

**GEOLOGY SUMMARY TABLES BY REGION**

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## APPENDIX 3.13-A

**GEOLOGY SUMMARY TABLES BY REGION**

**Table 3.13-A-1**  
**Summary Table: Geology and Soils, Bay Area to Merced**

Improvement Location	Seismic Hazards	Active Fault Crossings	Slope Stability	Difficult Excavation	Oil and Gas Fields	Mineral Resources
<b>No Project Alternative</b>						
<i>Highways</i>						
I-80 from I-5 to I-880	H	H	L	L	L	L
I-80 from I-880 to US-101	H	L	L	L	L	L
SR-152 from SR-99 to I-5	L	L	L	L	L	L
I-580 from I-880 to I-5	H	H	L	L	L	L
US-101 from I-880 to SR-152	H	L	L	L	L	L
SR-152 from US-101 to I-5	H	H	H	H	L	L
I-880 from I-80 to US-101 - East Bay	H	L	L	L	L	L
US-101 from I-80 to I-880 - West Bay	H	L	L	L	L	L
<i>Airports</i>						
San Francisco	P	NP	NP	NP	NP	NP
Oakland	P	NP	NP	NP	NP	NP
San Jose	P	NP	NP	NP	NP	NP
<b>Modal Alternative</b>						
<i>Highways</i>						
I-80 from I-5 to I-880	H	H	L	L	L	L
I-80 from I-880 to US-101	H	L	L	L	L	L
SR-152 from SR-99 to I-5	L	L	L	L	L	L
I-580 from I-880 to I-5	H	H	L	L	L	H
US-101 from I-880 to SR-152	H	L	L	L	L	H
SR-152 from US-101 to I-5	H	H	H	H	L	L
I-880 from I-80 to US-101 - East Bay	H	L	L	L	L	L
US-101 from I-80 to I-880 -West Bay	H	L	L	L	L	L
<i>Airports</i>						
San Francisco	P	NP	NP	NP	NP	NP
Oakland	P	NP	NP	NP	NP	NP
San Jose	P	NP	NP	NP	NP	NP

Improvement Location	Seismic Hazards	Active Fault Crossings	Slope Stability	Difficult Excavation	Oil and Gas Fields	Mineral Resources
<b>High-Speed Train Alternative</b>						
<b>San Jose to San Francisco</b>						
Alignment	H	L	L	L	L	H
<i>Stations</i>						
Transbay Terminal	P	NP	NP	P	NP	NP
4th and King	P	NP	NP	NP	NP	NP
Millbrae	P	NP	NP	NP	NP	NP
Redwood City	P	NP	NP	NP	NP	NP
Palo Alto	P	NP	NP	NP	NP	NP
Santa Clara	P	NP	NP	NP	NP	NP
<b>San Jose to Oakland</b>						
<i>Alignments</i>						
Hayward/I-880	H	M-H	L	L	L	L
Hayward/Niles/Mulford	H	H	L	L	L	H
<i>Stations</i>						
West Oakland	P	NP	NP	NP	NP	NP
12th Street/City Center	P	NP	NP	P	NP	NP
Coliseum BART Station	P	NP	NP	NP	NP	NP
Union City	P	NP	NP	NP	NP	NP
Fremont	P	NP	NP	NP	NP	NP
<b>San Jose to Merced</b>						
<i>Alignments</i>						
Northern Diablo Range	M	H	L	M	L	H
Diablo Range Direct, tunnel under park	M	H	L	M	L	H
Diablo Range Direct, minimize tunnels	M	H	M	M	L	H
Caltrain/Gilroy Pacheco Pass	M	H	L	L-M	L	L
Gilroy Bypass	M	H	L	M	L	L
<i>Stations</i>						
San Jose (Diridon)	P	NP	NP	NP	NP	NP
Morgan Hill	P	NP	NP	NP	NP	NP
Gilroy	P	NP	NP	NP	NP	NP
Los Banos	NP	NP	NP	NP	NP	NP

**Table 3.13-A-2**  
**Summary Table: Geology and Soils, Sacramento to Bakersfield**

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<b>No Project Alternative</b>						
Region-wide	L	L	L	L	L	L
<b>Modal Alternative</b>						
<i>Highways</i>						
Sacramento to Stockton	L	L	L	L	H	L
I-5: I-80 to Stockton	L	L	L	L	L	L
SR-99: Sacramento to SR-120	L	L	L	L	L	L
Stockton to Modesto	M	H	L	L	L	L
I-5: Stockton to I-580/SR-120	M	H	L	L	L	L
I-5: I-580/SR-120 to SR-152	H	H	L	L	L	L
SR-99: SR-120 to Modesto	L	L	L	L	L	L
Modesto to Merced	L	L	L	L	L	L
SR-99: Modesto to Merced	L	L	L	L	L	L
Merced to Fresno	L	L	L	L	L	L
SR-99: Merced to SR-152	L	L	L	L	L	L
SR-99: SR-152 to Fresno	L	L	L	L	L	L
I-5: SR-152 to Fresno	L	L	L	L	L	L
Fresno to Tulare	L	L	L	L	L	L
I-5: Fresno to Tulare	L	L	L	L	L	L
SR-99: Fresno to Tulare	L	L	L	L	L	L
Tulare to Bakersfield	M	H	L	L	L	L
I-5: Tulare to SR-99	L	H	L	L	L	L
SR-99: Tulare to SR-58	L	L	L	L	L	L
<i>Airports</i>						
Sacramento	NP	NP	NP	NP	P	NP
Fresno	NP	NP	NP	NP	NP	NP
<b>High-Speed Train Alternative</b>						
<i>Alignments</i>						
Sacramento to Stockton (A1-A8)	L	L	L	L	L	H
Stockton to Modesto (B1, B2)	L	L	L	L	L	L
Modesto to Merced (C1-C16)	L	L	L	L	L	L
Merced to Fresno (D1-D8)	L	L	L	L	L	L
Fresno to Tulare (E1, E2)	L	L	L	L	L	L
Tulare to Bakersfield (F1-F14, F16, F18, F24)	L	L	L	L	L	L

