4.6.1 Affected Environment

4.6.1.1 Regulatory Framework

Federal Clean Air Act: Air quality in the United States is governed by the Federal Clean Air Act (CAA) and is administered by the U.S. Environmental Protection Agency (EPA). Under the authority granted by the CAA, EPA has established national ambient air quality standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). Table 4-6 presents the NAAQS that are currently in effect for criteria air pollutants. O_3 is a secondary pollutant, meaning that it is formed from reactions of "precursor" compounds under certain conditions. The primary precursor compounds that can lead to the formation of O_3 include volatile organic compounds (VOC) and oxides of nitrogen (NO_x).

Table 4-6 South Coast Air Basin Attainment Status /a/

Pollutant	National Standards	California Standards
Ozone (O3)	Non-attainment – Severe 17	Non-attainment
Carbon monoxide (CO)	Attainment – Maintenance /b/	Non-attainment – Transitional /c/
Nitrogen dioxide (NO2)	Attainment – Maintenance	Attainment
Sulfur dioxide (SO2)	Attainment	Attainment
Respirable particulate matter (PM10)	Non-attainment – Serious	Non-attainment
Fine particulate matter (PM2.5)	Non-attainment	Non-attainment
Lead (Pb)	Attainment	Attainment

/a/ Status as of June 15, 2007.
/b/ The EPA redesignated the SCAB as attainment for the CO NAAQS in 2007 (72 FR 26718).
/c/ The Los Angeles County portion of the SCAB was redesignated by CARB as attainment for the CO CAAQS, awaiting final State administrative process to officially change designation.
Source: CDM 2007

The CAA also specifies future dates for achieving compliance with the NAAQS and mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The City of Los Angles is included in the South Coast Air Basin (SCAB), which is designated as a federal non-attainment area for O3, PM10, and PM2.5.

California Clean Air Act: In addition to being subject to the requirements of the Federal CAA, air quality in California is also governed by the more stringent regulations under the California CAA. The California CAA is administered statewide by the California Air Resources Board (CARB). CARB oversees the functions of local air pollution control districts and air quality management districts, who in turn administer air quality activities at the regional, or air district, level. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the State to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CAAQS are at least as stringent, and often more stringent than the NAAQS. The currently applicable CAAQS are presented with the NAAQS in Table 4-6 for each pollutant.

CARB has been granted jurisdiction over several air pollutant emission sources that operate in the State. Specifically, CARB has the authority to develop emission standards for on-road motor vehicles, as well as for stationary sources and some off-road mobile sources. In turn, CARB has granted authority to the regional air pollution control and air quality management districts to develop stationary source emission standards, issue air quality permits, and enforce permit conditions.

Assembly Bill 32: The California Global Warming Solutions Act of 2006, also known as Assembly Bill (AB) 32, requires CARB to adopt regulations to require the reporting and verification of statewide greenhouse gas (GHG) emissions and to monitor and enforce compliance with the program. In general, the bill requires CARB to reduce statewide GHG emissions to the equivalent of those in 1990 by 2020. CARB was required to adopt regulations for mandatory GHG emissions reporting by January 1, 2008 and to adopt a plan indicating how emission reductions will be achieved by January 1, 2009. Major rulemakings for reducing GHGs must be developed by January 1, 2011, while the rules and market mechanisms adopted by CARB do not take effect until January 1, 2012. Since CARB is still in the rulemaking process for AB 32, information about project compliance at the state-level is currently not available.

An individual project, even a very large one, does not generate enough greenhouse gas emissions on its own to significantly influence global climate change; therefore, the issue of global climate change is, by definition, a cumulative environmental impact.

Air Quality Management Plan: At the local level, the South Coast Air Quality Management District (SCAQMD) has jurisdiction over a 10,743 square mile area consisting of Orange County, the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, and the Riverside County portions of the Salton Sea Air Basin and Mojave Desert Air Basin. SCAB is a sub region of the SCAQMD's jurisdiction, which covers an area of 6,745 square miles and includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. While air quality in this area has improved, the Basin requires continued diligence to meet air quality standards.

The SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the CAAQS and NAAQS. These plans require, among other emissions-reducing activities, control technology for existing sources; control programs for area sources and indirect sources; a permitting system designed to ensure no net increase in emissions from any new or modified permitted sources of emissions; transportation control measures; sufficient control strategies to achieve a five percent or more annual reduction in emissions (or 15 percent or more in a three-year period) for reactive organic compounds (ROC), NOx, CO, and PM10; and demonstration of compliance with CARB's established reporting periods for compliance with air quality goals1. On June 1, 2007, the SCAQMD adopted a comprehensive update, the 2007 AQMP for the Basin. The 2007 AQMP

[1] Reactive organic compounds (ROC) and volatile organic compounds (VOC) are designations made by CARB and USEPA, respectively, for organic compounds that react with NOx in the presence of sunlight to form O_3. Slight variations exist between the two designations; for example, the CARB definition of ROC includes ethane while the USEPA definition of VOC does not.

outlines the air pollution control measures needed to meet the federal PM2.5 standard by 2015 and the federal eight-hour ozone standard by 2024.

The SCAQMD also adopts rules to implement portions of the AQMP. Several of these rules may apply to construction or operation of the project. For example, Rule 403 requires the implementation of best available fugitive dust control measures during active operations capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads. In addition, Regulation XI from the SCAQMD contains source-specific standards for different operations that may be completed under the jurisdiction of the SCAQMD. Rule 1166 contains requirements related to VOC emissions from decontamination of soil. The rule sets requirements to control the emission of VOC from excavating, grading, handling, and treating VOC-contaminated soil.

4.6.1.2 Existing Conditions

Table 4-7 below provides air quality data for 2006 (the most recent available air quality data available from the SCAQMD), for the Central Los Angeles monitoring location (Station Number 087), the closest monitoring station to the proposed project site.

Table 4-7 South Coast Air Quality Management District - Air Quality Data
Central Los Angeles Station (Station Number 087) – 2006

		Maximum Concentration (ppm)	Days of AAQS Exceeded	
			Federal	State
Ozone	1-hour	0.11	0	8
	8-hour	0.079	0	4
NO2	1-hour	0.11		
	24-hour	0.06		
	Annual Average	0.0288		
SO2	1-hour	0.03		
	24-hour	0.006		
	Annual Average	0.0019		
		Maximum Concentration (ug/m3)	Days of AAQS Exceeded	
			Federal	State
PM10	24-hour	59	0	3
	Annual Average	30.3		
PM2.5	24-hour	56.2	11	
	Annual Average	15.6		

In addition to the criteria pollutants traditionally considered, GHG emissions need to be evaluated. Different from criteria pollutants, GHG considerations are not based on maintaining or achieving an ambient air quality standard, but instead focus on achieving reductions, regardless of increases in population or operations. While there are currently no specific regulatory requirements for GHG beyond mandatory reporting requirements per the guidelines developed in response to AB 32, the SCAQMD is currently in the process of developing thresholds of significance that would require all projects to provide a minimum reduction over the existing conditions. As the project is further evaluated, it will be important to estimate existing levels of GHG emissions versus the change in GHG emissions resulting from implementation of the alternatives.

4.6.2 Evaluation Methodology

This air quality evaluation is qualitative, based on experience with emissions associated with construction activities and transit systems' operational air quality emissions. A more comprehensive quantitative air quality and greenhouse gas emissions assessment will be required once additional specific analysis is performed during the EIS/EIR phase.

The subsequent analysis will evaluate the alternatives regarding criteria pollutants in accordance with SCAQMD CEQA guidelines and GHG in accordance with draft guidance as available by SCAQMD. Emissions under the current year and existing conditions will be provided as a baseline point of comparison. Criteria pollutants, specifically NOx, CO, PM2.5, and PM10, will be evaluated using SCAQMD's localized significance thresholds (LST) methodology as detailed in the Final LST Methodology document, dated June 2003. It is assumed that dispersion modeling for operational emissions will not be required as part of this evaluation, with the potential exception of localized CO impacts resulting from changes in intersection configurations and congestion resulting from any of the alternatives. If deemed necessary due to potential future decreases in level of service, localized CO impacts may be evaluated using the Cal3HQC roadway CO dispersion model.

While CEQA guidance does not currently exist detailing a methodology for estimating construction or operational GHG emissions, GHG CEQA thresholds of significance are currently being considered and drafted for the SCAQMD. Assuming a finalized, official SCAQMD methodology may not be available during this evaluation, current CARB AB 32 reporting requirements, methodologies, and emission factors will be utilized to estimate GHG emissions for all years and scenarios. Where CARB methodologies or emission factors are not available for specific sources, available EPA factors will be reviewed for use in the analysis.

4.6.3 Environmental Issues

Based on at-grade versus tunnel construction, it is anticipated that construction emissions and impacts associated with the Underground Emphasis LRT Alternative would be greater than those associated with the At-Grade Emphasis LRT Alternative. Underground construction requires excavation and disposal or reuse of greater amounts of dirt than at-grade construction. The moving of this dirt generates fugitive dust emissions as well as engine emissions from the equipment needed to dig the hole,

remove the dirt, and place it elsewhere. At-Grade construction does require moving dirt; however the quantity is significantly less.

Annual regional vehicle miles traveled (VMT) is expected to decrease under both the At-Grade Emphasis LRT and Underground Emphasis LRT Alternatives, and therefore, emissions related to vehicle exhaust (CO, CO2, and NOx) are expected to also decrease as compared to existing conditions and the No Build Alternative. As a result, none of the project alternatives are predicted to exceed operational conformity or CEQA operational thresholds.

Localized impacts, specifically localized CO concentrations at specific intersections, may occur for various alternatives due to changes in intersection configurations and levels of service (LOS). These localized impacts may result in CO hot spots. If the future traffic analysis indicates that specific intersections may suffer a decrease in the LOS, those intersections will be evaluated further for localized CO impacts in the EIS/EIR.

4.7 Noise and Vibration

This section addresses the potential impacts of the project on noise within the PSA. The analysis describes the regulatory setting and the existing setting as it relates to noise. The potential impacts that could result to surrounding land uses from noise from construction and operation of each of the components are also addressed.

4.7.1 Affected Environment

4.7.1.1 Regulatory Framework

A number of federal agencies maintain noise regulations and guidelines. These agencies include EPA, the U.S. Department of Housing and Urban Development (HUD), the Federal Highway Administration (FHWA), the Federal Aviation Administration (FAA), and the Federal Transit Administration (FTA), among others. The applicability of noise regulations depends on the nature of the agency. EPA regulations, for instance, generally apply to interstate rail, interstate commercial mobile vehicles, or to certification procedures for "low-noise emissions products." HUD noise regulations apply to HUD-assisted projects and actions, while FHWA noise regulations pertain to federally aided highway projects. Federal regulations are not applicable to the project because it does not involve interstate activities, is not assisted by HUD, and does not involve construction of highways.

The California Office of Noise Control has developed guidelines showing a range of noise standards for various land use categories. Cities within the state have incorporated these guidelines into their General Plan noise elements. These guidelines are meant to maintain acceptable noise levels in a community setting based on the type of land use. Noise compatibility by different types of land uses is a range from "Normally Acceptable" to "Clearly Unacceptable" levels. The guidelines are used by cities within the state to help determine the appropriate land uses that could be located within an existing or anticipated ambient noise level, and are primarily considered in general plans.

The project has the potential to affect noise levels within the City of Los Angeles. Noise within the City is regulated by noise ordinances, which are found in the Los Angeles Municipal Code (LAMC). These noise ordinances limit intrusive noise and establish sound measurements and criteria; minimum ambient noise levels for different land use zoning classifications; sound emission levels for specific uses (such as radio, television, vehicle repairs, and amplified equipment); hours of operation for certain activities (such as construction and trash collection); standards for determining noise deemed a disturbance of the peace; and legal remedies for violations. The noise ordinance for the City of Los Angeles can be found in Chapter XI of the LAMC. In addition, the General Plan Noise Element for the City of Los Angeles provides noise management goals, objectives, policies, and programs to achieve. The City has incorporated the California Office of Noise Control noise compatibility guidelines into their Noise Element.

4.7.1.2 Existing Conditions

Sound is defined as any pressure variation detected by the human ear. Noise is defined as any unwanted sound. The degree to which noise can affect the human environment range from levels that interfere with speech and sleep (annoyance and nuisance) to levels that cause adverse health effects (hearing loss and psychological effects). Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise; the amount of background noise present before the intruding noise; and the nature of work or human activity that is exposed to the noise source. The preferred unit for measuring sound is the decibel (dB). The dB expresses the logarithmic ratio of the amount of energy radiating from a source in the form of an acoustic wave. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Sound intensity is measured in decibels that are A-weighted (dBA) to correct for the relative frequency response of the human ear. The range of human hearing extends from approximately three to 140 dBA.

