Table 4-29: 2020 Carbon Monoxide Concentrations				
Intersection	**1-Hour CO Concentration**	**Exceed State 1-Hour Standard (20 ppm)**	**8-Hour CO Concentration**	**Exceed State 8-Hour Standard (9 ppm)**
Owensmouth Ave/Victory Blvd	9.3	No	6.5	No
Canoga Ave/Victory Blvd	8.3	No	5.8	No
Variel Ave/Victory Blvd	9.2	No	6.5	No
De Soto Ave/Victory Blvd	8.1	No	5.7	No
Winnetka Ave/Victory Blvd	10.0	No	7.0	No
Tampa Ave/Topham Street	9.5	No	6.7	No
Reseda Blvd/Hatteras Street	6.5	No	4.6	No
Balboa Blvd/Victory Blvd	9.7	No	6.8	No
Woodley Ave/Victory Blvd	8.6	No	6.0	No
Haskell Ave/Victory Blvd	10.3	No	7.2	No
Sepulveda Blvd/Victory Blvd	9.6	No	6.7	No
Sepulveda Blvd/Erwin Street	7.5	No	5.3	No
Sepulveda Blvd/Oxnard Street	8.5	No	6.0	No
Kester Ave/Oxnard Street	7.2	No	5.1	No
Van Nuys Blvd/Oxnard Street	8.9	No	6.3	No
Hazeltine Ave/Oxnard Street	7.6	No	5.3	No
Woodman Ave/Oxnard Street	8.9	No	6.3	No
Laurel Canyon Blvd/Oxnard St	8.0	No	5.6	No
Lankershim Blvd/Oxnard St	7.2	No	5.1	No
Lankershim Blvd/Burbank Blvd	7.4	No	5.2	No
Lankershim Blvd/Cumpston St	6.8	No	4.8	No
Note: CO concentrations represent PM peak hour traffic conditions.				

Source: Terry A. Hayes Associates, CAL3QHC output, see Air Quality Appendix, 2000.

b. Transportation System Management (TSM) Alternative

Table 4-30 identifies the 1- and 8-hour CO concentrations at the 21 study intersections under the TSM Alternative. Under the TSM Alternative, CO concentrations would range from 6.5 to 10.3 ppm for 1-hour concentrations and from 4.5 to 7.2 for 1-hour concentrations. CO emitted at the 21 study intersections would not exceed the State 1- and eight hour CO standard of 20 ppm and 9 ppm, respectively.

Table 4-30: 2020 Carbon Monoxide Concentrations – TSM Alternative				
Intersection	**1-Hour CO Concentration**	**Exceed State 1-Hour Standard (20 ppm)**	**8-Hour CO Concentration**	**Exceed State 8-Hour Standard (9 ppm)**
Owensmouth Ave/Victory Blvd	9.3	No	6.5	No
Canoga Ave/Victory Blvd	8.3	No	5.8	No
Variel Ave/Victory Blvd	9.2	No	6.5	No
De Soto Ave/Victory Blvd	8.1	No	5.7	No
Winnetka Ave/Victory Blvd	10.0	No	7.0	No
Tampa Ave/Topham Street	9.5	No	6.7	No
Reseda Blvd/Hatteras Street	6.5	No	4.6	No
Balboa Blvd/Victory Blvd	9.7	No	6.8	No
Woodley Ave/Victory Blvd	8.6	No	6.0	No
Haskell Ave/Victory Blvd	10.3	No	7.2	No
Sepulveda Blvd/Victory Blvd	9.6	No	6.7	No
Sepulveda Blvd/Erwin Street	7.5	No	5.3	No
Sepulveda Blvd/Oxnard Street	8.5	No	6.0	No
Kester Ave/Oxnard Street	7.2	No	5.1	No
Van Nuys Blvd/Oxnard Street	8.9	No	6.3	No
Hazeltine Ave/Oxnard Street	7.6	No	5.3	No
Woodman Ave/Oxnard Street	8.9	No	6.3	No
Laurel Canyon Blvd/Oxnard St	8.0	No	5.6	No
Lankershim Blvd/Oxnard St	7.2	No	5.1	No
Lankershim Blvd/Burbank Blvd	7.4	No	5.2	No
Lankershim Blvd/Cumpston St	6.8	No	4.8	No
Note: CO concentrations represent PM peak hour traffic conditions.				

Source: Terry A. Hayes Associates, CAL3QHC output, see Air Quality Appendix, 2000.

c. Bus Rapid Transit (BRT) Alternative

❑ Full BRT

Table 4-31 identifies the 1- and 8-hour CO concentrations at the 21 study intersections with the implementation of the Full BRT. As indicated, future 1-hour CO concentrations would range from 6.5 to 10.3 ppm; and future 8-hour CO concentrations would range from 4.6 to 7.2 ppm. CO emitted at the 21 study intersections would not exceed the State 1- and 8-hour CO standard of 20 ppm and 9 ppm, respectively.

As discussed earlier, vehicular exhaust is the primary source of CO. Since vehicular delays would be longer at congested intersections than non-congested intersections, CO concentrations would be higher at congested intersections since vehicles would be idling longer. CO concentrations listed in Table 4-31 represent the lower bound BRT scenario (28.8-minute signal delay). Slightly more background traffic (approximately 0.1 percent) is anticipated for the upper bound BRT scenario (40 minute signal delay) than the lower bound scenario. However, this increase in background traffic is offset by the decrease in auto trips to each station since the

overall transit ridership would decrease with the upper bound scenario. Since the upper bound scenario would have less transit ridership, fewer vehicles would travel to the transit stations, which would reduce the number of vehicles at street intersections that are near transit stations. Additionally, buses would not be given full priority at signalized intersections under the upper bound scenario, which would reduce vehicular delay at signalized intersections. The combination of fewer auto trips to the transit stations and less vehicular delay at street intersections would result in less traffic congestion than the lower bound scenario. Since there would be less traffic congestion at nearby street intersections, it is anticipated that lower concentrations of CO would result under the upper bound scenario when compared to the lower bound scenario. Thus, CO concentrations for the lower bound scenario (Table 4-31) represent the worst-case scenario. As stated above, under the lower bound scenario, none of the 21 study intersections would exceed the State one- and eight-hour CO standards. Therefore, it is also anticipated that the upper bound scenario would also not exceed the State one- and eight-hour CO standards.

Table 4-31: 2020 Carbon Monoxide Concentrations – Full BRT

Intersection	1-Hour CO Concentration	Exceed State 1-Hour Standard (20 ppm)	8-Hour CO Concentration	Exceed State 8-Hour Standard (9 ppm)
Owensmouth Ave/Victory Blvd	9.3	No	6.5	No
Canoga Ave/Victory Blvd	8.3	No	5.8	No
Variel Ave/Victory Blvd	9.2	No	6.5	No
De Soto Ave/Victory Blvd	8.1	No	5.7	No
Winnetka Ave/Victory Blvd	9.9	No	7.0	No
Tampa Ave/Topham Street	9.5	No	6.7	No
Reseda Blvd/Hatteras Street	6.5	No	4.6	No
Balboa Blvd/Victory Blvd	9.7	No	6.8	No
Woodley Ave/Victory Blvd	8.7	No	6.1	No
Haskell Ave/Victory Blvd	10.3	No	7.2	No
Sepulveda Blvd/Victory Blvd	9.6	No	6.7	No
Sepulveda Blvd/Erwin Street	7.5	No	5.3	No
Sepulveda Blvd/Oxnard Street	8.7	No	6.1	No
Kester Ave/Oxnard Street	7.2	No	5.1	No
Van Nuys Blvd/Oxnard Street	9.0	No	6.3	No
Hazeltine Ave/Oxnard Street	7.7	No	5.4	No
Woodman Ave/Oxnard Street	8.9	No	6.3	No
Laurel Canyon Blvd/Oxnard St	8.0	No	5.6	No
Lankershim Blvd/Oxnard St	7.2	No	5.1	No
Lankershim Blvd/Burbank Blvd	7.5	No	5.3	No
Lankershim Blvd/Cumpston St	6.9	No	4.9	No
Note: CO concentrations represent PM peak hour traffic conditions.				

Source: Terry A. Hayes Associates, CAL3QHC output, see Air Quality Appendix, 2000.

❑ Lankershim/Oxnard On-Street Alignment

Table 4-32 identifies the 1- and 8-hour CO concentrations at the 21 study intersections with the implementation of the Lankershim/Oxnard Alignment. As indicated, future 1-hour CO concentrations would range from 6.5 to 10.3 ppm; and future 8-hour CO concentrations would range from 4.6 to 7.2 ppm. CO emitted at the 21 study intersections would not exceed the State 1- and 8-hour CO standard of 20 ppm and 9 ppm, respectively.

Table 4-32: 2020 Carbon Monoxide Concentrations – Lankershim/Oxnard On-Street Alignment

Intersection	1-Hour CO Concentration	Exceed State 1-Hour Standard (20 ppm)	8-Hour CO Concentration	Exceed State 8-Hour Standard (9 ppm)
Owensmouth Ave/Victory Blvd	9.3	No	6.5	No
Canoga Ave/Victory Blvd	8.3	No	5.8	No
Variel Ave/Victory Blvd	9.2	No	6.5	No
De Soto Ave/Victory Blvd	8.1	No	5.7	No
Winnetka Ave/Victory Blvd	9.9	No	7.0	No
Tampa Ave/Topham Street	9.5	No	6.7	No
Reseda Blvd/Hatteras Street	6.5	No	4.6	No
Balboa Blvd/Victory Blvd	9.7	No	6.8	No
Woodley Ave/Victory Blvd	8.7	No	6.1	No
Haskell Ave/Victory Blvd	10.3	No	7.2	No
Sepulveda Blvd/Victory Blvd	9.6	No	6.7	No
Sepulveda Blvd/Erwin Street	7.5	No	5.3	No
Sepulveda Blvd/Oxnard Street	8.7	No	6.1	No
Kester Ave/Oxnard Street	7.2	No	5.1	No
Van Nuys Blvd/Oxnard Street	9.0	No	6.3	No
Hazeltine Ave/Oxnard Street	7.7	No	5.4	No
Woodman Ave/Oxnard Street	8.9	No	6.3	No
Laurel Canyon Blvd/Oxnard St	8.0	No	5.6	No
Lankershim Blvd/Oxnard St	7.2	No	5.1	No
Lankershim Blvd/Burbank Blvd	7.5	No	5.3	No
Lankershim Blvd/Cumpston St	6.9	No	4.9	No
Note: CO concentrations represent PM peak hour traffic conditions.				

Source: Terry A. Hayes Associates, CAL3QHC output, see Air Quality Appendix, 2000.

❑ Minimum Operable Segment (MOS)

Table 4-33 identifies the 1- and 8-hour CO concentrations at the 21 study intersections with the implementation of the MOS. As indicated, future 1-hour CO concentrations would range from

6.5 to 10.3 ppm; and future 8-hour CO concentrations would range from 4.6 to 7.2 ppm. CO emitted at the 21 study intersections would not exceed the State 1- and 8-hour CO standard of 20 ppm and 9 ppm, respectively.

Table 4-33: 2020 Carbon Monoxide Concentrations – MOS

Intersection	1-Hour CO Concentration	Exceed State 1-Hour Standard (20 ppm)	8-Hour CO Concentration	Exceed State 8-Hour Standard (9 ppm)
Owensmouth Ave/Victory Blvd	9.3	No	6.5	No
Canoga Ave/Victory Blvd	8.3	No	5.8	No
Variel Ave/Victory Blvd	9.2	No	6.5	No
De Soto Ave/Victory Blvd	8.1	No	5.7	No
Winnetka Ave/Victory Blvd	9.9	No	7.0	No
Tampa Ave/Topham Street	9.5	No	6.7	No
Reseda Blvd/Hatteras Street	6.5	No	4.6	No
Balboa Blvd/Victory Blvd	9.7	No	6.8	No
Woodley Ave/Victory Blvd	8.7	No	6.1	No
Haskell Ave/Victory Blvd	10.3	No	7.2	No
Sepulveda Blvd/Victory Blvd	9.6	No	6.7	No
Sepulveda Blvd/Erwin Street	7.5	No	5.3	No
Sepulveda Blvd/Oxnard Street	8.7	No	6.0	No
Kester Ave/Oxnard Street	7.2	No	5.1	No
Van Nuys Blvd/Oxnard Street	9.0	No	6.3	No
Hazeltine Ave/Oxnard Street	7.7	No	5.4	No
Woodman Ave/Oxnard Street	8.9	No	6.3	No
Laurel Canyon Blvd/Oxnard St	8.0	No	5.6	No
Lankershim Blvd/Oxnard St	7.2	No	5.1	No
Lankershim Blvd/Burbank Blvd	7.5	No	5.3	No
Lankershim Blvd/Cumpston St	6.9	No	4.9	No
Note: CO concentrations represent PM peak hour traffic conditions.				

Source: Terry A. Hayes Associates, CAL3QHC output, see Air Quality Appendix, 2000.

4-7.3.3 CO Emissions From Park-and-Ride Facilities

a. Bus Rapid Transit (BRT) Alternative

The USEPA Industrial Source Complex-Short Term Model (ISCST3) air dispersion model was used to estimate CO emissions at each park-and-ride facility, which are proposed for the three alignments under the BRT Alternative. CO concentrations from each facility were calculated based on lot capacity and lot demand of each park-and-ride facility. The results were added to

year 2020 ambient 1-hour and 8-hour ambient CO concentration of 5.1 and 3.6 ppm, respectively. Results are discussed below.

❑ Full BRT

The Full BRT would have six park-and-ride facilities, of which four are proposed and two are existing. Table 4-34 shows the highest 1-hour and 8-hour average CO concentrations emitted by each park-and-ride facility.

Table 4-34: CO Emissions from Park-and-Ride Facilities

Park-and-Ride Facility	1-Hour CO Concentration		8-Hour CO Concentration	
	CO Concentration (ppm) /a/	Exceed State 1-Hour Standard (20 ppm)	CO Concentration (ppm) /b/	Exceed State 8-Hour Standard (9 ppm)
Chandler/Lankershim (Lot Capacity: 850 Lot Demand: 850)	6.8	No	5.4	No
Oxnard/Van Nuys (Lot Capacity: 1,060 Lot Demand: 989)	7.0	No	5.5	No
Oxnard/Sepúlveda (Lot Capacity: 1,200 Lot Demand: 926)	6.8	No	5.3	No
Victory/Balboa (Lot Capacity: 240 Lot Demand: 171)	5.6	No	4.1	No
Oxnard/Reseda (Lot Capacity: 400 Lot Demand: 400)	6.1	No	4.7	No
Mason(Victory)/Winnetka (Lot Capacity: 350 Lot Demand: 350)	6.0	No	4.6	No

Notes:
(a) CO concentration at each park-and-ride facility is added to the future 1-hour ambient CO concentration of 5.1 ppm.
(b) CO concentration at each park-and-ride facility is added to the future 1-hour ambient CO concentration of 3.6 ppm.
ppm = parts per million.

Source: Terry A. Hayes Associates, 2000.

As shown in Table 4-34, the Oxnard/Van Nuys park-and-ride facility would emit the highest 1-hour and 8-hour CO concentrations. The maximum 1- and 8-hour CO concentrations at the Oxnard/Van Nuys park-and-ride facility are 7.0 and 5.5 ppm, respectively. Exceedances in the State and Federal 1- and 8-hour standards of 20 and 9 ppm, respectively, at each of the park-and-ride facilities are not anticipated. Thus, no significant increases in CO concentrations at sensitive receptor locations are expected, and no significant impacts are anticipated.

❑ Lankershim/Oxnard On-Street Alignment

The location and size of the park-and-ride facilities for the Lankershim/Oxnard Alignment would be the same as the park-and-ride facilities for the Full BRT Alignment. Both the Full BRT and the Lankershim/Oxnard Alignment would have six park-and-ride facilities, of which four are proposed and two are existing. Table 4-34, above, shows the highest 1- and 8-hour average CO concentration at each park-and-ride facility. As discussed in the Full BRT Alignment, the Oxnard/Van Nuys park-and-ride facility emits the highest 1- and 8-hour CO concentration. The facility would emit a maximum 1-hour CO concentration of approximately 7.0 ppm, and an 8-hour CO concentration of approximately 5.5 ppm. Exceedances in the State and Federal 1- and 8-hour standards are not anticipated at each facility, thus sensitive receptors within the vicinity of each park-and-ride facility would not be significantly affected.

❑ Minimum Operable Segment (MOS)

The MOS would have five park-and-ride facilities, of which three are proposed and two are existing. Table 4-35 shows the highest 1- and 8-hour average CO concentration at each park-and-ride facility.

Table 4-35: CO Emissions from Park-and-Ride Facilities – MOS

Park-and-Ride Facility	1-Hour CO Concentration		8-Hour CO Concentration	
	CO Concentration (ppm) /a/	Exceed State 1-Hour Standard (20 ppm)	CO Concentration (ppm) /b/	Exceed State 8-Hour Standard (9 ppm)
Chandler/Lankershim (Lot Capacity: 850 Lot Demand: 850)	6.8	No	5.4	No
Oxnard/Van Nuys (Lot Capacity: 1,060 Lot Demand: 989)	7.0	No	5.5	No
Oxnard/Sepúlveda (Lot Capacity: 1,200 Lot Demand: 926)	6.8	No	5.3	No
Victory/Balboa (Lot Capacity: 240 Lot Demand: 171)	5.6	No	4.1	No
Mason(Victory)/Winnetka (Lot Capacity: 350 Lot Demand: 350)	6.0	No	4.6	No

Notes:
(a) CO concentration at each park-and-ride facility is added to the future one-hour ambient CO concentration of 5.1 ppm.
(b) CO concentration at each park-and-ride facility is added to the future one-hour ambient CO concentration of 3.6 ppm.
ppm = parts per million.

Source: Terry A. Hayes Associates, 2000.

As shown in Table 4-35, CO emitted from the park-and-ride facilities are not anticipated to exceed State 1- and 8-hour standards. The Oxnard/Van Nuys park-and-ride facility would emit the highest 1- and 8-hour CO concentrations. The maximum 1- and 8-hour CO concentrations at the Oxnard/Van Nuys park-and-ride facility are 7.0 and 5.5 ppm, respectively. Because CO is a gas that disperses quickly, concentrations at sensitive receptor locations are expected to be much lower than at the park-and-ride facilities, modeled in this analysis. Thus, no significant increase in carbon monoxide concentrations at sensitive receptor locations are expected, and no significant impacts are anticipated.

4-7.3.4 CO Emissions at Bus Stations

CO concentrations at bus stations for the three alignments under the BRT Alternative were calculated using the USEPA CAL3QHC micro scale dispersion model. CO contributions at bus stations were added to ~~the~~ year 2020 background 1- and 8ight-hour CO concentration of 5.1 and 3.6 ppm, respectively. Results are discussed below.

a. Bus Rapid Transit (BRT) Alternative

❑ Full BRT

The Full BRT is proposed to have 13 stations. During peak hour, a total of approximately 48 buses are anticipated to travel between North Hollywood and Reseda, and a total of approximately 36 buses are anticipated to travel between Reseda and Warner Center. Should 48 buses travel through each station during peak hour, 1- and 8-hour CO concentrations at each station are anticipated to be 5.4 ppm and 3.8 ppm, respectively.[13] Exceedances in the State 1-hour CO standards of 20 ppm and the State 8-hour CO standard of 9 ppm are not anticipated to occur, and no significant impacts are anticipated.

❑ Lankershim/Oxnard On-Street Alignment

The Lankershim/Oxnard Alignment is proposed to have 13 stations. During the peak hour, a total of approximately 48 buses are anticipated to travel between North Hollywood and Reseda, and a total of approximately 36 buses are anticipate to travel between Reseda and Warner Center. Worst-case 1- and 8-hour CO concentrations at each station are anticipated to be 5.4 ppm and 3.8 ppm, respectively.[14] Exceedances in the state and federal 1-hour and 8-hour standards of 20 ppm and 9 ppm, respectively, are not anticipated to occur.

❑ Minimum Operable Segment (MOS)

The MOS would have 13 stations. During peak hour, a total of approximately 36 buses are anticipated to travel between North Hollywood and Reseda, and a total of approximately 24

[13] See Air Quality Appendix.
[14] Assumes that 48 buses would be traveling by each station during peak hour. See Air Quality Appendix.

buses are anticipate to travel between Reseda and Warner Center. Worst-case 1-hour and 8-hour CO concentrations at each station are anticipated to be 5.3 ppm and 3.7 ppm.[15] Exceedances of the state and federal 1-hour and 8-hour standards of 20 ppm and 9 ppm, respectively, are not anticipated to occur.

4-7.4 Conformity Analysis

The EPA Transportation Conformity Rule requires that projects must (1) be included in the first three years of the most recently conforming transportation plan and Transportation Improvement Plan (TIP) and (2) not result in or exacerbate localized exceedances of the Federal CO standards. The SCAQMD transportation conformity requirements are similar to the Federal Conformity Criteria. Additionally, both the Federal and State conformity criteria are only applicable to operations emissions. They do not apply to construction emissions.

(1) The proposed project was included in the most recently conforming transportation plan and TIP.

The most recently conforming transportation plan is the 1998 Regional Transportation Plan (RTP). The RTP is a 20-year transportation plan for six counties within the Southern California region (Ventura, Los Angeles, Orange, San Bernardino, Riverside, and Imperial counties). The RTP provides long-term solutions to the region's transportation needs under a framework that meets mobility goals, air quality regulations, and other regional goals. It is a critical document for projects to qualify for future federal, state, and local funding sources. The RTP is revised every three years by the Southern California Association of Governments (SCAG). The last updated plan that meets the EPA Transportation Conformity Rule was adopted by SCAG in April 1998. The 1998 RTP reflects changes in regional demographics, environmental factors, land-use forecasts, technology, and subregional planning. The proposed project is included in the 1998 RTP.

The Regional Transportation Improvement Program (RTIP) is a short-term federal transportation improvement program, which includes a list of proposed transportation projects. The RTIP is submitted by SCAG to the California Transportation Commission (CTC) as a request for state funding. Individual projects are first proposed by the local jurisdictions. Then, the projects are evaluated and prioritized by SCAG for submission to the CTC. The RTIP is updated every two years and has a seven-year planning horizon. The latest RTIP is the 2000 RTIP. The 2000 RTIP was approved by the federal agency on October 6, 2000. The 2000 RTIP is for the fiscal years 2000/2001 to 2005/2006.

The proposed project is included in the 2000 RTIP and was also included by SCAG in the 1998 RTIP. The proposed project is included in the latest conforming RTP; thus it would be listed in the RTIP once the project is approved by SCAG and requires state or federal funding for project implementation.

[15] Assumes that 36 buses would be traveling by each station during peak hour. See Air Quality Appendix.

(2) The proposed project would not result in or worsen localized exceedances of the Federal CO standards.

The EPA transportation conformity rule states that the proposed project must not cause or exacerbate any localized exceedances of the Federal CO standards. The federal 1-hour and 8-hour CO standards are 35 ppm and 9.0 ppm, respectively. As stated previously in Section 4-7.3.2, 4-7.3.3, and 4-7.3.4, the TSM, Full BRT, On-Street Alignment, and MOS would not result in localized exceedances of the Federal 1- and 8-hour CO standards. Therefore, the proposed project is consistent with Conformity Criteria 2.

The proposed project is consistent with Conformity Criteria 1 and 2. Therefore, the proposed project conforms to the EPA Transportation Conformity Rule.

4-7.5 Mitigation Measures

4-7.5.1 No Build Alternative

No mitigation measures are necessary.

4-7.5.2 Transportation System Management (TSM) Alternative

No mitigation measures are necessary.

4-7.5.3 Bus Rapid Transit (BRT) Alternative

a. Full BRT

No mitigation measures are required.

b. Lankershim/Oxnard On-Street Alignment

No mitigation measures are required.

c. Minimum Operable Segment (MOS)

Under the MOS, an increase in ROG emissions when compared to the No Build Alternative would violate CFR 40 Part 51 for ROG emissions. The increase in ROG emissions is mostly generated by the increase in commuter rail VMT and bus VMT over the No Build Alternative.[16]. ~~No mitigation measures are available to reduce ROG emissions levels generated by commuter rail.~~ Implementation of the following mitigation measure would reduce ROG emissions such that the MOS would comply with 40 CFR Part 51:

AQ1 All transit buses operated by the MTA shall comply with the South Coast Air Quality Management District Rule 1192 – Clean On Road Transit Buses.

[16] Commuter rail refers to all locomotives that are operated by diesel engines.

4-8 ENERGY

4-8.1 Setting

Existing buses, urban rail vehicles, commuter rail, and automobile modes of travel consume a total of approximately 620,250 billion British thermal units (BTU)[17] annually in the southern California region. Automobiles currently consume the most amount of oil (approximately 105,243,547 barrels) and urban rail consumes the least amount of oil (approximately 53,485 barrels). Table 4-36 shows the existing amount of energy used annually for each vehicle class.

Table 4-36: Annual Regional Energy Usage

Vehicle Class	Total BTU Consumption (Billions)	Total Barrels of Oil
Bus	9,158	1,578,968
Urban Rail	310	53,485
Commuter Rail	369	63,682
Automobiles	610,413	105,243,547
Annual Total	620,250	106,939,683

Source: Terry A. Hayes Associates, Manuel Padron & Associates, 2000.

4-8.2 Impact Analysis Methodology and Evaluation Criteria

Direct energy consumption involves energy used by the operation of vehicles (automobile, truck, bus, or train) within the corridor. In assessing the direct energy impact, consideration was given to the following factors:

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

The direct energy analysis for each alternative was based on projected year 2020 corridor traffic volumes and total VMT. The 2020 daily traffic volumes for the study corridor were provided by the MTA model and annualized using a factor of 315 days per year. The VMT fuel consumption method utilized for this project is outlined in the *Technical Guidance on Section 5309 New Starts Criteria* (FTA, 1999). Energy consumption factors for the various modes identified in Table 4-37 were developed by Oak Ridge Laboratory and published in the 1996 *Transportation Energy Book: Edition 16.*

[17] One British thermal unit (BTU) is the quantity of energy necessary to raise one pound of water one degree Fahrenheit.

Table 4-37: Energy Consumption Factors	
Mode	Factor
Passenger Vehicles (automobiles, vans, light trucks)	6,233 BTU/Vehicle Mile
Transit Bus (all vehicle types) [(a)]	41,655 BTU/Vehicle Mile
Rail (light or heavy)	77,739 BTU/Vehicle Mile
Notes: (a) FTA recommends utilizing a transit bus energy consumption factor of 41.655 BTUs/VMT for all bus types (including alternative fueled buses). Sufficient data have not been available to develop consumption factors for alternative fuels such as CNG (compressed natural gas), LNG (liquefied natural gas), and others. BTU = British thermal unit.	

Source: Oak Ridge Laboratory, 1996.

Direct energy, measured in BTU, was converted to the equivalent barrels of crude oil for comparison of alternatives. The change in annual BTUs was calculated for all alternatives.

4-8.3 Impacts

A substantial increase in energy consumption (defined for purposes of this EIS/EIR as more than a 5 percent increase) would constitute an adverse impact under NEPA (significant impact under CEQA).

This section assesses the impact of the alternatives on transportation-related energy consumption for the region in 2020. The analysis estimates the total amount of energy expected to be consumed by each of the alternatives. The annual direct energy consumption for each alternative is summarized in Table 4-38. The change in vehicle miles traveled (VMT) over the No Build Alternative is shown in Table 4-39. Regional energy consumption for each alternative is compared to the No Build Alternative in Table 4-40. Similarly, the change in vehicle miles traveled (VMT) over the TSM Alternative is shown in Table 4-41. Regional energy consumption for each alternative is compared to the TSM Alternative in Table 4-42. Table 4-43 shows the annual energy savings of each alternative. Passenger vehicle VMT for the three alignments (Full BRT, MOS, and On-Street) would decrease, while CNG bus VMT would increase. All alignments (Full BRT, MOS, and On-Street) are projected to decrease energy consumption when compared to the No Build and TSM Alternatives. When the three alignments are compared to each other, the Full BRT Alignment is shown to conserve the most energy and the MOS shown to conserve the least amount of energy.

Table 4-38: Annual Direct Energy Consumption – Year 2020

Vehicle Class	Regional VMT per Year				
	No Build	TSM	Full BRT	MOS	On-Street Alignment
Passenger Vehicle	141,666,951,994	141,646,828,151	141,632,730,366 to 141,641,391,673	141,636,207,669	141,634,469,018
CNG Bus	235,507,550	236,864,527	237,730,082 to 237,789,841	237,382,029	237,556,056
Light or Heavy Rail	9,985,688	10,033,980	10,117,100	10,127,860	10,122,480
Commuter Rail	4,894,378	4,946,721	4,917,686	4,952,890	4,935,288
Energy Consumption (BTU) /a/ (billions)	894,086	894,026	893,978 to 894,024	893,989	894,005
/a/ One British Thermal Unit (BTU) is the quantity of energy necessary to raise one pound of water one degree Fahrenheit.					

Source: Terry A. Hayes Associates, 2000; see FTA New Start Worksheets.

Table 4-39: Change in VMT of Each Alternative Compared to No Build Alternative

Vehicle Class	Change in VMT/Year					
	Full BRT vs. No Build		MOS vs. No Build		On-Street vs. No Build	
	VMT/Year	Percent Change	VMT/Year	Percent Change	VMT/Year	Percent Change
Passenger Vehicle	-34,221,628	-0.02%	-30,744,325 to -25,560,321	-0.02%	-32,482,976	-0.02%
CNG Bus	2,222,532	0.94%	1,874,479 to 2,282,291	0.80% to 0.97%	2,048,506	0.87%
Light or Heavy Rail	142,172	1.42%	142,172	1.42%	136,792	1.37%
Commuter Rail	58,512	1.20%	58,512	1.20%	40,910	0.84%
VMT = vehicle miles traveled.						

