No Project conditions, and levels in the Pressure Zone or area of Historic High Groundwater (AHHG) tracked generally below No Project.

Water levels were generally higher in the forebay as a result of the related recharge of State Water Project water. The recharge creates mounding and the associated increase in levels is highest in the upper layer at the spreading basins. The maximum increase in level occurs in the Waterman spreading area in 2022 in the amount of over 150 feet. However by 2025 the increased difference in levels was about 100 feet and by 2030 the increase was projected to be less than 50 feet. Increase in level or mounding in the lower layer is much less significant (see **Figure 4.6-5, 2005 PEIR – Differences in Groundwater Level Between No Project Condition and Scenario 1 – 2000 to 2039** and **Figure 4.6-6, 2005 PEIR – Differences in Groundwater Level Between No Project Condition and Scenario 2 – 2000 to 2039**).



Source: Geoscience, 2009

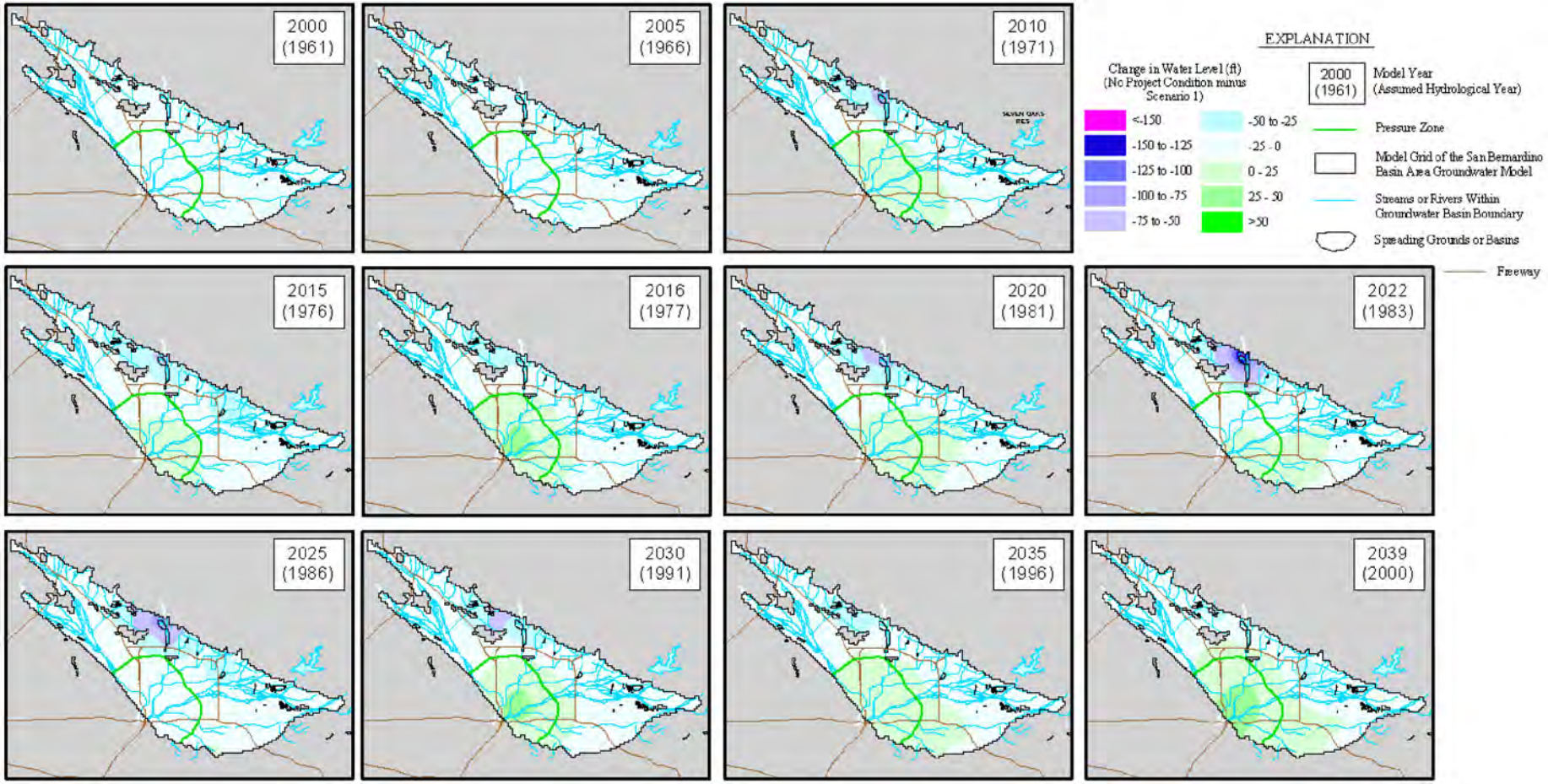
Figure 4.6-4
Locations of Spreading Grounds for Artificial Recharge



G:\2007\07-0377\GIS\EIR_2005_PEIR_No_Project-Scenario_1.mxd

Source: 2005 PEIR, Appendix F, Figure 6

Figure 4.6-5
2005 PEIR - Differences in Groundwater Level Between No Project Condition and Scenario 1 - 2000 to 2039



G:\2007\07-0377\GIS\EIR_2005_PEIR_No_Project-Scenario_2.mxd

Source: 2005 PEIR, Appendix F, Figure 7

Figure 4.6-6
2005 PEIR - Differences in Groundwater Level Between No Project Condition and Scenario 2 - 2000 to 2039

Increased water levels in the forebay reduce the cost of pumping for forebay producers. On the average, water levels in the forebay increase about 9 feet during the 39-year model simulation period.

Water levels are generally lower in the Pressure Zone as a result of pumping under the Project operating scenario analyzed. Areas within the Pressure Zone where depth to water is less than 50 feet below ground surface were delineated using the model. These areas were delineated because of the higher potential for liquefaction during an earthquake.

Pumping associated with the 2005 Project Alignment lowers water levels in the Pressure Zone and therefore decreases the area potentially subject to liquefaction. In the Pressure Zone where liquefaction potential is high during many of the forecast years under No Project conditions, the area subject to such impact is reduced by additional pumping.

The cumulative total area of potential liquefaction during the period 2001 – 2039 under No Project conditions is approximately 32,000 acres. With the 2005 Project Alignment operating as defined in this analysis, the potential liquefaction area is reduced to about 25,000 acres.

Decreasing the potential for earthquake damage due to liquefaction by lowering the water table in the Pressure Zone increases the energy required to pump the water. There are currently two major areas of production in the Pressure Zone. One is centrally located along Warm Creek and is referred to herein as the Antil Area. The other is located along the Santa Ana River near the southwesterly boundary of the basin and is referred to as the South San Bernardino Area.

Projected water level hydrographs for wells in the Antil Area and wells in the South San Bernardino Area are shown on in 2005 PEIR, Appendix F on Figures 8(l) and 8(ai) through 8(al). The hydrographs indicate that the average increase in depth to water in wells located in the Pressure Zone is approximately 9 feet during the 39-year model simulation period.

At the time the 2005 PEIR was prepared, no specific depth of change in water levels was identified as significant. Higher water levels in the forebay and lower water levels in the Antil Area of approximately 9 feet were not considered significant because they contributed to the reduced area of liquefaction potential. Subsequently, as described below, WMWD, SBVMWD and the City of Riverside entered into an agreement relating to the diversion of water from the Santa Ana River system (Riverside Agreement). This agreement specifies that a reduction in average static groundwater levels at one or more index wells by more than 10 feet could be considered significant. For purposes of evaluating the current project, this is the threshold of significance. (See page 4.6-27.) When applied to the changes seen in the 2005 modeling, a less than significant finding is still appropriate.

The project is in accord with the Western Judgment which provides that extractions may be made in addition to those determined by the Western Judgment, pursuant to agreement between SBVMWD and WMWD. The Western Judgment further provides that nothing therein shall preclude SBVMWD, WMWD or any other party from exercising such rights as they may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of underground storage capacity of the Basin Area shall not interfere with any

replenishment program of the Basin Area. The Watermaster is charged with the responsibility of administering the Western Judgment, and all subsequent orders of the Court made pursuant to the Court's continuing jurisdiction. The Watermaster is required to file with the Court annual reports which include, among other information, summaries of extractions by all parties pumping water from the Basin Area, groundwater level measurements, and an accounting of all credits and obligations in the groundwater basin. Because of this, the Basin Area sustainability is insured over the long-term, therefore, no significant effects related to groundwater levels are anticipated.

In addition to realizing the primary purposes of the proposed project which are to increase reliability for WMWD customers, the combined recharge and extraction operations associated with the project could help stabilize water levels in the upper part of the Basin Area, where recharge occurs, and help prevent undesirably high water levels in the AHHG. The proposed project will not result in significant adverse impacts to groundwater levels. No mitigation measures will be necessary.

Although no significant adverse impacts were identified related to groundwater levels in the 2005 PEIR prepared for the 2005 Riverside-Corona Feeder Alignment, potential impacts were identified related to groundwater quality (see Section 4.7). Since mitigation measures were recommended to address groundwater quality impacts, mitigation measures MM GWL 1 and MM GWL 2 were included so that modeling and operational plans required to address groundwater quality would consider groundwater levels also. This will ensure that mitigation required to alleviate potential groundwater quality impacts does not create undesirable impacts to groundwater levels.

2005 Project Alignment Mitigation Measures

The following Mitigation Measures were recommended in the Draft 2005 PEIR to reduce potentially significant impacts related to Groundwater Levels:

MM GWL 1: Prepare operating strategies to be tested using the most current versions of the groundwater flow and groundwater quality model(s) available at the time. An operating plan consistent with any overall management plan adopted for the Basin Area shall be developed prior to commencing replenishment activities for the project that defines parameters of replenishment and extraction based on groundwater model(s) as evaluative tool(s).

MM GWL 2: As described in MM GWL 1, existing groundwater flow and groundwater quality model(s) shall be used to predict the effects of project operations pursuant to the operating plan developed as a requirement of MM GWL 1. If the model(s) suggest that the replenishment and pumping regime of the proposed project operation would result in significant impacts, the project operation shall be modified to reduce impacts or appropriate mitigation measures shall be developed as part of a subsequent CEQA compliance document (i.e., tiered negative declaration, EIR addendum, Supplemental EIR or Subsequent EIR).

Typical measures that could be implemented to maintain the safe yield of the basin include:

- Increased, decreased, or no replenishment

- Replenishment in an alternative location
- Increased, decreased or no extraction
- Extraction at targeted locations.

Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in MM GWL 1, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, MM GWL 1 was accomplished and is no longer needed to mitigate potential impacts of the RCF realigned pipeline.

Additionally, WMWD has been participating in ongoing management efforts as part of a Basin Area Technical Advisory Committee (BTAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. See page 4.6-38. The ongoing monitoring and adaptive management recommended by MM GWL 2 is still necessary, but has been revised to include WMWD's involvement with the BTAC. See page 4.6-44 and 45 for the currently revised mitigation measure.

2005 Project Alignment Determination under CEQA

The 2005 PEIR prepared for the 2005 Riverside-Corona Feeder Alignment found that impacts related to water levels would not be significant. No mitigation measures are necessary. However the mitigation measures required for potentially significant water quality impacts (outlined above) shall be implemented as operating actions associated with this project and will further ensure that potential impacts to groundwater levels (safe yield) from the proposed project would not be significant.

4.6.3 Analysis of the Riverside-Corona Feeder Project Realignment Alternatives

Relation of the Realignment Alternatives to the 2005 Project Alignment

The impacts and findings discussed in the 2005 PEIR related to groundwater levels are applicable to both the 2005 Project Alignment Alternative and the Realignment Alternative projects, as appropriate. The Realignment Alternative will substitute a new alignment for that portion of the 2005 Project Alignment identified as Reaches A, B, C, and D, in the 2005 PEIR and includes the addition of connections to some other regional facilities not included in the original project. The analysis of groundwater levels contained within the 2005 PEIR does not specifically address the proposed realignment and additional facilities. However, the analysis conducted in this section of the SEIR/EIS addresses changed conditions since the 2005 PEIR was completed and evaluates an alternate well field location for the Riverside-Corona Feeder Project Central Feeder Connection in addition to the well field locations analyzed previously. Among all well fields, no more than 20 wells will be used for project operations with approximately 25 percent of the wells pumping at any one time.

Thresholds of Significance

Western Municipal Water District has not established local CEQA significance thresholds as described in Section 15064.7 of the State CEQA Guidelines. However, Western Municipal Water District's "Environmental Checklist" for the subject project (see Appendix A of this document) indicates that impacts to groundwater levels may be considered potentially significant if the project would:

- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there is a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells drops to a level which does not support existing land uses or planned uses for which permits have been granted) or (2) causes undesirably high groundwater levels in the area of historically high groundwater (AHHG).
- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in subsidence.

In addition, as described below, in 2007 WMWD, SBVMWD and the City of Riverside entered into the Riverside Agreement. This agreement defines a significant change in groundwater levels in the San Bernardino Basin Area that would warrant a correction in operations as a reduction in average static groundwater levels at one or more index wells greater than 10 feet. To be consistent, the first threshold above shall be considered a "substantial depletion" in the AHHG if a reduction in average groundwater levels of more than 10 feet results from the project.

The Chino Basin was not previously connected directly to the proposed RCF alignment therefore, no thresholds were specifically related to the Chino Basin in the 2005 PEIR.

Related Regulations

The 1969 Western Judgment

Production of groundwater from the Basin Area as well as recharge with imported water are regulated by a court judgment that was entered in 1969 in the case of Western Municipal Water District of Riverside County, et al., vs East San Bernardino County Water District, et al., Riverside County Superior Court No. 78426 (Western Judgment).

The Western Judgment, among other provisions, determines the rights of certain Plaintiffs to extract groundwater from an area described in the Judgment as the San Bernardino Basin Area (Basin Area). This area includes the groundwater basins in San Bernardino County that are above the Bunker Hill Dike in the Santa Ana River Watershed, but excludes the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins. The plaintiffs holding such rights are the City of Riverside including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company; the Riverside Highland Water Company; the Elsinore Valley Municipal Water District as successor to the rights of the Agua Mansa Water Company and the Meeks & Daley Water Company; and the Regents of the University of California (collectively "Plaintiffs").

The Western Judgment provides for a Watermaster, consisting of a committee composed of two persons appointed by the Court, one nominated by San Bernardino Valley Municipal Water District (SBVMWD) and one by Western Municipal Water District (WMWD). The Watermaster is charged with the responsibility of administering the Western Judgment, and all subsequent orders of the Court made pursuant to the Court's continuing jurisdiction. The Watermaster is required to file with the Court annual reports which include, among other information, summaries of extractions by all parties pumping water from the Basin Area, groundwater level measurements, and an accounting of all credits and obligations in the groundwater basin.

The Western Judgment provides that extractions may be made in addition to those determined by the Western Judgment, pursuant to agreement between SBVMWD and WMWD. The Western Judgment allowed extractions on an annual basis of 167,238 acre-feet by parties other than the plaintiffs and 64,862 acre-feet by the plaintiffs, for a total of 232,100 acre-feet. The Western Judgment further provides that nothing therein shall preclude SBVMWD, WMWD or any other party from exercising such rights as they may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of underground storage capacity of the Basin Area shall not interfere with any replenishment program of the Basin Area.

In addition to certain enumerated matters, the Western Judgment provides that the Court retains jurisdiction over other matters not specifically set forth which might occur in the future, and which would be of benefit to the parties in the utilization of groundwater within the Basin Area.

The Replenishment and Extraction Agreement

At the time the 2005 PEIR was certified and pursuant to the Western Judgment, WMWD and SBVMWD were proposing to enter into a Replenishment and Extraction Agreement (Appendix D of the 2005 PEIR) the purpose of which was to set forth the institutional arrangements for the purchase and delivery of imported water from MWD by WMWD, for replenishment of the Basin Area, and for extraction of amounts equal to the amounts of imported water purchased. Subsequent to the certification of the 2005 PEIR, such a cooperating agreement was executed by WMWD, SBVMWD and MWD.

The 1978 Chino Basin Judgment

The groundwater rights and storage capacity within the Chino Basin were established by San Bernardino Superior Court Case No. 164327 in *Chino Basin Municipal Water District v. City of Chino*, et al. in 1978, now designated No. RCV 51010 (Chino Basin Judgment). In the Chino Basin Judgment, the Chino Basin Watermaster was appointed to administer and enforce the provisions of the Judgment and any subsequent instructions or orders of the Court.

The Chino Basin Judgment declared that the safe yield of the Chino Basin is 140,000 acre-feet per year. The safe yield is allocated among three pools as follows:

(1) Overlying Agricultural Pool (dairy farmers and the State of California): 82,800 acre-feet per year

(2) Overlying Non-Agricultural Pool (industrial users): 7,366 acre-feet per year

(3) Appropriative Pool (water for municipalities and other government agencies):

49,834 acre-feet per year

An additional 5,000 acre-feet per year (200,000 acre-feet per year of controlled overdraft, averaged over 40 years) is allocated to the Appropriative Pool, which defines the safe yield per the Chino Basin Judgment as 145,000 acre-feet per year. Parties are allowed to pump in excess of the safe yield as needed, provided replenishment water is later purchased and restored to the basin. Groundwater not pumped by the agricultural users (Overlying Agricultural Pool) is re-allocated to the Appropriative Pool for municipal use.

The Superior Court mandated that the Chino Basin Watermaster develop an Optimum Basin Management Plan (OBMP). The OBMP, developed in 1998, established primary management goals to address issues, needs and interests of the water producers in Chino Basin, including four primary goals: (1) enhance basin water supplies, (2) protect and enhance water quality, (3) enhance management of the basin, and (4) equitably finance the OBMP (OBMP). In July 2000, the Watermaster's planning process culminated with the adoption of the Peace Agreement and certification of the OBMP Program EIR (PEIR, SCH#2000041047) that ended over 15 years of litigation within the Chino Basin. In December 2007, the Peace II Agreement was approved by the court; its two main features include: the expansion of the desalter program and the strategic reduction in groundwater storage to achieve hydraulic control for the Chino Groundwater Basin. A Subsequent EIR (SEIR) was prepared for the Peace II Program and what certified on October 6, 2010. (SEIR 2010)

Agreement Relating to the Diversion of Water from the Santa Ana River System

On March 20, 2007, WMWD, SBVMWD and the City of Riverside entered into an agreement titled "Agreement Relating to the Diversion of Water from the Santa Ana River System Among Western Municipal Water District of Riverside County, San Bernardino Valley Municipal Water District and City of Riverside" (Riverside Agreement). The Riverside Agreement established common support for pending applications before the State Water Resources Control Board related to the Santa Ana River (SAR) including the proposed diversion of water from the SAR and provided for the protection of Riverside's water resources in groundwater basins. The agreement also established thresholds of groundwater levels of significance to determine when the diversion of SAR water would be considered to have adversely impacted the San Bernardino Basin Area mitigation measures to reduce those impacts to less than significant levels. Potential impacts to the Riverside North Basin and mitigation of those impacts are also established by the Riverside Agreement.