The following describes the existing (baseline) environmental noise setting information presented for the At-Grade Emphasis LRT and Underground Emphasis LRT Alternatives.

The existing noise and vibration environment of an area (without the project) is generally established by the type and intensity of the existing land use and related transportation system activity. The PSA, and specifically the area of potential effect located immediately adjacent to or above the alternative alignments, is best described as an intensely developed urban core. The structure type is predominately steel and concrete high-rise buildings, attached and detached parking structures, plus a limited number of masonry low-rise multi-story buildings. There is also a small number of street-level pedestrian plazas. The land uses are office/commercial, institutional, and government plus some hotels and mixed commercial/retail with upper floor residential apartments/condominiums.

The PSA transportation network is essentially a grid pattern of street-level roads plus a few elevated ramps and below surface traffic tunnels. Both the At-Grade Emphasis LRT Alternative and the Underground Emphasis LRT Alternative are located between one and two blocks from major freeways, the I-101 (below-grade) and I-110 (western edge). Because of the characteristics of the downtown fabric and the existing buildings located in between the alignments and the freeways, very little additional noise would be expected for either alternative. One key note is the underpass element which is introduced in the Underground Emphasis LRT and the option for the At-Grade Emphasis LRT. The underpass would direct through north-south traffic on Alameda St. (the only truck-heavy street in the PSA) underground, thus minimizing traffic noise impacts even more. The estimated average ambient noise level is a Day Night Average Noise Level (Ldn) of approximately mid/upper 60's to low 70's, dBA.

The two build alternatives and proximate land use categories are shown on Figure 4-1.

4.7.2 Evaluation Methodology

This noise and vibration evaluation is qualitative, based on substantial experience with ambient and transit systems' environmental noise plus a "windshield" survey of the alternative alignments conducted during April 2008. A more comprehensive quantitative noise and vibration impact assessment will be required once additional specific analysis is performed during the EIS/EIR phase. The subsequent analysis will follow the Federal Transit Administration (FTA) guidelines contained in Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), issued as a Final Report May 2006.

4.7.3 Environmental Issues

Noise and vibration associated with the two build alternatives would be generated by a LRT system with associated stations and ancillary structures (e.g., discharge vent for tunnel ventilation of underground alternative). The main noise sources of the LRT vehicle are the wheel/track interface, vehicle brakes, and the propulsion system of the trainset. For stations, the primary noise sources are mechanical HVAC plus station platform paging. An additional noise source for subway systems is the tunnel ventilation system. Additional noise sources for street-level operations are grade-crossing warning bells and track horns. In general, the noise from trainsets operating at street level (with concomitantly low relative speeds compared to subway operation) would be about the same as a medium truck or a bus operating at similar speeds. The noise emission from a trainset operating in a tunnel section could be slightly louder because of a higher allowable travel speed, but the noise escaping to street level and higher, including noise from tunnel vents, would be minimal and likely inaudible compared to the existing urban ambient noise. With the exception of grade-crossing bells, noise emission from either sub-grade or street level stations would likely blend into the existing ambient noise currently generated by traffic and the myriad of high-rise buildings in the PSA. Vibration generated by the operating trainsets is expected to be low for the slower speed street-level alternatives. Vibration and resulting ground-borne noise from subway operation might be of interest in the vicinity of the Disney Concert Hall but is likely to be insignificant.

Table 4-8 Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use	Noise Metric	Description of Land Use Category
1	Outdoor Leq(h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor dn(h)*	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be utmost importance.
3	Outdoor Leq(h)*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interferences with such activities as speech, meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

***Leq for the noisiest hour of transit-related activity during hours of noise sensitivity.**
Source: Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), Chapter 3, issued as a Final Report May 2006.

At-Grade Emphasis LRT Alternative

For purposes of noise and vibration impact analysis, the potential impacts associated with Options A and B are the same. As discussed above, LRT vehicles generate more potentially audible noise when running at street level. The normal trainset noise is similar in nature and sound level to the existing street traffic traversing the area. However, "wheel squeal", train platform paging systems and any at-grade crossing bells would add noise of a different character to the existing ambient noise. When the hustle and bustle of daytime street traffic and activity subsides, the operation of a street-level LRT system could become more audible. The phenomenon of wheel squeal occurs when a steel-wheeled LRT vehicle traverses a tight-radius steel track curve and high-pitched vibration and noise emission occurs. Wheel squeal can be avoided or minimized during design by considering the radius of necessary curved track sections. This may be difficult in a densely developed urban environment. For a given track layout with tight curves, the squeal can usually be mitigated at extra expense and maintenance costs but can be a stubborn problem. Based on this, the At-Grade Emphasis LRT Alternative has a slightly higher potential for noise impacts than the Underground Emphasis LRT Alternative.

Underground Emphasis LRT Alternative

As discussed above, subway LRT noise is generally not of concern to noise-sensitive street-level land use because the noise from the train and below-grade stations/platforms is well contained within the tunnel structure and at-grade crossing bells would not be necessary. One exception is the 1st and Alameda St. intersection. This at-grade intersection may experience higher levels of noise and vibration due to the volume of trains passing through. In addition, the trains will be surfacing in a portal located in the 'Office Depot' parcel and this may affect surrounding businesses and/or residences due to vibration.

The potential noise emissions from tunnel ventilation structures is readily attenuated by application of established design principles and the common practice of locating the vent shafts such that their exits are in or adjacent to parking structures or building service areas. Because of potentially higher train speeds and closer proximity to the foundations of ground-born-noise-sensitive structures, the potential concern for these issues should be evaluated when more project details become available. In general, the Underground Emphasis LRT Alternative has a low potential for noise impacts and a slightly higher potential for vibration/ground-born noise impacts at critical receptors than the At-Grade Emphasis LRT Alternative.

4.8 Ecosystems/Biological Resources

The PSA traverses the highly developed downtown area. As such, biological resources are limited to landscaped areas where mature trees or other vegetation could support wildlife species that are adapted to the urban environment. This section discusses potential issues associated with biological resource impacts in the PSA.

4.8.1 Affected Environment

4.8.1.1 Regulatory Framework

Endangered Species Act: The Endangered Species Act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Section 7 of the Endangered Species Act requires federal agencies to aid in the conservation of listed species, and to ensure that the activities of federal agencies will not jeopardize the continued existence of listed species or adversely modify designated critical habitat. At the federal level, the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration are responsible for administration of the Endangered Species Act.

Migratory Bird Treaty Act: The Migratory Bird Treaty Act decrees that all migratory birds and their parts (including eggs, nests and feathers) are fully protected. Nearly all native North American bird species are protected by the act. Under the act, taking, killing, or possessing migratory birds is unlawful. Activities that would require such a permit would include destruction of migratory bird nesting habitat during the nesting season when eggs or young are likely to be present.

California Endangered Species Act: The California Department of Fish and Game is responsible for administration of the California Endangered Species Act. Unlike the federal Endangered Species Act, there are no state agency consultation procedures under the California Endangered Species Act. For projects that affect both a state and federal listed species, compliance with the federal Endangered Species Act will satisfy the California Endangered Species Act if the California Department of Fish and Game determines that the federal incidental take authorization is "consistent" with the California Endangered Species Act. Projects that result in a take of a state only listed species require a take permit under the California Endangered Species Act.

California Fish and Game Code Sections 3500 - 3705, Migratory Bird Protection: Sections 3500 through 3705 of the California Fish and Game Code regulate the taking of migratory birds and their nests. These codes prohibit the taking of nesting birds, their nests, eggs, or any portion thereof during the nesting season. Typically, the breeding/nesting season is from March 1 through August 30. Depending on each year's seasonal factors, the breeding season can start earlier and/or end later.

Los Angeles County General Plan: The Los Angeles County General Plan identifies Significant Ecological Areas containing biological resources and sets forth the goal of conserving these areas. While development within a Significant Ecological Area (SEA) is not prohibited, the general plan does require development to be limited and controlled in order to avoid impacting valuable biological resources.

City of Los Angeles Native Tree Protection Ordinance: The City of Los Angeles enacted an oak tree protection ordinance in 1982 to protect oak trees in the City. Although the ordinance slowed the oak tree decline, the oak population, as well as other native tree species, continued to decline. In an effort to further slow the decline of native tree habitat, the City passed an amended Native Tree Protection Ordinance (Ordinance No. 177,404), which became law on April 23, 2006. The Native Tree Protection Ordinance protects all native oak tree species (Quercus spp), California Sycamore (Platanus racemosa), California Bay (Umbellularia californica), and California Black Walnut (Juglans californica); applies to protected trees four inches or greater in diameter at 4.5 feet above ground (multiple trunk trees are calculated by cumulative diameter); applies to protected trees on private lots; and requires that a protected tree report be submitted by a registered consulting arborist, landscape architect, or pest control advisor who is also a certified arborist.

Protected tree removal requires a removal permit by the Board of Public Works. Any act that may cause the failure or death of a protected tree requires inspection by the City's Urban Forestry Division. Although the law does not require a permit for the pruning of protected trees, the City recommends consultation with a certified arborist to ensure that the pruning of protected trees is performed carefully.

4.8.1.2 Existing Conditions

Due to its densely developed and urbanized nature, the PSA provides little opportunity for wildlife species or other biological resources to exist. There are no Habitat Conservation Plans for this area, and no SEAs located within one-quarter mile of either side of the At-Grade Emphasis LRT or Underground Emphasis LRT Alternatives. There are no wildlife corridors within this area to support movement of wildlife species. There are no wetlands, oak woodlands, or coastal sage scrub habitat within the PSA. Due to the lack of habitat, sensitive species are not known to occur here. The Los Angeles River, which is contained within a concrete channel through the downtown area, is located more than one-quarter mile away from the build alternatives.

In general, biological resources within the PSA are limited to a few green spaces consisting of landscaped vegetation where highly-adaptive urban wildlife species may exist. Native plant species are mainly limited to those few that are maintained in these small green spaces. A small number of large mature trees located within the PSA may provide potential roosting and nesting sites for birds, including raptors.

4.8.2 Evaluation Methodology

To evaluate potential impacts related to the project construction and operation, the possible plant species that could occur in the PSA were reviewed, and their respective value as protected species or habitat that supports a protected species was evaluated.

4.8.3 Environmental Issues

Because of the general lack of biological resources in the PSA, as described above under Section 4.8.1.2, there are few environmental issues to consider in this regard. However, trees that may provide potential roosting and nesting sites for birds may exist within one-quarter mile of the two build alternatives. If construction of the project would require removal of these trees during nesting season, focused surveys for nesting birds would be required. Compliance with the City of Los Angeles Native Tree Ordinance would also be required. For these reasons, the Underground Emphasis LRT Alternative could be preferable to the At-Grade Emphasis LRT Alternative if it would avoid disturbance or destruction of protected trees and nesting birds. In addition, design elements would be incorporated that could add more trees and vegetation than currently exist in either alternative.

4.9 Geotechnical: Subsurface and Hazardous Materials

This section discusses potential issues associated with geology and subsurface conditions and hazardous materials within the PSA.

4.9.1 Affected Environment

4.9.1.1 Geology and Subsurface Conditions Geologic Features and Soils

The PSA is located in the northern portion of the Los Angeles Basin. This basin is a major elongated northwest-trending structural depression that has been filled with sediments up to 13,000 feet thick since middle Miocene time. On a regional scale, the PSA lies within the northernmost portion of the Peninsular Ranges geomorphic provinces near its boundary with the Transverse Ranges geomorphic provinces. The Peninsular Ranges province is characterized by elongate northwest-trending mountain ridges separated by sub-parallel, sediment-filled valleys. This province is bounded by the San Jacinto fault zone on the east, the Pacific Ocean coastline on the west, and the Transverse Ranges geomorphic province on the north. In contrast, the adjacent Transverse Ranges are characterized by east-west trending geologic structures and mountain ranges that include the Santa Ynez, San Gabriel, San Bernardino, and Santa Monica Mountains, and associated valleys. The Transverse Ranges province is a composite structural block bounded by the Big Pine fault on the north, the San Andreas fault zone on the east, the Pacific Ocean on the west, and the Malibu Coast, Santa Monica,

Hollywood, Raymond, Sierra Madre, and Cucamonga faults on the south. The regional geology in the site vicinity is shown on Figure 4-4, Regional Geology.

On a local geologic setting, the proposed alignments would traverse the southeastern end of the Elysian Park Hills and the ancient floodplain of the Los Angeles River. The Elysian Hills comprise the low-lying hills west of the Los Angeles River and southeast of the eastern end of the Santa Monica Mountains. The Hollywood fault separates the northern end of the Elysian Hills from the Santa Monica Mountains. The Elysian Hills are comprised largely of Miocene age sedimentary rocks with Pliocene age rocks flanking the southeastern edge of the hills. Previous geologic mapping identified several major geologic structures within the Elysian Hills, including the Elysian Park anticline and northwest trending faults. The proposed project located on the southwestern flank of the northwest trending Elysian Park anticline. The southerly limb of the anticlinorium contains apparent secondary folds of relatively shorter wavelength and lesser continuity of fold axes. In the vicinity of the project alignment, bedding within the Fernando and Puente formations strike approximately east-west to slightly north of east and dips moderately to steeply to the south.