Source: Terry A. Hayes Associates, 2000; see FTA New Start Worksheets.

Table 4-40: Change in BTU of Each Alignment Compared to No Build Alternative

Vehicle Class	Change in BTU/Year					
	Full BRT vs. No Build		MOS vs. No Build		On-Street vs. No Build	
	BTU/Year (billions)	Percent Change	BTU/Year (billions)	Percent Change	BTU/Year (billions)	Percent Change
Passenger Vehicle	-202.5 to -159.3	-0.02%	-191.6	-0.02%	-202.5	-0.02%
CNG Bus	92.6 to 95.1	0.94% to 0.97%	78.1	0.80%	85.3	0.87%
Light or Heavy Rail	10.2	1.30%	11.1	1.42%	10.6	1.37%
Commuter Rail	2.3	0.48%	5.9	1.20%	4.1	0.84%
BTU = British Thermal Unit. One BTU is the quantity of energy necessary to raise one pound of water one degree Fahrenheit.						

Source: Terry A. Hayes Associates, 2000; see FTA New Start Worksheets.

Table 4-41: Change in VMT of Each Alignment Compared to TSM Alternative

Vehicle Class	Change in VMT/Year					
	Full BRT vs. TSM		MOS vs. TSM		On-Street vs. TSM	
	VMT/Year	Percent Change	VMT/Year	Percent Change	VMT/Year	Percent Change
Passenger Vehicle	-14,097,785 to -5,438,151	-0.004% to -0.01%	-10,620,482	-0.01%	-12,359,133	-0.01%
CNG Bus	865,555 to 925,473	0.36% to 0.39%	517,502	0.22%	691,529	0.29%
Light or Heavy Rail	83,120	0.83%	93,880	0.94%	88,500	0.88%
Commuter Rail	-29,035	-0.59%	6,169	0.12%	-11,433	-0.23%
VMT = vehicle miles traveled.						

Source: Terry A. Hayes Associates, 2000; see FTA New Start Worksheets.

Table 4-42: Change in BTU of Each Alignment Compared to TSM Alternative

Vehicle Class	Change in BTU/Year					
	Full BRT vs. TSM		MOS vs. TSM		On-Street vs. TSM	
	BTU/Year (billions)	Percent Change	BTU/Year (billions)	Percent Change	BTU/Year (billions)	Percent Change
Passenger Vehicle	-33.9 to -87.9	0.004% to -0.01%	-66.2	-0.01%	-77.0	-0.01%
CNG Bus	36.1 to 38.6	0.37% to 0.39%	21.6	0.22%	28.8	0.29%
Light or Heavy Rail	6.5	0.83%	7.3	0.94%	6.9	0.88%
Commuter Rail	-2.9	-0.59%	0.6	0.13%	-1.1	-0.23%
BTU = British Thermal Unit. One BTU is the quantity of energy necessary to raise one pound of water one degree Fahrenheit.						

Source: Terry A. Hayes Associates, 2000; see FTA New Start Worksheets.

Table 4-43: Annual Energy Savings

Alternative	Total BTU Consumed (Billions)	Barrels of Oil	Change in Barrels of Oil Consumed vs. No Build		Changes in Barrels of Oil Consumed vs. TSM	
			Barrels	Percent Change	Barrels	Percent Change
No Build	894,024 to 894,086	154,142,065 to 154,152,740	~~N/A~~ –10,675	~~N/A~~ –0.01%	~~N/A~~ -345	~~N/A~~ –0.0002%
TSM	894,026	154,142,410	-10,330	-0.01%	N/A	N/A
Full BRT	893,978	154,134,809	-18,651	-0.01%	-8,321	-0.01%
MOS	893,989	154,136,078	-16,662	-0.01%	-6,332	-0.004%
On-Street Alignment	893,983	154,135,083	-17,657	-0.01%	-7,327	-0.005%
BTU = British thermal unit.						

Source: Terry A. Hayes Associates, see FTA New Start Worksheets.

4-8.3.1 No Build Alternative

Under the No Build Alternative, the annual VMT for automobiles and trucks within the region is forecasted to be approximately 141.7 billion miles in the year 2020. The annual VMT is anticipated to be approximately 235.5 million for CNG buses, 10 billion for light or heavy rail, and 4.9 million for commuter rail. Given the VMT and vehicle fuel consumption on an annual basis, vehicles operating within the region are anticipated to consume approximately 154,152,740 barrels of oil, or approximately 894,086 billion BTU, per year.

4-8.3.2 Transportation System Management (TSM) Alternative

Under the TSM Alternative, the annual VMT for automobiles and trucks within the region is forecasted to be approximately 141,646,828,151 miles in 2020. The annual VMT is anticipated to be approximately 236.9 million miles for CNG buses, 10.0 million miles for light or heavy rail, and 4.9 million miles for commuter rail. Given the VMT and vehicle fuel consumption on an annual basis, vehicles operating within the region are anticipated to consume approximately 154,123,424 barrels of oil, or approximately 894,026 billion BTU, per year. Oil consumption under the TSM Alternative is anticipated to decrease by approximately 0.01 percent (10,330 barrels) when compared to the No Build Alternative.

4-8.3.3 Bus Rapid Transit (BRT) Alternative

a. Full BRT

Under the Full BRT, the annual automobiles and trucks VMT within the region is forecasted to be approximately 141,632,730,366 miles in 2020. The annual VMT is anticipated to be approximately 237.7 million miles for CNG bus, 10.1 million miles for light or heavy rail, and 4.9 million miles for commuter rail. Given the annual VMT and vehicle fuel consumption rates, vehicles operating within the region are anticipated to consume approximately 154,134,089 barrels of oil, or approximately 893,978 billion BTU, per year. The Full BRT consumes approximately 0.01 percent (18,651 barrels) and 0.06 percent (8,321 barrels) less oil annually when compared to the No Build and TSM Alternatives, respectively.

Compared to the No Build Alternative, there would be an annual 0.02 percent decrease in passenger vehicle VMT per year. However, CNG bus, light or heavy rail, and commuter rail VMT would increase by approximately 0.94, 1.42, and 1.20 percent per year, respectively. When compared to the TSM Alternative, passenger vehicles VMT would decrease by approximately 0.01 percent annually. CNG bus and light or heavy rail VMT would increase by approximately 0.36 and 0.83 percent per year, respectively. Commuter rail VMT would decrease by approximately 0.59 percent per year.

b. Lankershim/Oxnard On-Street Alignment

Under the Lankershim/Oxnard On-Street Alignment, buses would leave the North Hollywood Metro Red Line Station and head north on-street along Lankershim to Oxnard Street. Then, buses would travel west along Oxnard Street to Woodman Avenue, where the buses would enter the ~~SP right-of-way~~ MTA ROW.

Under the Lankershim/Oxnard On-Street Alignment, the annual VMT for automobiles and trucks within the region is forecasted to be approximately 141,634,469,018 miles in 2020. The annual VMT is anticipated to be approximately 237.6 million miles for CNG bus, 10.1 million miles for light or heavy rail, and 4.9 million miles for commuter rail. Given the annual VMT and vehicle fuel consumption rates, vehicles operating within the region are anticipated to consume approximately 893,983 BTU per year. Oil consumption is anticipated to decrease by approximately 0.01 percent per year under the On-Street Alignment when compared to the No Build Alternative. When compared to the TSM Alternative, oil consumption is anticipated to decrease by approximately 0.005 percent per year.

VMT for the Lankershim/Oxnard On-Street Alignment would decrease by approximately 0.02 percent for passenger vehicles when compared to the No Build Alternative. CNG bus, light or heavy rail, and commuter rail are anticipated to increase by approximately 0.87 percent, 1.37 percent, and 0.84 percent, respectively. When compared to the TSM Alternative, passenger vehicle VMT and commuter rail VMT are anticipated to decrease by approximately 0.01 percent and 0.23 percent, respectively. Additionally, annual CNG bus VMT and light or heavy rail VMT are anticipated to increase by approximately 0.29 percent and 0.88 percent respectively.

c. Minimum Operable Segment (MOS)

Under the MOS, the annual VMT for automobiles and trucks within the region is forecasted to be approximately 141,636,207,669 miles in 2020. The annual VMT is anticipated to be approximately 237.4 million miles for CNG buses, 10.1 million miles for light or heavy rail, and 5.0 million miles for commuter rail. Given the annual VMT and vehicle fuel consumption rates, vehicles operating within the region are anticipated to consume approximately 893,989 billion BTU, or 154,136,078 barrels of oil, per year. When compared to the No Build and TSM Alternative, oil consumption for the MOS is anticipated to decrease by approximately 0.01 and 0.004 percent per year, respectively.

When compared to the No Build Alternative, passenger vehicle VMT for the MOS would decrease by approximately 0.02 percent per year, and CNG bus VMT would increase by approximately 0.8 percent per year. Commuter Rail VMT is anticipated to increase by approximately 1.4 percent per year. Light or heavy rail VMT is anticipated to increase by approximately 1.2 percent per year.

4-8.4 Mitigation Measures

4-8.4.1 No Build Alternative

No mitigation measures are necessary.

4-8.4.2 Transportation System Management (TSM) Alternative

Under the TSM Alternative, the proposed project would not be implemented. As no environmental impacts would result from the TSM Alternative, no mitigation measures are necessary.

4-8.4.3 Bus Rapid Transit (BRT) Alternative

a. Full BRT

Implementation of the Full BRT would reduce energy consumption within the region. This is considered a beneficial ~~impact~~ effect. As no adverse impacts under NEPA (significant impacts under CEQA) are anticipated under the Full BRT, no mitigation measures are required.

b. Minimum Operable Segment (MOS)

Implementation of the MOS would reduce energy consumption within the region. This is considered a beneficial ~~impact~~ effect. As no adverse impacts under NEPA (significant impacts under CEQA) are anticipated under the MOS, no mitigation measures are required.

c. Lankershim/Oxnard On-Street Alignment

Implementation of the On-Street Alignment would reduce energy consumption within the region. This is considered a beneficial effect. As no adverse impacts under NEPA (significant impacts under CEQA) are anticipated under the On-Street Alignment, no mitigation measures are required.

4-9 NOISE AND VIBRATION

This section summarizes the analysis of potential noise and vibration impacts from the proposed project. The potential noise impacts include:

1. Bus operations. The major noise sources on a typical bus include tire-roadway interaction, which increases with speed, and the engine exhaust, which generally has a higher source height for buses used in Los Angeles than elsewhere in the United States. Additional bus noise sources include ancillary systems such as engine cooling fans (generally located on the roadway side of the vehicle) and air conditioning systems (generally located near the top or rear of the vehicle). No audible warning systems are planned for street crossings and therefore the bus horn would only be used for emergency situations.
2. Park-and-Ride Lots. Park-and-ride lots can generate some additional traffic in the vicinity of the lots. However, this primarily consists of automobiles operating at low speeds and therefore noise impact from park-and-ride lots is not expected to be substantial, being limited to starting automobiles and occasional car alarms.
3. Construction noise. Construction noise is a temporary impact that does not have any long-term effects. For the proposed project, the construction equipment and activities are expected to be similar to those for typical road construction. The potential noise impacts from construction activities are discussed in Section 5-10.

Section 4-9.1 describes the existing noise conditions; the assessment methodology and criteria are discussed in Section 4-9.2. A summary of projected noise impacts is presented in Section 4-9.3 and appropriate mitigation measures are summarized in Section 4-9.4. Vibration is discussed in Section 4-9.5.

4-9.1 Setting

The study area for this project extends from the North Hollywood Metro Red Line Station to the Warner Center Transit Hub. Noise-sensitive land uses in the study area include a considerable number of single-family and multi-family residences, along with parks, schools, day-care centers, and places of worship. The existing noise environment in these areas varies depending on proximity to major traffic arteries.

The Full Bus Rapid Transit (BRT) Alternative follows the ~~SP~~ MTA ROW that runs west from North Hollywood in the median of Chandler Boulevard, then traverses a diagonal path to the northwest through a residential area before resuming an east-west alignment to the north of Oxnard Street between Woodman Avenue and Sepulveda Boulevard. In the West Valley, the alignment continues west in the ~~SP~~ MTA ROW to the intersection of Victory Boulevard and De Soto Avenue, and then proceeds on street to the Warner Center Transit Hub. The existing noise levels along this alignment are dominated by motor vehicle traffic, with the highest noise levels at locations near major arteries such as Victory Boulevard and the San Diego Freeway. Areas that are further away from major traffic sources, such as the diagonal in the East Valley and the area north of Topham Street and Oxnard Street in the West Valley, are relatively quiet.

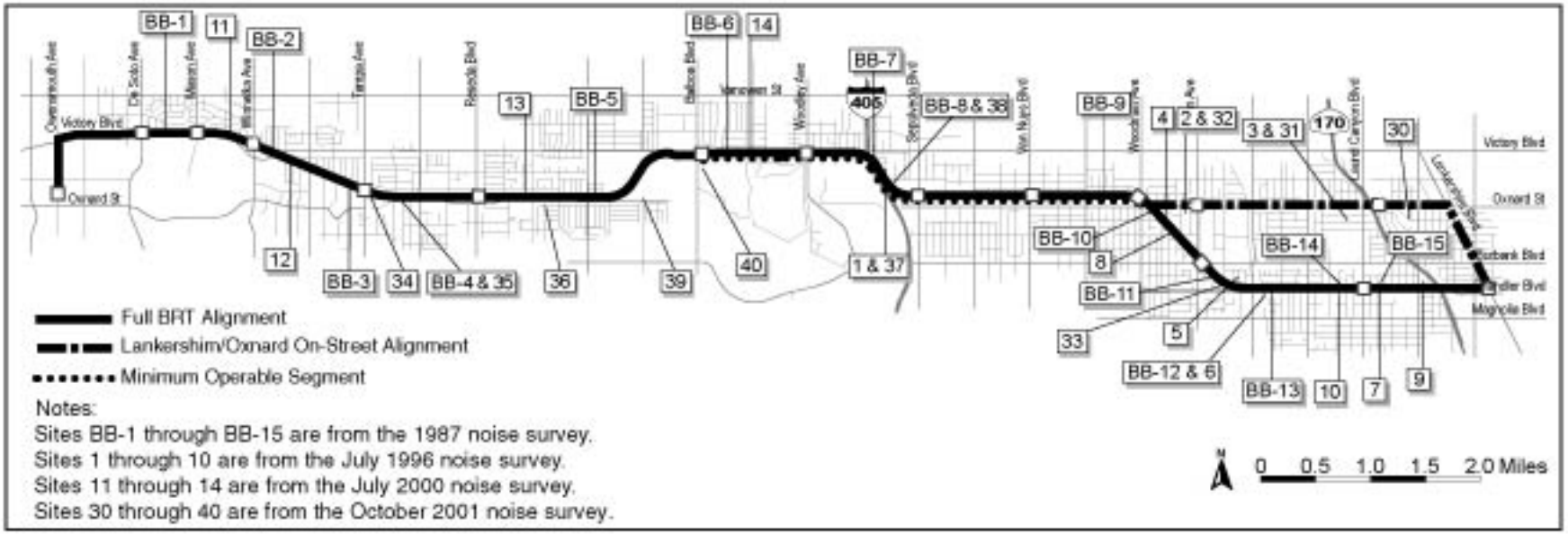
The Lankershim/Oxnard On-Street Alignment of the BRT Alternative represents a possible variation of the BRT alternative. Buses leaving the North Hollywood station would follow an on-street route along Lankershim Boulevard to Oxnard Street. They would then proceed west along Oxnard to Woodman where they would enter the ~~SP~~ MTA ROW, continuing to Warner Center as described for the BRT Alternative. The existing noise levels are relatively high along the on-street alignment segment. The noise analysis also considers potential noise impacts from weekend service along Lankershim Boulevard and Oxnard Street.

The Minimum Operable Segment (MOS) represents another variation of the BRT alternative, following the same route as the BRT from Woodman Avenue to Balboa Avenue. It integrates already planned on-street bus transit projects along Oxnard Street and Victory Boulevard.

A noise-monitoring program was performed to determine existing levels of noise exposure at noise sensitive receptors along the corridor. Estimating existing noise exposure is an important step in the noise impact assessment since, as discussed in Section 4-9.2.c, the thresholds for noise impact are based on the existing levels of noise exposure. An initial noise survey was performed in November 1987 as part of previous evaluations of east-west transit in the San Fernando Valley. Additional monitoring was performed in July 1996, ~~and~~ July 2000, and October 2001 to document more current conditions. In many cases, the measurements in 1987, 1996, ~~and~~ 2000, and 2001 show similar levels of noise exposure. This is not surprising since traffic on freeways and busy arterials was the dominant source of noise exposure during all three of the noise monitoring periods. The only substantial noise increase from 1987 was measured on the south side of the corridor along the Topham/Oxnard Street segment in the West Valley, which may reflect increased use of this route as an alternative to the major east-west arterial roads.

Most of the noise monitoring was performed using unattended monitors that were located at representative sites along the corridor. The monitors were left in place for 24 hours to document the variation of noise exposure over a complete day. The 24-hour monitoring was supplemented with short-term noise measurements, most of which were made along busy arterial streets. Traffic counts were made at the same time as the short-term measurements to provide a means of correlating traffic volumes with ambient noise levels.

All of the measurement sites were located in noise sensitive areas along the proposed alignment, and were selected to represent the range of noise conditions along the corridor. Figure 4-47 shows the general locations of the monitoring sites. Sites BB-1 through BB-15 are from the 1987 noise survey; sites 1 through 10 represent the July 1996 measurements, ~~and~~ sites 11 through 14 represent the July 2000 measurements, and sites 30 through 40 represent the October 2001 measurements. The measurement microphones were positioned to characterize the exposure of the site to the dominant noise source in the area, which was almost always vehicular traffic on freeways, busy arterials, or local streets. The measurement microphones were located at the approximate setback lines of residences from the road and were positioned to avoid acoustic shielding by landscaping, fences, or other obstructions.



Source: HMMH, 2001; Myra L. Frank & Associates, Inc., 2001.

Figure 4-47: Noise Monitoring Sites

The Larson Davis Model LD870 and LD820 monitors used for the survey meet all of the specifications in American National Standards Institute (ANSI) Standard S1.4 for Type 1, precision, sound measurement equipment. Field calibrations traceable to the U.S. National Institute of Standards and Technology (NIST) were carried out before and after each set of measurements. The monitors sample the A-weighted sound level one or more times per second and can be programmed to provide a wide variety of statistics. For this study, the monitors were programmed to collect hourly and daily noise statistics along with information about particularly loud noise events. The daily results are summarized in Table 4-44 in terms of the Day-Night Sound Level and the equivalent sound level over the daytime and nighttime hours. The short-term noise survey results are summarized in Table 4-45 in terms of 30-minute equivalent sound levels. These terms are defined below:

A-Weighted Sound Level: Although sound is measured using microphones that respond directly to pressure variations in the air, the human hearing system does not respond equally to sound pressure variations at all frequencies. The frequency of a sound is observed subjectively as tone or pitch, expressed in cycles per second of air pressure fluctuation (in Hertz, or Hz). Low-frequency sounds (below about 400 Hz) and high-frequency sounds (above 10,000 Hz) do not sound as loud as mid-frequency sounds of the same magnitude. To approximate the way the humans respond to sound, a filter circuit with frequency characteristics similar to the human hearing system is built into sound measurement equipment. Measurements with this filter enabled are referred to as *A-weighted sound levels*, expressed in decibels (dBA). Community noise is almost always characterized in terms of A-weighted levels. In relative terms, a noise increase of 3 decibels would be only barely perceptible outside the laboratory, whereas a noise increase of 10 decibels would generally be perceived as an approximate "doubling" of loudness.

Equivalent Sound Level (Leq): Leq is a measure of sound energy over a period of time. It is referred to as the *equivalent sound level* because it is equivalent to the level of a steady sound, which, over a referenced duration and location, has the same A-weighted sound energy as the fluctuating sound. Leq's for periods of one hour, the daytime or nighttime hours, and 24 hours are commonly used in environmental assessments. Because Leq is a measure of the total sound energy, any new community noise source will cause Leq to increase. To estimate how bus transit in the East-West San Fernando Valley corridor will increase Leq, it is necessary to know the existing Leq and to add in the sound energy that would be generated by all of the bus transit operations. The more bus operations and the louder the buses, the more sound energy is added to the existing Leq.

Day-Night Sound Level (Ldn): Ldn, also abbreviated DNL, is a 24-hour Leq, but with a 10-decibel penalty added to noise events occurring at night. Nighttime is defined as 10 pm to 7 am. The effect of this penalty is that, in the calculation of Ldn, an event during nighttime hours is equivalent to an event during the daytime hours that is 10 decibels louder, or to 10 events at the same sound level during the daytime hours. This strongly weights Ldn toward nighttime noise, since most people are more easily annoyed by noise during the nighttime hours when both background noise is lower and most people are sleeping. Ldn is often used to characterize community noise when assessing community noise impacts. Almost all urban and suburban neighborhoods are in the range of Ldn 50 to 70 dBA. An Ldn of 70 dBA represents a relatively

Table 4-44: Noise Survey Results, 24-Hour Survey Locations

Site No.	Location	Start		Results, dBA		
		Date	Time	Ldn	Lday[1]	Lnight2
East Valley						
1	6253 Blucher Avenue	7/17/1996	11:00	67	63	60
37	6253 Blucher Avenue	10/23/2001	16:00	61	58	53
BB-7	6311 Blucher Avenue	11/16/1987	15:00	71	68	64
2	5954 Nagle Avenue	7/18/1996	17:00	70	68	62
32	5954 Nagle Avenue	10/19/2001[3]	18:00	67	65	59
3	12232 Oxnard Street	7/18/1996	16:00	69	67	61
31	12232 Oxnard Street	10/19/2001[3]	18:00	71	68	63
4	5805 Hillview Park Avenue	7/17/1996	16:00	57	58	44
5	13001 Chandler Boulevard	7/17/1996	12:00	64	64	54
30	5955 Colfax Avenue	10/20/2001[3]	13:00	72	70	64
33	13079 Chandler Boulevard (Chabad Temple)	10/19/2001[3]	16:00	61	61	51
		10/20/2001[3]	17:00	62	61	54
		10/22/2001	16:00	64	64	54
		10/23/2001	16:00	63	63	53
6	5350 Alcove Avenue	7/18/1996	15:00	65	64	56
BB-12	5350 Alcove Avenue	11/5/1987	18:00	66	63	58
7	11956 Chandler Boulevard	7/22/1996	13:00	67	65	59
8	13407 Collin Street	7/17/1996	14:00	55	53	47
BB-9	14002-1/2 Costello Avenue	11/11/1987	18:00	56	55	46
BB-10	13515 Emelita Avenue	11/9/1987	13:00	57	56	48
BB-11	13164 Burbank Boulevard	11/10/1987	15:00	63	55	56
BB-15	5405 Gentry Avenue	11/16/1987	14:00	65	65	54
38	6200 Langdon Avenue	10/23/2001	17:00	63	64	53
West Valley						
11	20348 Gilmore Street	8/1/2000	12:00	62	59	54
BB-1	6510 Drake Place	11/3/1987	11:00	65	63	57
12	6247 Oakdale Avenue	8/1/2000	14:00	67	67	57
BB-3	19350 Topham Street	11/9/1987	10:00	62	61	53
13	18125 Topham Street	8/2/2000	14:00	56	55	48
BB-5	17945 Topham Street	11/10/1987	12:00	58	56	50
34	19222 Topham Street	10/22/2001	14:00	67	66	59
14	16623 Victory Boulevard	8/2/2000	15:00	73	71	65
35	6029 Topeka Drive	10/22/2001	15:00	67	66	58
36	17941 Bullock Street	10/22/2001	15:00	56	55	48

Notes:
[1] Day: 7 am to 10 pm. [2] Night: 10 pm to 7 am. [3] Weekend measurement.
Measurements were taken at Sites BB-1 through BB-15 in 1987; at Sites 1 through 10 in July 1996; and at Sites 11 through 14 in July 2000; and at Sites 30 through 40 in October 2001.

Source: HMMH, 2001.

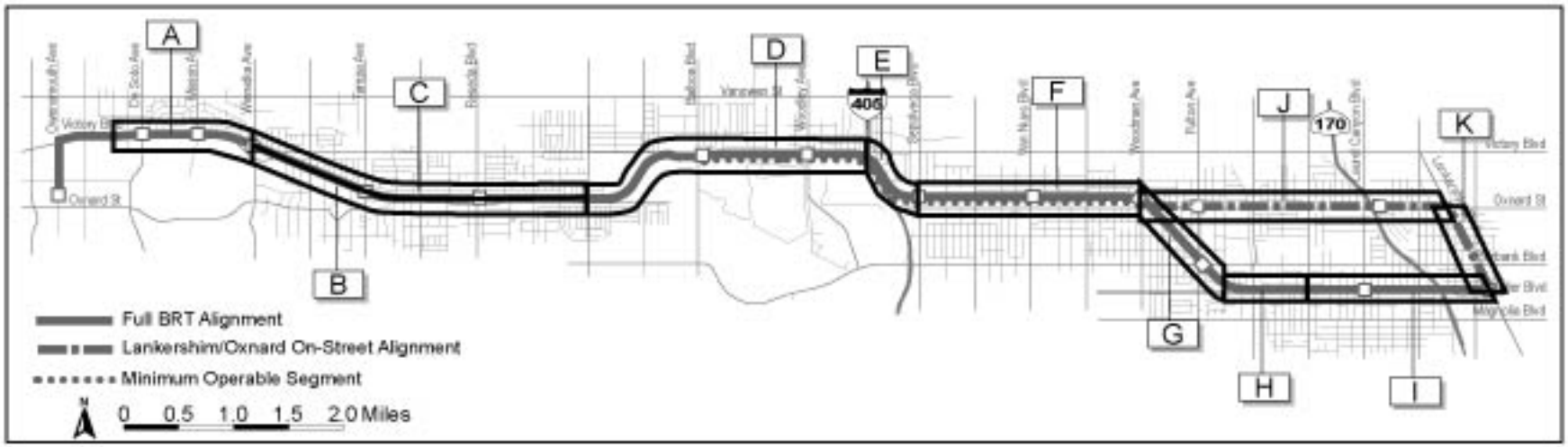
Table 4-45: Noise Survey Results, Short-Term Locations

Site No.	Location	Start		Leq (dBA)
		Date	Time	
BB-8	6200 Langdon Ave	11/6/1987	14:50	64
2	5954 Nagle Avenue	7/19/1996	13:31	69
3	12232 Oxnard Street	7/19/1996	14:18	71
5	13001 Chandler Boulevard	7/18/1996	11:35	64
BB-13	Emek Hebrew Academy	11/7/1987	10:10	63
9	Chandler Blvd & Colfax Ave	7/19/1996	17:25	68
9	Chandler Blvd & Colfax Ave	7/19/1996	10:11	66
10	Chandler Blvd & Hermitage Ave	7/19/1996	16:49	67
10	Chandler Blvd & Hermitage Ave	7/19/1996	11:33	65
BB-14	12257 Chandler Boulevard	11/17/1987	8:25	67
BB-2	6505 Laramie Street	11/3/1987	15:45	59
BB-4	6029 Topeka Street	11/4/1987	10:25	65
BB-6	16667 Victory Boulevard	11/6/1987	10:25	73
39	Sepulveda Basin, Franklin Field	10/24/2001	12:20	56
40	Sepulveda Basin, Overflow Parking Lot near Balboa Park	10/24/2001	14:37	57

Source: HMMH, 2001.

noisy area, which might be found near a freeway or a busy surface street. Residential neighborhoods that are not near major sound sources are usually in the range of Ldn 50 to 60 dBA. If there is a freeway or moderately busy arterial nearby, or any substantial nighttime noise, Ldn is usually in the range of 60 to 65 dBA.

One goal of the noise survey is to develop sufficient information on existing conditions so that the existing Ldn can be estimated at all noise sensitive residences along the proposed alignments. As part of this process, the corridors have been divided into 11 general areas with relatively uniform levels of existing noise exposure throughout each area. The areas and the generalized Ldn's used for the noise impact assessment are summarized in Table 4-46 and discussed below, heading from west to east. See also Figure 4-48.



Source: HMMH, 2001; Myra L. Frank & Associates, Inc., 2001.

Figure 4-48: Community Areas Employed in Noise Monitoring Study

Table 4-46: Community Areas and Generalized Measurement Results			
AREA		**Measurement Sites in Area**	**Generalized Ldn**
WEST VALLEY			
A	Victory Boulevard from Variel Avenue to Winnetka Avenue.	11, BB-1, BB-2	62 dBA
B	South Side of Topham/Oxnard Street from Winnetka Avenue to White Oak Avenue.	12, BB-3, BB-4 34, 35, 36	67 dBA
C	North Side of Topham/Oxnard Street from Winnetka Avenue to White Oak Avenue.	13, BB-5	56 dBA
D	Victory Boulevard from White Oak Avenue to the San Diego Freeway.	14, BB-6, 39, 40	73 dBA
EAST VALLEY			
E	Area along the San Diego Freeway from Haskell Avenue to Sepulveda Boulevard.	1, BB-7, BB-8, 37, 38	~~67~~ 61 dBA
F	Oxnard Street from Sepulveda Boulevard to Woodman Avenue.	BB-9	56 dBA
G	Diagonal section of the ~~SP~~ MTA ROW between Oxnard Street and Chandler Boulevard.	4, 8, BB-10, BB-11	55 dBA
H	Chandler Boulevard from Ethel Avenue to Whitsett Avenue.	5, 33, 6, BB-12	64 dBA
I	Chandler Boulevard from Whitsett Avenue to Lankershim Boulevard.	7, 9, 10, BB-15	65 dBA
J (1)	Oxnard Street from Woodman Avenue to Lankershim Boulevard (WEEKDAY).	2, 3	70 dBA
J (2)	Oxnard Street from Woodman Avenue to Lankershim Boulevard (WEEKEND).	30, 31, 32	67 dBA
K	Lankershim Boulevard from Oxnard Street to Chandler Boulevard.	Commercial Area	

Soure: HMMH, 2001.