Design Considerations/Avoidance

As a part of the proposed project, WMWD shall cooperate and coordinate with other water agencies that replenish and extract water in the Basin Area so as not to interfere with other programs being implemented to manage and protect groundwater in the Basin Area, and, when possible, to assist in such programs. The Central Feeder Connection well field was added to the project in part to alleviate concerns raised by other water agencies using the Basin Area. Multiple possible extraction and replenishment locations allow for optimal operating scenarios to assure that recharge and extraction operations maintain or improve, to the extent possible, and do not exacerbate water level or water quality problems.

Potential Significant Impacts/Environmental Consequences

Threshold: *(1) Substantially depletes groundwater supplies or interferes substantially with groundwater recharge such that there is a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells drops to a level which does not support existing land uses or planned uses for which permits have been granted) or (2) causes undesirably high groundwater levels in the area of historically high groundwater (AHHG). A reduction in average groundwater levels in the San Bernardino Basin Area at one or more index wells of more than 10 feet shall be considered significant.*

San Bernardino Groundwater Basin

Modeling Background and Existing Condition

Subsequent to the completion of the 2005 PEIR, there have been changes in factors that affect the potential availability and reliability of imported water supplied by MWD which may be used to recharge the San Bernardino Basin Area (Basin Area). Such factors include potential reductions in Delta exports, potential regulatory and emergency constraints on the use of water conveyance facilities, water quality issues, and short and long term climatic changes. (See "State Water Project" information, pg 4.6-12.)

In order to provide an updated assessment of potential groundwater impacts due to the RCF project, and in consideration of the Western Judgment, two hydrologic analyses were completed by Geoscience Support Services, Inc. (Appendix F) that reflect current conditions regarding the availability and reliability of imported water and natural hydrological conditions. The first model provides analysis of the RCF for an average rainfall year cycle (January 1979 through December 2004) which is similar to the 2005 PEIR modeling except with updated information starting in 2007. The second hydrologic analysis evaluates the project for a prolonged dry year period (January 1945 through December 1968). The same modeling assumptions are used in both analyses, as described below and in **Table 4.6-A, Comparison of Model Assumptions**.

The following discussions summarize findings of the hydrologic analyses regarding groundwater levels. The term "Baseline Run" for purposes of modeling is not considered the "existing condition baseline" per CEQA. The existing (2007) water elevation levels are shown in **Tables 4.6-B** and **4.6-D** for reference as CEQA requires, but are not the most appropriate baseline to which groundwater modeling results should be compared. This is because groundwater levels are not static and the changes in groundwater levels occur over months, years and sometimes decades, and are affected by operating agreements, court decisions, regulations and laws as they can be implemented under the Western Judgment.

The "existing condition" of Basin Area operations is per the Western Judgment (see page 4.6-25) and other agreements between the parties. The project will be in accordance with the Western Judgment which provides that extractions may be made in addition to those determined by the Judgment, pursuant to agreement between SBVMWD and WMWD. The Judgment further provides that nothing therein shall preclude SBVMWD, WMWD or any other party from

exercising such rights as they may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of underground storage capacity of the Basin Area shall not interfere with any replenishment program of the Basin Area. The Watermaster is charged with the responsibility of administering the Judgment, and all subsequent orders of the Court made pursuant to the Court's continuing jurisdiction. The Watermaster is required to file with the Court annual reports which include, among other information, summaries of extractions by all parties pumping water from the Basin Area, groundwater level measurements, and an accounting of all credits and obligations in the groundwater basin. Thus, a modeled "Baseline Run" is a more relevant comparative measure against which the project's projected operational impacts can be measured.

The Chino Basin groundwater levels are discussed following the discussion of the San Bernardino Basin Area. The potential impact of the RCF project upon water quality is discussed in Section 4.7 (Groundwater Quality) of this SEIR/EIS.

The MODFLOW groundwater flow model of the San Bernardino Basin Area Refined Basin Flow Model was used to evaluate water level changes for various project-related scenarios, all assuming the well field location adjacent to the Central Feeder Pipeline Connection. MODPATH particle tracking was utilized to evaluate potential impacts of the proposed project on remediation (i.e., cleanup) efforts by evaluating groundwater flow paths seepage velocities and travel times. The Refined Basin Solute Transport Model was used to simulate the groundwater quality for PCE (Newmark and Muscoy plumes), TCE (Norton and Redlands-Crafton plumes), and perchlorate in the Basin Area. Details of the groundwater quality (MODPATH) modeling are analyzed in Section 4.7.

A total of four predictive model runs were made using the Refined Basin Flow Model and Refined Basin Solute Transport Model to assess the potential impacts of the RCF on groundwater levels and water quality. These model runs are:

- Baseline Run (No Project)
- RCF Scenario 1
- RCF Scenario 2
- RCF Scenario 3

The RCF modeling Scenarios includes two "bookend" scenarios (Scenarios 1 and 3) and one "most likely" scenario (Scenario 2). "Bookend" conditions are generally described as conditions that result from extraction and replenishment schedules that are likely to cause the most environmentally stressful conditions (Scenario 3) and conditions that are the least stressful (Scenario 1) than those encountered under the "most likely" scenario. Results from the Scenarios were compared to the Baseline Run (No Project).

The Baseline Run prepared for the 2005 PEIR was conducted by Geoscience and included the model assumptions initially used for the model at that time. For the Upper Santa Ana River Watershed Integrated Regional Water Management Plan (USAR IRWMP), Geoscience updated the model baseline to include changes in the status of water agreements and hydrologic factors that reflected the Baseline conditions in 2007. The USAR IRWMP Baseline Run 1 was updated in June 2009 to include changes to the USAR IRWMP Baseline Run 1 that had occurred in the

intervening years. **Table 4.6-A** compares the assumptions used for the Baseline Run (Average), Baseline Run (Prolonged Dry) and USAR IRWMP Baseline Run 1.

Table 4.6-A
Comparisons of Model Assumptions

Model Assumptions		IRWMP Baseline Run 1	Baseline Run (Average)	Baseline Run (Prolonged Dry)
Hydrologic Base Period		1962–2000 with Annual Stress Period	1979-2004 with Monthly Stress Period	1945-1968 with Monthly Stress Period
Groundwater Pumping		2005 Urban Water Management Plans	2005 Urban Water Management Plans with 2008 Update	2005 Urban Water Management Plans with 2008 Update
Artificial Recharge	Valley District's Replenishment Obligation	Western Judgment	Western Judgment	Western Judgment
	Diversion by SBVWCD	Agreement between SBVWCD and Valley District/Western	SBVWCD's Licensed Rights	SBVWCD's Licensed Rights
	Diversion by Senior Water Rights Claimants	Seven Oaks Accord	Seven Oaks Accord	Seven Oaks Accord
	Valley District/Western	SAR Water Rights Applications	SAR Water Rights Applications	SAR Water Rights Applications

Source: 2009 Geoscience, Page 19, and 2010 Geoscience, Page 13.

Average Year Conjunctive Use Analysis

The average modeling Baseline Run was based upon monthly data availability and analyses of historic precipitation and stream flow for the 26-year period from January 1979 through December 2004. This base period covers both wet and dry hydrologic cycles and the average precipitation and streamflow are approximately the same as the long-term average (2009 Geoscience, Figures 4 and 5). For model prediction runs, the hydrologic base period was assumed to represent future conditions for the 26-year period from January 2007 through December 2032. Baseline groundwater pumping was determined based on future water demands obtained from 2005 Urban Water Management Plans and updated information presented by cities of Colton and Redlands, San Bernardino Municipal Water District, and West Valley Water District.

As indicated in the 2009 Geosciences report, during the projected model period 2007-2032, the groundwater pumping for the baseline run ranged from 206,100 acre-ft to 308,300 acre-ft, with an average of 258,600 acre-ft/yr. The baseline recharge consists of Santa Ana River diversions and the Valley District's Replenishment Obligations. The baseline artificial recharge ranges from 8,200 acre-ft to 144,000 acre-ft, with an average of 87,700 acre-ft per year. (2009 Geoscience, p. 20)

Groundwater storage in the Basin Area declines by 32,181 acre-ft during the period 2007 through 2032 under Baseline Run (No Project) conditions. The average underflow outflow across the San Jacinto Fault near the SAR to the Rialto-Colton Groundwater Basin for the period 2007 to 2032 was estimated to be 712 acre-ft/yr under Baseline Run (No Project) conditions.

The three Scenarios were run for the 26-year period from 2007 through 2032 with monthly stress periods. The RCF Scenarios use the same assumptions as the Baseline Run (No Project), except these RCF conjunctive use scenarios include additional project artificial recharge and groundwater pumping. The actual amount of RCF water replenishment and extraction will vary year to year, depending upon natural hydrologic conditions that may affect the timing of available surplus water, spreading ground capacity and basin groundwater levels (i.e., storage). As shown in **Table 4.6-C**, below, inflow into the Basin Area (replenishment) include recharge from gaged streamflow, artificial recharge, local runoff generated by precipitation, infiltration from direct precipitation, return flow from groundwater pumping, from ungaged mountain front runoff and underflow. Outflow from the Basin Area (extraction) comprise evapotranspiration, groundwater pumping, and underflow. The difference between the inflow and outflow is the change in groundwater storage. The projected annual inflow and outflow remain relatively constant in the Baseline Run (No Project) and the three RCF Scenarios, with the greatest variable being RCF-related artificial recharge and RCF-related groundwater pumping. However, the replenishment and extraction schedules for the RCF Scenarios were quantified through iterative model runs so that total RCF-related extraction under each scenario is less than total RCF-related replenishment. Additionally, RCF-related groundwater pumping will occur in the same hydrologic years as RCF-related recharge, or in the years immediately following such recharge. As a result, the Basin Area storage for each RCF Scenario will always be equal to or above the storage for the Baseline Run (No Project).

The initial replenishment schedules for each RCF Scenario are based on availability of surplus water that are likely to cause the most environmentally stressful conditions (RCF Scenario 3) and conditions less stressful (RCF Scenario 1) than those encountered under the "most likely" condition (RCF Scenario 2). Based on results from iterative model runs, RCF Scenario 1 consists of artificial recharge of 42,000 acre-ft during the 26 years from 2007 through 2032. RCF Scenario 2 includes artificial recharge of 150,000 acre-ft for 2007 through 2032. RCF Scenario 3 includes artificial recharge of 198,000 acre-ft for 2007 through 2032.

Five new wells are to be located within the Redlands-Crafton plume at the eastern end of the proposed Riverside-Corona Feeder Pipeline. The maximum capacity for each well is assumed to be 3,000 acre-ft/yr (total of 15,000 acre-ft/yr) based on local geohydrologic conditions. Based on results from iterative model runs, RCF Scenario 1 consists of extraction of 34,500 acre-ft during the 26 years from 2007 through 2032. RCF Scenario 2 includes extraction of 125,800 acre-ft. RCF Scenario 3 includes extraction of 163,300 acre-ft for 2007 through 2032.

In general, the model generated groundwater flow direction is similar to historical directions with groundwater flowing west from the Santa Ana River and Mill Creek Spreading Grounds, and southeast from the Lytle Creek and Cajon Creek (i.e., flowing to the Pressure Zone area). Groundwater flow directions and general patterns of fluctuations for the three RCF scenarios are similar to the Baseline Run. (No Project).

Groundwater level fluctuations reflect hydrological wet and dry cycles. For example, a change in groundwater level of 50 feet to 100 feet occurs in the Pressure Zone between model years 2011 (highest level) and 2020 (lowest level). Groundwater elevations for the Baseline Run (No Project) and each of the three RCF Scenarios in the years 2011, 2020, and 2032 (end of model run) are shown in Figures 18 through 29 of the 2009 Geoscience Report (Appendix F).

The average simulated groundwater elevations and the difference between the average groundwater elevations for the Baseline Run (No Project) with respect to the RCF scenarios are shown in **Table 4.6-B** and summarized below.

Based on results of the modeling, the following conclusions were made for the RCF conjunctive use scenarios:

- **RCF Scenario 1 (Less Stressful Conditions).** For RCF Scenario 1, the changes in groundwater level from the Baseline Run (No Project) range from a decline of one foot to a rise of three feet. Based on results from iterative model runs, RCF Scenario 1 consists of total artificial recharge of 42,000 acre-ft and total extraction of 34,500 acre-ft during the 26 years from 2007 through 2032. Total Basin Area groundwater storage decline for RCF Scenario 1 was less than the storage decline of the Baseline Run (No Project) and is estimated to be negative 31,496 acre-ft. This indicates that slightly more water (685 acre-ft) would be recharged annually over the 26 years than what was necessary to maintain a total recharge equal to the Baseline Run (No Project) conditions. The average underflow outflow across the San Jacinto Fault was estimated to be 707 acre-ft/yr for the RCF Scenario 1. This change in underflow outflow is minimal as compared to the Baseline Run. (No Project).
- **RCF Scenario 2 (Most Likely Conditions).** Groundwater level changes range from a decline of four feet to a rise of 11 feet for RCF Scenario 2 as compared to the Baseline Run (No Project). RCF Scenario 2 includes total artificial recharge of 150,000 acre-ft and total extraction of 125,800 acre-ft. Total Basin Area groundwater storage decline for RCF Scenario 2 was less than the storage decline of the Baseline Run (No Project) conditions and is estimated be negative 30,909 acre-ft. These results indicate that slightly more water (1,272 acre-ft) would be recharged over the 26 years than what was necessary to maintain a total recharge equal to the Baseline Run (No Project) conditions. The average underflow outflow across the San Jacinto Fault was estimated to be 694 acre-ft/yr, and 691 acre-ft/yr for RCF Scenario 2. This change in underflow outflow is minimal as compared to the Baseline Run. (No Project).
- **RCF Scenario 3 (Most Stressful Conditions).** For RCF Scenario 3, groundwater level changes range from a decline of six feet to a rise of 13 feet. RCF Scenario 3 includes total artificial recharge of 198,000 acre-ft and total extraction of 163,300 acre-ft. Total Basin Area groundwater storage decline for RCF Scenario 3 was also less than the storage decline of the Baseline Run (No Project) conditions and is estimated be negative 31,358 acre-ft. These results indicate that slightly more water (823 acre-ft) would be recharged over the 26 years than what was necessary to maintain a total recharge equal to the Baseline Run (No Project) conditions. The average underflow outflow across the San

Jacinto Fault was estimated to be 691 acre-ft/yr for this RCF Scenario. This change in underflow outflow is minimal as compared to the Baseline Run. (No Project).

In general, the wells with declines in water levels are located in the vicinity or downgradient of the proposed RCF well field (e.g., City of Redlands Well No. 32 and City of Riverside Raub 1 Well). Wells with increases in groundwater elevations are located in the forebay recharge areas due to artificial recharge from the RCF. As shown in **Table 4.6-B**, below, the maximum projected decline in groundwater levels is six (6) feet. Inasmuch as the maximum projected reduction in average groundwater levels at all wells is less than 10 feet, the potential impact upon groundwater levels will **be less than significant**.

In the 2005 PEIR, the acreage of the potential liquefaction area in the Pressure Zone is approximately 720 acres for the year 2001 (year with the greatest potential liquefaction area) and is approximately 3.7% of total Pressure Zone area of 19,320 acres for the Baseline Run. (No Project). The potential liquefaction area was estimated to be approximately 690 acres, 540 acres, and 600 acres for RCF Scenarios 1 through 3, respectively. The slight reduction in potential liquefaction area in the Pressure Zone was due to extraction occurring in the proposed RCF well field near the Pressure Zone area. The 2009 modeling corroborates this finding in that the AHHG wells (City of Riverside Raub 1, Gage Canal Company Lower Kelly and SBVMWD Backyard) are projected to experience decreases in water levels of one to four feet (**Table 4.6-B**). A lower water table results in **less susceptibility to liquefaction**.

Table 4.6-C shows a comparison of the groundwater modeling results between that discussed in the 2005 PEIR and those prepared for this SEIR/EIS (2009 Geoscience).

The results of recharge and extraction modeling show that the RCF conjunctive scenarios, as currently projected, will have less groundwater pumping and artificial recharge than were originally projected for the RCF project. As a result, under all three current scenarios, the total changes in groundwater storage within the Basin Area will be less than previously projected. Additionally, as shown in **Table 4.6-C**, the total reduction in groundwater storage will be less under each of the three RCF conjunctive scenarios than would occur under Baseline (No Project) conditions.

Therefore, it can be concluded that the Realignment Alternative with Additional Connections will have **less than significant** impacts on groundwater resource levels within the Basin Area, consistent with the findings of the 2005 Project Alignment analysis. No additional mitigation measures will be necessary.

Table 4.6-B
Groundwater Elevations at Wells 2007-2032

Well Name	Existing Groundwater Elevation in 2007	Average Groundwater Elevations 2007 to 2032				Difference in Average Groundwater Elevation between Baseline Run (Average No Project) and RCF Scenarios		
		Baseline Run (No Project) [ft amsl[10]]	RCF Scenario 1 [ft amsl]	RCF Scenario 2 [ft amsl]	RCF Scenario 3 [ft amsl]	RCF Scenario 1 minus Baseline Run [ft]	RCF Scenario 2 minus Baseline Run [ft]	RCF Scenario 3 minus Baseline Run [ft]
SBVMWD San Bernardino Ave. Well	1,456	1,476	1,477	1,481	1,482	2	5	7
City of San Bernardino Mt. Vernon Well	1,183	1,038	1,038	1,039	1,039	0	1	1
East Valley Water District Well 62	1,122	1,084	1,084	1,085	1,085	0	1	1
Fontana Union Well 13	1,513	1,266	1,267	1,268	1,268	0	2	2
Fontana Union Well 26	2,047	1,920	1,920	1,291	1,921	0	1	1
Fontana Union Well 27	2,215	2,152	2,152	2,152	2,152	0	0	0
East Valley Water District Well 120	1,358	1,376	1,376	1,377	1,377	0	1	1
City of San Bernardino Vincent Well	2,328	2,190	2,190	2,190	2,190	0	0	0
City of San Bernardino Devil Canyon Well No. 1	1,359	1,464	1,467	1,473	1,475	3	9	11
City of San Bernardino Newmark 3 Well	1,291	1,351	1,353	1,357	1,359	2	6	8
West Valley Water District Lord 7 Well	1,233	1,071	1,071	1,072	1,072	0	1	1
City of Riverside Raub 1 Well[11]	1,003	866	865	863	862	-1	-3	-3
City of Redlands Well 32	1,199	1,226	1,224	1,221	1,220	-1	-4	-6
City of Redlands Orange Street Well	1,240	1,254	1,253	1,252	1,251	-1	-2	-3
East Valley Water District Well 24A	1,118	1,077	1,078	1,080	1,081	1	3	4
City of San Bernardino Cajon Well No. 1	1,805	1,717	1,718	1,718	1,719	1	2	2
East Valley Water District Well 40	1,166	1,173	1,173	1,172	1,171	0	-2	-2
City of San Bernardino Devil Canyon Well No. 3	1,288	1,649	1,653	1,660	1,663	3	11	13
City of San Bernardino Leroy Street Well	1,116	1,069	1,070	1,072	1,073	1	3	4
City of Redlands Agate 2 Well	1,630	1,580	1,583	1,588	1,591	3	9	11
East Valley Water District Cone Camp Well	1,602	1,549	1,550	1,553	1,554	1	4	5
Bear Valley Mutual Water Company Nelson Street Well	1,351	1,367	1,367	1,368	1,368	0	1	1
Gage Canal Company Lower Kelly Well[2]	1,005	881	880	878	877	-1	-3	-4
City of Redlands Airport Well No. 2	1,630	1,364	1,364	1,365	1,365	0	1	2
East Valley Water District Well 146 A	1,287	1,303	1,303	1,302	1,302	0	0	0
SBVMWD Backyard Well[2]	965	863	862	860	860	-1	-2	-3