The geomorphology along the proposed alignments ranges from gently sloping alluvial floodplain surfaces to hill-side slopes of moderate relief and grade. The steepest slopes along the alignment surface are between 3rd St. (at Flower St.) and Olive St. (at 2nd St.). Review of the historical U.S. Geological Survey topographic map of the Hollywood Quadrangle shows a relatively narrow alluvial valley follows Flower St. from 6th St. up-gradient to 3rd St., then diverges to the northwest toward Glendale Blvd. (west of the 110- Harbor Freeway). This alluvial valley appears to be a tributary drainage course to an ancestral course of the Los Angeles River (i.e., prior to channelization of the modern Los Angeles River). The Los Angeles River floodplain covers the broad, gently sloping, alluvial terrain east of the Bunker Hill area. Artificial fill of variable thickness underlies the alignment in the near surface. The fill consists of mixtures of sand, silt, clay, with variable amounts of construction debris. Deep areas of fill to depths of approximately 25 feet below ground surface are locally present at abandoned tunnels (5th St.) and storm drain excavations that have been backfilled.

The numerous faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS - previously the California Division of Mines and Geology) for the Alquist-Priolo Earthquake Fault Zoning Program. By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault is a fault that has demonstrated surface displacement of Quaternary age deposits (last 1.6 million years). Inactive faults have not moved in the last 1.6 million years.

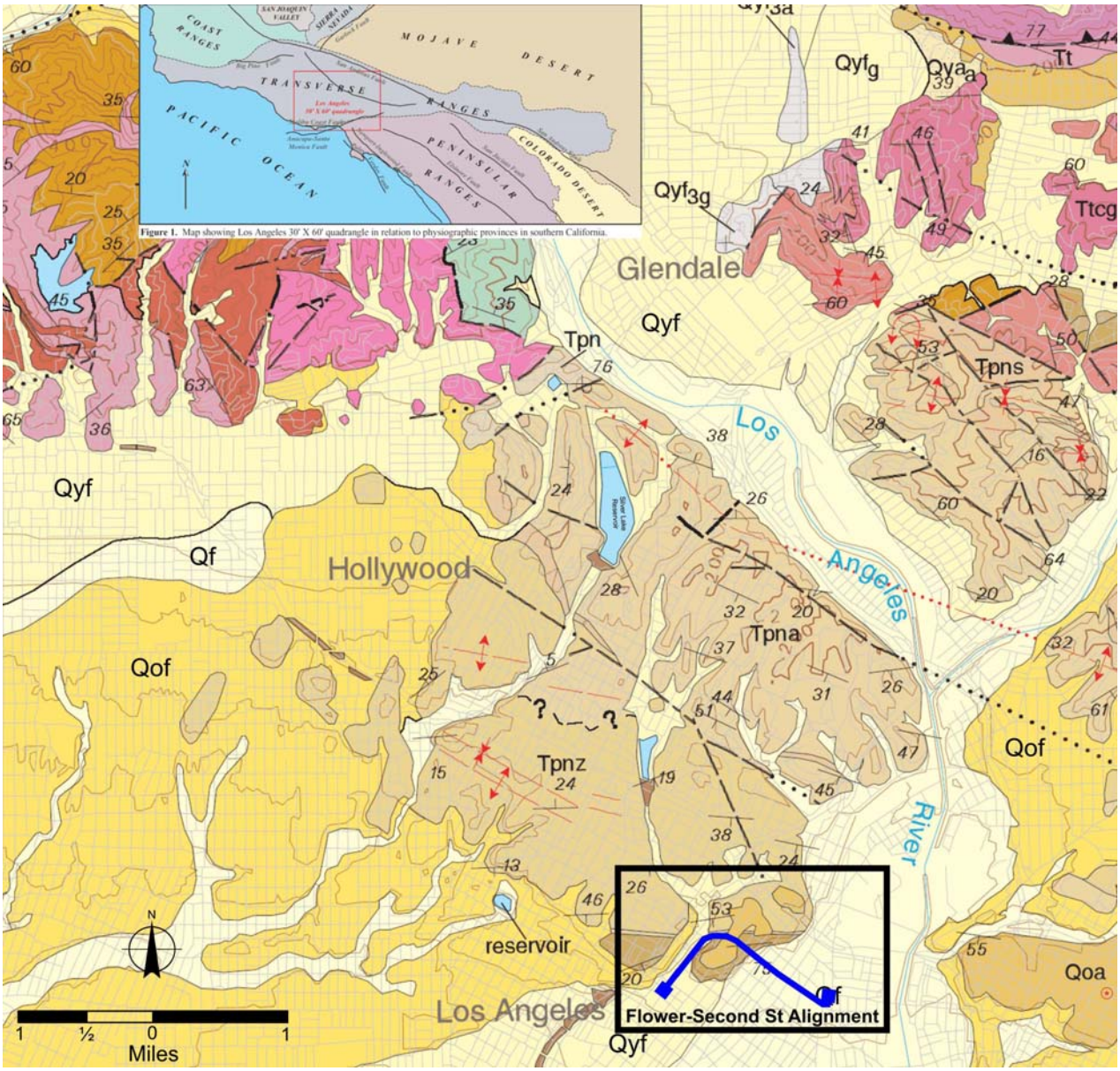

Figure 4-4 Regional Geology

Active and potentially active faults that are located within ten miles of the alignment are discussed below with respect to their known recency of displacement and location relative to the proposed alignments along Flower St. to 2nd St. Based on review of the available data, no known Holocene Active or Latest Pleistocene Active faults trend through the PSA. The PSA is not located within a currently established Alquist-Priolo earthquake fault zone for surface fault rupture. The faults in the vicinity of the site are shown in Figure 4-5, Regional Faults and Seismicity.

Active Faults

The Holocene active fault with surface expression closest to the PSA is the Hollywood fault, located approximately 3.9 miles to the northwest. Active blind thrust faults in vicinity of the site are discussed separately below. Holocene Active faults within ten miles of the planned alignment include the Raymond fault, the Newport-Inglewood fault zone, Verdugo fault and the Santa Monica fault. These faults, respectively, are located the following approximate distances from the proposed alignment; 5.9 miles southeast, 7.8 miles west-northwest, 8.4 miles north-northeast, and 9.6 miles west. The active Hollywood fault trends east-west along the base of the Santa Monica Mountains from the West Beverly Hills Lineament in the West Hollywood-Beverly Hills area to the Los Feliz area of Los Angeles. The fault is a groundwater barrier within Holocene sediments. Studies by several investigators have indicated that the fault is active based on geomorphic evidence, stratigraphic correlation between exploratory borings, and fault trenching studies. Although the Hollywood fault is considered active by the State Geologist, an Alquist-Priolo Earthquake Fault Zone has not yet been established for the Hollywood fault due to the poorly defined location along its length. The City of Los Angeles considers the Hollywood fault active for planning purposes and the CGS includes the fault in its database of seismic sources.

Potentially Active Faults

The inferred trace of the MacArthur Park fault is located approximately 0.5 miles southeast of the proposed alignment. The fault has not been definitively proven to exist. It is inferred west of downtown Los Angeles and has been located based on south-facing scarps, truncated drainages, and other geomorphic features. The Eagle Rock fault, a latest Pleistocene active fault is located approximately eight miles to the northeast.

Blind Thrust Fault Zones

Several buried thrust faults, commonly referred to as blind thrusts, underlie the Los Angeles Basin at depth. These faults are not exposed at the ground surface and are typically identified at depths greater than three kilometers. These faults do not present a potential surface fault rupture hazard, however, they are considered active and potential sources for future earthquakes. The nearest thrust is the Elysian Park Thrust. The Elysian Park Thrust, previously defined as the Elysian Park Fold and Thrust Belt, was postulated to extend northwesterly from the Santa Ana Mountains to the Santa Monica Mountains, extending westerly and paralleling the Santa Monica-Hollywood and Malibu Coast faults. The Elysian Park Thrust is now believed to be smaller in size, only underlying the central Los Angeles Basin. The Elysian Park Thrust underlies the PSA at depth (approximately six to nine miles below ground surface). Like other blind thrust faults in the Los Angeles area, the Elysian Park Thrust is not exposed at the surface and does not present a potential surface rupture hazard; however, the Elysian Park Thrust should be considered an active feature capable of generating future earthquakes with associated significant ground shaking and possible deformation of the near surface materials.

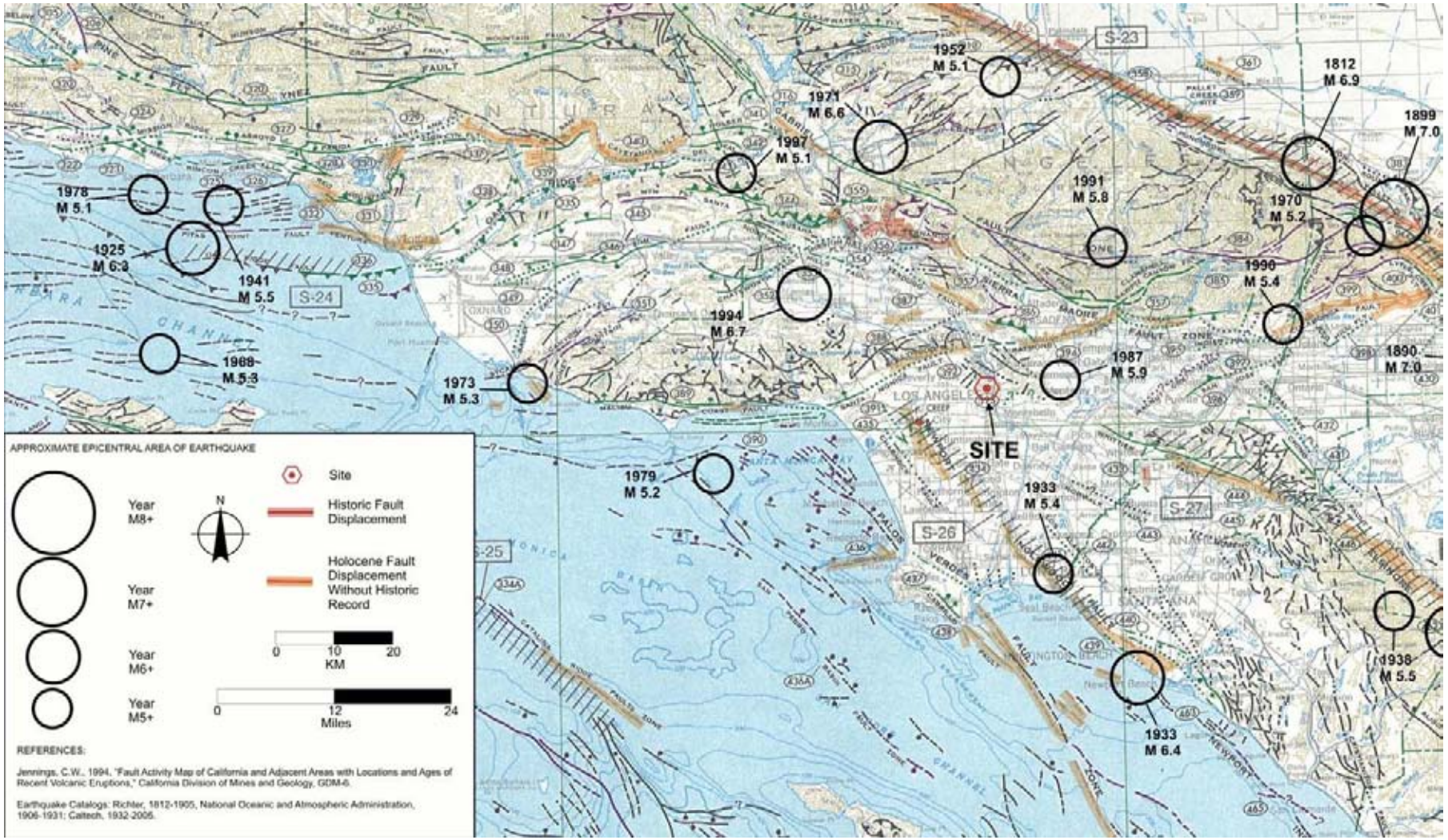

Figure 4-5 Regional Faults and Seismicity

In addition, the Elysian Park fault is a blind thrust fault located northeast of and at a shallower depth than the Elysian Park Thrust. The up-dip edge of the blind thrust fault tip is located about 0.6 miles north of downtown Los Angeles. The estimated, average recurrence-interval for events of the Elysian Park fault ranges from 500 to 1,300 years, with an estimated moment magnitude of up to 6.7. Evidence to define the activity of the Elysian Park fault is lacking; however, given the history of seismic events on blind thrust faults in the greater Los Angeles area (i.e., Whittier Narrows and Northridge earthquakes) and proximity to the PSA of this newly defined fault, the Elysian Park fault is considered active for planning and design of the project.