Area A. Victory Boulevard from Variel Avenue to Winnetka Avenue

The residences in this area are all on the north side of the proposed BRT alignment. The south side has mostly vacant land with a few parking areas. The July 2000 measurement at 20348 Gilmore Street indicated an Ldn of 62 dBA, 3 dBA lower than measured at a similar location in 1987. Traffic noise from Victory Boulevard was the main noise source. For the impact assessment, an Ldn of 62 dBA is used for this area.

Area B. South Side of Topham and Oxnard Streets from Winnetka Avenue to White Oak Avenue

The area along Topham Street on the south side of the proposed BRT alignment is primarily residential. The area along Oxnard Street on the south side of the alignment is also residential, except for a commercial area between Wilbur Avenue and Etiwanda Avenue. Along this entire section, the buildings are separated from the alignment by a busy two-lane street, Topham then Oxnard. A Year 2000 measurement at ~~6274~~ 6247 Oakdale Avenue indicated an Ldn of 67 dBA, 5 dBA higher than measured at a similar location in 1987. The traffic on both Topham Street

and Oxnard Street was the dominant noise source, and has likely increased over the years with increased use of these streets as an alternate route to the major east-west arterial roads. For the impact assessment, an Ldn of 67 dBA is used for this area.

Area C. North Side of Topham/Oxnard Streets from Winnetka Avenue to White Oak Avenue

The north side of this section passes through quieter neighborhoods and is primarily residential, except for a small stretch to the east of Wilbur Avenue. West of Wilbur Avenue, the back yards of the residences ~~are~~ directly abut the alignment. East of Wilbur Avenue, a lightly traveled segment of Topham Street separates the houses from the alignment in most locations. An Ldn of 56 dBA was recorded in July 2000 at 18125 Topham Street, 2 dBA less than measured at a similar location in 1987. For the impact assessment, an Ldn of 56 dBA is used for this area.

Area D. Victory Boulevard from White Oak Avenue to the San Diego Freeway

The section from White Oak Avenue to Balboa Boulevard is contained within the Sepulveda Basin Recreation Area. Non-noise-sensitive recreational and agricultural uses are located in this section. Short-term noise measurements conducted in October 2001 indicated Leq sound levels of 56 dBA and 57 dBA at the Franklin Field baseball facility near Balboa Park. In the section beginning at Balboa Boulevard, the south side is commercial and open space while the north side land use is residential. On the north side however, Victory Boulevard separates the residences from the proposed BRT alignment. A high Ldn level of 73 dBA, measured at 16623 Victory Boulevard, indicates that the road traffic clearly dominates the noise level in this area.

Area E. Area along the San Diego Freeway

~~There are residences in this area located on Blucher Avenue directly east of the San Diego Freeway, and~~ In this area, the BRT alignment would run between the San Diego Freeway and the residences located on Blucher Avenue directly east of the freeway. The measurement made in 1996 at 6253 Blucher was Ldn 67 dBA and the measurement in 1987 (at a residence several doors to the north) was Ldn 71 dBA. For both measurements, freeway traffic was by far the dominant noise source. The site monitored in 1987 was closer to the freeway, which is partially responsible for the higher reading. The 2001 measured Ldn of 61 dBA reflected the addition of a soundwall along the San Diego Freeway. Despite the measured reduction in sound levels, the freeway continues to dominate the Ldn in this area. For the impact assessment, the Ldn at all of the residences along Blucher Avenue has been assumed to be 67 dBA.

Area F. Oxnard Street from Sepulveda Boulevard to Woodman Avenue

Most of the land use adjacent to the BRT alignment in this area is commercial or industrial. However, at the eastern end there are a number of residences north of the alignment between Hazeltine and Woodman, and several residences on both sides of the alignment near Oxnard. The measured Ldn of 56 dBA at Site BB-9, which was located two blocks east of Hazeltine, has been used to characterize existing noise exposure for this area. Traffic on Oxnard and other nearby arterials is the dominant noise source. Even though much of the land use near the measurement site is industrial, existing noise levels are relatively low because of: (1) the distance from the arterials, (2) acoustic shielding provided by buildings, and (3) relatively low noise levels during the monitoring period from industrial activities.

Area G. Diagonal Section of the ~~SP~~ MTA ROW between Oxnard Street and Chandler Boulevard

This segment passes through relatively quiet residential areas. Much of the corridor is similar to Site 8 on Collins Street (Ldn 55 dBA), Site 4 on Hillview Park Avenue (Ldn 57 dBA), and Site BB-10 on Emelita Avenue (Ldn 57 dBA). The noise sources at these sites included distant traffic on Oxnard, Chandler, Fulton, Burbank, and other busy arterials, along with local traffic. Hourly Leq levels were generally in the low to mid 50's during the day, dropping to the low 40's during late night and early morning hours. The measurement at Site 4 on Hillview Park Avenue had several daytime hours with relatively high noise levels that may not be representative of typical conditions. Without these hours the Ldn at Site 4 would have been about 55 dBA. Existing noise exposure has been assumed to be Ldn 55 dBA for all residential land uses in this area except for those close to Oxnard, the Fulton/Burbank intersection, and Chandler. As discussed below, the measured levels near Oxnard and Chandler were Ldn 70 dBA and 64 dBA respectively. The measured level was Ldn 64 dBA at Site BB-11 at the Valley Cities Jewish Community Center. Site BB-11 was located adjacent to the alignment, about 400 feet south of Burbank Boulevard.

Area H. Chandler Boulevard from Ethel Avenue to Whitsett Avenue

Both the north and south side of this section of Chandler have primarily residential land uses. Existing noise exposure was characterized by measurements at 13001 Chandler (Site 5: Ldn 64 dBA) and 5350 Alcove Avenue (Site 6: Ldn 65 dBA and Site BB-12: Ldn 66 dBA). The 1-decibel difference between the measurements in 1987 and 1996 at 5350 Alcove Avenue is within normal day-to-day sound exposure fluctuations. Additional measurements were made in October 2001 at the Chabad of North Hollywood/Saara Ratner-Stauber Synagogue located at 13079 Chandler Boulevard, near Ethel Avenue. Measured Ldn values of 63 dBA to 64 dBA were consistent with the previous weekday measurement. Measured Ldn weekend levels of 61 dBA to 62 dBA were slightly lower. For the impact assessment it has been assumed that existing noise exposure is Ldn 64 dBA for all of the residences along Chandler in this area.

Area I. Chandler Boulevard from Whitsett Avenue to Lankershim Boulevard

The measured Ldn values ~~were~~ of 67 dBA at 11956 Chandler (Site 7) and 65 dBA at 5405 Gentry Avenue (Site BB-15)~~,~~ were slightly higher than Area H. In addition, short-term daytime measurements were conducted on Chandler near Colfax (Site 9) and near Hermitage (Site 10). The Leq's for these short term measurements ranged from 65 to 68 dBA, which are consistent with the hourly Leq values measured at Site 7 and Site BB-15. Similar to Area H, traffic on Chandler is the dominant noise source along this segment, with some additional traffic noise where the Hollywood Freeway crosses the alignment. The existing noise level in this area has been assumed to be Ldn 65 dBA for the impact assessment.

Area J. Oxnard Street from Woodman Avenue to Lankershim Boulevard

Oxnard Street is a busy arterial with a number of single and multi-family residential units along both sides. Measurements were conducted along Oxnard Street to provide a baseline for evaluating noise impact for the Lankershim/Oxnard On-Street Alignment variation of the BRT alternative. Site 2 was located at the corner of Oxnard and Nagle (5954 Nagle Avenue) and Site 3 was located near the intersection of Oxnard and St. Clair (12232 Oxnard). The measured Ldn at both sites was 70 dBA. In addition, short-term mid-afternoon measurements were Leq 69

dBA at Site 2 and 71 dBA at Site 3. Noise levels were dominated by traffic on Oxnard with the daytime Leq ranging from 65 to 70 dBA and the nighttime Leq dropping to a low of about 55 dBA between 3:00 AM and 4:00 AM. Existing noise exposure has been assumed to be Ldn 70 dBA for the residences facing Oxnard.

Additional measurements were conducted in 2001 to characterize weekend conditions in this area. Measurements repeated at 5954 Nagle Avenue indicated a decrease in Ldn from 70 dBA to 67 dBA. Measurements repeated at 12232 Oxnard Street indicated an increase in Ldn from 69 dBA to 71 dBA and measurements at a new site, 5955 Colfax Avenue, indicated an Ldn of 72 dBA. Because of the inconclusive weekend results, a conservative Ldn of 67 dBA was chosen to represent weekend conditions in this area.

Area K. Lankershim Boulevard from Oxnard Street to Chandler Boulevard

Lankershim Boulevard is a busy arterial with predominantly commercial land use.

4-9.2 Impact Analysis Methodology and Evaluation Criteria

a. Approach

The approach used to assess the noise impact consists of combining the available data on the project design and planned operational characteristics with models of bus noise to project future noise levels. Then, for sensitive receptors, the projections are compared with estimates of existing noise exposure. The steps in the assessment are:

1. *Determine Study Area Characteristics*: This step includes identifying sensitive receptors through the review of design drawings, land use maps, and visits to the study area. The design drawings for each alternative are then used to measure distances between the receptors and the proposed project alignment.

2. *Determine Existing Noise Environment*: As discussed in Section 4-9.1, noise monitoring was performed at representative sites along the proposed corridor. The measurement results were generalized in order to estimate the existing Ldn at all noise-sensitive receptors.

3. *Develop Noise Projection Models*: The model used to project noise from the proposed alternatives is based on source measurement data from MTA revenue service bus operations, the speed adjustment for cruising buses from the U. S. Federal Highway Administration (FHWA) Traffic Noise Model (TNM) and the U. S. Federal Transit Administration (FTA) noise model for highway/transit sources. The noise projections for a specific location require estimates of bus speed and schedule.

4. *Perform Noise Impact Assessment:* For each sensitive receptor or group of sensitive receptors, the projected transit noise is compared to the thresholds for noise impact. As discussed in Section 4-9.2.c, the impact thresholds vary based on estimates of existing noise exposure.

5. *Inventory Impact and Assess Mitigation Options:* The numbers of sensitive receptors for which noise impact was identified from Step 4 are tabulated, and measures to minimize

impact at these receptors are evaluated. The goal is always to eliminate as much project impact as possible. Potential mitigation measures for bus noise include the use of quieter vehicles, sound barriers, and sound insulation of affected buildings, in some cases. The final product of the noise assessment is a tabulation of impacts and a list of mitigation measures required to minimize the impacts.

b. Prediction Model for Bus Noise

The prediction of bus noise is based on source noise measurements of MTA Compressed Natural Gas (CNG) buses operating on the Ventura Boulevard (Line 750) Metro Rapid bus route, performed in August 2000. Additional measurements were conducted in October 2001 to determine the relative contributions of the various sub-sources of bus noise, including exhaust, air conditioning vents, and radiator fans. The results of the measurements indicated that these buses are louder than the average bus elsewhere in the country represented by the FHWA Traffic Noise Model (TNM). Specifically, the noise emissions measured on the left (exhaust) side of the buses were substantially higher than those in the FHWA model whereas the noise emissions measured on the right side of the buses were only slightly higher. Based on the measurement results, an average reference Sound Exposure Level (SEL) of 81.5 dBA at 50 feet and 24 mph was determined. The SEL is a measure of the sound energy at reference conditions, and is the basis for the prediction of Leq and Ldn.

For purposes of the noise projections, the reference SEL was first adjusted for speed based on the noise model for buses in cruise mode included in the FHWA TNM. Because the SEL for buses increases by only about 1 decibel for each 10 mph speed increase above the reference speed of 24 mph, average speeds were estimated for ranges of distances from the stations based on bus acceleration and deceleration characteristics. For the noise projections, bus speeds were modeled to be 30 mph within 400 feet of the stations, 40 mph at 400 to 800 feet from the stations, 50 mph at 800 to 3200 feet from the stations and 55 mph beyond 3200 feet from the stations, up to the maximum projected mid-station speeds (ranging from 35 mph to 55 mph, depending on location). Buses would reach speeds of 55 mph only in a limited number of areas, given the typical station spacing of 1 mile. Although the buses would operate at speeds below 30 mph near the stations, accelerating buses would be operating at higher throttle and thus the noise exposure is not expected to decrease below the exposure projected for bus operations at 30 mph. In portions of the alignment along Chandler Boulevard, buses were modeled with maximum speeds of 35 miles per hour.

The remaining components of the noise projections are the number of buses per day and the distribution of buses between daytime and nighttime hours. Ldn was calculated based on the bus schedule information summarized in Table 4-47; it should be noted that this schedule represents the projection for the year 2020 and that the bus volumes for the initial service will be considerably lower. In the calculation of Ldn, buses during the nighttime hours are considered equivalent to ten daytime buses. This reflects the enhanced human sensitivity to noise during the nighttime hours when the noise may disturb sleep or relaxation.

Table 4-47: Bus Schedule Used for Noise Projections				
Bus Rapid Transit	**Number of Buses**			
	Full BRT	**On-Street (Weekdays)**	**On-Street (Weekends)**	**MOS**
Day				
No. Hollywood- Reseda	464	464	120	360
Reseda - Warner Center	344	NA	NA	240
Night				
No. Hollywood- Reseda	158	158	32	126
Reseda - Warner Center	116	NA	NA	84
Notes: Daytime is defined as 7 am to 10 pm Nighttime is defined as 10 pm to 7 am. NA = not applicable.				

Source: Manuel Padron & Associates, 2000.

Figure 4-49 illustrates the projected Ldn from bus operations to the east of Reseda Boulevard with the full BRT alternative at the maximum speed of 55 mph as a function of distance from the BRT centerline with both hard ground and soft ground conditions. Except for the reference SEL and emission level speed adjustment described above, these projections were based on the FTA noise model for highway/transit sources from the guidance manual *Transit Noise and Vibration Impact Assessment* (FTA Report DOT-T-95-16, April 1995).

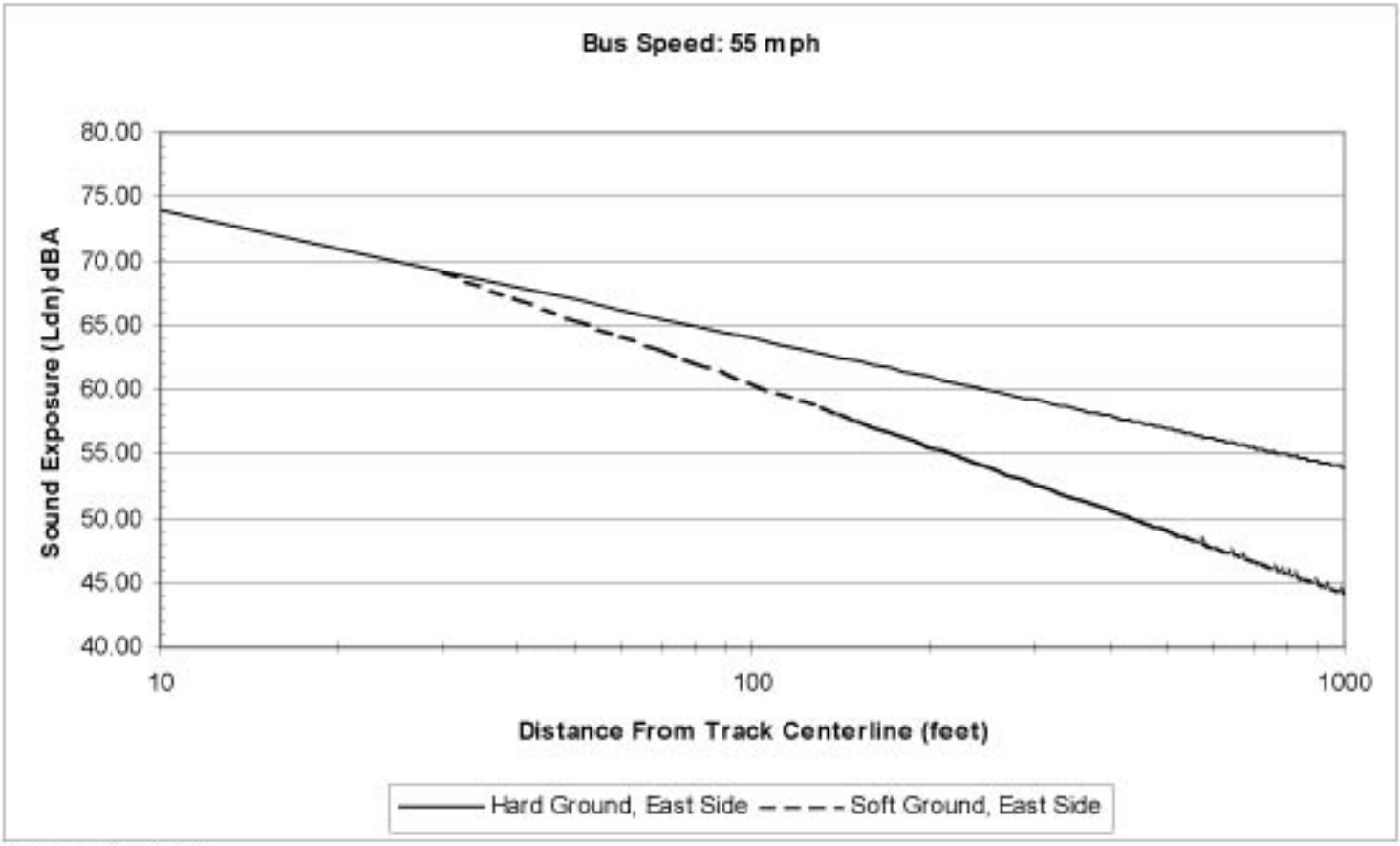
c. Noise Impact Criteria

Noise impact for this project is based on the criteria as defined in the FTA guidance manual. The FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. Although more transit noise is allowed in neighborhoods with high levels of existing noise, smaller increases in total noise exposure are allowed with increasing levels of existing noise.

The FTA Noise Impact Criteria group noise sensitive land uses into the following three categories:

Category 1: Buildings or parks where quiet is an essential element of their purpose.
Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches.

Ldn is used to characterize noise exposure for residential areas (Category 2). For other noise sensitive land uses such as parks and school buildings (Categories 1 and 3), the maximum 1-hour Leq during the facility's operating period is used.



Source: HMMH, 2000.

Figure 4-49: Maximum Projected Ldn vs. Distance from BRT Centerline

There are two levels of impact included in the FTA criteria. The interpretation of these two levels of impact are summarized below:

- Severe: Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations (significant under CEQA). Noise mitigation will normally be required for severe impact areas unless there is no practical method of mitigating the noise.
- Impact: Sometimes referred to as moderate impact, in this range of noise impact, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

The noise impact criteria are summarized in Table 4-48. The first column shows the existing noise exposure and the remaining columns show the additional noise exposure from the transit project that would cause either moderate or severe impact. The future noise exposure would be the combination of the existing noise exposure and the additional noise exposure caused by the transit project.

Table 4-48: FTA Noise Impact Criteria

Existing Noise Exposure Leq or Ldn	Project Noise Exposure Impact Thresholds, Ldn or Leq, (1) dBA			
	Category 1 Sites	Category 2 Sites	Category 3 Sites	
	Impact	Severe Impact	Impact	Severe Impact
<43	Amb.+10	Amb.+15	Amb.+15	Amb.+20
43	52	58	57	63
44	52	59	57	64
45	52	59	57	64
46	52	59	57	64
47	52	59	57	64
48	53	59	58	64
49	53	59	58	64
50	53	60	58	65
51	54	60	59	65
52	54	60	59	65
53	54	60	59	65
54	55	61	60	66
55	55	61	60	66
56	56	62	61	67
57	56	62	61	67
58	57	62	62	67
59	57	63	62	68
60	58	63	63	68
61	58	64	63	69
62	59	64	64	69
63	60	65	65	70
64	60	66	65	71
65	61	66	66	71

Table 4-48: FTA Noise Impact Criteria

Existing Noise Exposure Leq or Ldn	Project Noise Exposure Impact Thresholds, Ldn or Leq, (1) dBA			
	Category 1 Sites	Category 2 Sites	Category 3 Sites	
	Impact	Severe Impact	Impact	Severe Impact
66	61	67	66	72
67	62	67	67	72
68	63	68	68	73
69	64	69	69	74
70	64	69	69	74
71	65	70	70	75
72	65	71	70	76
73	65	72	70	77
74	65	72	70	77
75	65	73	70	78
76	65	74	70	79
77	65	75	70	80
>77	65	75	70	80

Notes:
(1) Ldn is used for land uses where nighttime sensitivity is a factor; maximum 1-hour Leq is used for land use involving only daytime activities.
Category Definitions:
Cat 1: Buildings or parks where quiet is an essential element of their purpose.
Cat 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
Cat 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches.

Source: FTA, 1995.

4-9.3 Impacts

4-9.3.1 No Build Alternative

Under the No Build Alternative, which reflects conditions anticipated for the year 2020 with no major transit improvements, changes in traffic would be limited to normal growth on the existing transit network. As such, noise increases are not likely to be substantial and no adverse noise impact under NEPA (significant noise impact under CEQA) is anticipated for the No Build Alternative.

4-9.3.2 Transportation System Management (TSM) Alternative

Under the TSM alternative, which includes enhancement of the existing bus system, increased bus traffic and noise are likely to be unsubstantial relative to the existing traffic conditions on major arterial routes. Thus, no adverse noise impact under NEPA (significant noise impact under CEQA) is anticipated for the TSM Alternative.

4-9.3.3 Bus Rapid Transit (BRT) Alternative

The model of bus noise previously discussed was applied to identify noise-sensitive receptors where project noise could cause either moderate or severe noise impact. The results of the noise impact assessment are summarized in Table 4-49 in terms of the number of moderate and severe noise impacts for single-family residential, multi-family residential, and other (parks, schools, and places of worship) land uses. The results are given for the Full BRT Alternative, the BRT Alternative with On-Street Alignment, and the Minimum Operable Segment (MOS). For comparison, results are also broken out separately (in shaded rows) for the Chandler Boulevard area in the East Valley and the Lankershim/Oxnard On-Street segment. For the Lankershim/Oxnard On-Street Alignment, separate results are provided for weekday and weekend service.

Table 4-49: Summary of Noise Impact Assessment – Bus Rapid Transit Alternative

Alignment	Number of Noise Impacts						Comments
	Moderate Impact			Severe Impact			
	SF	MF	Other	SF	MF	Other	
Full BRT	~~283~~ 340	~~27~~ 31	0	~~142~~ 125	2	0	North Hollywood -Warner Center
East Valley BRT Segment (Chandler Blvd. Alignment)	~~106~~ 112	~~27~~ 31	0	~~23~~ 29	2	0	~~SP~~MTA ROW – Woodman to Lankershim
Full BRT with On-Street Alignment	~~221~~ 272	97	1 day care/ 2 schools	~~119~~ 96	0	0	North Hollywood – Warner Center
Lankershim/Oxnard On-Street Alignment (weekday)	44	97	1 day care/ 2 schools	0	0	0	Oxnard Street – Woodman Ave to Lankershim
Lankershim/Oxnard On-Street Alignment (weekend)	0	0	0	0	0	0	Oxnard Street – Woodman Ave to Lankershim
Minimum Operable Segment[1]	~~39~~ 55	0	0	~~4~~ 8	0	0	Woodman Avenue – Balboa Boulevard

Notes:
SF = single-family residence, MF = multi-family residential building.
(1) Excluding on-street segments.

Source: HMMH, 2000; 2001.

Table 4-50 gives a breakdown of the results by area, including representative distances, maximum bus speeds, thresholds for both degrees of noise impact and bus noise projections, as well as the projected number of moderate and severe impacts. The entries for each segment are representative of noise-sensitive receptors in that area with "worst case" noise impact. For example, if severe impacts are indicated in a given row in the table, the distance, speed, and projected bus noise are representative of a location where severe impact is projected. In such cases, there are typically other locations at greater distances and/or with lower bus speeds that have lower projected bus noise levels and only moderate impact. These potential noise impacts are discussed below.

Table 4-50: Summary of Noise Impact Assessment[1]

Road Segment	Rep. Dist. (ft)	Exist. Ldn (dBA)	Project Ldn (dBA)[1]			Future Ldn (dBA)[2]	Number of Impacts			
			Impact Threshold		Bus Noise		Impact		Severe	
			Impact	Severe			SF	MF	SF	MF
FULL BRT ALIGNMENT										
WEST VALLEY										
A. Victory Boulevard from Variel Avenue to Winnetka Avenue	~~55~~ 50	61.8	58.8	64.3	~~64.9~~ 65.1	66.6	~~48~~ 49	0	~~10~~ 5	0
B1. South Side of Topham/Oxnard Streets from Winnetka Avenue to Wilbur Avenue	~~256~~ 130	67.0	62.2	67.5	~~50.8~~ 58.7	~~67.1~~ 67.6	0	0	0	0
B2. South Side of Topham/Oxnard Streets from Wilbur Avenue to White Oak Avenue	~~200~~ 115	67.0	62.2	67.5	~~52.2~~ 61.2	~~67.1~~ 68.0	0	0	0	0
C1. North Side of Topham/Oxnard Streets from Winnetka Avenue to Wilbur Avenue	~~68~~ 70	56.4	55.9	61.7	~~63.3~~ 63.2	~~64.1~~ 64.0	~~49~~ 90	0	~~68~~ 34	0
C2. North Side of Topham/Oxnard Streets from Wilbur Avenue to White Oak Avenue	~~94~~ 95	56.4	55.9	61.7	62.7	63.6	~~42~~ 46	0	35	0
D. Victory Boulevard from Balboa Boulevard to the San Diego Fwy.	~~242~~ 245	72.7	~~66.5~~ 66.7	~~71.4~~ 71.7	~~50.7~~ 51.3	~~72.7~~ 73.0	0	0	0	0
EAST VALLEY										
E. Blucher Avenue along the San Diego Freeway	100	~~67.0~~ 60.8	~~62.2~~ 58.2	~~67.5~~ 63.8	~~61.9~~ 62.2[3]	~~68.2~~ 64.6	~~0~~ 19	0	0	0
F. Oxnard Street from Sepulveda Boulevard to Woodman Avenue	~~64~~ 80	56.0	55.7	61.6	~~64.0~~ 63.3	~~64.6~~ 64.0	~~38~~ 24	0	~~6~~ 22	0
G. Diagonal section of the ~~SP~~ MTA ROW between Oxnard Street and Chandler Boulevard	~~60~~ 70	55.0	55.3	61.2	64.4	64.9	~~86~~ 101	2	~~23~~ 29	2
H. Chandler Boulevard from Ethel Avenue to Whitsett Avenue	~~90~~ 105	64.0	60.2	65.6	~~61.5~~ 61.1	~~65.9~~ 65.8	~~19~~ 10	~~1~~ 0	0	0
I. Chandler Boulevard from Whitsett Avenue to Lankershim Boulevard	~~81~~ 90	65.0	60.8	66.2	~~61.7~~ 61.5	~~66.7~~ 66.8	1	~~24~~ 29	0	0
ON-STREET ALIGNMENT SEGMENT (Compares with Segments H and I)										
J(1). Oxnard Street from Woodman Avenue to Lankershim Boulevard (WEEKDAYS)	~~51~~ 50	70.0	64.4	69.5	65.7	71.4	44	97	0	0
J(2). Oxnard Street from Woodman Avenue to Lankershim Boulevard (WEEKENDS)	50	67.0	62.2	67.5	59.1	67.7	0	0	0	0
MINIMUM OPERABLE SEGMENT (MOS)										
D. Victory Boulevard from Balboa Boulevard to the San Diego Fwy.	~~242~~ 245	72.7	66.5	71.4	~~50.7~~ 50.4	72.7	0	0	0	0

Table 4-50: Summary of Noise Impact Assessment[1]

Road Segment	Rep. Dist. (ft)	Exist. Ldn (dBA)	Project Ldn (dBA)[1]			Future Ldn (dBA)[2]	Number of Impacts			
			Impact Threshold		Bus Noise		Impact		Severe	
			Impact	Severe			SF	MF	SF	MF
E. Blucher Avenue along the San Diego Freeway	100	~~67.0~~ 60.8	62.2	67.5	~~61.9~~ 61.3[3]	~~68.2~~ 64.1	~~0~~ 19	0	0	0
F. Oxnard Street from Sepulveda Boulevard to Woodman Avenue	~~64~~ 65	~~56.0~~ 63.9	55.7	61.6	~~64.0~~ 63.2	~~64.6~~ 64.0	~~39~~ 36	0	~~4~~ 8	0

Notes:
SF = single-family residence; MF = multi-family residential building.
(1) Impact assessment based upon comparison of "bus noise" with thresholds for "impact" and "severe impact."
(2) Provided for informational purposes only. "Future Ldn" was computed by combining existing Ldn with Ldn projected for bus operations. Comparison of future and existing Ldn indicates approximate increase in total noise exposure for representative worst-case receptors in each area.
(3) Includes traffic on Haskell Avenue access road.

