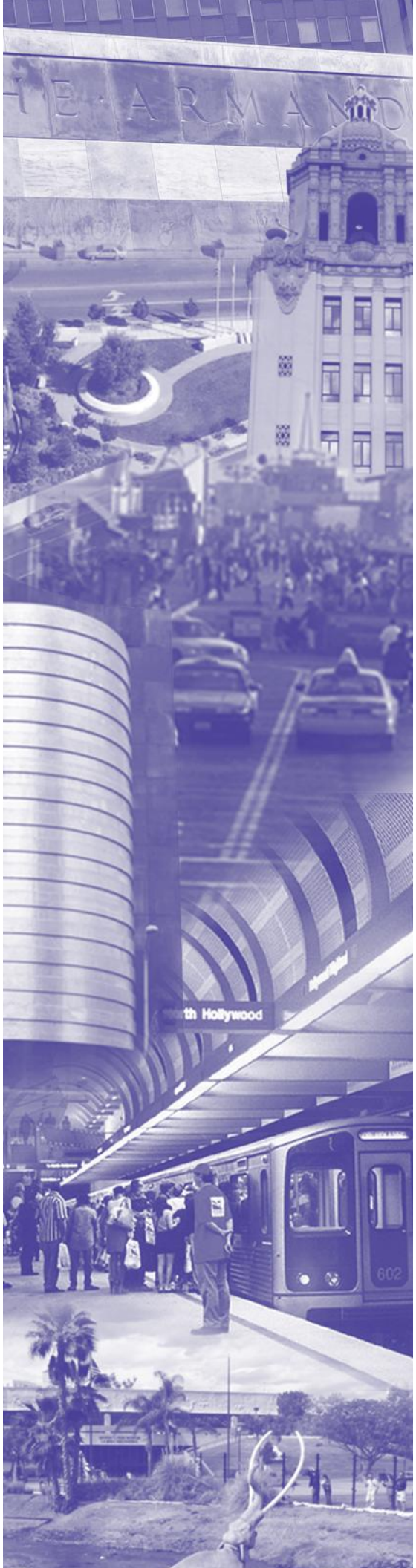

WESTSIDE SUBWAY EXTENSION

Hydrology and Water Quality Technical Report

Metro

August 2010

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Acronyms and Abbreviations

AA	Alternatives Analysis
ADA	Americans with Disabilities Act (42 USC 126)
AGR	Agricultural supply beneficial use water quality designation
APM	automated people mover
AQUA	Aquaculture beneficial use water quality designation
BFE	Base flood elevation
BMP	Best management practices
BRS	blast relief shafts
BRT	bus rapid transit
CCC	California Coastal Commission
CCTV	closed-circuit television
CDFG	California Department of Fish and Game
CDP	Coastal Development Permit
CEQA	California Environmental Quality Act
CFR	United States Code of Federal Regulations
CSOP	control standard operating procedure
CWA	Clean Water Act
CWC	California Water Code
CZMA	Coastal Zone Management Act
EIR	environmental impact report
EIS	environmental impact statement
ESA	Endangered Species Act
Expo I	Exposition Boulevard Light Rail Phase I
Expo II	Exposition Boulevard Light Rail Phase II
FAI	fresh air intakes
FEMA	Federal Emergency Management Agency
FIRM	Flood insurance rate map
FIS	Flood insurance study
FTA	Federal Transportation Authority
GLAVA	Greater Los Angeles Veterans Administration
HOV	high-occupancy vehicle
HRT	heavy rail transit
HRV	heavy rail vehicles
I-10	Interstate 10 Freeway
I-405	Interstate 405 Freeway
IND	Industrial service supply beneficial use water quality designation
LACDPW	Los Angeles County Department of Public Works
LADOT	Los Angeles Department of Transportation

LADWP	Los Angeles Department of Water and Power
LARWQCB	Los Angeles Regional Water Quality Control Board
LAWA	Los Angeles World Airports
LAX	Los Angeles Airport
LPA	Locally Preferred Alternative
LRT	light rail transit
LRTP	Long Range Transportation Plan
MDP	Master Drainage Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MOS	Minimum Operable Segment
mph	miles per hour
MS4	Municipal Separate Storm Sewer System
MUN	Municipal and domestic supply beneficial use water quality designation
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NOAA/FS	National Oceanic and Atmospheric Administration/Fisheries Service
NOI	Notice of intent
NPDES	National Pollutant Discharge Elimination System
OTE	over track exhaust
PCE	perchloroethylene
PROC	Industrial process supply beneficial use water quality designation
PTEL	passenger assistance telephones
REC-1	Contact Water Recreation
REC-2	Non-Contact Water Recreation
RHA	Rivers and Harbors Appropriation Act of 1899
ROC	Rail Operations Center
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SOP	standard operating procedure
SQMP	Stormwater quality management program
SR 90	State Route 90
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCE	Trichloroethylene
TMDL	Total Maximum Daily Load
TPIS	transit passenger information system

TPSS	traction power substation
TSM	Transportation System Management
TVM	ticket vending machines
UCLA	University of California—Los Angeles
ULARA	Upper Los Angeles River Area groundwater basin
UPE	under platform exhaust
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban water management plan
VA	Veterans Affairs
VOCs	volatile organic compounds
WDR	Waste Discharge Requirement
WILD	Wildlife Habitat
WLA	Waste Load Allocation
WMA	Watershed management area
WQBEL	Water Quality Based Effluent Limit
WRD	Water Replenishment District

1.0 INTRODUCTION

Surface water and groundwater quality can be potentially affected by construction activities such as grading and excavation, which can lead to increased erosion and sedimentation. Construction staging areas can also generate increased storm water runoff which, if not properly mitigated, can lead to increases in erosion. Improper storage and management of construction materials such as stockpiles or liquids like paints and wastes can also be washed off during storm events or contribute to non-stormwater discharges. Construction wastes such as concrete washouts, can potentially cause non-stormwater discharges.

Additionally, construction projects that result in increases in impervious surface area can lead to larger quantities and velocities of storm water runoff, which in turn can result in detrimental impacts to water quality as well as drainage infrastructure. When analyzing potential project impacts, it is also necessary to consider impacts to downstream receiving waters, flood plains, and flood control facilities in relation to the construction of publicly used structures in floodplain areas.

This report analyzes all of these potential construction and operations-related impacts to water resources and hydrology in the Westside Subway Extension project area. Impacts are addressed for each of the five alternatives, minimum operable segments (MOSs) as well as the stations and segment options and operations and maintenance facilities Mitigation measures for any significant impacts are proposed.

2.0 PROJECT DESCRIPTION

This chapter describes the alternatives that have been considered to best satisfy the Purpose and Need and have been carried forward for further study in the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). Details of the No Build, Transportation Systems Management (TSM), and the five Build Alternatives (including their station and alignment options and phasing options (or minimum operable segments [MOS]) are presented in this chapter.

2.1 No Build Alternative

The No Build Alternative provides a comparison of what future conditions would be like if the Project were not built. The No Build Alternative includes all existing highway and transit services and facilities, and the committed highway and transit projects in the Metro LRTP and the SCAG RTP. Under the No Build Alternative, no new transportation infrastructure would be built within the Study Area, aside from projects currently under construction or projects funded for construction, environmentally cleared, planned to be in operation by 2035, and identified in the adopted Metro LRTP.

2.2 TSM Alternative

The TSM Alternative emphasizes more frequent bus service than the No Build Alternative to reduce delay and enhance mobility. The TSM Alternative contains all elements of the highway, transit, Metro Rail, and bus service described under the No Build Alternative. In addition, the TSM Alternative increases the frequency of service for Metro Bus Line 720 (Santa Monica–Commerce via Wilshire Boulevard and Whittier Boulevard) to between three and four minutes during the peak period.

In the TSM Alternative, Metro Purple Line rail service to the Wilshire/Western Station would operate in each direction at 10-minute headways during peak and off-peak periods. The Metro Red Line service to Hollywood/Highland Station would operate in each direction at five-minute headways during peak periods and at 10-minute headways during midday and off-peak periods.

2.3 Build Alternatives

The Build Alternatives are considered to be the "base" alternatives with "base" stations. Alignment (or segment) and station options were developed in response to public comment, design refinement, and to avoid and minimize impacts to the environment.

The Build Alternatives extend heavy rail transit (HRT) service in subway from the existing Metro Purple Line Wilshire/Western Station. HRT systems provide high speed (maximum of 70 mph), high capacity (high passenger-carrying capacity of up to 1,000 passengers per train and multiple unit trains with up to six cars per train), and reliable service since they operate in an exclusive grade-separated right-of-way. The subway will operate in a tunnel at least 30 to 70 feet below ground and will be electric powered.

Furthermore, the Build Alternatives include changes to the future bus services. Metro Bus Line 920 would be eliminated and a portion of Line 20 in the City of Santa Monica would be eliminated since it would be duplicated by the Santa Monica Blue Bus Line 2. Metro Rapid

Bus Line 720 would operate less frequently since its service route would be largely duplicated by the Westside Subway route. In the City of Los Angeles, headways (time between buses) for Line 720 are between 3 and 5 minutes under the existing network and will be between 5 and 11.5 minutes under the Build Alternatives, but no change in Line 720 would occur in the City of Santa Monica segment. Service frequencies on other Metro Rail lines and bus routes in the corridor would be the same as for the No Build Alternative.

2.3.1 Alternative 1—Westwood/UCLA Extension

This alternative extends the existing Metro Purple Line from the Wilshire/Western Station to a Westwood/UCLA Station (Figure 2-1). From the Wilshire/Western Station, Alternative 1 travels westerly beneath Wilshire Boulevard to the Wilshire/Rodeo Station and then southwesterly toward a Century City Station. Alternative 1 then extends from Century City and terminates at a Westwood/UCLA Station. The alignment is approximately 8.60 miles in length.

Alternative 1 would operate in each direction at 3.3-minute headways during morning and evening peak periods and at 10-minute headways during midday. The estimated one-way running time is 12 minutes 39 seconds from the Wilshire/Western Station.

2.3.2 Alternative 2—Westwood/Veterans Administration (VA) Hospital Extension

This alternative extends the existing Metro Purple Line from the Wilshire/Western Station to a Westwood/VA Hospital Station (Figure 2-2). Similar to Alternative 1, Alternative 2 extends the subway from the Wilshire/Western Station to a Westwood/UCLA Station. Alternative 2 then travels westerly under Veteran Avenue and continues west under the I-405 Freeway, terminating at a Westwood/VA Hospital Station. This alignment is 8.96 miles in length from the Wilshire/Western Station.

Alternative 2 would operate in each direction at 3.3-minute headways during the morning and evening peak periods and at 10-minute headways during the midday, off-peak period. The estimated one-way running time is 13 minutes 53 seconds from the Wilshire/Western Station.

2.3.3 Alternative 3—Santa Monica Extension

This alternative extends the existing Metro Purple Line from the Wilshire/Western Station to the Wilshire/4th Station in Santa Monica (Figure 2-3). Similar to Alternative 2, Alternative 3 extends the subway from the Wilshire/Western Station to a Westwood/VA Hospital Station. Alternative 3 then continues westerly under Wilshire Boulevard and terminates at the Wilshire/4th Street Station between 4th and 5th Streets in Santa Monica. The alignment is 12.38 miles.

Alternative 3 would operate in each direction at 3.3-minute headways during the morning and evening peak periods and operate with 10-minute headways during the midday, off-peak period. The estimated one-way running time is 19 minutes 27 seconds from the Wilshire/Western Station.

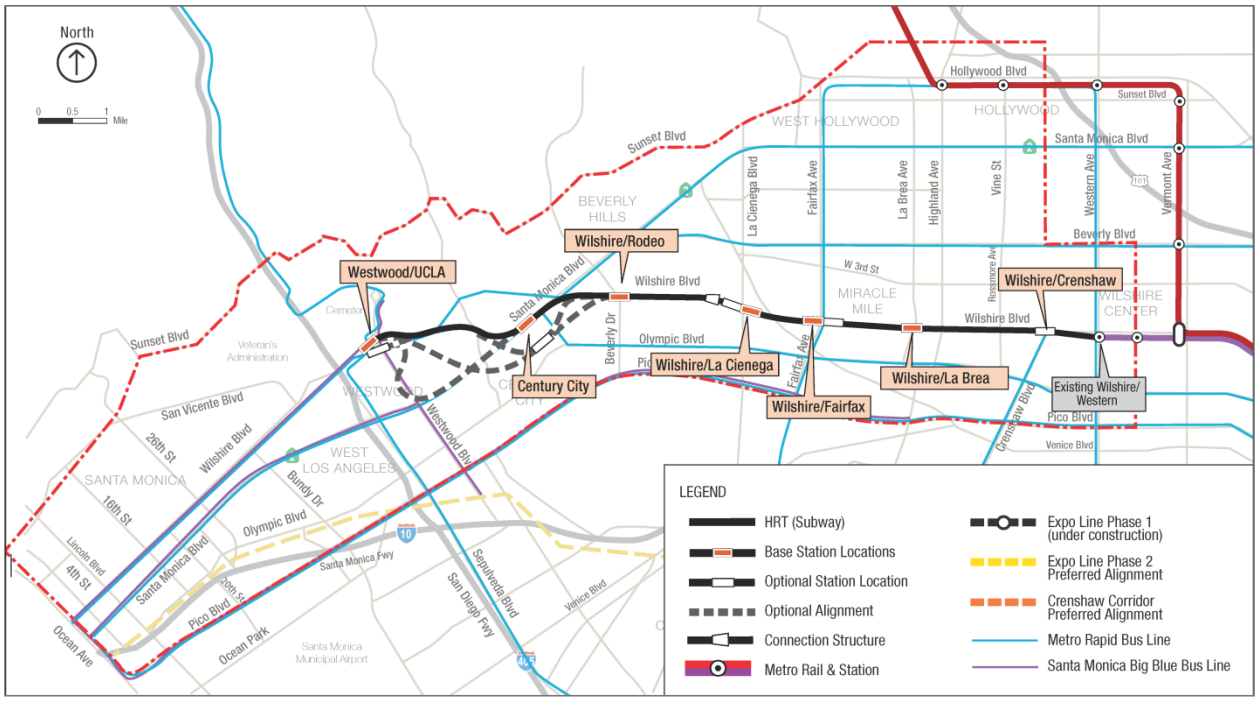


Figure 2-1. Alternative 1—Westwood/UCLA Extension

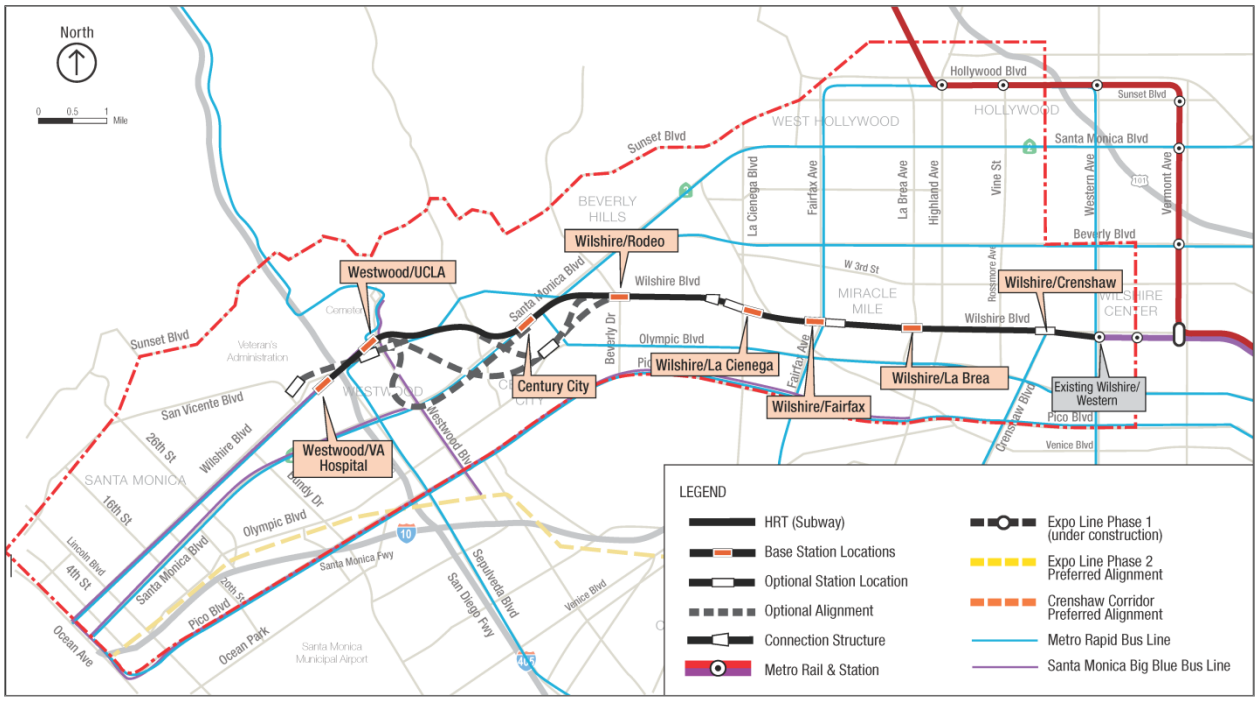


Figure 2-2. Alternative 2—Westwood/Veterans Administration (VA) Hospital Extension

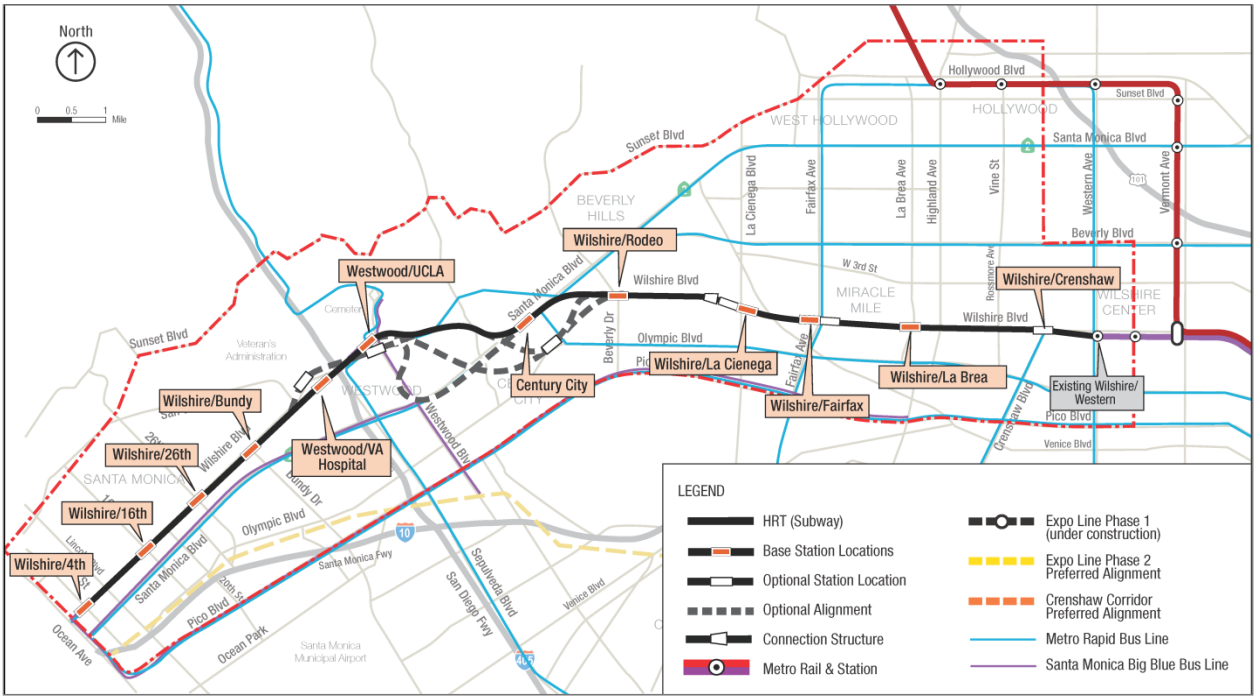


Figure 2-3. Alternative 3—Santa Monica Extension

2.3.4 Alternative 4—Westwood/VA Hospital Extension plus West Hollywood Extension

Similar to Alternative 2, Alternative 4 extends the existing Metro Purple Line from the Wilshire/Western Station to a Westwood/VA Hospital Station. Alternative 4 also includes a West Hollywood Extension that connects the existing Metro Red Line Hollywood/Highland Station to a track connection structure near Robertson and Wilshire Boulevards, west of the Wilshire/La Cienega Station (Figure 2-4). The alignment is 14.06 miles long.

Alternative 4 would operate from Wilshire/Western to a Westwood/VA Hospital Station in each direction at 3.3-minute headways during morning and evening peak periods and 10-minute headways during the midday off-peak period. The West Hollywood extension would operate at 5-minute headways during peak periods and 10-minute headways during the midday, off-peak period. The estimated one-way running time for the Metro Purple Line extension is 13 minutes 53 seconds, and the running time for the West Hollywood from Hollywood/Highland to Westwood/VA Hospital is 17 minutes and 2 seconds.

2.3.5 Alternative 5—Santa Monica Extension plus West Hollywood Extension

Similar to Alternative 3, Alternative 5 extends the existing Metro Purple Line from the Wilshire/Western Station to the Wilshire/4th Station and also adds a West Hollywood Extension similar to the extension described in Alternative 4 (Figure 2-5). The alignment is 17.49 miles in length. Alternative 5 would operate the Metro Purple Line extension in each direction at 3.3-minute headways during the morning and evening peak periods and 10-minute headways during the midday, off-peak period. The West Hollywood extension would operate in each direction at 5-minute headways during peak periods and 10-minute headways during the midday, off-peak period. The estimated one-way running time for the

Metro Purple Line extension is 19 minutes 27 seconds, and the running time from the Hollywood/Highland Station to the Wilshire/4th Station is 22 minutes 36 seconds.