Source: 2009 Geoscience, Table 1, 2008 Wildermuth

[10] Above mean sea level
[11] Located within Area of Historic High Groundwater (AHHG)

Table 4.6-C
Summary Average Annual Water Budgets

Flux Terms			2005 PROGRAM EIR[1,2] Baseline (No Project)	2005 PROGRAM EIR[1,2] Scenario 1 (RCF Project)	2009 SUPPLEMENTAL EIR/EIS[3,4] Baseline (No Project)	2009 SUPPLEMENTAL EIR/EIS[3,4] RCF Scenario 1 (Less Stressful Conditions)	2009 SUPPLEMENTAL EIR/EIS[3,4] RCF Scenario 2 (Most Likely Conditions)	2009 SUPPLEMENTAL EIR/EIS[3,4] RCF Scenario 3 (Most Stressful Conditions)
	Forecast Period		2001-2039		2007 to 2032			
Inflow	Recharge from Gaged Streamflow		139,517	138,927	113,208	113,184	113,071	112,968
	Artificial Recharge	Others	32,316	32,316	87,741	87,741	87,741	87,741
		RCF	**0**	**19,411[1]**	**0**	**1,615[3]**	**5,769[3]**	**7,615[3]**
	Recharge from Local Runoff Generated by Precipitation		5,627	5,627	5,221	5,221	5,221	5,221
	Infiltration from Direct Precipitation		1,137	1,137	1,083	1,083	1,083	1,083
	Return Flow from Groundwater Pumping		39,575	39,575	48,807	48,807	48,807	48,807
	Recharge from Ungaged Mountain Front Runoff		17,820	17,820	17,171	17,171	17,171	17,171
	Underflow Recharge		2,997	2,997	3,667	3,667	3,667	3,667
	Total Inflow		**238,989**	**257,809**	**276,898**	**278,489**	**282,531**	**284,273**
Outflow	Evapotranspiration		5,822	7,087	16,856	17,099	17,619	17,940
	Groundwater Pumping	Others	233,488	233,488	258,588	258,588	258,588	258,588
		RCF	**0**	**17,564[2]**	**0**	**1,327[4]**	**4,838[4]**	**6,281[4]**
	Underflow Discharge		3,003	2,951	2,692	2,687	2,674	2,671
	Total Outflow		**242,313**	**261,090**	**278,136**	**279,701**	**283,720**	**285,480**
Change in Groundwater Storage (Total Inflow – Total Outflow)			**-3,324**	**-3,281**	**-1,238**	**-1,211**	**-1,189**	**-1,206**

Sources: 2009 Geoscience, Tables 2 through 5and PEIR, Appendix F, Tables 1, 3, and 4.
Notes:
[1] Represents total annual recharge (757,000) divided equally over 39 year forecast period.
[2] Represents total annual extraction (685,000) divided equally over 39 year forecast period.
[3] Represents total annual recharge divided equally over 24 year forecast period.
[4] Represents total annual extraction divided equally over 24year forecast period.
Units in Acre-ft.

Prolonged Dry Year Modeling Analysis

To evaluate a worse case condition than the average rainfall conditions described above, a 2010 Geosciences report analyzed prolonged dry baseline runs. The Prolonged Dry Baseline Run uses the same projected water demands as the previous Baseline Run except with a prolonged dry base period from January 1945 through December 1968 instead of an average base period from January 1979 through December 2004.

For the sensitivity predictive runs, a prolonged dry hydrologic base period from January 1945 through December 1968 was assumed to represent future conditions for the 24-year period from January 2007 through December 2030. During this period, the average annual precipitation was 14.00 inches at the San Bernardino County Hospital Station compared to a long term average of 16.19 inches. The average annual streamflow at the Santa Ana River (SAR) near Mentone

gaging station was 36,400 acre-ft compared to the long term average of 57,000 acre-ft during the same period of time.

For the Prolonged Dry Baseline Run, the artificial recharge ranges from 15,800 acre-ft in year 2017 (hydrologic year 1955) to 131,500 acre-ft in year 2029 (hydrologic year 1967) with an average of 74,700 acre-ft/yr.

Three model predictive scenarios were run for a 24-year period (2007 through 2030) with monthly stress periods. The RCF Prolonged Dry Scenarios use the same assumptions as the Prolonged Dry Baseline Run (No Project), except these RCF prolonged dry conjunctive use scenarios include additional project artificial recharge and groundwater pumping. The actual amount of RCF artificial recharge and pumping will vary year to year, depending upon natural hydrologic conditions that may affect the timing of available surplus water, spreading ground capacity, and basin groundwater levels (i.e., storage). The artificial recharge and pumping schedules for the RCF Prolonged Dry Scenarios were quantified through iterative model runs so that total project extraction (i.e., pumping) were lower than total project replenishment. As a result, the San Bernardino Basin Area (Basin Area) storage for each RCF Prolonged Dry Scenario will always be equal to or above the storage for the Prolonged Dry Baseline Run (Dry Year No Project).

- **RCF Prolonged Dry Scenario 1.** Prolonged Dry Scenario 1 simulates RCF artificial recharge to occur when MWD surplus water is equal to or exceeds 718,000 acre-ft. Based on historic data for available MWD surplus water, this condition occurs approximately 2.8% or less of the time.

  RCF Prolonged Dry Scenario 2. Prolonged Dry Scenario 2 simulates RCF artificial recharge to occur when MWD surplus water is equal to or exceeds 485,000 acre-ft. Based on historic data for available MWD surplus water, this condition occurs approximately 20% or less of the time.

- **RCF Prolonged Dry Scenario 3.** Prolonged Dry Scenario 3 simulates RCF artificial recharge to occur when MWD surplus water is equal to or exceeds 250,000 acre-ft. Based on historic data for available MWD surplus water, this condition occurs approximately 28% or less of the time.

Based on results from iterative model runs, RCF Prolonged Dry Scenario 1 consists of no artificial **recharge** during the 24 years from 2007 through 2030 (i.e., hydrologic years from 1945 through 1968). RCF Prolonged Dry Scenario 2 includes artificial recharge of 203,200 acre-ft. RCF Prolonged Dry Scenario 3 includes artificial recharge of 300,000 acre-ft.

Based on results from iterative model runs, RCF Prolonged Dry Scenario 1 consists of no groundwater **pumping** during the 24 years from 2007 through 2030 (i.e., hydrologic years from 1945 through 1968. RCF Prolonged Dry Scenario 2 includes pumping a total of 140,000 acre-ft. RCF Prolonged Dry Scenario 3 includes pumping a total of 205,000 acre-ft.

The average simulated groundwater elevations and the difference between the average groundwater elevations for the Prolonged Dry Baseline Run (Dry Year No Project) with respect to the RCF Prolonged Dry scenarios are shown in **Table 4.6-D** and summarized below.

For RCF Prolonged Dry Scenario 1, there is no change in water level from the Prolonged Dry Baseline Run (No Project) due to no additional recharge or groundwater pumping. Water level changes range from zero (no change) to a rise of 32 ft for RCF Prolonged Dry Scenario 2 as compared to the Prolonged Dry Baseline Run (No Project). For RCF Prolonged Dry Scenario 3, these changes range from a decline of one (1) foot to a rise of 38 ft. Water levels in most of the wells would increase due to the artificial recharge from the RCF.

Groundwater storage decline for RCF Prolonged Dry Scenario 1 would be the same as the Prolonged Dry Baseline Run (No Project) conditions due to no RCF artificial recharge or groundwater pumping. Groundwater storage decline for RCF Prolonged Dry Scenarios 2 and 3 would be less than under Prolonged Dry Baseline Run (No Project) conditions, which are estimated be negative ("-") 702,419 acre-ft and negative 682,313 acre-ft. These results indicate that more water (45,071 acre-ft for Prolonged Dry Scenario 2 and 65,177 acre-ft for Prolonged Dry Scenario 3) was recharged over the 24 years than what was necessary to maintain a total recharge equal to the Prolonged Dry Baseline Run (No Project) conditions (see **Table 4.6-E** below).

In general, the patterns of the cumulative changes in groundwater storage for the Prolonged Dry Baseline Run (No Project) and RCF Prolonged Dry Scenarios 1 through 3 during the period 2007 to 2030 are similar to the historical prolonged dry base period from 1945 to 1968.

As shown in **Table 4.6-D**, below, the maximum projected decline in groundwater levels during prolonged dry years is one (1) foot at City of Redlands Well No. 32. Therefore, inasmuch as the maximum projected reduction in average groundwater levels at all wells is less than 10 feet, the potential impact upon groundwater levels during prolonged dry years will be **less than significant**.

Both the modeling analysis prepared in 2005 under average to wetter year assumptions and historically higher SWP water availability for recharge, and the Prolonged Dry-year modeling completed for the Realignment Project in 2010 indicate that the Basin Area can operate within the safe-yield of the basin and with less than significant impacts to existing wells and groundwater levels. Based on the modeling assumptions used, impacts of the project to groundwater levels are considered less than significant.

Coordinated basin management under current and future conditions is critical however, to assuring the safe-yield of the basin and less than significant impacts to all users of the Basin Area. If the RCF were not operated in a coordinated fashion under the requirements of the Western Judgment, then impacts could be significant. Therefore, mitigation measures **MM GWL 1** and **2** from the 2005 PEIR required that operating plans be prepared based on sound modeling set the frequency with which operating plans must be prepared. Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in **MM GWL 1**, were complete and became available

for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, **MM GWL 1** was accomplished and is no longer needed for the RCF realigned pipeline.

Additionally, WMWD has been participating in ongoing management efforts with the Basin Area Technical Advisory Committee (BTAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. The ongoing monitoring and adaptive management recommended by **MM GWL 2** is still necessary, but the mitigation measure has been revised to include WMWD's involvement with the TAC. The currently revised mitigation measure below, **MM GWL 2(Revised)**, will replace **MM GWL 1** and **2** from the 2005 PEIR. Potential adverse impacts to groundwater levels in the San Bernardino Basin Area will be **less than significant with implementation of mitigation measure MM GWL 2(Revised)**.

Table 4.6-D
Groundwater Elevations at Wells for Prolonged Dry Baseline 2007-2030

Well Name	Existing Groundwater Elevation in 2007	Average Groundwater Elevations 2007 to 2032 (Prolonged Dry Baseline Run and RCF Prolonged Dry Scenarios)				Difference in Average Groundwater Elevation between Prolonged Dry Baseline Run and RCF Prolonged Dry Scenarios		
		Baseline Run (Dry Year No Project) [ft amsl[12]]	RCF Scenario 1 [ft amsl]	RCF Scenario 2 [ft amsl]	RCF Scenario 3 [ft amsl]	RCF Scenario 1 minus Baseline Run [ft]	RCF Scenario 2 minus Baseline Run [ft]	RCF Scenario 3 minus Baseline Run [ft]
SBVMWD San Bernardino Ave. Well	1,456	1,411	1,411	1,432	1,436	0	21	26
City of San Bernardino Mt. Vernon Well	1,183	950	950	954	956	0	3	5
East Valley Water District Well 62	1,122	1,029	1,029	1,030	1,030	0	1	2
Fontana Union Well 13	1,513	1,073	1,073	1,083	1,091	0	9	17
Fontana Union Well 26	2,047	1,657	1,657	1,669	1,679	0	12	22
Fontana Union Well 27	2,215	2,061	2,061	2,064	2,067	0	3	6
East Valley Water District Well 120	1,358	1,329	1,329	1,343	1,346	0	14	16
City of San Bernardino Vincent Well	2,328	2,086	2,086	2,086	2,086	0	0	0
City of San Bernardino Devil Canyon Well No. 1	1,359	1,372	1,372	1,381	1,385	0	9	13
City of San Bernardino Newmark 3 Well	1,291	1,274	1,274	1,282	1,284	0	7	10
West Valley Water District Lord 7 Well	1,233	943	943	949	953	0	5	9
City of Riverside Raub 1 Well[13]	1,003	820	820	821	821	0	1	1
City of Redlands Well 32	1,199	1,184	1,184	1,185	1,183	0	1	-1
City of Redlands Orange Street Well	1,240	1,212	1,212	1,216	1,216	0	4	4
East Valley Water District Well 24A	1,118	1,009	1,009	1,011	1,011	0	2	3
City of San Bernardino Cajon Well No. 1	1,805	1,614	1,614	1,617	1,618	0	2	3
East Valley Water District Well 40	1,166	1,134	1,134	1,136	1,135	0	2	1
City of San Bernardino Devil Canyon Well No. 3	1,288	1,498	1,498	1,508	1,511	0	10	13
City of San Bernardino Leroy Street Well	1,116	1,000	1,000	1,002	1,003	0	2	3
City of Redlands Agate 2 Well	1,630	1,496	1,496	1,527	1,533	0	32	38
East Valley Water District Cone Camp Well	1,602	1,476	1,476	1,502	1,508	0	25	32
Bear Valley Mutual Water Company Nelson Street Well	1,351	1,314	1,314	1,327	1,330	0	13	15
Gage Canal Company Lower Kelly Well[2]	1,005	836	836	836	836	0	1	0
City of Redlands Airport Well No. 2	1,630	1,312	1,312	1,325	1,328	0	14	16
East Valley Water District Well 146 A	1,287	1,260	1,260	1,269	1,270	0	9	10
SBVMWD Backyard Well[2]	965	815	815	816	816	0	1	1

Source: 2010 Geoscience, Table 1, 2008 Wildermuth

[12] Above mean sea level
[13] Located within Area of Historic High Groundwater (AHHG)

Table 4.6-E
Summary Water Budgets 2007 – 2030 Prolonged Dry Scenarios

			2009 SUPPLEMENTAL EIR/EIS			
Flux Terms			**Prolonged Dry Baseline (No Project)**	**RCF Prolonged Dry Scenario 1**	**RCF Prolonged Dry Scenario 2**	**RCF Prolonged Dry Scenario 3**
	Forecast Period		2007 to 2030			
Inflow	Recharge from Gaged Streamflow		1,988,509	1,988,509	1,988,509	1,988,509
	Artificial Recharge	Others	1,792,214	1,792,214	1,792,214	1,792,214
		RCF	**0**	**0**	**203,196**	**300,000**
	Recharge from Local Runoff Generated by Precipitation		110,248	110,248	110,248	110,248
	Infiltration from Direct Precipitation		25,991	25,991	25,991	25,991
	Return Flow from Groundwater Pumping		1,164,025	1,164,025	1,164,025	1,164,025
	Recharge from Ungaged Mountain Front Runoff		264,001	264,001	264,001	264,001
	Underflow Recharge		88,008	88,008	88,008	88,008
	Total Inflow		**5,432,997**	**5,432,997**	**5,635,577**	**5,731,003**
Outflow	Evapotranspiration		118,813	118,813	136,280	146,553
	Groundwater Pumping	Others	6,008,285	6,008,285	6,008,285	6,008,285
		RCF	**0**	**0**	**140,000**	**205,000**
	Underflow Discharge		53,388	53,388	53,430	53,479
	Total Outflow		**6,180,486**	**6,180,486**	**6,337,995**	**6,413,316**
Change in Groundwater Storage (Total Inflow – Total Outflow)			**-747,490**	**-747,490**	**-702,419**	**-682,313**

Source: 2010 Geoscience
Note: Units in Acre-ft.

Chino Groundwater Basin

With the realignment of the project pipeline, connections can now be made to JCSD facilities in the Chino Groundwater Basin. A separate analysis was not done for this project with respect to groundwater in the Chino Basin, rather, the project will operate pursuant to a management plan that is already in place and includes water for JCSD to remove from the basin and to deliver to WMWD. (DYYP Expansion, p. 5-5). The results of that analysis and WMWD's rights within it, which will be exercised via the RCF project are presented below.

The groundwater rights and storage capacity within the Chino Basin were established by the Chino Basin Judgment. The Judgment represents an absolute adjudication of all water rights in the Basin and is currently administered under the authority of the Chino Basin Watermaster with continuing jurisdiction by the Court. The principal function of adjudication generally is to control the use of a water source in order to ensure the source is utilized in an optimum manner. The Optimum Basin Management Program (OBMP) is being implemented pursuant to the Judgment and a 1998 ruling of the court in its exercise of continuing jurisdiction. As stated previously, the OBMP, developed in 1998, established primary management goals to address issues, needs and interests of the water producers in Chino Basin, including four primary goals: (1) enhance basin water supplies, (2) protect and enhance water quality, (3) enhance

management of the basin, and (4) equitably finance the OBMP (OBMP). In July 2000, the Watermaster's planning process culminated with the adoption of the Peace Agreement and certification of the OBMP Program EIR (PEIR, SCH#2000041047) that ended over 15 years of litigation within the Chino Basin. In December 2007, the Peace II Agreement was approved by the court: its two main features include: the expansion of the desalter program and the strategic reduction in groundwater storage to achieve hydraulic control for the Chino Groundwater Basin. A Subsequent EIR (SEIR) was prepared for the Peace II Program and what certified on October 6, 2010. (SEIR 2010) One part of OBMP implementation was the Groundwater Basin (Chino Basin) Dry-Year Yield Program Expansion (DYYP Expansion) would accomplish OBMP Program Element 9 and contribute toward OBMP Program Elements 7 and 8. (DYYP Expansion, p. 1-5).

The Chino Groundwater DYYP Expansion is a proposed conjunctive-use program developed by the Chino Basin Watermaster in association with Inland Empire Utilities Agency (IEUA), MWD, Three Valleys Municipal Water District (TVMWD), and WMWD. (DYYP Expansion, p. ES-1) Conjunctive-use is the optimal management of both surface water and groundwater in order to increase overall water supplies. Storage or surplus surface supplies can be accomplished either directly or through "in-lieu." In 2008, MWD, IEUA, the Chino Basin Watermaster, and Chino Basin appropriators began implementation of the initial Dry-Year Yield Program (DYYP), which had been under development since 2002. The initial program attains conjunctive-use primarily through "in-lieu exchange" (i.e., Chino Basin appropriators use MWD surplus imported water in-lieu of groundwater during *wet* years, thereby storing unused groundwater for use during future *dry* years.), but could also use direct recharge of surplus MWD imported supplies. (DYYP Expansion, p. ES-2) The DYYP Expansion was evaluated pursuant to CEQA in an Initial Study/Mitigated Negative Declaration, which was adopted December 17, 2008 (DYYP Expansion MND/IS), and was part of the evaluated alternatives in the Pease II SEIR.