Coyote Pass Escarpment

The Coyote Pass Escarpment is a gentle south-facing, east-west trending topographic lineament that forms the southern flank of the Repetto Hills, from the Los Angeles River channel eastward to the Monterey Park area. The escarpment is an area of young, near-surface monoclinal folding, believed to be a result of fault rupture on the Elysian Park Thrust and/or the shallower Elysian Park fault. Although the trend of the escarpment beneath the floodplain west of the Los Angeles River has not been well defined, it has been inferred that the escarpment may align in the subsurface with the MacArthur Park escarpment, located west of the Harbor Freeway. The results of recent investigations of the Coyote Pass Escarpment indicate that the Elysian Park fault is active. Future fault rupture at depth along the Elysian Park fault and/or the Elysian Park Thrust could result in near-surface folding of the alluvial sediments and underlying bedrock in the area of the escarpment. Thus, no ground rupture is anticipated along the Coyote Pass Escarpment, but there is a potential for ground deformation (active folding) of the bedrock and the overlying alluvial sediments along the mapped location of the escarpment.

Landslides

Landslides occur in the City of Los Angeles and slope failures were instrumental in Los Angeles being one of the first municipalities in the nation to adopt hillside-grading ordinances. Rapid uplift of the mountainous areas of Los Angeles from past and ongoing tectonic movements gives rise to a geologic setting conducive to mass wasting. The variable nature of sediments and rocks exposed throughout Los Angeles, and the slope conditions created by uncontrolled grading, have led to frequent landslides of a variety of types. The hillside areas of Los Angeles, especially the central and eastern Santa Monica Mountains, have geologic and topographic conditions that are conducive to the development of surficial and gross landslides. The City of Los Angeles Department of Building and Safety regulates construction and development in hillside areas of Los Angeles. As part of the City of Los Angeles Building Code, and review process, the City has established a Hillside Ordinance, which specifies that a geologic report is required for proposed construction within hillside areas. The northwest portion of the PSA (area east of the 101/110 interchange) is within the Hillside Ordinance area.

Liquefaction

Liquefaction-induced ground failure has historically been a major cause of earthquake damage in Southern California. Significant damage to roads, utilities, pipelines, and buildings that occurred during the 1971 San Fernando and 1994 Northridge earthquakes was caused by liquefaction-induced ground displacement. Localities most susceptible to liquefaction-induced ground displacement are underlain by loose, water-saturated granular sediment within 50 feet of the ground surface. Liquefaction susceptibility generally decreases as the percentage of clay size particles in the soil increases and / or the coarse sand and gravel content increases.

In areas within the PSA, sediments susceptible to liquefaction comprise the young (Holocene to late Holocene age) alluvial fan deposits and young (Holocene) alluvial floodplain sediments. The older alluvial deposits are generally medium dense to dense and are considered by the CGS (1998, 2001) to have a low liquefaction susceptibility. The CGS has prepared seismic hazard maps for the Los Angeles Basin. The maps delineate liquefaction zones which have been defined by the CGS as areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacement such that mitigation (as defined in the Public Resources Code) would be required. The CGS uses criteria developed by the Seismic Hazard Mapping Act Advisory Committee in delineating liquefaction zones on the seismic hazard maps. In areas of limited or no geotechnical data, susceptibility zones are evaluated using a combination of geologic considerations.

The CGS has rated the liquefaction susceptibility for the Holocene age sediments in the PSA as high if saturated within 40 feet of the ground surface and, if not saturated, the susceptibility is rated as low. In contrast, the liquefaction susceptibility of older alluvial sediments (terrace deposits) is rated as low or not likely irrespective of ground-water levels. In this framework, the CGS has identified the Holocene sediments along Flower St. between Wilshire Blvd. and 2nd St. to be within a potential liquefaction zone. Likewise, the CGS has identified the Holocene sediments along 2nd St. between Hill St. and San Pedro St. to be within a potential liquefaction zone. The young (Holocene) age deposits along the alignment, where present, are on the order of five to 35 feet thick. Preliminary alignment profiles show the tunnel crown elevations appear to be below the young alluvial deposits that are rated as highly susceptible to liquefaction. For station locations with shallow groundwater and younger alluvial deposits, station walls may have to be designed for greater than usual lateral earth pressures to account for liquefaction potential. Settlement beneath the planned stations due to liquefaction is considered remote due to the depth of the Fernando formation beneath the Holocene alluvium at preliminary station depths.

4.9.1.2 Hazardous Materials

The PSA is located in a highly developed area with a long history of commercial and industrial land use. As such, there is potential for the presence of hazardous materials in soil and groundwater within one-quarter mile of the build alternatives. Contaminated soil and groundwater could be found at former and current gas stations, dry cleaners, or

manufacturing facilities, and may include, but are not limited to, petroleum hydrocarbons, volatile and semi-volatile organic compounds, and metals.

Naturally-occurring hazardous materials may also exist within the PSA from known oil and gas fields and geologic formations. These may include petroleum hydrocarbons, methane, and hydrogen sulfide, as well as other hazardous materials associated with historic or current production operations.

Soil contamination can result from spills at industrial facilities or leaks from underground storage tanks. Initially, soil contamination would be primarily located at the point of release, which typically would not be within existing streets. However, depending on the amount of the release, the type of contamination, the soil type, and location of groundwater, contaminants can move vertically and laterally and become located within right-of-ways where the project would be constructed.

A regulatory database search was conducted to identify potential or existing conditions, including soil and/or groundwater contamination that would present environmental health and safety concerns within one-quarter mile of the two build alternatives. Table 4-9 below provides the regulatory databases included in the search.

Results of the search indicate there are approximately 500 regulatory database listings in the PSA. Many sites are listed on more than one regulatory database. The listings include all past and present generators, transporters, treaters, storers, and disposers of hazardous waste. In addition, properties where contamination has been remediated and is no longer present in soil and/or groundwater are listed.

The PSA would potentially cross the Union Station Oil Field (along 2nd St. east of Central Ave.). In addition, there are seven oil wells located between 1st and 2nd Streets on the west side of Garey St. and west of Vignes St. Six of these wells were abandoned in June 2005 and the seventh well was abandoned prior to 2005. The Union Station Oil Field has been delineated as a Methane Zone by the City of Los Angeles Department of Public Works, Bureau of Engineering. Due to the proximity to the oil field, the potential for methane gas exists along the proposed alignments. The proposed alignments would cross this buffer zone north of 3rd St. and west of Grand Ave.

4.9.2 Evaluation Methodology

Geologic-related issues include subsurface geology and soils, seismicity, landslides, and liquefaction. All available data was reviewed in identifying potential geologic impacts within the PSA. As detailed above, a regulatory database search was conducted to identify potential or existing conditions, including soil and/or groundwater contamination that would present environmental health and safety concerns within one-quarter mile of the build alternatives.

Table 4-9 Regulatory Database Search Results		
Database		# of sites identified1
Federal Records		
NPL	National Priority List	0
Proposed NPL	Proposed National Priority List Sites	0
Delisted NPL	National Priority List Deletions	0
NPL LIENS	Federal Superfund Liens	0
CERCLIS	The Comprehensive Environmental Response, Compensation and Liability Information System	1
CERC-NFRAP	Archived sites removed from the CERCLIS inventory	1
LIENS 2	CERCLA Lien Information	0
CORRACTS	Corrective Action Report	0
RCRA-LQG	RCRA- Large Quantity Generator	2
RCRA-SQG	RCRA- Small Quantity Generator	65
RCRA-NonGen	RCRA-Sites which do not presently generate hazardous waste	9
RCRA-TSDF	RCRA - Transporters, Storage and Disposal	0
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator	0
ERNS	Emergency Response Notification System	3
FTTS	FIFRA/TSCA Tracking System	2
HIST-FTTS	Historical FIFRA/TSCA Tracking System	2
US ENG CONTROLS	Engineering Controls Sites List	0
US INST CONTROL	Sites with Institutional Controls	0
HMIRS	Hazardous Materials Information Reporting System	0
DOT OPS	Incident and Accident Data	0
US CDL	Clandestine Drug Labs	0
US BROWNFIELDS	A Listing of Brownfields Sites	0
DOD	Department of Defense Sites	0
FINDS	Facility Index System	16
FUDS	Formerly Used Defense Sites	0
LUCIS	Land Use Control Information System	0
CONSENT	Superfund (CERCLA) Consent Decrees	0
ROD	Records Of Decision	0
UMTRA	Uranium Mill Tailings Sites	0
ODI	Open Dump Inventory	0
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations	0
MINES	Mines Master Index File	0
TRIS	Toxic Chemical Release Inventory System	0
TSCA	Toxic Substances Control Act	0
SSTS	Section 7 Tracking Systems	0
ICIS	Integrated Compliance Information System	0
PADS	PCB Activity Database System	0
MLTS	Material Licensing Tracking System	0
RADINFO	Radiation Information Database	0
RAATS	RCRA Administrative Action Tracking System	0

Table 4-9 Regulatory Database Search Results		
Database		# of sites identified1
State and Local Records		
AIRS	Toxics and Criteria Pollutant Emissions Data	16
HIST-Cal-Sites	Replaced with Envirostor	1
CA BOND EXP. PLAN	Bond Expenditure Plan	0
CA WDS	California Water Resources Control Board- Waste Discharge System	6
CA FID UST	Active and Inactive Underground Storage Tank Locations	79
CHMIRS	California Hazardous Material Incident Report System	2
Cortese	No longer updated	35
DRYCLEANERS	Registered Drycleaner Related Facilities	3
ENVIROSTOR	DTSC Site Mitigation and Brownfields Reuse Database	20
LUST	Leaking Underground Storage Tank Incident Reports	34
HAZNET	DTSC Hazardous Waste Manifest Records	66
RESPONSE	DTSC Involved in Remediation	1
SCH	School Property Evaluation Program	0
SWRCY	Recycling Facility Sites	1
Toxic Pits	Toxic Pits Cleanup Act Sites	0
SWF/LF	Solid Waste Information System	0
SLIC	Spills, Leaks, Investigation and Cleanup Sites	7
SWEEPS UST	Statewide Environmental Evaluation and Planning System	84
UST	Underground Storage Tank Database	39
HIST UST	Historical Underground Storage Tank Database	30
AST	Aboveground Storage Tank Database	1
WMUDS/SWAT	Waste Management Unit Database	0
L.A. CO SML	Los Angeles County Site Mitigation Log	1
L.A. CO HMS	Los Angeles County Industrial Waste and Underground Storage	4
AOCONCERN	San Gabriel Valley Areas of Concern	0
LIENS	Environmental Liens Listing	0
Notify 65	Proposition 65 Records	0
DEED	Deed Restriction Listing	0
VCP	Voluntary Cleanup Program Properties	0
WIP	Well Investigation Program Case List	0
CDL	Clandestine Drug Labs	0
HAULERS	Registered Waste Tire Haulers Listing	0
Tribal Records		
INDIAN RESERV	Indian Reservations	0
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands	0
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land	0
INDIAN UST	Underground Storage Tanks on Indian Land	0
EDR Proprietary Records		
Manufactured Gas Plants		5

4.9.3 Environmental Issues

4.9.3.1 Geology and Subsurface Conditions

As part of standard practice and the predesign process, a geotechnical study would be prepared to identify geotechnical conditions and design features (such as foundation requirements and the maximum credible design earthquake) that would have to be included as part of the project design. The seismicity of Southern California is dominated by movements on the intersecting northwest-southeast trending San Andreas fault system and the east-west trending faults of the Transverse Ranges fault system. The Los Angeles Basin is located south of the intersection of these two systems. Both of the build alternatives would be potentially impacted by the fault systems. Both the At-Grade Emphasis LRT Alternative and Underground Emphasis LRT Alternative would be designed and constructed in accordance with all applicable earthquake standards to ensure the greatest protection from earthquakes. With respect to landslides, if the most western portion of the At-Grade Emphasis LRT Alternative is within the Hillside Ordinance area, then design and construction would be in accordance to all applicable standards and ordinances. Where liquefaction concerns are present, final engineering specifications would determine the proper footings and/or foundations along the alignment, as well as at the station locations.

Neither the construction nor the operation of the project would be expected to cause, accelerate, or exacerbate geologic hazards that would result in substantial damage to structures or infrastructure, or that would expose people to increased risk of hazards. Construction and operation would not cause or accelerate instability from erosion, expansion or settlement or offsite sediment runoff.