Source: HMMH, 2000; 2001.

a. Full BRT

Without mitigation, ~~454~~ 498 noise impacts are projected for the Full BRT Alternative, including ~~310~~ 371 with moderate impact and ~~144~~ 127 with severe impact. These impacts are primarily at single-family residences; there are ~~29~~ 33 multi-family buildings affected, ~~27~~ 31 with moderate impact and two with severe impact. Approximately ~~55 percent~~ half of the impacts occur in the West Valley, with most of these at homes along the north side of the Topham/Oxnard Street segment of the alignment, between Winnetka Avenue and White Oak Avenue, where existing noise levels are the lowest. In the East Valley, more than half of the impacts~~,~~ and most of the moderate impacts~~, and all of the severe impacts~~ occur at homes located along the relatively quiet diagonal section of the alignment between Oxnard Street and Chandler Boulevard. In addition, moderate impacts occur at 19 single-family homes located on Blucher Avenue, adjacent to the San Diego Freeway. No impacts are projected in areas where busy roads separate the homes from the BRT alignment, such as the south side of Topham and Oxnard Streets between Winnetka Avenue and White Oak Avenue~~,~~ and the north side of Victory Boulevard between Balboa Boulevard and the San Diego Freeway~~ and Blucher Avenue along the San Diego Freeway~~. The Chandler Boulevard segment (from Ethel Avenue to Lankershim Boulevard) would experience moderate impacts at ~~20~~ 11 single-family residences and ~~25~~ 29 multi-family residential buildings, and no severe impacts.

b. BRT with Lankershim/Oxnard On-Street Alignment

Without mitigation, ~~440~~ 468 noise impacts are projected for this BRT variation, including ~~321~~ 372 with moderate impact and ~~119~~ 96 with severe impact. Of the moderate impacts, ~~221~~ 232 are at single-family residences and 97 are at multi-family residences; one day care facility and two schools are also affected. All of the severe impacts occur at single-family residences. Overall, the projected number of impacts for this alignment variation is ~~only~~ slightly lower than for the Full BRT alternative. Although ~~a greater~~ essentially the same number of moderate impacts ~~are~~ is projected for this variation ~~than for~~ compared to the Full BRT ~~(due to the greater density of housing along the on-street segment of the corridor)~~, because the existing noise levels are higher along the on-street segment, this variation is projected to have fewer severe impacts than the Full

BRT Alternative. No moderate or severe noise impacts are projected for weekend service on the Lankershim/Oxnard On-Street Alignment.

c. Minimum Operable Segment (MOS)

Without mitigation, noise impacts are projected at ~~43~~ 63 single-family residences along the MOS, excluding on-street segments. These include ~~39~~ 36 moderate impacts and ~~4~~ 8 severe impacts at residences on the north side of the BRT alignment between Hazeltine Avenue and Woodman Avenue. In addition, 19 homes on Blucher Avenue along the San Diego Freeway would experience moderate impact. Although the lower projected bus volumes ~~are lower~~ for the MOS result in fewer severe impacts, the projected total number of noise impacts ~~are~~ is nearly identical to those projected for this segment of the Full BRT Alternative.

4-9.4 Mitigation Measures

4-9.4.1 No Build Alternative

No noise impact is anticipated for the No Build Alternative and therefore mitigation measures are not required.

4-9.4.2 Transportation System Management (TSM) Alternative

No noise impact is anticipated for the TSM Alternative and therefore mitigation measures are not required.

4-9.4.3 Bus Rapid Transit (BRT) Alternative

Potential noise mitigation approaches for the BRT Alternative include the following source, path, and receiver options:

N&V-1: Quieter Vehicles: Whenever practical, noise control at the source is the most desirable approach. In ~~this case, it would be possible to include~~ bus procurements intended for use in the corridor, noise limits will be included in the vehicle specifications that would require the bus supplier to minimize vehicle noise emissions. The present noise assessment was based on measurements of existing MTA Metro Rapid CNG buses, which were found to generate about 3 dBA more sound energy than the national average for buses. Thus, it ~~would be~~ is reasonable to specify noise limits that are at least 3 dBA lower than for these existing buses; greater reductions will likely be feasible in the future when new technology buses become available. Although such limits ~~could~~ will likely add to the vehicle cost, this approach ~~would~~ will provide system-wide noise benefit ~~and reduce the need for the path and receiver mitigation measures described below~~.

N&V-2: Sound Barriers: In many cases, noise impacts can be reduced or eliminated by blocking the sound path between the source and receiver by using sound walls and/or berms located along the sides of the alignment. Such barriers are most effective when located close to either the source (bus) or the noise-sensitive receiver. To be effective, sound barriers must also break the direct line of sight from the source to the receiver, have a minimum surface density of 4 pounds per square foot, and have no holes, drainage gaps or access openings that act as "sound leaks." Barriers can be walls composed of masonry blocks, pre-cast concrete, wood, or metal, depending on aesthetic and cost

factors. Where space permits, a barrier may also consist of a wall on top of an earth berm to reduce the amount of wall required. However, due to the height of some of the major bus noise sources (e.g. the exhaust and air-conditioning), the total sound barrier height ~~would~~ will need to be on the order of 12 feet to provide a substantial noise reduction (in the range of 5 to 10 dBA). The actual noise reduction will depend on the specific site geometry. The locations of sound barrier walls to be constructed as part of the project are listed on Table 4-51 and Table 4-52 and are shown on the engineering drawings. It should be noted that multiple reflections of sound (reverberations) between soundwalls on either side of the alignment have the potential to degrade the performance of both barriers substantially (by about 3 to 7 decibels). This effect may be mitigated in several ways, including use of sound-absorptive materials for the barriers or using berm/wall combinations. This issue should be addressed during final design for all areas where soundwalls are proposed for both sides of the alignment. In addition, the proposed designs of all soundwalls should be reviewed by a qualified acoustician during final design to ensure that they provide the intended benefit.

The following measure will be implemented if the first two mitigation measures do not reduce noise impacts to below the level of significance.

N&V-3: Sound Insulation: Although noise control at the receiver is typically the least desirable approach, improving the exterior-to-interior sound insulation of buildings is an option that may be applied in areas where other alternatives for noise mitigation are either impractical or not cost effective. This usually requires replacing or improving windows, weather stripping doors, and installing central air-conditioning systems. Central air-conditioning is needed because opening windows or using wall units for ventilation compromises the sound insulation improvements. Sound insulation improvements will be provided for all severe impacts remaining after sound walls are constructed, without regard for the income of the occupants.

The results of the noise impact assessment indicate that a noise reduction of ~~5~~ up to 6 dBA ~~would be~~ is required to eliminate all severe noise impacts for the BRT Alternative. It should be noted that there ~~would~~ will be substantially fewer bus movements expected in the early years of the project and therefore the impacts are overstated for those years. While this amount of vehicle noise reduction is likely to be possible in the future, it cannot be assumed at this time that mitigation option N&V-1 would be sufficient to eliminate all severe noise impacts. However, this amount of noise reduction could reasonably be achieved by mitigation option N&V-2, with the construction of sound barriers at the locations specified in Table 4-51.

To completely eliminate noise impact at all locations for the BRT Alternative, a noise reduction of ~~11~~ 12 dBA ~~would be~~ is necessary. Because no single mitigation measure alone is likely to achieve this goal, a combination of the above options ~~would~~ will be required. It is expected that nearly all noise impact ~~could~~ can be eliminated with a combination of mitigation options N&V-1 and N&V-2, assuming that (1) noise limits are included in the vehicle specification requiring the new buses to be 3 dBA quieter than the current MTA Metro Rapid CNG buses and (2) sound barriers are constructed at the locations specified in Table 4-52. At the few locations where it may not be feasible to eliminate impacts using sound barriers, such as near intersections or along the on-street alignment segment, mitigation option N&V-3 (building sound insulation) ~~could~~ will be applied.

Table 4-51: Summary of Mitigation Required to Eliminate Severe Impacts for the BRT Alternative

Location	Sound Barrier Wall Description			Number Protected
	Side	Civil Stations	Length(ft)	
Full BRT				
Victory Blvd at Drake Pl	N	55+00 to 62+00	700	3 SF
Victory Blvd west of Winnetka Ave	N	97+00 to 102+00	500	7 SF
West of Victory Blvd crossing	N	112+00 to 116+00	400	6 SF
Topham St, Victory Blvd to Corbin Ave	N	118+00 to 133+00	1500	18 SF
Topham St, east of Corbin Ave	N	135+00 to 140+00	500	5 SF
Topham St, Melvin Ave to Shirley Ave	N	142+00 to 151+00	900	13 SF
Topham/Oxnard St, east of Tampa Ave	N	169+00 to 184+00	1500	21 SF
Topham St, Zelzah Ave to White Oak Ave	N	255+00 to 268+00	1300	34 SF
Topham St, White Oak Ave to Encino Ave	N	269+50 to 277+50	800	12 SF
Bessemer St, east of Hazeltine Ave	N	529+00 to 534+00	500	6 SF
Bessemer St, at Ranchito Ave	N	537+00 to 540+00	300	1 MF,1 SF
Diagonal, Buffalo Ave to Sunnyslope Ave	S	557+00 to 570+00	1300	2 MF,8 SF
Diagonal, Fulton Ave to Ethel Ave	S	596+00 to 607+00	1100	9 SF
Diagonal, Albers St to Ethel Ave	N	601+00 to 605+00	400	3 SF
Diagonal, Ethel Ave to Chandler Blvd	N	608+00 to 612+00	400	3 SF
		Total	12100	3 MF,149 SF
BRT with On-Street Alignment				
Victory Blvd at Drake Pl	N	55+00 to 62+00	700	3 SF
Victory Blvd west of Winnetka Ave	N	97+00 to 102+00	500	7 SF
West of Victory Blvd crossing	N	112+00 to 116+00	400	6 SF
Topham St, Victory Blvd to Corbin Ave	N	118+00 to 133+00	1500	18 SF
Topham St, east of Corbin Ave	N	135+00 to 140+00	500	5 SF
Topham St, Melvin Ave to Shirley Ave	N	142+00 to 151+00	900	13 SF
Topham/Oxnard St, east of Tampa Ave	N	169+00 to 184+00	1500	21 SF
Topham St, Zelzah Ave to White Oak Ave	N	255+00 to 268+00	1300	34 SF
Topham St, White Oak Ave to Encino Ave	N	269+50 to 277+50	800	12 SF
Bessemer St, east of Hazeltine Ave	N	529+00 to 534+00	500	6 SF
Bessemer St, at Ranchito Ave	N	537+00 to 540+00	300	1 MF,1 SF
		Total	8900	1 MF,126 SF
Minimum Operable Segment (MOS)				
Bessemer St, at Costello Ave	N	529+00 to 532+00	300	1 MF,2 SF
Bessemer St, at Ranchito Ave	N	537+00 to 540+00	300	1 MF,1 SF
		Total	600	2 MF,3 SF

Notes:
1. Mitigation includes 12-ft high sound barriers at $20/sq. ft at the locations indicated.
2. SF = single-family residence, MF = multi-family residential building.

Source: HMMH, 2000; 2001.

Table 4-52: Summary of Mitigation for Noise Impacts of the BRT Alternative

Location	Sound Barrier Wall Description			Number Protected
	Side	Civil Stations	Length(ft)	
Full BRT				
Victory Blvd. at Drake Pl.	N	~~54+50 to 67+50~~ 52+50 to 75+00	~~1300~~ 2250	~~9 SF~~ 19 SF
~~Victory Blvd at Oso St~~	~~N~~	~~86+00 to 91+00~~	~~500~~	~~6 SF~~
Victory Blvd. west of Winnetka Ave.	N	~~97+00 to 102+00~~ 79+00 to 104+00	~~500~~ 2500	~~7 SF~~ 29 SF
Winnetka Ave. to Victory Blvd.	N	~~106+00 to 116+00~~ 106+00 to 115+00	~~1000~~ 900	~~17 SF~~ 14 SF
Topham St., Victory Blvd. to Corbin Ave.	N	118+00 to 133+00	1500	~~18 SF~~ 24 SF
Topham St., Corbin Ave. to Tampa Ave.	N	~~135+00 to 158+00~~ 135+00 to 159+50	~~2300~~ 2450	~~29 SF~~ 37 SF
Topham/Oxnard St., Tampa Ave. to Wilbur Ave.	N	~~169+00 to 189+00~~ 163+50 to 188+00	~~2000~~ 2450	~~28 SF~~ 46 SF
Topham St., Reseda Blvd. to Lindley Ave.	N	~~223+50 to 241+50~~ 219+00 to 241+00	~~1800~~ 2200	~~20 SF~~ 26 SF
Topham St., Lindley Ave. to White Oak Ave.	N	~~243+00 to 268+00~~ 243+00 to 267+50	~~2500~~ 2450	~~32 SF~~ 37 SF
Topham St., White Oak Ave. to Encino Ave.	N	269+50 to 277+50	800	12 SF
Victory Blvd. west of Balboa Blvd.	S	321+00 to 329+00	800[4]	--
Blucher Ave., Haskell Ave. Access Road	N	414+00 to 425+00	1100	19 SF
Erwin Street, Sepulveda Park and Ride	N	425+00	1070[3]	--
Bessemer St., Hazeltine Ave. to Woodman Ave.	N	~~525+00 to 549+00~~ 524+50 to 549+50	~~2400~~ 2500	~~28 SF~~ 46 SF
Diagonal, Buffalo Ave. to Fulton Ave.	N	559+00 to 583+00	2400	~~26 SF~~ 41 SF
~~Diagonal, Buffalo Ave to Sunnyslope Ave~~	~~S~~	~~557+00 to 570+00~~	~~1300~~	~~3 MF,12 SF~~
~~Diagonal, Sunnyslope Ave to Collins St~~	~~S~~	~~571+50 to 580+50~~	~~900~~	~~4 SF~~
Diagonal, Buffalo Ave. to Collins St.	S	557+00 to 580+50	2350	45 SF, 4 MF
Diagonal, Fulton Ave. to Ethel Ave.	S	~~596+00 to 608+00~~ 595+00 to 607+50	~~1200~~ 1250	~~13 SF~~ 26 SF
~~Diagonal, Albers St to Ethel Ave~~	~~N~~	~~601+00 to 606+00~~	~~500~~	~~4 SF~~
~~Diagonal, Ethel Ave to Chandler Blvd~~	~~N~~	~~608+00 to 613+00~~	~~500~~	~~6 SF~~
Diagonal, Chabad Temple at Ethel Ave.	S	608+00 to 610+00	200	--
Diagonal, Albers St. to Chandler Blvd.	N	600+50 to 606+50	600	15 SF
Diagonal, Albers St. to Chandler Blvd.	N	607+50 to 612+50	500	5 SF
		Total	~~23400~~ 29470	~~3 MF,271 SF~~ 441 SF, 4 MF
BRT with On-Street Alignment				
Victory Blvd. at Drake Pl.	N	~~54+50 to 67+50~~ 52+50 to 75+00	~~1300~~ 2250	~~9 SF~~ 19 SF
~~Victory Blvd at Oso St~~	~~N~~	~~86+00 to 91+00~~	~~500~~	~~6 SF~~
Victory Blvd. west of Winnetka Ave.	N	~~97+00 to 102+00~~ 79+00 to 104+00	~~500~~ 2500	~~7 SF~~ 29 SF
Winnetka Ave. to Victory Blvd.	N	~~106+00 to 116+00~~ 106+00 to 115+00	~~1000~~ 900	~~17 SF~~ 14 SF

Table 4-52: Summary of Mitigation for Noise Impacts of the BRT Alternative

Location	Sound Barrier Wall Description			Number Protected
	Side	Civil Stations	Length(ft)	
Topham St., Victory Blvd. to Corbin Ave.	N	118+00 to 133+00	1500	~~18 SF~~ 24 SF
Topham St., Corbin Ave. to Tampa Ave.	N	~~135+00 to 158+00~~ 135+00 to 159+50	~~2300~~ 2450	~~29 SF~~ 37 SF
Topham/Oxnard St., Tampa Ave. to Wilbur Ave.	N	~~169+00 to 189+00~~ 163+50 to 188+00	~~2000~~ 2450	~~28 SF~~ 46 SF
Topham St., Reseda Blvd. to Lindley Ave.	N	~~223+50 to 241+50~~ 219+00 to 241+00	~~1800~~ 2200	~~20 SF~~ 26 SF
Topham St., Lindley Ave. to White Oak Ave.	N	~~243+00 to 268+00~~ 243+00 to 267+50	~~2500~~ 2450	~~32 SF~~ 37 SF
BRT with On-Street Alignment				
Topham St., White Oak Ave. to Encino Ave.	N	269+50 to 277+50	800	12 SF
Blucher Ave., Haskell Ave. Access Road	N	414+00 to 425+00	1100	19 SF
Erwin Street, Sepulveda Park and Ride	N	425+00	1070[3]	--
Bessemer St., Hazeltine Ave. to Woodman Ave.	N	~~525+00 to 549+00~~ 524+50 to 549+50	~~2400~~ 2500	~~28 SF~~ 46 SF
		Total	~~16600~~ 22170	~~206 SF~~ 309 SF
Minimum Operable Segment (MOS)				
Blucher Ave., Haskell Ave. Access Road	N	414+00 to 425+00	1100	19 SF
Erwin Street, Sepulveda Park and Ride	N	425+00	1070[3]	--
Bessemer St, Hazeltine Ave to Woodman Ave	N	~~525+00 to 549+00~~ 524+50 to 549+50	~~2400~~ 2500	~~23 SF~~ 44 SF
		Total	~~2400~~ 4670	~~23 SF~~ 63 SF

Notes:
(1) Mitigation includes 12-foot-high sound barriers at $20/sq. ft at the locations indicated.
(2) SF = single-family residence, MF = multi-family residential building.
(3) Proposed height for Erwin Street barrier is 8 feet.
(4) Mitigation provided for military classroom use.

Source: HMMH, 2000; 2001.

Noise mitigation measures for each of the alignment variations of the BRT Alternative are discussed below. The locations of required soundwalls are shown on Figure 4-50.

a. Full BRT

The results of the mitigation analysis indicate that to ~~eliminate all severe impacts for the Full BRT Alternative, a total of 12,100 lineal feet (2.3 miles) of 12-ft high sound wall would be required. To~~ eliminate essentially all noise impacts, a 3-dBA reduction in vehicle noise together with the construction of ~~23,400~~ 28,400 lineal feet (~~4.4 miles~~ 5.4 miles) of 12-foot-high sound wall would be required. In addition, 1,070 lineal feet (0.02 mile) of 8-foot-high soundwall is proposed for construction along the north side of the Sepulveda Boulevard park-and-ride lot, adjacent to Erwin Street. If it is determined that additional vehicle noise control is feasible, the amount of required sound wall could be reduced. Without noise control on BRT buses, an estimated ~~25~~ 65 receptors ~~would~~ may experience residual impacts. With sound insulation, no receptors would experience residual impacts.

Figure 4-50(a): Locations of Soundwalls Required for Noise Impacts (Full BRT)

Sources: HMMH, 2001; Myra L. Frank & Associates, Inc., 2001.

Figure 4-50(b): Locations of Soundwalls Required for Noise Impacts (BRT with Lankershim / Oxnard On-Street Alignment)

Sources: HMMH, 2001; Myra L. Frank & Associates, Inc., 2001.

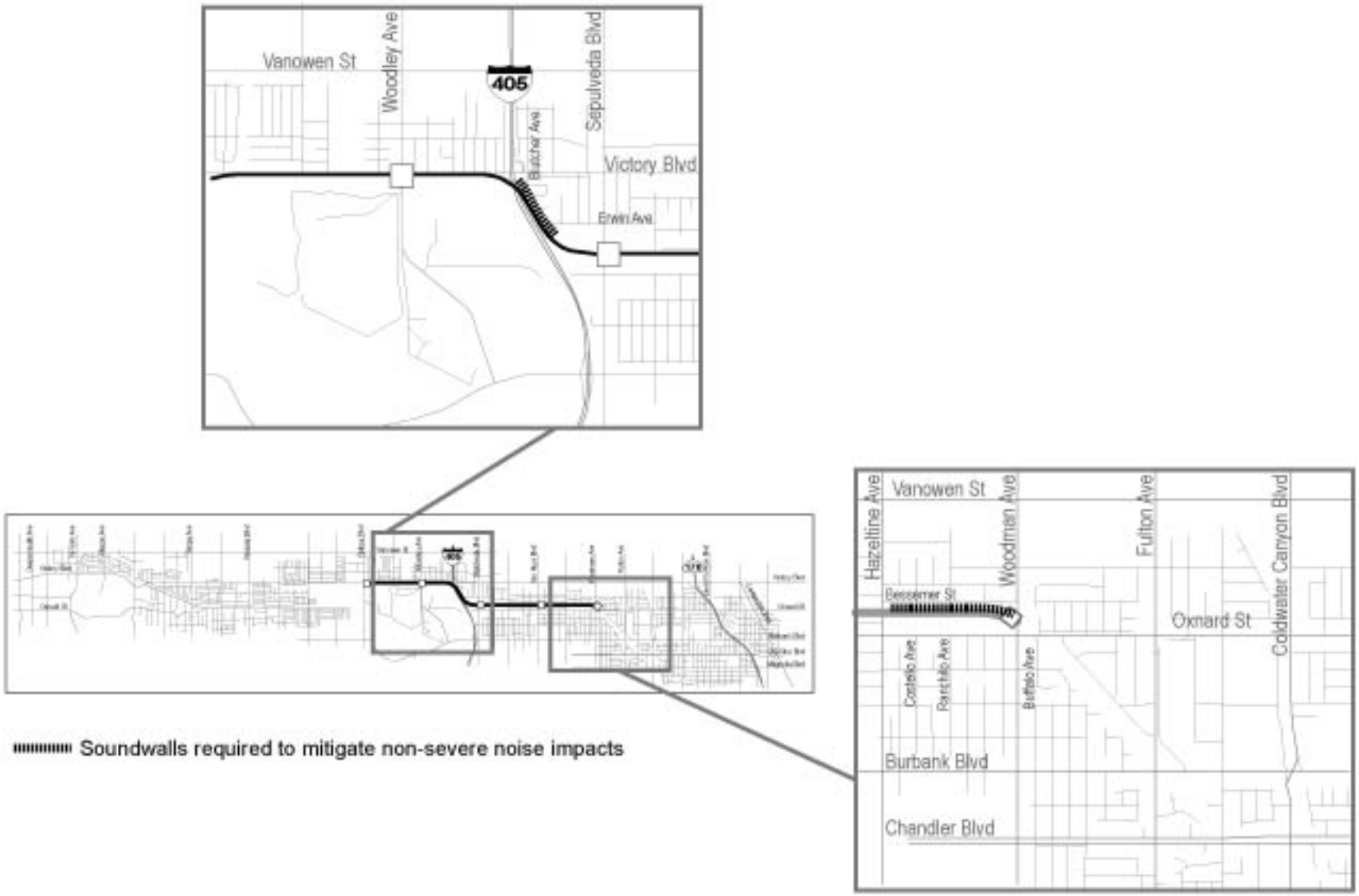


Figure 4-50(c): Locations of Soundwalls Required for Noise Impacts (MOS)

Sources: HMMH, 2001; Myra L. Frank & Associates, Inc., 2001.

b. BRT with Lankershim/Oxnard On-Street Alignment

The results of the mitigation analysis indicate that to ~~eliminate all severe impacts for this variation of the BRT Alternative, a total of 8,900 lineal feet (1.7 miles) of 12-ft high sound wall would be required. To~~ eliminate essentially all noise impacts for this variation of the BRT Alternative, a 3-dBA reduction in vehicle noise together with the construction of ~~16,600~~ 21,100 lineal feet (~~3.1 miles~~ 4.0 miles) of 12-foot-high sound wall would be required. In addition, 1,070 lineal feet of 8-foot-high soundwall is proposed for construction along the north side of the Sepulveda Boulevard park-and-ride lot, adjacent to Erwin Street. ~~Because sound walls are not practical for reducing noise from on-street bus operations, sound insulation of 3 multi-family buildings along the On-Street Alignment segment would also be needed to fully eliminate noise impact.~~ Without noise control on BRT buses, an estimated ~~151~~ 155 receptors would experience residual moderate impacts. No mitigation would be necessary for weekend service on the Lankershim/Oxnard On-Street Alignment as no noise impacts are projected.

c. Minimum Operable Segment (MOS)

The results of the mitigation analysis indicate that to eliminate ~~all severe impacts along the MOS, a total of 600 lineal feet (0.1 mile) of 12-ft high sound wall would be required. To eliminate~~ essentially all noise impacts along the MOS, a 3-dBA reduction in vehicle noise together with the construction of ~~2,400~~ 3,600 feet (~~0.5~~ 0.7 mile) of 12-foot-high sound wall would be required. In addition, 1,070 lineal feet of 8-foot-high soundwall is proposed for construction along the north side of the Sepulveda Boulevard park-and-ride lot, adjacent to Erwin Street. Without noise control on BRT buses, an estimated ~~four~~ three receptors would experience residual moderate impacts.

4-9.5 Vibration

4-9.5.1 Vibration Impacts

The project is limited to rubber-tire bus operations. Rubber-tire vehicles rarely create ground-borne vibration problems unless they are operating extremely close to vibration-sensitive buildings and there is a discontinuity, pothole, or bump in the roadway. Because BRT buses would operate on smooth road surfaces, no adverse vibration impact under NEPA (significant vibration impact under CEQA) is anticipated, with the following exception. A sound studio is under consideration within an existing building adjacent to and south of the MTA ROW. A sound studio requires low ambient sound and vibration for its operations. The building is also located adjacent to Tujunga Avenue and Chandler Boulevard (south), so ambient conditions include impacts from traffic on these thoroughfares. A study of bus bypasses on the existing, unimproved MTA ROW was conducted. The study concluded there would be no sound impacts to the building above FTA criteria, but identified a potentially adverse impact under NEPA (potentially significant impact under CEQA) to the future sound studio, according to FTA vibration criteria. The study, however, was based on the existing condition of the MTA ROW adjacent to the building, which is an uneven, unpaved, gravel surface. Accordingly, vibration measurements from this condition do not represent the vibration levels that would be expected from operating buses on an improved roadway surface. Vibration levels from the improved BRT are not expected to exceed those from current ambient conditions at the property or the FTA

criteria. However, mitigation measures are included in case the criteria are exceeded. ~~This applies equally to the TSM and BRT Alternatives.~~

4-9.5.2 Vibration Mitigation

N&V-4: Vibration Reduction Measures. If an adverse significant impact materializes after construction of the sound studio and the BRT, MTA will employ appropriate mitigation measures to reduce the resultant impact to a level of insignificance. Among the measures that may be employed are a vibration reduction trench and a reduction in bus speed.

4-10 GEOTECHNICAL CONSIDERATIONS

4-10.1 Setting

4-10.1.1 Topography

The project corridor is in the southern portion of the San Fernando Valley, a broad, flat, elliptically shaped alluvial valley between mountain ranges of the Transverse Ranges geomorphic province. The bounding mountain ranges include the Santa Monica Mountains on the south, the Santa Susana and San Gabriel Mountains on the north, the Simi Hills on the west, and the Verdugo Mountains on the east. A topographic map of the San Fernando Valley is shown in Figure 4-51. The San Fernando Valley slopes gently to the east with an average gradient of less than 1 percent. Existing ground surface elevations along the project corridor range from about 840 feet above mean sea level at the western terminus to about 630 feet above mean sea level at the eastern terminus.

4-10.1.2 Geologic Setting

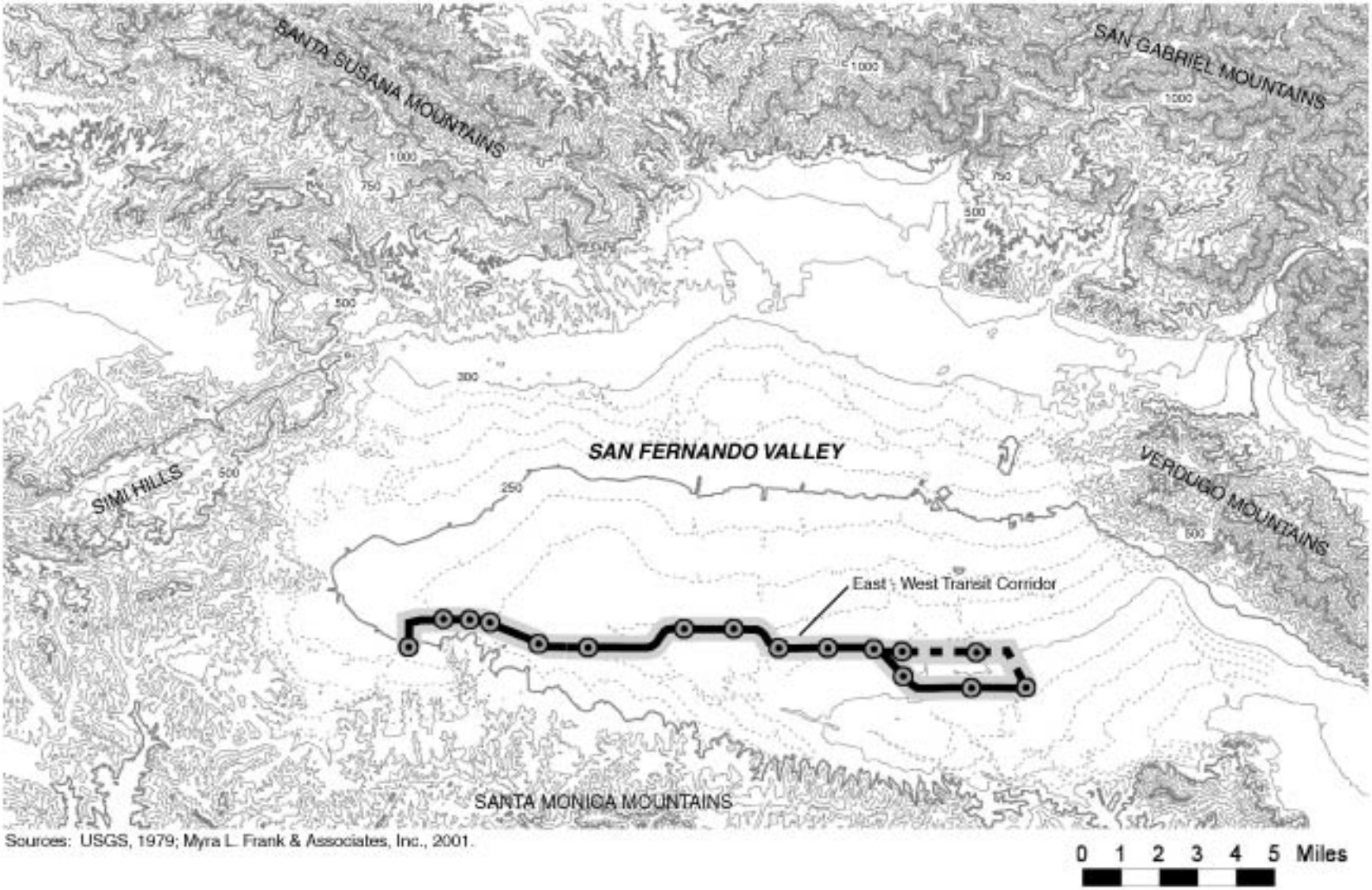
The San Fernando Valley lies within the Transverse Ranges geomorphic province, a region of east-west trending mountain ranges that formed as a result of compressive stress at a restraining bend in the San Andreas Fault. These mountain ranges continue to rise through folding and faulting of rocks being compressed between the North American and Pacific tectonic plates. As the mountains rise, landslides and erosion break down the rocks and transport the resulting sediment, or alluvium, to the San Fernando Valley. Over time, hundreds of meters of alluvium have been deposited in the Valley. The continuing processes of folding and faulting result in frequent earthquakes in the region.