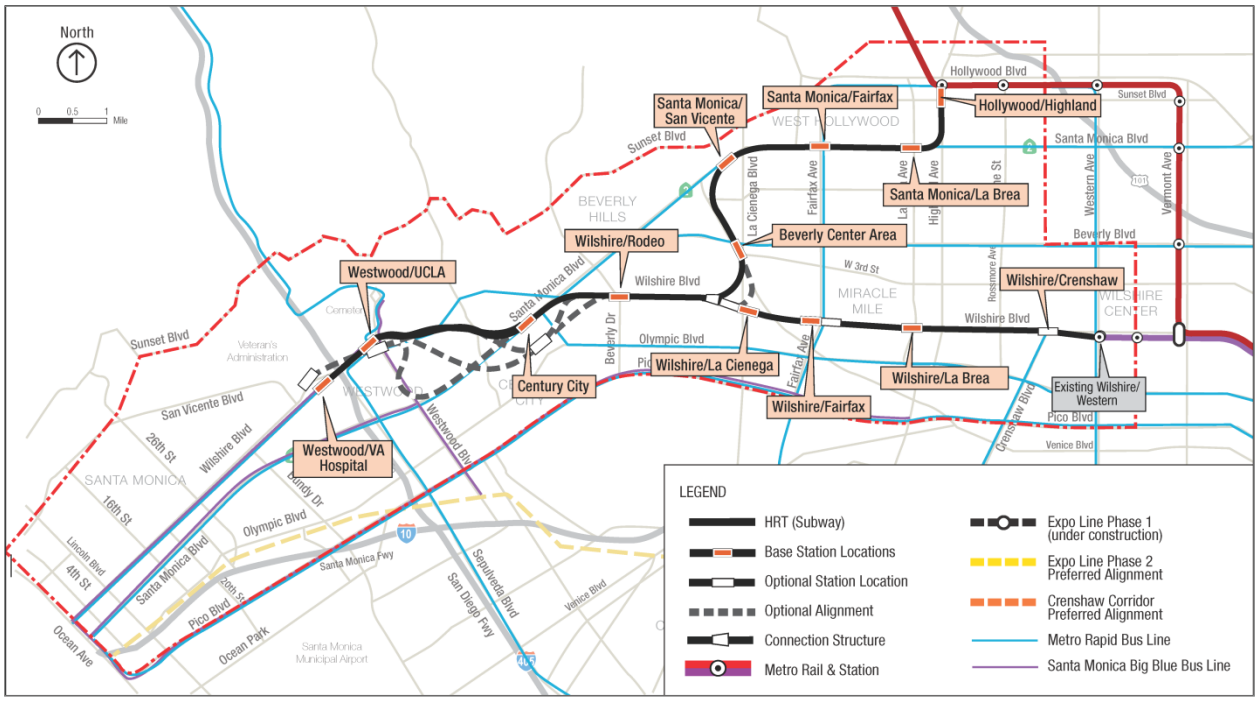


Figure 2-4. Alternative 4—Westwood/VA Hospital Extension plus West Hollywood Extension

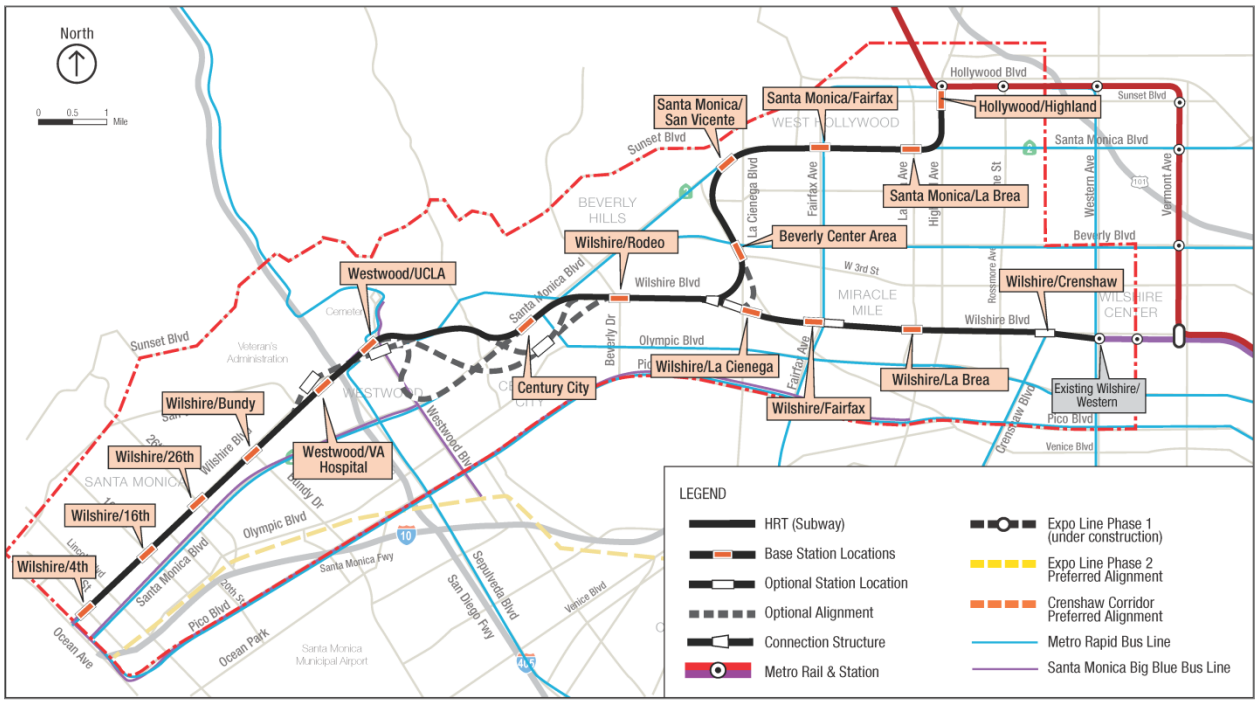


Figure 2-5. Alternative 5—Santa Monica Extension plus West Hollywood Extension

2.4 Stations and Segment Options

HRT stations consist of a station "box," or area in which the basic components are located. The station box can be accessed from street-level entrances by stairs, escalators, and elevators that would bring patrons to a mezzanine level where the ticketing functions are located. The 450-foot platforms are one level below the mezzanine level and allow level boarding (i.e., the train car floor is at the same level as the platform). Stations consist of a center or side platform. Each station is equipped with under-platform exhaust shafts, over-track exhaust shafts, blast relief shafts, and fresh air intakes. In most stations, it is anticipated that only one portal would be constructed as part of the Project, but additional portals could be developed as a part of station area development (by others). Stations and station entrances would comply with the *Americans with Disabilities Act of 1990*, Title 24 of the California Code of Regulations, the California Building Code, and the Department of Transportation Subpart C of Section 49 CFR Part 37.

Platforms would be well-lighted and include seating, trash receptacles, artwork, signage, safety and security equipment (closed-circuit television, public announcement system, passenger assistance telephones), and a transit passenger information system. The fare collection area includes ticket vending machines, fare gates, and map cases.

Table 2-1 lists the stations and station options evaluated and the alternatives to which they are applicable. Figure 2-6 shows the proposed station and alignment options. These include:

- Option 1—Wilshire/Crenshaw Station Option
- Option 2—Fairfax Station Option
- Option 3—La Cienega Station Option
- Option 4—Century City Station and Alignment Options
- Option 5—Westwood/UCLA Station Option
- Option 6—Westwood/VA Hospital Station Option

Table 2-1. Alternatives and Stations Considered

Stations	Alternatives				
	1	2	3	4	5
	Westwood/ UCLA Extension	Westwood/ VA Hospital Extension	Santa Monica Extension	Westwood/ VA Hospital Extension Plus West Hollywood Extension	Santa Monica Extension Plus West Hollywood Extension
Base Stations					
Wilshire/Crenshaw	●	●	●	●	●
Wilshire/La Brea	●	●	●	●	●
Wilshire/Fairfax	●	●	●	●	●
Wilshire/La Cienega	●	●	●	●	●
Wilshire/Rodeo	●	●	●	●	●
Century City (Santa Monica Blvd)	●	●	●	●	●
Westwood/UCLA (Off-street)	●	●	●	●	●
Westwood/VA Hospital		●	●	●	●
Wilshire/Bundy			●		●
Wilshire/26th			●		●
Wilshire/16th			●		●
Wilshire/4th			●		●
Hollywood/Highland				●	●
Santa Monica/La Brea				●	●
Santa Monica/Fairfax				●	●
Santa Monica/San Vicente				●	●
Beverly Center Area				●	●
Station Options					
1—No Wilshire/Crenshaw	●	●	●	●	●
2—Wilshire/Fairfax East	●	●	●	●	●
3—Wilshire/La Cienega (Transfer Station)	●	●	●	●	●
4—Century City (Constellation Blvd)	●	●	●	●	●
5—Westwood/UCLA (On-street)	●	●	●	●	●
6—Westwood/VA Hospital North		●	●	●	●

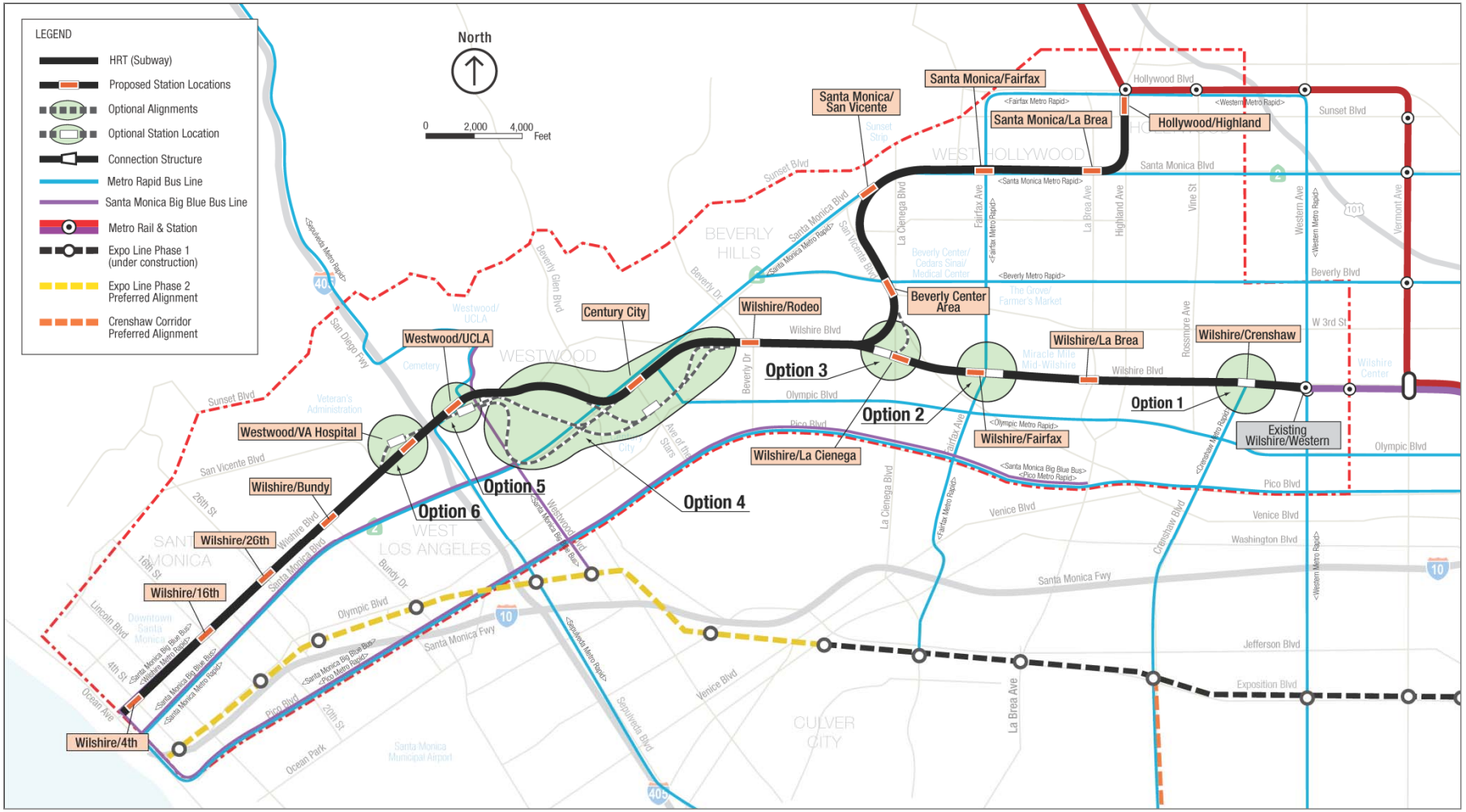


Figure 2-6. Station and Alignment Options

2.4.1 Option 1—Wilshire/Crenshaw Station Option

- **Base Station: Wilshire/Crenshaw Station**—The base station straddles Crenshaw Boulevard, between Bronson Avenue and Lorraine Boulevard.
- **Station Option: Remove Wilshire/Crenshaw Station**—This station option would delete the Wilshire/Crenshaw Station. Trains would run from the Wilshire/Western Station to the Wilshire/La Brea Station without stopping at Crenshaw. A vent shaft would be constructed at the intersection of Western Avenue and Wilshire Boulevard (Figure 2-7).

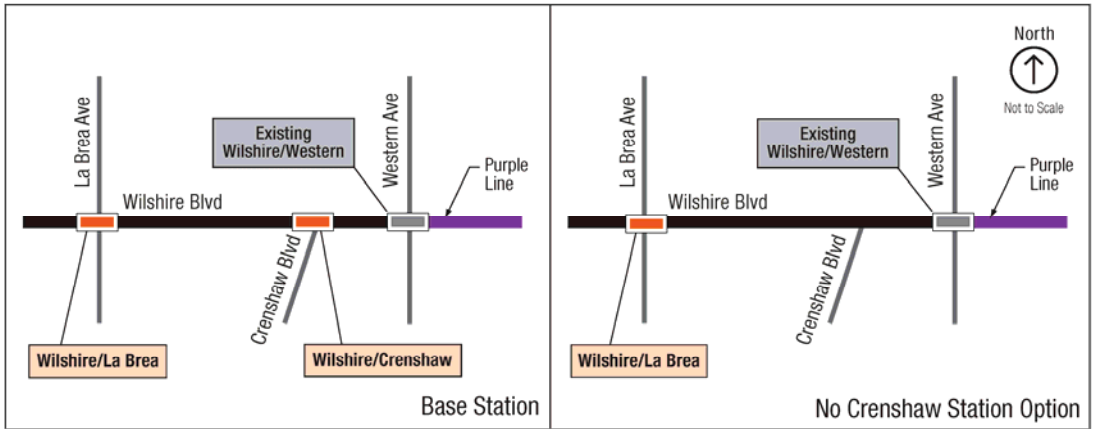


Figure 2-7. Option 1—No Wilshire/Crenshaw Station Option

2.4.2 Option 2—Wilshire/Fairfax Station East Option

- **Base Station: Wilshire/Fairfax Station**—The base station is under the center of Wilshire Boulevard, immediately west of Fairfax Avenue.
- **Station Option: Wilshire/Fairfax Station East Station Option**—This station option would locate the Wilshire/Fairfax Station farther east, with the station underneath the Wilshire/Fairfax intersection (Figure 2-8). The east end of the station box would be east of Orange Grove Avenue in front of LACMA, and the west end would be west of Fairfax Avenue.

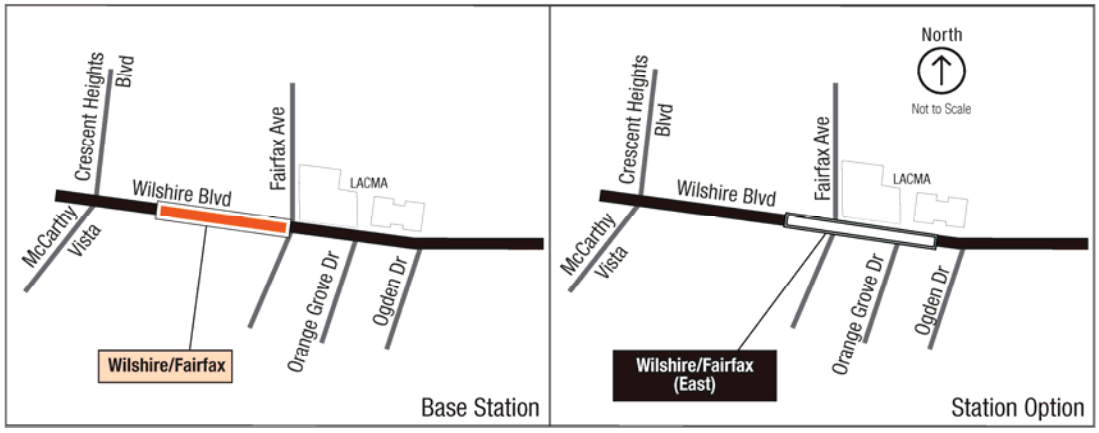


Figure 2-8. Option 2—Fairfax Station Option

2.4.3 Option 3—Wilshire/La Cienega Station Option

- **Base Station: Wilshire/La Cienega Station**—The base station would be under the center of Wilshire Boulevard, immediately east of La Cienega Boulevard. A direct transfer between the Metro Purple Line and the potential future West Hollywood Line is not provided with this station. Instead, a connection structure is proposed west of Robertson Boulevard as a means to provide a future HRT connection to the West Hollywood Line.
- **Station Option: Wilshire/La Cienega Station West with Connection Structure**—The station option would be located west of La Cienega Boulevard, with the station box extending from the Wilshire/Le Doux Road intersection to just west of the Wilshire/ Carson Road intersection (Figure 2-9). It also contains an alignment option that would provide an alternate HRT connection to the future West Hollywood Extension. This alignment portion of Option 3 is only applicable to Alternatives 4 and 5.

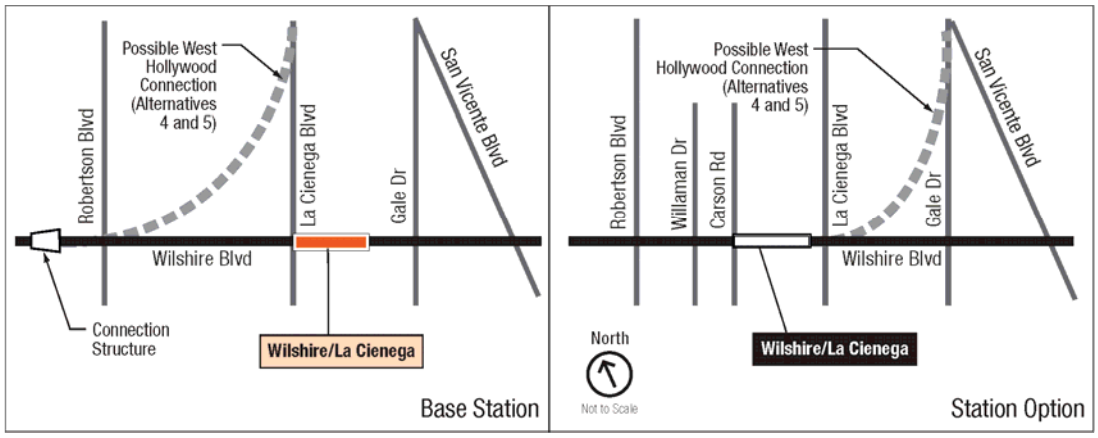


Figure 2-9. Option 3—La Cienega Station Option

2.4.4 Option 4—Century City Station and Segment Options

2.4.4.1 Century City Station and Beverly Hills to Century City Segment Options

- **Base Station: Century City (Santa Monica) Station**—The base station would be under Santa Monica Boulevard, centered on Avenue of the Stars.
- **Station Option: Century City (Constellation) Station**—With Option 4, the Century City Station has a location option on Constellation Boulevard (Figure 2-10), straddling Avenue of the Stars and extending westward to east of MGM Drive.
- **Segment Options**: Two route options are proposed to connect the Wilshire/Rodeo Station to Century City (Constellation) Station: Constellation North and Constellation South. As shown in Figure 2-10, the base segment to the base Century City (Santa Monica) Station is shown in the solid black line and the segment options to Century City (Constellation) Station are shown in the dashed grey lines.

2.4.4.2 Century City to Westwood Segment Options

Three route options considered for connecting the Century City and Westwood stations include: East, Central, and West. As shown in Figure 2-10, each of these three segments would be accessed from both Century City Stations and both Westwood/UCLA Stations. The

base segment is shown in the solid black line and the options are shown in the dashed grey lines.

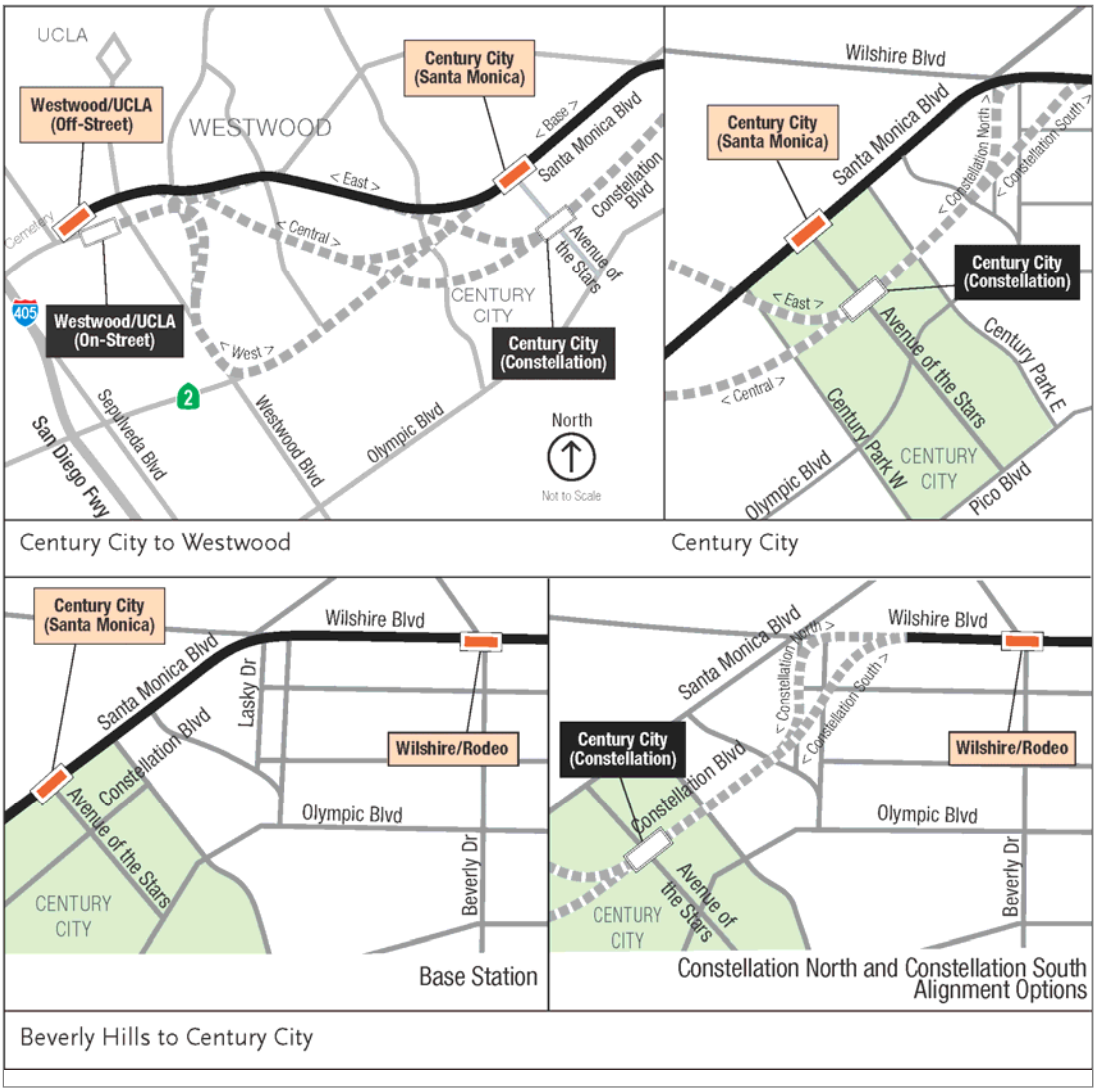


Figure 2-10. Century City Station Options

2.4.5 Option 5—Westwood/UCLA Station Options

- **Base Station: Westwood/UCLA Station Off-Street Station Option**—The base station is located under the UCLA Lot 36 on the north side of Wilshire Boulevard between Gayley and Veteran Avenues.
- **Station Option: Westwood/UCLA On-Street Station Option**—This station option would be located under the center of Wilshire Boulevard, immediately west of Westwood Boulevard (Figure 2-11).

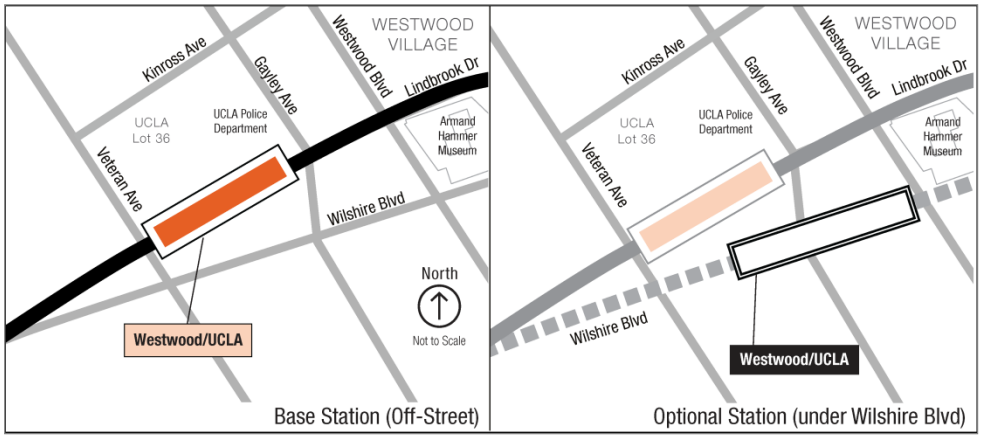


Figure 2-11. Option 5—Westwood/UCLA Station Options

2.4.6 Option 6—Westwood/VA Hospital Station Option

- **Base Station: Westwood/VA Hospital**—The base station would be below the VA Hospital parking lot on the south side of Wilshire Boulevard in between the I-405 exit ramp and Bonsall Avenue.
- **Station Option: Westwood/VA Hospital North Station**—This station option would locate the Westwood/VA Hospital Station on the north side of Wilshire Boulevard between Bonsall Avenue and Wadsworth Theater. (Shown in Figure 2-12)

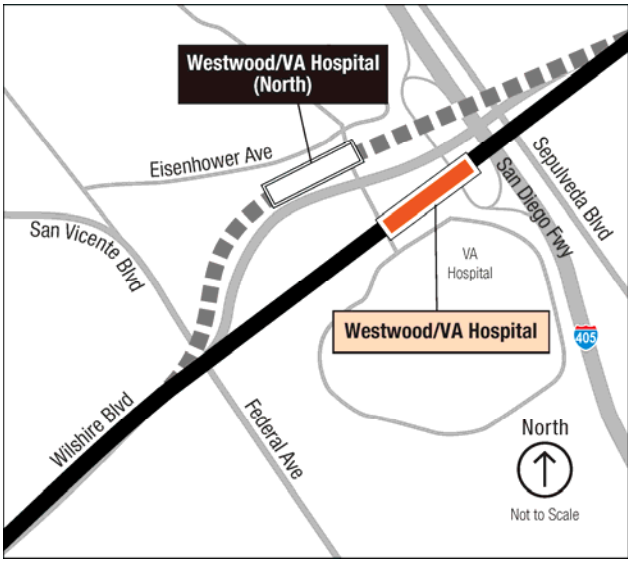


Figure 2-12. Option 6—Westwood/VA Hospital Station North

To access the Westwood/VA Hospital Station North, the alignment would extend westerly from the Westwood/UCLA Station under Veteran Avenue, the Federal Building property, the I-405 Freeway, and under the Veterans Administration property just east of Bonsall Avenue.