The initial DYYP anticipated that over the course of the initial DYYP, the Chino Basin appropriators would decrease groundwater production and increase imported water deliveries from MWD by 25,000 acre-ft during *wet* years. The program also provides the flexibility for MWD to deliver "surplus" imported water for recharge, thereby increasing Chino Basin storage. Conversely, during *dry* years, the Chino Basin appropriators would increase groundwater production and decrease imported water purchases from MWD by 33,000 acre-ft. This exchange would allow the Chino Basin appropriators to use MWD surplus imported water in-lieu of groundwater during wet years, thereby storing unused groundwater for use during future dry years. The DYYP Expansion provides for maximum storage up to 150,000 acre-ft. Under the expanded DYYP, assuming that withdrawals from MWD's storage account would occur over the same three-year dry period (as with the initial program), the "take" from MWD's account could be as high as 50,000 acre-ft. This MWD conjunctive-use storage program represents about 20 percent of the Chino Watermaster's long-term storage objectives for the Chino Basin. (DYYP Expansion, p. 1-5)

The initial DYYP relied on in-lieu exchange to develop MWD's storage account. During wet years when surface supplies exceed demand, imported water deliveries would increase and groundwater extraction would decrease by an equal amount. This unpumped groundwater is thereby stored and available for use in later years when surface supplies may be limited. This

type of year is called a "put year." When surface supplies are short, i.e., in a dry year, the previously unpumped groundwater would be extracted, in addition to the normal groundwater production. This type of year is called a "take year." The in-lieu exchange capacity of any agency is limited by the resource with the least available supply. (DYYP Expansion, pp. 1-5 and 1-6)

WMWD's participation in the DYYP Expansion would provide a direct export connection to the Chino Basin. WMWD's primary role would be participation on the extraction, or "take" side, of the DYYP Expansion. WMWD's point of connection (Clay Street Connection) to the Chino Basin would be via the Jurupa Community Services District, a Chino Basin Appropriator and retail agency of WMWD. (DYYP Expansion, p. 3-11) Thus, this analysis applies only to the Realignment Alternative with Additional Connections which includes the Clay Street Connection.

As part of the DYYP Expansion, groundwater modeling was conducted to evaluate the potential for material physical injury to the Chino Basin including an analysis of groundwater-level changes, increased potential for subsidence, losses from storage, change in direction and speed of known water quality anomalies, and the ability to maintain hydraulic control. An updated version of the Watermaster Model was used to evaluate a baseline alternative along with the three proposed Operations Plan scenarios. The baseline alternative was based on the Alternative 1C Peace II Project Description with the current 100,000 acre-ft DYYP. This baseline was determined to have no material physical injury to the Chino Basin and was therefore used as the basis from which to evaluate any impacts resulting from three DYYP Expansion operations scenarios as shown in **Table 4.6-F**.

Table 4.6-F
Summary of Chino Basin Dry-Year Yield Operations Scenarios

Operations Scenario	Description	Range in Storage (acre-ft)
No. 1: "Typical Storage"	Out of a ten year cycle, this scenario assumes a consistent 3-year "put" term, 3-year "take" term, and 4-year "hold" term. Maximum annual "puts" and "takes" are 50,000 afy.	0 to +150,000
No. 2: "Negative Storage"	This scenario assumes a 3-year "put" term but "takes" can extend beyond 3 years, thus allowing the storage account to accumulate a negative balance.	-100,000 to +150,000
No. 3: "Maximum Storage"	This scenario assumes a 3-year "put" term and assumes both maximum and smaller "summertime" "takes," thus allowing the storage account to accumulate a higher balance.	0 to +300,000

Source: DYYP Expansion, Table 6-2

The groundwater modeling integrated the DYYP Expansion groundwater production requirements during "put" or "take" years with the latest groundwater pumping projections for the Chino Basin. The groundwater modeling started with the initially proposed "takes" from the Chino Basin appropriators and, if necessary, was reiterated with reduced "takes" until there were

no signs of material physical injury. Due to hydraulic control limitations, the modeling results showed that the initially proposed "takes" for Chino Hills and WMWD (via JCSD) could not be maintained, and the WMWD proposed maximum "take" was reduced from 10,000 AF/YR to 5,000 AF/YR. (DYYP Expansion, p. 6-10) This level of take was confirmed in the Peace II SEIR.

Upon finalization of the DYY Program Expansion proposed "takes," it was concluded there is no material physical injury to a Party to the Chino Basin Judgment or the Chino Basin from the projected groundwater level changes from either the baseline or dry-year yield scenarios. The findings in the Peace II SEIR substantiate this finding that no significant impacts would result from the operating assumptions included in the evaluation which include the DYY Program.

"After detailed evaluation of all hydrology/water quality issues in the DSEIR, it was concluded that all hydrology and water quality impacts can be controlled to a less than significant level. Detailed assumptions regarding future water management activities are included in this finding, for example pumping locations must be optimized, the future location of groundwater recharge must be optimized, additional imported water must be brought into the Basin over the next 20 years to offset cumulative unmet replenishment obligation (CURO), and hydraulic control of the Basin must be accomplished. Regardless, under these assumptions, all hydrology and water quality impacts can be offset or otherwise mitigated, and the hydrology and water quality impacts (including those identified under Utilities and Services Systems [section of the Peace II SEIR]) have been found to be less than significant, on a project specific and cumulative basis." (SEIR 2010, pp. 1-8)

Pursuant to the DYYP Expansion and the Peace II Agreement, groundwater extracted from the Chino Basin through the Chino Desalter and transferred to WMWD would be a maximum of 5,000 AF/YR. This extraction would be consistent with the provisions of the OBMP. Pursuant to that analysis of the DYYP Expansion and its IS/MND and the Final SEIR for Peace II, **less than significant effects** related to groundwater levels within the Chino Basin are anticipated as a result of implementation of the Riverside-Corona Feeder project.

Threshold: *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in subsidence.*

In addition to liquefaction which was evaluated in the 2005 modeling, subsidence is another condition that can result from too much (i.e. unmanaged) pumping of groundwater. Geoscience analyzed the various recharge and pumping scenarios with respect to subsidence.

The changes in land subsidence are minimal for the RCF scenarios as compared to the Baseline Run (No Project) under the average base period conditions (1979 to 2004). Increase in land subsidence due to the RCF would be minimal and would only occur in three wells under RCF Scenarios 2 and 3 conditions ranging from a total of 0.01 ft to 0.03 ft during the 26 years (i.e., approximately 0.0004 ft/yr to 0.0012 ft/yr). These sites are located in the vicinity or hydraulically downgradient of the proposed Central Feeder Connection wellfield. For the majority of the sites (i.e., 23 of 26), there would be no change in land subsidence.

The changes in land subsidence are minimal for the RCF prolonged dry scenarios as compared to the Prolonged Dry Baseline Run (No Project) under the prolonged dry base period conditions (1945 to 1968). Increase in land subsidence due to the RCF would be minimal and would only occur in three wells under Prolonged Dry Scenario 3 conditions ranging from a total of 0.01 ft to 0.02 ft during the 24 years (i.e., approximately 0.0004 ft/yr to 0.0008 ft/yr). These sites are also located in the vicinity of the proposed RCF Central Feeder Connection wellfield. Again, for the majority of the sites (i.e., 23 of 26), there would be no change in land subsidence.

Land subsidence due to declining groundwater levels has historically been reported in the Basin Area. These reports show that there was an average annual subsidence ranging from 0.015 ft/yr to 0.04 ft/yr during the period from 1944 to 1956. During the period from 1944 to 1969, at least one foot of subsidence had occurred in the Pressure Zone near the Raub well field and immediately north of Loma Linda between the San Jacinto and Loma Linda faults (2010 Geoscience).

The results of project modeling compared to existing average annual subsidence in the Basin Area indicate that the project will result in substantially lower than historic averages for the years prior to the significant subsidence experienced in the 1960's. Project subsidence ranges from 0.0004 ft/yr to 0.0012 ft/yr while historic subsidence ranges from 0.015 to 0.04 ft/yr. Impacts are **less than significant** with respect to subsidence.

Realignment Alternatives Proposed Mitigation Measures/Minimization

An Environmental Impact Report is required to describe feasible mitigation measures which could minimize significant adverse impacts (CEQA Guidelines, Section 15126.4). Mitigation Measures were evaluated for their ability to eliminate or reduce the potential significant adverse impacts to groundwater levels to below the level of significance.

*Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in **MM GWL 1**, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, **MM GWL 1** was accomplished and is no longer needed for the RCF realigned pipeline.*

*Additionally, WMWD has been participating in ongoing management efforts with the Basin Area Technical Advisory Committee (BTAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. The ongoing monitoring and adaptive management recommended by **MM GWL 2** is still necessary, but the mitigation measure has been revised to include WMWD's involvement with the BTAC. The currently revised mitigation measure below, **MM GWL 2(Revised)**, will replace **MM GWL 1** and **2** from the 2005 PEIR.*

~~**MM GWL 1:** Prepare operating strategies to be tested using the most current versions of the groundwater flow and groundwater quality model(s) available at the time. An operating plan consistent with any overall management plan adopted for the Basin Area shall be developed prior~~

~~to commencing replenishment activities for the project that defines parameters of replenishment and extraction based on groundwater model(s) as evaluative tool(s).~~

MM GWL 2 (Revised): To assure that ongoing management of the RCF is coordinated with management of the Basin Area as a whole, monitoring and adaptive management shall be employed. The RCF operations management plan will be developed and tested using the groundwater modeling employed by the Basin Area TAC (or its successor or assignee) on a annual basis. ~~As described in **MM GWL 1**, existing~~The groundwater flow and groundwater model(s) shall be used to predict the effects of project operations ~~pursuant to the operating plan developed as a requirement of **MM GWL 1**~~on the safe yield of the Basin Area. If the model(s) suggest that the replenishment and pumping regime of the proposed project operation would result in ~~significant impacts~~ a water level reduction of greater than 10 feet, the project operation shall be modified to reduce impacts to less than significant levels.

Typical measures that could be implemented to maintain the safe yield of the basin include:

- Increased, decreased, or no replenishment
- Replenishment in an alternative location
- Increased, decreased or no extraction
- Extraction at targeted locations

Realignment Alternatives Determination of Significance under CEQA

As stated in the 2005 PEIR, impacts to groundwater levels would be less than significant after incorporating mitigation measures **MM GWL 1** through **MM GWL 2**. In light of the updated groundwater modeling prepared as part of this SEIR/EIS (Appendix F), it can be concluded that the 2005 PEIR remains adequate to address potential impacts related to groundwater levels and the mitigation measures contained therein, as described above, will be applicable to the proposed project.

With implementation of mitigation measure **MM GWL 2 (Revised)** impacts to groundwater levels will be **less than significant**.

4.6.4 No Project/Action Alternative

As there would be no recharge or extraction associated with the No Project/Action Alternative, no effects would result to groundwater levels from this alternative.

4.7 GROUNDWATER QUALITY

Potential impacts related to the degradation of water quality were found to be less than significant in the Initial Study/NOP prepared for this project (Appendix A). However, comment letters from the City of San Bernardino Municipal Water Department and City of Colton raising concerns over the issue of potentially significant impacts related to groundwater quality were received in response to the Initial Study/NOP. The focus of the following analysis is related to whether the proposed project has the potential to substantially degrade water quality. A summary of the Groundwater Quality section of the 2005 Certified PEIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment) is included in the following discussion.

In addition to the 2005 PEIR and its reference documents, and other reference documents, the following references were used in the preparation of this section of the SEIR/EIS:

- California Department of Water Resources, *State Water Project Grab Sample Data*. (Available at http://www.water.ca.gov/swp/waterquality/OM_WQ_Pubs.cfm?display=topic&pub=120,126,7679,8308, accessed on November 9, 2009) (DWR)
- California Department of Water Resources, *State Water Project Operations Data for the Months of January 2006 through December 2006*. (Available at http://www.water.ca.gov/swp/operationscontrol/monthly.cfm accessed on August 6, 2010.)
- California Regional Water Quality Control Board, Santa Ana Region, *Water Quality Control Plan Santa Ana River Basin*, 1995. (Available at http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml, accessed on August 11, 2009.) (SARWQCB Basin Plan)
- Chino Basin Watermaster, *Chino Basin Optimum Basin Management Program, State of the Basin Report 2006* prepared by Wildermuth Environmental, Inc., July 2007. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 30, 2008.) (OBMP 2006 State of the Basin Report)
- Chino Basin Watermaster and Inland Empire Utilities Agency, Chino Basin Dry-Year Yield Program Modeling Report, Volume III, prepared by Wildermuth Environmental, Inc., July 2003. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 19, 2009.) (DYYP)
- Chino Basin Watermaster, *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program Expansion, Project Development Report, Volume I,* prepared by Black & Veatch., December 2008. (Available at http://www.cbwm.org/rep_engineering.htm, accessed on October 19, 2009.) (DYYP Expansion)
- Geoscience Support Services, Inc., *Groundwater Modeling of TDS and Nitrate-Nitrogen Concentrations, Riverside-Corona Feeder Project Conjunctive Use Scenarios*, prepared for Western Municipal Water District, March 12, 2010. (Appendix F) (2010a Geoscience)

- Geoscience Support Services, Inc., *Groundwater Modeling of Riverside-Corona Feeder Project Conjunctive Use Scenarios*, prepared for Western Municipal Water District, October 23, 2009. (Appendix F) (2009 Geoscience)
- Inland Empire Utilities Agency, *Final Subsequent EIR for the IEUP Peace II Project*, September 25, 2010. (Available at http://www.ieua.org/news_reports/notices.html, accessed on October 20, 2010) (SEIR 2010)
- Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, November 2005. (Available at http://www.mwdh2o.com/mwdh2o/pages/yourwater/ywater01.html, accessed on November 10, 2009.) (MWD Regional UWMP)
- Santa Ana Watershed Project Authority, *Draft 2009 Santa Ana Integrated Watershed Plan*, January 2009. (Available at http://www.sawpa.org/owow-generalinfo.html, accessed on November 10, 2009.) (SAWPA)
- United States Environmental Protection Agency, *Region 9 Superfund, Newmark Groundwater Contamination Site Overview.* (Available at http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/vwsoalphabetic/Newmark+Groundwater+Contamination?OpenDocument, accessed November 10, 2009.) (EPA)
- Wildermuth Environmental Inc. for Basin Monitoring Program Taskforce, *Basin Plan Amendment Required Monitoring and Analysis Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1987-2006, Final Technical Memorandum*, August 2008. (Available At SAWPA.)

4.7.1 Setting/Affected Environment

In addition to the discussion of groundwater below, see also a general discussion of water rights and background issues in Section 2.1, Background, and analysis of groundwater levels in Section 4.6.

Groundwater Quality in General

Groundwater is the water that is present below ground in saturated soil or rock materials. Groundwater "recharge" occurs when water (e.g., from rain) infiltrates through the soil and enters the groundwater reservoir. When groundwater is pumped and extracted from the ground, it may be used for domestic, irrigation, and industrial purposes; consequently the quantity and quality of local ground water are important water resource issues.

Groundwater can be contaminated by native or introduced pollutants. Man-made sources of pollutants can include landfills, septic tanks, leaky underground storage tanks, overuse of fertilizers and pesticides, and from fuels used in the defense industry. If groundwater becomes polluted, it may no longer be safe to drink without treatment to remove the contamination. Pollutants that contaminate groundwater may be some of the same pollutants that contaminate surface water. Compounds from the surface can move through the soil and end up in the groundwater. For example, pesticides and fertilizers used in agriculture and landscaping applications can find their way into groundwater supplies over time. Road salt, toxic substances

from mining sites, and used motor oil also may seep into groundwater. In addition, it is possible for untreated waste from septic tanks and toxic chemicals from underground storage tanks to contaminate groundwater. Perchlorate and its salts (e.g., ammonium perchlorate) used in solid propellant for rockets, missiles, and fireworks is a widespread inorganic contaminant of drinking water. Results of monitoring by public water systems has shown perchlorate in over 300 drinking water sources, primarily wells and mostly in the counties of Los Angeles, San Bernardino and Riverside. Perchlorate is also present in the Colorado River, an important source of water for drinking and contamination.

Native or natural groundwater pollution occurs when minerals already existing within the soil leach into the groundwater, causing it to become unsuitable for drinking. Groundwater can remain in contact with minerals present in the soil and bedrock for extended periods of time and become saturated with dissolved solids from these minerals. Measurement of total dissolved solids (TDS) is a good indicator of the mineralized character and the quality of groundwater.

Groundwater also has the potential to be contaminated through artificial recharge. Various cooperating entities have the ability to recharge the local groundwater basin through surface water spreading at various locations in the project area. If the water being recharged is significantly higher in TDS than levels currently in the receiving basin, then recharge activities can adversely affect the groundwater quality.

The 2005 Project Alignment had the potential to affect groundwater in only the San Bernardino Basin Area. The currently proposed RCF Realignment will also connect to the Chino Groundwater Basin; thus each of these two basins is discussed separately in the following sections.

San Bernardino Groundwater Basin

Groundwater Quality of the San Bernardino Groundwater Basin

The San Bernardino Groundwater Basin (Basin Area) serves as the primary source of water supply for the cities of Riverside, Redlands, Loma Linda, Highland, San Bernardino and adjacent areas. TDS levels throughout the San Bernardino Groundwater Basin range from below 200 mg/l near the eastern mountains and Lytle Creek areas to over 600 mg/l in the Colton area.

Data from wells in the Basin Area indicate the local groundwater resource has been contaminated by manufacturing and military activities. Trichloroethylene (TCE) and tetrachloroethylene (PCE), both volatile organic priority pollutants, were first discovered in the Basin Area in 1981. A third chemical used in the production of solid rocket fuel, perchlorate, has impacted groundwater supplies in the Redlands area. Nitrates (NO3) and a pesticide, dibromochloropropane (DBCP), have been found in groundwater in the Basin Area; the origin attributed to former agricultural activity.

Extensive groundwater quality sampling and analysis is ongoing in the Basin Area to quantify and better understand groundwater contamination in the project area. As a result, five pollution

[1] U.S. Department of the Interior, Geological Survey. USGS Professional Paper: Chemistry and Isotopic Composition of Ground Water Along a Section near the Newmark Area, San Bernardino County, California. Prepared by John A. Izbicki, Wesley R. Danskin, and Gregory O. Mendez. 1998. (As referenced in the 2005 PEIR.)

plumes have been identified (see **Figure 4.7-1, Groundwater Contamination Plumes** and **Figure 4.7-2, Existing Plumes in the San Bernardino Groundwater Basin Area**).

Newmark Plume and Muscoy Plume: The United States Environmental Protection Agency (EPA) has identified and designated two plumes within the identified "Newmark Groundwater Contamination" site, which consists of area-wide groundwater contamination underlying portions of the city of San Bernardino. The two groundwater plumes border Shandin Hills. On the east side of the site, a contaminated groundwater plume extends for 5 miles and is referred to as the Newmark Plume area. On the west side of Shandin Hills is a 4-mile long contaminated groundwater plume known as the Muscoy Plume area. Although the suspected disposal may have occurred as early as the 1940s, the problem was not discovered until a water supply monitoring program was instituted in 1980. The contaminated groundwater contains volatile organic compounds (VOCs) including TCE and PCE. (EPA) Treatment plants are operating to remove VOC contamination. A total of thirteen extraction wells produce on average approximately 26,000 AFY, which is treated at the four treatment plants. (SAWPA, pp. 179 – 180)

Norton Air Force Base Plume: Located in the vicinity of the former Norton Air Force Base in the central part of the project area, this plume contains TCE and PCE contamination. The Air Force is conducting a clean-up operation for this plume consisting of extraction and filtration. A portion of this plume, with weaker concentrations, is extending off-base. The Air Force is remediating this weaker plume utilizing wellhead treatment at existing wells, where necessary, through an agreement with the City of Riverside.