Bedrock exposed in the mountain ranges is composed of Precambrian (greater than 570 million years old) to Tertiary (66 to 1.6 million years old) crystalline basement rocks and Tertiary and Quaternary (1.6 million to 11,000 years old) sedimentary and volcanic rocks. The wide range in composition of bordering bedrock materials results in a similarly wide range in composition and grain size of the alluvial sediments in the San Fernando Valley. A geologic map of the San Fernando Valley is shown in Figure 4-52.

The project area is not within a known oil producing area (FTA/MTA, 1997).

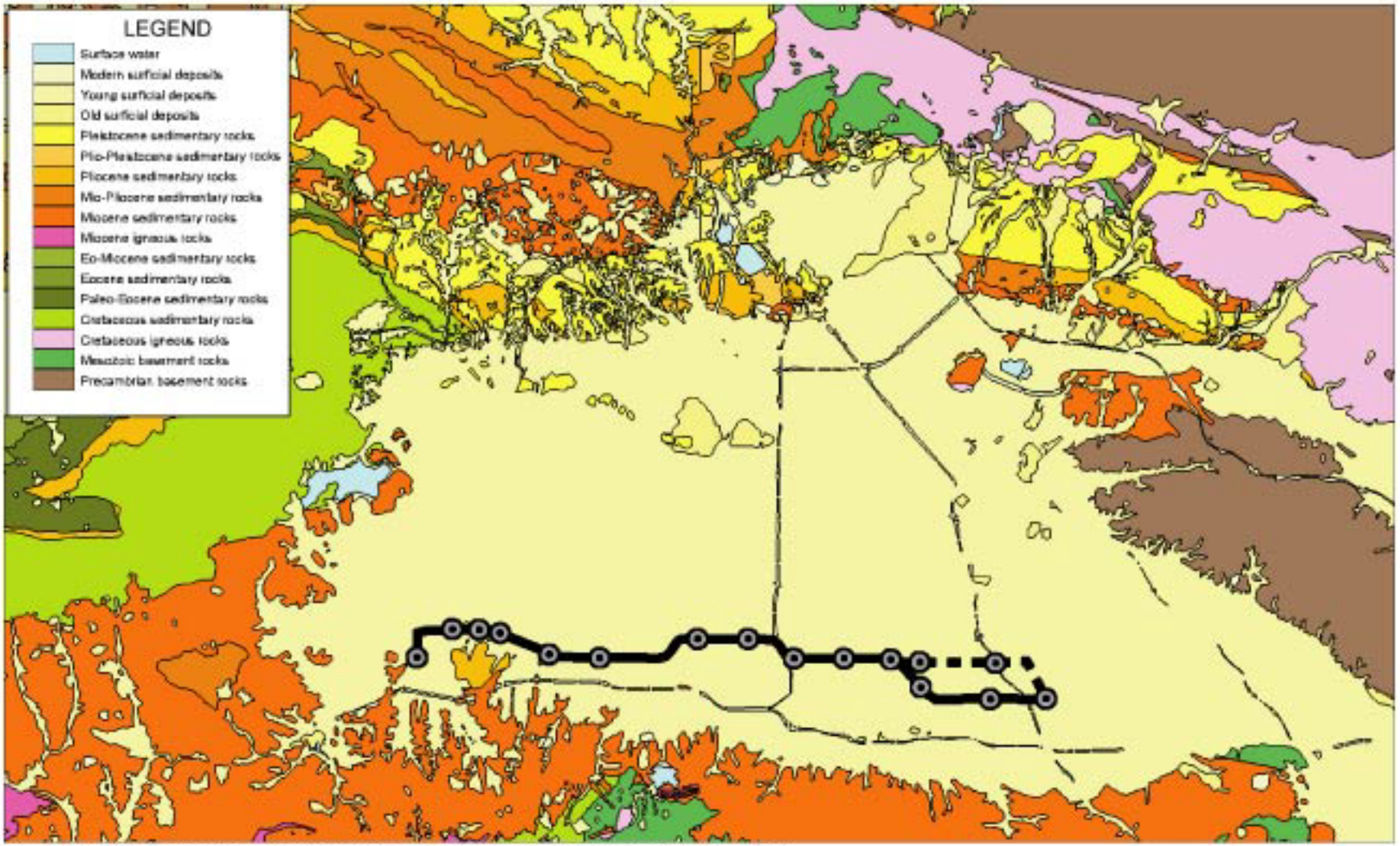
4-10.1.3 Soils

Limited geotechnical investigations have been performed in the past to examine surface and subsurface soil conditions along the project corridor (ETC, 1993). The proposed alignments are predominantly underlain by very thick (200 to 600 feet) sandy and clay loams on alluvial fan deposits of Holocene age (less than 11,000 years old). Representative boring logs along the



Sources: USGS, 1979; Myra L. Frank & Associates, Inc., 2001.

Figure 4-51: Topographic Map of the San Fernando Valley



Sources: Yerkes, 1997; Yerkes and Campbell, 1995, 1997, 1999; Myra L. Frank & Associates, Inc., 2001.

Figure 4-52: Geologic Map of the San Fernando Valley

alignment are shown on Figure 4-53. Alluvial compositions along the project corridor generally trend from fine-grained, cohesive materials in the western portion of the alignment to extremely coarse-grained, granular materials in the eastern portion of the alignment (ETC, 1993). Some of the soils are poorly compacted and thus unsuitable for foundation support. The characteristics of these alluvial deposits (grain size, sorting, composition, etc.) are highly laterally and vertically non-uniform. As a result, site-specific design accommodations to soil characteristics will be necessary, especially where bridges will be constructed.

4-10.1.4 Seismicity

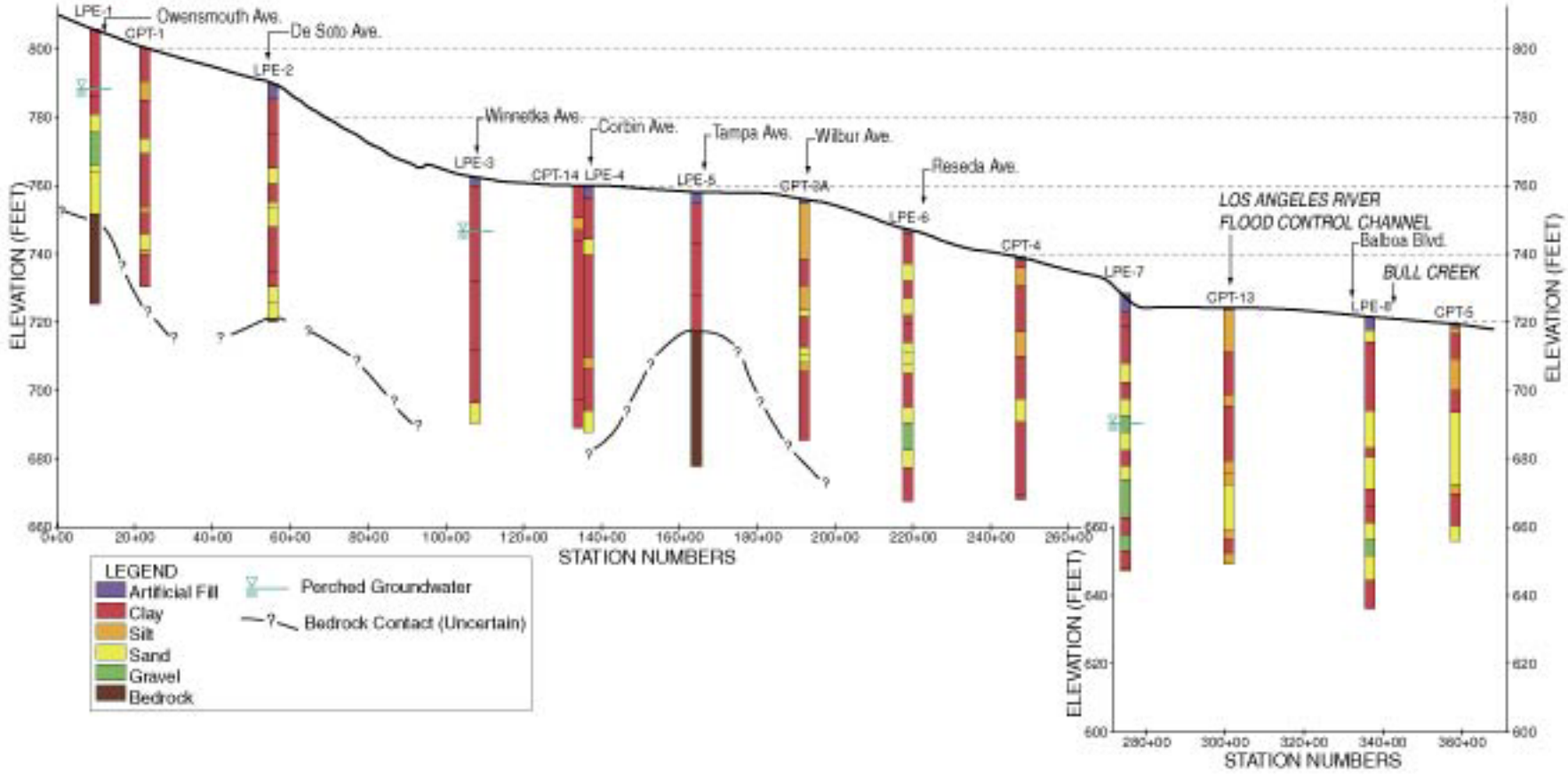
a. History

Southern California is a seismically active area, and the San Fernando Valley is no exception; the epicenter of the Northridge earthquake of 1994 lay only 2.5 miles north of the project corridor along Reseda Boulevard. Earthquakes occur when the build-up of tectonic stresses causes two blocks of rock to slide past each other along a fault plane. Therefore, nearby faults represent potential locations of future earthquakes.

After the highly destructive San Fernando earthquake of 1971 (located 16 miles north of the project corridor), on which up to 2 meters of surface displacement occurred, California passed the Alquist-Priolo Earthquake Fault Zoning Act of 1972 to prevent the location of structures designed for human occupancy across the traces of active faults. To implement the Act, the California Department of Conservation Division of Mines and Geology (DMG) mapped known faults and fault zones and classified their level of activity: "active" faults had surface displacement within Holocene time (in the last 11,000 years); "potentially active" faults had surface displacement within Quaternary time (within the last 1.6 million years). After 1977, however, the term "potentially active" was dropped by the DMG because the extreme number of Quaternary faults in California made the term meaningless for zoning purposes. Since then the description "sufficiently active and well defined" has been used to identify and map those faults that have experienced displacement in the past 11,000 years and that have clearly detectable traces on the surface (DMG, 1999).

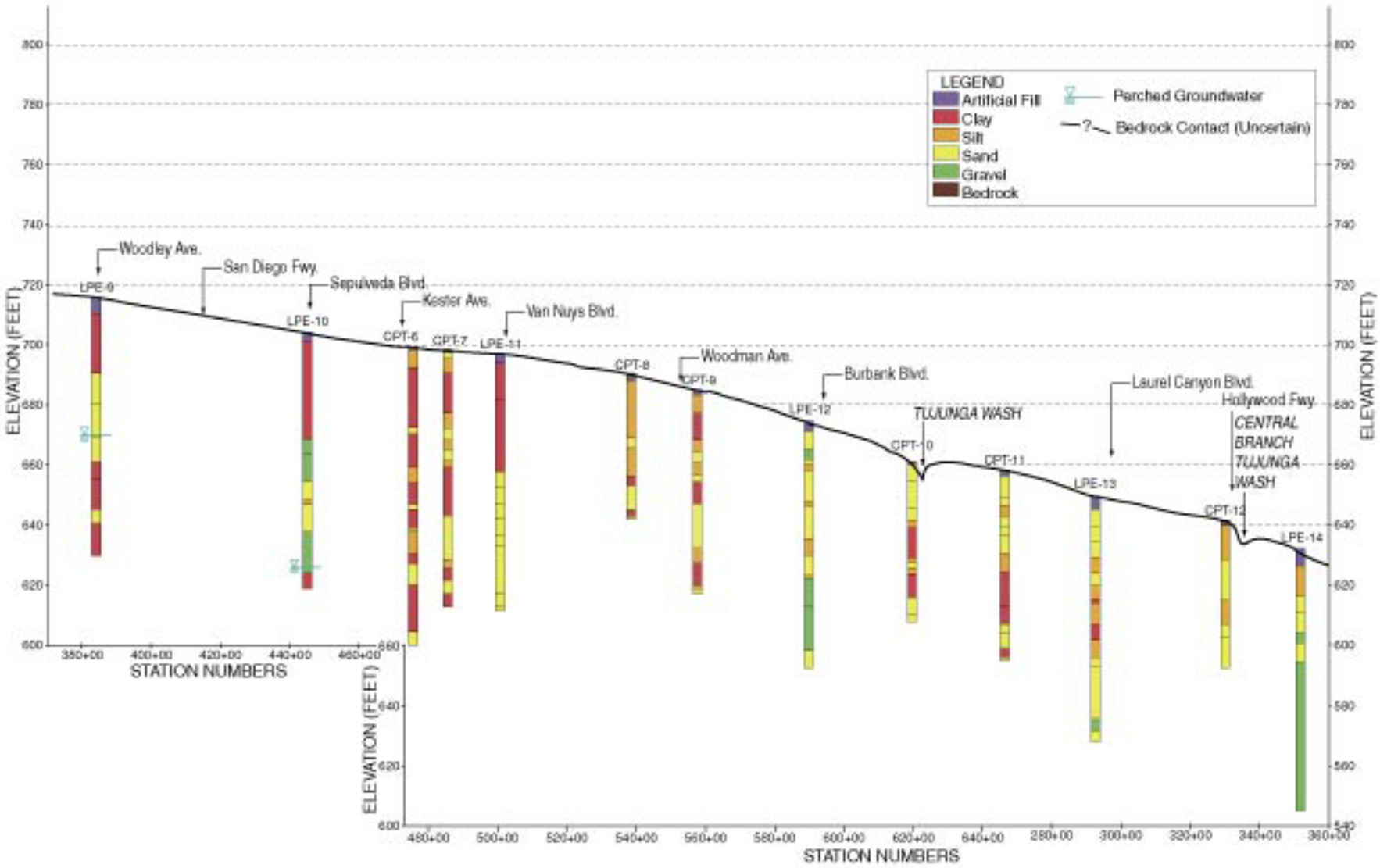
In 1977, the Federal government passed the Earthquake Hazards Reduction Act (Public Law 95-24) to establish engineering codes and to characterize seismic hazards in order to mitigate the effects of major earthquakes in urban areas. As a result of this Act, a massive study of seismicity in the Los Angeles region was published in 1985 that redefined the characterizations of faults. *Active* faults are now defined as those that are "considered likely to undergo renewed movement within a period of concern to humans" (Ziony and Yerkes, 1985). The relative activity of a fault is related to the rate of slip along the fault during recent geologic history (within the last 10,000 years). Slip rates range from 0.01 millimeters per year on moderately active faults to 100 millimeters per year on very highly active faults.

Figure 4-54 shows the locations of active faults and historic earthquake epicenters near the East-West Transit Corridor.



Source: ETC, 1993.

Figure 4-53(a): Subsurface Profile Along the East-West Transit Corridor (West Half)



Source: ETC, 1993.

Figure 4-53(b): Subsurface Profile Along the East-West Transit Corridor (East Half)

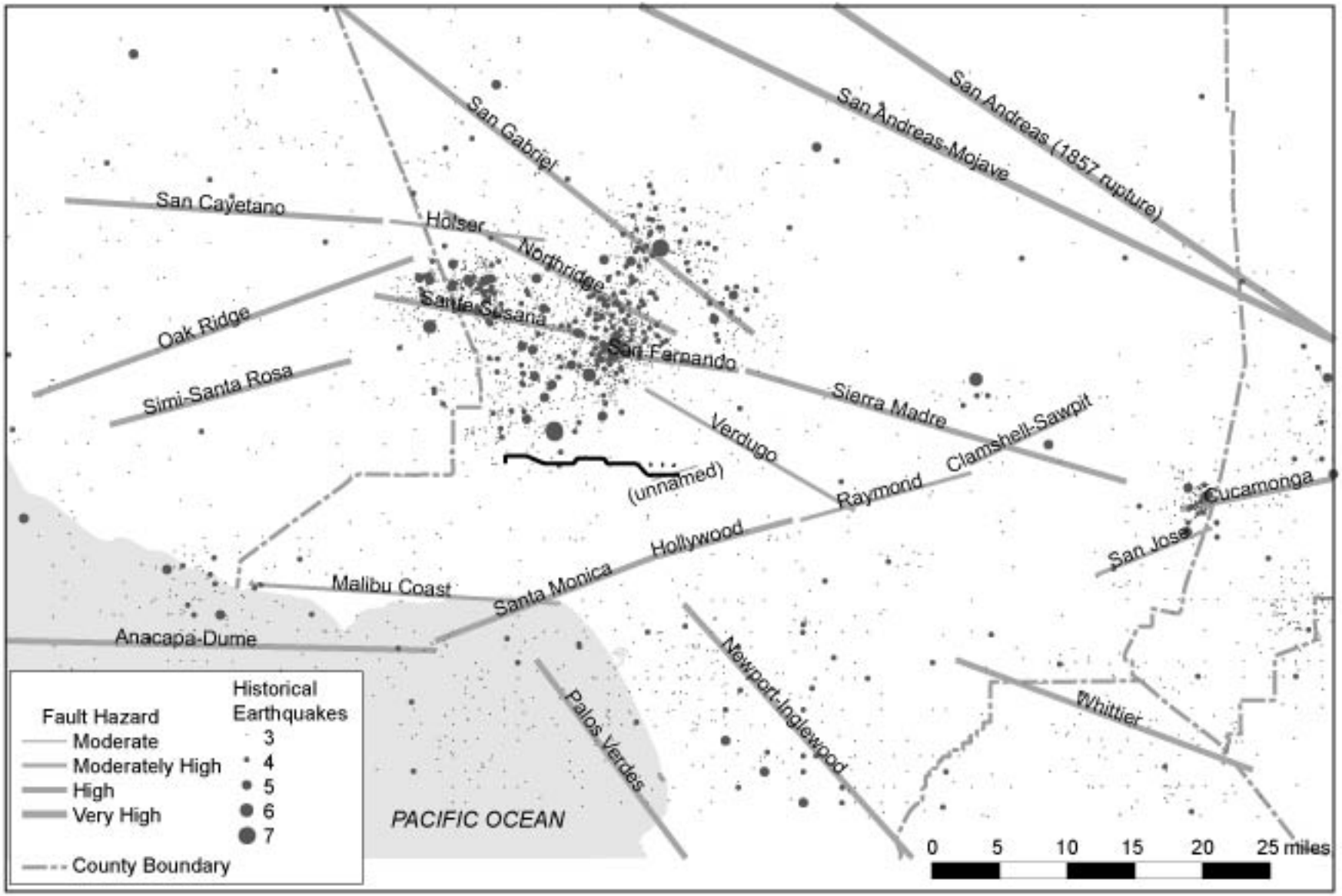


Figure 4-54: Faults and Historic Earhquakes in the Region Surrounding the San Fernando Valley

Sources: Petersen et al., 1996; Myra L. Frank & Associates, Inc., 2001.

Table 4-53 lists the active faults mapped in Figure 4-54, their estimated slip rates, the magnitude of the maximum credible earthquake for each fault, and the recurrence interval for the maximum credible earthquake.

b. Surface Rupture Hazard

There are no Alquist-Priolo Earthquake Fault Zones that cross the project corridor; the nearest such zone is within the Mission ~~Wells~~ Hills segment of the San Fernando Fault Zone, located approximately 7 miles north of the corridor. However, an unnamed fault trending parallel to and 250 meters south of the corridor was mapped by Weber et al. (1980), and a hypothetical extension to this fault extends across the ROW between the Laurel Canyon and North Hollywood stations (see Figure 4-52). ~~As mapped, this fault does not present a surface rupture hazard to any proposed station. However, this fault warrants further geotechnical investigation, including seismic reflection surveys, in order to more accurately determine its location and rule out the potential of surface rupture hazard.~~ Several researchers have designated this fault as active based on displacement of Holocene Age alluvial deposits at depth (Jennings 1994; Weber 1990). If there is surface rupture along the mapped trace of the fault, it would affect critical structures such as bridges. Since no structures are planned in this area of the alignment, the potential for ground rupture should not have an adverse effect on the project.

c. Ground Shaking and Liquefaction Hazard

While surface rupture is unlikely along the project corridor, substantial ground shaking producing peak accelerations ~~equivalent to half the force of gravity~~ between 0.4 and 0.6g (units of gravity)could occur as a result of earthquakes on nearby faults; design of above ground structures, particularly bridges, will need to accommodate the maximum design earthquake. Figure 4-55 presents maximum credible ground shaking expected for earthquakes on the faults mapped on Figure 4-54.

Ground shaking in areas underlain by unconsolidated alluvium may cause soil liquefaction. Since unconsolidated alluvium fills the San Fernando Valley, the entire right-of-way lies within an "area that may contain liquefiable materials" (Real et al., 1996). Soil liquefaction is most likely where the water table lies close to (within 10 feet of) the surface. The local water table has historically lain less than 10 feet from the surface in two segments of the right-of-way: from Warner Center to Reseda and along the Chandler alternative from south of Oxnard St. to U.S. 170 (Tinsley et al. 1985) (See Figure 4-55). The recent geotechnical survey of the alignment failed to find groundwater within 10 feet of the surface in any of ~~6~~ 7 boreholes measured; the lowest depth to groundwater measured was ~~14.9~~ 14.0 feet ~~at the west end of the alignment near the intersection of Owensmouth Avenue and Victory Boulevard (ETC, 1993)~~ between Tampa and Corbin Avenues. ~~However, t~~These measurements were taken in ~~September and October~~ May, ~~at~~ near the end of the ~~dry~~ rainy season. During the wet season (October 15 to April 15), percolation of rainfall into the ground could create local "perched" groundwater that lies within 10 feet of the surface, thus increasing the risk of soil liquefaction. Inundation of the Sepulveda Flood Control Basin could also saturate the soil and increase the soil liquefaction hazard along the project corridor from Encino Avenue to Interstate 405.

Table 4-53: Active Faults in the vicinity of the San Fernando Valley East-West Transit Corridor

Fault Name	Esti-mated Slip Rate (mm/yr)	Moment Magnitude of Maximum Credible Earthquake[1]	Recurrence Interval (years)[2]	Age of Most Recent Displacement[3]	Approximate Distance from Corridor (miles)		
					West End	Center	East End
Very Highly Active							
San Andreas Fault	24 ± 6	7.4	220	Historic (1857)	32	33	36
Highly Active							
San Cayetano	6 ±3	6.8	150	Holocene	20	23	29
Santa Susana	5 ±2	6.6	820	Historic (1971)	8	9	13
Cucamonga	5 ±2	7.0	650	Holocene	51	45	38
Oakridge	4 ±2	6.9	300	Late Quaternary	16	19	25
Palos Verdes Hills	3 ±1	7.1	650	Holocene	15	17	18
Anacapa	3 ±2	7.3	530	Late Quaternary	14	17	22
Whittier	2.5 ±1	6.8	640	Holocene	36	31	25
Sierra Madre	2 ±1	7.0	1000	Holocene	18	13	8
San Fernando	2 ±1	6.7	1000	Historic (1971)	9	8	8
Red Mountain	2 ±1	6.8	510	Late Quaternary	42	44	53
Newport-Inglewood	1.5 ±0.5	6.9	650	Holocene	16	12	9
Northridge Hills	1.5 ±1	6.9	820	Historic (1994)	6	4	7
Moderately Highly Active							
San Gabriel	1 ±0.5	7.0	1300	Holocene	19	15	12
Hollywood	1 ±0.5	6.4	630	Holocene	12	8	4
San Gabriel	1 ±0.5	7.0	1300	Holocene	16	13	12
Santa Monica	1 ±0.5	6.6	820	Holocene	13	8	7
Simi	1 ±0.5	6.7	930	Late Quaternary	10	14	20
Raymond	0.5 ±0.3	6.5	1500	Historic (1988)	15	18	12
Clamshell-Sawpit	0.5 ±0.5	6.5	1500	Late Quaternary	35	29	22
Verdugo	0.5 ±0.5	6.7	1600	Holocene	11	6	4
San Jose	0.5 ±0.5	6.5	1500	Late Quaternary	45	39	32
Holser	0.4 ±0.4	6.5	1900	Late Quaternary	17	16	20
Malibu Coast	0.3 ±0.2	6.7	2900	Holocene	10	10	13
Moderately Active							
Unnamed fault	0.1 ±0.1	5.7	?	Holocene	12	7	0

Notes:
(1) Moment magnitude is substantially similar to Richter magnitude and describes the size of a potential earthquake. The Maximum Credible Earthquake is the largest earthquake that appears to be reasonably capable of occurring under the presently understood geologic conditions (Mualchin and Jones, 1992).
(2) The recurrence interval is the predicted average period of time between earthquakes of the maximum credible magnitude.
(3) The Holocene period was from approximately 11,000 years ago to historic time. The Late Quaternary period includes the Holocene and the time approximately 1 million years before the Holocene.

Sources: ETC, 1993; Petersen et al., 1996; Yerkes, 1985.

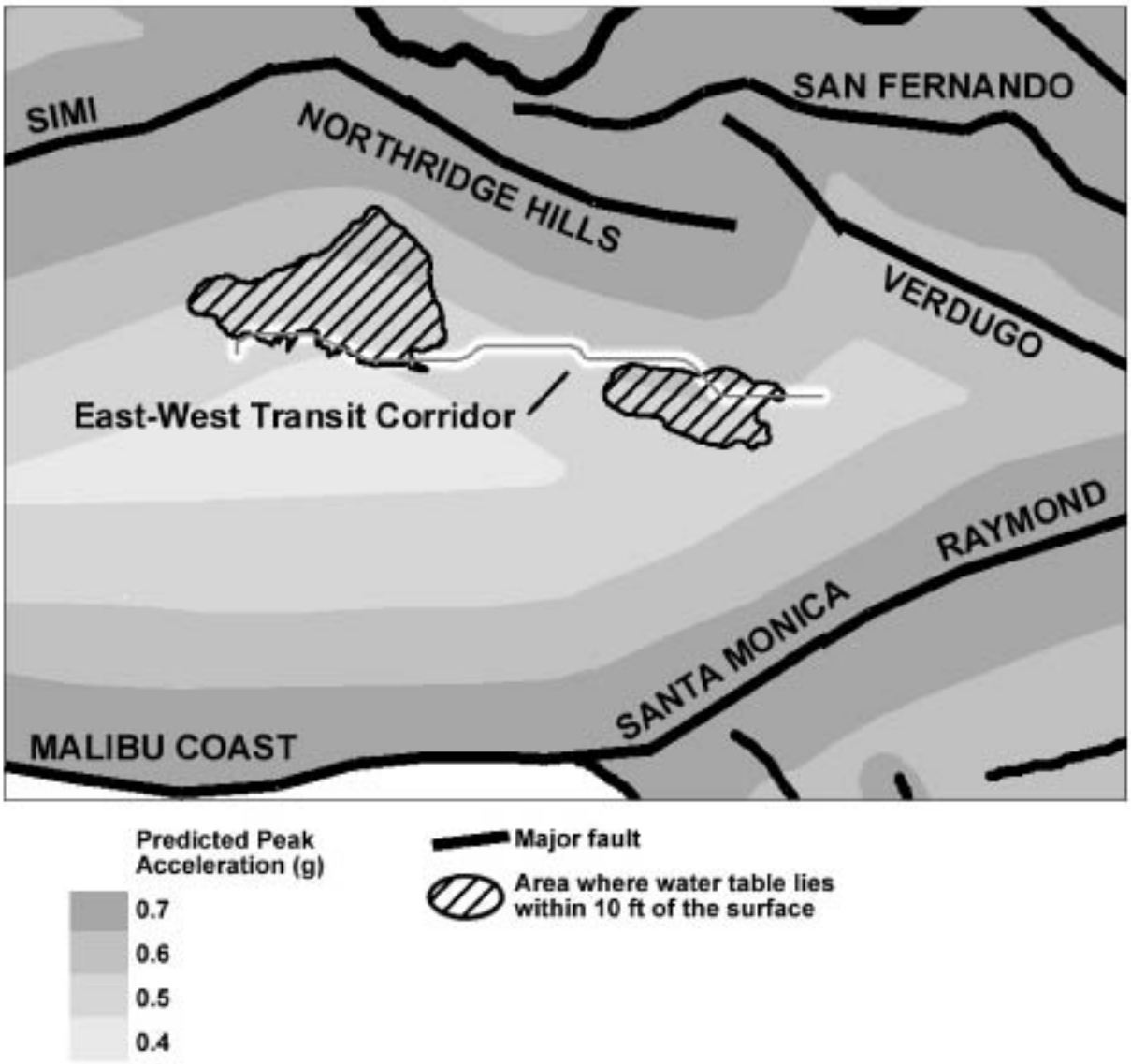


Figure 4-55: Maximum Peak Acceleration for Earthquakes on Faults Near the San Fernando Valley

d. Hazardous Materials

There is potential for encountering hazardous waste in the soil along the project corridor due to the known presence of contaminated properties and hazardous or potentially hazardous waste sites. Existing hazardous waste conditions along the proposed transit corridor were determined based on a review of sites within 500 feet of the project corridor that were identified by regulatory environmental records as having known soil and/or groundwater contamination or a potential to have contamination.