2.5 Base Stations

The remaining stations (those without options) are described below.

- **Wilshire/La Brea Station—**This station would be located between La Brea and Cloverdale Avenues.
- **Wilshire/Rodeo Station—**This station would be under the center of Wilshire Boulevard, beginning just west of South Canon Drive and extending to El Camino Drive.

- **Wilshire/Bundy Station—**This station would be under Wilshire Boulevard, east of Bundy Drive, extending just east of Saltair Avenue.
- **Wilshire/26th Station—**This station would be under Wilshire Boulevard, with the eastern end east of 26th Street and the western end west of 25th Street, midway between 25th Street and Chelsea Avenue.
- **Wilshire/16th Station—**This station would be under Wilshire Boulevard with the eastern end just west of 16th Street and the western end west of 15th Street.
- **Wilshire/4th Station—**This station would be under Wilshire Boulevard and 4th Street in Santa Monica.
- **Hollywood/Highland Station—**This station would be located under Highland Avenue and would provide a transfer option to the existing Metro Red Line Hollywood/Highland Station under Hollywood Boulevard.
- **Santa Monica/La Brea Station—**This station would be under Santa Monica Boulevard, just west of La Brea Avenue, and would extend westward to the center of the Santa Monica Boulevard/Formosa Avenue.
- **Santa Monica/Fairfax Station—**This station is under Santa Monica Boulevard and would extend from just east of Fairfax Avenue to just east of Ogden Drive.
- **Santa Monica/San Vicente Station—**This station would be under Santa Monica Boulevard and would extend from just west of Hancock Avenue on the west to just east of Westmount Drive on the east.
- **Beverly Center Area Station—**This station would be under San Vicente Boulevard, extending from just south of Gracie Allen Drive to south of 3rd Street.

2.6 Other Components of the Build Alternatives

2.6.1 Traction Power Substations

Traction power substations (TPSS) are required to provide traction power for the HRT system. Substations would be located in the station box or in a box located with the crossover tracks and would be located in a room that is about 50 feet by 100 feet in a below grade structure.

2.6.2 Emergency Generators

Stations at which the emergency generators would be located are Wilshire/La Brea, Wilshire/La Cienega, Westwood/UCLA, Westwood/VA Hospital, Wilshire/26th, Highland/Hollywood, Santa Monica/La Brea, and Santa Monica/San Vicente. The emergency generators would require approximately 50 feet by 100 feet of property in an off-street location. All would require property acquisition, except for the one at the Wilshire/La Brea Station which uses Metro's property.

2.6.3 Mid-Tunnel Vent Shaft

Each alternative would require mid-tunnel ventilation shafts. The vent shafts are emergency ventilation shafts with dampers, fans, and sound attenuators generally placed at both ends of a station box to exhaust smoke. In addition, emergency vent shafts could be used for station

cooling and gas mitigation. The vent shafts are also required in tunnel segments with more than 6,000 feet between stations to meet fire/life safety requirements. There would be a connecting corridor between the two tunnels (one for each direction of train movement) to provide emergency egress and fire-fighting ingress. A vent shaft is approximately 150 square feet; with the opening of the shaft located in a sidewalk and covered with a grate about 200 square feet.

Table 2-2. Mid-Tunnel Vent Shaft Locations

Alternative/Option	Location
Alternatives 1 through 5, MOS 2	Part of the connection structure on Wilshire Boulevard, west of Robertson Boulevard
Alternatives 2 through 5	West of the Westwood/VA Hospital Station on Army Reserve property at Federal Avenue and Wilshire Boulevard
Option 4 via East route	At Wilshire Boulevard/Manning Avenue intersection
Option 4 to Westwood/UCLA Off-Street Station via Central route	On Santa Monica Boulevard just west of Beverly Glen Boulevard
Option 4 to Westwood/UCLA On-Street Station via Central route	At Santa Monica Boulevard/Beverly Glen Boulevard intersection
Options 4 via West route	At Santa Monica Boulevard/Glendon Avenue intersection
Options 4 from Constellation Station via Central route	On Santa Monica Boulevard between Thayer and Pandora Avenues
Option from Constellation Station via West route	On Santa Monica Boulevard just east of Glendon Avenue

2.6.4 Trackwork Options

Each Build Alternative requires special trackwork for operational efficiency and safety (Table 2-3):

- Tail tracks—a track, or tracks, that extends beyond a terminal station (the last station on a line)
- Pocket tracks—an additional track, or tracks, adjacent to the mainline tracks generally at terminal stations
- Crossovers—a pair of turnouts that connect two parallel rail tracks, allowing a train on one track to cross over to the other
- Double crossovers—when two sets of crossovers are installed with a diamond allowing trains to cross over to another track

Table 2-3. Special Trackwork Locations

Station	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Westwood/ UCLA Extension	Westwood/ VA Hospital Extension	Santa Monica Extension	Westwood/VA Hospital Extension Plus West Hollywood Extension	Santa Monica Extension Plus West Hollywood Extension
Special Trackwork Locations—Base Trackwork Alternatives					
Wilshire/Crenshaw	None	None	None	None	None
Wilshire/La Brea	Double Crossover	Double Crossover	Double Crossover	Double Crossover	Double Crossover
Wilshire/Fairfax	None *MOS 1 Only: Terminus Station with Tail tracks*	None *MOS 1 Only: Terminus Station with Tail tracks*	None *MOS 1 Only: Terminus Station with Tail tracks*	None *MOS 1 Only: Terminus Station with Tail tracks*	None *MOS 1 Only: Terminus Station with Tail tracks*
Wilshire/La Cienega	None	None	None	None	None
Station Option 3 - Wilshire/La Cienega West	Turnouts	Turnouts	Turnouts		
Wilshire/Robertson Connection Structure	Equilateral Turnouts—for future West Hollywood connection	Equilateral Turnouts—for future West Hollywood connection	Equilateral Turnouts—for future West Hollywood connection	Equilateral Turnouts	Equilateral Turnouts
Wilshire/Rodeo	None	None	None	None	None
Century City	Double Crossover *MOS2 Only: Terminus Station with Double Crossover and tail tracks*	Double Crossover *MOS2 Only: Terminus Station with Double Crossover and tail tracks*	Double Crossover *MOS2 Only: Terminus Station with Double Crossover and tail tracks*	Double Crossover *MOS2 Only: Terminus Station with Double Crossover and tail tracks*	Double Crossover *MOS2 Only: Terminus Station with Double Crossover and tail tracks*
Westwood/UCLA	End Terminal with Double Crossover and tail tracks	Double Crossover	Double Crossover	Double Crossover	Double Crossover
Westwood/VA Hospital	N/A	End Terminal with Turnouts and tail tracks	Turnouts	End Terminal with Turnouts and tail tracks	Turnouts
Wilshire/Bundy	N/A	N/A	None	N/A	None
Wilshire/26th	N/A	N/A	None	N/A	None
Wilshire/16th	N/A	N/A	None	N/A	None
Wilshire/4th	N/A	N/A	End Terminal with Double Crossover. Pocket Track with Double Crossover, Equilateral Turnouts and tail tracks	N/A	End Terminal with Double Crossover, Pocket Track with Double Crossover, Equilateral Turnouts and tail tracks
Hollywood/ Highland	N/A	N/A	N/A	Double Crossover and tail tracks	Double Crossover and tail tracks
Santa Monica/La Brea	N/A	N/A	N/A	None	None
Santa Monica/Fairfax	N/A	N/A	N/A	None	None
Santa Monica/ San Vicente	N/A	N/A	N/A	Double Crossover	Double Crossover
Beverly Center	N/A	N/A	N/A	None	None
Additional Special Trackwork Location (Optional Trackwork)					
Wilshire/Fairfax	Double Crossover	Double Crossover	Double Crossover	Double Crossover	Double Crossover
Wilshire/La Cienega	Double Crossover	Double Crossover	Double Crossover	Double Crossover	Double Crossover
Wilshire/ Rodeo	Pocket Track	Pocket Track	Pocket Track	Pocket Track	Pocket Track
Wilshire/26th	N/A	N/A	Double Crossover	N/A	Double Crossover

2.6.5 Rail Operations Center

The existing Rail Operations Center (ROC), shown on Figure 2-13, located in Los Angeles near the intersection of Imperial Highway and the Metro Blue Line does not have sufficient room to accommodate the new transit corridors and line extensions in Metro's expansion program. The Build Alternatives assume an expanded ROC at this location.

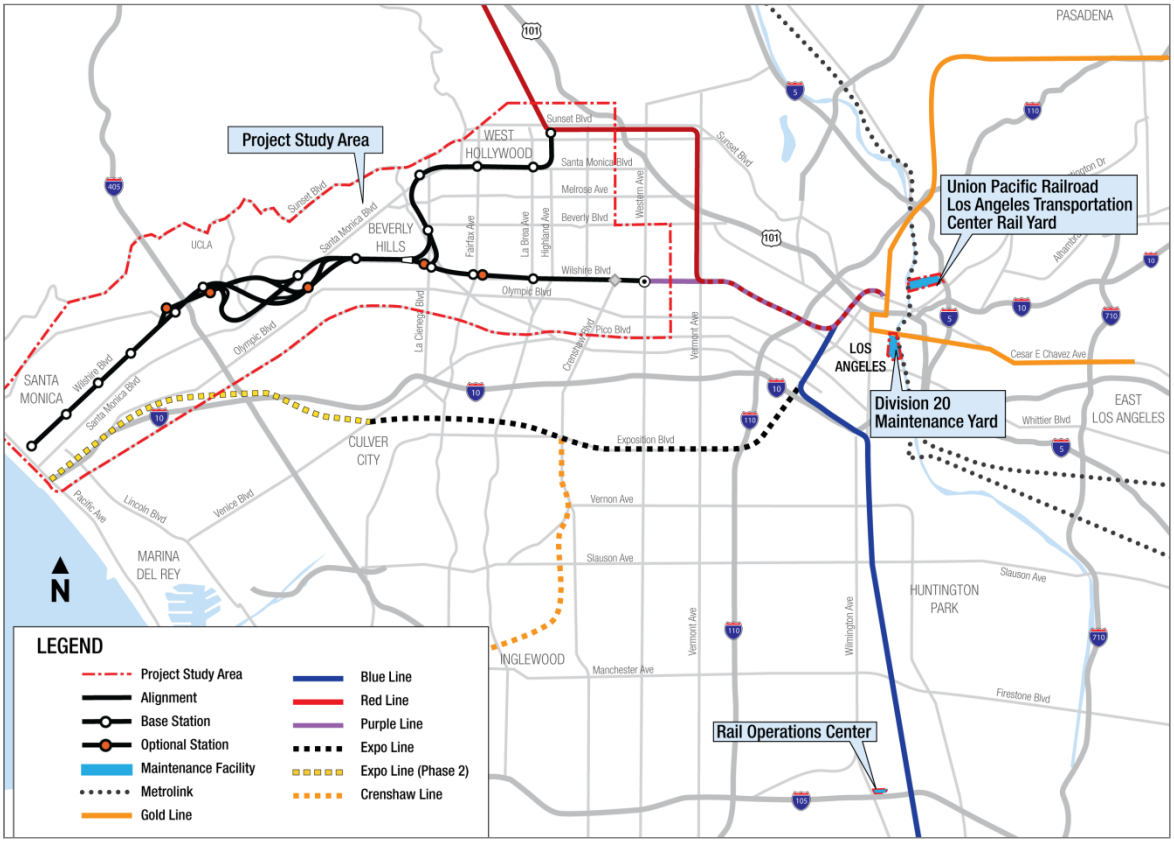


Figure 2-13. Location of the Rail Operations Center and Maintenance Yards

2.6.6 Maintenance Yards

If any of the Build Alternatives are chosen, additional storage capacity would be needed. Two options for providing this expanded capacity are as follows (Figure 2-14 and Figure 2-15):

- The first option requires purchasing 3.9 acres of vacant private property abutting the southern boundary of the Division 20 Maintenance and Storage Facility, which is located between the 4th and 6th Street Bridges. Additional maintenance and storage tracks would accommodate up to 102 vehicles, sufficient for Alternatives 1 and 2.
- The second option is a satellite facility at the Union Pacific (UP) Los Angeles Transportation Center Rail Yard. This site would be sufficient to accommodate the vehicle fleet for all five Build Alternatives. An additional 1.3 miles of yard lead tracks from the Division 20 Maintenance and Storage Facility and a new bridge over the Los Angeles River would be constructed to reach this yard

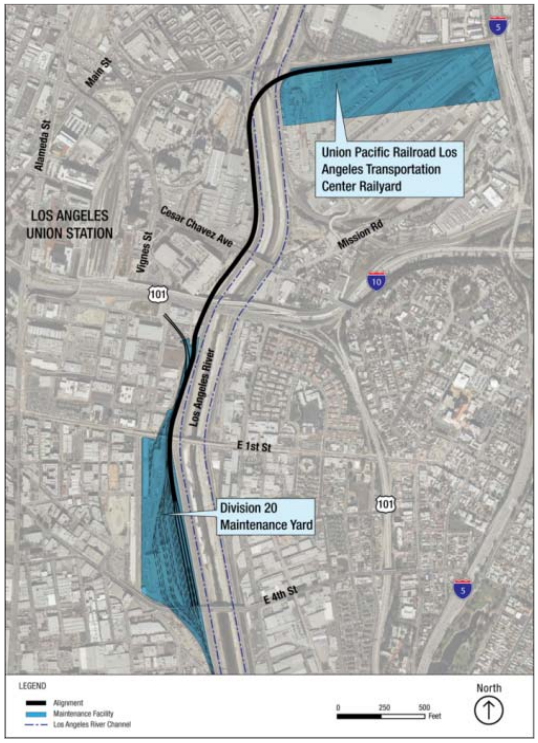


Figure 2-14. Maintenance Yard Options

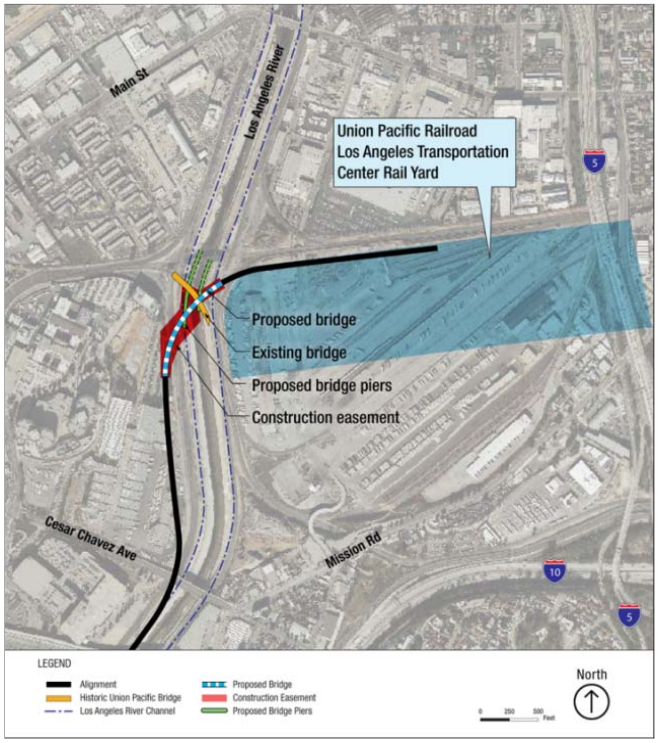


Figure 2-15. UP Railroad Rail Bridge

2.7 Minimum Operable Segments

Due to funding constraints, it may be necessary to construct the Westside Subway Extension in shorter segments. A Minimum Operable Segment (MOS) is a phasing option that could be applied to any of the Build Alternatives.

2.7.1 MOS 1—Fairfax Extension

MOS 1 follows the same alignment as Alternative 1, but terminates at the Wilshire/Fairfax Station rather than extending to a Westwood/UCLA Station. A double crossover for MOS 1 is located on the west end of the Wilshire/La Brea Station box, west of Cloverdale Avenue. The alignment is 3.10 miles in length.

2.7.2 MOS 2—Century City Extension

MOS 2 follows the same alignment as Alternative 1, but terminates at a Century City Station rather than extending to a Westwood/UCLA Station. The alignment is 6.61 miles from the Wilshire/Western Station.

3.0 REGULATORY FRAMEWORK

3.1 Federal

3.1.1 Clean Water Act of 1977 (33 U.S. Code 1251-1376)

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. and gives the U.S. Environmental Protection Agency (USEPA) the authority to implement pollution control programs such as setting wastewater standards for industries. In certain states such as California, the EPA has delegated authority to state agencies.

3.1.1.1 Section 303(d)

Section 303(d) of the 1972 CWA requires states, territories, and authorized tribes to develop a list of water quality-impaired segments of waterways. The 303(d) list includes water bodies that do not meet water quality standards for the specified beneficial uses of that waterway, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water bodies on their 303(d) lists and implement a process, called Total Maximum Daily Loads (TMDLs), to meet water quality standards (USEPA 2009).

The TMDL process is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. The TMDL establishes the maximum allowable loadings of a pollutant that can be assimilated by a water body while still meeting applicable water quality standards. The TMDL provides the basis for the establishment of water quality-based controls. These controls should provide the pollution reduction necessary for a water body to meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDLs allocation calculation for each water body must include a margin of safety to ensure that the water body can be utilized for its State –designated uses. Additionally, the calculation also must account for seasonal variation in water quality (USEPA 2009).

TMDLs are intended to address all significant stressors which cause or threaten to cause impairments to beneficial uses, including point sources (e.g., sewage treatment plant discharges), nonpoint sources (e.g., runoff from fields, streets, range, or forest land), and naturally occurring sources (e.g., runoff from undisturbed lands). TMDLs may be based on readily available information and studies. In some cases, complex studies or models are needed to understand how stressors are causing water body impairment. In many cases, simple analytical efforts provide an adequate basis for stressor assessment and implementation planning. TMDLs are developed to provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. States are required to include approved TMDLs and associated implementation measures in State water quality management plans. Within California, TMDL implementation is through regional Basin Plans.

TMDL implementation Plans provide the schedule for responsible jurisdictions to implement Best Management Practices (BMPs) to comply with the pollutant reduction schedules.

3.1.1.2 Section 401

Section 401 of the act requires a State Water Quality Certification to show that the proposed project will comply with State water quality standards for any activity that results in a discharge to a water body. In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCB) are responsible for the implementation of the NPDES permitting process at the state and regional levels, respectively.

3.1.1.3 Section 402 (National Pollution Discharge Elimination System)

The National Pollution Discharge Elimination System (NPDES) permit process provides a regulatory mechanism for the control of point source discharges—a municipal or industrial discharge at a specific location or pipe—to surface waters of the U.S. Two exceptions that are regulated under the NPDES program are: 1) diffuse source discharges caused by general construction activities of over one acre, and 2) storm water discharges in municipal storm water systems as a separate system in which runoff is carried through a developed conveyance system to specific discharge locations. The NPDES program regulates pollution generated by runoff from construction activities, industrial activities, and general and urban land use, including runoff from streets. Federal storm water regulations require municipalities to obtain NPDES permits for storm water discharges from municipal storm drains to surface waters. In 1990, the EPA established final regulations for storm water discharges through the implementation of Section 402(p) of the CWA. The two permits that enforce Section 402(p), the General Industrial Permit and the General Construction Permit, are a major attempt to control non-point source pollutants in urban runoff that discharge to the local storm drain system and into receiving waters. Applicable permits are discussed in further detail in the discussion in Section 3.2.4.

Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a Notice of Intent (NOI) with the Los Angeles RWQCB (LARWQCB) (Region 4) to indicate their intent to comply with the State General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit). The General Permit establishes conditions to minimize sediment and pollutant loadings and requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) prior to construction. The SWPPP is intended to help identify the sources of sediment and other pollutants, and to establish BMPs for storm water and non-storm water source control and pollutant control.

3.1.1.4 Section 404

The CWA also requires that a permit be obtained from the USEPA and United States Army Corps of Engineers (USACE) when discharge of dredged or fill material into wetlands and Waters of the United States occurs. Section 404 of the CWA regulates the discharge of dredged or fill materials into waters of the U.S. The USACE is responsible for issuing permits under Section 404.

3.1.2 Rivers and Harbors Appropriation Act of 1899

Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 U.S.C. § 401-403) provides for the protection of navigable waters and prohibits the obstruction or alteration of navigable waters of the United States. Any work performed in, over, or under navigable waters of the United States must obtain a Section 10 Permit from the USACE. The Los Angeles River is

designated as navigable water by the United States Environmental Protection Agency (USEPA).

Section 14 of the RHA of 1899 (33 U.S.C. § 408) provides that the Secretary of the Army, on the recommendation of the Chief of Engineers, may grant permission for the temporary occupation or use of any sea wall, bulkhead, jetty, dike, levee, wharf, pier or other work built by the United States.

3.1.3 Federal Emergency Management Agency—Executive Order 11988

Through Executive Order 11988, all Federal agencies are directed to avoid to the extent possible long-and short-term adverse impacts associated with the modification of floodplains. In addition, Federal agencies should avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The Federal Emergency Management Agency (FEMA) provides floodplain information and regulates development in and around FEMA established floodplains for many areas of the country through Flood Insurance Studies (FIS) and their associated Flood Insurance Rate Maps (FIRMs).

3.1.4 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act requires Federal agencies to consult with the United States Fish and Wildlife Service (USFWS), or, in some instances, with the National Oceanic and Atmospheric Administration Fisheries Service (NOAA/FS) and with State fish and wildlife resource agencies (such as the California Department of Fish and Game [CDFG]) before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife concerns receive equal consideration in the development of water resource projects and are coordinated with the features of these projects. Federal agencies are required to fully consider these agencies' recommendations in project reports and to include measures to reduce impacts on fish and wildlife in project plans.

3.1.5 Endangered Species Act of 1970

The Endangered Species Act (ESA) requires Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species (according to the lists maintained by the USFWS and the NMFS) or result in the destruction or adverse modification of habitat critical to such species' survival. To ensure against jeopardy, each Federal agency must consult with the USFWS or NMFS, or both.

3.1.6 National Flood Insurance Program

In order to determine the necessity to comply with the FEMA National Flood Insurance Program (NFIP) regulations, FEMA issues countywide floodplain maps (also known as Flood Insurance Rate Maps [FIRMs]) delineating the limits of FEMA defined flood zones throughout the county (Refer to Figures 4-5 through 4-7 depicting FEMA defined floodplains in the vicinity of the proposed alternatives). Flood zones are defined as follows:

Moderate to Low Risk Areas: Zones B, C, and X are defined as areas outside the one percent annual chance floodplain and no Base Flood Elevations or depths are shown within this zone;

- High Risk Areas:
  - Zone A is defined as areas with a one percent annual chance of flooding, which corresponds to the 100-year floodplain; however, detailed analyses are not performed for these areas and no depths or base flood elevations (BFEs) are shown on FIRMs;
  - Zones AE and A1-A30 are defined as areas with a one percent chance of flooding where BFEs are derived from detailed analyses and shown at selected intervals on FIRMs;
  - Zone AH is defined as areas with a one percent chance of shallow flooding, usually in the form of a pond with an average depth of one to three feet. BFEs are derived from detailed analyses and shown at selected intervals on FIRMs; and,
  - Zone AO is defined as river or stream flood hazard areas and areas with a one percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth of one to three feet. Average flood depths are derived from detailed analyses and shown within these zones.

Volume 44 of the Code of Federal Regulations (CFR) Sections 59-65 sets the minimum basic NFIP floodplain management building requirements. These include:

- Ensure that proposed building sites will be reasonably safe from flooding, and that all new construction and substantial improvements in flood prone areas be properly designed and adequately anchored; constructed with materials resistant to flood damage; and, constructed with equipment and other service facilities that are designed or located to prevent water from entering components during flood conditions;
- All buildings constructed within a riverine floodplain (FEMA Flood Zones: A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the BFE level in accordance with the effective FIRM;
- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any *development* must not increase BFE levels. The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials. A hydrologic and hydraulic analysis must be performed prior to the start of development and must demonstrate that the development would not cause any rise in base flood levels;
- All buildings constructed within a coastal high hazard area, (any of the "v" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structure (excluding the pilings and columns) is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components; and,
- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision.