Redlands-Crafton Plume**:** The Redlands-Crafton Plume is a six-mile long plume of VOC and ammonium perchlorate contamination, which was first detected in the early 1980s. Approximately 46 drinking water wells have been affected. A number of well head treatment units and treatment plants to remove these contaminants are being operated by the cities of Redlands, Loma Linda and Riverside. (SAWPA, pp. 180 – 181)

Burlington Northern and Santa Fe (BNSF) Plume**:** Located under the BNSF rail yard in the city of San Bernardino, this plume consists of TCE and PCE contamination. Limited on-site groundwater treatment using aeration, separation and evaporation (air sparging) is being conducted at the Burlington Northern and Santa Fe Rail yard site. Off-site migration is being observed and is not currently being remediated.

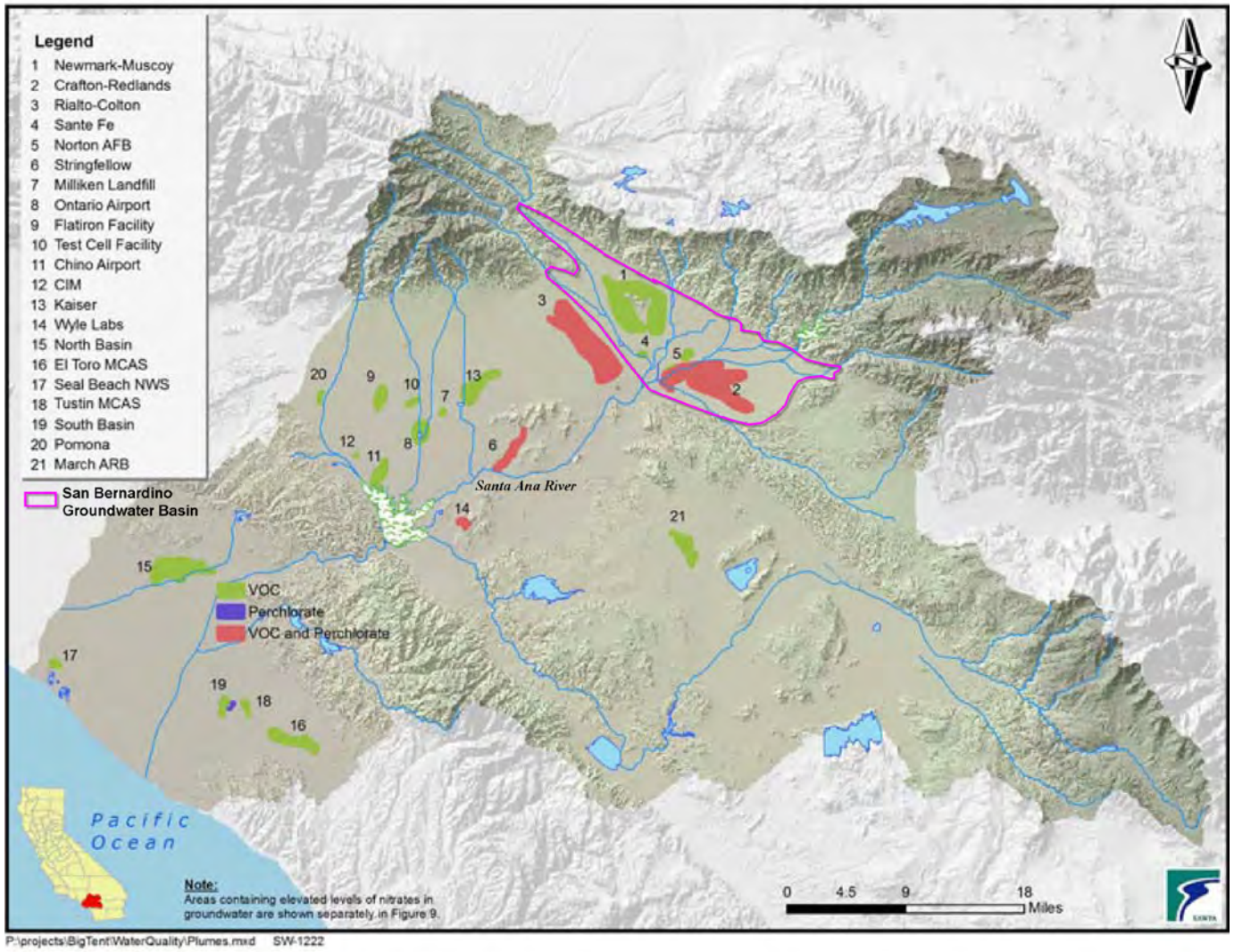
All of the above pollution plumes are currently undergoing remediation in accordance with state and federal laws.

Several other smaller groundwater pollution plumes associated with hazardous materials sites compiled pursuant to Government Code Section 65962.5 are present along the alignment of the RCF realignment project within the Basin Area. Impacts related to these smaller plumes are addressed in the Section 4.8 (Hazards and Hazardous Materials) of this SEIR.

Imported Water Quality

Water from the State Water Project is currently recharged in the Basin by the San Bernardino Valley Municipal Water District (SBVMWD). Grab Samples[2] showed that TDS levels at the Devil Canyon Afterbay, where State Water Project water would most likely be delivered for this project, ranged between 225 and 325 milligrams per liter (mg/l) during the 12-month period between October 2008 and September 2009 (DWR). Overall, State Water Project water at the Devil Canyon Afterbay averages 250 mg/l. (MWD Regional UWMP, p. IV-3)

[2] A grab sample is a single sample chosen in a given matrix (usually natural water) to represent conditions at a specific location, depth and time. (DWR)



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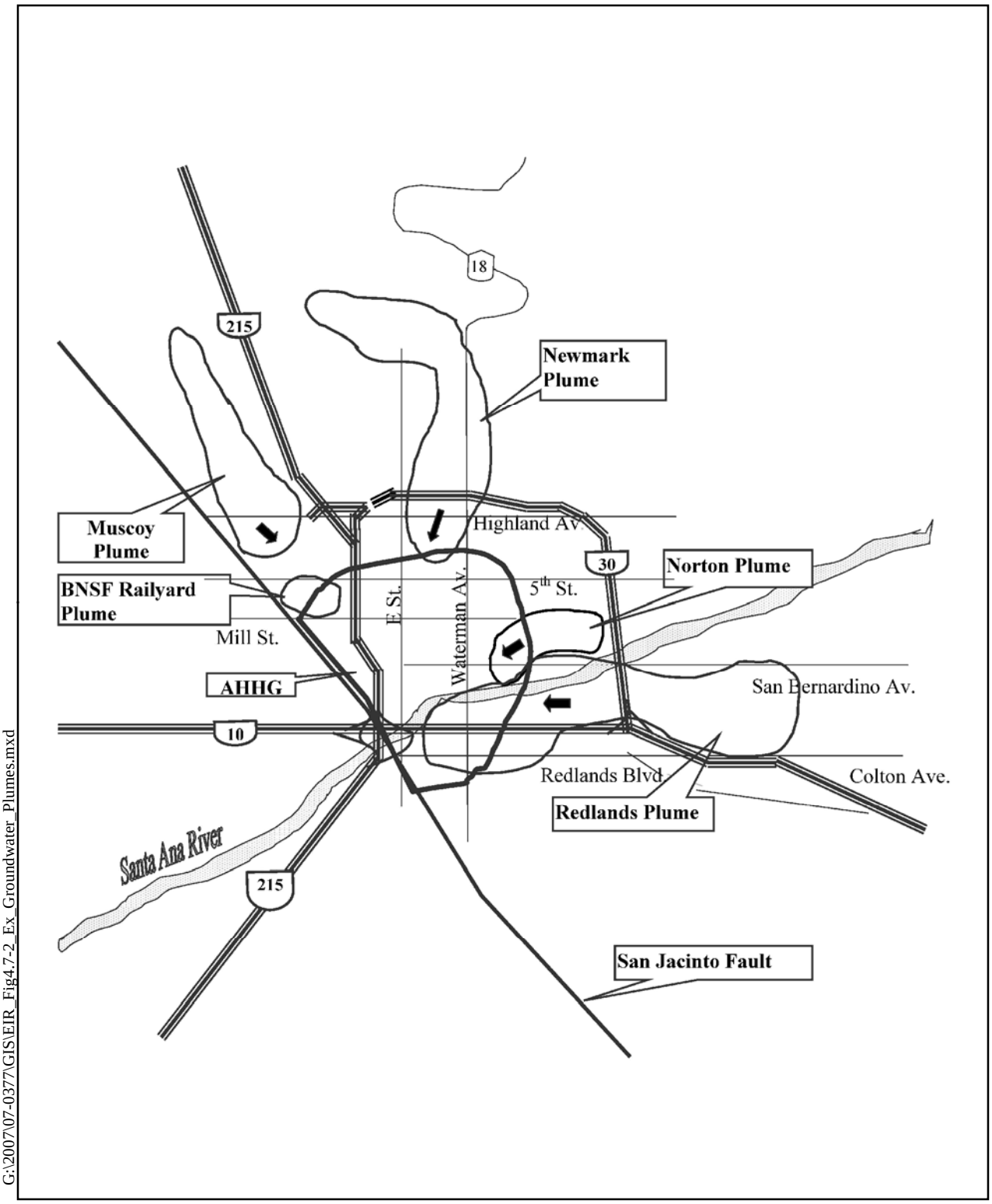
Source: SAWPA, 2006

Figure 4.7-1
Groundwater Contamination Plumes



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N
W E
S

Not to Scale

Figure 4.7-2
Existing Pollution Plumes in the San Bernardino Groundwater Basin Area

Chino Groundwater Basin

Groundwater Quality of the Chino Groundwater Basin

The groundwater quality in Chino Basin is generally very good, with better groundwater quality found in the northern portion of Chino Basin where recharge occurs. Between 2001 and 2006, the maximum TDS concentration within the Chino Basin ranged from less than 75 mg/L to 3,900 mg/L with an average and median concentration of approximately 730 mg/l and 530 mg/L, respectively. The highest concentrations are located south of State Route 60 where impacts from agriculture are the highest. The impacts of agriculture on TDS in groundwater are primarily caused by fertilizer use on crops, consumptive use, and dairy waste disposal. (OBMP 2006 State of the Basin Report, p. 4-5)

Other constituents that have the potential to impact groundwater quality from a regulatory or Basin Plan standpoint include certain VOCs, arsenic, and perchlorate. There are a number of point source releases of VOCs in Chino Basin. These are in various stages of investigation or cleanup. There are also known point source releases of perchlorate (MVSL area, Stringfellow, *et cetera*) as well as what appears to be non-point source related perchlorate contamination from currently undetermined sources. Arsenic at levels above the WQS appears to be limited to the deeper aquifer zone near the city of Chino Hills. Total chromium and hexavalent chromium, while currently not a groundwater issue for Chino Basin, may become so, depending on the promulgation of future standards. (OBMP 2006 State of the Basin Report, p. 4-16)

Areas with either significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. The primary areas of nitrate degradation were formerly or are currently overlain by citrus in the northern parts of the Chino-North Management Zone (MZ) and dairy in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin MZ (PBMZ) Nitrate concentrations in groundwater have increased slightly or remained relatively constant in the northern parts of the Chino-North MZ over the period ranging from 1960 to the present, but rarely exceed 10 mg/L (as nitrogen). Over the same period, nitrate concentrations have increased significantly in the southern parts of the Chino-North MZ, the Chino-South MZ, the Chino-East MZ, and the Prado Basin MZ where land use was progressively converted from irrigated/non-irrigated agricultural land to dairies, and nitrate concentrations typically exceed the 10 mg/L maximum contaminant level (MCL) and frequently exceed 20 mg/L. (OBMP 2006 State of the Basin Report, p. 4-6)

The other constituents that have the potential to impact groundwater quality are volatile organic compounds (VOCs), arsenic, manganese, and perchlorate. In addition, radon and gross alpha radiation, while naturally-occurring, are found above their MCLs in Chino Basin. Chromium and hexavalent chromium may be problematic, depending on the promulgation of future standards. (DYYP, p. 3-10)

The following groundwater contamination plumes have been identified within the Chino Basin.

Chino Airport**:** Located approximately four miles east of the city of Chino and six miles south of Ontario International Airport, and occupying an area of about 895 acres. Analytical results from groundwater sampling revealed the presence of VOCs above MCLs in six wells downgradient of Chino Airport. (DYYP, p. 3-15)

California Institute for Men (CIM): Located in Chino and bounded on the north by Edison Avenue, on the east by Euclid Avenue, on the south by Kimball Avenue, and on the west by Central Avenue. Analytical results from groundwater sampling indicated that the most common VOCs detected in groundwater underlying CIM were PCE and TCE. Other VOCs detected included carbon tetrachloride, chloroform, 1,2-DCE, bromodichloromethane, 1,1,1-trichloroethane (1,1,1-TCA), and toluene. (DYYP, p. 3-15 and 3-16)

General Electric Flatiron Facility: Occupied the site at 234 East Main Street, Ontario, California from the early 1900s to 1982. Analytical results from groundwater sampling indicated that VOCs and total dissolved chromium were the major groundwater contaminants. The most common VOC detected at levels significantly above its MCL is TCE. Other VOCs periodically detected, but commonly below MCLs, included PCE, toluene, and total xylenes. (DYYP, p. 3-16)

The General Electric Company's Engine Maintenance Center Test Cell Facility (Test Cell Facility)**:** Located at 1923 East Avon, Ontario, California. Primary operations at the Test Cell Facility include the testing and maintenance of aircraft engines. Analytical results from investigations indicated that the most common and abundant VOC detected in groundwater beneath the Test Cell Facility was TCE. Other VOCs detected included PCE, *cis*-1,2-DCE, 1,2-dicholoropropane, 1,1- DCE, 1,1-DCA, benzene, toluene, and xylenes, among others. (DYYP, p. 3-16)

Kaiser Steel Fontana Steel Site**:** In July of 1983, Kaiser initiated a groundwater investigation that revealed the presence of a plume of degraded groundwater under the facility. In August of 1987, the RWQCB issued Cleanup and Abatement Order Number 87-121, which required additional groundwater investigations and remediation activities. The results of these investigations showed that the major constituents of the release to groundwater were inorganic dissolved solids and low molecular weight organic compounds. (DYYP, p. 3-17)

Mid-Valley Sanitary Landfill (MVSL)**:** A Class III Municipal Solid Waste Management Unit located at 2390 North Adler Avenue in the city of Rialto. VOCs and perchlorate have been detected in groundwater beneath and downgradient from the MVSL. The most common and abundant VOCs in groundwater are PCE, 1,1-DCA, and 1,1-DCE. TCE, cis-1,2-DCE, 1,2-DCA, vinyl chloride, and benzene also have been detected. Perchlorate has been detected in the Rialto-Colton and Chino Basins. (DYYP, p. 3-17)

Milliken Sanitary Landfill (MSL)**:** A Class III Municipal Solid Waste Management Unit located near the intersections of Milliken Avenue and Mission Boulevard in the city of Ontario. Analytical results from groundwater sampling indicated that VOCs are the major constituents of the release. The most common VOCs detected were TCE, PCE, and dichlorodifluoromethane.

Other VOCs detected above MCLs included vinyl chloride, benzene, 1,1-dichloroethane, and 1,2-dichloropropane. (DYYP, pp. 3-3-17 and 3-18)

Municipal Wastewater Disposal Ponds**:** Treated municipal wastewater has been disposed into ponds located near the current IEUA Regional Plant 1 (RP1), located in south Ontario, and the former Regional Plant 3 (RP3), located in south Fontana. The areas downgradient of these recharge ponds typically have elevated TDS and nitrate concentrations. Contaminant plumes emanating from these ponds have never been fully characterized. (DYYP, p. 3-18)

Upland Sanitary Landfill**:** The closed and inactive Upland Sanitary Landfill (USL) is located on the site of a former gravel quarry at the southeastern corner of 15th Street and Campus Avenue in the city of Upland. Analytical results from historic groundwater sampling indicate that VOCs are the major constituents of the organic release. The most common VOCs detected above MCLs are dichlorodifluoromethane, PCE, TCE, and vinyl chloride. Other VOCs that have been periodically detected above MCLs include methylene chloride, *cis*-1,2-DCE, 1,1-DCA, and benzene. (DYYP, p. 3-18)

Un-named VOC Plume – South of the Ontario Airport**:** A VOC plume containing primarily TCE exists south of the Ontario Airport. The plume extends approximately from State Route 60 on the north and Haven Avenue on the east to Cloverdale Road on the south and South Grove Avenue on the west. (DYYP, p. 3-19) The plume was largely consumed by production at the Chino-1 Desalter well field. The remarkable decrease in plume size is largely a result of the assumed absence of a VOC source accompanied by desalter pumping and treatment. (DYYP, p. 7-6)

Stringfellow NPL Site**:** One facility in the Chino Basin is on the current National Priorities List (NPL) of Superfund sites. The Stringfellow site is located in Pyrite Canyon, north of Highway 60, near the community of Glen Avon, in Riverside County (Figure 3-21). Groundwater at the site contains various VOCs, perchlorate, N-nitrosodimethylamine (NDMA), and heavy metals. Soil in the original disposal area is contaminated with pesticides, PCBs, sulfates, and heavy metals. Contamination at the Stringfellow site has been addressed by cleanup remedies described in four U.S. Environmental Protection Agency (USEPA) Records of Decision. (DYYP, p. 3-19)

Several other smaller groundwater pollution plumes associated with hazardous materials sites compiled pursuant to Government Code Section 65962.5 are present along the alignment of the RCF realignment project within the Chino Basin. Impacts related to these smaller plumes are addressed in the Section 4.7 (Hazards and Hazardous Materials) of this SEIR.

4.7.2 Summary of the 2005 Certified PEIR for the Riverside-Corona Feeder Project

Design Considerations/Avoidance

The 2005 Project Alignment did not identify specific locations for wells or recharge spreading; thus allowing for flexibility in operating scenarios to best limit adverse impacts to groundwater. Several well fields (located primarily within the AHHG) and possible spreading grounds were

modeled to help understand the relationships of the project to the Basin Area management system. Potential Significant Impacts/Environmental Consequences

Groundwater Quality was addressed in Section II-6 (pp. II-6-1 through II-6-10) of the 2005 Certified PEIR (2005 PEIR) for the Riverside-Corona Feeder Project (2005 Project Alignment), which are hereby incorporated by reference. The following discussion is a summary of the Groundwater Quality section of the 2005 PEIR:

Threshold: *Impacts to groundwater quality may be considered significant if construction or operation of the proposed project would violate water quality standards or otherwise substantially degrade water quality in the Basin as a whole or for any individual pumper.*

The addition of water to the San Bernardino Groundwater Basin (Basin Area) through spreading and/or injection wells will not violate water quality standards or otherwise substantially degrade the water quality of the basin as a whole. By the nature of the project, no additional sources of contaminants such as TCE, PCE, DBCP and nitrates (NO_3) will be added by the RCF project. The imported water to be used for recharge comes from the State Water Project. Total dissolved solids (TDS) levels are a good indicator of the mineralized character and overall quality of groundwater. Existing TDS levels throughout the Basin Area range from below 200 mg/l near the eastern mountains and Lytle Creek areas to over 600 mg/l in the Colton area. TDS levels at the Devil's Canyon Afterbay, where State Water Project water would most likely be delivered, ranged between 239 and 373 milligrams per liter (mg/l) and averaged 312 mg/l during the 12-month period between July 2002 and June 2003. Therefore, the recharge water to be used for this project is generally of an equal or better quality than that of the receiving water resulting in, through dilution, water within the Basin Area of generally equal or higher quality than presently exists. Therefore, no water quality standards will be exceeded by the proposed direct addition of the imported water. (2005 PEIR)

WMWD joined with the City of San Bernardino and other producers that could affect the effectiveness of inhibitor wells in preventing the spreading of volatile organics contamination to develop an Institutional Controls Groundwater Management Program (ICGMP). To respond to the City's concerns about the RCF Project substantially and adversely affecting the movement of the contamination plumes in the Bunker Hill Basin, the MODPATH and MT3DMS models were run based on the same assumptions used for operations in the MODFLOW analysis.