The regulatory databases reviewed are listed in Table 4-54. The locations of known spills are mapped on Figure 4-56.

Table 4-54: Hazardous Materials Databases

Abbreviation	Database Name	Agency[1]	Number of Records	
			West half	East Half
Databases of Known or Suspected Spills of Hazardous Waste				
NPL	National Priority List: The nation's worst uncontrolled or abandoned waste sites.	US EPA	0	0
SPL	State Priority List: The state's worst uncontrolled or abandoned waste sites.	CA EPA	0	0
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System Database of known or suspected uncontrolled or abandoned waste sites.	US EPA	0	0
SCL	CalSites List of sites that have undergone or are undergoing review and/or remediation by the State Department of Toxic Substances Control. Two thirds of these sites require no further action.	CA DTSC	0	3
CORRACTS	RCRA Corrective Action Sites: Conservation and Recovery Act facilities that are currently undergoing a corrective action.	US EPA	0	0
ERNS	Emergency Response Notification System of recent sudden or accidentally released hazardous spills	US EPA	1	2
RCRA-V	RCRA Violations / enforcement actions	US EPA	1	1
SPILLS	State spills list	RWQCB	4	2
LUST	Leaking Underground Storage Tanks	CA EPA, RWQCB	6	17
TOXIC PITS	Toxic Pits cleanup facilities	SWQCB	0	0
SWLF	Solid waste landfills, incinerators, or transfer stations	State/ County	0	3
CORTESE	State index of properties with hazardous waste	CA OHM OEP	1	9
LA Site Mit	L.A. County Site Mitigation List	County	3	15
Databases of Potential Spills of Hazardous Waste				
TRIS	Toxic Release Inventory database: Facilities that manufacture, process, or import chemicals in quantities in excess of 25,000 pounds per year	US EPA	1	1
RCRA-TSD	RCRA permitted treatment, storage, disposal facilities	US EPA	0	0
CERCLIS-NFRAP	Comprehensive Environmental Response, Compensation, and Liability Information System No Further Remedial Action Planned: Sites which have been removed from the CERCLIS database either because no contamination was found or was not serious enough to require NPL consideration,	US EPA	0	1
FINDS	Facility Index System: an index of every facility that is regulated or tracked by the U.S. EPA.	US EPA	22	85

Table 4-54: Hazardous Materials Databases

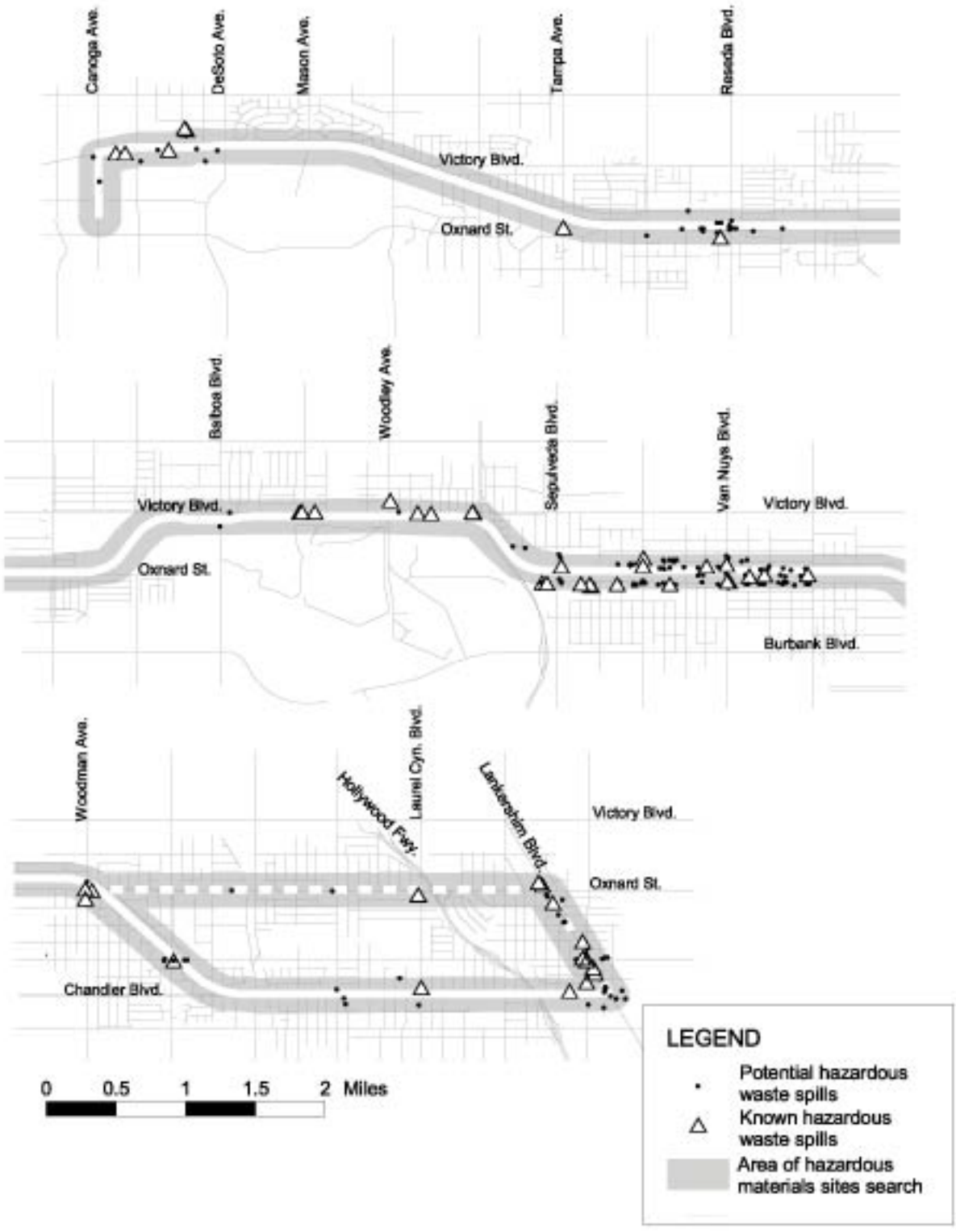
Abbreviation	Database Name	Agency[1]	Number of Records	
			West half	East Half
RCRA Small or Large Gen	RCRA registered small (under 1000 kg/month of non-acutely hazardous waste) or large (over 1000 kg/month of non-acutely hazardous waste or over 1 kg/month of acutely hazardous waste) generators of hazardous waste	US EPA	21	78
DEED RSTR	Sites with deed restrictions	State	0	0
UST	Registered Underground Storage Tanks	SWRCB, cities	20	89
AST	Registered Aboveground Storage Tanks	SWRCB	2	1

Notes:
(1) US EPA: United States Environmental Protection Agency; CA DTSC: Cal. Dept. of Toxic Substances Control; RWQCB: one of the Cal. Regional Water Quality Control Boards; CA EPA: Cal. Environmental Protection Agency; SWQCB: Cal. State Water Quality Control Board; CA OHM OEP: Cal. Office of Hazardous Materials Office of Environmental Planning.

Source: Vista Information Solutions, 2000.

There is also potential for encountering previously unknown hazardous waste in the soil due to unreported spills, particularly considering the prior use of the right-of-way for rail freight transportation and the use of chemicals for weed abatement. There may also be recent deposition of hazardous materials in some portions of the corridor from existing industrial uses occupying leasehold interests. A preliminary geotechnical investigation found that levels of volatile organic chemicals in soil samples taken from proposed station locations were not substantially different from samples taken from the background environment (ETC, 1993). However, groundwater samples taken from two sites were found to have low levels of contamination with semi-volatile organic chemicals. Standard site assessment practices performed during the construction phase of the project will be followed to discover and mitigate the impact of previously unknown hazardous waste spills.

A review of California Division of Oil and Gas Wildcat Well maps determined that the proposed transit corridors are not within the boundaries of an oil field.



Source: Vista Information Solutions, 2000;
Myra L. Frank & Associates, Inc., 2000.

Figure 4-56: Locations of Known and Potential Hazardous Materials Sites

4-10.2 Impact Analysis Methodology and Criteria

Potential impacts associated with geotechnical considerations have been identified by reviewing available published and unpublished geotechnical literature pertinent to the proposed project. These include, but are not limited to, the safety elements of the general plans for the city and county of Los Angeles, aerial photographs, Alquist-Priolo Earthquake Fault Zone Maps, geologic and topographic maps and other publications by the California Department of Conservation, the United States Geological Survey, and available geotechnical and environmental reports.

The criteria for determining the presence of adverse impacts under NEPA (significant impacts under CEQA) are as follows:

- Disruption of a unique geologic feature of unusual scientific value or landform alteration;
- Loss of the availability of mineral resources that would be of future value;
- Exposure of people or property to geologic hazards (including surface fault rupture, landslides or mudflows, subsidence, or other types of ground failure);
- Exposure of people or property to seismic hazards (such as ground shaking, liquefaction, lateral spreading, and seismic settlement);
- Increases in wind or water erosion and changes in topography or ground surfaces;
- Exposure of people or property to existing soil or groundwater contamination; and
- Accumulation of hazardous gases.

4-10.3 Geotechnical Impacts

Because neither the No Build Alternative nor the TSM Alternative would require substantial earth movement, neither landform alteration nor loss of mineral resources would occur. Furthermore, because the project corridor is nearly level and over a mile from any steep, unstable slopes, erosion and changes in topography are not expected to be substantial. Therefore, the following section will focus on geologic and seismic hazards and exposure to contaminated soils.

4-10.3.1 Surface Fault Rupture

No Alquist-Priolo Earthquake Fault Zones cross the proposed project. However, a proposed fault mapped by Weber et al. (1980) may cross the corridor between the Laurel Canyon and North Hollywood stations (see Figure 4-54). Previous investigation of aerial photographs and geomorphic evidence indicates that surface fault rupture is not considered likely on this fault. ~~A more detailed survey of this fault should be performed to accurately determine its location and level of activity.~~ If ~~the fault is found~~ structures are not ~~to cross a~~ proposed ~~station~~ along the mapped trace, or if it is determined that the fault is not active, there would be no adverse impact under NEPA (significant impact under CEQA) on the proposed project. If structures are ~~the fault~~

~~is found to be active and to cross a~~ proposed ~~station~~ along the mapped trace, either additional seismic safety design accommodations or relocation of the station may be required to mitigate the adverse impact under NEPA (significant impact under CEQA).

4-10.3.2 Subsidence, Settlement, and Liquefaction

Subsidence of the ground surface can typically result from several causes, including extraction of petroleum, gas, and groundwater, and from ongoing tectonic activity. According to a study by Weber et al. (1980), there is documented subsidence in the easternmost portion of the proposed Chandler alignment (east of Tujunga Avenue). This subsidence is attributed to either groundwater withdrawal or to ongoing tectonic downwarping of the San Fernando Valley. However, the subsidence has occurred over a very broad area and there has been no reported damage to surface structures as a result. While subsidence due to groundwater extraction may have occurred in the past, it is no longer a threat because groundwater withdrawal in the San Fernando Valley is now regulated to prevent substantial changes in groundwater levels over time. There is no evidence that subsidence is currently occurring in the vicinity of the proposed project.

Seismic settlement may occur when poorly compacted granular soils are densified during ground shaking. A preliminary geotechnical investigation revealed localized layers of soils subject to seismic settlement along the entire length of the proposed alignment (ETC, 1993). Because the subsurface soil composition is laterally non-uniform, the degree of seismic settlement would also be laterally non-uniform and could cause structural damage. The predominantly at-grade project elements (existing streets for the TSM alternative and busway for the BRT alternative) would present a level of risk comparable to existing conditions throughout the surrounding area.

Liquefaction potential is greatest where the water table is close to the ground surface and loose, fine sands occur within a depth of 50 feet or less. According to Reconnaissance Seismic Hazard Maps published by the California Department of Conservation, the soils underneath the entire alignment are potentially liquefiable (Real et al., 1996). The local water table has historically lain less than 10 feet from the surface in the vicinity of the proposed alignment from Warner Center to Reseda and along the Chandler alternative from south of Oxnard St. to U.S. 170 (Tinsley et al. 1985; see Figure 4-55), but groundwater measurements taken during the dry season failed to find groundwater within 10 feet of the surface. Due to the laterally non-uniform nature of the soils underlying the proposed alignment, heavy rainfall could create local "perched" groundwater that would increase the hazard due to liquefaction. The water table could potentially be raised underneath the Sepulveda Flood Control Basin (along the right-of-way from Encino Avenue to Interstate 405) following a 100-year flood event. Soil liquefaction during an earthquake could negatively affect above-ground structures in these areas.

4-10.3.3 Exposure to Contaminated Soils

Because the proposed bus busway will be paved, exposure to hazardous materials in the soil will be limited to the construction phase of the project. No public exposure to contaminated soil

would occur as a result of operation of the project, so no adverse impact under NEPA (significant impact under CEQA) is predicted.

4-10.4 Mitigation Measures

The following mitigation measures are proposed to lessen the effects or potential impacts.

4-10.4.1 Surface Fault Rupture

GEO-1: The closest fault to the proposed alignments is an unnamed fault previously mapped by Weber et al. (1980; see Figure 4-54 and Table 4-53) This fault does not lie within a previously mapped Alquist-Priolo Earthquake Fault Zone. A comprehensive fault rupture hazard investigation ~~should~~ will be performed as part of the Design/Build phase to determine if the fault exists, whether it is active, and whether the fault traverses a proposed station. Appropriate design accommodations ~~should~~ will be made to allow for this geologic feature.

4-10.4.2 Subsidence, Settlement, and Liquefaction

GEO-2: Prior to the construction of the proposed project, a detailed geotechnical investigation ~~should~~ will be performed to delineate specific areas of potential liquefaction or settlement. The details of mitigation measures to address settlement along the proposed alignments will be developed in the Design/Build phase of the project using proper engineering design and conformance with current building code requirements.

4-10.4.3 Exposure to Contaminated Soils

This would not occur during operation of the project. Therefore, no mitigation is necessary. See Section 5-11 for a discussion of mitigation measures to be employed during the construction process.

4-11 BIOLOGICAL RESOURCES

4-11.1 Regulatory Framework

In addition to NEPA and CEQA, other laws that apply to biological resources are addressed briefly below.

4-11.1.1 Federal Endangered Species Act

Species listed as endangered or threatened by the U.S. Fish & Wildlife Service (USFWS) under the federal Endangered Species Act (ESA) are protected under Section 9 of the ESA, which forbids any person to "take" an endangered or threatened species. "Take" is defined in Section 3 of the Act as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The U.S. Supreme Court ruled in 1995 that the term "harm" includes destruction or modification of habitat. Sections 7 and 10 of the ESA may authorize an "incidental take" for otherwise lawful activity (e.g. development project) if it is determined that the activity would not jeopardize the species' survival or recovery.

4-11.1.2 California Endangered Species Act

The California Endangered Species Act (Cal-ESA), enacted in 1970, is intended to provide protection to endangered and threatened species in California. The definition of "take" under Cal-ESA does not include "harm" or "harass" as does Federal ESA; thus, no provisions to protect habitat are included. Sections 2081 and 2090 provide for consultation by project proponents with the California Department of Fish and Game (CDFG) regarding measures to minimize impacts on species listed by Cal-ESA.

4-11.1.3 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA), first enacted in 1916, prohibits any person to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase..." any migratory bird.

The MBTA statute was extended in 1974 to include parts of birds, such as eggs and nests. Thus, it is illegal under MBTA to directly kill, or destroy a nest of, nearly any bird species, not just endangered species. The list of migratory birds includes nearly all bird species native to the United States; non-native species such as European starlings, are not included. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests however, or bird mortality resulting indirectly from implementation of a project, would generally not violate the MBTA. For example, removal of abandoned nests would not violate the MBTA.

4-11.1.4 Section 404 of the U.S. Clean Water Act

The objective of the Clean Water Act of 1977 is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 404 of the Act regulates activities that result in discharge of dredged, fill or excavated material into "waters of the United States;" this generally includes any waterway, intermittent stream, man-made wetland or reservoir. Projects that include any such physical modification of a "water of the United States" must generally comply with Section 404 under the jurisdiction of the U.S. Army Corps of Engineers (ACOE). Because the San Fernando Valley East-West Transit Corridor project includes reconstruction of the bridge crossing over the Los Angeles River and other drainages, project construction could result in modifications to streambeds. At a minimum, the Los Angeles River is considered "waters of the United States;" therefore, consultation with the U.S. Army Corps of Engineers to comply with Section 404 of the Clean Water Act is required.

4-11.1.5 Sections 401 and 402 of the U.S. Clean Water Act

These sections of the Clean Water Act address problems of water pollution through the National Pollution Discharge Elimination System (NPDES). Section 401 prohibits the discharge of any pollutant without a permit, and Section 402 establishes the permit program administered by the Environmental Protection Agency (EPA). The project must comply with Section 401/402 provisions.

4-11.1.6 California, Department of Fish and Game Code Sections 1600 to 1607

The CDFG oversees streambeds and their associated habitats pursuant to Sections 1600 to 1607 of the California Fish and Game Code, which manages activities that would "substantially change" the "bed, channel, or bank of any river, stream or lake designated by the department in which there is at any time an existing fish or wildlife resource, or from which these resources derive benefit." In addition to complying with Section 404 of the Clean Water Act, any modification of streambed habitat may require a Streambed Alteration Agreement from CDFG. As stated above the San Fernando Valley East-West Transit Corridor project includes reconstruction of the bridge crossing within over the Los Angeles River and other drainages. Thus construction would not result in modifications to streambeds within the meaning of sections 1600 to 1607 of the Fish and Game Code.

4-11.2 Existing Conditions

4-11.2.1 Methods for Inventory of Biological Resources

Prior to conducting surveys of the project area, the project description, project maps and project alternatives were reviewed to ascertain potential habitat suitability of the project area for native plant and wildlife species, including sensitive species.

A survey of the project area was conducted by Keene Biological Service on September 10, 2000. The survey focused on assessing the existing biological resources of the project area and its surroundings and on identifying the presence and locations of plant communities, wildlife habitat and potential habitat for sensitive species. It also determined whether the project area supported riparian (streambed) habitats that may be subject to potential jurisdiction under Section 404 of the U.S. Clean Water Act and/or Section 1600 of the California Fish and Game Code. In addition, the survey focused on habitats in areas surrounding the project site that may incur indirect project impacts. Plant and wildlife species observed during the survey were recorded. The entire proposed alignment was surveyed, from east of Warner Center to the North Hollywood Red Line Station.

Documents were also reviewed pertaining to sensitive species that may be present in the project vicinity. A plant or wildlife species is defined as sensitive when it has been afforded special recognition by federal, state or local resources conservation agencies (e.g., USFWS, CDFG) and/or resource conservation organizations (e.g., California Native Plant Society or National Audubon Society). Sources used to identify sensitive species potentially occurring in the project vicinity include the following:

- *California Natural Diversity Data Base,* CDFG, Natural Heritage Division.
- *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994), California Native Plant Society Special Publication No. 1 (Fifth Edition), Sacramento, CA.
- *State and Federally Listed Endangered and Threatened Animals of California,* CDFG, Natural Heritage Division, January 2000.
- *State and Federally Listed Endangered, Threatened and Rare Plants of California*, CDFG, Natural Heritage Division, January 2000.
- *Special Animals* (including California Species of Special Concern and those listed by), CDFG, Natural Heritage Division, June 1999.

The following summarizes the findings of the literature review and field observations.

4-11.2.2 Vegetation

The project area for the San Fernando Valley East-West Transit Corridor is surrounded by residential, commercial, institutional, open space / park, public infrastructure, and industrial land uses. Open space areas in the project area include parts of Pierce College, the Sepulveda Dam Recreation Area and Lake Balboa Park, all bordering the alignment on the south, and a portion of Valley Plaza Park north of the alignment. Native plant communities that formerly occupied the project area are no longer present. Some native, as well as non-native, vegetation is present a short distance downstream of the proposed crossing over the Los Angeles River; otherwise, the

project area is composed of unvegetated areas, areas supporting ruderal (weedy) vegetation, and areas supporting exotic (landscaped) species. No native plant communities[18] were detected in the project area; thus, no vegetation map depicting plant communities is provided in this document. Weedy species present along the proposed alignment include tree tobacco (*Nicotiana glauca*[19]), common horseweed (*Conyza canadensis*), western sunflower (*Helianthus annuus*), tocalote (*Centaurea mellitensis*), and non-native grasses (*Bromus* and *Avena* sp.). Evidence of weed control is apparent along the old railroad right-of-way. Landscaping in the project area consists of date palm (*Phoenix canariensis*), Mexican fan palm (*Washingtonia robusta*), oleander (*Nerium oldeander*), eucalyptus of various species (*Eucalyptus* sp.), London plane tree (*Platanus* x *hispanica*), Peruvian pepper tree (*Schinus molle*), pine of various species (*Pinus* sp.) and acacia (*Acacia* sp.), among several others. A detailed inventory of trees existing within the right-of-way is provided in Section 4-6.

The corridor crosses the Los Angeles River, which is channelized and barren at the crossing but heavily vegetated with riparian habitat downstream of the bridge crossing with native species including California fan palm (*Washingtonia filifera*), mulefat (*Baccharis salicifolia*), willow (*Salix* sp.) and western sunflower, as well as non-native species including castor bean (*Ricinis communis*).

4-11.2.3 Wildlife

The disturbed condition of the project area and the predominance of non-native vegetation limits its potential to support native wildlife species other than birds and other species well-adapted to human-disturbed habitats. Amphibians that may occur in the Los Angeles River and other channelized drainages traversed by the alignment include Pacific treefrog (*Pseudacris regilla*) and non-native bullfrog (*Rana catesbeiana*). Some native reptiles may occur rarely in the project area, including side-blotched lizard (*Uta stansburiana*) and western fence lizard (*Sceloporus occidentalis*), but the lack of natural plant communities and open space limits the ability of the project site to support reptile species that are typical in open space areas elsewhere in Los Angeles County.

Birds observed during the field survey were limited to species common in residential habitats of southern California and included American kestrel (*Falco sparverius*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). A variety of other species may occur in the project vicinity during migration.

Because of the lack of native vegetation and prey species associated with such vegetation, foraging on the site by raptors (birds of prey) other than the American kestrel is expected to be rare. Mammal species that may be found in the project area and its vicinity include primarily

[18] A plant community is defined as "an assemblage of interacting plant species characterized by the presence of one or more dominant species" (Holland 1986).

[19] Scientific names are provided only after the first mention of the common name in this document.

non-native species: domestic dogs (*Canis familiaris*) and cats (*Felis domesticus*), Virginia opossum (*Didelphis virginiana*), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), and Eastern fox squirrel (*Sciurus niger*).

4-11.2.4 Wildlife Corridors

A wildlife corridor is an area of habitat(s) connecting two or more larger areas of habitat. It is generally free of physical barriers such as fences and developed areas. A functioning wildlife corridor allows for ease of movement between habitat areas. Canyon bottoms with a well-developed tree canopy often serve as wildlife corridors and offer food, shelter, and water, as well as ease of movement, depending upon the density of the understory.

Corridors function to prevent habitat fragmentation, which can result in the loss of species that require large contiguous expanses of unbroken habitat and/or that occur in low densities. Habitat fragmentation can result in increases of non-native species and may allow inbreeding in species whose populations are small because they have become confined to smaller areas. This in turn reduces the rate of reproductive success. Fragmentation also reduces functioning ecosystems to small pockets, decreasing biodiversity and the interactive processes required for healthy ecosystem functioning. Corridors promote gene flow within species, allow recolonization of areas following catastrophic events such as fire, prevent the loss of large animals by linking suitable habitat areas, and help to ensure the survival of native species that cannot compete with more aggressive non-native species in fragmented habitats.

The project area is surrounded by development, aside from some riparian habitat in the Los Angeles River. However, because the river is barren and channelized upstream of the proposed alignment crossing, it provides little cover for wildlife movement other than that by locally common species. Based upon field observations, wildlife corridors are not present in the vicinity of the proposed project.

4-11.2.5 Sensitive Species

Species are typically considered sensitive because of declining or limited population sizes resulting, in most cases, from loss of habitat. Those listed as threatened or endangered by the federal or California Endangered Species Acts are protected by those acts. Other categories for sensitive species that do not afford legal protection are USFWS Category 1 candidates or CDFG Species of Special Concern; still other species are included on lists maintained by resource conservation organizations (California Native Plant Society Society [CNPS] or National Audubon Society [NAS]). Although these species are not protected by law as are those listed by Endangered Species Acts, measures to avoid or minimize impacts on these species are often considered during environmental review. Because the project site supports no native plant communities, and because of the high level of human disturbance throughout the project corridor, no sensitive plant or wildlife species were observed in the field. In addition, no potential habitat is present for sensitive species that occur elsewhere in the project vicinity or region.

No species listed under the ESA are expected to occur in the project area; thus, the ESA would not apply to the San Fernando Valley East-West Transit Corridor project. No other species currently listed by the ESA are expected to be affected directly or indirectly by the project (see "Sensitive Species" above).

No species currently listed by Cal-ESA is expected to incur "take" by the San Fernando Valley East-West Transit Corridor project.

4-11.3 Impact Analysis Methodology and Impact Evaluation

The proposed project would have an adverse effect under NEPA (significant effect under CEQA) on biological resources if it would satisfy any of the following conditions:

- Have a substantial[20] adverse effect under NEPA (significant adverse effect under CEQA), either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect under NEPA (significant adverse effect under CEQA) on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect under NEPA (significant adverse effect under CEQA) on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrologic interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan.

[20] An impact would be considered "substantial" only if it would adversely affect a biological resource that is considered rare or of limited distribution in northern Los Angeles County (the San Fernando Valley).

4-11.4 Impacts to Biological Resources

4-11.4.1 Effects on Protected Species

The proposed project would not cause an adverse impact under NEPA (significant impact under CEQA) on protected species, because, as described above, the project area supports no habitat for any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

4-11.4.2 Effects on Wetlands Riparian Habitat, or Sensitive Natural Communities

The San Fernando Valley East-West Transit Corridor would cross the Los Angeles River, which supports some riparian habitat downstream of the proposed crossing. Potential runoff would be controlled via adherence to NPDES requirements; therefore, no adverse impact under NEPA (significant impact under CEQA) would occur.

4-11.4.3 Effects on Migratory Fish or Wildlife

No impact would occur because, as described above in Existing Conditions, surrounding development limits the ability of the San Fernando Valley East-West Transit Corridor project area to support the movement of native resident or migratory wildlife species. No established native resident or migratory wildlife corridors or native wildlife nursery sites are present on the site or in its vicinity.

4-11.4.4 Conflicts with Established Policies

No operational impacts would occur because no sensitive resources protected by local ordinances occur within the San Fernando Valley East-West Transit Corridor project area. However, the Migratory Bird Treaty Act, a national ordinance, protects nests of nearly all native birds, and removal by the project of one or more active nests of birds protected by the MBTA would be a violation of the MBTA and thus an adverse impact. See Section 5-12 for further discussion of this topic.

4-11.4.5 Conflicts with Conservation Plans

No impact would occur, because the project site and its vicinity are not part of an adopted Habitat Conservation Plan, Natural Community Conservation Plan (NCCP), or other approved or pending local, regional or state habitat conservation plan.

4-11.4.6 Direct and Indirect Impacts

The following is an overview of potential direct/indirect effects associated with operation of the proposed project.

a. Vegetation:

Following project construction, aside from regular maintenance of both existing and added project site vegetation, no direct impacts on vegetation are anticipated. However, indirect impacts may occur in habitats located downstream of the corridor's crossing over the Los Angeles River due to runoff of pollutants from the site.

b. Wildlife:

Following construction, project operation (corridor use) would not be expected to result in any direct impacts on wildlife species. However, because wildlife species in the area are generally common in surrounding residential habitats, this would not be considered an adverse impact under NEPA (significant impact under CEQA).

The project area will generate higher levels of noise that may affect wildlife in the project vicinity; however, the project area is completely surrounded by existing development; thus, indirect adverse impacts under NEPA (indirect significant impacts under CEQA) of project operation on wildlife on and adjacent to the site are not expected.

c. Wildlife Dispersion Corridors:

The San Fernando Valley East-West Transit Corridor project area is not part of a major or minor wildlife corridor as it is surrounded by development; thus, no indirect impacts of project operation on wildlife movement are anticipated.

d. Sensitive Species:

No impacts on sensitive species are expected to occur during project operation.

4-11.5 Mitigation Measures

The following mitigation measures are proposed to lessen the potential for adverse effects under NEPA (significant effects under CEQA) on biological resources:

BIO-1: The project will be required to comply with applicant provisions of section 401 and 402 of the Federal Clean Water Act, including adherence to NPDES standards and permit requirements to minimize adverse impacts under NEPA (significant impacts under CEQA) on vegetation downstream on the Los Angeles River. Included among the likely permit requirements ~~would~~ will be installation

of Best Management Practices (BMPs) and appropriate drainage design provisions to minimize harmful runoff. These provisions will be incorporated during the Design/Build phase.