3.2 State

The SWRCB and the nine RWQCBs are responsible for the protection of water quality in the state. The SWRCB establishes statewide policies and regulations mandated by federal and state water quality statutes and regulations. The RWQCBs are responsible for the development and implementation of Water Quality Control Plans (Basin Plans) that address regional beneficial uses, water quality characteristics, and water quality problems. The RWQCB is responsible for implementing the Porter-Cologne Water Quality Control Act discussed below. The RWQCB is also responsible for issuing Water Quality Certifications pursuant to Section 401 of the CWA. This section of the CWA protects water quality in the Los Angeles River and in Santa Monica Bay.

All projects resulting in discharges, whether to land or water are subject to Section 13263 of the California Water Code (CWC). Through the mandates of this section, dischargers are required to comply with Waste Discharge Requirements (WDRs) as developed by the RWQCB. WDRs for discharges to surface waters must meet requirements for related NPDES permits (further described below).

3.2.1 Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* of 1969 (Act) established the principal California program for water quality control. The Act authorizes the SWRCB to adopt, review, and revise all policies for all waters of the U.S. (including both surface and groundwater); regulates discharges to surface and groundwater; and directs the RWQCB to develop regional Basin Plans. Section 13170 of the *California Water Code* also authorizes the SWRCB to adopt water quality control plans on its own initiative. The Act also divides the State of California into RWQCB areas. Each RWQCB implements and enforces provisions of the CWA subject to policy guidance and review by the SWRCB. The project area is located in RWQCB Regional 4, the Los Angeles Region.

3.2.2 California Fish and Game Code Section 1600

Section 1600 *et seq* of the California Fish and Game Code, as administered by the California Department of Fish and Game (CDFG), mandates that "it is unlawful for any person to substantively diver or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of such activity." Streambed alteration must be permitted by CDFG through a Streambed Alteration Agreement. CDFG defines streambeds as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life" and lakes as "natural lakes and man-made reservoirs." CDFG jurisdiction includes ephemeral, intermittent, and perennial watercourses, and can extend to habitats adjacent to watercourses.

3.2.3 State Antidegradation Policy

In accordance with the federal Antidegradation Policy, the state policy was adopted by the SWRCB to maintain high quality waters in California. This state policy establishes ambient water quality criteria for priority toxic pollutants. Implemented by the RWQCBs, the policy is necessary to achieve the federal CWA's goals and objectives. In addition, the policy protects bodies of water where the existing water quality is higher than necessary for the protection

of present and anticipated beneficial uses. Toxic pollutants regulated under the policy can be attributed to, among other sources, industrial and municipal discharges. The numeric criteria are important in deriving water quality based effluent limits (WQBELs) in NPDES permits as well as wasteload allocations for TMDLs (CFR 2000).

3.2.4 National Pollution Discharge Elimination System

3.2.4.1 Construction General Permit

In accordance with CWA Section 402(p), which regulates municipal and industrial storm water discharges under the NPDES program, the SWRCB adopted a General Permit applicable to all storm water discharges associated with construction activity. The General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, Order No. 99-08-DQW) applies to storm water discharges from construction sites that disturb land equal to or greater than one acre. Construction activity subject to this permit includes clearing, grading, and ground disturbances such as stockpiling or excavation. The Los Angeles RWQCB (LARWQCB) adopted a new Construction General Permit on September 2, 2009 (Construction General Permit Order 2009-0009-DWQ). The new permit goes into effect on July 1, 2010 and all discharges will be required to obtain coverage under it. The new Order has similar requirements to the current permit, but it specifies more minimum BMPs which were previously only required as elements of the SWPPP or suggested by guidance.

In order to obtain coverage under the Construction General Permit, the permit applicant must submit a NOI to the SWRCB and prepare and implement the SWPPP. Because construction of the Westside Extension would disturb more than one acre, it would be subject to these permit requirements.

3.2.4.2 Industrial General Permit

Amendments made to the CWA in 1987 require that storm water associated with industrial activities that discharge either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit. As with the Construction General Permit, the SWRCB administers the Industrial General Permit. In order to obtain authorization for storm water discharges associated with industrial activities under this permit, the facility operator must submit a NOI. The proposed project would be subject to the regulations of this NPDES permit under category 8 of the categories that require coverage under the general permit. Category 8 includes; "Transportation facilities that conduct any type of vehicle maintenance such as fueling, cleaning, repairing, etc." (Water Quality Order No. 97-03-DWQ).

3.2.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 was enacted by Congress to effectively manage and protect the natural, commercial, recreational, ecological, industrial, and aesthetic value of the country's coastal zone (16 USC 1451, Section 302). In order for states to locally manage their coastal resources, Congress created a federal and state management partnership through the Federal Consistency Program of the CZMA. Since the City of Santa Monica does not have an adopted Local Coastal Program, potential coastal zone permitting would be accomplished through application to the California Coastal Commission (CCC).

3.3 Regional

The Westside Extension Transit Corridor study area is east-west oriented and includes portions of five jurisdictions: the cities of Los Angeles, West Hollywood, Beverly Hills, Santa Monica, as well as portions of unincorporated County of Los Angeles. The corridor generally extends north to Sunset/Hollywood Boulevards, east to Western Avenue, south to Pico Boulevard, and west to Ocean Avenue.

3.3.1 Los Angeles Regional Water Quality Control Board

3.3.1.1 NPDES Permits

The LARWQCB issues the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (Order No. 01-182, NPDES No. CAS004001). The existing permit, originally issued in 1996 and subsequently amended in 2001 and 2006, covers the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the Los County Flood Control District including the Cities of West Hollywood, Beverly Hills, and Santa Monica. The permit covers the permittees for their contributions to discharges of storm water and urban runoff from MS4s, also called storm drain systems. The discharges flow to water courses within the Los Angeles County Flood Control District and into receiving waters of the Los Angeles Region. Discharges are covered under countywide waste discharge requirements (WDRs) contained in Order No. 96-054 originally adopted by the LARWQCB in 1996. These WDRs also serve as the NPDES permit for discharge of municipal storm water. The current permit is undergoing a limited reopening in order to incorporate the Los Angeles River Watershed Trash TMDL and Waste Load Allocations (WLAs) and associated provisions for discharges from the MS4 to the Los Angeles River and its tributaries as required by federal regulation and state law (LARWQCB no date).

The MS4 permit requires permittees to implement a Standard Urban Storm Water Management Plan (SUSMP) that designates BMPs that must be used in specified categories of development to treat storm water runoff, control peak flow discharges, and reduce post-project discharge of pollutants from storm water conveyance systems.

In addition to the Municipal NPDES Permit issued by the LARWQCB, General NPDES Permit CAG994004 (LARWQCB Order No. R4-2008-0032), *Discharges of Groundwater from Construction Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties*, allows for the discharge of treated or untreated groundwater generated from dewatering activities when such discharges will not cause state or federal water quality objectives to be exceeded. The permit includes effluent and receiving water limitations for metals and other potential contaminants in discharges from dewatering operations to freshwater, as well as monitoring and reporting requirements. This permit will apply to the proposed alternatives due to the potential for dewatering.

3.3.1.2 Waste Discharge Requirements for Specified Discharges to Groundwater in Santa Clara and Los Angeles River Basins (Order No. 93-010)

This WDR allows for the discharge of water resulting from the following activities that may occur as part of the proposed project: construction dewatering, and dust control application.

The WDR requires that wastewater be analyzed prior to being discharged in order to determine if it contains pollutants in excess of the applicable Basin Plan Water Quality

Objectives. Additionally, any wastewater that might be encountered and subsequently discharged to groundwater will need to comply with applicable water quality standards.

Due to the potential for construction dewatering activities , this WDR applies to the proposed alternatives.

3.3.1.3 Waste Discharge Requirements for Discharge of Non-Hazardous Contaminated Soils and Other Wastes in Los Angeles River and Santa Clara River Basins (Order No. 91-93)

The purpose of this WDR is to protect waters of the State from contamination due to disposal of soils contaminated with moderate concentrations of petroleum hydrocarbons, heavy metals and other wastes. The permit allows the disposal of up to 100,000 cubic yards of nonhazardous contaminated soils and other wastes for a maximum period of 90 days. This WDR requires that waste used as soil backfill shall not contain any substance in concentrations toxic to human, animal, plant, or aquatic life. The General Permit allows for temporary stockpiling of nonhazardous, contaminated soils until they can be appropriately disposed of or reused, per permit conditions. Due to the Project Area's long history of commercial and industrial uses, there is significant potential for subsurface hazardous materials to be found in the project area.

3.3.1.4 Basin Plan

The Basin Plan that applies to the Project Area is the *Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (LARWQCB 1995). The plan sets forth the regulatory water quality standards for surface waters and groundwater within the region. The water quality standards address both the designated beneficial uses for each water body and the water quality objectives to meet them. Where multiple designated beneficial uses exist, water quality standards are written to protect the most sensitive use.

3.3.1.5 Total Maximum Daily Loads

In accordance with the federal CWA and the state Porter-Cologne Water Quality Control Act, TMDLs have been developed an incorporated into the Basin Plan for some pollutants identified on the 303(d) list as causing contamination in the Los Angeles River Watershed. The Los Angeles River has TMDLs for metals, trash, and nutrients (Resolution Numbers 2007-014, 2007-012, and 2003-016).

3.3.1.6 Standard Urban Storm Water Mitigation Plan

As part of the Los Angeles County Municipal NPDES Permit, the permittees implemented a storm water quality management program (SQMP). The goal of this program is to accomplish the requirements of the NPDES permit and reduce the amount of pollutants in storm water and urban runoff. The SUSMP is one specific requirement of the SQMP. The SUSMP outlines the necessary BMPs which must be incorporated into design plans for projects and/or development related activities that include vehicle or equipment maintenance areas (LACDPW 2002).

3.3.2 County of Los Angeles

3.3.2.1 Los Angeles County General Plan

The Los Angeles County General Plan (1980, updated in 2008) contains the following policies related to water resources, water quality, and flood hazards:

- Restrict urban development in flood prone areas;
- Conserve the available supply of water and protect water quality;
- Full compliance with all NPDES permits;
- Full compliance with all approved TMDL implementation and compliance plans for impaired water bodies;
- Protect groundwater recharge and watershed areas; and,
- Encourage the maintenance, management and improvement of groundwater supplies.

3.3.2.2 Los Angeles County Code

Los Angeles County's Storm Water Ordinance regulates discharges to the storm drain system, runoff management requirements, and violations of the ordinance (Chapter 12.80, Parts 3-5) (Los Angeles County 1998). Applicable sections include:

- Prior to construction activity, all storm water and runoff pollution mitigation measures must be implemented as required by applicable permits (Section 450);
- Discharges from industrial activities are prohibited unless the discharge is in compliance with a NPDES permit (Section 460);
- All BMPs required by applicable construction activity permits must be in effect during the term of the project (Section 510); and,
- All industrial facilities must implement BMPs to the maximum extent practicable (Section 520), including:
  - Termination of non-storm discharge to the storm drain system not specifically authorized by a NPDES permit;
  - Exercising general good housekeeping practices;
  - Incorporating regular scheduled preventive maintenance into operations;
  - Maintaining spill prevention and control procedures;
  - Implementing soil erosion control; and,
  - Insuring that stormwater runoff is directed away from operating, processing, fueling, cleaning, and storage areas (Order 98-0021 Section 1 1998).

3.3.2.3 Los Angeles County Department of Public Works

The Los Angeles River is considered navigable waters and as such is under the jurisdiction of the USACE. Flood control facilities along the river corridor are maintained by the County of Los Angeles. Therefore, any construction activity in the waterway would require a permit from the County's Department of Public Works.

The County of Los Angeles Department of Public Works (LACDPW) is responsible for planning and implementation of watershed management within the county. Watershed management plans that pertain to the study area include the *Ballona Creek Watershed Management Plan* (LACDPW 2004) and the *Los Angeles River Master Plan* (LACDPW 1996). The main goals of the watershed management plans are the protection and enhancement of the Ballona and Los Angeles Rivers for flood protection, recreation, and environmental services.

Master Drainage Plan for Los Angeles County

The LACDPW has developed Master Drainage Plans (MDPs) to address individual watersheds within the Department's jurisdiction. The plans include proposed drainage facilities to protect upstream and downstream properties from serious damage (Refer to Figure 4-4 for existing drainage facilities and flow directions).

3.4 Local

3.4.1 City of Los Angeles

3.4.1.1 City of Los Angeles General Plan

Water resources and flood hazard goals and policies are addressed in the city's Infrastructure Systems and Safety Elements (City of Los Angeles 1996). Policies are generally geared towards the protection of water quality, risk reduction in relation to flooding hazards, and compliance with all applicable state and federal regulations. The City of Los Angeles Bureau of Sanitation Watershed Protection Division is responsible for reducing water pollution and improving receiving waters and their aquatic environments. Some of the methods that are used include:

- Public education and outreach
- Commercial/industrial facilities inspection
- Private development plan approval
- Construction development activities inspection
- Illicit discharger and illicit dumping site investigations
- Monitoring of the City's receiving water bodies

3.4.1.2 City of Los Angeles Specific Plan for the Management of Flood Hazards (Ordinance No. 172081)

The City of Los Angeles has more stringent floodplain management building requirements than those required by the federal government. Ordinance number 172081 defines Special Flood Hazard Areas as those designated as A, AO, AE, AH, AI-30, A-99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, V, VE and VI-30 Zones on the Los Angeles Flood Hazard Map. The proposed alignments of the Westside Extension Project are not located within any of these zones.

3.4.2 City of Los Angeles Department of Water and Power

As the water supply authority for the Project Area, the Los Angeles Department of Water and Power (LADWP) prepared an Urban Water Management Plan (UWMP) to promote effective management of its water resources (LADWP 2005). The plan outlines the strategies that will be used to meet the city's current and future water needs. The following water management categories from the UWMP apply to the proposed project:

- Protect existing water supplies from contamination and clean up groundwater supplies; and,
- Maintain the structural integrity of the Los Angeles Aqueduct and in-city water distribution systems.

3.4.3 City of Los Angeles—Department of Public Works, Bureau of Engineering

The City of Los Angeles Bureau of Engineering is responsible for the construction public infrastructure in the city. The bureau issues permits for construction activities related to public right-of-ways. A "B" Permit (LAMC 62.106) is issued by the Bureau for the construction of bridges. Construction plans are usually required and must be signed by a California licensed Civil and/or Electrical and/or Traffic Engineer (City of Los Angeles 2009).

3.4.4 City of West Hollywood

The General Plan for the City of West Hollywood is currently undergoing an update. The draft General Plan was available for public review in June, 2010.

The City of West Hollywood, Department of Public Works, Environmental Services Division, is responsible for implementing the Storm Water Management and Discharge Control Ordinance through the city's Municipal Code (City of West Hollywood 2006).

Title 15 of the Municipal Code, *Environmental Protection, Pollution, and Solid Waste*, includes storm water and urban runoff pollution controls as well as floodplain management regulations (Article 3, Chapters 15.56 and 15.68). Similar to the Los Angeles County Code, the city's Municipal Code prohibits illicit discharges unless permitted through the municipal or other NPDES permit and requires the implementation of applicable mitigating best management practices. In addition, Chapter 15.56 specifies storm water runoff requirements for industrial dischargers including reducing runoff containing sediment, construction materials or other construction-related pollutants.

The city requires any development located within a special flood hazard area (as established in Section 15.68.070 of the Municipal Code) to obtain a flood damage prevention permit (City of West Hollywood 2006). Section 15.68.160 specifies Standards of Construction in areas of special flood hazards as identified by FEMA in the city's FIRM (City of West Hollywood 2006).

3.4.5 City of Beverly Hills

3.4.5.1 City of Beverly Hills General Plan

Policies in Chapter 3 of the city's General Plan, Infrastructure and Public Services, relate to construction and operations of the proposed alternatives. This chapter includes goals that address issues related to water systems, sewer and wastewater systems, and storm drainage (City of Beverly Hills 2008). Specific policies aimed at preserving the quantity and quality of water resources in and available to the city include;

- Continued evaluation and updating of the Urban Water Master Plan and the Drain System Master Plan (Policies IU 1.1 and IU 9.2);
- Required assessments by new development of potential storm runoff impacts on the local and subregional storm drainage systems which includes submittal of final drainage plan to the City Engineer (Policy IU 9.3 and Implementation Measure 2.2);
- Required mitigation for new development with the potential to degrade surface waters or the groundwater system (Policy IU 10.1, Implementation Measure 2.2); and,

- Require developers to obtain and comply with a NPDES permit from the SWRCB (Policy IU 10.3, Implementation Measure 2.2 and 3.4).

3.4.5.2 City of Beverly Hills Municipal Code

Title six of the City of Beverly Hills Municipal code, Utilities and Franchises, addresses wastewater systems in the city. Specifically, Section 6-1-307 prohibits the unlawful discharge of wastewater that would pollute underground or surface waters. This section of the code would relate to activities and potential impacts during the construction and operations phase of the proposed project. All potential discharges would be made in compliance with applicable permits and municipal regulations.

Title nine of the Municipal Code, Building and Property Health and Safety Regulations, addresses stormwater and urban runoff pollution control. Article five establishes prohibited activities related to stormwater and urban runoff pollution and requirements for construction projects. Section 506, Urban Runoff and Stormwater Mitigation Plans and Redevelopment Projects, regulates projects requiring compliance with the most recent SUSMP and current municipal NPDES permit. Regulated development projects include; commercial or industrial developments with one hundred square feet or more of impervious surface area, automotive service facilities, or parking lots of 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to stormwater runoff.

3.4.6 City of Santa Monica

3.4.6.1 City of Santa Monica General Plan

The following policy statements in the city's General Plan, *Conservation, Open Space, Scenic Corridors Element,* are relevant in relation to the proposed alternatives (City of Santa Monica 1975):

- Policy 3: The city water division shall be charged with the responsibility of determining and maintaining the safe level of local well water extraction to obtain the highest possible production while avoiding the hazards of salt water intrusion.
- Policy 4: The city shall actively participate in the protection of water shed areas affecting Santa Monica water supplies.
- Policy 6: The city shall protect the city aquifers from contamination by controlling all forms of access or contact such as private wells, industrial dumping or any other type of intrusion into the aquifers which may affect the water quality.
- Policy 7: The city shall continue to strive for higher quality water standards even though they may exceed those of recognized domestic and international agencies and organizations which develop such standards.
- Policy 8: The Public Works Department shall identify and mitigate all potential sources of industrial or commercial pollution, which may adversely affect water supplies stored in city reservoirs or water being pumped into the city.

3.4.6.2 City of Santa Monica Municipal Code

Article 7, Public Works, addresses urban runoff regulations, water conservation, and floodplain management regulations. Chapter 7.10, Urban Runoff Pollution, includes sections applicable to the proposed alternatives including (City of Santa Monica 2009),

- Good housekeeping requirements for reduction of urban runoff applicable to all properties (Section 7.10.040);
- Urban runoff reduction requirements for new development (Section 7.10.050); and,
- Urban runoff requirements for construction sites (Section 7.10.060).

Among other aspects of urban runoff management, the city's municipal code prohibits non-storm water discharges, regulates permitting under the municipal NPDES permit, and industrial activities to be permitted under the NPDES general industrial activity storm water permit. Additionally, persons conducting industrial activities within the city should refer to the city's *Industrial/Commercial Best Management Practices Handbook* for specific guidance on best management practices for reducing pollutants in storm water discharges from industrial activities (Title 15 Article 3 Chapter 15.56.060 Prohibited Activities).

The sections of the Municipal Code contain important requirements for handling and reducing negative impacts potentially associated with urban runoff.

Article 7 Chapter 7.68 of the city's Municipal Code contains floodplain management regulations and defines standards of construction for special flood hazard areas. For nonresidential construction, applicable regulations include:

- Structures shall be flood-proofed so that the structure is watertight with walls substantially impermeable to the passage of water,
- Structures shall have structural components capable of resisting hydrostatic and hydrodynamic loads, and
- Structures shall be certified by a registered civil engineer or architect that the standards of Section 7.68.140(c)(2)(A) and (B) are satisfied.

In addition, a floodplain development permit is required before construction within special flood hazard areas in the city.

3.5 Significance Criteria

3.5.1 CEQA Guidance

The following significance criteria were developed based on guidance from Appendix G of the state California Environmental Quality Act (CEQA) Guidelines (2009). The build alternatives would be determined to result in a significant impact to hydrology and water quality if they would:

- Violate any applicable water quality standards or waste discharge requirements, including those defined in Section 13050 of the CWC;
- Affect the rate or change the direction of movement of existing groundwater contaminants, or expand the area affected by contaminants;
- Substantially 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;

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows; or
- Expose people of structures to a significant risk of loss, injury or death involving flooding.

3.5.2 NEPA Guidance

3.5.2.1 Federal Transit Administration

The Federal Transit Administration (FTA) realizes that mass transportation projects have the potential to impact water quality by increasing runoff or altering surface or sub-surface drainage patterns (FTA 2009). In order to address potential impacts, this environmental document will discuss:

- Activities that could generate wastewater and the provisions for containing these possible pollutants; and,
- The project's potential for increasing runoff, and measures that will be used to reduce runoff or prevent pollutants from entering stormwater systems.

4.0 AFFECTED ENVIRONMENT

This section examines the affected environment related to water resources and water quality associated with the proposed Westside Subway Extension Alternatives. The information in this section is based primarily on information readily available from the LACDPW, LARWQCB and FEMA (Figure 4-3 shows the local surface water bodies in the study area).

4.1 Municipal Water Supply

The LADWP is responsible for supplying, treating and distributing water for domestic and industrial uses in the project area. The LADWP serves an area of approximately 460 square miles with over 712,000 water service connections. LADWP draws its water from three main sources: the San Fernando Groundwater Basin (11 percent), the Los Angeles Aqueduct (35 percent), and the Metropolitan Water District (53 percent) (LADWP 2009). LADWP serves the City and County of Los Angeles as well as unincorporated areas of Los Angeles County.

Other water supply agencies in the area of the proposed project include the West Basin Municipal Water District (West Basin) and the Metropolitan Water District of Southern California (MWD). The West Basin serves a total area of 185 square miles including the cities of West Hollywood and Beverly Hills as well as unincorporated areas of Los Angeles County. The West Basin purchases imported water from the MWD. The MWD provides 85 to 90 percent of the City of Santa Monica's water. The MWD imports its supplies from two separate sources; Colorado River water delivered from Lake Havasu and State Project water from the Sacramento-San Joaquin Delta. Santa Monica derives approximately 10 to 15 percent of its water supply from local groundwater (City of Santa Monica Water Division 2009).

Groundwater is a major component of water supply in the Los Angeles metropolitan area. Local groundwater resources provide about 15 percent of the total water supply. In drought years this number can be as large as 30 percent (LA DPW and LADWP 2005). The city owns water rights in the Upper Los Angeles River Area (ULARA) groundwater basin in addition to the supply that comes from the Central and West Coast sub-basins of the Coastal Plain of Los Angeles Groundwater Basin (LA DPW, LADWP and USACE 2007). On average, about 86 percent of the groundwater supply comes from the ULARA groundwater basin (LA DPW and LADWP 2005).

4.2 Surface Water Hydrology

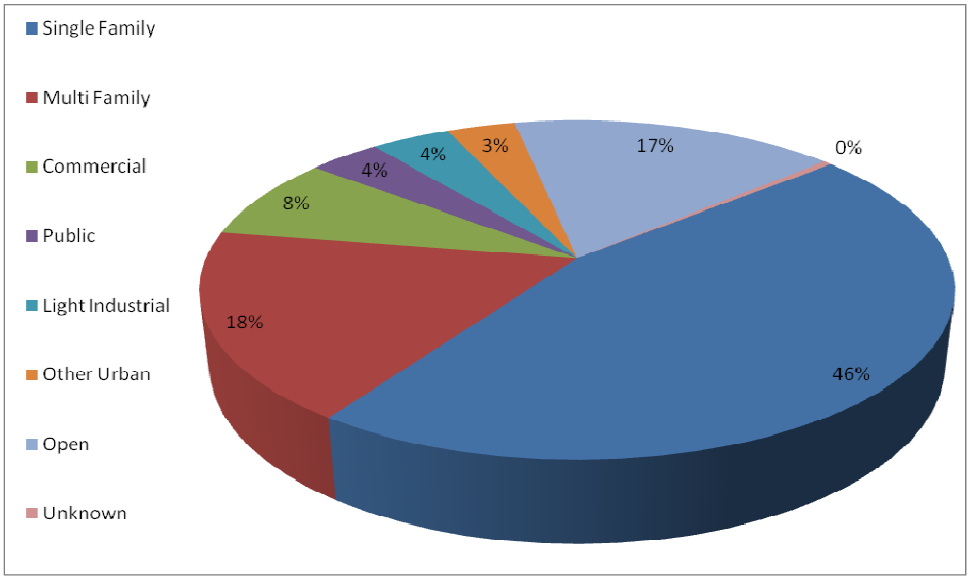
4.2.1 Regional Surface Water Setting and Conditions

The alignment alternatives are located in the Santa Monica Bay Watershed Management Area (WMA). The Santa Monica Bay WMA encompasses an area of 414 square miles, covering a diverse part of Los Angeles County and the southeastern corner of Ventura County (LARWQCB 2007a). The WMA includes the Ballona Creek Watershed, which encompasses the alignment alternatives. Ballona Creek Watershed has an area of 125 square miles and is the largest tributary to the Santa Monica Bay (LA DPW 2005).