MODPATH is a particle-tracking model that uses the output from MODFLOW to trace the path and rate of flow of water from recharge areas and from contaminant plumes within the Basin Area. The results of the particle-tracking analysis indicate that the Project related recharge and extraction accelerates groundwater movement from the recharge areas toward the increased area of production. This acceleration is consistent with the MODFLOW results which show increased water levels in the forebay, decreased levels in the Pressure Zone and a general increase in the slope of the groundwater gradient.

Particle-tracking from within the contaminant plumes is performed in order to determine if the plume migrates differently with the RCF Project in operation than without. Results of particle-tracking from the Newmark and Muscoy plumes indicate that the path and rate of the PCE is the

same under RCF Project operation as it is under No Project conditions. In both cases the particles from each plume were shown to be pumped from the barrier wells.

MT3DMS is a solute transport model used to simulate groundwater quality for PCE, TCE, perchlorate, TDS and nitrate. The transport model confirms the conclusions of the particle-tracking analysis regarding effectiveness of the Newmark and Muscoy barriers. In addition, it is capable of detecting differences in the rate at which clean-up occurs and determines the extent of lateral movement of the plume.

Plume boundaries for the Newmark and Muscoy plumes are shown on **Figures 4.7-1** and **4.7-2** using the MCL of 5 µg/l. The analysis shows that the MCL plume boundary did not move past the barrier wells under the No Project condition or the operating scenario for the RCF Project. This confirms the conclusions reached through the particle-tracking analysis.

Due to the increased groundwater gradient resulting from 2005 Project Alignment Alternative recharge and extraction, the rate of subsurface flow is increased and the Newmark and Muscoy plumes are cleaned up more quickly under RCF Project conditions than under No Project conditions.

Lastly, the transport model analysis shows the area or footprint of the contaminated area and the extent to which the plume may migrate laterally as a result of 2005 RCF Project operations. The footprint of the Newmark and Muscoy plumes was smaller at the end of the forecast period for the RCF Project operation than for the No Project condition. The average area of the plume over the 39 year forecast period was 1941 acres under No Project conditions and 1,925 acres under RCF Project operations.

The transport model results indicate that operation of 2005 RCF Project could result in a small lateral movement of the Newmark and Muscoy plumes which is different than for the No Project condition. The model predicts that such differences in movement would cause five additional wells for a brief period of time to degrade to values greater than 5 µg/l of PCE, and 7 additional wells to improve in quality to less than 5 µg/l (see Appendix F of the 2005 PEIR, Table 5).

Figures 17(a) through 17(e), Appendix F of the 2005 PEIR, show the model-predicted PCE concentrations through time for the five wells that degrade (see Figure 18 for well locations). For example, Figure 17(a) shows that the PCE concentration at Well 1N/4W-16E01 would increase from 4.9 µg/l to 5.5 µg/l (slightly above the 5 µg/l MCL) in 2006 (hydrologic year 1967) and from 4.7 µg/l to 5.1 µg/l in 2008 (hydrologic year 1969) due to Project implementation. Seven wells that would be contaminated under No Project Condition would avoid contamination due to Project implementation.

The addition of water to the Basin Area through spreading and/or injection wells will not violate water quality standards or otherwise substantially degrade the water quality of the basin as a whole, as discussed in the first paragraph under this Threshold on page 4.7-10 and 4.7-23. No additional sources of contaminants such as TCE, PCE, DBCP and nitrates (NO_3) will be added by the RCF project. The imported water to be used for recharge comes from the State Water Project.

The indirect effect of the proposed replenishment and extraction of water to/from the Basin Area is its potential effect on existing groundwater pollution plumes. Water added to the Basin Area (recharge) and extracted from the Basin Area has the potential to move the polluted groundwater depending on timing and location of recharge or extraction. For example, the project could alter the direction of a pollution plume and cause contamination in an individual well that did not previously exist. If an existing well is used as an extraction point for the RCF project, contamination might occur sooner than it would have without the project, but over time, contamination would likely have occurred at any given existing well with or without the project.

Although project-related recharge and/or extraction may cause changes in the pollution plumes, it is not possible to predict where, when or to what extent those changes might occur due to the programmatic level of the project operations. Future unknowns such as natural recharge and extraction unrelated to this project would also have potential impacts on pollution plumes. The Draft 2005 PEIR determined that due to the lack of specific details concerning the amount and location of pumping and recharge activities associated with the project, it would be speculative at that time to try to predict how significant these activities may be for the water quality of the basin. Mitigation measures MM GWQ 1 and 2 were developed to monitor and evaluate future operations.

Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in MM GWQ 1, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR.

Since the location and number of new wells was not known, the direct potential siting impacts of specific new wells (e.g., soils, biological resources, cultural resources) was not addressed in the 2005 PEIR. The potential impacts that new well sites might have on the environment, including water quality through the movement of pollution plumes, will be addressed through normal well permitting procedures, implementation of mitigation measures, or subsequent CEQA compliance.

2005 Project Alignment Mitigation Measures

The following Mitigation Measures were adopted in the 2005 PEIR to reduce potentially significant impacts related to groundwater quality:

MM GWQ 1: Prepare operating strategies to be tested using the most current versions of the groundwater flow and groundwater quality model(s) available at the time. An operating plan consistent with any overall management plan adopted for the Basin Area shall be developed prior to commencing replenishment activities for the project that defines parameters of replenishment and extraction based on groundwater model(s) as evaluative tool(s).

MM GWQ 2: As described in **MM GWQ 1**, existing groundwater flow and groundwater quality model(s) shall be used to predict the effects of project operations pursuant to the operating plan developed as a requirement of **MM GWQ 1**. If the model(s) suggest that the replenishment and pumping regime of the proposed project operation would result in significant

impacts, the project operation shall be modified to reduce impacts or appropriate mitigation measures shall be developed as part of a subsequent CEQA compliance document (i.e. tiered negative declaration, EIR addendum, Supplemental EIR or Subsequent EIR). Typical mitigation measures that may be implemented to improve water quality may include but are not limited to:

- Appropriate Use. Contaminated water could be utilized for purposes that would allow or require lower water quality standards.
- Blend. Water that has poor quality can be blended and diluted until water quality standards are achieved.
- Move (Avoid). Choose another production area.
- Careful Management. Operate wells in a manner that will prevent or delay contamination. This may include installation of barrier wells or avoidance of strategies that would result in acceleration of the movement of contaminated water towards existing wells.
- Wellhead Treatment. Wellhead treatment can be utilized to bring water to acceptable water quality levels.

As stated above, subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in MM GWQ 1, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, MM GWQ 1 was accomplished and is no longer needed to mitigate potential impacts of the RCF realigned pipeline.

Additionally, WMWD has been participating in ongoing management efforts with the Basin Area Technical Advisory Committee (TAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. See page 4.6-33. The ongoing monitoring and adaptive management recommended by MM GWQ 2 is still necessary, but has been revised to include WMWD's involvement with the TAC. See pages 4.7-27 and 28 for the currently revised mitigation measure.

2005 Project Alignment Determination under CEQA

The 2005 PEIR prepared for the 2005 Project Alignment found that direct project-related environmental effects to groundwater quality will be **less than significant** due to the quality of the water being used for recharge being similar or better than the quality of the receiving water. No mitigation measures are required.

Indirect project-related environmental effects to groundwater quality through changes in the location and/or speed of migration of pollution plumes could not be addressed at that time due to the lack of specific operating information. Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in MM GWQ 1, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Future unknowns such as natural recharge and extraction unrelated to this project would also have potential impacts on pollution plumes. The 2005 PEIR determined that due to the lack of specific details concerning the amount and location

of pumping and recharge activities associated with the project, it would be speculative at that time to try to predict how significant these activities may be for the water quality of the basin. Although a specific conclusion as to the potentially significant indirect groundwater quality impacts associated with pollution plumes would be speculative at this time, future studies, plans and modeling shall conform to §15168(c) of the CEQA Guidelines which states, "Subsequent activities in the program must be examined in the light of the PEIR to determine whether an additional environmental document must be prepared." This may include, for example, sufficient hydrology studies, groundwater modeling or coordinated studies with other agencies with jurisdiction over regional groundwater and related surface resources, in order to evaluate and address all potentially significant direct, indirect and cumulative impacts of the proposed actions under CEQA. The ongoing monitoring and adaptive management recommended by MM GWQ 2 is necessary.

The above-listed mitigation measure shall be implemented as operating actions associated with this project.

4.7.3 Analysis of the Riverside-Corona Feeder Project Realignment Alternatives

Relation of the Realignment Alternatives to the 2005 Project Alignment

The impacts and findings discussed in the 2005 PEIR related to groundwater quality are applicable to both the 2005 Project Alignment and the Realignment Alternative, (Jackson Street or Monroe Street options) as appropriate. The proposed realignment project will substitute a new alignment for that portion of the 2005 Project Alignment identified as Reaches A, B, C, and D in the 2005 PEIR. The analysis of groundwater resources contained within the 2005 PEIR does not specifically address the proposed realignment. However, the analysis conducted in this section of the SEIR/EIS addresses changed conditions since the 2005 PEIR was completed; and evaluates an alternate well field location for the Riverside-Corona Feeder Project, that is included in the vicinity of the Central Feeder Connection component of the Realignment Alternative with Additional Connections (Preferred Alternative).

Thresholds of Significance

Western Municipal Water District has not established local CEQA significance thresholds as described in Section 15064.7 of the State CEQA Guidelines. However, Western Municipal Water District's "Environmental Checklist" for the subject project (see Appendix A of this document) indicates that impacts to groundwater quality may be considered potentially significant if the project would:

- violate any water quality standards or waste discharge requirements.
- otherwise substantially degrade water quality.

However for the purposes of the following analysis of potential groundwater quality impacts, these two thresholds have been combined into a single threshold more precisely related to the proposed project that states:

Impacts to groundwater quality may be considered significant if construction or operation of the proposed project would violate water quality standards or otherwise substantially degrade water quality in the Basin as a whole or for any individual pumper.

If a given well currently meets state drinking water standards then, for purposes of impacts to "individual pumpers," the appropriate threshold will be a well that experiences a change in groundwater quality, due to the project, and no longer meets drinking water standards. California's drinking water standard is 1,000 mg/L MCL for TDS, 10 mg/L MCL for Nitrate reported as Nitrogen, and 45 mg/L MCL for Nitrate measured as NO_3.

The Chino Basin was not previously connected directly to the proposed RCF alignment therefore, no thresholds specifically related to the Chino Basin in the 2005 PEIR. Potential adverse water quality impacts to any water allocated to the RCF from the Chino desalter have been evaluated in the *Optimum Basin Management Program, Chino Basin Dry-Year Yield Program Expansion, Project Development Report, Volume I* and the Peace II SEIR, see page 4.7-31.

Related Regulations

Santa Ana River Basin Plan

The Water Quality Control Plan for the Santa Ana Basin (SARWQCB Basin Plan) sets forth water quality objectives for constituents that could potentially cause an adverse effect or impact on the beneficial uses of water. Specifically, the Basin Plan is designed to accomplish the following:

- Designate beneficial uses for surface and groundwaters;
- Set the narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy;
- Describe implementation programs to protect the beneficial uses of all waters within the region; and
- Describe surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.

The Basin Plan incorporates by reference all applicable State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) plans and policies.

Beneficial uses are officially designated for all surface and groundwater resources to identify the various ways each particular surface water or groundwater sub-basin can be used for the benefit of people and/or wildlife. Examples include drinking, swimming, industrial, and agricultural

water supply, and the support of fresh and saline aquatic habitats. Four beneficial uses have been assigned to groundwater resources within the groundwater management zones within which the RCF Feeder project are located – municipal and domestic, agricultural, industrial, and industrial process supply (**Table 4.7-A**). Water quality objectives for the groundwater management zones within which the RCF Feeder project are located are shown in **Table 4.7-B**. Implementation of the RCF will add State Water Project Water to the Basin Area. The RWQCB Objectives range from 260mg/l to 330mg/L for the Basin Area (Bunker Hill - A, Bunker Hill - B and Lytle).

Table 4.7-A
RWQCB (Santa Ana Region) Beneficial Uses for the Groundwater Basins Within the Project Area

Water Body	Beneficial Uses
Upper Santa Ana River Basin Groundwater Management Zones	
Bunker Hill - A	MUN, AGR, IND, PROC
Bunker Hill - B	MUN, AGR, IND, PROC
Lytle	MUN, AGR, IND, PROC
Rialto	MUN, AGR, IND, PROC
Colton	MUN, AGR, IND, PROC
San Timoteo	MUN, AGR, IND, PROC
Yucaipa	MUN, AGR, IND, PROC
Chino – North "maximum benefit"	MUN, AGR, IND, PROC
Chino – North (Chino 1) "antidegradation"	MUN, AGR, IND, PROC
Chino – North (Chino 2) "antidegradation"	MUN, AGR, IND, PROC
Chino – North (Chino 3) "antidegradation"	MUN, AGR, IND, PROC
Chino – East	MUN, AGR, IND, PROC
Chino – South	MUN, AGR, IND, PROC
Middle Santa Ana River Basin Groundwater Management Zones	
Arlington	MUN, AGR, IND, PROC
Riverside – A	MUN, AGR, IND, PROC
Riverside – B	MUN, AGR, IND, PROC
Riverside – C	MUN, AGR, IND, PROC
Riverside – D	MUN, AGR, IND, PROC
Riverside – E	MUN, AGR, IND, PROC
Riverside – F	MUN, AGR, IND, PROC
Temescal	MUN, AGR, IND, PROC
Definitions	
MUN	Waters used for community, military, municipal or individual water supply systems. Uses may also include drinking water supply.
AGR	Waters are used for farming, horticulture or ranching. Uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.
IND	Waters for industrial service supply. These uses do not depend primarily upon water quality, and may include mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.
PROC	Waters for industrial process supply. Uses are for industrial activities that are dependent upon water quality. Uses may include process water supply and all uses of water related to product manufacture or food preparation.

Source: SARWQCB Basin Plan, Table 3-1

Table 4.7-B
RWQCB (Santa Ana Region) Water Quality Objectives

	Water Quality Objectives (milligrams/liter)					
	TDS	**Hard**	**Na**	**Cl**	**NO_3-N**	**SO_4**
Upper Santa Ana River Basin Groundwater Management Zones						
Bunker Hill - A	310	-	-	-	2.7	-
Bunker Hill - B	330	-	-	-	7.3	
Lytle	260	-	-	-	1.5	-
Rialto	230	-	-	-	2.0	-
Colton	410	-	-	-	2.7	-
San Timoteo "maximum benefit"	400	-	-	-	5.0	-
San Timoteo "antidegradation"	300	-	-	-	2.7	-
Yucaipa "maximum benefit"	370	-	-	-	5.0	-
Yucaipa "antidegradation"	320	-	-	-	4.2	-
Chino – North "maximum benefit"	420	-	-	-	5.0	-
Chino – North (Chino 1) "antidegradation"	280	-	-	-	5.0	-
Chino – North (Chino 2) "antidegradation"	250	-	-	-	2.9	-
Chino – North (Chino 3) "antidegradation"	260	-	-	-	3.5	-
Chino – East	730	-	-	-	10.0	-
Chino – South	680	-	-	-	4.2	-
Middle Santa Ana River Basin Groundwater Management Zones						
Arlington	980	-	-	-	10.0	-
Riverside – A	560	-	-	-	6.2	-
Riverside – B	290	-	-	-	7.6	-
Riverside – C	680	-	-	-	8.3	-
Riverside – D	810	-	-	-	10.0	-
Riverside – E	720	-	-	-	10.0	-
Riverside – F	660	-	-	-	9.5	-
Temescal	770	-	-	-	10.0	-

Source: SARWQCB Basin Plan, Table 4-1

Drinking Water Standards

Plans and specifications for the proposed water facilities are subject to review and approval by the California Department of Public Health, Division of Drinking Water and Environmental Management to insure that potable water distributed by the project will meet or exceed drinking water quality standards. Development of new wells within San Bernardino County will require a permit from the County of San Bernardino Department of Public Health, Division of Environmental Health Services. Well development design features required by the County Division of Environmental Health Services ensure that development of the wells will not increase the probability of aquifer contamination.

Design Considerations/Avoidance

As a part of the proposed project, WMWD shall cooperate and coordinate with other water agencies that replenish and extract water in the Basin Area so as not to interfere with other programs being implemented to manage and protect groundwater in the Basin Area, and, when possible, to assist in such programs. The well field in the vicinity of the Central Feeder Connection was added to the project in part to alleviate concerns raised by other water agencies using the Basin Area. Multiple possible extraction and replenishment locations allow for optimal operating scenarios to assure that recharge and extraction operations maintain or improve, to the extent possible, and do not exacerbate water level or water quality problems.

Potential Significant Impacts/Environmental Consequences

Threshold: *Impacts to groundwater quality may be considered significant if construction or operation of the proposed project would violate water quality standards or otherwise substantially degrade water quality in the Basin as a whole or for any individual pumper. "Substantially degrade" for any individual pumper means that the project causes drinking water standards violations so more than: 1,000 mg/L MCL for TDS, 10 mg/L MCL for Nitrate reported as Nitrogen, and 45 mg/L MCL for Nitrate measured as NO_3.*

There are two groundwater basins to which this Threshold applies: the San Bernardino Groundwater Basin (Basin Area) and the Chino Groundwater Basin (Chino Basin). For ease of the reader, they are analyzed under separate headings, below. The Chino Basin discussion begins on page 4.7-30.

Operational Effects - San Bernardino Groundwater Basin

Basin-wide Effects

Project operations that could affect groundwater include spreading SWP water for recharge and extracting stored water when needed. Recharge would occur at one or more existing spreading basin. Extraction would occur from one of up to 20 new and/or existing wells. The 2005 PEIR analysis assumed all wells would be located in the vicinity of the AHHG. The current RCF Realignment Preferred Alternative (proposed Project) includes five new wells to be located within the Redlands-Crafton plume at the eastern end of the proposed Riverside-Corona Feeder Pipeline. The maximum capacity for each well is estimated to be 3,000 acre-ft/yr (total of 15,000 acre-ft/yr) based on local geohydrologic conditions.

Modeling Background and Existing Conditions

In order to provide an updated assessment of potential groundwater quality impacts due to the RCF project, current groundwater quality readings and further hydrologic analyses were completed by Geoscience Support Services, Inc. (Appendix F) that project groundwater quality based on current conditions regarding the availability and reliability of imported water and natural hydrological conditions.