4-11.5.1 Effects on Protected Species

No additional mitigation is required.

4-11.5.2 Effects on Wetlands, Riparian Habitat or Sensitive Natural Communities

No additional mitigation is required.

4-11.5.3 Effects on Migratory Fish or Wildlife

No additional mitigation is required.

4-11.5.4 Conflicts with Established Policies or Conservation Plans

No additional mitigation is required.

4-11.5.5 Direct and Indirect Impacts

No additional mitigation is required.

4-12 WATER RESOURCES

4-12.1 Setting

Precipitation in the San Fernando Valley is characterized by intermittent rain during winter months and negligible rain during summer months; 85 percent of the annual precipitation occurs from November to March. Although precipitation normally occurs as rainfall, winter snow is common in the higher elevations of the San Gabriel Mountains. As is typical of many semi-arid regions, the Los Angeles area experiences wide variations in monthly and seasonal precipitation totals.

Precipitation may flow into surface reservoirs and groundwater basins or run off to the ocean. Short-term water storage is in surface reservoirs and long-term storage is in groundwater basins. The amount of infiltration to groundwater basins is dependent upon the slope, the soil type, and the intensity and duration of rainfall. Because most of the greater Los Angeles area is either paved or developed, a great deal of runoff occurs. Flood control structures have been constructed to channel runoff safely through inhabited areas to minimize flooding and to aid in recharging groundwater storage units.

4-12.1.1 Surface Water Resources

Surface water in the San Fernando Valley drains out of the Valley through the Los Angeles River, which flows parallel to the proposed San Fernando Valley East-West Transit Corridor. Figure 4-57 shows the major surface water resources in the region. The Los Angeles River flows from the southwest side of the San Fernando Valley through the Los Angeles Coastal Plain to San Pedro Bay. It is located approximately 0.5 miles north of the ~~SP~~ MTA ROW at the west end of the corridor, crosses under the corridor 0.5 miles west of the Balboa station, and is 1.5 miles south of the ~~SP~~ MTA ROW at the east end of the corridor. The Los Angeles River has been channelized and lined with concrete along most of its course for flood control purposes. Within the Sepulveda Flood Control Basin, the floor of the channel is unlined, allowing percolation of water from the channel into the ground.

Numerous tributaries, most of which have intermittent flow, discharge into the Los Angeles River. These include the Arroyo Calabasas, Bell Creek, Aliso Wash, Browns Canyon Wash, Chatsworth Creek, Pacioma Wash, Tujunga Wash, and Verdugo Wash. These washes and creeks are primarily concrete-lined within the urban areas.

Flows in the Los Angeles River system are highly variable. Dry season flows are comprised chiefly of excess irrigation water applied in urban areas, controlled release of reservoirs, and municipal and industrial wastewater including effluent from the Tillman and Los Angeles-Glendale sewage treatment plants. During the wet season, flows in the Los Angeles River are augmented by storm water runoff that varies with storm duration, intensity, and frequency.

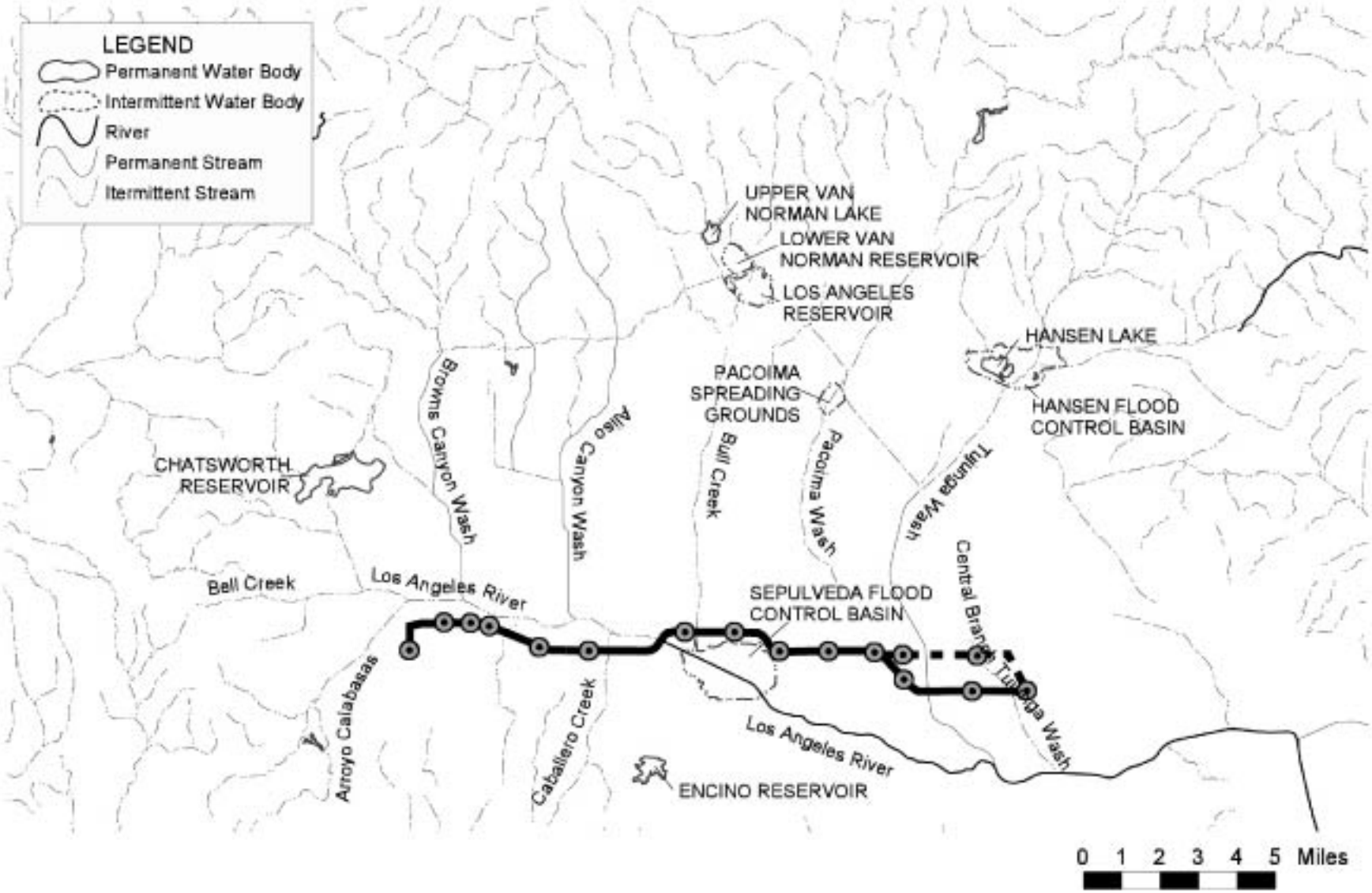


Figure 4-57: Water Resources in the San Fernando Valley Region

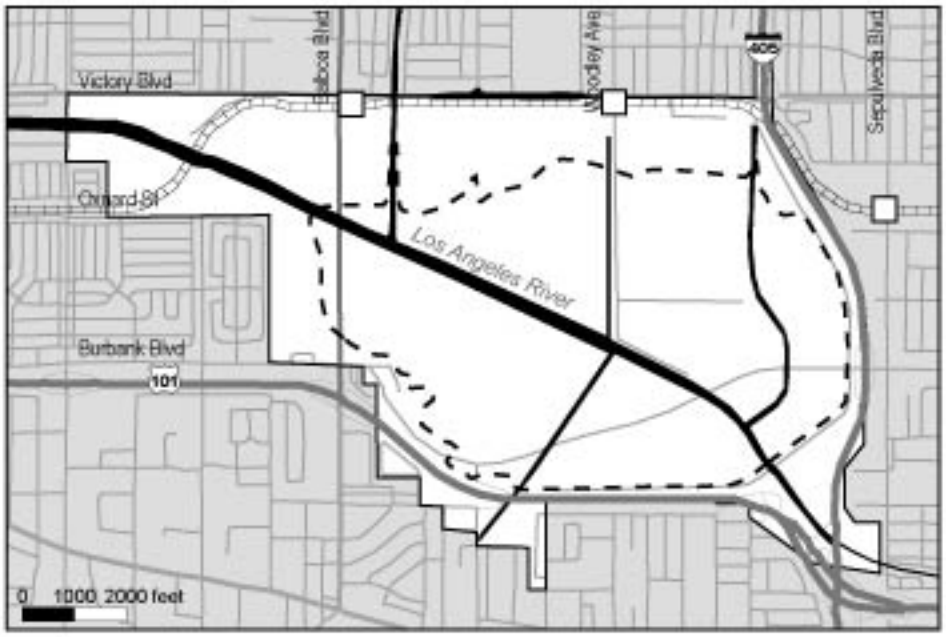
Storm water runoff from the first storm of the season tends to contain high levels of contaminants; contaminant levels decrease in the storm water runoff as the number of storms increases.

The Los Angeles River is partially located within the Sepulveda Dam and the Flood Control Basin. Both are owned and maintained by the U. S. Army Corps of Engineers, who constructed the facilities in 1941 following the Flood Control Act of 1936. The Sepulveda Dam is an earthfill structure consisting of an earth embankment with a concrete spillway near the center. The dam is 15,444 feet long and has a maximum height of 57 feet above the streambed. The basin has a storage capacity of 17,425 acre feet at the crest of the raised spillway, which is located at an elevation of 710 feet above sea level. During a maximum design flood (greater magnitude than the 100-year flood event), the basin can hold 17,563 acre feet of water, cresting at an elevation of 717 feet. The part of the proposed project that is within the Sepulveda Flood Control Basin lies above the maximum design flood elevation everywhere except for a 1000-foot stretch immediately west of the Woodley Station (see Figure 4-58).

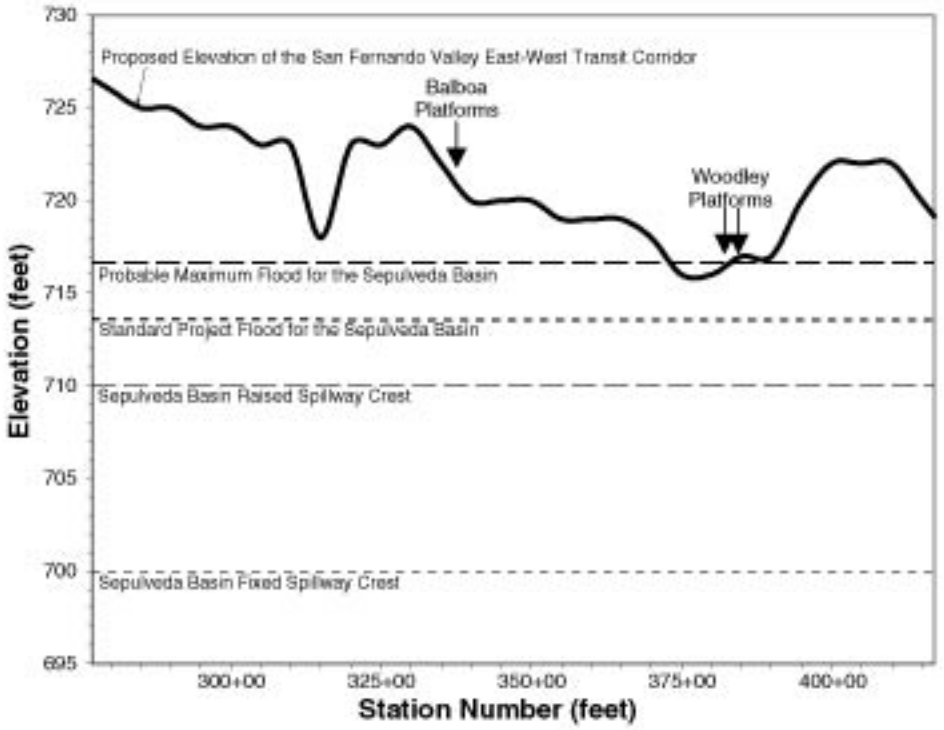
Other major surface water resources in the vicinity of the project corridor are Caballero Creek, Bull Creek, and the Tujunga Wash. Caballero Creek drains an area of approximately 10 square miles, most of which lies within the Santa Monica Mountains. The creek flows only intermittently. It crosses the project corridor as a box culvert approximately 0.4 miles east of the Reseda Station and joins the Los Angeles River 1 mile to the north. Bull Creek drains an area of approximately 150 square miles, including large areas within the San Gabriel and Santa Susana Mountains. Bull Creek is regulated by the Upper Van Norman Dam and Lake, which is located approximately 7 miles north of the project corridor. It crosses the project corridor as a concrete-lined channel 0.2 miles east of the Balboa Station and joins the Los Angeles River 0.6 miles to the south within the Sepulveda Basin. The Tujunga Wash drains an area of approximately 150 square miles, including large areas within the San Gabriel Mountains. The Tujunga Wash is regulated by the Hansen Dam and Flood Control Basin, which is located approximately 5 miles north of the project corridor. In the vicinity of the project corridor it flows through two branches; the main concrete-lined flood control channel crosses the project corridor 0.9 miles west of the Laurel Canyon Station, and the Central Branch of the Tujunga Wash crosses the corridor 0.4 miles west of the North Hollywood Station as a box culvert. Both branches flow into the Los Angeles River 2 miles to the southeast of the crossings in Studio City.

4-12.1.2 Groundwater

Fresh water permeates soils to varying degrees, depending on the composition of the soil. Coarsely grained, sandy, or gravelly strata comprise individual aquifers. These water-bearing deposits are readily capable of absorbing, storing, transmitting, and yielding water to wells. Fine-grained sediments, such as silts and clays, are interbedded with the aquifers and form aquicludes which limit the transmission of water out of the aquifer. Aquicludes may “pinch out” laterally, allowing transmission of water between adjacent aquifers.



Sepulveda Flood Control Basin
100-year flood zone (FEMA)
100-year flood zone (USACE)
Proposed San Fernando Valley East-West Transit Corridor
Proposed Station



Sources: Parsons Transportation Group, 2000;
Myra L. Frank & Associates, Inc., 2001.

Figure 4-58: Location of Project in Relation to the Sepulveda Flood Control Basin

Groundwater basins are underlain by one or more layers of permeable soil, which can store water. Basin boundaries do not necessarily coincide with drainage basins; they are formed instead by groundwater divides such as faults or non-waterbearing rocks, or by political boundaries. The elevation of groundwater within a basin varies with the amount of water being pumped out of the basin and the amount of recharge returning water to the basin. Groundwater basins may be recharged naturally through percolation of precipitation or artificially with imported or reclaimed water. Artificial recharge with imported water is practiced as a means of offsetting declining groundwater levels and providing storage for use in times of drought.

The San Fernando Valley East-West Transit Corridor is located entirely within the San Fernando Basin. Beneficial uses of the groundwater in the San Fernando Basin are municipal and industrial water supply and agriculture. Pumping of groundwater is controlled in order to prevent groundwater levels from declining.

Groundwater flow in the San Fernando Valley is generally eastward, parallel to the course of the Los Angeles River. The highly nonuniform character of the soils in the San Fernando Valley results in local "perched" aquifers that do not communicate with deeper groundwater. A geotechnical survey found that groundwater depths in the vicinity of the project corridor varied from 15 to more than 100 feet below the ground surface during the dry season, with depth to groundwater generally increasing from west to east (ETC, 1993; see Figure 4-53); this study did not differentiate between perched aquifers and the deeper, more continuous aquifers. Historically, perched groundwater has sometimes been found within 10 feet of the surface (see Figure 4-55).

4-12.1.3 Floodplains

A review of Flood Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA) indicates that all of the proposed corridor is within Zone C, which is defined as an area of minimal flooding. No 100-year or 500-year floodplains would be crossed, except where 100-year floodplains are contained entirely within flood control channels (Caballero Creek, the Los Angeles River, Bull Creek, and the Tujunga Wash).

Between Encino Avenue and Interstate 405 the right-of-way lies within the boundaries of the Sepulveda Flood Control Basin, used by the U. S. Army Corps of Engineers (USACE) to manage flood levels on the Los Angeles River during major storm events. Since the maximum design flood for the Basin would have an elevation of 717 feet, only a small section of the project (the 1000 feet immediately west of the Woodley Station) would be affected by a maximum flood event, in which case the depth of flood water in the immediate vicinity would be less than approximately 1 foot (see Figure 4-58).

The maximum design flood for the Sepulveda Flood Control Basin does not correspond with 100- or 500-year floodplains defined by FEMA (see Figure 4-58). The Sepulveda Basin would not *naturally* flood during a 100-year storm event. The actual extent of flooding within the Sepulveda Basin in any given event is up to the discretion of the U. S. Army Corps of Engineers. During a 100-year flood event, the portion of the Sepulveda Basin that would be flooded by the U. S. Army Corps of Engineers would not encroach upon the proposed project.

4-12.2 Impact Assessment Methodology and Evaluation Criteria

Operational impacts to surface waters were assessed with regards to degredation of water quality and changes in surface water flow. Effects on future water quality were estimated based on the potential for runoff to reach surface and groundwater resources and the types of pollutants anticipated. Anticipated impacts were examined with regards to applicable water quality standards and permit requirements.

Section 401 of the Clean Water Act regulates the discharge of pollutants to surface water bodies through National Pollutant Discharge Elimination System (NPDES) permits, which are administered by the State Water Resources Control Board and the nine Regional Water Quality Control Boards.

Previously prepared environmental and technical reports for the project were reviewed to determine the local groundwater setting. Maps prepared by FEMA were examined to determine the potential for floodplain impacts. Project alternatives would have adverse impacts under NEPA (significant impact under CEQA) during operation if the project would result in any of the following conditions:

- create storm water volumes that exceed the capacity of existing drainage facilities;
- deplete or contaminate a groundwater aquifer;
- place new development in areas susceptible to 100-year flooding; or
- create pollution, contamination, or nuisance as defined in Section 12050 of the California Water Code.

4-12.3 Impacts on Water Resources

4-12.3.1 Surface Water Resources

No new paved surfaces would be constructed for the TSM alternative, so no adverse impact under NEPA (significant impact under CEQA) on surface water resources is predicted.

Additional runoff would be produced by new impervious surfaces associated with the BRT facility (parking lots and access roads), potentially resulting in degradation of downstream water quality. Potential contaminants include oil and grease. The addition of hydrocarbons into an aquatic environment can have direct toxic effects on aquatic organisms. Hydrocarbons can also indirectly affect aquatic organisms by depleting dissolved oxygen during bacterial degradation. Therefore, runoff is of greatest concern near biologically important areas such as the Sepulveda Flood Control Basin.

The impact of storm runoff would be greatest following the first substantial rainfall of the season because long dry periods common to California allow greater accumulation of compounds on paved surfaces than during periods of more frequent rainfall. The highest concentration of these pollutants in surface waters occurs early (first flush) in a given rainfall event.

Water quality impacts associated with operation of the BRT or MOS alternatives would be minor because the watershed within the San Fernando Valley is essentially urban; the amount of new impervious surface that would be added and the resulting additional runoff would be small compared to the amount of runoff in the watershed as a whole. The parking lots proposed at the station sites would be constructed mostly on developed or paved surfaces already having high runoff. This would not constitute an adverse impact under NEPA (significant impact under CEQA).

4-12.3.2 Groundwater

No new paved surfaces would be constructed for the TSM alternative, so no adverse impact under NEPA (significant impact under CEQA) on groundwater resources is predicted.

Operation of the BRT or MOS alternatives is not anticipated to have an adverse effect under NEPA (significant impact under CEQA) on groundwater resources or beneficial uses of groundwater in the San Fernando Basin, because (a) groundwater recharge from the surface within the Valley is limited by the occurrence of groundwater aquicludes composed of impermeable sediments within the Basin and (b) once constructed, the busway would be separated from the water table.

4-12.3.3 Floodplains

None of the project lies within 100-year floodplains mapped by FEMA or the U. S. Army Corps of Engineers. It therefore would not be subject to the requirements of Executive Order 18988. However, the project is contained within the Sepulveda Flood Control Basin, which is under the control and management of the U.S. Army Corps of Engineers, and therefore other flood control requirements must be adhered to. The 1000 feet of the project immediately west of the Woodley Station could be flooded to a depth of 1 foot during a maximum design event (substantially greater than the 100-year event) in the Sepulveda Flood Control Basin (see Figure 4-58), potentially requiring the closure of that part of the busway. Since the maximum design event for the Sepulveda Flood Control Basin exceeds 100-year severity, this does not represent an adverse impact under NEPA (significant impact under CEQA). In the event of a maximum design flood event within the Sepulveda Basin, the actual extent of flooding would be confined to the 1,000 feet of the project immediately west of the Woodley station, to a depth of 1 foot.

The project would cross five flood control channels: Caballero Creek, the Los Angeles River, Bull Creek, and two branches of the Tujunga Wash. New bridges would be required across some, and perhaps all, of these channels for the BRT alternative and up to three of the channels (Bull Creek and the two branches of the Tujunga Wash) for the MOS alternative. For Caballero Creek, Bull Creek, and the two branches of the Tujunga Wash, the new bridges (if needed) would be complete spans, so they would not interfere with flow of flood waters through the channels. The bridge across the Los Angeles River would require five to six piers, similar to the existing condition. The final bridge design will be reviewed with the U. S. Army Corps of Engineers to ensure that it is compatible with hydraulic design capacity required for flow through the channel. A determination will be made in preliminary engineering regarding which bridges would require complete replacement.

4-12.4 Mitigation Measures

4-12.4.1 Surface Water Resources

No new paved surfaces would be constructed for the TSM alternative, so no adverse impact under NEPA (significant impact under CEQA) on surface water resources is predicted. For the BRT and MOS Alternatives, the following mitigation measure is proposed:

WR-1: Runoff from the busway constructed for either the BRT or MOS alternatives ~~would~~ will be managed via Best Management Practices (BMPs) and an appropriate Storm Water Pollution Prevention Plan (SWPP) as mandated by NPDES permit requirements. Consultation among the project proponent, US Army Corps of Engineers, and the Regional Water Quality Control Board ~~would~~ will be undertaken during the Design/Build phase to establish appropriate permit conditions. A drainage system ~~would~~ will be constructed as part of the project that ~~would~~ will direct storm water runoff to the local drainage system. Because the area of new paved surface for the BRT and MOS alternatives is small compared to the area of paved surface in the region, the increase in runoff volume associated with the project would not negatively affect the local storm drainage system. Since Best Management Practices mandate the installation of oil-water separators in storm drains at proposed parking lots, operation of the project would actually improve the quality of storm water runoff.

4-12.4.2 Groundwater

WR-2: ~~It is recommended that a~~Additional piezometers will be installed within the corridor and monitored prior to final design of the ~~chosen alternative~~ project to better monitor groundwater levels along the chosen alignment. Site-specific design accommodations to local patterns of groundwater flow may be required as a result of this monitoring, and if so, will be incorporated into the Design/Build phase.

4-12.4.3 Floodplains

Coordination with the U. S. Army Corps of Engineers and the Los Angeles County Department of Public Works will be completed to establish flood design parameters for final design of the project to further identify and minimize potential flood hazards.

WR-3: Construction of a bridge across the Los Angeles River (required as a part of the BRT alternative) will require the reconstruction or new construction of five to six piers within the channel. The final bridge design will be reviewed with the U.S. Army Corps of Engineers to ensure that it is compatible with required hydraulic capacity for flow through the channel.

WR-4: The U. S. Army Corps of Engineers requires that any permanent structures placed within the Sepulveda Flood Control Basin be floodable. Site-specific design accommodations and drainage facilities may be required, including at the Balboa Boulevard and Woodley Avenue stations. Appropriate specifications will be incorporated into the Design/Build bid package to require coordination with the U.S. Army Corps.

4-13 SAFETY AND SECURITY

4-13.1 Setting

Safety and security, as it pertains to the San Fernando Valley East-West Transit Corridor, is concerned with three general topics:

1. Accident prevention (including accidents involving vehicles, bicycles, and pedestrians; and injuries)
2. Crime prevention (including crimes against patrons and/or employees, theft, and fare evasion); and
3. Emergency response

Existing procedures and design of facilities are described below to provide a context for the impact discussions of these three topics.

4-13.1.1 Existing Procedures

The Metropolitan Transportation Authority (MTA) oversees the operation of bus, heavy rail transit (Metro Red Line), and Light Rail Transit (LRT) services throughout Los Angeles County. As part of its responsibilities, the MTA implements its *System Safety Program Plan* to maintain and improve the safety of commuter operations, reduce costs associated with accidents, and comply with state regulations. These safety measures have been established to ensure worker and passenger safety, crime prevention, adequate emergency response, and emergency procedures to be followed in the event of a natural disaster. The MTA currently provides police surveillance (via contracts with Los Angeles. Police Department (LAPD) and Los Angeles County Sheriff's Department), non-uniformed police inspectors on transit buses and at major transit nodes, closed-circuit television in some locations, and an emergency radio response system.

MTA has implemented pro-active measures such as police surveillance (using Los Angeles Police Department and Los Angeles County Sheriff's Department personnel), non-uniformed police inspectors on transit buses and at major transit nodes, and closed-circuit television to prevent crime.

Over the last 10 years, the MTA has established several bus transit-specific projects and programs to further enhance safety for its passengers, employees, and the community. These include:

- Photo equipment installed on buses to permit live video surveillance and recording.
- Direct communication between buses, drivers, and LAPD or the Los Angeles County Sheriff's Department Transit Dispatch/ Emergency Response Center.
- The Transit Safety Awareness Program, which communicates safety information to motorists and pedestrians through transit user aids, bus stop information signs, and the Internet.

- MTA's Injury and Illness Prevention Program, which addresses workplace safety procedures, communication with employees on health and safety issues, identification and resolution of unsafe conditions, procedures for investigating workplace injuries and illnesses, and occupational health and safety training.
- Community Emergency Response Training (CERT) in collaboration with the Los Angeles City Fire Department, in which employees are trained in earthquake awareness, disaster medical procedures, and rescue operations.

4-13.1.2 Facility Design

The design of existing MTA fixed rail facilities (including vehicles, stations, parking lots, etc.) is intended to provide a safe, secure, and comfortable transit system. A number of the features of fixed rail facilities may be applied to the proposed busway. Included among these are station and platform amenities similar to the rail system, park-and-ride lots, and security lighting. Some locations may include an Advanced Traveler Information System (ATIS), bike lockers, map cases, and ticket vending machines. Security-related design features may include emergency telephones at station platforms, public announcement (PA) systems, open sight lines, graffiti-resistant materials, crosswalks, and a contract for security patrol by LAPD.

4-13.2 Impact Analysis Methodology and Evaluation Criteria

The No Build Alternative was compared with the Transportation System Management (TSM) Alternative, Bus Rapid Transit (BRT) Alternative, Lankershim/Oxnard On-Street Alignment, and Minimum Operable Segment (MOS). The assessment of safety and security issues addresses accident prevention, crime prevention, and emergency response, with regard to both design and operation. The project would have an adverse impact under NEPA (significant impact under CEQA) if it unduly exposes the public to crime, exposes the public to increased danger from accidents, or impairs emergency response capability within surrounding communities.

4-13.2.1 Accident Prevention

This analysis addresses accidents resulting from operation of project alternatives. Safety issues to be considered include the potential for car/bus; pedestrian/car; pedestrian/bus; and other types of accidents. Accidents can occur at park-and-ride lots, at-grade crossings, stations or waiting platforms, or on the right-of-way. Accident prevention also relates to bus maintenance, as well as station and busway design (lighting, fencing, signage, surfaces and material, control devices, etc). The City of Los Angeles Department of Transportation (LADOT) safety standards for pedestrians and bicycles will be utilized in the proposed project, in addition to MTA standards.

4-13.2.2 Crime Prevention

This analysis addresses crimes against persons or property potentially occurring during operation of the proposed project. Crime prevention measures are typically implemented to manage this potential risk through station and busway design (layout, lighting, sight lines) and operational

procedures including security along the busway, at park-and-ride lots, stations, and graffiti removal.

Local crime statistics, project design features, MTA procedures, and safety records have been reviewed. The analysis focuses on the potential for crimes against persons, property theft, and vandalism.

4-13.2.3 Emergency Response

Station and busway design (access, layout, exits, alarms, evacuation) and operational procedures (interagency agreements, training, evacuation) are pertinent to the efficiency of emergency response personnel and the ability of passengers to clear an area in an emergency. Impacts have been assessed through a review of proposed design aspects and traffic conditions.

4-13.3 Impacts

4-13.3.1 Accident Prevention

a. No Build

This alternative will have no adverse impacts under NEPA (significant impacts under CEQA) on accidents, since it will maintain existing transit service as it is at present.

b. Transportation System Management (TSM) Alternative

According to 1998 statistics, MTA's at-grade bus accident rate (involving collisions with vehicles or people) was approximately 1,000 accidents per 81,380,000 annual revenue vehicle miles (MTA, 1998). This is a ratio of one accident per approximately 80,000 vehicle miles. Based on projections to the year 2020, the TSM alternative would add approximately 3,200,000 additional bus miles per year to the total MTA bus system, and therefore could theoretically increase the potential for accidents by a marginal amount. However, the TSM Alternative would enhance existing transit service in the Valley, which, by attracting new riders from autos, could theoretically reduce the marginal increase of potential accidents.

On balance, bus operation associated with the TSM Alternative within the study area would be expected to have an impact that is minor adverse under NEPA (not significant under CEQA) on public safety due to bus-related accidents.

c. Full BRT, Lankershim/Oxnard On-Street Alignment, and Minimum Operable Segment (MOS)

The full BRT, BRT with Lankershim/Oxnard On-Street alignment and the MOS would add approximately 5,000,000 additional bus miles per year to the total countywide system by the year 2020. Similar to the effects associated with the TSM Alternative, these BRT alignments would

be expected to have an impact that is minor adverse under NEPA (not significant under CEQA) on accident potential.