The proposed vehicle and maintenance yards are located in the Los Angeles River Watershed, which covers an area of over 834 square miles from the eastern portions of the Santa Monica Mountains, Simi Hills, and the Santa Susana Mountains in the west to the

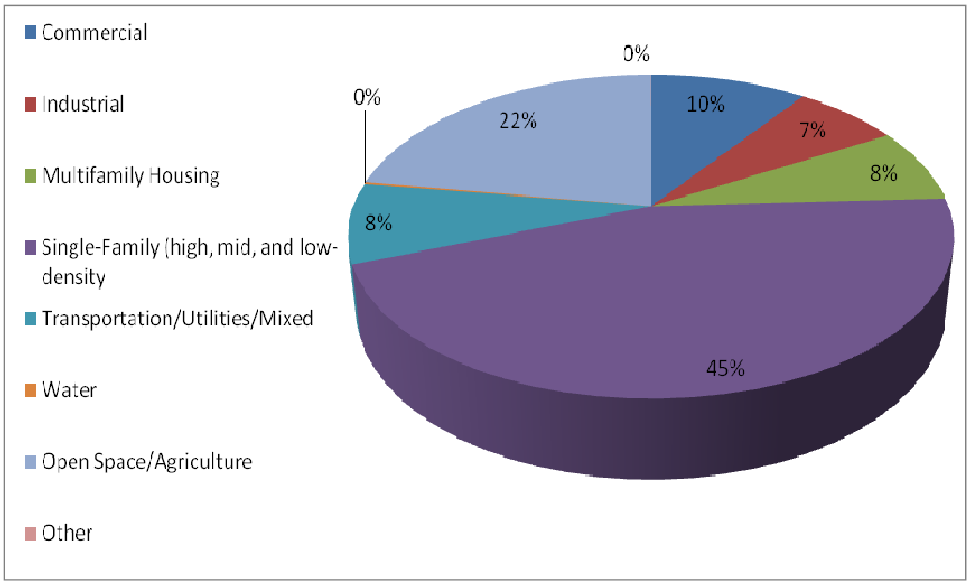
San Gabriel Mountains in the east. While the upper portion of the watershed is covered by forest and open space, approximately 474 square miles of the watershed is highly developed with commercial, industrial, and residential uses (LARWQCB 2007b).

Figure 4-1 and Figure 4-2 summarize land use patterns in both the Ballona Creek Watershed Los Angeles River Watershed, illustrating the lack of open water areas in each.



Source: LA DPW 2005 (Data from Caltrans, 1998)

Figure 4-1. Land Use in the Ballona Creek Watershed



Source: LADPW and LADWP 2005

Figure 4-2. Land Use in the Los Angeles River Watershed

4.2.2 Local Surface Water Issues

As depicted in Figure 4-3, water-related features in the Ballona Creek Watershed include Ballona Creek and associated tributaries of the Sepulveda Channel, Benedict Canyon, and Centinela Creek. Historically, these water bodies were meandering streams through the watershed. However, winter rains would often overwhelm the creek banks and cause flood damage (LACDPW 2004). As a result, Ballona Creek and its tributaries have been channelized and are controlled by structural flood control measures, including storm drains and underground culverts (LACDPW 2004). The closest surface water body to the alternative alignments is Ballona Creek, which is approximately 3.5 miles from Highway 10 in the project area. In the vicinity of the proposed storage and maintenance facilities, the Los Angeles River is the closest water body, located approximately 0.2 miles from the proposed locations of the maintenance yards.

The ultimate receiving water body in the region is Santa Monica Bay and the Pacific Ocean. The bay is considered a natural resource of national significance by both the federal and state governments and is protected under the Natural Estuary Program. Santa Monica Bay is a federal navigable water body, and is listed as an impaired water body in the federal listing established under the CWA, Sections 131.1, 303, 304, and 319. Water quality conditions within the study area are described in more detail in Section 4.6.

Additional water bodies considered in this analysis are the La Brea Tar Pits located on the northern side of Wilshire Boulevard between Spaulding and Curson Avenues and Compton Creek, located approximately 1 mile west of Metro's Rail Operations Center (ROC).

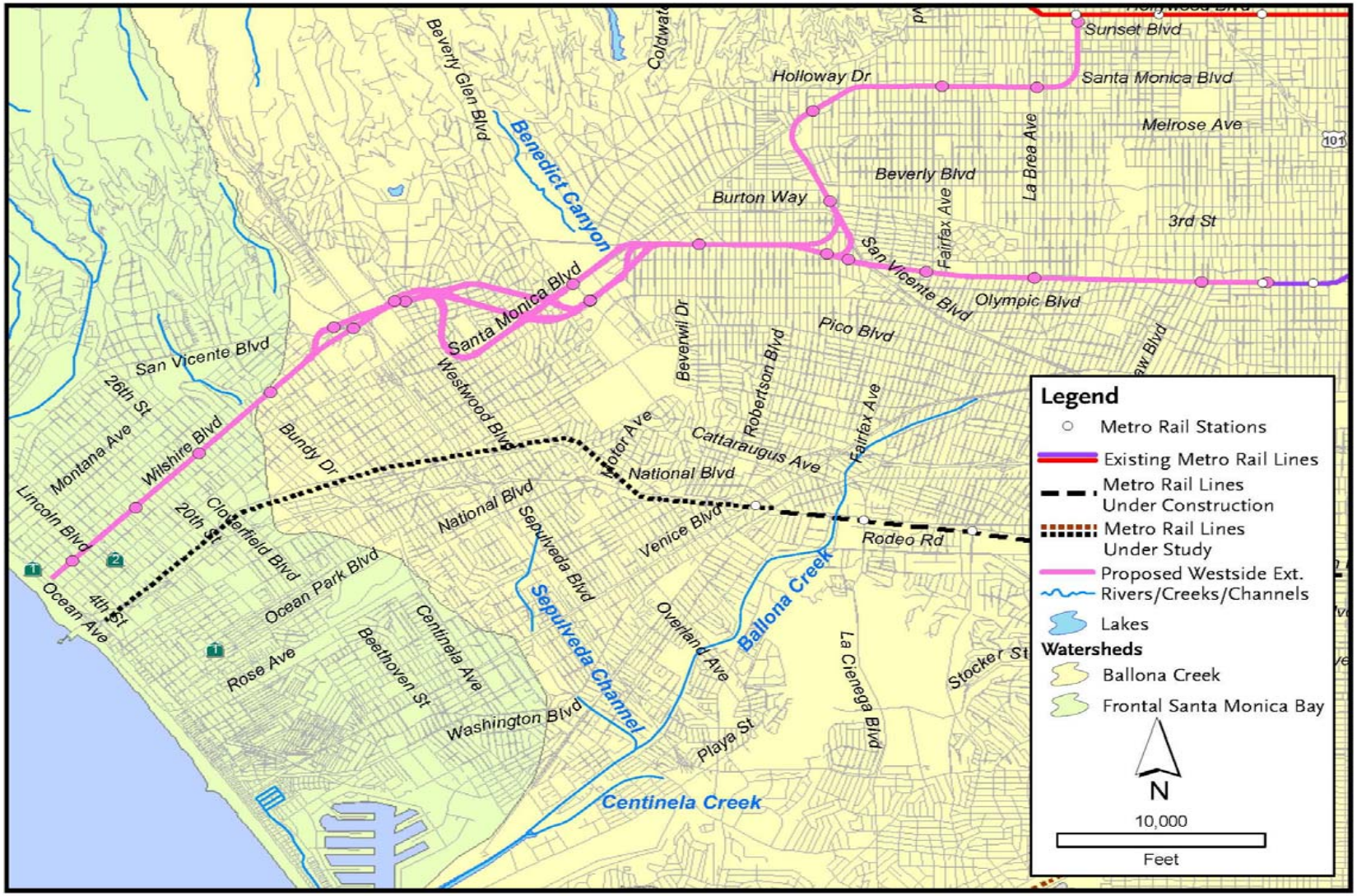


Figure 4-3. Local Surface Water Bodies in the Study Area

4.3 Groundwater

The Los Angeles Coastal Plain Groundwater Basins underlie the project area. These groundwater basins are part of the Coastal Plain Hydrographic Subunit. The Coastal Plain Basin contains the Central and West Coast, Santa Monica, and Hollywood subbasins. The West Coast, Santa Monica, and Hollywood Subbasins underlie the Ballona Creek Watershed while the Central Subbasin underlies the Los Angeles River Watershed. The Central, Santa Monica, and Hollywood Subbasins directly underlie the proposed alignments. The designated beneficial uses of these subbasins include: Municipal and Domestic Supply (MUN), Industrial Service Supply (IND), Industrial Process Supply (PROC), Agricultural Supply (AGR), and Aquaculture (AQUA) (Metro 2009a).

The majority of groundwater production in the Central subbasin is from the deeper San Pedro Formation including the Lynwood, Silverado, and Sunnyside aquifers (WRD 2006b, as cited in MWD of Southern California 2007). Similarly, the main potable production aquifer in the Santa Monica subbasin is the Silverado aquifer of the San Pedro Formation. This aquifer is up to 280 feet thick in the Santa Monica Subbasin (MWD of Southern California 2007). Semi-perched groundwater may occur in the alluvium in the Hollywood Subbasin (ranging in thickness from 5 to 35 feet). Limited groundwater is produced from this zone, but it is still an important source in the basin, as water from this zone can percolate into the underlying aquifers. The main potable production aquifers include the deeper San Pedro Formation (including the Jefferson, Lynwood, Silverado and Sunnyside aquifers). In general, aquifers in the Hollywood Subbasin do not yield significant groundwater except in the western portion where the subbasin is deeper (MWD of Southern CA 2007).

Long-term annual rainfall in the subbasins averages between 12.5 inches along the coast to 15.5 inches in downtown Los Angeles (LACDPW 2004). Most precipitation falls in a few major storms that typically occur between November and March. Groundwater in Ballona Creek Watershed is replenished by percolation of rainfall from the Santa Monica Mountains to the north and Baldwin Hills to the south. Urbanization and impervious surfaces substantially reduces percolation through stream channels. Groundwater resources are replenished in the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water in the forebay areas (DWR 2004). Natural replenishment of groundwater happens in the forebay areas where permeable soils are exposed at ground surface (DWR, 2004). For the Central Basin, this takes place largely in the Whittier Narrows area near the Rio Hondo, approximately 10 miles east of the project area. Percolation and groundwater replenishment in the Los Angeles Forebay is limited due to the large amount of paving and urban development throughout the City of Los Angeles (DWR 2004). There are defined underground streams under the study area.

4.3.1 Wilshire Boulevard Area

Groundwater along Wilshire Boulevard in the vicinity of the proposed alignments varies in depth and inflow rate. In part, this is due to the presence of different soil types throughout the area. Groundwater is encountered at greater depths in clayey soils and at more shallow depths in sandy soils. In certain areas, such as the Westwood area, the groundwater appears to be under artesian pressure and major dewatering has been necessary for previous underground construction projects.

Exploratory borings drilled in 1980 and 1981 for the Metro Rail project along Wilshire Boulevard between Western and Fairfax Avenues found groundwater, probably perched, between approximately 10 and 35 feet below ground surface (Metro 2009b). Locally, groundwater as shallow as 5 to 10 feet below ground surface was reported in borings drilled along Wilshire Boulevard between Curson and Orange Grove Avenues (Le Roy Crandall and Associates 1983, as cited in Metro 2009b). Groundwater measurements conducted in 2007 along Wilshire Boulevard between Crenshaw Boulevard and Burnside Avenue indicated groundwater levels ranging from approximately 12 to 40 feet (TRC 2007 as cited in Metro 2009b). Core borings drilled in 2004 about 1,000 feet south of Wilshire Boulevard at Texas and Barrington Avenues in West Los Angeles (on the northern portion of University High School) indicated localized zones of perched water as shallow as 5 to 10 feet below ground surface (Mactec 2004 as cited in Metro 2009b).

Groundwater level data along Wilshire Boulevard west of the 405 freeway is sparse. Measurements recorded in the 1970s near Bundy and Sepulveda Boulevards ranged from 40 to 75 feet below ground surface. Recent groundwater data recorded by MACTEC recorded groundwater depths in the Sawtelle area at least 20 feet shallower than prior groundwater level measurements. Some of this rise in groundwater levels may be due to the decrease in groundwater pumping in the vicinity since the 1970s (Metro 2009b). As described in Metro 2009b, the Santa Monica Fault Zone presents a barrier to ground water; therefore, west of Stanford Street, the ground water is well below the planned subway depth.

4.3.2 Santa Monica Boulevard Area

Along Santa Monica Boulevard, groundwater monitoring conducted in 2009 recorded depths ranging from 1.3 feet below ground surface at La Cienega near Beverly Boulevard to 87.7 feet below ground surface at Santa Monica Boulevard near Fairfax Avenue. East of Fairfax Avenue, groundwater levels were measured on Santa Monica Boulevard near North Flores Street (50.6 feet below ground surface) and on Santa Monica Boulevard near North West Knoll Drive (34 feet below ground surface). Historical groundwater level contour mapping shows groundwater depths ranging from 10 to 150 feet below ground surface along Santa Monica Boulevard (Metro 2009b).

4.4 Drainage

4.4.1 Build Alternatives

The study area is highly urbanized and heavily covered with impervious surfaces associated with areas of asphalt, concrete, buildings, and other land uses which concentrate storm runoff. Along the alignment alternatives stormwater and other surface water runoff is conveyed to municipal storm drains (Figure 4-4). The majority of local drainage networks are controlled by structural flood control measures.

Most of the proposed subway alignment alternatives are along major arterials with curb and gutter features. There are multiple storm drains and features within the study area, but the proposed project alignments do not cross any major aboveground drainage features. Drainage along the proposed alignment in the West Hollywood area is generally southwest through the city's MS4. Drain pipes along the Wilshire Boulevard area of the alignment direct runoff both to the southeast and southwest of the proposed alignment. Ballona Creek, which ultimately drains into Santa Monica Bay, is the main receiving drainage channel for

runoff in the area of the alternative alignments. Before reaching Ballona Creek, runoff throughout the study area drains to tributaries including Sepulveda Channel and Benedict Canyon Channel.

4.4.2 Maintenance Yards

The area in the vicinity of the proposed maintenance yards is part of the Los Angeles River Basin, which includes the coastal areas of Los Angeles County south of the divide of the San Gabriel Mountains and Santa Susana Mountains, plus a small part of the coastal portion of Ventura County south of the divide of the Santa Monica Mountains (City of Los Angeles Planning Department 1995).

For planning purposes, the City of Los Angeles divides the Los Angeles River Basin into three drainage areas: the Upper Los Angeles River Area, the Santa Monica Bay area, and the Central area. The three major rivers that drain the basin include the Los Angeles River, the Rio Hondo, and the San Gabriel River.

The Los Angeles River is the closest surface water feature to the proposed maintenance yards. This river drains the San Fernando Valley, flowing southward through the Coastal Plain where it is joined by the Rio Hondo 12 miles upstream from the Pacific Ocean (City of Los Angeles Planning Department 1995). Drainage in the immediate vicinity of the proposed maintenance yards generally flows southeast towards the Los Angeles River. Runoff rates and volumes in the City of Los Angeles, and more specifically in the project area due to are influenced by urbanization and increased impervious cover associated with large areas of asphalt, concrete, buildings, and other land uses which concentrate storm runoff. Due to previous flood control projects, almost all local streams and rivers (including the Los Angeles River) have been channelized and/or culverted in the urban areas and they now serve primarily as storm runoff channels.

Storm drains within the city are constructed and maintained by both the City and the Los Angeles County Flood Control District. The Los Angeles County Flood Control District constructs the major storm drains and open flood control channels, and the City constructs local interconnecting tributary drains. The City's system is designed to convey storm flows from a ten-year storm event, while the County system is designed for a 50 year storm event.

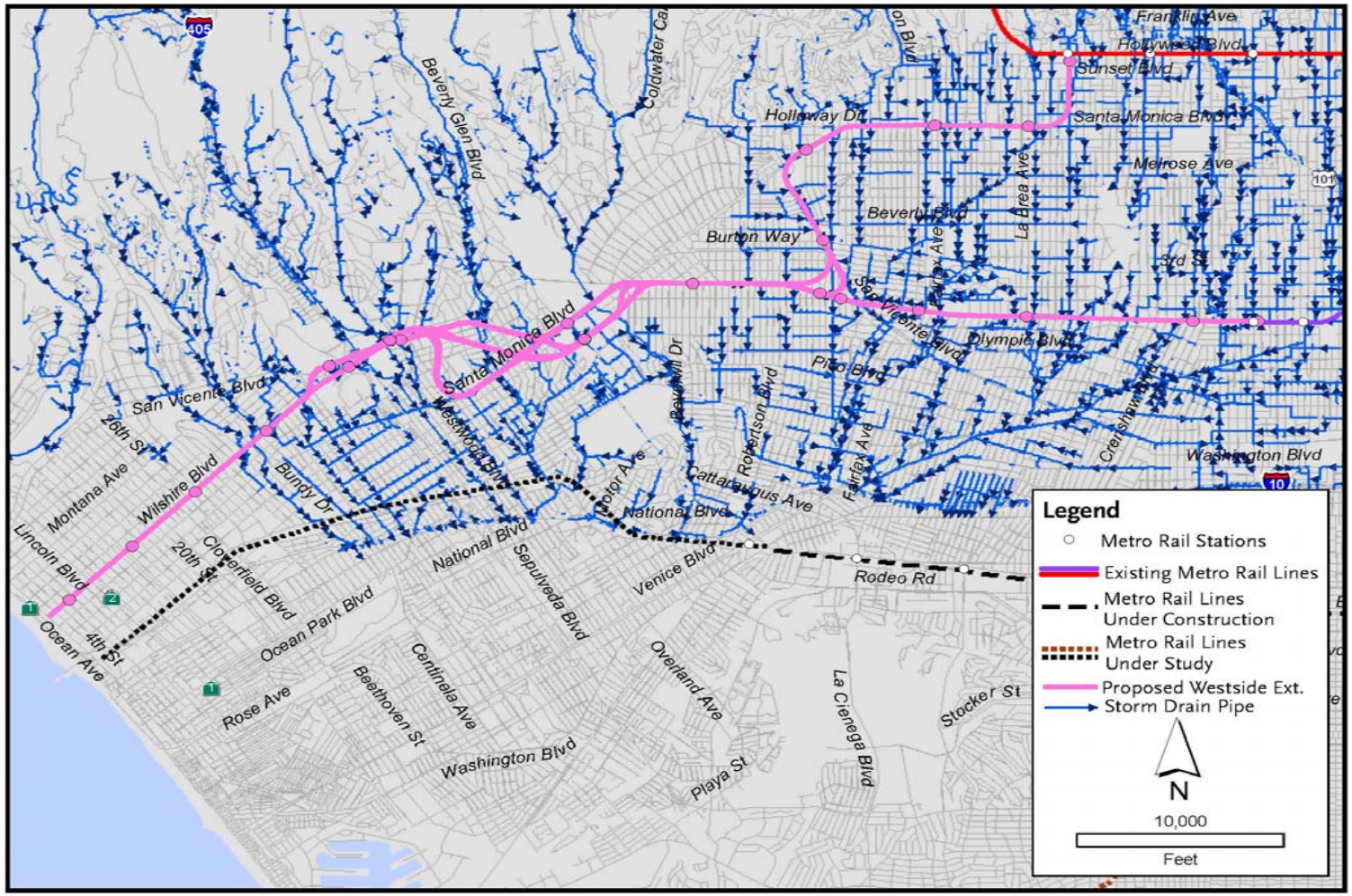


Figure 4-4. Existing Drainage Infrastructure and Flow Direction in the Vicinity of the Build Alternatives

4.5 Flooding

Los Angeles and nearby cities are located in a relatively flat alluvial plain, about 30 miles wide, lying on uplift terraces surrounded by mountain ranges. FEMA has prepared flood maps identifying areas in Los Angeles County and surrounding cities that would be subject to flooding during 100-year and 500-year storm events. The following sections describe the floodplains in the vicinity of the alternative alignments and the maintenance yards.

4.5.1 Build Alternatives

Areas along the alignment of the Build Alternatives contain 500-year floodplain and 100-year floodplain (FIRMs: 06037C1580F, 06037C1557F, 06037C1556F, 06037C1552F, 06037C1288F, 06037C1290F, 06037C1295F, 06037C1551F, 06037C1532F, 06037C1533F, 06037C1529F, 06037C1528F, 06037C1536F, 06037C1517F, 06037C1519F).

Areas of 500-year floodplain (flood zone B) occur at the following locations:

- Wilshire Boulevard between the existing Wilshire/Western station and the optional Wilshire/Crenshaw station;
- South San Vicente Boulevard in the vicinity of North La Cienega Boulevard;
- Santa Monica Boulevard south of Holloway Drive; and,
- Wilshire Boulevard between South Sepulveda Boulevard and 26th Street.

Areas of 100-year floodplain occur along North La Cienega Boulevard to the north and south of the intersection at Burton Way. The 100-year floodplain in this area is designated as AO, which means it is subject to a one percent annual chance of shallow flooding hazards in the form of sheet flow (average depths ranging from 1 to 3 feet). Another area of 100-year floodplain lies adjacent to Santa Monica Boulevard south of the intersection with Wilshire Boulevard. This area is designated as AH, which means it is subject to a one percent annual chance of shallow ponding (average depths ranging from 1 to 3 feet). Figure 4-5 shows these floodplain areas along the Build Alternatives.

4.5.2 Rail Operations Center

The Rail Operations Center (ROC) is located in flood zone X, defined as an area of no flooding. The closest floodplain is a channel contained 100-year flood zone A (Compton Creek) located approximately 1 mile away from the ROC (Figure 4-6).

4.5.3 Maintenance Yards

In the vicinity of the proposed maintenance yards, the Los Angeles River has been channelized and/or culverted and serves primarily as a storm runoff channel. The current floodplain for much of the river is contained in the channel, and the flood zone is designated Zone A (100-year floodplain, channel contained) by FEMA (FIRM 06037C1636F). Part of the proposed maintenance yard located at the Union Pacific Railroad—Los Angeles Transportation Center Railroad is located in flood zone AE (Figure 4-7). Flood zone AE is designated as areas in the 100-year floodplain where base flood elevations (BFEs) have been derived from detailed analyses. The base flood, also known as the 100-year flood, is defined as having a one percent chance of being equaled or exceeded in any given year. Therefore, BFEs are the determined elevation to which floodwater is anticipated to rise during a base flood. The BFE is the regulatory requirement for the elevation or floodproofing of structures (FEMA 2010).