4.9.3.2 Hazardous Materials

A large number of sites where hazardous materials may be present are located within one-quarter mile of the two build alternatives, indicating that localized areas of contaminated soils and groundwater could be encountered during the construction of the project.

The At-Grade Emphasis LRT Alternative may offer an advantage over the Underground Emphasis LRT Alternative in avoidance of soil contamination from sources such as underground storage tanks. In addition, naturally-occurring hazardous materials such as petroleum hydrocarbons, methane (portions of the PSA are within a methane zone), and hydrogen sulfide would be less of a concern with the At-Grade Emphasis LRT Alternative. However, hazardous materials in surface soils and potentially shallow groundwater would be a potential concern with construction of any of the promising alternatives.

4.10 Water Resources

This section provides an overview of water resources within the PSA, regulatory requirements, and the potential environmental issues associated with each alternative. Water resources include surface water hydrology, flood hazards, tsunamis, inundation, seiches, and groundwater.

4.10.1 Affected Environment

4.10.1.1 Regulatory Framework

Clean Water Act: The EPA regulates water quality under the Clean Water Act (CWA) also known as the Federal Water Pollution Control Act. Enacted by the EPA in 1972, the CWA is designed to restore and maintain the chemical, physical, and biological integrity of waters of the United States. The CWA provides the legal framework for several water quality regulations including National Pollution Discharge Elimination System (NPDES) Permits, effluent limitations, water quality standards, pretreatment standards, antidegradation policy, non-point source discharge regulation, and wetlands protection. EPA has delegated the responsibility of portions of the CWA to state and regional agencies, including the State of California; therefore the primary regulations resulting from the CWA are discussed in the state and local regulation descriptions that follow.

National Flood Insurance Act: The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. NFIP is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. Flood Insurance Rate Maps are developed by FEMA to determine if a particular parcel lies in a designated Special Flood Hazard Zone.

Porter-Cologne Water Quality Control Act: The Porter-Cologne Water Quality Control Act (embodied in the California Water Code [CWC]) established the principal California legal and regulatory framework for water quality control. The CWC authorizes the State Water Resources Control Board (SWRCB) and Regional Boards to implement the provisions of the federal CWA. The alternative alignments are located in Region 4, also known as the Los Angeles Regional and governed by the Los Angeles Regional Water Quality Control Board (LARWQCB).

NPDES Permit Program: The NPDES program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. In California the permits are issued by the SWRCB or Regional Boards. The applicable permits include:

- NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the SWRCB. The General Permit includes measure to eliminate or reduce pollutant discharges through a Stormwater Pollution Prevention Plan (SWPPP), which describes the implementation and maintenance of Best Management Practices (BMPs) to control stormwater and other runoff during and after construction.

- NPDES Los Angeles County Municipal Storm Water Discharge Permit issued by the LARWQCB. Under the MS4 Permit, the County and City are required to implement development planning guidance and control measures that control and mitigate stormwater quality and quantity impacts to receiving waters as a result of new development and redevelopment. The MS4 Permit requires permittees to implement a Standard Urban Stormwater Management Plan (SUSMP) that designates BMPs that must be used in specified categories of development and redevelopment projects to

infiltrate, filter, or treat stormwater runoff, control peak flow discharges, and reduce the post-project discharge of pollutants from stormwater conveyance systems.

Basin Plan: As required by the CWC, the Regional Board adopts and periodically updates a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). The Basin Plan designates beneficial uses for bodies of water, sets numerical (quantitative) and narrative (qualitative) water quality objectives applicable to inland surface waters and enclosed bays and estuaries, and includes implementation provisions, programs, and policies to protect all waters in the Los Angeles region.

California Toxics Rule: The EPA has established water quality criteria for certain toxic substances via the California Toxics Rule (CTR). The CTR established acute (i.e. short term) and chronic (i.e. long term) standards for bodies of water such as inland surface waters and enclosed bays and estuaries that are designated by the LARWCB as having beneficial uses protective of aquatic life or human health, such as the Los Angeles River.

California Impaired Water Bodies: Under Section 303(d) of the CWA, the SWRCB identifies impaired bodies of water that do not meet water quality standards and together with the Regional Boards prioritizes and schedules them for development of Total Maximum Daily Loads (TMDLs).

California Nonpoint Source Pollution Control Program: The State Board and the California Coastal Commission (CCC) developed the Nonpoint Source Pollution Control Program in California, which contains management measures for categories of land use/development. Under the Nonpoint Source Program Strategy and Implementation Plan 1998-2013, a three-tier system of BMPs is used as a means of implementing nonpoint source water quality management measures and strategies.

State Antidegradation Policy: In accordance with the federal Antidegradation Policy discussed above, the State Board adopted Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (more commonly referred to as the State Antidegradation Policy) which restricts the degradation of surface waters of the state and protects bodies of water where the existing water quality is higher than necessary for the protection of present and anticipated designated beneficial uses. The State Antidegradation Policy is implemented by the Regional Board.

Flood Control: Drainage and flood control structures and improvements in the City of Los Angeles are subject to review and approval by the City of Los Angeles Bureau of Engineering. The City utilizes a 50-year design storm for flood control design purposes, which is a predicted storm event estimated using the City's methodology and assumption, which are considered to be conservative.

4.10.1.2 Existing Conditions

The two build alternatives are in the general vicinity of each other when viewed from a water resources perspective. For purposes of this section, the environmental setting is discussed for the general vicinity and not for the individual alternatives, except where differences in the alternatives may result in potential environmental issues.

Surface Water Hydrology

Hydrologic conditions in the area, natural and man-made, cause runoff within the watershed to drain to a receiving water body. For purposes of the municipal NPDES Stormwater Permit, the LARWQCB has defined Watershed Management Areas (WMA). The alternatives are located in the Los Angeles River WMA.

The alternative alignments are located in the downtown portion of the City of Los Angeles. This area is characterized as highly urban with no or limited pervious surfaces. Surface runoff is characterized as either dry weather or wet weather flows. Water quality of the runoff is determined by the quality of water of the water discharged and by the materials runoff collects on its way to a waterbody. The Los Angeles River watershed and many of its tributaries are on the CWA Section 303(d) list of impaired uses for not meeting water quality standards.

Flood Hazards

The City of Los Angeles, in coordination with Los Angeles County, state, and federal agencies has an extensive system for providing protection against flood hazards. The system drains wet and dry weather runoff from impervious surface areas, such as streets, and routes flows into underground pipes and drains discharging to various inland streams and channels. According to FEMA, there are no 500- or 100-year flood zones within the general vicinity of the alternatives.

Tsunami, Inundation, Seiche

Tsunamis are large ocean waves generated by major displacement of the ocean, such as earthquakes, volcanic eruptions, and submarine landslides. Low lying coastal areas of the City of Los Angeles are potentially at risk from tsunamis. A seiche is a standing wave in an enclosed or partially enclosed body of water, including water storage facilities. Seiches have multiple causes, including earthquakes and wind. Inundation is flooding related to a tsunami, seiche or other event. The alternatives are located more than 15 miles from the ocean and are not within a tsunami inundation area as determined in the City of Los Angeles Safety Element. Two small lakes, Hollenbeck Lake and Echo Park Lake, are the closest enclosed bodies of water and are located more than one mile from the vicinity of the alignments. The Los Angeles River is located at a distance greater than 2,000 feet to the east of the PSA.

Multiple flood control facilities are located upgradient of the PSA in the San Fernando Valley portion of the Los Angeles River watershed. According to the City of Los Angeles Safety Element Exhibit G, failure of upgradient flood control basins could potentially cause inundation in the vicinity of the alignments. Both build alternatives are at the edge of an inundation area where the alignments cross (as an underpass) Alameda St. under Temple St. (At-Grade) and under 1st St. (Underground).

Groundwater

The Coastal Plain of Los Angeles Basin underlies the PSA. This groundwater basin is divided into four subbasins, with the Central Subbasin directly underlying the PSA. The Central Subbasin has a surface area of approximately 277 square miles with an estimated storage capacity of 13,800,000 acre-feet. Potable water production occurs throughout the majority of the basin via approximately 497 wells. Most groundwater production occurs in deep aquifers of the San Pedro Formation. No production wells are located in the vicinity of the PSA. In addition, aquifer recharge, which flows mainly in the permeable sediments at the ground surface, is not an issue for the PSA as the closest recharge area is located in the northern portion of the subbasin where the Los Angeles River enters the subbasin at the Los Angeles Narrows.

Groundwater levels vary across the subbasin. According to the EDR report, depth to groundwater in the project vicinity is approximately 37 feet and groundwater flows in a southeast direction. Exploratory borings drilled for many building sites adjacent to Flower St. between 7th and 2nd Streets encountered seepage at relatively shallow depths ranging from approximately 15 to 35 feet below ground surface. Groundwater, probably perched, has been reported in borings at depths between approximately 18 to 27 feet below ground surface adjacent to Flower St. in the area between 2nd and 5th Streets. In the portion of the proposed alignment along 2nd St., groundwater seepage water has been reported in borings at depths between approximately 14 to 36 feet below ground surface in the area between Hill St. and Alameda St. The seepage water encountered in the borings appears to be groundwater that is perched on the underlying Fernando formation bedrock. It should be noted that shallow groundwater levels are influenced by seasonal rainfall and infiltration in addition to possible nearby groundwater extraction.

Water quality in the main production zones is generally good with localized areas of poor water quality. Constituents of concern present in localized areas are total dissolved solids, volatile organic compounds (tetrachloroethylene and trichloroethylene), perchlorate, nitrate, iron and manganese, and chromium. According to the EDR report, there are localized areas that have experienced groundwater contamination in the vicinity of the PSA.

4.10.2 Evaluation Methodology

To determine potential environmental issues associated with water resources in relation to the alternatives, regulatory requirements and laws were reviewed at the federal, state, and local level.

4.10.3 Environmental Issues

Potential environmental issues related to water resources are discussed for the PSA and where applicable for specific alternatives.

Surface Water Hydrology

As stated above, the general vicinity of the PSA is highly impervious with limited or no pervious areas. The alternatives are not expected to increase imperviousness or increase runoff volumes within the Los Angeles River WMA. The alternatives are not expected to alter existing flow patterns.

Construction and operation of the alternatives are not expected to significantly impact surface water quality. Construction of any of the alternatives will require filing a Notice of Intent, preparation of a SWPPP, and compliance with the NPDES General Construction Permit and SUSMP requirements. BMPs will be identified to provide for temporary stormwater management during construction preventing the construction process from exposing people or property to water related hazards and keeping pollutants from being discharged to receiving water. Any dewatering discharges to the storm drain system and/or sewer system associated with tunneling will be required to meet minimum discharge requirements to not adversely impact surface waters. Construction and operation of the alternatives is not expected to adversely impact any designated beneficial uses of the Los Angeles River.

Flood Hazards

The alternative alignments are not located in a 100- or 500-year flood zone as determined by FEMA. Construction and operation of the alignments would not alter any existing flood zones.

Tsunami, Inundation, Seiche

The build alternatives are not located within a tsunami inundation zone as the alternatives are not in vicinity of the coast as discussed above.

The alternatives are partially located within the outlying edges of the inundation zone established for the unlikely failure of an upgradient flood control facility. The area between the intersection of 1st and Alameda Streets and Temple and Alameda Streets is at the edge of the inundation zone. Mitigation during engineering would include appropriate design features to alleviate any hazards associated with the inundation zone.

Inundation from a seiche is not a potential hazard, as the nearest enclosed or partially enclosed bodies of water are greater than one mile from the alternative alignments and the size of the waterbodies is limited.

Groundwater

The exact depths to groundwater in the PSA are not currently known. If groundwater is encountered, any dewatering activities are not anticipated to adversely affect groundwater flow, recharge, or production. Dewatering activities would not affect management of the subbasin. As discussed above, no groundwater production occurs in the PSA. Recharge in the area is restricted due to the lack of pervious surfaces.

If any groundwater is encountered all groundwater will be discharged, and treated if necessary, prior to disposal, in accordance with all applicable regulations. Dewatered groundwater requires treatment prior to discharge to comply with an NPDES permit issued by the LARWQCB or pretreatment requirements for discharge to the sewer system.

Localized groundwater contamination occurs on a limited basis in multiple areas in the downtown vicinity. Local contamination sources in the vicinity of the alignments include underground storage tanks and former manufactured gas sites. Contaminants may include gasoline, diesel fuel, and waste oil among other pollutants. Therefore, there is the potential that if groundwater is encountered and dewatering is required water could be contaminated and may need to be treated prior to discharge. During construction any tunneling could potentially serve as a preferential pathway for contaminated groundwater if it is encountered, thereby spreading groundwater contamination at higher rates than would normally occur. This can be mitigated during the engineering process with specifications for impermeable concrete-based grouting materials to fill the gap between the tunnel and surrounding earth. The permeability of the grouting materials would be lower than the surrounding soil types reducing the possibility that the tunnel would serve as a preferential pathway for contamination migration.