It should also be noted that the accident experience is based on buses running in mixed-flow traffic. The BRT Alternative would place buses within a dedicated corridor, separated from mixed-flow traffic except at intersections, which would reduce the potential for conflict between normal street traffic and bus operations. This would lessen the potential for accidents from that noted above. This finding would apply to the Full BRT, the Lankershim/Oxnard On-Street Alignment, and MOS Alignment.

In addition to the physical separation of the busway from parallel street traffic, the dedicated bus corridor will be designed to further reduce the potential for accidents and create a safer transit system through the use of enhanced signal control and operator communications equipment.

Pedestrian/bus conflicts are another potential concern. ~~Some intersections, if required and agreed to by LADOT, would be specifically designed to protect the pedestrian through the installation of "Z" gates (or other similar devices) on either side of the corridor. The "Z" gate is a comprised of two 2½-foot-high metal barriers offset from one another creating an obstacle that the pedestrian would have to weave through before reaching the corridor. A low, hinged door that would require the pedestrian to push through to gain access across the corridor is another approach to this situation. These gates would be installed in addition to normal LADOT standards for pedestrian crossings.~~ LADOT safety standards for pedestrians and bicycles will be implemented. Warning signage would also be placed in plain view of the pedestrian. The Full BRT alternative has three mid-block crossings incorporated into its design. Two of these crossings (Agnes Avenue and Goodland Avenue) would be designed for non-mechanical signal activation. On Orthodox Jewish holidays and ~~weekends~~ Saturdays, the pedestrian signal would operate on a recall memory, and at a periodic rate, it would automatically signal the buses to stop, creating a safe crossing for pedestrians. The third crossing (at Zelzah Avenue) would not have this feature. The mid-block crossings would also be designed to LADOT pedestrian crossing and safety standards.

Specific safety features have also been designed to protect vehicular traffic crossing the corridor. Before reaching the intersection, drivers would be warned by "pre-signals" that they are approaching an intersection that crosses the corridor. Traffic lighting will be modified to insure adequate stopping distances for cross traffic lanes to maintain acceptable levels of service at intersections. The corridor will be painted or striped to visually designate that the corridor is not a surface street.

The intersections will operate as an at-grade street crossing, and will not require the installation of gates, bells or whistles associated with rail crossings. Busway drivers will have direct control over their vehicles and will be able to brake quickly or move out of the way to avoid incidents.

Another issue of accident prevention relates to the areas parallel to the corridor. ~~The City of Los Angeles is planning a~~ A bike/pedestrian path is planned to run parallel to much of the corridor, placing bicyclists and pedestrians in close proximity to the corridor. To ~~keep~~ separate people ~~out of~~ from the corridor, earth berms, fencing, and vegetation will be used. Some areas will not have fencing~~, such as the Sepulveda Basin~~. However, in most areas, bike paths and sidewalks will be separated from the corridor by fencing of sufficient height to discourage unauthorized entry into

the corridor. This will physically and visually mark the corridor as a dedicated area, not for use by pedestrians or bikes. The Chandler Boulevard segment of the full BRT would have a 4- to 5-foot-high fence with vegetation and breaks in the fencing at the mid-block crossings to allow for pedestrian access across the corridor.

As a result of the dedicated corridor and integrated safety features (for drivers, bikes, and pedestrians), the project would have, at most, a minor adverse impact under NEPA (not significant impact under CEQA) on safety.

4-13.3.2 Crime Prevention – All Alternatives

The study area is served by the City of Los Angeles Police Department (LAPD), which is divided into four bureaus—the Valley Bureau dealing with crimes within the San Fernando Valley. Each bureau is further divided into divisions that provide protection and services to the local communities. The Van Nuys, West Valley, and North Hollywood divisions operate within the Valley Bureau in the proposed project area. Table 4-55 and Table 4-56 display the number of property crimes and crimes against persons reported by the LAPD Van Nuys, West Valley, and North Hollywood divisions for MTA-reported crimes and community crimes, respectively.

Table 4-55: Los Angeles Police Department Valley Bureau 1999 MTA Reported Crimes

Category	Van Nuys	West Valley	North Hollywood
Crimes Involving Property			
Vandalism	7	8	7
Larceny/Theft	12	4	3
Crimes Against Persons			
Assault	14	10	3
Robbery	11	6	3
Total	44	28	16

Los Angeles Police Department, 2000.

Table 4-56: Los Angeles Police Department Valley Bureau 1997 Community-Wide Crime Data

Category	Van Nuys	West Valley	North Hollywood
Crimes Involving Property			
Vandalism	1801	1728	1701
Larceny/Theft	8773	8889	7438
Crimes Against Persons			
Aggravated assault	2121	1499	1698
Robberies	935	792	796
Total	13630	12908	11633

Los Angeles Police Department, 2000.

The comparison of crimes occurring on MTA buses compared with crimes occurring in the community are presented below in Table 4-57. This comparison demonstrates that potential crimes on MTA buses are a small fraction of the crimes occurring in the communities. The proposed project would not be expected to substantially alter the number of crimes occurring on MTA property, although reductions in crime statistics may be possible as a result of additional safety and surveillance measures that would be implemented as part of the design of stations.

Table 4-57: Community (1997) vs. MTA (1999) Crime Statistics

	Van Nuys	West Valley	North Hollywood
Total MTA crimes	44	28	16
Total Community Crimes	13630	12908	11633
Percent	0.3%	0.2%	0.1%

Los Angeles Police Department, 2000.

Many residential areas are adjacent to the corridor, stations, and parking lots; and therefore, lighting and fencing will also be part of the project design to enhance security. For some neighborhoods immediately adjacent to the corridor, a 12-foot-high sound wall barrier (combination berm and soundwall) will be installed to mitigate noise impacts (see Section 4-9). This will also act as a security wall between the residents and the corridor. At intersections and where the proposed fencing is not installed along the ROW line, fencing along the corridor will be extended to connect with soundwalls of the adjacent properties to deny pedestrian access to those portions of the right-of-way between the ROW and back yard fences of private properties. Park-and-Ride lots will also be fenced.

The proposed project would incorporate all the preventative measures mentioned previously, in addition to MTA crime prevention policies, to deter criminal acts and protect passengers, employees, and the community from crime. The proposed project could potentially have less crime (than other transit systems) as a result of the installation of emergency telephones at each platform, potentially closed-circuit monitoring systems, bike lockers, fencing, and lighting at stations and parking lots. Therefore, the proposed project would have a not adverse impact under NEPA (not significant impact under CEQA).

4-13.3.3 Emergency Response

a. No Build

There would be no impacts to emergency response under this alternative, since it would maintain present conditions.

b. TSM

The addition of more buses to the existing system would not negatively affect emergency access or evacuation routes, since it would only marginally affect traffic conditions. This alternative would have a not adverse impact under NEPA (not significant impact under CEQA) on emergency response in the Valley.

c. Full BRT, Lankershim/Oxnard On-Street Alignment, and Minimum Operable Segment (MOS)

The dedicated corridor segments within the alternative or alignments would not block or interrupt emergency access or evacuation routes. The on-street segments of the Lankershim/Oxnard On-Street and MOS would add buses to the mixed-flow traffic, which would also have no impact on emergency access or evacuation routes. However, should a major accident occur within the dedicated corridor, or should there be a substantial emergency of some kind, emergency vehicles could, with permission from the MTA, use the corridor as an emergency access route. This alternative would have a not adverse impact under NEPA (not significant impact under CEQA).

4-13.4 Mitigation Measures

4-13.4.1 No Build Alternative

No mitigation is required.

4-13.4.2 Transportation System Management (TSM) Alternative

No mitigation is required.

4-13.4.3 Full BRT, Lankershim/Oxnard On-Street Alignment, and MOS

S&S-1: Although mitigation measures for the BRT, Lankershim/Oxnard On-Street or the MOS alignments are not required to reduce adverse impacts under NEPA (significant impacts under CEQA), the following are proposed as enhancements that would further improve MTA safety and security.

- Bus stop platforms and surrounding areas will be designed to minimize conflicts involving buses, auto traffic, and pedestrian traffic at intersections. Lighting, landscaping, and walkways will be provided for pedestrians.
- Stations will provide lighting, cover, and an open design conducive to surveillance by security personnel. Additional station safety measures may include bike lockers, emergency telephones, public announcement (PA) systems, LAPD patrols, and bus driver/dispatch communication.
- Communication systems will include an emergency radio on the buses to ensure quick response to incidents.
- Transit police will be assigned routine patrol routes along or in proximity of the busway.
- Crossing protection devices including signs~~, pedestrian "Z" (or similar) gates,~~ and road painting/striping at intersections ~~may~~ will be provided.
- ~~Implementation of~~ Los Angeles Department of Transportation (LADOT) standards for bicycle and pedestrian safety will be implemented.

4-14 CULTURAL RESOURCES

4-14.1 Setting

The proposed project is located in an area that was part of the prehistoric remains of the Canaliño culture. Historically, the proposed project falls within the historical territory of the Takic-speaking Gabrieliño; specifically the Fernandeño dialect of the Gabrieliño. Although contact with the indigenous peoples was made by the Spanish with the arrival of the Cabrillo (1542), Vizcaino (1602), and Portola (1769) expeditions, European settlement in the region did not begin until establishment of the Mission San Gabriel Archangel in 1771 and the pueblo at Los Angeles in 1781. Settlement and use of the San Fernando Valley lagged behind the growth of the pueblo. Francisco Reyes, *alcalde* (mayor) of the pueblo from 1793 to 1795, built a house in the San Fernando Valley. The Reyes ranch, where he kept livestock with Comelio Avila, became the foundation for the Mission at San Fernando, which was established in 1797. Mexican independence in 1821 subsequently led to the secularization of mission lands in 1833, with Lieutenant Antonio del Valle acting as administrator. With the signing of the Treaty of Guadalupe Hidalgo in 1848, California became a territory of the United States. During the following 20 years, Eulogio de Celis, Pio Pico, Andres Pico, and Juan Manso each owned and controlled a portion of the valley.

In 1869, the southern 60,000 acres of the valley, which includes present-day North Hollywood, Van Nuys, Reseda, and Canoga Park, were purchased from Pio Pico by the San Fernando Homestead Association for $115,000. The purchase was financed by Isaac Lankershim, who hired his son-in-law, Isaac Newton Van Nuys, to manage the ranch. The Southern Pacific Railroad reached the valley in 1873, extending their service 25 miles northwest from Los Angeles along San Fernando Road. The Chatsworth Park Branch, which provided rail service to the southern half of the Valley, was completed in 1893. Also known as the Burbank Branch, the Chatsworth Park Branch provided some passenger service, but was constructed primarily to transport the Valley wheat and barley crops to Los Angeles and, from there, to San Pedro and the world market. By 1888, the increase in property values that occurred following the arrival of the railroad convinced the Lankershim heirs to begin subdividing approximately 12,000 acres of the ranch for development. The resulting community was first known as Toluca, then Lankershim, and finally North Hollywood.

The rapid process of subdivision and development began in earnest after the remaining approximately 47,500 acres of the Lankershim ranch were sold to the Los Angeles Suburban Homes Company in 1909 for $2.5 million. Composed of a syndicate of 30 men, including H.J. Whitley, Harry Chandler, and Harrison Gray Otis, the company anticipated the benefits of the completion of the Owens Valley Aqueduct. Using their political connections, the syndicate also persuaded the Pacific Electric to begin Red Car passenger service from Los Angeles in 1912, effectively eliminating the need for passenger service on the Southern Pacific (SP). The Red Cars ran on tracks parallel to the ~~SP~~ MTA ROW along Chandler Boulevard, then north on Van Nuys Boulevard to Sherman Way. After the floods of 1938 destroyed both rail bridges over the Tujunga Wash, the SP and Pacific Electric joined forces to reconstruct one bridge which was

shared by the two enterprises. The Owens Valley Aqueduct was completed in 1913, at a cost of approximately $24 million under the direction of William Mulholland, Superintendent of the Water Commission. Once water became available in the San Fernando Valley, little impediment remained for the further development of the area.

Census figures indicate that the Valley population increased from 3,300 occupants in 1910, to more than 200,000 by 1940, indicating that the community had completed its transformation from a sparsely settled agricultural region to a residential suburb. By 1950, the population of the Valley jumped to approximately 500,000. The staggering population increase can be attributed primarily to the residential and industrial growth caused by World War II. Although the San Fernando Valley had been the home to several motion picture studios for decades, the start of the war bolstered the production at aeronautics companies headquartered in the area. Vega Airplane Company, Lockheed Corporation, and Bendix Aviation all played a major role in supplying aircraft to allied forces. Lockheed, which purchased Vega, employed approximately 50,000 people by 1941, of which 30% were women. By the end of the war, Lockheed had 90,000 workers and had supplied more than 20,000 planes. Workers employed by the factories created a need for housing, amenities, and capital improvements. Demand for housing was met by a flurry of construction, resulting in hundreds of tract home developments containing primarily Minimal Traditional or Contemporary style residences. Approximately 90% of the buildings within the project study area (see Section 4-14.2 for a definition) were constructed during or after 1942, evidence of the extensive World War II-related and post-war development in the San Fernando Valley.

4-14.2 Impact Analysis Methodology and Evaluation Criteria

Federal funds might be used for construction of the proposed project, which would require compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, hereafter "NHPA"). Because it is a discretionary act of a governmental agency, it must meet the requirements of the California Environmental Quality Act (PRC §21084.1; hereafter "CEQA"). Consequently, historic properties were identified and their significance evaluated using both the National Register of Historic Places and California Register of Historical Resources eligibility criteria. Any resource determined eligible for listing in the National Register is automatically listed in the California Register. The California Register, however, allows for the listing of some properties that would not be considered eligible for the National Register, such as those that have been moved from their original location.

- **Area of Potential Effects**

Section 106 of the NHPA requires the delineation of an Area of Potential Effects (APE) [(36 CFR Part 800.4(a)(1)], which is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" [36 CFR Part 800.16(d)]. The APE defined under the federal guidance is adequate as a study area for compliance with CEQA.

The APE for archaeological resources is limited to the area that would be disturbed during construction, including the maximum required right-of-way and any permanent or temporary easements. The APE for historic and architectural resources includes the APE for archaeological resources, as well as all parcels adjacent to the proposed maximum right-of-way, and areas where visual or audible changes could occur outside the required right-of-way.

❑ Identification of Archaeological Resources

A complete description of background research and field investigation results are contained in the *Phase I Archaeological Survey/Class III Inventory,* which was completed by W & S Consultants. A copy of the archaeological report is included with the *Request for Determination of Eligibility and Effects Report,* prepared for this project under separate cover.

• Archival Research

The South Central Coastal Information Center, which is part of the California Historical Resources Information System, conducted a record search on September 14, 2000. According to the results of the search, the approximate eastern half of the APE had been surveyed in 1996. Numerous additional Phase I surveys had covered portions of the APE, including its western terminus. No prehistoric or historical archaeological sites had been recorded within the APE or within a half-mile radius of it.

In addition to the record search, period maps and local histories were also examined to further clarify the potential for extant cultural resources within the proposed project's APE. The 1898 U.S.G.S. Santa Monica Quadrangle shows the Chatsworth Park Branch of the Southern Pacific Railroad in-place before the turn of the 20th century. The route of this early rail line serves as the primary alignment for the proposed project. Rail sidings are labeled at Toluca and Kester, located in the vicinity of modern North Hollywood and Van Nuys, respectively. The Toluca siding extends from Lankershim westward past Tujunga approximately to present day State Route 170. Both of these sidings fall within the proposed project's APE.

A sparse network of roads was also present by 1898; however, the number of buildings and structures at the time is extremely low. The map shows no indication of structures near the proposed alignment.

A review of the history of this portion of the San Fernando Valley suggests that the potential for historical cultural resources will be greatest along Lankershim Boulevard, which was one of the first streets developed in this part of the valley; along Chandler Boulevard, which was a primary east-west transportation corridor historically, especially near its intersection with Lankershim; in the Van Nuys section of the route, which was subdivided and developed during the 1890s; and within the Southern Pacific right-of-way. The sidings at Toluca and Kester were constructed prior to 1898 and the siding at Van Nuys was completed by 1912.

According to the results of the record search, no prehistoric sites are known to exist within one-half mile of the proposed project alignment. Given the general nature of the terrain within which

the proposed project is located, the probability of encountering prehistoric sites does not appear to be high. The alignment does, however, intersect a series of drainages that appear on historical maps, including Tujunga Wash (labeled "Pacoima Wash" on historical maps). The alignment also crosses a number of tributaries to the Los Angeles River. Given the lack of information regarding prehistoric settlement patterns in the San Fernando Valley, an absolute assessment of the sensitivity of these areas is not possible. As a general rule, however, areas near former water courses have a higher sensitivity for archaeological sites than other portions of the alignment.

- **Field Reconnaissance**

A Phase I archaeological survey/Class III inventory of the proposed project's APE was conducted on October 2 through 5, 2000, by archaeologists meeting the Secretary of the Interior's *Professional Qualifications Standards* (FR 190:44738-44739). The survey effort included background studies of the prehistory, ethnography, and land-use history of the APE; an archival records search of published and unpublished books, articles, photographs, maps, site forms, and documents; and an intensive, on-foot survey of the APE.

The APE was found to be urbanized throughout the majority of its length; thus, the ground surface has been highly disturbed. The alignment remains primarily within the Southern Pacific Railroad right-of-way (~~SP~~ MTA ROW). At the eastern end of the alignment, Chandler Boulevard retains its original 1911 configuration, with a central median strip containing a rail track separating two road beds. Portions of the original landscaping appear to be present within sections of this street, including examples of Monterey pine, eucalyptus, and palm trees.

The ~~SP~~ MTA ROW leaves Chandler Boulevard west of Coldwater Canyon Avenue, and proceeds on a northwest diagonal to Woodman Avenue where it continues in an east-west direction north of Oxnard Street. The ground surface within this portion of the ~~SP~~ MTA ROW has been graded and covered with fill and/or gravel, and is surrounded by high-density commercial and light industrial establishments, many of which have been built out to the property line of the ~~SP~~ MTA ROW.

West of the San Diego Freeway, the APE crosses the Sepulveda Flood Control Basin and follows the ~~SP~~ MTA ROW until Variel Avenue, where the project alignment leaves the tracks and proceeds on-street to Warner Center. Much of the APE between the San Diego Freeway and Topanga Canyon Boulevard contains post-World War II tract housing.

Throughout the APE, the ~~SP~~ MTA ROW was graded and then covered with gravel ballast to create an elevated rail bed, and is accordingly heavily disturbed. The Chatsworth Park Branch, which was abandoned by SP and sold to MTA in the early 1990s, and has been used for illegal dumping. Items such as broken glass and cans were noted within the project APE; however, none could be identified as historical in nature or age. Present conditions are such that any extant remains of a prehistoric or historical nature within the study area would have been effectively impossible to identify in the field. Although excavation required for construction of the busway would be relatively shallow, a possibility exists that the proposed project could affect unknown cultural resources. Appropriate mitigation measures are discussed in Section 5-15.3.3.

The Lankershim/Oxnard On-Street Alignment follows Lankershim Boulevard north from the ~~SP~~ MTA ROW, then proceeds west on Oxnard Street to its intersection with the ~~SP~~ MTA ROW east of Woodman Avenue. Because buses would operate on existing streets, use of the on-street portion of the Lankershim/Oxnard On-Street Alignment would not affect cultural resources; therefore, it was not surveyed.

❑ Identification of Historical and Architectural Resources

A complete description of background research and field investigation results is contained in the *Request for Determination of Eligibility and Effects Report* completed under separate cover for this project.

• Archival Research

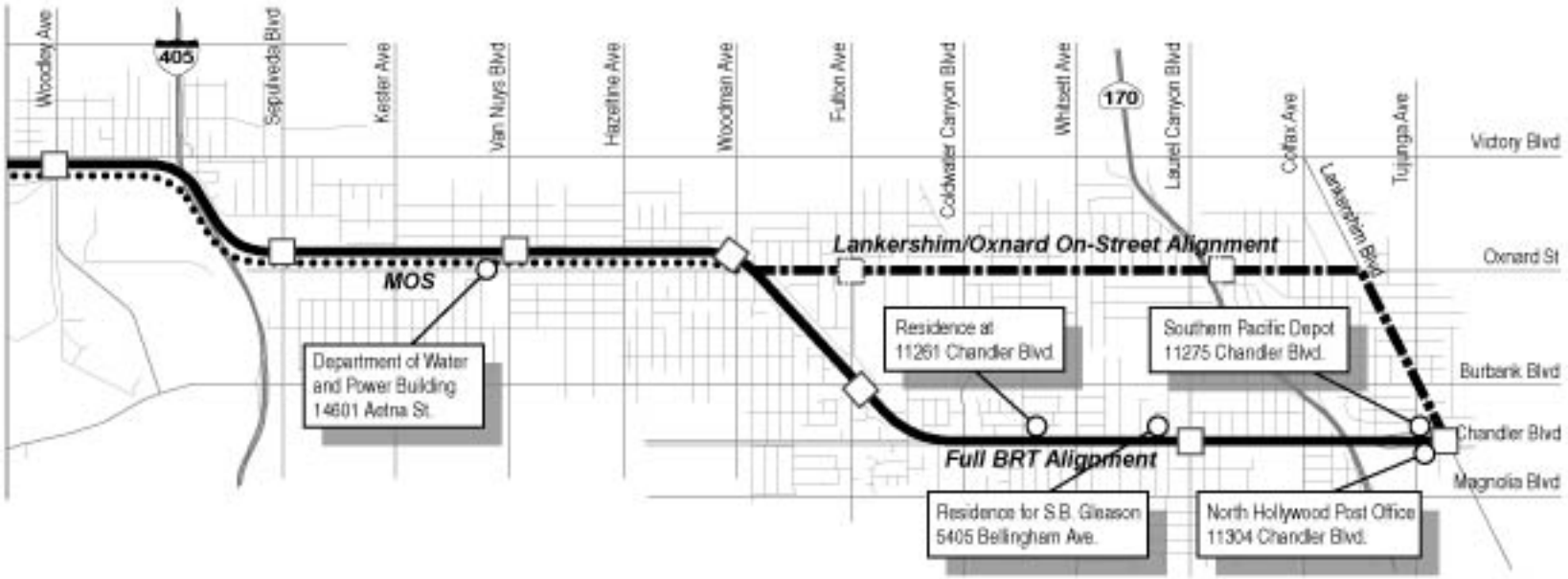
National, state, and local inventories and lists were reviewed to determine previously identified historical resources. According to the record search completed by the South Central Coastal Information center, no resources within the APE are currently listed in the National Register of Historic Places (National Register), California Historical Landmarks, California Points of Historical Interest, or City of Los Angeles Historic-Cultural Monuments. One resource within the APE, the Lankershim Depot, was previously determined eligible for listing in the National Register and is currently listed in the California Register of Historical Resources (California Register).

• Field Reconnaissance

A reconnaissance survey of the proposed project's APE was conducted on September 6 and September 26, 2000, by an architectural historian who meets the Secretary of the Interior's *Professional Qualifications Standards* (FR 190:44738-44739). A large percentage of the properties meeting the 50 year age requirement for listing in either the National or California registers were constructed during the post-World War II building boom and are Minimal Traditional style tract housing. Two resources, the S.B. Gleason Residence and the DWP Building, were identified during the field survey as meeting the eligibility criteria for listing in the National and California Registers. Two additional buildings, the Masciotra Residence at 12641 Chandler Boulevard, and the North Hollywood Post Office at 11304 Chandler Boulevard, were identified as meeting the criteria for listing in the California Register.

• Results of Investigation

Following is a brief description of the historical resources identified during archival or field investigations. A more complete description of the findings is contained in the *Request for Determination of Eligibility and Effects Report*, completed for this project under separate cover, and are subject to concurrence from the California State Historic Preservation Officer (SHPO). Figure 4-59 provides a map identifying the location of the historical resources.



Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-59: Location of Historic Resources

Lankershim Southern Pacific Depot, 11275 Chandler Boulevard

The Lankershim Depot was constructed in 1896 by the Southern Pacific Railroad on the Chatsworth Park Branch line to serve the agricultural needs of the Lankershim Ranch and passenger needs of the community of Toluca (later known as Lankershim and North Hollywood). From 1911 to 1952, this one story, wood frame building also provided passenger service for the Pacific Electric Railway as part of its San Fernando Valley line. In later years, it was used for lumber storage by Hendrick's Builders Supply Company. The Depot is located in the wide median of Chandler Boulevard, immediately west of Lankershim Boulevard, on property purchased by LACTC (now MTA) in 1991 (see Figure 4-60).

The Depot was determined eligible for listing in the National Register on May 24, 1983, as a result of a study conducted for an earlier Metro Rail project. Consequently, it is automatically listed on the California Register. The building is important for its association with the early growth and subsequent settlement of North Hollywood and as a relatively unaltered example of a rare building type: a nineteenth century, wood frame, railroad depot in Southern California. It is also one of the only surviving non-adobe structures constructed during the nineteenth century in the Valley.

Residence for S.B. Gleason, 5404 Bellingham Avenue

The S.B. Gleason Residence is located at the northeast corner of Chandler Boulevard and Bellingham Avenue approximately 60 feet from the median of Chandler Boulevard, and approximately 500 feet west of the proposed Laurel Canyon Station. It was constructed in the Streamline Moderne style by architect Milton J. Black. Black was one of Los Angeles' most prolific designers of the Streamline Moderne style during its period of popularity. The vast majority of Black's work was undertaken in the Hollywood-West Hollywood area, and the 1936 Gleason Residence is Black's only known design in the Valley (see Figure 4-61). Black's most important Streamline Moderne designs may be found in a group of approximately 10 apartment buildings constructed near Kings Road and 1st Street between 1935 and 1936. The apartments are regarded as the finest grouping of Streamline Moderne residential buildings in Los Angeles. Black's other important designs include the Westwood-Ambassador Apartments (1940) at 10427 Wilshire; the Cernitz House (1938) at 601 Amalfi; and a Moderne interpretation of the Spanish Colonial Revival style at the El Cadiz Apartments (1936) located at 1721-1731 N. Sycamore. The Gleason Residence appears eligible for listing in the National Register under Criterion (C) and the California Register under Criterion 3 for the quality of its Streamline Moderne design. FTA will be submitting this finding of National Register eligibility to the SHPO for concurrence.

Residence for Mike Masciotra, 12641 Chandler Boulevard

The Masciotra Residence at 12641 Chandler Boulevard is located approximately 60 feet north of the Chandler Boulevard ~~SP~~ MTA ROW. Constructed in 1928, the Masciotra Residence was designed by Milton R. Sutton in the Storybook/English Revival style, an unusual architectural style that is occasionally found in the Los Angeles basin, but rarely in the San Fernando Valley (see Figure 4-62). The resource is located on a large parcel and is one of the earliest resources along the

Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-60: Lankershim (Toluca) Southern Pacific Depot, 11275 Chandler Boulevard

Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-61: Residence for S.B. Gleason, 5404 Bellingham Avenue

Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-62: Mike Masciotra Residence, 12641 Chandler Boulevard

section of Chandler Boulevard that falls within the proposed project's APE. The resource appears to be eligible for listing in the California Register under Criterion 3 for its quality of architectural design.

North Hollywood Post Office, 11304 Chandler Boulevard

The North Hollywood Post Office is located approximatey 60 feet south of the Chandler Boulevard ~~SP~~ MTA ROW. Constructed in 1936 at a cost of $100,000 the North Hollywood Post Office was the realization of a 7-year campaign by the Chamber of Comerce to secure a new post office for the growing community of North Hollywood. It was designed in a restrained Spanish Colonial Revival style, and is a good representative example of regional government architecture in Los Angeles, as well as being one of the earlier government buildings in the San Fernando Valley (see Figure 4-63) The resource appears to be eligible for listing in the California Register under Criterion 3 for its quality of architectural design.

Department of Water and Power Building, 14601 Aetna Street

The Department of Water and Power (DWP) Building, which is located at the northwest corner of Aetna Street and Vesper Avenue, approximately 30 feet south of the ~~SP~~ MTA ROW and approximately 750 feet west of the proposed Van Nuys Station. It is a good example of the PWA Moderne architectural style, a style that was commonly used for utilitarian buildings and structures during the 1930s (see Figure 4-64). Generally, intact examples of the PWA Moderne style are becoming increasingly rare; however, those constructed for the DWP are still evident throughout Los Angeles. Within the context of the San Fernando Valley the DWP building appears to be individually eligible for the National Register at the local level under criterion (C) and the California Register under Criterion 3 because it is a relatively rare example of PWA Moderne architecture in a municipal structure within the San Fernando Valley. The period of significance for the DWP building is 1938. FTA will be submitting this finding of National Register eligibility to the SHPO for concurrence.

SP Burbank-Chatsworth Branch Rail Line

To evaluate the significance of the Burbank-Chatsworth rail line, John R. Signor, a railroad historian, conducted research and a field review of the Burbank-Chatsworth Branch railroad corridor. The complete report is contained in the *Request for Determination of Eligibility and Effects Report* completed under separate cover. The conclusions are as follows.

> The Burbank-Chatsworth Branch as a railroad line does not meet any of the National Register criteria. While it might be argued that Collis Huntington was connected with the branch, it was in no way a unique association, as the mogul was involved in building thousands of miles of railroad throughout California. As an engineering site, it has no distinctive characteristics of a type, period, or method of construction, and was one of many southern California branch lines built to open new territory during California's railroad building era prior to 1910. No significant railroad buildings survive, with the exception of the North Hollywood station, which is currently under restoration, and none of the original track structure.

Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-63: North Hollywood Post Office, 11304 Chandler Boulevard

Source: Myra L. Frank & Associates, Inc., 2001.

Figure 4-64: Department of Water and Power Building, 14601 Aetna Street