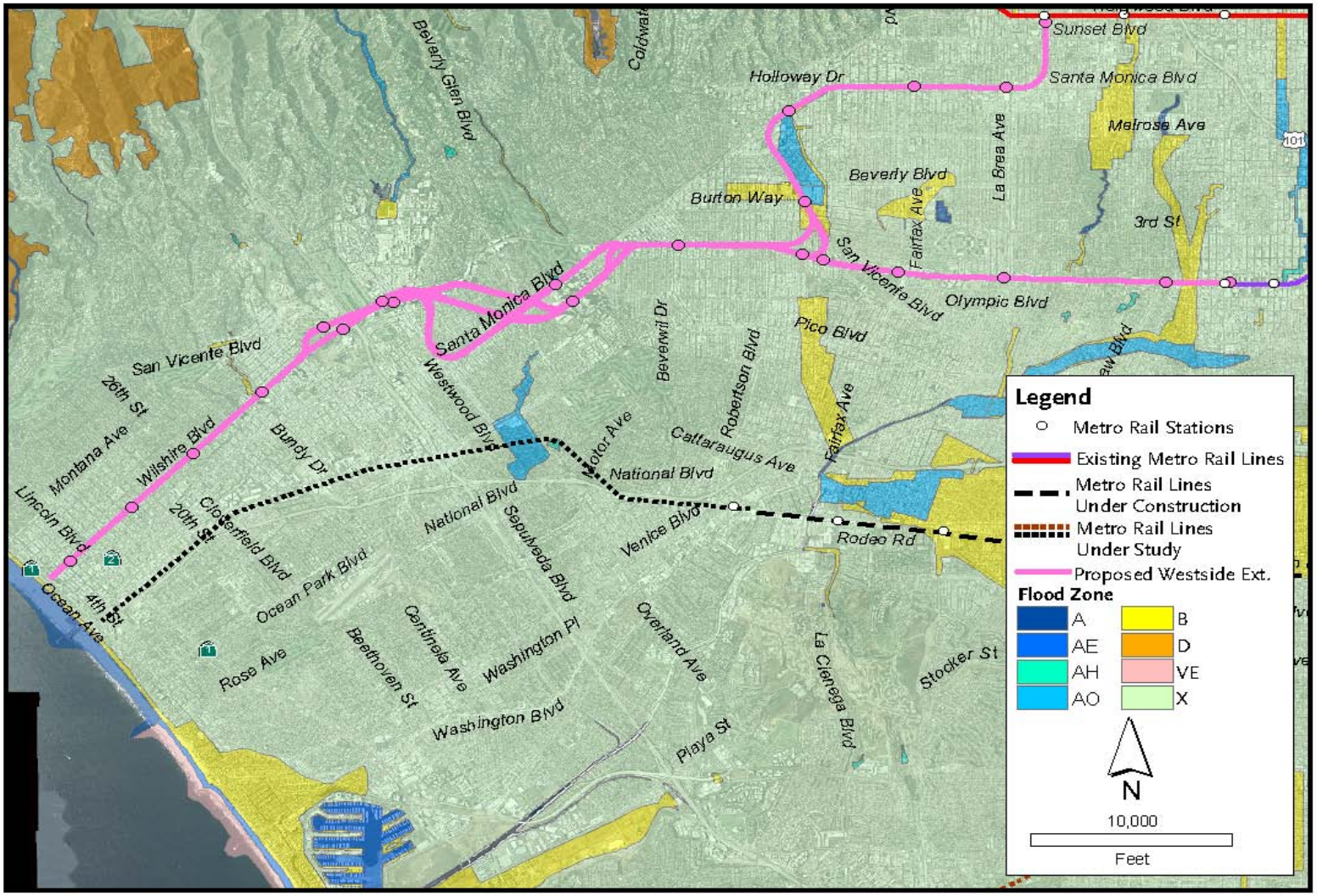


Figure 4-5. FEMA Floodplains in the Vicinity of the Build Alternative

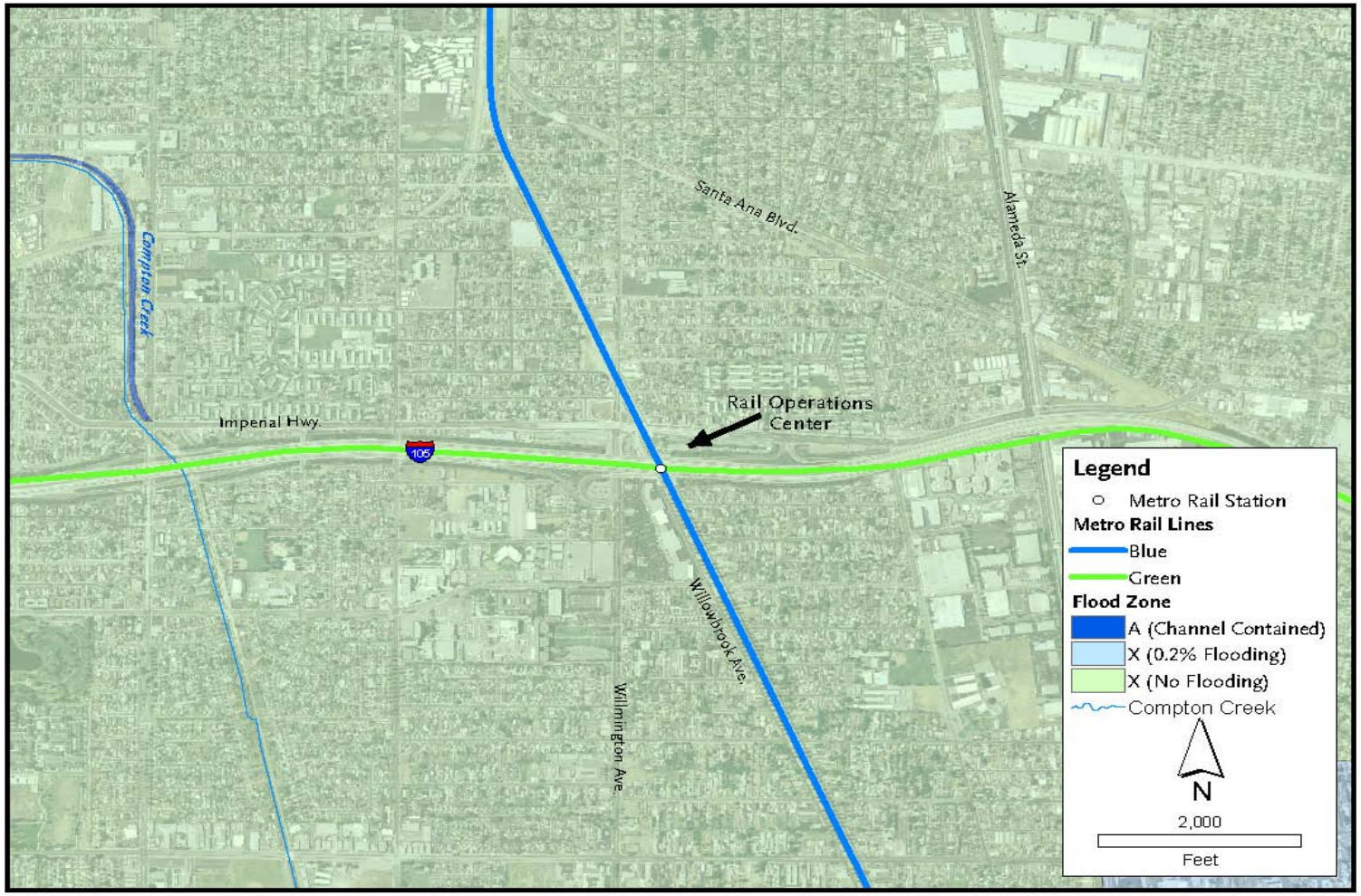


Figure 4-6. FEMA Floodplains in the Vicinity of the Rail Operations Center

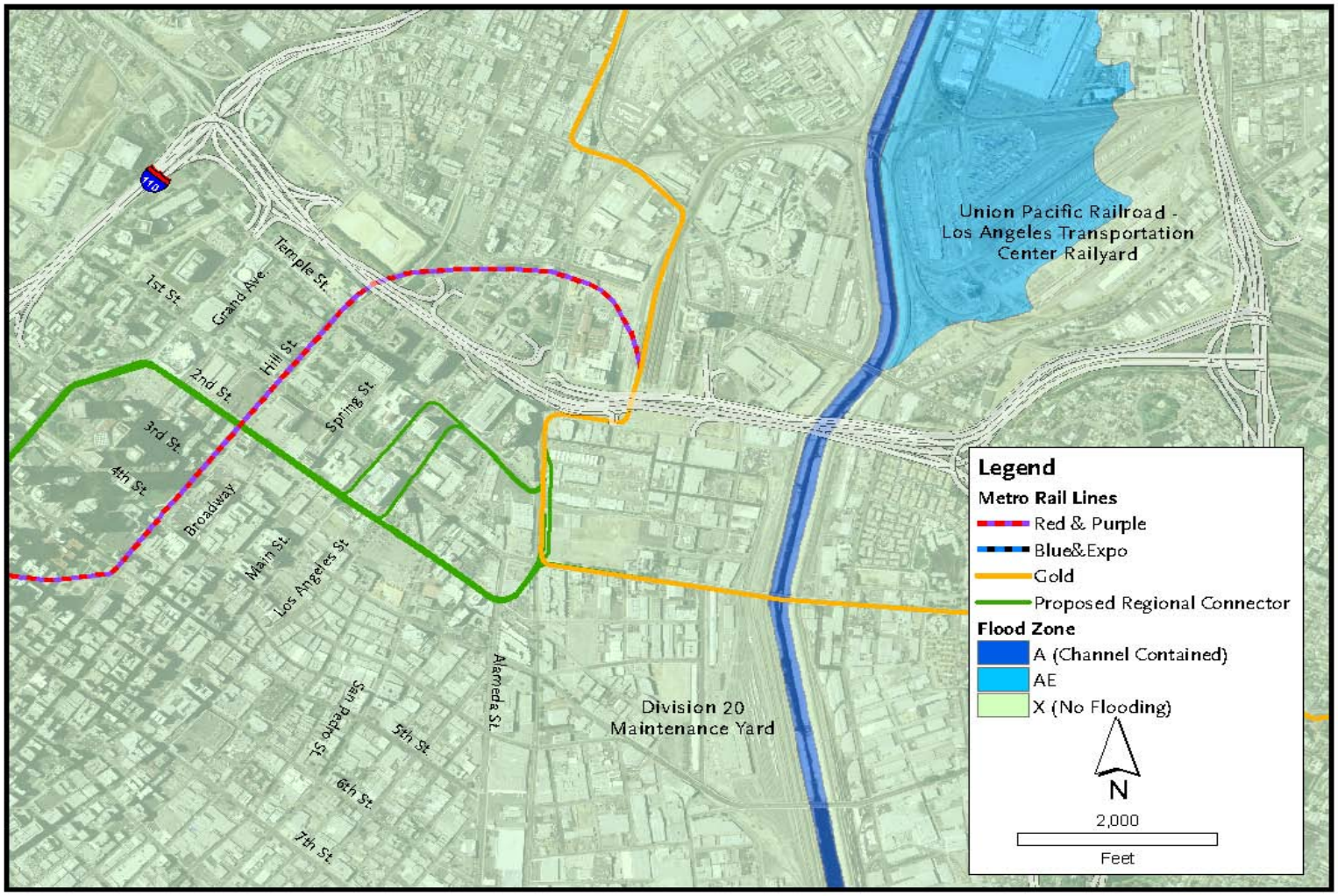


Figure 4-7. FEMA Floodplains in the Vicinity of the Proposed Maintenance Yards

4.6 Water Quality

4.6.1 Surface Water Quality

Urban runoff from the study area typically has negative impacts on surface water quality. Stormwater and other water runoff washes residues from the land, including deposits from vehicles, pet waste, pesticides, and street litter into the storm drain system. The LARWQCB is responsible for protecting the surface and groundwater quality of the region (between the coastal drainages of Rincon Point in western Ventura County and the eastern Los Angeles County line). In order to protect and enhance water quality and the beneficial uses of the region's waters, the LARWQCB develops the Basin Plan.

The Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties lists the following beneficial uses for the Ballona Creek (LARWQCB 1995):

- Non-Contact Water Recreation (REC-2): Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, and camping.
- Wildlife Habitat (WILD): Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources.

Ballona Creek in the study area does not meet the water quality standards for the beneficial uses described above; therefore, it is on the 303(d) list of Water Quality Limited Segments and the state is required to develop TMDLs for the pollutants causing impairment. Table 4-1 summarizes the pollutants causing impairment in the creek, the TMDL requirement status, and the associated TMDL completion and approval dates.

Table 4-1. 303(d) List of Pollutants Requiring TMDLs, Ballona Creek

Pollutant	TMDL Requirement Status[1]	Expected TMDL Completion Date	Date USEPA Approved TMDL
Coliform Bacteria	B		3/26/2007
Copper, Dissolved	B		12/22/2005
Cyanide	A	01/01/2019	
Lead	B		12/22/2005
Selenium	B		12/22/2005
Shellfish Harvesting Advisory	B		01/01/2006
Toxicity	B		01/01/2005
Trash	B		01/01/2001
Viruses (enteric)	B		03/26/2007
Zinc	B		12/22/2005

Source: LARWQCB 20N0tes:

B = Pollutant being addressed by USEPA approved TMDL
A = Pollutant requiring TMDL

Beneficial uses for the Los Angeles River include:

- Groundwater Recharge: Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- Water Contact Recreation (REC-1 and REC-2): Uses of water for recreational activities involving both body contact with water (REC-1) and no body contact with water (REC-2). These uses include, but are not limited to, swimming, wading, and boating.
- Warm Freshwater Habitat: Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

The Los Angeles River in the project area is listed on the LARWQCB's 2008 CWA Section 303(d) list of impaired water bodies. TMDLs have been developed for trash, metals, and nitrogen compounds. In addition to the impact trash has on aesthetics, its presence inhibits plant growth and it can be ingested by or entangle wildlife (LA DPW, LADWP and USACE 2007).

Table 4-2 summarizes the pollutants causing impairment in Reach 3 of the Los Angeles River in the vicinity of the proposed maintenance yards, the TMDL requirement status, and the associated TMDL completion and approval dates.

Table 4-2. 303(d) List of Pollutants Requiring TMDLs, Los Angeles River Reach 3

Pollutant	TMDL Requirement Status	Date USEPA Approved TMDL
Ammonia	B	3/18/2004
Copper	B	12/22/2005
Lead	B	12/22/2005
Nutrients (Algae)	B	3/18/2004
Trash	B	7/24/2008

Source: LARWQCB 2008

B = Pollutant being addressed by USEPA approved TMDL.

4.6.2 Groundwater Quality

Due to the long history of commercial and industrial activity in the study area, potential groundwater contaminants include sulfate, total dissolved solids, iron, chloride, and other types of industrial wastes (City of Los Angeles Planning Department 1995). The Water Replenishment District (WRD) of Southern California and the U.S. Geological Survey (USGS) conduct regional groundwater quality monitoring in the Central and West Coast Basins. The WRD's monitoring for Water Year 2007-2008 found that groundwater in the main producing aquifers of the basin is of good quality; however volatile organic compounds (VOCs) (primarily perchloroethylene (PCE) and trichloroethylene (TCE)) are present in the Central and West Coast Basins and have impacted many production wells (WRD 2009). The VOCs are at low concentrations and are below enforceable regulatory levels.

Table 4-3 summarizes water quality in public supply wells in the Central and West Coast Basins as monitored by the WRD of Southern California.

Table 4-3. Constituents of Concern in the Central and West Coast Basins

Constituent	Units	MCL	Range Detected in Sampling	
			Central Basin	West Coast Basin
Total Dissolved Solids	mg/L	500-1,000	170 to 2,770 Average: 500	190 to 13,900 Average: 1,016
Volatile Organic Compounds—TCE[2]	µg/L	5	Not detected to 32 for TCE Not detected to 8.3 for PCE	Not detected to 21
Volatile Organic Compounds—PCE[2]	µg/L	5	Less than 6	Not detected
Nitrate	mg/L	45	Not detected to 12	Not detected to 25
Iron and manganese	mg/L (iron) µg/L (manganese)	0.3 (iron) 50 (manganese)	Not detected to 8.4 for iron Not detected to 630 for manganese	Not detected to 1.1 for iron Not detected to 1,200 for manganese
Chromium	µg/L	50	Not detected above MCL	Not detected
Arsenic	µg/L	10	Not detected to 42	Not detected to 68

Source: WRD 2008

MCL = Maximum Contaminant Level
TCE = trichloroethylene; PCE = perchloroethylene

The *Site Assessment Study* prepared for this project describes local causes and sources of groundwater contamination at specific sites in the vicinity of the alignment alternatives and proposed station locations in more detail (Metro, 2009c).

5.0 ENVIRONMENTAL IMPACTS/ENVIRONMENTAL CONSEQUENCES

The following section discusses potential impacts to surface and groundwater resources in the Westside Subway Extension study area. Potential impacts were determined for each of the build alternatives, including optional station and alignment locations, as well as other components of the build alternatives (substations, Rail Operations Center (ROC), vehicles, maintenance yards, and operating plans) for the build alternatives.

5.1 Methodology

In order to determine alternative-specific impacts to hydrology and water quality, existing data on hydrology, drainage patterns, water quality, and floodplains was evaluated. Existing water quality conditions and identified beneficial uses in the project-area watersheds were assessed. Other issues considered include impacts to aquifer recharge, and possible groundwater contamination resulting from construction of the proposed alternatives.

Construction and operations phases of the proposed project were analyzed for compliance with applicable regulations that function to maintain and improve current water quality conditions. Project activities were also assessed in order to determine their potential impact on existing drainage patterns and the exposure of people and/or property to water-related hazards.

Each of the alternatives was analyzed for potential construction-related surface water sedimentation, generated by erosion and runoff from proposed staging areas; and for potential increases in impervious surface area and associated potential increases in post-construction storm water runoff volumes. Potential impacts were then analyzed against applicable significance criteria (described in Section 3.5). Where a potentially significant impact would be anticipated, proposed mitigation measures to address these potential effects were developed.

5.2 Municipal Water Supply

5.2.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts to the municipal water supply.

5.2.2 TSM Alternative

Similar to the No Build Alternative, the Transportation System Management (TSM) Alternative would not include any facilities that would require a substantial amount of water supply. Therefore, no adverse impacts are anticipated related to municipal water supply.

5.2.3 Alternative 1- Westwood/UCLA Extension

5.2.3.1 Construction

During early phases of construction, construction field offices would be established for personnel use during construction activities. In some instances, these offices would be established in existing office space in the vicinity of the work areas. However, where space allows, temporary jobsite trailers would be established for field offices. These offices would

include bathrooms, which would rely on municipal water supply. It is not anticipated that the use of these offices would have a substantial impact on municipal water supply in the project area.

Underground excavation and tunneling would encounter shallow groundwater along the alignment as described in Section 4.3. In general, construction-related tunnel excavation dewatering impacts have the potential to result in over-withdrawal of groundwater resources. However, as previously described, potable groundwater resources in the subbasins underlying the proposed alignment comes from the deeper, confined aquifers of the San Pedro Formation, while much of the shallow groundwater encountered along the alignment is perched (e.g., separated from the aquifers of the San Fernando Formation); therefore, potential dewatering would not impact groundwater levels in the aquifers used for municipal and industrial water uses.

A tunnel boring machine (TBM) would be used to construct Alternative 1. Bentonite slurry would be used to apply fluid (hydraulic) pressure to the tunnel face and to transport soil cuttings from the tunneling machine's pressure chamber to the surface. The slurry would require water use since water is added to the bentonite to create the fluid mixture used in the TBM. Water from the discharge slurry would be recycled for further use in preparing the bentonite slurry. Also, TBM motors require cooling. Typically, cooling water is recycled and cooled using cooling towers near the access shafts. Thus cooling water will have little impact on water use or discharge into the sanitary or storm drain system. Water use for the cooling towers would be temporary during construction and would be approved during specific construction design. It is anticipated that the LADWP has the capacity to supply this water. Therefore, construction of Alternative 1 would not have substantial adverse impacts on municipal water supply.

5.2.3.2 Operations

Operations of Alternative 1 include the operation of seven stations and four station options. The proposed stations and station options would consume water due to routine maintenance and cleaning of the stations. The proposed stations would not include public restrooms. Maintenance of the stations would consume a negligible amount of water. It is assumed that LADWP has the capacity to supply this water. Additionally, water use could be reduced with the implementation of standard water conservation measures (i.e. water saving devices for faucets, hoses, and other water-using facilities). Overall, Alternative 1 would not include any facilities that would require a significant amount of water supply. Therefore, no adverse impacts related to municipal water supply are anticipated.

5.2.4 Alternative 2—Westwood/VA Hospital Extension

5.2.4.1 Construction

Potential construction-related impacts to municipal water supply would be the same as those described for Alternative 1, above. Thus, there would be no adverse impacts from construction of Alternative 2 on municipal water supply.

5.2.4.2 Operations

Operations of Alternative 2 would include an additional station to the seven proposed in Alternative 1. There is also an optional Wilshire/VA Hospital station. As described above, none of the proposed stations would include public restroom facilities. Operational impacts

to municipal water supply would be negligible and could be reduced even further with the implementation of standard water saving devices. Therefore, no adverse impact would occur.

5.2.5 Alternative 3—Santa Monica Extension

5.2.5.1 Construction

Potential construction impacts would be the same as those described for Alternative 1 and 2, above.

5.2.5.2 Operations

Alternative 3 would include a total of 12 stations, with five stations in addition to the seven proposed under Alternative 1. No public restrooms would be located in any of the proposed stations. Station maintenance and cleaning would rely on municipal water supply. Despite the fact that Alternative 3 includes more stations than Alternatives 1 and 2, water use for station maintenance would still be expected to result in negligible impacts to municipal water supplies. The installation of standard water saving devices would reduce the amount of water used during station maintenance. Thus, there would be no adverse impact on municipal water supply from operations of Alternative 3.

5.2.6 Alternative 4—Westwood/VA Hospital Extension plus West Hollywood Extension

5.2.6.1 Construction

Impacts would be the same as those described for Alternatives 1-3, above.

5.2.6.2 Operations

Alternative 4 would also include 12 stations. Operational impacts to municipal water supply would be the same as those described under Alternative 3.

5.2.7 Alternative 5—Santa Monica Extension plus West Hollywood Extension

5.2.7.1 Construction

As with Alternatives 1 through 4, field offices during the early stages of construction would use a negligible amount of municipal water for the operation of bathrooms in the office facilities. This would not result in significant adverse impacts to municipal water supply within the project area.

5.2.7.2 Operations

Alternative 5 includes 17 stations. As with Alternative 4, as the number of stations increases, the amount of water used for station maintenance would increase as well. The installation and use of standard water saving technology would reduce the amount of water used by cleaning and maintenance tools. The overall impact on municipal water supply is still expected to be minimal with the operation of 17 stations. There would be no adverse impacts on municipal water supply in the study area.

5.2.8 MOS-1—Fairfax Extension

5.2.8.1 Construction

Impacts to municipal water supply would be the same as those described for the build alternatives above.

5.2.8.2 Operations

MOS-1 includes three proposed stations, as this is fewer stations than are planned for Alternative 1, municipal water resource impacts from station maintenance would be negligible.

5.2.9 MOS-2—Century City Extension

5.2.9.1 Construction

Impacts would be the same as those described for the Build Alternatives.

5.2.9.2 Operations

Operational impacts to municipal water resources would be slightly less than those described for Alternative 1 since MOS-2 only includes six stations.

5.2.10 Stations and Segment Options

5.2.10.1 Construction

Impacts would be the same as those described for the Build Alternatives.

5.2.10.2 Operations

The stations and segment options would not increase the number of stations included in the Build Alternatives. There would be no adverse impacts to municipal water resources.

5.2.11 Other Components of the Build Alternatives

There would be no impact on municipal water supplies from construction or operations of the proposed substations, emergency generators, or the mid-tunnel/vent shaft.

5.2.12 Rail Operations Center

5.2.12.1 Construction

Proposed changes and improvements to the Rail Operations Center (ROC) would not require substantial increases in municipal water use; thus, there would be a negligible impact on municipal water supply.

5.2.12.2 Operations

Operations of the expanded ROC could lead to increases in water use since more employees would be using the building. Such increases would be negligible and would not result in significant impacts to municipal water supply in Los Angeles County.

5.2.13 Maintenance Yards

5.2.13.1 Construction

Construction of the proposed vehicle storage and maintenance yards would have a negligible impact on municipal water supply.

5.2.13.2 Operations

The proposed maintenance facilities may include restrooms or vehicle wash facilities. With the implementation of standard water conservation measures such as water saving devices for irrigation and restroom facilities and recycling for car washes, the effect of the proposed

maintenance facility sites on municipal water supplies would be negligible. Therefore, no adverse impacts are anticipated related to water supply.

5.3 Surface Water Hydrology

5.3.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts to the watersheds in the project area or local surface water bodies.

5.3.2 TSM Alternative

The TSM Alternative enhances the No Build Alternative by expanding the Metro Rapid bus services operating in the Westside Transit Corridor. The alternative focuses on increasing service frequency within the study area and would not require any major new construction. Thus, construction-related impacts to local surface water bodies are not anticipated.

No local surface water bodies are located in the immediate vicinity of the corridor (Figure 4-3). Therefore, no adverse effects are anticipated related to surface water bodies or the local watershed setting.