Two modeling evaluations were prepared. The updated hydrologic analysis (2009 Geoscience) used the MODFLOW groundwater flow model of the San Bernardino Basin Area (Basin Area) Refined Basin Flow Model to evaluate water level changes for various project alternatives, all assuming the Central Feeder Connection well field location. MODPATH particle tracking was utilized to evaluate potential impacts of the proposed project on remediation (i.e., cleanup) efforts by evaluating groundwater flow paths seepage velocities and travel times. The Refined Basin Solute Transport Model was used to simulate the groundwater quality for PCE (Newmark and Muscoy plumes), TCE (Norton and Redlands-Crafton plumes), and perchlorate in the Basin Area.

Additional groundwater modeling was performed by Geoscience in 2010 to address concerns regarding the potential impact of the RCF on the total dissolve solids (TDS) and nitrate-nitrogen concentrations in the Basin Area (2010a Geoscience).

A total of four predictive model runs was made using the Refined Basin Flow Model and Refined Basin Solute Transport Model to assess the potential impacts of the RCF on groundwater levels and water quality. These model runs are:

- Baseline Run (No Project)
- RCF Scenario 1 (Less Stressful Conditions)
- RCF Scenario 2 (Most Likely Conditions)
- RCF Scenario 3 (Most Stressful Conditions)

The RCF Scenarios includes two "bookend" scenarios (Scenarios 1 and 3) and one "most likely" scenario (Scenario 2). "Bookend" conditions are generally described as conditions that result from extraction and replenishment schedules that are likely to cause the most environmentally stressful conditions (Scenario 3) and conditions that are the least stressful (Scenario 1) than those encountered under the "most likely" scenario. Results from the Scenarios were compared to the Baseline Run. (No Project).

The "Baseline Run" for purposes of modeling is not considered the "existing condition baseline" per CEQA. The existing condition is different for every contaminant at every location throughout the Basin Area. **Table 4.7-B1** includes actual 2006 TDS and Nitrate levels for imported SWP water with additional 2008 data following the table. **Table 4.7-C** includes the RWQCB Water Quality TDS and Nitrate concentrations goals for the Bunker Hill and Lytle Management Zones of the Basin Area. This existing condition compared to the quality of the imported water to be spread via the Project is used to evaluate the overall basin-wide project impact. **Table 4.7-D and 4.7-E** include existing TDS and Nitrate levels at specific wells.

Table 4.7-C also compares the Regional Water Quality Control Board (RWQCB) goals and the projected RCF modeling Scenario results.

The "existing condition" of Basin Area operations is per the Western Judgment (see page 4.6-25) and other agreements between the parties and therefore, the existing condition is dynamic. The project will be in accordance with the Western Judgment which provides that extractions may be made in addition to those determined by the Judgment, pursuant to agreement between SBVMWD and WMWD. The Judgment further provides that nothing therein shall preclude

SBVMWD, WMWD or any other party from exercising such rights as they may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of underground storage capacity of the Basin Area shall not interfere with any replenishment program of the Basin Area. Thus, modeling the future "existing condition" based on the Judgment and other current agreements (Baseline Run) is an appropriate evaluative tool for a dynamic system.

The potential impact of the RCF project upon groundwater levels is discussed in Section 4.6 (Groundwater Levels) of this SEIR/EIS.

Basin-wide TDS and Nitrate Analysis

As per the analysis methodology used in the 2005 PEIR, impacts to basin-wide water quality will be less than significant if the quality of the water being imported and spread into the basin is of equal or better quality than the existing water quality of the Basin Area. The imported water to be used for recharge comes from the State Water Project (SWP). TDS levels are a good indicator of the mineralized character and overall quality of groundwater. TDS levels at the Devil's Canyon Afterbay, where State Water Project water would most likely be delivered, ranged between 110 and 299 mg/L between January and December 2006, and averaged 181 mg/L during that 12-month period, as shown in **Table 4.7-B1**, below. Ambient TDS levels in 2006 throughout the Basin Area range from 230 mg/L in the Lytle Management Zone to 330 mg/L in the Bunker Hill – A Management Zone. (2008 Wildermuth).

Table 4.7-B1
2006 State Water Project Water Quality Data

Month	TDS	Nitrates
Jan	299	0.87
Feb	219	0.78
Mar		0.79
Apr	157	0.54
May	139	0.40
Jun	110	0.25
Jun	162	0.42
Aug	172	0.30
Sep		0.33
Oct	169	0.43
Nov	171	0.58
Dec	208	0.78
Average	181	0.54

Source: DWR SWP Operations Data, 2006

More current sampling data for TDS indicates that concentrations ranged between 225 and 325 milligrams per liter (mg/L) during the 12-month period between October 2008 and September 2009 (DWR). Overall, State Water Project at the Devil Canyon Afterbay averages 250 mg/l. (MWD Regional UWMP, p. IV-3). Therefore, the SWP recharge water to be used for this project is generally of an equal or better quality than that of the receiving groundwater in the Basin Area resulting in, through dilution, groundwater within the Basin Area of generally equal or higher quality than presently exists.

In addition, the RWQCB Water Quality Objectives for TDS are 310 mg/L for Bunker Hill-A, 330 mg/L for Bunker Hill-B, and 260 mg/L for Lytle Management Zones, see **Table 4.7-C.** Both the current ambient TDS levels and the SWP imported water averages are below the RWQCB objectives, therefore basin-wide water quality impacts based on TDS levels are less than significant for the RCF Realignment Project.

Nitrate levels are also a concern from a basin-wide perspective. Nitrate levels at the Devil's Canyon Afterbay, where State Water Project water would most likely be delivered, ranged between 0.25 and 0.87 mg/L between January and December 2006, and averaged 0.54 mg/L during that 12-month period, as shown in **Table 4.7-B1**, above. Current ambient Nitrate-Nitrogen levels throughout the Basin Area range from 2.7 mg/L in the Lytle Management Zone to 5.4 mg/L in the Bunker Hill – B Management Zone. (2008 Wildermuth). Therefore, the SWP recharge water to be used for this project is much better quality with respect to nitrates than that of the receiving groundwater in the Basin Area resulting in, through dilution, groundwater within the Basin Area of generally equal or higher quality than presently exists.

The RWQCB Water Quality Objectives for nitrates (NO_3) are 2.7 mg/L for Bunker Hill-A, 7.3 mg/L for Bunker Hill-B, and 1.5 mg/L for Lytle Management Zones, see **Table 4.7-C.** The current water quality does not meet these objectives in all locations, but the imported water which will be recharged through the RCF Realignment Project is well below the RWQCB objectives, therefore basin-wide water quality impacts based on nitrate levels are less than significant for the RCF Realignment Project.

To further evaluate the proposed Project's potential to change groundwater quality basin-side, Geoscience prepared a report in 2010 using the Refined Basin Solute Transport Model (RBSTM) to evaluate water quality changes for a Baseline Run (No Project) and RCF conjunctive use scenarios (Baseline Run (No Project) and RCF Scenarios 1 through 3).

It should be noted that, the RBSTM is a useful tool for evaluating water levels and water quality of the aquifer systems. However, it is a simplified approximation of a complex hydrogeologic system. The accuracy of model predictions is dependent on the assumptions used for the model prediction. More conservative mass loading assumptions were used for modeling of the TDS and nitrate-nitrogen, including:

- Local runoff generated from precipitation from urban areas may have an increase in TDS of 250 mg/L,
- Salt concentration due to evaporation should be considered, and

- Return flows should have higher concentrations of TDS and nitrate-nitrogen than ambient concentrations due to salt concentration through evapotranspiration.

These conservative mass-loading assumptions may not represent actual conditions due to the fact that these mass loading assumptions have not been calibrated to historical conditions. The model simulations were not expected to predict the future TDS and nitrate-nitrogen concentrations with a high degree of accuracy. Rather, they were intended to allow relative comparisons between the Baseline Run (No Project) and RCF conjunctive use scenarios to simulate the relative change that Project operations could have on the Basin Area.

TDS concentrations in Year 2032 under Baseline Run (No Project) conditions are projected to be 463 milligrams per liter (mg/L), 346 mg/L and 274 mg/L for the Bunker Hill-A, Bunker Hill-B and Lytle Management Zones, respectively. The model predicted TDS concentration would be the same or decrease by 1 to 2 mg/L under the RCF Scenarios in the Bunker Hill-A, Bunker Hill-B, and Lytle Management Zones. The 2032 TDS concentrations for the Baseline Run and the RCF Scenarios are greater than the RWQCB Water Quality Objectives for Bunker Hill-A (310 mg/L), Bunker Hill-B (330 mg/L), and Lytle (260 mg/L) Management Zones, see **Table 4.7-C**, but as stated above, the RBSTM was not calibrated to reflect absolute values but rather to show that projected conditions would not worsen the basin-wide groundwater quality.

The RBSTM predicted nitrate-nitrogen concentrations in year 2032 under Baseline Run (No Project) conditions would be 4.9 mg/L, 5.2 mg/L and 2.8 mg/L for the Bunker Hill-A, Bunker Hill-B and Lytle Management Zones, respectively. The model predicted nitrate-nitrogen concentrations would increase by 0.1 mg/L under the RCF Scenario 1 (Less Stressful Condition) in the Bunker Hill-A Management Zone. The model predicted nitrate-nitrogen concentrations for all other RCF Scenarios and all three Management Zones would be the same or decrease by 0.1 mg/L compared to the Baseline Run The 2032 nitrate-nitrogen concentrations for the Baseline Run and the three RCF Scenarios are greater than the RWQCB Water Quality Objectives for Bunker Hill-A (2.7 mg/L) and Lytle (1.5 mg/L) Management Zones, see **Table 4.7-C,** but as stated above, the RBSTM was not calibrated to reflect absolute values but rather to show that projected conditions would not substantially worsen the basin-wide groundwater quality. The Bunker Hill-B Management Zone RWQCB objective concentration is 7.3 mg/L and none of the modeled scenarios exceed this.

Therefore, impacts to basin-wide water quality will be **less than significant** because the quality of the SWP water being imported and spread into the Basin Area is of equal or better quality than the existing ambient water quality of the Basin Area; RWQCB Water Quality Objectives are not exceeded as a result of the project, even though current conditions may exceed these objectives; and there is no significant adverse change that results from the Project operations based on modeled comparisons to a Baseline Run.

Table 4.7-C
Comparison of RWQCB (Santa Ana Region) Water Quality Objectives and Modeling Results for TDS and Nitrates/Nitrogen

Upper Santa Ana River Basin Groundwater Management Zones	Goal [mg/L TDS][1]	Ambient TDS [mg/L] 2006[3]	Baseline (No Project) [mg/L TDS][2]	RCF Scenarios [mg/L TDS]/ Change[2]			Goal [mg/L NO_3-N][1]	Ambient NO_3-N [mg/L] 2006[3]	Baseline (No Project) [mg/mL NO_3-N][2]	RCF Scenarios [mg/mL NO_3-N]/Change[2]		
				1	2	3				1	2	3
Bunker Hill - A	310	330	463	463/0	461/-2	462/-1	2.7	4.0	4.9	5.0/+0.1	4.9/0	4.9/0
Bunker Hill - B	330	280	346	346/0	345/-1	346/0	7.3	5.4	5.2	5.2/0	5.2/0	5.1/-0.1
Lytle	260	230	274	274/0	274/0	274/0	1.5	2.7	2.8	2.8/0	2.8/0	2.8/0

[1]Source: SARWQCB Basin Plan, Table 4-1
[2]Source: 2010a Geoscience, Tables, pages 16 and 17
[3] 2008 Wildermuth

PCE, TCE and Perchlorate Analysis

In addition to the overall Basin Area groundwater quality discussed above related to TDS and nitrate-nitrogen levels, the Basin Area groundwater resource has been contaminated by former industrial and military uses. The project would have a significant impact on basin-wide water quality if these existing contamination plumes were enlarged or caused to contaminate areas down gradient of the interceptor wells that have been installed to contain them.

Results for the PCE transport model show no change in the Newmark and Muscoy PCE Plume areas for all of the RCF Scenarios as compared to the plume area under Baseline Run (No Project) conditions. By the end of the predictive run (2032), the overall initial area of the PCE plume (approximately 1,910 acres) is reduced to approximately 670 acres for all of the RCF Scenarios.(2009 Geoscience, Figure 36 through 39)

Likewise, the results for the TCE transport model show no change in the Norton and Redland-Crafton TCE plumes areas for all the RCF Scenarios as compared to plume area under Baseline Run (No Project) conditions. By the end of the predictive run (2032), the overall initial area of the TCE plume (approximately 2,030 acres) is reduced to approximately 260 acres for all of the RCF Scenarios. (2009 Geoscience, Figures 40 through 43)

The modeling results show that the perchlorate plume dissipates slightly faster for RCF Scenarios as compared to the Baseline Run (No Project) as a result of increased extraction from the proposed RCF well field. Under Baseline Run (No Project) conditions, the overall initial area of the perchlorate plume (approximately 7,820 acres) is reduced to approximately 480 acres by the end of the predictive run (2032). By the end of the predictive run (2032), the perchlorate plume area would be 470 acres, 460 acres, and 450 acres for the RCF Scenarios 1 through 3, respectively. (2009 Geoscience, Figures 44 through 47)

The purpose of the MODPATH model was to evaluate potential impacts of the production from the RCF conjunctive use scenarios on remediation (i.e., cleanup) efforts in the Newmark and Muscoy plumes by evaluating directions of groundwater flow paths and travel times.

As discussed in more detail in the 2009 Geoscience report (Appendix F), the MODPATH modeling shows that particle recovery for the Newmark Plume is 91% to 92% for the RCF scenarios as compared to a particle recovery of 93% for the Baseline Run (No Project). The particle recovery for the Muscoy Plume is 97% for the all RCF scenarios and the Baseline Run. (No Project). The Newmark and Muscoy Operable Units Statement of Work specifies a minimum particle recovery of 85% for the Newmark Plume Front extraction well network and the Muscoy Plume Front extraction well network when these extraction wells are set equivalent to or above the design extraction rates. Results of the particle tracking from the Newmark and Muscoy Plumes show that the RCF Conjunctive Use project would not impact the contamination plumes.

Whereas the 2005 PEIR, applicable to the 2005 Project Alignment Alternative and the Realignment Alternative (Jackson Street or Monroe Street options), found that the transport model results indicate that operation of RCF Project could result in a small lateral movement of the Newmark and Muscoy plumes which is different than for the No Project condition; the results of both the 2009 and 2010 hydrologic modeling, applicable to the Realignment Alternative with Additional Connections, show that the RCF conjunctive scenarios, will not adversely impact the contamination plumes within the Basin Area due to the option to extract from the new well field proposed adjacent to the Central Feeder Connection. Newmark and Muscoy PCE Plume, Norton and Redland-Crafton TCE plumes, and the perchlorate plume are all reduced in size as a result of the RCF Scenarios compared to the Baseline Run (No Project). Therefore, potential basin-wide impacts associated with the exiting contamination plumes are **less than significant**.

Underflow Outflow Analysis

Groundwater underflow flows from the San Bernardino Basin Area to other adjacent groundwater basins. This is a natural occurrence which could result in one basin affecting another. Groundwater underflow flows from the Bunker Hill Management Zone across the San Jacinto Fault near the Santa River to the Colton Management Zone. Similarly, groundwater underflow also flows from the Lytle Management Zone across the Barrier E to the Rialto Management Zone.

Also, as described above, the RBSTM is a useful tool for evaluating water levels and water quality of the aquifer systems however, it is a simplified approximation of a complex hydrogeologic system. The accuracy of model predictions is dependent on the assumptions used for the model prediction. More conservative mass loading assumptions were used for modeling of the TDS and nitrate-nitrogen were used and the RBSTM was not calibrated to reflect absolute values but rather to show whether the Project substantially adversely changed the water quality situation of the Basin Area thereby worsening the basin-wide groundwater quality. (2010a Geoscience)

The predicted average TDS concentration of underflow outflow across the San Jacinto Fault near the SAR to the Colton Management Zone during the 26 year predictive period would be 319 mg/L to 698 mg/L with an average of 520 mg/L under Baseline Run (No Project) conditions. The total mass of the underflow outflow would be 12,398 tons. The predicted TDS concentrations of the underflow for the RCF Scenarios would be approximately the same with an average ranging from 519 mg/L to 522 mg/L. The total mass of the underflow would be slightly less for the RCF Scenarios ranging from 12,106 tons to 12,317 tons. The RWQCB Objective for TDS levels in the Colton Management Zone is 410 mg/L. The current ambient TDS concentration in the Colton Management Zone is 450 mg/L. Thus, the existing conditions exceed the Objective for the Colton Basin. The modeling shows that with the RCF Scenarios, there is would be approximately the same concentration of TDS as the Baseline Run (No Project) with an overall reduction in the mass of the underflow outflow.

The predicted average TDS concentration of underflow outflow from the Lytle Management Zone across Barrier E to the Rialto Management Zone during the 26 year predictive period would be 186 mg/L to 222 mg/L with an average of 201 mg/L under Baseline Run (No Project) conditions. The total mass of the underflow outflow would be 14,066 tons. The predicted TDS concentrations and total mass of the underflow for RCF Scenarios would be the same as compared to the Baseline Run. (No Project). The RWQCB Objective for TDS levels in the Rialto Management Zone is 230 mg/L. The current ambient TDS concentration in the Rialto Management Zone is 230 mg/L. The project results in no changes to the Rialto Basin related to TDS levels.

The predicted average nitrate-nitrogen concentration of underflow outflow across the San Jacinto Fault near the SAR to the Colton Management Zone during the 26 year predictive period would be 5.0 mg/L to 9.7 mg/L with an average of 7.4 mg/L under Baseline Run (No Project) conditions. The total mass of the underflow outflow would be 177 tons. The predicted nitrate-nitrogen concentrations of the underflow for the RCF Scenarios would be the same. The total mass of the underflow would be slightly less for the RCF Scenarios ranging from 172 tons to 175 tons due to slightly less underflow outflow. The RWQCB Objective for nitrate-nitrogen levels in the Colton Management Zone is 2.7 mg/L. The current ambient nitrate-nitrogen concentration in the Colton Management Zone is 2.9 mg/L. Thus, the existing conditions exceed the Objective for the Colton Basin. The modeling shows that with the RCF Scenarios, there is would be the same concentration of nitrate-nitrogen as the Baseline Run (No Project) with an overall reduction in the mass of the underflow outflow.

The predicted average nitrate-nitrogen concentrations of underflow outflow from the Lytle Management Zone across Barrier E to the Rialto Management Zone during the 26 year predictive period would be 2.6 mg/L to 2.7 mg/L with an average of 2.7 mg/L under Baseline Run (No Project) conditions. The total mass of the underflow outflow would be 187 tons for nitrate-nitrogen during the 26 year period for the Baseline Run (No Project). The RWQCB Objective for nitrate-nitrogen levels in the Rialto Management Zone is 2.0 mg/L. The current ambient nitrate-nitrogen concentration in the Rialto Management Zone is 2.9 mg/L. Thus, the existing conditions exceed the Objective for the Rialto Management Zone. The predicted nitrate-nitrogen concentrations and total mass of the underflow for RCF Scenarios would be the same as compared to the Baseline Run (No Project).