At-Grade Emphasis LRT Alternative

This alternative is at-grade for the majority of the proposed alignments and would have a low probability of encountering groundwater during construction. The portions of the alignments for the At-Grade Emphasis LRT Alternative that are below-grade traverse the same proposed alignment as the Underground Emphasis LRT Alternative. Engineering and design specifications would mitigate any previously discussed potential issues associated with groundwater dewatering.

Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative is below-grade for the entire alignment except for a limited portion at-grade at the connection point with the Metro Gold Line. Construction of the Underground Emphasis LRT Alternative would result in a higher probability of encountering groundwater during construction. Engineering and design specifications would mitigate any previously discussed potential issues associated with groundwater dewatering.

4.11 Energy

The transportation sector is responsible for approximately half of the energy consumed in the State of California[2]. Transportation energy consumption estimates consider:

- Annual vehicle miles traveled (VMT) for automobiles, trucks, buses and heavy rail vehicles and
- Variation of fuel consumption rates by vehicle type.

Fuel consumption has grown approximately 50 percent over the last 20 years, and is projected to continue to increase over the next 20 years. The proposed alternatives are anticipated to reduce energy consumption by providing an alternative to dependence on personal automobiles, thereby reducing VMT.

4.11.1 Affected Environment

Each alternative would require the installation of an overhead catenary system (OCS), suspended above the track-way to supply electricity to the trains. Traction power substations would be situated approximately every mile along the corridor to transmit and distribute electricity. Signaling and communication systems would also be required. Energy consumption would also be associated with operation of stations, stations and transit service maintenance, and construction activities to provide the required infrastructure.

Within the PSA, the Los Angeles Department of Water and Power (LADWP) provides electricity services. Electrical services are readily available to the PSA, with existing lines located along each of the proposed alignments.

4.11.2 Evaluation Methodology

To determine potential environmental issues associated with energy, a general review of energy requirements associated with operation and construction of the new alignments was conducted. The energy needs were considered in conjunction with the potential benefits associated with a diversion of automobile traffic to transit.

4.11.3 Environmental Issues

While construction and operation of all proposed alignments would have electrical energy expenditures associated with construction and operation, a new transit alignment is anticipated to decrease vehicle miles traveled and thereby decrease the consumption of fossil fuels.

Depending on the number of rail cars and frequency of operations, propulsion of each alternative would have similar energy consumption needs. The at-grade open air platforms associated with the At-Grade Emphasis LRT Alternative would have less energy needs than the underground stations, which would have escalators, elevators, and heating

[2] The California Energy Commission, Consumer Energy Center website. Accessed on June 23, 2008. http://www.consumerenergycenter.org/transportation/index.html.

and cooling systems. The Underground Emphasis LRT Alternative would require more energy resources during construction when compared to the At-Grade Emphasis LRT Alternative associated with the use of earthmoving equipment for excavating tunnels. Also, the extensive amount of haul trucks and haul truck travel of excavated earthwork would require additional energy consumption.

To maximize potential benefits associated with a reduction in vehicle miles traveled for each alternative, coordination between other Metro commuter rail lines, LRT, and bus transit is needed in order to optimize efficiency and convenience to minimize energy consumption.

A further consideration is projected ridership for each alternative. The greatest potential benefit associated with a reduction in VMT would be associated with any alternative that achieves a higher ridership level, thereby achieving the greatest reduction in the use of personal automobiles.

4.12 Historic, Archaeological & Paleontological Resources

This section addresses archaeological and built environment resources located in the PSA that qualify as "historic properties" as defined in Section 106 of the National Historic Preservation Act of 1966 (as amended) and "historical resources" as identified in CEQA. The definitions for both historic properties and historical resources include archaeological as well as built resources. In addition, the section discusses paleontological resources located in the PSA.

4.12.1 Affected Environment

4.12.1.1 Regulatory Framework

Historical Resources

- **National Historic Preservation Act**: The National Historic Preservation Act (NHPA) of 1966 (16 United States Code, USC 470-470), as amended, created the Advisory Council on Historic Preservation (Advisory Council) to advise the President and Congress on historic preservation. This Act also expanded the National Register of Historic Places (National Register) to include sites not only of national, but of state and local significance. The NHPA is a national policy to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and it mandates (under Section 106) that federal agencies take into account the effect of an undertaking on properties that are listed in, or determined eligible for inclusion in the National Register of Historic Places.

- **Section 106**: Section 106 of the NHPA requires that Federal agencies take into account the effects an action is expected to have on historic properties. It requires that the Advisory Council be afforded a reasonable opportunity to comment on such actions, when they are expected to result in effects on historic properties.

- **National Register of Historic Places**: The National Register is the nation's official list of districts, sites, buildings, structures, and objects worthy of preservation. Currently, the National Register includes approximately 80,000 listings, including icons of American architecture, engineering, culture, and history. Overseen by the National Park Service (NPS), under the Department of the Interior, the National Register was authorized under the NHPA, as amended. National Register guidelines for the evaluation of significance were developed to be flexible and to recognize accomplishments of all who have made significant contributions to the history and heritage of the nation. Its criteria are designed to guide state and local governments, federal agencies, and others in evaluating potential entries in the National Register.

- **National Historic Landmarks**: National Historic Landmarks (NHL) are cultural properties designated by the Secretary of the Interior as having national significance. They are acknowledged as being among the most significant historic places, and these buildings, sites, districts, structures, and objects possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archaeology, engineering, and culture. NHL designation is an official recognition by the federal government of the significance of historic properties. By definition, the properties designated as National Historic Landmarks are the most significant places in American history.

- **United States Department of Transportation Act of 1966 – Section 4(f)**: Historic properties are also governed under Section 4 (f) of the United States Department of Transportation Act of 1966 (recodified as amended at 49 USC Section 303), which regulates the "use" of land from historic properties. In 49 USC 303 Section 771.135, Section 4(f) asserts:

  (a) (i) The Administration may not approve the use of land from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

  (i) There is no feasible and prudent alternative to the use of land from the property; and

  (ii) The action includes all possible planning to minimize harm to the property resulting from such use.

- **California Code of Regulations**: As defined by state law in Title 14 *California Code of Regulations* Section 4850, the term "historical resource" means "any object, building, structure, site, area, place, record, or manuscript, which is historically or archaeologically significant, or which is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural history of California. Historical resources include archaeological sites as well as the built environment.

- **California Register of Historical Resources**: Under PRC §5024.1, the California Register was established to serve as an authoritative guide to the state's significant historical and archaeological resources. In order for a property to be considered eligible for listing in the California Register, resources must retain "substantial" integrity to identified periods of significance, and it must be found by the State Historical Resources Commission to be significant under at least one of the below-listed criteria.

    - Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

    - Is associated with the lives of persons important in our past.

    - Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual or possesses high artistic values.

    - Has yielded, or may be likely to yield, information important in prehistory or history.

There are two principal categories of local designation for historically significant properties in the City of Los Angeles. Properties may be designated as Historic-Cultural Monuments and/or may be contributors to designated local historic districts, known as Historic Preservation Overlay Zones (HPOZs). The HPOZ designation applies to specific bounded areas of historic or cultural significance and generally includes both properties which contribute to the significance of the district and non-contributing properties. Non-contributing properties are those which do not contribute to the significance of the HPOZ because they have undergone alterations, were built outside the period of significance, or do not share the unifying characteristics of the district.

Historic-Cultural Monuments: In the City of Los Angeles, the Historic-Cultural Monument (HCM) designation is equivalent to local landmarks in other communities and is reserved for individually significant properties. Listing as an HCM is subject to review and recommended approval by the Cultural Heritage Commission, review by an additional committee of City Council, and final approval by the City Council.

Historic Preservation Overlay Zones: The Historic Preservation Overlay Zone Ordinance was adopted by the City of Los Angeles in 1979, and revised in 1997. As defined in the Cultural Heritage Master Plan (adopted by City Council in 2000), the HPOZ designation is "a planning tool which recognizes the special qualities of areas of historic, cultural, or architectural significance. An HPOZ does not change the underlying zoning, rather it lays an added level of protection over a zone through local board oversight." There are currently 22 designated HPOZs in Los Angeles, incorporating more than 5,000 separate properties. Many more are currently proposed in various stages of development. Because HPOZs have "special character or special historical, cultural, architectural, archeological, community or aesthetic value," they are presumed to be historically or culturally significant and are therefore listed in the California Register.

Paleontological Resources

Federal protection for scientifically significant paleontological resources applies to projects if any construction or other related project impacts occur on federally owned or managed lands, involve the crossing of state lines, or are federally funded. The following federal protections may apply to paleontological resources within the proposed PSA:

- **American Antiquities Act of 1906**: The American Antiquities Act of 1906 (6 USC 431 433) establishes a penalty for disturbing or excavating any historic or prehistoric ruin or monument or object of antiquity on federal lands as a maximum fine of $500 or 90 days in jail.

- **National Historic Preservation Act of 1966**: The National Historic Preservation Act of 1966 (Pub. L. 89 665; 80 Stat. 915, 16 U.S.C. 470 et seq.) provides for the survey, recovery, and preservation of significant paleontological data when such data may be destroyed or lost due to a federal, federally licensed, or federally funded project.

- **Federal Land Management and Policy Act of 1976**: The Federal Land Management and Policy Act of 1976 (43 U.S.C. 1712[c], 1732[b]); sec. 2, and 30 U.S.C. 611; Subpart 3631.0 et seq.) defines significant fossils as: unique, rare or particularly well-preserved; an unusual assemblage of common fossils; being of high scientific interest; or providing important new data concerning [1] evolutionary trends, [2] development of biological communities, [3] interaction between or among organisms, [4] unusual or spectacular circumstances in the history of life, or [5] anatomical structure.

- **Public Resources Code (Chapter 1.7), §5097.5 and §30244:** These statutes prohibit the removal of any paleontological site or feature on public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state) lands.

City of Los Angeles General Plan: The Conservation Element of the City of Los Angeles General Plan (adopted September 2001) specifically addresses paleontological resources in Section 3 of Chapter 2. The Plan's paleontological objective is to "protect the city's archaeological and paleontological resources for historical, cultural, research and/or educational purposes." The Plan's policy is to "continue to identify and protect significant archaeological and paleontological sites and/or resources known to exist or that are identified during land development, demolition or property modification activities."

4.12.1.2 Existing Conditions

Historical Resources

Historically, the PSA falls within the Gabrieliño/Tongva (also known as the Tongva) tribal boundaries. The Tongva established large, permanent villages in the fertile lowlands along rivers and streams, and in sheltered areas along the coast, stretching from the foothills of the San Gabriel Mountains to the Pacific Ocean. The fundamental economy of the Tongva was one of subsistence gathering and hunting. The ethnographic and historic literature indicates that the Native American village of Yangna is located in the general

vicinity of the PSA. It is assumed to be on the west bank of the Los Angeles River, just south of the Pueblo of Los Angeles.

Settlement of the Los Angeles region continued in the early American Period (1848–Present). On April 4, 1850, only two years after the Mexican-American War and five months prior to California achieving statehood, the City of Los Angeles was formally incorporated. Los Angeles maintained its role as a regional business center in the early American Period and the transition of many former rancho lands to agriculture, as well as the development of citriculture in the late 1800s, further strengthened this status. These factors combined with the expansion of port facilities and railroads throughout the region contributed to the impact of the real estate boom of the 1880s on the City of Los Angeles. Los Angeles continued to grow in the twentieth century in part due to the discovery of oil in the area and its strategic location as a wartime port. The County's mild climate and successful economy continued to draw new residents in the late 1900s, with much of the County transformed from ranches and farms into residential subdivisions surrounding commercial and industrial centers. Hollywood's development into the entertainment capitol of the world and southern California's booming aerospace industry were key factors in the County's growth in the twentieth century.

The PSA is located entirely within the downtown area of the City of Los Angeles. The development of downtown Los Angeles occurred sequentially from north to south. In the *Los Angeles Architectural Guide*, there are three principal downtown commercial building periods: 1900-1917, early 1920s through 1931, and from the late 1960s through the present. The first two major periods of activity were characterized principally by classical *Beaux Arts* style, based on great buildings of Western Europe and most of those efforts were focused on Broadway and Spring St. The 1920s and 1930s brought development patterns west on 7th St. and included the geometrical-based Art Deco and sweeping Streamline Moderne styles. Finally, high rises constructed from the early 1960s until the present have been a variety of Contemporary styles, encompassing approaches from glass curtain wall Corporate Modern to Post Modern styles.