5.3.3 Alternative 1—Westwood/UCLA Extension

The only surface water bodies located in the immediate vicinity of the alignment are the La Brea Tar Pits. With implementation of construction BMPs and compliance with federal, state, and local permits and regulations, construction and operations of Alternative 2 would not result in adverse effects to the tar pits. Therefore, no adverse effects are anticipated related to surface water bodies.

5.3.4 Alternative 2—Westwood/VA Hospital Extension

Impacts would be the same as those for Alternative 1.

5.3.5 Alternative 3—Santa Monica Extension

5.3.5.1 Construction

The closest surface water body to Alternative 3 is Santa Monica Bay and the Pacific Ocean at the western terminus of the alternative alignment, which is approximately 0.5 mile away from the proposed Wilshire/4th Street Station. Compliance with local, state, and federal regulations during construction would minimize potential impacts to this surface water body. Project construction would require compliance with the SWRCB's NPDES General Construction Permit.

Additionally, the coastal zone boundary runs down the inland side of 4th Street; therefore, construction of Alternative 3 is located within the coastal zone and would require a CDP from the CCC.

5.3.5.2 Operations

Given that the alternative alignment and associated stations would be underground, there would be no adverse impacts to surface water resources related to operations of the subway.

5.3.6 Alternative 4—Westwood/VA Hospital Extension Plus West Hollywood Extension

There are no surface water bodies in the vicinity of the West Hollywood extension corridor. There would be no adverse impacts related to surface water resources.

5.3.7 Alternative 5—Santa Monica Extension Plus West Hollywood Extension

There are no local surface water bodies located in the immediate vicinity of the West Hollywood Extension corridor. Potential impacts to surface water bodies related to the part of Alternative 5 along Wilshire Boulevard would be the same as those described for Alternative 3. Therefore, no adverse effects are anticipated related to surface water bodies.

5.3.8 MOS-1—Fairfax Station Extension

There are no surface water bodies in the vicinity of MOS-1; therefore, no adverse effects are anticipated related to surface water bodies.

5.3.9 MOS-2—Century City Extension

There are no surface water bodies in the vicinity of MOS-2; therefore, no adverse effects are anticipated related to surface water bodies.

5.3.10 Stations and Segment Options

The design option alignments do not cross any or are not in close proximity to surface water bodies. Potential impacts would be the same as those described for Alternative 1. Therefore, no adverse effects related to surface water bodies are anticipated.

5.3.11 Other Components of the Build Alternatives

The La Brea Tar Pits are the only surface water bodies in the vicinity of the Build Alternatives. The construction of substations (TPSS), emergency generators, or the mid-tunnel/vent shaft would not be constructed near the tar pits. Thus, there would be no construction-related impacts to surface water resources.

Operation of the other components of the build alternatives would have no adverse impacts on surface water resources in the study area.

5.3.12 Rail Operations Center

There are no local surface water bodies located in the immediate vicinity of the ROC. Therefore, no adverse effects are anticipated related to surface water bodies.

5.3.13 Maintenance Yards

5.3.13.1 Construction

Construction of the proposed improvements at the Union Pacific Los Angeles Transportation Center Rail Yard would involve crossing the Los Angeles River to the north of the East Cesar Chavez Bridge. The Los Angeles River is considered navigable waters by the USACE and the USEPA. Therefore, the project would require a CWA Section 404 Permit, CWA Section 401 Water Quality Certification, as well as permitting under Sections 10 and 14 of the RHA. Other required approvals and permits include a Section 1602 Streambed Alteration Agreement with the CDFG and a construction permit from the City of

Los Angeles, DPW Bureau of Engineering. Coordination with the LACFCD may also be required. Compliance with these approvals and permits and implementation of BMPs in the SWPPP would minimize impacts associated with construction in the Los Angeles River.

5.3.13.2 Operations

Given that the proposed location of the maintenance yards has been previously developed and used for industrial purposes, operations of the proposed project would have a negligible impact on surface water bodies in the vicinity. Operations of the proposed maintenance yards would comply with applicable federal, state, and local regulations. Overall, there would be no adverse impacts to surface water bodies as a result of the operations of the Maintenance Yards.

5.4 Groundwater

5.4.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts to groundwater resources.

5.4.2 TSM Alternative

The TSM Alternative would expand the Metro Rapid bus services operating in the Westside Transit Corridor. As there would be no underground tunneling to implement the TSM Alternative, there would be no dewatering activities.

Since there is no new construction proposed under the TSM Alternative, there would be no added impervious surface area in the project study area. Operations of the TSM Alternative would be not result in adverse impacts to groundwater recharge. No adverse effects are anticipated related to groundwater resources from operation of the TSM Alternative.

5.4.3 Build Alternatives

In the discussion of potential groundwater impacts, the build alternatives are addressed as a group, not individually. This is because potential impacts would be the same or similar for each of the build alternatives. It is important to note that while potential impacts would be generally similar, they would increase in intensity as the length of the proposed alignment increases. However, implementation of design and mitigation measures would be implemented along the length of phased construction and would reduce all potential impacts to less than significant.

5.4.3.1 Construction

Contaminated Groundwater

Much of the tunnel would be constructed below groundwater. Stations along the Build Alternatives would likely be constructed at, or below groundwater. As described in Section 4.3, groundwater is encountered at varying depths along the alignment. Since dewatering during construction is anticipated, a dewatering permit is required from the LARWQCB prior to construction. Uncontaminated groundwater that is collected during construction dewatering can be treated and pumped back into the groundwater table, pumped to the sewer or storm drain system, or used onsite for dust control purposes. Permission from the

LARWQCB is required if groundwater is pumped back into the groundwater table or discharged into the storm drain system.

The *Draft Site Assessment Study Report* describes that the historical land use on properties adjacent to each of the stations has ranged from residential, retail, commercial, and light industrial. Additionally, a majority of the stations are in the vicinity of properties that were/are occupied by businesses more commonly associated with soil and groundwater contamination (namely, automotive service stations, dry cleaners, and light industrial operations). Therefore, the likelihood of encountering undocumented soil/groundwater contamination during construction is high (Metro 2009c). Contaminated groundwater cannot be discharged to the storm drain system. Implementation of Mitigation Measures **WQ1** (described in Section 6.3.1, establishing procedures for encountering contaminated groundwater) and **WQ2** (described in Section 6.3.1, establishing mitigation for potential spreading of contaminated groundwater) would avoid adverse impacts from construction of the Build Alternatives related to groundwater resources.

It is recommended that site specific groundwater investigations may be necessary to further determine the extent and location of groundwater contaminants as well as potential impacts. Since the presence of shallow groundwater (some even under artesian pressure is greater in the La Brea and Westwood areas and less likely along areas south of the Santa Monica Fault, the intensity of impacts from encountering contaminated groundwater would be similar for each of the Build Alternatives. Construction of the Build Alternatives would be phased, so that potential impacts are not experienced all at the same time.

In addition to the Mitigation Measures outlined in Section 6.3.1, the Geotechnical/Subsurface/Seismic/Hazardous Materials Section of the EIS/EIR describes compliance with applicable federal, state, and local regulations which would be required during construction activities. Further mitigation measures to minimize potential environmental and social impacts from encountering contaminated groundwater are also described in this section of the EIS/EIR.

Construction Dewatering

As described in the *Draft Geotechnical and Environmental Report* (Metro 2009b), shallow groundwater (encountered at depth between 10 to greater than 40 feet below ground surface and in some areas as shallow as 5 to 10 feet below ground surface) is expected along several areas of the alignment and at most of the station locations. Stations would occur between 50 and 60 feet below ground surface, while subway tunnels would be constructed between 40 and 80 feet below ground surface, thus construction activities would likely require dewatering. The exact depth to groundwater and the anticipated flow rate will vary along the alignment; therefore, specific dewatering requirements would have to be designed for each specific station. For example, the Santa Monica Fault Zone (between Western Avenue and Stanford Street) presents a barrier to groundwater. Therefore, groundwater west of Stanford Street is encountered well below planned subway depth and groundwater during construction is not expected to be an issue during construction. The geotechnical report outlines a couple of different dewatering approaches that might be necessary for varying groundwater conditions in the project study area. Along the Wilshire corridor, deep basement excavation dewatering can be accomplished by pumping from a limited number of deep wells strategically located within the site and augmented by gravel-filled trenches

and sumps throughout the excavation area. In the Westwood area, groundwater has been found to be under artesian head and can require a more comprehensive dewatering system.

As the main areas with shallow groundwater occur between La Brea and Fairfax/Wilshire Fairfax and in the Westwood area, each of the Build Alternatives would have similar levels of construction dewatering that would be necessary. Compliance with federal, state, and local regulations would avoid adverse impacts to groundwater during construction and operations of Alternatives 2 through 5. Additionally, Mitigation Measures WQ1 and WQ2 would reduce potential negative impacts.

More specific design solutions will be developed in later stages of engineering design and in the Final Geotechnical and Environmental Report. Additionally the *Draft Geotechnical and Environmental Report* (Metro 2009b) recommends pump tests at select locations along the alignment during the next phases of investigation. Overall, no adverse effects from construction of Alternative 1 are anticipated related to groundwater resources.

5.4.3.2 Operations

The area along the alignment for the Build Alternatives consists heavily of impervious surfaces. Therefore, the project study area does not currently allow for direct percolation within the underlying groundwater basins. There would be no impacts on groundwater levels for water supplies used for consumption by municipal, industrial, or irrigation purposes.

Upon operation of the Build Alternatives, conditions in the project study area would be comparable to existing conditions and would continue to be developed largely with impervious surfaces. Thus, there would be no adverse impacts to the percolation of water to groundwater aquifers.

Along areas of the alignment where stations would extend below groundwater, the foundation system shall include a conventional mat type foundation or spread footings interconnected with a substantial structural slab. The mat type foundation in combination with High Density Polyethelyne (HDPE) membrane would waterproof the station structures where shallow groundwater exists. Therefore, sump pump operations and groundwater dewatering during operations of the proposed project would not occur. There would be no operations-related impact from groundwater dewatering.

5.4.4 Stations and Segment Options

Potential impacts and required mitigation would be the same for the stations and segment options as those described under the Build Alternatives. Therefore, no adverse effects are anticipated related to groundwater resources.

5.4.5 Other Components of the Build Alternatives

Substations, emergency generators, and the mid-tunnel/vent shaft would be constructed above-ground and would not add a significant amount of impervious cover to the study area. Thus, there would be no adverse impacts to groundwater resources.

5.4.6 Rail Operations Center

Proposed improvements to the ROC would not require significant excavation below ground surface. Therefore, no adverse effects related to groundwater resources are anticipated.

5.4.7 Maintenance Yards

The proposed sites for the maintenance and operations facilities are in highly urbanized areas which consist of mainly impervious surfaces with underground drainage infrastructure. Construction of the proposed maintenance facilities would not require significant excavation below ground surface. Therefore, no adverse effects related to groundwater resources are anticipated.

5.5 Drainage

5.5.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts to local drainage basins.

5.5.2 TSM Alternative

The TSM Alternative enhances the No Build Alternative by expanding the Metro Rapid bus services operating in the Westside Transit Corridor. This alternative would not include facilities that would impact drainage in the study area. Therefore, no adverse effects are anticipated related to drainage.

5.5.3 Build Alternatives

In the discussion of potential drainage impacts, the build alternatives are addressed as a group, not individually. This is because potential impacts would be the same or similar for each of the build alternatives. It is important to note that while potential impacts would be generally similar, they would increase in intensity as the length of the proposed alignment increases. However, implementation of design and mitigation measures would be implemented along the length of phased construction and would reduce all potential impacts to less than significant.

5.5.3.1 Construction

The Build Alternatives all include belowground tunneling and station construction, which have the potential to affect catch basins or storm drain structures located throughout the study area. It is assumed that tunnel construction would occur deep enough as to completely avoid impacts to drainage facilities. Hydrologic analysis has identified eight stations along the Build Alternatives that would conflict with drainage facilities. When conflicts occur along the alignment, drainage structures would be resized or relocated appropriately so that flooding or ponding is not induced on the alignment or on adjacent properties. With implementation of a drainage control plan (**WQ3**), no adverse effects related to local drainage basins would occur.

As described in Section 5.2.3.1, tunnel construction would require the use of cooling towers for the TBM. While much of the water used for cooling can be recycled and used again, some wastewater would be created. Wastewater would be treated and disposed of in

compliance applicable NPDES permits requirements (Municipal Stormwater Permit and Construction General Permit). Thus, cooling water that is disposed of would not result in adverse effects to the local drainage infrastructure.

5.5.3.2 Operations

Operations of the Build Alternatives would not result in any adverse impacts to local drainage basins.

5.5.4 Stations and Segment Options

5.5.4.1 Construction

The stations and segment options would involve below grade tunneling and station construction. These structures have the potential to affect catch basins or storm drain structures in the area. Drainage facilities that are affected by station options would be relocated or resized appropriately so that flooding or ponding is not induced on the alignment or on adjacent properties. With the implementation of a drainage control plan (**WQ3**), no adverse effects related to drainage would occur.

5.5.4.2 Operations

Operations of the station and segment options would not result in any adverse impacts to local drainage basins.

5.5.5 Other Components of the Build Alternatives

Construction and operations of the proposed substations, emergency generators, and mid-tunnel/vent shaft would not involve any below grade structures in addition to those required for the Build Alternatives; therefore, would be no adverse impacts to local drainage basins from as a result of the these components of the build alternatives..

5.5.6 Rail Operations Center

Construction and operations of planned improvements at the ROC would not involve any below grade structures. Thus, there would be no adverse impact to drainage infrastructure in the study area.

5.5.7 Maintenance Yards

Construction and operations of the maintenance yards would not involve any below grade structures. There would be no adverse impacts to drainage basins or infrastructure in the study area.

5.6 Flooding

5.6.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts related to flooding or increased risk of flood hazards.

5.6.2 TSM Alternative

The TSM Alternative enhances the No Build Alternative by expanding the Metro Rapid bus services operating in the Westside Transit Corridor. The alternative focuses on increasing

service frequency within the study area and would not require any major new construction. Thus, construction-related impacts to floodplains are not anticipated.

The TSM Alternative would not significantly alter transportation patterns throughout the study area. While there are areas of 100-year and 500-year floodplain that run throughout the study area (described in Section 4.2, above), the TSM Alternative would not result in new permanent structures in the floodplains and would not alter floodplain integrity. Therefore, no adverse impacts are anticipated from the TSM Alternative related to flooding.

5.6.3 Alternative 1—Westwood/UCLA Extension

5.6.3.1 Construction

As illustrated in Figure 4-5, parts of the Alternative 1 alignment are planned through areas of 500-year floodplain (along Wilshire Boulevard near the intersection of Wilton Place and Wilshire Boulevard) and adjacent to areas classified as AH (as described above in Section 4.2). As construction would be temporary, adverse impacts to floodplains in the vicinity of the alignment would not be expected.

5.6.3.2 Operations

Both the proposed rail extension and the stations included in Alternative 1 would be located underground; therefore, there would be no structures that would impede or redirect flood flows along the alignment. As described in Section 4.2, the study area is highly impervious and has an extensive underground drainage infrastructure. Implementation of Alternative 1 would not substantially increase the amount of impervious cover in the area of the alignment. Therefore, operation of this alternative would not be expected to create additional runoff that would exceed the drainage and flood control capacity of the storm drain system. While implementation of Alternative 1 includes power traction substations (discussed below in Section 5.3.11), there would be no other above-ground facilities that would encroach on the floodplain areas or change floodplain depths and elevations.

Drainage would be properly conveyed away from the site so as not to induce ponding or flooding on adjacent properties (Mitigation Measure **WQ3** as discussed in Section 6.3.2). Additionally, the alternative alignment runs through an urbanized area comprised mainly of impervious surfaces as well as an extensive drainage infrastructure. With implementation of a drainage control plan (**WQ3**), no direct or indirect adverse impacts to flooding would occur.

5.6.4 Alternative 2—Westwood/VA Hospital Extension

There are no additional floodplain areas in the vicinity of the proposed alignment for Alternative 2; potential impacts from construction and operations would be the same as those described for Alternative 1.

5.6.5 Alternative 3—Santa Monica Extension

The proposed alignment for Alternative 3 does not intersect any floodplain zones in addition to those described under Alternative 1. Thus, there would be no adverse impacts to floodplains from construction and operations of Alternative 3.

5.6.6 Alternative 4—Westwood/VA Hospital Extension Plus West Hollywood Extension

In addition to the impacts discussed for Alternative 1, the extension of this alternative north on Santa Monica Boulevard encounters a section of 500-year floodplain as well as an area of 100-year floodplain designated as zone AO (sheet flood depths of 1 to 3 feet).

5.6.6.1 Construction

As shown in Figure 4-5, parts of the alignment in Alternative 4 would be constructed through areas of 500-year and 100-year floodplain. Given the existing impervious nature of the study area in the vicinity of these floodplains as well as the extensive urban drainage infrastructure that exists, implementation of Mitigation Measure **WQ3** (section 6.3.2) would ensure that there would be no adverse impacts related to flooding during construction.

5.6.6.2 Operations

Similar to the operational impacts of Alternative 1, operations of Alternative 4 would not create or contribute to runoff that would exceed the drainage and flood control capacity of the urban storm drain system. The existing land cover is highly impervious and Alternative 4 would not add a substantial amount of impervious land in the study area. Further, as the stations and subway would be located underground, there would not be any major structures that would impede or redirect flood flows. As described for Alternatives 1, implementation of Mitigation Measure **WQ3** (Section 6.3.2) would ensure that there are no direct or indirect adverse impacts related to flooding.

5.6.7 Alternative 5—Santa Monica Extension Plus West Hollywood Extension

In addition to the floodplains and floodplain impacts described for Alternatives 1 through 4, the alignment for Alternative 5 would be located through an additional area of 500-year floodplain at Wilshire Boulevard between South Sepulveda Boulevard and 26th Street. Potential impacts from construction and operations would be the same as those described for Alternatives 1 through 4. Implementation of Mitigation Measure **WQ3** (Section 6.3.2) would avoid adverse impacts related to flooding.

5.6.8 MOS-1—Fairfax Station Extension

The MOS-1 alignment would pass through the 500-year floodplain described under Alternative 1. Potential construction and operations-related impacts would be the same as those described for Alternative 1. Implementation of Mitigation Measure **WQ3** (Section 6.3.2) would mitigate potential impacts related to flooding. Adverse impacts to flooding and floodplains from construction and operations of MOS-1 would be negligible.

5.6.9 MOS-2—Century City Extension

Floodplain impacts from MOS-2 would be the same as those described for Alternative 1. Implementation of Mitigation Measure **WQ3** (Section 6.3.2) would ensure that there are no adverse impacts related to flooding.

5.6.10 Stations and Segment Options

The proposed stations and segment options are adjacent to the 100-year floodplain located next to Santa Monica Boulevard south of the intersection with Wilshire Boulevard. However, none of the stations and segment options would be located directly within the floodplain in this area. Additionally, the stations and segment options would be located underground and

would not add significantly to the imperviousness of the study area in the vicinity. There would be minimal impact from construction of above-ground facilities that have the potential to impede or redirect flood flows. Implementation of Mitigation Measure WQ3 (Section 6.3.2) would ensure that there are no adverse impacts related to flooding.

5.6.11 Other Components of the Build Alternatives

The addition of emergency generators in the study area would add aboveground structures. None of these would be located in a floodplain area. Given the highly developed nature of the study area, the substations would add a negligible amount of impervious cover throughout the study area and would not create or contribute to runoff that would exceed the drainage and flood control capacity of the storm drain system. No adverse impacts related to flooding and floodplains would result from implementation of construction and operations of the other components of the build alternatives.

5.6.12 Rail Operations Center

Proposed improvements to the ROC would not contribute to runoff that would exceed the drainage and flood control capacity of the storm drain system. The area around the ROC is currently urbanized and highly impervious. The proposed improvements would not significantly impede or redirect flood flows. Furthermore, since the proposed improvements would be located outside of the street systems, where a majority, if not all, of the drainage occurs, implementation of this alternative would not expose people and/or property to flooding-related hazards. No direct and indirect impacts related to flooding are expected from the proposed improvements to the ROC.

5.6.13 Maintenance Yards

The potential location of the Division 20 Maintenance Yard is not in a floodplain area (Figure 4-7); there would be no adverse impacts.

Construction of the proposed improvements at the Union Pacific Los Angeles Transportation Center Rail Yard would involve a new bridge crossing of the Los Angeles River to the north of the East Cesar Chavez Bridge. This crossing is considered an encroachment on the floodplain. The piers and abutments are expected to result in approximately 74,260 sq ft (1.7 acres) of temporary impact within the river channel. The construction of the bridge would require temporary diversion of flows.

The northwestern portion of the Union Pacific Railroad—Los Angeles Transportation Center Rail Yard is located in the 100-year floodplain (AE flood zone). Proposed improvements to the maintenance yards would not increase the amount of impervious cover in these locations and would not create a significant increase in runoff that would exceed the drainage and flood control capacity of the storm drain system. Additionally, the rail yard currently has aboveground structures on the property. Development of the proposed maintenance yard, except for the bridge, would not add structures that would substantially impede or redirect flood flows in the long term.

The piers and abutments of the new bridge across the Los Angeles River are expected to result in approximately 4,312 sq ft (0.1 acres) of permanent impact within the river channel. The new piers and abutments would result in a small change to the river flow. Temporary

and permanent impacts to the river channel and to river flow would require permitting through the USACE and USEPA (CWA Section 404 and RHA Section 10 and Section 14), and the LARWQCB (CWA Section 401). Additionally, coordination with the LACFCD would be necessary to ensure that construction of the proposed alignment alternatives would not result in adverse impacts to flood control structures in this segment of the Los Angeles River. Drainage would be properly conveyed away from the sites so as not to induce ponding or flooding on the maintenance and operations facilities sites or adjacent properties. With implementation of Mitigation Measure **WQ3** (Section 6.3.2), no adverse impacts related to flooding would occur.

5.7 Water Quality

5.7.1 No Build Alternative

The No Build Alternative would not include any activities that would result in adverse impacts to surface or groundwater quality.

5.7.2 TSM Alternative

The TSM Alternative enhances the No Build Alternative by expanding the Metro Rapid bus services operating in the Westside Transit Corridor. Construction would not result in adverse impacts to water quality in the study area. Proposed transportation improvements under the TSM Alternative would be accomplished through minor physical modifications such as upgraded bus stops and new shuttle bus routes. Therefore, operation of the TSM Alternative would result in negligible increases in the buildup of typical runoff contaminants that collect on streets (i.e., oil, grease, and metals). There would be negligible increase in pollutant loadings that would percolate to groundwater. Implementation of the TSM Alternative would result in no adverse impact to water quality.

5.7.3 Build Alternatives

In the discussion of potential water quality impacts, the build alternatives are addressed as a group, not individually. This is because potential impacts would be the same or similar for each of the build alternatives. It is important to note that while potential impacts would be generally similar, they would increase in intensity as the length of the proposed alignment increases. However, implementation of design and mitigation measures would be implemented along the length of phased construction and would reduce all potential impacts to less than significant.

5.7.3.1 Construction

Construction-related activities including grading and excavation have the potential to result in water quality impacts due to increased erosion and sedimentation. Runoff during construction would be routed to the existing underground storm drain systems and/or lined channels, mitigating offsite erosion. The impact of tunnel construction activities on stormwater is a consideration due to the potential for excavated materials (and pollutants contained therein) to come into contact with stormwater or be discharged into stormwater drainage facilities. The processed water used in the slurry is also a potential source of concern if it is not property contained and disposed. Tunneling activities would also require the use and eventual disposal of water used in water cooling towers. While much of this water can be recycled and reused in the cooling process, this process would also create wastewater that would require disposal. Wastewater from the cooling process would be

contained onsite and disposed of periodically. Disposal would be conducted in compliance with applicable municipal NPDES permits and waste discharge requirements would be complied with in order to minimize potential impacts to water quality. As described in Section 3.3, above, all of the alignment alternatives would be required to comply with the Los Angeles Municipal NPDES permit and the SUSMP, a SWPPP including BMPs would be prepared which would reduce potential adverse effects to surface water quality from sedimentation during the construction. The SWPPP would include specific measures to avoid water quality impacts from construction site runoff resulting in impairments to the water quality of the Los Angeles River. These measures would be the same as those described in Mitigation Measures **WQ4** through **WQ7** (Section 6.3.3).

Trenching and tunneling activities could lead to exposure to contaminated groundwater. The Geotechnical/Subsurface/Seismic/Hazardous Materials Section of the EIS/EIR analyses potential impacts from encountering contaminated groundwater as well as mitigation measures that should be employed for proper handling of contaminated materials. Excavation activities also have the potential to create a preferential pathway for the spreading of contaminated groundwater in the groundwater basin. This impact could be minimized by the use of impermeable concrete grouting or similar materials which would reduce contaminant migration. Therefore, no adverse impacts related to water quality are anticipated from construction of the Build Alternatives.