For all the underflow outflows described above, the total mass of the underflow is substantially less based on the prolonged dry year modeling assumptions. (2010 Geoscience) Thus, potential impacts of underflow are **less than significant**.

Effects to Individual Pumpers

Operational impacts to groundwater quality may be considered significant if the proposed project would cause individual well(s) to violate drinking water standards of 1,000 mg/L MCL for TDS, 10 mg/L MCL for Nitrate reported as Nitrogen, and 45 mg/L MCL for Nitrate measured as NO_3.

The difference between the average TDS concentrations for the Baseline Run (No Project) with respect to the RCF Scenarios was calculated for 26 selected wells (including 25 index wells of the Seven Oaks Accord and the Backyard Well for the Valley District/Western/City of Riverside Agreement). The results of these calculations are shown in **Table 4.7-D**. For RCF Scenario 1, the changes in TDS concentration from the Baseline Run (No Project) range from a decline of 5 mg/L to a rise of 2 mg/L. TDS concentration changes range from a decline of 19 mg/L to a rise of 7 mg/L for RCF Scenario 2 as compared to the Baseline Run (No Project). For RCF Scenario 3, these changes range from a decline of 24 mg/L to a rise of 9 mg/L. In general, the wells with an increase in TDS concentration are located in the vicinity or downgradient of the proposed well field adjacent to the Central Feeder Connection (e.g., SBVMWD Backyard Well and City of Riverside Raub 1 Well). Wells with decreases in TDS concentrations are primarily located in the forebay recharge areas due to artificial recharge from the RCF. Neither the existing or modeled TDS levels (with or without the Project) at any well exceed the drinking water standard of 1,000 mg/L.

The difference between the average nitrate-nitrogen concentrations for the Baseline Run (No Project) with respect to the RCF Scenarios was calculated for the same 26 selected wells. The results of these calculations are shown in **Table 4.7-E**. For RCF Scenario 1, the changes in nitrate-nitrogen concentrations compared to the Baseline Run (No Project) range from a decline of 0.2 mg/L to a rise of 0.1 mg/L. Concentration changes range from a decline of 0.4 mg/L to a rise of 0.2 mg/L for RCF Scenario 2 as compared to the Baseline Run (No Project). For RCF Scenario 3, these changes range from a decline of 0.5 mg/L to a rise of 0.2 mg/L. The well with greatest increase in nitrate-nitrogen concentrations is the City of Riverside Raub 1 Well, which is located down gradient of the proposed RCF wellfield. Wells with decreases in nitrate-nitrogen concentrations are primarily located in the forebay recharge areas due to artificial recharge from the RCF. Neither the existing or modeled levels (with or without the Project) at any well exceed the drinking water standard of 10 mg/L MCL for Nitrate reported as Nitrogen.

Table 4.7-D
TDS Concentration at Wells 2007-2032

Well Name	Existing TDS Conditions in 2007	Average TDS Concentration 2007 to 2032				Difference in Average TDS Concentration between Baseline Run (No Project) and RCF Scenarios		
		Baseline Run (No Project) [mg/L]	RCF Scenario 1 [mg/L]	RCF Scenario 2 [mg/L]	RCF Scenario 3 [mg/L]	RCF Scenario 1 [mg/L]	RCF Scenario 2 [mg/L]	RCF Scenario 3 [mg/L]
SBVMWD San Bernardino Ave. Well	280	342	342	340	341	-1	-2	-1
City of San Bernardino Mt. Vernon Well	330	393	393	394	396	0	0	3
East Valley Water District Well 62	280	441	442	443	445	1	2	4
Fontana Union Well 13	230	190	190	190	190	0	0	0
Fontana Union Well 26	230	221	221	221	221	0	0	0
Fontana Union Well 27	230	203	203	203	203	0	0	0
East Valley Water District Well 120	280	239	239	240	240	0	0	1
City of San Bernardino Vincent Well	330	457	457	457	457	0	0	0
City of San Bernardino Devil Canyon Well No. 1	330	498	493	479	474	-5	-19	-24
City of San Bernardino Newmark 3 Well	330	387	386	382	380	-1	-4	-7
West Valley Water District Lord 7 Well	230	211	211	210	211	0	0	0
City of Riverside Raub 1 Well	280	382	384	388	391	2	7	9
City of Redlands Well 32	280	372	370	368	366	-2	-4	-5
City of Redlands Orange Street Well	280	279	280	280	283	1	1	4
East Valley Water District Well 24A	330	312	311	310	310	-1	-2	-2
City of San Bernardino Cajon Well No. 1	330	717	717	718	718	0	1	2
East Valley Water District Well 40	280	275	275	272	272	0	-3	-3
City of San Bernardino Devil Canyon Well No. 3	330	393	393	392	391	0	0	-1
City of San Bernardino Leroy Street Well	330	239	238	238	238	-1	-1	-1
City of Redlands Agate 2 Well	280	290	290	289	288	0	-1	-2
East Valley Water District Cone Camp Well	280	205	205	206	206	0	2	1
Bear Valley Mutual Water Company Nelson Street Well	280	293	293	293	293	0	-1	-1
Gage Canal Company Lower Kelly Well	280	428	428	429	430	0	0	2
City of Redlands Airport Well No. 2	280	286	287	287	288	0	1	1
East Valley Water District Well 146 A	280	296	295	295	296	0	0	1
SBVMWD Backyard Well	280	593	593	594	597	0	1	4

Source: 2010 Geoscience, Table 3, and 2008 Wildermuth.

Table 4.7-E
Nitrate-Nitrogen Concentration at Wells 2007-2032

Well Name	Existing Nitrate-Nitrogen Conditions 2007	Average Nitrate-Nitrogen Concentration 2007 to 2032				Difference in Average Nitrate-Nitrogen Concentration between Baseline Run (No Project) and RCF Scenarios		
		Baseline Run (No Project) [mg/L]	RCF Scenario 1 [mg/L]	RCF Scenario 2 [mg/L]	RCF Scenario 3 [mg/L]	RCF Scenario 1 [mg/L]	RCF Scenario 2 [mg/L]	RCF Scenario 3 [mg/L]
SBVMWD San Bernardino Ave. Well	5.4	5.7	5.6	5.5	5.4	-0.1	-0.3	-0.3
City of San Bernardino Mt. Vernon Well	4.0	4.4	4.4	4.4	4.4	0.0	0.0	0.0
East Valley Water District Well 62	5.4	6.1	6.1	6.2	6.2	0.0	0.1	0.1
Fontana Union Well 13	2.7	2.7	2.7	2.7	2.7	0.0	0.0	0.0
Fontana Union Well 26	2.7	2.7	2.7	2.7	2.7	0.0	0.0	0.0
Fontana Union Well 27	2.7	2.7	2.7	2.7	2.7	0.0	0.0	0.0
East Valley Water District Well 120	5.4	2.7	2.7	2.7	2.6	0.0	0.0	0.0
City of San Bernardino Vincent Well	4.0	1.6	1.6	1.6	1.6	0.0	0.0	0.0
City of San Bernardino Devil Canyon Well No. 1	4.0	4.7	4.6	4.4	4.3	-0.1	-0.3	-0.4
City of San Bernardino Newmark 3 Well	4.0	2.9	2.9	2.8	2.8	0.0	-0.1	-0.1
West Valley Water District Lord 7 Well	2.7	2.5	2.5	2.5	2.5	0.0	0.0	0.0
City of Riverside Raub 1 Well	5.4	6.8	6.8	6.9	6.9	0.0	0.2	0.2
City of Redlands Well 32	5.4	5.9	5.7	5.5	5.4	-0.2	-0.4	-0.5
City of Redlands Orange Street Well	5.4	3.7	3.7	3.7	3.7	0.0	0.0	0.0
East Valley Water District Well 24A	4.0	1.9	1.9	1.9	1.9	0.0	0.0	0.0
City of San Bernardino Cajon Well No. 1	4.0	7.8	7.8	7.8	7.8	0.0	0.0	0.0
East Valley Water District Well 40	5.4	4.0	4.0	.9	3.9	0.0	-0.1	-0.1
City of San Bernardino Devil Canyon Well No. 3	4.0	3.5	3.5	3.5	3.5	0.0	0.0	0.0
City of San Bernardino Leroy Street Well	4.0	2.2	2.3	2.3	2.3	0.1	0.1	0.1
City of Redlands Agate 2 Well	5.4	4.1	4.0	3.9	3.8	-0.1	-0.2	-0.3
East Valley Water District Cone Camp Well	5.4	1.4	1.4	1.4	1.4	0.0	0.0	0.0
Bear Valley Mutual Water Company Nelson Street Well	5.4	4.4	4.3	4.2	4.2	-0.1	-0.2	-0.3
Gage Canal Company Lower Kelly Well	5.4	7.8	7.8	7.8	7.8	0.0	0.0	0.0
City of Redlands Airport Well No. 2	5.4	4.0	3.9	3.8	3.7	-0.1	-0.2	-0.2
East Valley Water District Well 146 A	5.4	4.0	4.0	4.0	4.0	0.0	0.0	-0.1
SBVMWD Backyard Well	5.4			7.3	7.3	0.0	0.0	0.0

Source: 2010 Geoscience, Table 3 and 2008 Wildermuth.

San Bernardino Basin Area Conclusions and Recommendations

The 2005 PEIR found direct groundwater quality impacts that may result from the proposed importation of State Water Project water for replenishment less than significant due to the equal or better quality of the imported water than existing Basin Area water quality. No additional sources of contaminants such as TCE, PCE, DBCP and nitrates (NO_3) will be added by the project. The imported water to be used for recharge comes from the State Water Project. The quality of imported State Water Project water remains of equal or better quality than the existing Basin Area water quality and therefore, the potential direct groundwater quality impacts remain less than significant.

Both the modeling analysis prepared in 2005 under average to wetter year assumptions and historically higher SWP water availability for recharge, the 2009 modeling for the average rainfall conditions, and the Prolonged Dry-year modeling completed for the Realignment Project in 2010 indicate that project operations in the San Bernardino Basin Area can have less than significant impacts to groundwater quality, and as shown in **Table 4.7-C**, the implementation of the project has the potential to decrease the level of groundwater contaminants (TDS and NO_3-N specifically) over the No-Project baseline scenario.

Coordinated Basin Area management under current and future conditions is critical however, to assuring the water quality of the Basin Area is not adversely affected. IF the RCF were not operated in a coordinated fashion under the requirements of the Western Judgment, THEN impacts could be significant. Therefore, mitigation measures **MM GWQ 1** and **2** from the 2005 PEIR required that operating plans be prepared based on sound modeling and set the frequency with which operating plans must be prepared.

Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in **MM GWQ 1**, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, **MM GWQ 1** was accomplished and is no longer needed for the RCF realigned pipeline.

Additionally, WMWD has been participating in ongoing management efforts with the Basin Area Technical Advisory Committee (BTAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. The ongoing monitoring and adaptive management recommended by **MM GWQ 2** is still necessary, but the mitigation measure has been revised to include WMWD's involvement with the TAC. The currently revised mitigation measure below, **MM GWQ 2(Revised)**, will replace **MM GWQ 1** and **2** from the 2005 PEIR. Potential adverse impacts to groundwater levels in the San Bernardino Basin Area will be **less than significant with implementation of mitigation measure MM GWQ 2(Revised)**. Potential adverse impacts to groundwater quality overall in the Basin Area and at individual existing wells will be **less than significant with implementation of mitigation MM GWQ 2 (Revised)**.

As discussed in the 2005 PEIR, the precise location of individual new wells was not known. At this time, the precise location of individual new wells is still undetermined and therefore the direct potential site-specific impacts of new wells (e.g., biology or cultural impacts at a particular well site) is also not addressed in this SEIR. The potential impacts that new well sites might have on the environment will be addressed through normal well permitting procedures and subsequent CEQA compliance.

Operational Effects - Chino Groundwater Basin

The Chino Groundwater Basin (Chino Basin) Dry-Year Yield Program Expansion (DYYP Expansion) is a proposed conjunctive-use program developed by the Chino Basin Watermaster in association with Inland Empire Utilities Agency (IEUA), MWD, Three Valleys Municipal Water District (TVMWD), and WMWD. (DYYP Expansion, p. ES-1) WMWD's participation in the DYYP Expansion would provide a direct export connection to the Chino Basin. WMWD's primary role would be participation on the extraction, or "take" side, of the DYYP Expansion. WMWD's point of connection (Clay Street Connection) to the Chino Basin would be via the Jurupa Community Services District, a Chino Basin Appropriator and retail agency of WMWD. (DYYP Expansion, p. 3-11)

As part of the DYYP Expansion, groundwater modeling was conducted to evaluate the potential for material physical injury to the Chino Basin including an analysis of groundwater-level changes, increased potential for subsidence, losses from storage, change in direction and speed of known water quality anomalies, and the ability to maintain hydraulic control. The DYYP Expansion groundwater modeling showed the simulated location of the groundwater contaminant plumes in Chino Basin at the end of the planning period (2028) for the both the baseline and dry-year yield scenarios. All plume locations are virtually identical for both scenarios, indicating that the change in direction and speed of movement of these plumes caused by the dry-year yield program is not significant. (DYYP, p. 7-8) It was concluded that there is no material physical injury related to the redirection and transport of known groundwater contaminant plumes from the operation of the dry-year yield program. The model-projected change in direction and speed of movement of these plumes caused by the dry-year yield program is not significant. (DYYP, p. 7-10) The findings in the Peace II SEIR substantiate this finding that no significant impacts would result from the operating assumptions included in the evaluation which include the DYY Program.

> "After detailed evaluation of all hydrology/water quality issues in the DSEIR, it was concluded that all hydrology and water quality impacts can be controlled to a less than significant level. Detailed assumptions regarding future water management activities are included in this finding, for example pumping locations must be optimized, the future location of groundwater recharge must be optimized, additional imported water must be brought into the Basin over the next 20 years to offset cumulative unmet replenishment obligation (CURO), and hydraulic control of the Basin must be accomplished. Regardless, under these assumptions, all hydrology and water quality impacts can be offset or otherwise mitigated, and the hydrology and water quality impacts (including those identified under Utilities and Services Systems [section of the Peace II SEIR]) have

been found to be less than significant, on a project specific and cumulative basis." (SEIR 2010, pp. 1-8)

Pursuant to the DYYP Expansion, WMWD's would have access to a maximum of 5,000 AF/YR from the Chino Basin desalter. This amount would be consistent with the provisions of the Chino Basin Watermaster's Optimum Basin Management Program as evaluated in the Peace II Final SEIR. Pursuant to that analysis of the DYYP Expansion and Peace II SEIR, **no significant impacts related to groundwater quality within the Chino Basin** are anticipated as a result of implementation of the Riverside-Corona Feeder project.

Construction Effects

Construction activities can have an effect on surface and/or groundwater quality. The potential impacts to water quality resulting from Project construction activities are analyzed in Section 4.11, Stormwater/Water Quality. Additionally, dewatering activities which may be required of the Project at stream and river crossings, are analyzed in Section 4.3, Biological Resources and Section 4.11.

Realignment Alternatives Proposed Mitigation Measures/Minimization

An Environmental Impact Report is required to describe feasible mitigation measures which could minimize significant adverse impacts (CEQA Guidelines, Section 15126.4). Mitigation Measures were evaluated for their ability to eliminate or reduce the potential significant adverse impacts to groundwater quality to below the level of significance.

*Subsequent to the public review period for the Draft 2005 PEIR, the groundwater models necessary to evaluate potential operating strategies, as required in **MM GWQ 1**, were complete and became available for use. In response to comments received from other agencies regarding the Draft 2005 PEIR, WMWD ran the model prior to preparing and certifying the Final 2005 PEIR. Thus, **MM GWQ 1** was accomplished and is no longer needed for the RCF realigned pipeline.*

*Additionally, WMWD has been participating in ongoing management efforts with the Basin Area Technical Advisory Committee (BTAC) which will assure that this project is included and managed to avoid adverse impacts to water levels in the Basin Area. The ongoing monitoring and adaptive management recommended by **MM GWQ 2** is still necessary, but the mitigation measure has been revised to include WMWD's involvement with the TAC. The currently revised mitigation measure below, **MM GWQ 2(Revised)**, will replace **MM GWQ 1** and **2** from the 2005 PEIR*

~~**MM GWQ 1:** Prepare operating strategies to be tested using the most current versions of the groundwater flow and groundwater quality model(s) available at the time. An operating plan consistent with any overall management plan adopted for the Basin Area shall be developed prior to commencing replenishment activities for the project that defines parameters of replenishment and extraction based on groundwater model(s) as evaluative tool(s).~~

MM GWQ 2(Revised): To assure that ongoing management of the RCF is coordinated with management of the Basin Area as a whole, monitoring and adaptive management shall be employed. The RCF operations management plan will be developed and tested using the groundwater modeling employed by the Basin Area TAC (or its successor or assignee) on an annual basis.~~: As described in **MM GWQ 1**~~Existing groundwater flow and groundwater quality model(s) shall be used to predict the effects of project operations on groundwater quality. ~~pursuant to the operating plan developed as a requirement of **MM GWQ 1.**~~ If water quality testing at any indicator wells (which are already tested regularly) ~~the model(s)~~ suggest that the replenishment and pumping regime of the proposed project operation is causing drinking water quality in a given well to exceed state drinking water standards, production and/or spreading in the area(s) contributing to the contamination shall cease until a remedy is identified and adverse affects associated with the project no longer occur. Such remedies may include but not be limited to the following: ~~would result in significant impacts, the project operation shall be modified to reduce impacts to less than significant. Typical mitigation measures that may be implemented to improve water quality may include but are not limited to:~~

- Appropriate Use. Contaminated water could be utilized for purposes that would allow or require lower water quality standards.
- Blend. Water that has poor quality can be blended and diluted until water quality standards are achieved.
- Move (Avoid). Choose another production and/or spreading area.
- Careful Management. Operate wells in a manner that will prevent or delay contamination. This may include installation of barrier wells or avoidance of strategies that would result in acceleration of the movement of contaminated water towards existing wells.
- Wellhead Treatment. Wellhead treatment can be utilized to bring water to acceptable water quality levels.

Realignment Alternatives Determination of Significance under CEQA

As stated in the 2005 PEIR, impacts to groundwater quality would be less than significant after incorporating mitigation measures. In light of the updated groundwater modeling prepared as part of this SEIR/EIS (Appendix F), it can be concluded that the 2005 PEIR remains adequate to address potential impacts related to groundwater levels and the revised mitigation measure contained therein, as described above, will be applicable to the proposed project. With implementation of mitigation measures **MM GWQ 2(Revised),** impacts to groundwater quality will be **less than significant**.

4.7.4 No Project/Action Alternative

Due to the increased groundwater gradient resulting from 2005 Project Alignment Alternative recharge and extraction, the rate of subsurface flow is increased and the Newmark and Muscoy plumes are cleaned up more quickly under RCF Project conditions than under No Project conditions. The footprint of the Newmark and Muscoy plumes was smaller at the end of the forecast period for the RCF Project operation than for the No Project condition. Seven wells that would be contaminated under No Project Condition would avoid contamination due to Project

implementation. As there would be no recharge or extraction associated with the No Project/Action Alternative, there would be no direct adverse effects that would result to groundwater quality from this alternative however, the potential benefits of cleaning up the overall groundwater quality of the Basin Area faster as a result of the project would not be realized.