The first Sanborn Fire Insurance Company maps prepared for Los Angeles in 1888 portrayed north-south streets in the below-listed west-to-east order: Pearl St. (now Figueroa St.), Flower St., Hope St., Bunker Hill Ave. (not applicable to current street name), Grand Ave., Olive Ave., Hill St., Fort St. (now Broadway), Spring St., Main St. and Los Angeles St.

For the purposes of discussion, the PSA was divided into four segments, arranged from south to north, and then east, and are described below.

Flower St., between 4th and 7th Streets

In 1888, the streets in the southern portion of the PSA were located on the outskirts of town. Figueroa St. was one of a handful of great boulevards of Los Angeles that was expanded in the 1920s. An early alignment of Figueroa St. was part of the famed U.S. Route 66, and is currently a component of the Pasadena Freeway (Interstate 110). The notable Figueroa St. tunnels near Chinatown were built in 1931 and were once a part of Figueroa St. as well. Figueroa St. is said to be one of the longest avenues in the United

States, with a length of more than 30 miles, stretching between Eagle Rock to the Los Angeles Harbor. The 2nd St. tunnel, which extends from Figueroa St. on the west side to Hill St. in the east, was completed in 1925.

Among the ambitious 1920s building projects in downtown that announced Los Angeles as a major city, the Los Angeles Central Library (630 West 5th St., Bertram Goodhue with Carleton Winslow) was completed in 1926. The "light of learning" architectural theme was a remarkable architectural collaboration and remains one of the largest library systems in the nation.

The Harbor Freeway (Interstate 110) on the western side of downtown was completed in 1952, and coined "downtown's new Main St." Construction of that freeway, along with repeal of the limiting building height ordinance, created a significant new concentration of high- and mid-rise buildings concentrated on Figueroa and 7th Streets.

Flower St., between 4th St., and 2nd St. East to Hill St.

By the end of the second World War, as suburbs became increasingly desirable as residential and commercial hubs, downtown Los Angeles lost some of its *caché* as a business and retail destination. The CRA was established in 1948, in part to cure economic "blight" by funding and overseeing redevelopment. Like the rest of downtown, Bunker Hill, which had been one of the more exclusive residential neighborhoods at the turn of the twentieth century, fell into disrepair and out of fashion by the 1960s. Although the action was controversial, Victorian era buildings on Bunker Hill were cleared in the 1960s by CRA, the streets were reconfigured and high-rises have been constructed over time in their places.

2nd and Temple Streets between Hill and San Pedro Streets

As Los Angeles developed from an agrarian settlement to a more diverse economy, single-family homes were typically built without regard to their surroundings in the area now identified as downtown. By the early 1900s, those residences stood side-by-side with commercial blocks, and residential use eventually diminished. Broadway evolved as a main retail thoroughfare, served by Pacific Electric (PE) interurban rail lines. Many of the PE's routes terminated at 4th St. and Broadway. Public use of the PE peaked in 1924 and its configuration made the intersection and corridor valuable commercial property, concentrated in one confined area. Broadway was developed with commercial uses, specifically retail and theater buildings between the 1910s and the 1940s and was the center of retail commerce in the growing City of Los Angeles. After the end of World War II, the decentralization of the community, coupled with demise of the interurban railroad, caused major stores and small shops to relocate to 7th St., later disbursing to outlying suburbs. As of the millennium, Broadway continues to be a busy retail center, although patronage changed since the early nineteenth century from American-born to Latino. The customer base of the area is primarily Mexican-American and South American. The Broadway Theater & Commercial District comprised of office, retail and theater buildings, was listed in the National Register in 1979 and includes portions of the PSA.

Adopted in 1947, the plan for the Civic Center included buildings of contemporary design flanked by multi-acre parking lots. The Civic Center replaced business blocks of the late nineteenth century and has encroached westward upon Bunker Hill. The resulting Civic Center has an east-west axis and is roughly bounded on the north by Aiso St., on the south by 2nd St., on the west by Grand Ave., and on the east by Alameda St.

2nd and Temple Streets between San Pedro and Alameda Streets

The City's oldest areas, just east of Main St. exhibit the imperfect platting that dates before 1848. The 33 degree "skewed" grid orientation of downtown Los Angeles characterizes the north-south streets east of Hoover Ave. and west of Indian St. When Los Angeles converted from a Mexican pueblo to an American town, public authority rather than private enterprise became the influence behind development. As enumerated in *California: A Land of Contrast*, "few vestiges of the original community remain; the much-altered plaza is a tiny park with adjacent Olvera St. 'restored' as a tourist attraction." The original Chinatown was replaced in the 1938 by the Union Passenger Terminal (now Union Station), relocated and reconstructed in a stylized Chinese theme. The construction of Union Station also alleviated the need for multiple passenger railroad stations in downtown Los Angeles. The first Japanese-American resident came to Los Angeles in 1886 and started a restaurant on East 1st St. By the end of the nineteenth century, the area known as Little Tokyo was home to more than 2,000 Japanese-Americans, and a thriving community had been established. Many of those residents moved to the area to lay track for the Pacific Electric interurban streetcar system. During World War II, Executive Order 9066 gave the Army authority to relocate more than 110,000 Japanese Americans on the west coast to internment camps in isolated and barren areas. This action eradicated Japanese settlements until after the end of the war and caused interned families to start their lives over once they were released. Little Tokyo Historic District was listed in the National Register of Historic Places, and became a National Historic Landmark district in 1995.

In summary, the development of downtown Los Angeles, which began with the City's founding in the 18th century, continues to evolve in diverse ways over time. Early downtown Los Angeles was primarily residential and commercial in nature. In the 20th century, uses in the "core" grew to be retail with a large amount of office use in upper floors of large buildings. In the latter part of the 1900s, aside from the few skyscrapers built, office, retail and entertainment uses dwindled and the popularity of downtown waned. As economic forces became more obviously cyclical (including recession and strong influence of interest rates), commercial development in downtown was replaced in large part by public investment. Since the last decades of the 20th century, tax incentives, with changes in federal legislation, state regulations and local ordinances have made reuse of long-vacant office buildings and their conversion to apartments and condominium use possible. The result of those factors has been a rebirth in downtown of a significant residential population, spurred by renewed interest in urban lifestyles and "loft-style" living.

Known Historical Resources within One-Quarter Mile of the Project

A search of the California Historical Resources Information System (CHRIS) was conducted for the PSA. In addition, a literature and archival records search for previously recorded historical resources and investigations within a one-quarter mile radius was performed. Tables 4-10 and 4-11 indicate the existence of at least two National Historic Landmarks, four National Register Districts, at least 76 to 78 separate National Register properties, 89 to 99 California Register properties, and 34 to 37 locally designated properties previously identified within the preferred project alternatives.

As indicated in Table 4-10, 21 known archaeological resources of unknown historical significance are located within one quarter-mile of the PSA proposed build alternatives. Twenty-one archaeological resources have been previously recorded within one-quarter mile of the At-Grade Emphasis LRT Alternative. Eleven of these sites are also within one-quarter mile of Underground Emphasis LRT Alternative (Table 4-10). A majority of the archaeological sites were identified by archaeological monitoring of construction activities related to recent construction projects. Most of these sites that have been encountered during ground disturbances contain historic period building or structure foundations or construction materials, and/or historic refuse deposits. One isolated prehistoric burial was encountered at considerable depth during trenching. The burial was found eleven feet below the ground surface, consisting of nine feet of overburden and 2 feet of natural stratigraphy. No archaeological properties listed in the National Register, Archaeological Determinations of Eligibility, or Historic Property Data File are located within one-quarter mile of the PSA.

A Native American cemetery (CA-LAN-1575/H) was encountered during construction-related ground disturbances on Alameda St. next to Union Station in the immediate vicinity of the Pueblo of Los Angeles. In addition, a single Native American burial was recorded near the intersection of Temple and Hill Streets during construction-related ground disturbances.

A review of historic literature indicates that the City's original water system, built in 1781 during the Spanish Period, crosses the PSA. The original water system consisted of the main ditch, the Zanja Madre, and several branch ditches that flowed south and southwest into the city and beyond. A circa 1880 map of the Zanja system indicates that the Zanja Madre, and Zanja Numbers three, four, five, and nine cross the northeastern portion of the PSA. In addition, the Woolen Mill Ditch and the West Branch Zanja Number 8R, cross the two build alternative alignments in the southwestern portion of the PSA.

The results of the records search and literature review indicate that the build alternatives are located in areas that are highly sensitive for buried archaeological resources from both prehistoric and historic time periods.

While specific conclusions regarding project-related effects to these historic properties and identification of all previously unevaluated properties cannot be made at this level of project development, it must be noted that future project development should be coordinated with a consulting, qualified architectural historian and qualified archaeologist, in order to identify all previously unevaluated properties and evaluate project effects.

Detailed plans of the project will be necessary to conduct the next environmental review steps (e.g., identification and analysis of impacts). Table 4-12 through Table 4-14 present preliminary identification of archaeological resources in the PSA.

Paleontological Resources

The PSA is situated in the southwestern block of the Los Angeles basin. The Los Angeles basin is one of many basins comprising the Neogene continental borderland of southern California. It extends from the Santa Ana Mountains in the north to the San Joaquin Hills to the south, and includes the southern foothills of the San Gabriel Mountains, the Puente Hills, and the Palos Verdes Hills. The Los Angeles basin is a structural depression that has been the site of discontinuous deposition since the Late Cretaceous and of continuous subsidence and primarily marine deposition since the middle Miocene. This and other sedimentary basins formed during Miocene and Pliocene as a result of an early San Andreas-type phase of transform motion along the western margin of North America. According to geologic mapping and museum collections records, the PSA is immediately underlain by the following geologic units, from oldest to youngest: (1) Miocene Puente Formation, (2) Pliocene Fernando Formation, and (3) Quaternary alluvium. These geologic units, and their paleontological resource potential, are discussed in more detail below.

Puente Formation

The Puente Formation is middle to late Miocene (14 to 5 million years ago [Ma]) in age. The Puente Formation is known to produce significant paleontological resources including fossilized remains of sharks, fish, marine and terrestrial mammals, as well as some of the most complete collections of marine algae and terrestrial flora. It has been assigned a high paleontological resource sensitivity for its proven potential to yield scientifically significant fossil resources.

Table 4-10 Known Historic Properties/Historical Resources within One-Quarter Mile of the At-Grade Emphasis LRT Alternative

	TOTALS	National Register of Historic Places	California Register of Historic Places	City of Los Angeles Historic-Cultural Monuments
Known historic properties and/or historical resources within one-quarter mile of proposed alignments	**2** National Historic Landmarks 4 National Register Districts **76** separate National Register **99** California Register **37** local landmarks **highly sensitive** archaeological resources3	National Historic Landmarks 1. Little Tokyo Historic District, north side of 200-300 E 1st St. 2. Bradbury Building, 300-310 S Broadway National Register Districts 1. Southern California Gas Company Complex, 800-830 S Flower St. 2. Los Angeles Plaza-Los Angeles State Historic Park, Spring, Alameda, Macy and Sunset 3. Little Tokyo Historic District, north side of 200-300 E 1st St. 4. Spring Street Financial District, 354-704 S Spring St. <u>Separate</u> 1. Figer 8 Bar, 746 S Figueroa 2. Louis Brownstein Building, 751 S Figueroa 3. So. Calif Gas Co Building, 830 S Flower St. 4. So. Calif. Gas Co Building, 820 S Flower St. 5. So. Calif. Gas Co Building, 810 S Flower St. 6. So Calif. Gas Co Building, 800 S Flower St. 7. 816 S Grand Ave. Bldg. 8. Engine Co No 28, 644 S Figueroa 9. Fine Arts Building, 807-811 W 7th St. 10. Roosevelt Building, 727 W 7th St. 11. Barker Brothers Building, 800-818 W 7th St. 12. Los Angeles Central Library, 630 W 5th St.	1. 218 Main St. Bldg 2. 275 W 1st St. Building 3. 5th St. Retaining Wall betw...(near L.A. Central Library) 4. 811 Wilshire Bl. Bldg 5. Pantages/Warner Brothers Theatre, 401 W 7th St. 6. 816 S Grand Ave. Bldg 7. Angel's Flight Railway, 300 block S Hill St. 8. AP Giannini - Bank of America, 505 W 7th St./649 S Olive 9. Associated Realty Building, 510 W 6th St. 10. AT & T Telecommunications Facility, 420 S Grand 11. Baker Detweiler Bldg, 412 W 6th St. 12. Barker Brothers Building, 800-898 W 7th St./709-711 S Flower St. 13. Bible Institute, 550 S Hope 14. Biltmore Bldg, 515 S Olive 15. Biltmore Hotel, 503-539 S Olive St./ 512 W 5th St./ 514-530 S Grand Ave. 16. Boston Dry Goods Store, 237 S Broadway 17. Boston Stores - J.W. Robinson Co., 600-632 W 7th St. 18. Brack Shops, 527 W 7th St. 19. Bradbury Building, 300 S Broadway 20. Brock Jewelers - Clifton's, 513-515 W 7th St. 21. California Club Building, 532-538 S Flower St. 22. Commercial Exchange Bldg., 416 W 8th St. 23. Coulter Dry Goods Co, 500 W 7th St.	1. Nuestra Senora de Los Angeles-Plaza Church, 100-110 Cesar Chavez Av/535 N Main St. 2. First Cemetery of Los Angeles, 521 N Main St. 3. Los Angeles Plaza Park, Cesar Chavez Av 4. Los Angeles City Hall, 200 N Spring St. 5. Bradbury Building, 300-310 S Broadway 6. St. Vibiana's Cathedral, 110 E 2nd St. 7. California Club Building, 532-538 S Flower St. 8. Los Angeles Central Library Building and Grounds, 630 W 5th St. 9. Biltmore Hotel, 503-539 S Olive St./ 512 W 5th St./ 514-530 S Grand Ave. 10. Philharmonic Auditorium (site of), 421-433 W 5th St. 11. Saint Paul's Cathedral (site of) (901-915 Wilshire Bvd.) 12. Los Angeles Athletic Club Building, 425-437 W 7th St. 13. Fine Arts Building (Global Marine House), 807-815 W 7th St. 14. Subway Terminal Building, 416-424 S Olive St. 15. James Oviatt Building, 615-617 S Olive St. 16. Original Pantry, 811 W 9th St. 17. Mayflower Hotel 531-535 S Grand Ave. 18. Embassy Auditorium and Hotel, 501 W 9th St./ 839-861 S Grand Ave. 19. One Bunker Hill Building, 455 S Grand Ave. 20. AP Giannini - Bank of America, 505 W

[3] Archaeological resources have not necessarily been evaluated for National or California register significance.