5.7.3.2 Operations

As described previously, the study area is composed of mainly impervious surfaces. The Build Alternatives would not add a significant amount of impervious cover to the study area. Therefore, long-term operations of the Build Alternatives would not lead to a significant increase in stormwater runoff. During operation, stormwater runoff from station platforms would be conveyed to permanent treatment BMP controls (Mitigation Measure **WQ8**, described in Section 6.3.3) to treat stormwater runoff before it is discharged offsite. Therefore, no adverse effects to surface or groundwater quality are anticipated from operations of the Build Alternatives.

5.7.4 MOS-1—Fairfax Station Extension

Potential impacts and required mitigation would be the same as that described under the Build Alternatives. Therefore, no adverse effects are anticipated related to surface or groundwater quality.

5.7.5 MOS-2—Century City Extension

Potential impacts and required mitigation would be the same as that described under the Build Alternatives. Therefore, no adverse effects are anticipated related to surface or groundwater quality.

5.7.6 Stations and Segment Options

The stations and segment options would comply with all applicable federal, state, and local regulations as described under the Build Alternatives. In addition, Mitigation Measures **WQ4-WQ7** (section 6.3.3) and the permanent treatment BMPs described in **WQ8** (Section 6.3.3) would be implemented. Therefore, no adverse effects to surface or groundwater quality are anticipated from construction or operations of the stations and segment options.

5.7.7 Other Components of the Build Alternatives

5.7.7.1 Construction

Similar to the potential water quality construction impacts described for the Build Alternative, construction of the emergency generators could result in increased erosion and sedimentation that would adversely affect water quality in the study area. Compliance with the Los Angeles Municipal NPDES permit as well as implementation of Mitigation Measures **WQ4** through **WQ7** (Section 6.3.3) would reduce adverse surface and groundwater quality impacts from construction. Overall, construction of these other components of the build alternatives would not substantially degrade surface or groundwater quality in the study area.

5.7.7.2 Operations

The substations, emergency generators, and mid-tunnel/vent shaft would not substantially increase impervious land cover in the study area; therefore, they would not create or contribute to additional runoff volumes or contaminated surface water runoff that would flow to surface water resources within the study area. There would be no adverse impact to surface or groundwater quality.

5.7.8 Rail Operations Center

Potential adverse impacts to water quality would be the same as those described for the Maintenance Yards. Implementation of the Mitigation Measures described in Section 6.3.3 would avoid adverse impacts to groundwater and surface water quality.

5.7.9 Maintenance Yards

During operation of maintenance and operation facilities, storm runoff would be conveyed to permanent treatment BMPs. Mitigation Measure **WQ8** (Section 6.3.3) describes potential BMPs that would be used to treat stormwater runoff before it is discharged off-site. Therefore, no long term adverse effects to water quality are anticipated.

6.0 MITIGATION MEASURES

6.1 No Build Alternative

The No Build Alternative would not result in impacts to water resources. Therefore, no mitigation measures would be required.

6.2 TSM Alternative

Similar to the No Build Alternative, there would be no impacts on water resources. Therefore, no mitigation measures would be required.

6.3 Build Alternatives

If construction and operations of Alternatives 1 through 5, MOS-1 and 2, the Maintenance Yards, and the ROC comply with applicable federal, state, and local regulations and permits, substantial impacts to water resources would not result. In addition to compliance with the Clean Water Act and standard best management practices (BMPs) required for compliance with applicable NPDES permits, the following mitigation measures are recommended to further avoid adverse impacts to water resources as described in this chapter.

6.3.1 Groundwater

6.3.1.1 WQ1

If contaminated groundwater is encountered during construction, the contractor shall stop work in the vicinity, cordon off the area, and contact the appropriate hazardous waste coordinator and maintenance hazardous spill coordinator at Metro and immediately notify the Certified Unified Program Agencies (City of Los Angeles Fire Department, County of Los Angeles Fire Department, and Los Angeles RWQCB) responsible for hazardous materials and wastes. Through coordination with the Los Angeles RWQCB, an investigation and remediation plan shall be developed in order to protect public health and the environment. The contractor shall properly treat or dispose of any hazardous or toxic materials according to local, state, and federal regulations.

6.3.1.2 WQ2

In the case that contaminated groundwater is encountered in test borings and it is determined that there is potential for spreading of the contamination, this would be mitigated during the design and engineering process. For example, it shall be specified that impermeable concrete-based grouting materials be used to fill the gap between the tunnel and the surrounding earth. The permeability of the grouting materials is lower than surrounding soil types and this would reduce the possibility that the tunnel shall serve as a preferential pathway for contaminant migration. Additional BMPs that would address potential impacts from encountering shallow groundwater and contaminated groundwater are proposed in the Geotechnical and Environmental Report Technical Memorandum. These include:

- Shoring systems – In areas of shallow groundwater, a secant/tangent pile system, consisting of alternating overlapping drilled piles, could be used to create an effective barrier to groundwater.

6.3.2 Drainage

6.3.2.1 WQ3

A drainage control plan shall be developed during project design to properly convey drainage from the project area and avoid ponding on adjacent properties. The flood capacity of existing drainage or water conveyance features shall not be reduced in a way that would cause ponding or flooding during storms.

6.3.3 Water Quality

6.3.3.1 WQ4

As required by the municipal stormwater NPDES permit (Order No. 01-182 and NPDES No. CAS004001), permittees must implement a program to control runoff from construction activity. As part of this, an erosion and sediment control plan shall be established prior to the initiation of construction activities. Ultimately approved by the LARWQCB, the plan shall include BMPs, such as the following measures as appropriate:

- Use of natural drainage, detention ponds, sediment ponds, or infiltration pits to allow runoff to collect and to reduce or prevent erosion;
- Use of barriers to direct and slow the rate of runoff and to filter out large-sized sediments;
- Use of downdrains or chutes to carry runoff from the top of a slope to the bottom; and,
- Control of the use of water for irrigation so as to avoid off-site runoff.

6.3.3.2 WQ5

Potentially significant impacts to water quality resulting from both construction and operations of the proposed project shall be mitigated with the following measures, which would be approved by the Municipal Stormwater NPDES Permit permittees:

- Project design shall include properly designed and maintained biological oil and grease removal systems in new storm drain systems to treat water before it leaves project sites;
- Proper storage of hazardous materials to prevent contact with precipitation and runoff;
- Development and maintenance of an effective monitoring and cleanup program for spills and leaks of hazardous materials;
- Placement of equipment to be repaired or maintained in covered areas on a pad of absorbent material to contain leaks, spills, or small discharges;
- Periodic and consistent removal of landscape and construction debris;
- The removal of any significant chemical residue on the project sites through appropriate methods;
- The use of non-toxic alternatives for any necessary applications of herbicides or fertilizers;
- Installation of temporary detention basins to remove suspended solids by settlement; and/or,
- Periodic monitoring of the water quality of runoff before discharge from the site and into the storm drainage system.

6.3.3.3 WQ6

As required under the NPDES MS4 permit, a SUSMP and appropriate drainage plan shall be implemented to control pollutants to the maximum extent practicable. BMPs would need to be implemented in relation to tunnel construction activities (Metro 2008. Draft Alternatives Analysis Report. Chapter 4.0- Tunnel Feasibility Review.), including the following measures:

- Slurry treatment plan operation areas (mining sites) shall require BMPs to divert potential storm water runoff from entering the construction area. Containment around the site shall include use of temporary measures such as fiber rolls to surround the construction areas to prevent any potential spills of slurry discharge or spoils recovered during the separation process. Downstream drainage inlets shall also be temporarily covered to prevent potential discharge from entering the storm drain system.
- Construction entrances/exits shall be properly set up so as to reduce or eliminate the tracking of sediment and debris offsite. Appropriate measures may include measures such as grading to prevent runoff from leaving the site, and establishing rumble racks at the exit to remove sediment from construction vehicles.
- Overhead covering for the soil separation plant and debris loading areas shall prevent contact with rainfall.
- Onsite rinsing or cleaning of any equipment shall be performed in contained areas and rinse water collected for appropriate disposal.
- A tank is required onsite to collect the waters for periodic offsite disposal. Since the slurry production is a closed loop system in which the water separated off from the discharge slurry is continually recycled, minimal and infrequent water discharges are anticipated. These discharges can be accommodated in a tank onsite to collect the waters and treat and dispose of periodically.
- Soil and other building materials (e.g., gravel) stored onsite must be contained and covered to prevent contact with storm water and potential offsite discharge.

6.3.3.4 WQ7

In addition to the above BMPs, specific construction stormwater management controls shall be implemented in order to comply with the project SWPPP. These controls would function to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, solvents) with storm water. The SWPPP would specify properly designed, centralized storage areas that would keep these materials out of the rain. Spill cleanup materials (e.g., rags, absorbent materials, and secondary containment) would be kept at the work site when handling materials. It is important that site supervisors and workers have knowledge of the SWPPP. Therefore, site supervisors would conduct regular meetings to discuss pollution prevention. The frequency of such meetings and the personnel required to attend would be specified in the Stormwater Pollution Prevention Plan.

6.3.3.5 WQ8

The following permanent treatment BMPs are recommended for incorporation into the proposed project:

Extended/dry detention basins or underground detention tanks

Depressed basins that temporarily store some of the stormwater runoff following a storm. These function like detention basins, but are located underground. The purpose of these systems is to remove particulate pollutants and reduce maximum runoff values associated with development to their pre-development levels. They may be corrugated metal pipe, concrete pipes, or vaults.

Infiltration basins/trenches

Infiltration basins are surface ponds which capture first-flush stormwater and treat it by allowing it to percolate into the ground and through permeable soils. Infiltration trenches are excavated trenches that have been lined with filter fabric and backfilled with stone to form an underground basin that allows runoff to infiltrate into the soil. As the water percolates through the ground, physical, chemical, and biological processes occur to remove both sediments and soluble pollutants. Pollutants are trapped in the upper layers of the soil, and the water is released to groundwater. Infiltration basins are generally dry except immediately following storms, but a low-flow channel may be necessary is a constant base flow is present.

Bioretention facilities

Utilize soils and woody and herbaceous plants to remove pollutants from stormwater runoff. Runoff must be reduced to sheet flow as it moves to the treatment area, which consists of a grassy buffer strip, sand bed, ponding area, organic or mulch layer, planting soil, and plants. Runoff passes through the sand bed, which decreases the velocity of runoff and distributes it evenly along the length of the ponding area. These areas are applicable as on-lot retention facilities that are designed to mimic forested systems that naturally control hydrology.

Media filtration

Media filters are two-stage constructed treatment systems, including pretreatment setline basins and a filter bed containing sand or other filter media. The filters are not designed to treat the entire storm volume, but the water volume that contains higher pollutant levels.

Porous pavement

Asphalt based paving material that allows stormwater to quickly infiltrate the surface pavement layer to enter into a high-void aggregate sub-base layer. The captured runoff is stored in this “reservoir” layer until it either infiltrates into the underlying soil strata or is routed through an underdrain system to a conventional stormwater conveyance system. These are typically only applicable in low-traffic volume areas.

Vegetated filter strips

Typically similar to grassed swales, except that they are essentially flat with low slopes, and are designed only to accept runoff overland sheet flow. They can appear in any form from grassland to forest, and are designed to intercept upstream flow, lower flow velocity, and spread water out as sheet flow. The strips facilitate conventional pollutant removal through detention, filtration by vegetation, and infiltration to soil. These are the most useful in contributing watershed areas where peak runoff velocities are low.

6.4 California Environmental Quality Act Determination

Anticipated changes that would result from implementation of the proposed project are compared to the CEQA thresholds outlined in Section 3.5.1. Impacts identified fall within one of the following categories:

- *Less-Than-Significant Impact:* No substantial adverse change to existing
- *Significant Mitigable Impact*: Substantial adverse change to environmental conditions that can be mitigated to less-than-significant levels by implementation of mitigation measures
- *Significant Unavoidable Impact*: Substantial adverse change to environmental conditions that cannot be fully mitigated by implementation of mitigation measures; and
- *Beneficial Impact:* Positive change to environmental conditions.

6.4.1 No Build Alternative

The No Build Alternative would have no impact on surface or groundwater resources, the storm water drainage system, water quality or flood issues.

6.4.2 TSM Alternative

The TSM Alternative would not be expected to result in significant impacts to existing conditions in relation to surface water and groundwater resources, drainage, flooding, or water quality. Additionally, this alternative would not be expected to result in significant impacts to erosion or increased runoff. This alternative would not require construction dewatering and disposal of contaminated groundwater. Therefore, potential impacts to water resources would be less-than-significant.

6.4.3 Alternative 1- Westwood/UCLA Extension

Construction and operations of Alternative 1 could result in potential impacts associated with polluted storm water runoff, degradation of surface and groundwater quality, and adverse impacts related to the possibility of encountering contaminated groundwater.

The incremental impact on water quality would be minor since the project area is already highly urbanized. Additionally, the amount of impervious surfaces and any potential added runoff would be small. Appropriate measures would be taken in order to avoid significant surface water runoff impacts on water quality, human health, or safety, appropriate measures would be taken to control runoff. Some examples of these include establishing an erosion control plan, ensuring the proper storage and handling of hazardous materials, and the periodic monitoring of the water quality of runoff leaving the site. Alternative 1 is required to comply with NPDES permit requirements during construction. In addition, implementation of Mitigation Measures WQ1-WQ9 would avoid significant long term impacts to water quality, drainage, or groundwater resources. Therefore, implementation of the proposed mitigation measures would reduce potential impacts to a less-than-significant level.

6.4.4 Alternative 2—Westwood/VA Hospital Extension

As with Alternative 1, construction and operation of Alternative 2 could result in potential impacts to water resources. Potential impacts would be associated with polluted storm water runoff, the degradation of surface and groundwater quality, and adverse impacts related to the possibility of encountering contaminated groundwater. Compliance with federal, state, and local laws and regulations would reduce many of these potential impacts to a less-than-significant level. In addition, implementation of Mitigation Measures **WQ1- WQ9** would reduce potential impacts to a less-than-significant level.

6.4.5 Alternative 3—Santa Monica Extension

As with Alternative 1, construction and operation of Alternative 3 could result in potential impacts to water resources. Potential impacts would be associated with polluted storm water runoff, the degradation of surface and groundwater quality, and adverse impacts related to the possibility of encountering contaminated groundwater. Compliance with federal, state, and local laws and regulations would reduce many of the potential impacts associated with Alternative 3 to a less than significant level. Additionally, compliance with any necessary CDP would reduce potential impacts to Santa Monica Bay to a less-than-significant level. Implementation of mitigation Measures **WQ1- WQ9** would reduce potential impacts to a less-than- significant level.

6.4.6 Alternative 4—Westwood/VA Hospital Extension Plus West Hollywood Extension

Alternative 4 could result in adverse impacts to water resources similar to those listed under Alternatives 1-3. As with Alternatives 1-3, Alternative 4 will require to compliance with NPDES permit requirements during construction. In addition, implementation of Mitigation Measures **WQ1-WQ9** will avoid impacts to water quality, drainage, or groundwater resources would be less-than-significant.

6.4.7 Alternative 5—Santa Monica Extension Plus West Hollywood Extension

Alternative 5 could result in adverse impacts to water resources including degradation of surface and groundwater quality as well as potential impacts related to the possibility of encountering contaminated groundwater. Alternative 5 will require compliance with applicable federal, state, and local regulations and permits including (if applicable) a construction dewatering permit, NPDES General Construction Permit, and CDP. In addition, implementation of Mitigation Measures **WQ1- WQ9** would reduce potential impacts to a less-than-significant level.

6.4.8 MOS-1—Fairfax Station Extension

MOS-1 could have similar impacts as those described for Alternative 1. These would be mitigated to a less-than-significant level through compliance with federal, state, and local laws and regulations. Mitigation Measures **WQ1-WQ9** would ensure that no significant long term impacts to water quality, drainage, or groundwater resources would occur.

6.4.9 MOS-2—Century City Extension

MOS-2 could have similar impacts as those described for Alternative 1. These would be reduced to a less-than-significant level through compliance with federal, state, and local laws

and regulations. Mitigation Measures WQ1-WQ9 would ensure that no significant long term impacts to water quality, drainage, or groundwater resources would occur.

6.4.10 Stations and Segment Options

As with build alternatives, construction and operation of the stations and segment options could result in potential impacts to water resources. Potential impacts would be associated with polluted storm water runoff, the degradation of surface and groundwater quality, and adverse impacts related to the possibility of encountering contaminated groundwater. With implementation of mitigation measures, potential impacts to water resources from the stations and segment options would be less-than-significant.

6.4.11 Maintenance Yards

The construction and operation of maintenance yards are not anticipated to result in significant adverse impact to water resources or water quality. Mitigation measures would reduce potential impacts to water resources from construction at the proposed maintenance yard sites, and Metro ROC to less-than-significant levels.

6.4.12 Rail Operations Center

Mitigation measures would reduce potential impacts to water resources from construction at the ROC to less-than-significant levels.

6.5 Impacts Remaining After Mitigation

Following implementation of mitigation measures WQ1—WQ9, potential impacts to water resources from all of the Build Alternatives would be reduced to less-than-significant levels.

References

Caltrans 1998 — California Department of Transportation. 1998. *Financial and Economic Impacts of Stormwater Treatment Los Angeles County NPDES Permit Area.* Accessed December 10, 2009. Available online at: http://www.ascecareportcard.org/Outside_Source/LA-Cost_Data/caltrans-1998.pdf

CEQA 2009 — California Environmental Quality Act (CEQA) Statute and Guidelines, 2009. Reprinted by the Association of Environmental Professionals. Accessed on May 26, 2009. Available online at: http://www.califaep.org/userdocuments/File/2009%20CEQA%20Statute%20and%20Guidelines2.pdf.

City of Beverly Hills 2008 — City of Beverly Hills, Planning Department. 2008. *General Plan. Chapter 3, Infrastructure and Public Services.* Accessed January 25, 2010. Available online at: http://www.beverlyhills.org/civica/filebank/blobdload.asp?BlobID=3782.

City of Los Angeles. 1996 — City of Los Angeles. August 1996. *Los Angeles City General Plan*.

City of Los Angeles, Bureau of Engineering 2009 — City of Los Angeles, Bureau of Engineering website. Accessed January 24, 2010. Available online at: http://eng.lacity.org/permits/

City of Los Angeles Planning Department 1995 — City of Los Angeles Planning Department. January, 1995.Los Angeles Citywide General Plan Framework Draft Environmental Impact Report.

City of Santa Monica 2009 — City of Santa Monica. 2009. *Santa Monica Municipal Code.* Accessed December 10, 2009. Available online at: http://www.qcode.us/codes/santamonica/

City of Santa Monica, Water Division 2009 — City of Santa Monica. May 2009. *Annual Water Quality Report.*

City of Santa Monica 1975 — City of Santa Monica. September, 1975. *Conservation, Open Space, Scenic Corridors Elements of the General Plan.*

City of West Hollywood 2006 — City of West Hollywood. 2006. West Hollywood Municipal Code. Accessed December 8, 2009. Available online at: http://qcode.us/codes/westhollywood/view.php?frames=off

DWR 2004 — California Department of Water Resources. Updated February 27, 2004. *California's Groundwater Bulletin 118, South Coast Hydrologic Region. Coastal Plain of Los Angeles Groundwater Basin, Central Subbasin*.

CFR 2000 — Federal Register, 40 CFR 131. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California. May 2000.

FEMA 2010 — Federal Emergency Management Agency. 2010. Floodplain Management Website. Accessed March 1, 2010. Available at: http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/base_flood_elevation.shtm.

FTA 2009	Federal Transit Administration. 2009. *Environmental Resources Information.* Accessed on March 25, 2009. Available at: http://www.fta.dot.gov/planning/environment/planning_environment_232.html.
Los Angeles County 1998	Los Angeles County. 1998. *Los Angeles County Code.* Accessed January 25, 2010. Available online at: http://search.municode.com/html/16274/index.htm.
Los Angeles County 1980 and 2008	Los Angeles County Department of Regional Planning. 1980 (update 2008). *General Plan.* Accessed January 25, 2010. Available online at: http://planning.lacounty.gov/generalplan#gp-existing.
LACDPW 2004	Los Angeles County Department of Public Works. 2004. *Ballona Creek Watershed Management Plan.*
LAC DPW 2002	Los Angeles County Department of Public Works. September 2002. *Development Planning for Storm Water Management: A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP).* Accessed on January 25, 2010. Available online at: http://ladpw.org/wmd/npdes/table_contents.cfm.
LACDPW 1996	Los Angeles County Department of Public Works. 1996. *Los Angeles River Master Plan.* Accessed December 10, 2009. Available online at: http://ladpw.org/wmd/watershed/LA/LARMP/
LA DPW 2005	City of Los Angeles Department of Public Works, Bureau of Sanitation. March 2005. *Integrated Regional Water Management Plan for the Ballona Creek Watershed.* Draft Plan Version 1. Accessed on January 25, 2010. Available online at: http://www.lastormwater.org/Siteorg/program/science/IRWMP/IRWMP_documents/Ballona-Creek.pdf.
LA DPW and LADWP 2005	City of Los Angeles Department of Public Works, Bureau of Sanitation and Department of Water and Power. November 2005. *Integrated Resources Plan, Draft Environmental Impact Report.* Accessed May 14, 2009. Available at: http://www.lacity-irp.org/drafteir.htm
LA DPW, LADWP and USACE 2007	City of Los Angeles Department of Public Works, Bureau of Engineering, City of Los Angeles Department of Water and Power and U.S. Army Corps of Engineers. April 2007. *Programmatic Environmental Impact Report/Programmatic Environmental Impact Statement for the Los Angeles River Revitalization Master Plan,* Volume I.
LADWP 2009	City of Los Angeles, Department of Water and Power. 2009. *LADWP Quick Facts and Figures.* Accessed on January 25, 2010. Available online at: http://www.ladwp.com/ladwp/cms/ladwp000509.jsp
LADWP 2005	City of Los Angeles, Department of Water and Power. 2005. *Urban Water Management Plan.*

LARWQCB No date — Los Angeles Regional Water Quality Control Board. Fact Sheet, Supporting amendments to the Los Angeles County Municipal Separate Storm Sewer System Permit (Order No. 01-182; NPDES Permit No. CAS004001) to incorporate waste load allocations for trash pursuant to the Los Angeles River Watershed Trash TMDL. Accessed December 9, 2009. Available online at: http://www.swrcb.ca.gov/losangeles/water_issues/programs/stormwater/municipal/ms4_permits/los_angeles/LACo_2009/LAR%20Trash%20MS4%20Fact%20Sheet.pdf

LARWQCB 2008 — Los Angeles Regional Water Quality Control Board. 2008 CWA Section 303(d) List of Water Quality Limited Sections. Accessed on June 4, 2009. Available at: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/303d/2008/Appendix%20F.pdf.

LARWQCB 2007a — Los Angeles Regional Water Quality Control Board. 2007a. Santa Monica Bay Watershed Management Area Summary Report. Accessed December 8, 2009. Available online at: http://www.swrcb.ca.gov/losangeles/water_issues/programs/regional_program/wmi/ws_santamonica.shtml

LARWQCB 2007b — Los Angeles Regional Water Quality Control Board. 2007b. Los Angeles River Watershed Summary Report. Accessed December 8, 2009. Available online at: http://www.swrcb.ca.gov/losangeles/water_issues/programs/regional_program/wmi/ws_losangeles.shtml

LARWQCB 1995 — Los Angeles Regional Water Quality Control Board. February, 1995. Water Quality Control Plan, Los Angeles Region. Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties.

Metro 2009a — Los Angeles Metropolitan Transportation Authority. 2009a. Crenshaw Transit Corridor Project. Draft Environmental Impact Statement/Draft Environmental Impact Report. Chapter 4.0, Section 4.9: Water Resources.

Metro 2009b — Los Angeles Metropolitan Transportation Authority. 2009b. Westside Subway Extension, Draft Geotechnical and Environmental Report. October, 2009.

Metro 2009c — Los Angeles Metropolitan Transportation Authority. December 10, 2009. Westside Subway Extension, Draft Site Assessment Study Report (127A).

Metro 2008 — Los Angeles Metropolitan Transportation Authority. August 29, 2008. Draft Alternatives Analysis Report. Chapter 4.0- Tunnel Feasibility Review.

WRD 2009 — Water Replenishment District of Southern California. June 2009. *Regional Groundwater Monitoring Report Water Year 2007-2008. Central and West Coast Basins, Los Angeles County, California.*