Table 4-10 Known Historic Properties/Historical Resources within One-Quarter Mile of the At-Grade Emphasis LRT Alternative

TOTALS	National Register of Historic Places	California Register of Historic Places	City of Los Angeles Historic-Cultural Monuments
	13. Jonathan Club Building, 545 S Figueroa St. 14. General Petroleum Building, 612 S Flower 15. Superior Oil Co Building/Bank of California, 550 S Flower St. 16. Biltmore Bldg, 515 S Olive 17. Oviatt Building, 617 S Olive 18. Subway Terminal Building, 417 S Hill St. 19. AP Giannini - Bank of America, 649 S Olive 20. Ville de Paris Store, 712 S Olive 21. So. Calif. Telegraph Co, 716 S Olive 22. AT & T Telecommunications Facility, 420 S Grand 23. Mayflower Hotel, 533 S Grand 24. Pacific Mutual Garage & Annex, 540 S Grand 25. Edwards Widney Bldg., 609 S Grand 26. New York Cloak & Suit House/Brockman Bldg/Brooks Bros., 708 S Grand Ave./, 520 W 7th St. 27. 816 S Grand Ave. Bldg. 28. Embassy Auditorium, 843 S Grand 29. Embassy Hotel Auditorium, 851 S Grand 30. Woodward/Bristol Hotel, 423 W 4th St. 31. Title Guarantee Bldg, 401 W 5th St. 32. Wells Fargo Bank, 415 W 5th St. 33. Philharmonic Auditorium, 427 W 5th St. 34. Edison Bldg, 601 W 5th St. 35. Los Angeles Central Library, 630 W 5th St. 36. "5th St. Retaining Wall betw..." (near Central Library) 37. Baker Detweiler Bldg, 412 W 6th St. 38. Warner Theatre, 460 W 6th St. 39. Associated Realty Building, 510 W 6th St. 40. Pacific Mutual Bldg, 523 W 6th St.	24. Edison Bldg, 601 W 5th St. 25. Edwards-Wildey Bldg.- National Oil Bldg, 600-609 S Grand Ave., 600 W 6th St. 26. Edwards-Wildey Bldg Addition, 612 W 6th St. 27. Embassy Auditorium and Hotel, 501 W 9th St./ 839-861 S Grand Ave. 28. Embassy Auditorium, 843 S Grand Ave. 29. Embassy Hotel Auditorium, 851 S Grand Ave. 30. Engine Co No 28, 644 S Figueroa 31. Figer 8 Bar, 746 S Figueroa 32. Fine Arts Building (Global Marine House), 807-815 W 7th St. 33. Fire Department HQ, 219 S Hill St.. 34. First Baptist Church of San Pedro (Facade & Stained Glass Window), 555 W 7th St. 35. First Cemetery of Los Angeles, 521 N Main St. 36. Fort Moore Pioneer Memorial, 400 block N Broadway 37. Garnier Block, 419 N Main St. 38. General Petroleum Building, 612 S Flower St. 39. Grand Central Market, 315 S Broadway 40. Higgins Building, 108 W 2nd St. 41. Home Telephone, 246 S Hill St. 42. Homer Laughlin Bldg. , 317 S Broadway 43. Irvine Block-Byrne Bldg, 249 S Broadway/301 W 3rd St. 44. Italian Hall, 650 N Main St.. 45. James Oviatt Building, 615-617 S Olive St. 46. Jonathan Club Building, 545 S Figueroa St. 47. Joyeria Esmerelda Jewelry, 332 S Hill St.	7th St. 21. Roosevelt Building, 727 W 7th St. 22. Barker Brothers Building, 800-898 W 7th St./709-711 S Flower St. 23. Boston Stores - J.W. Robinson's, 600-632 W 7th St. 24. Brock Jewelers - Clifton's, 513-515 W 7th St. 25. Title Insurance & Trust Company Building and Annex, 433 S Spring St. 26. Pacific Mutual Building, 523 W 5th St. 27. First Baptist Church of San Pedro (Facade & Stained Glass Window), 555 W 7th St. 28. Spanish - American War Memorial (Pershing Square), 5th, 6th Olive & Hill 29. Angel's Flight, 300 block of S Hill St. 30. Irvine-Byrne Building, 249-259 S Broadway/ 301 W 3rd St. 31. Superior Oil Company Building, 550 S Flower St. 32. South Park Loft Building, 816 S Grand Ave. 33. State Theater Building, 300-314 W 7th St. 34. Edwards-Widney Building, 609 S Grand Ave. 35. General Petroleum Building, 612 S Flower St. 36. Southern California Gas Company complex, 800-830 S Flower St. 37. Higgins Building, 108 W 2nd St.

Table 4-10 Known Historic Properties/Historical Resources within One-Quarter Mile of the At-Grade Emphasis LRT Alternative

TOTALS	National Register of Historic Places	California Register of Historic Places	City of Los Angeles Historic-Cultural Monuments
	41. Edwards-Wildey/National Oil Bldg, 600 W 6th St. 42. Edwards-Wildey Bldg Addition, 612 W 6th St. 43. Kerckhoff Annex, address unknown 44. 811 Wilshire Bl Bldg Pantages/Warner Brothers Theatre, 401 W 7th St. 45. Los Angeles Athletic Club, 431 W 7th St. 46. Coulter Dry Goods Co, 500 W 7th St. 47. Brock & Co. Jewelry Store/Clifton's Cafeteria, 513 W 7th St. 48. Brack Shops, 527 W 7th St. Quinby Bldg., 529 W 7th St. 49. San Pedro 1st. Baptist Church, 543 W 7th St. 50. Boston Stores/J.W. Robinson Co., 600 W 7th St. 51. Union Oil Bldg, 617 W 7th St. 52. Commercial Exchange Bldg., 416 W 8th St. 53. Lindy Hotel, 419 W 8th St. 54. Bible Institute, 550 S Hope St. 55. Los Angeles 3rd Church of Christ, 734 S. Hope St. 56. Angel's Flight Railway, 300 block of Hill St. 57. Los Angeles City Hall, 200 N Spring St. 58. US Courthouse and Post Office, 312 N Spring St. 59. Garnier Block, 419 N Main St. 60. Plaza Park, 500 N Main St. 61. Nuestra Senora de la Reina de Los Angeles, 535 N Main St. 62. Italian Hall, 650 N Main St. 63. Temple Mishkon Tephillo, 206 Main St. 64. 218 Main St. Bldg. 65. Plaza Substation, 10 Olvera St.	48. Kerckhoff Annex, address unknown 49. King Edward Hotel, 121 E 1st St. 50. LA Soap Co. 617 E 1st St. 51. Lindy Hotel, 419 W 8th St. 52. Los Angeles 3rd Church of Christ., 734 S Hope St. 53. Los Angeles Athletic Club Building, 425-437 W 7th St. 54. Los Angeles Central Library Building and Grounds, 630 W 5th St. 55. Los Angeles City Hall, 200 N Spring St. 56. Los Angeles Plaza Park, Cesar Chavez Av. 57. Los Angeles Times Building, 202 W 1st St. Los Angeles Union Passenger Terminal, 800 N. Alameda 58. Louis Brownstein Building, 751 S. Figueroa 59. Mayflower Hotel 531-535 S Grand Ave. 60. Million Dollar Theater, 301 S Broadway 61. Temple Mishkon Tephillo, 206 Main St. 62. New York Cloak & Suit House-Brockman Bldg-Brooks Bros., 708 S Grand Ave./520 W 7th St. 63. Newark Brothers-Uyeda Building, 312 E 1st St. 64. Nuestra Senora de Los Angeles-Plaza Church, 100-110 Cesar Chavez Av/535 N Main St. 65. One Bunker Hill Building, 455 S Grand Ave. 66. Original Pantry, 811 W 9th St. 67. Oviatt Building, 617 S Olive 68. Pacific Mutual Bldg, 523 W 5th St. 69. Pacific Mutual Garage & Annex, 540 S Grand Ave. 70. Philharmonic Auditorium (site of), 421-	

Table 4-10 Known Historic Properties/Historical Resources within One-Quarter Mile of the At-Grade Emphasis LRT Alternative

TOTALS	National Register of Historic Places	California Register of Historic Places	City of Los Angeles Historic-Cultural Monuments
	66. Los Angeles Times Building, 202 W 1st St. 67. 275 W 1st St. Building 68. King Edward Hotel, 121 E 1st St. 69. Newark Brothers/Uyeda Building, 312 E 1st St. 70. Progressive Theatre, 320 E 1st St.. 71. LA Soap Co. 617 E 1st St. 72. St. Vibiana's Cathedral, 110 E 2nd St. 73. Pío Pico House, 424-430 N. Main St. 74. Terminal Annex, 900 Alameda 75. Los Angeles Union Passenger Terminal, 800 N. Alameda 76. US Post Office- Los Angeles Terminal Annex, 900 Alameda St.	433 W 5th St. 71. Pío Pico House, 424 N Main St. 72. Plaza Park, 500 N Main St. 73. Plaza Substation, 10 Olvera St. 74. Progressive Theatre, 320 E 1st St. 75. Quinby Bldg., 529 W 7th St. 76. Roosevelt Building, 727 W 7th St. 77. So. Calif Gas Co Bldg, 800 S Flower St. 78. So. Calif Gas Co Bldg, 810 S Flower St. 79. So. Calif Gas Co Bldg, 820 S Flower St. 80. So. Calif Gas Co Bldg, 830 S Flower St. 81. So. Calif Gas Co complex, 800-830 S Flower St. 82. S Calif Telegraph Co, 716 S Olive 83. Saint Paul's Cathedral (site of), address unknown (possibly 901-915 Wilshire Blvd.) 84. San Pedro 1st Baptist. Church, 543 W 7th St. 85. South Park Loft Building, 816 S Grand Ave. 86. Spanish - American War Memorial (Pershing Square), 5th, 6th Olive & Hill 87. St. Vibiana's Cathedral, 110 E 2nd St. 88. State Theater Building, 300-314 W 7th St. 89. Subway Terminal Building, 416-424 S Olive St./417 S Hill St. 90. Superior Oil Co Building-Bank of California, 550 S Flower St. 91. The Aldine/Myrick Hotel, 324 or 342 S Hill St. 92. The Whipple/ Markham Hotel, 326 S Hill St. 93. Title Guarantee Bldg, 401 W 5th St. 94. Union Oil Bldg, 617 W 7th St. 95. US Courthouse and Post Office, 312 N Spring St.	

Table 4-10 Known Historic Properties/Historical Resources within One-Quarter Mile of the At-Grade Emphasis LRT Alternative			
TOTALS	National Register of Historic Places	California Register of Historic Places	City of Los Angeles Historic-Cultural Monuments
		96. Ville de Paris Store, 712 S Olive St. 97. Warner Theatre, 460 W 6th St. 98. Wells Fargo Bank, 415 W 5th St. 99. Woodward/Bristol Hotel, 423 W 4th St. 100. US Post Office- Los Angeles Terminal Annex, 900 Alameda St.	

Source: SWCA Environmental Consultants, 2008