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
Tulare to Bakersfield (F15, F17, F19-F23)	L	L	L	L	M	L
<i>Stations</i>						
Sacramento Downtown Depot	NP	NP	NP	NP	NP	NP
Power Inn Road Station	NP	NP	NP	NP	NP	NP
Stockton Downtown Station	NP	NP	NP	NP	P	NP
Modesto Downtown Station	NP	NP	NP	NP	NP	NP
Modesto Briggsmore Station	NP	NP	NP	NP	NP	NP
Merced Downtown Station	NP	NP	NP	NP	NP	NP
Merced Municipal Airport Station	NP	NP	NP	NP	NP	NP
Castle Air Force Base Station	NP	NP	NP	NP	NP	NP
Fresno Downtown Station	NP	NP	NP	NP	NP	NP
Visalia Airport	NP	NP	NP	NP	NP	NP
Hanford Station	NP	NP	NP	NP	NP	NP
Bakersfield Airport Station	NP	NP	NP	NP	P	NP
Golden State Station	NP	NP	NP	NP	P	NP
Truxton (Amtrak) Station	NP	NP	NP	NP	NP	NP
Union Station	NP	NP	NP	NP	NP	NP
<i>Maintenance Facilities</i>						
Sacramento Maintenance Facility BNSF Alternative	NP	NP	NP	NP	NP	P
Sacramento Maintenance Facility UPRR Alternative	NP	NP	NP	NP	NP	NP
Main Maintenance Facility BNSF Alternative	NP	NP	NP	NP	P	NP
Main Maintenance Facility UPRR Alternative	NP	NP	NP	NP	NP	NP

**Table 3.13-A-3**  
**Summary Table: Geology and Soils, Bakersfield to Los Angeles**

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<b>No Project Alternative</b>						
Region-wide	L	L	L	L	L	L
<b>Modal Alternative</b>						
<i>Highways</i>						
I-5: SR-99 to SR-14	H	H	M	H	L	L
I-5: SR-14 to I-405	H	M	L	L	L	L
I-5: SR-405 to Burbank	H	H	L	L	L	L
I-5: Burbank to LAUS	H	L	L	L	L	L
SR-58/11: SR-99 to Palmdale	H	H	L	L	L	L
SR-14: Palmdale to I-5	H	H	L	H	L	L
<i>Airports</i>						
Burbank	P	P	NP	NP	NP	NP
<b>High-Speed Train Alternative</b>						
<i>Alignments</i>						
Wheeler Ridge Corridor	H	M	L	L	M	L
Union Avenue Corridor	H	M	L	L	H	L
Metrolink/UPRR: Sylmar Station to Metrolink	H	M	L	L	L	L
Metrolink/UPRR: Sylmar Station Siding	H	M	L	L	L	L
Metrolink/UPRR: Sylmar Station North	H	L	L	L	L	L
SR-58 Corridor	H	H	L	H	L	L
South Connection	H	L	L	L	L	L
Soledad Canyon Corridor	H	H	L	H	L	L
Metrolink/UPRR: Under I-5 and SR-110	H	L	L	L	L	L
Metrolink/UPRR: Over I-5 and SR-110	H	L	L	L	L	L
Metrolink/UPRR: Over and Under I-5 and SR-110	H	L	L	L	L	L
Metrolink/UPRR: Glendale	H	M	L	L	L	L
LAUS: South Siding	H	L	L	L	L	L
LAUS: East Bank Siding	H	L	L	L	L	L
LAUS: East Bank North	H	L	L	L	L	L
I-5: Tehachapi Corridor	H	H	M	L	L	L
I-5: Silverlake Aerial/Cut-and-Cover Option	H	L	H	L	L	L

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
I-5: Glendale	H	M	L	L	L	L
LAUS: Existing South	H	L	L	L	H	L
LAUS: Existing Siding	H	L	L	L	L	L
LAUS: Existing East	H	L	L	L	H	L
East Connection	H	L	L	L	L	L
I-5: Burbank Downtown Siding	H	L	L	L	L	L
Metrolink/UPRR: Burbank Downtown Siding	H	L	L	L	L	L
Burbank Downtown Siding	H	L	L	L	L	L
Burbank Airport Siding	H	L	L	L	L	L
Antelope Valley Corridor	H	L	L	L	L	L
Burbank Airport to Downtown	H	L	L	L	L	L
Maintenance Yard	H	L	L	L	L	L
Palmdale Siding	H	L	L	L	L	L
<i>Stations</i>						
Burbank Airport Station	P	NP	NP	NP	NP	NP
Union Station East	P	NP	NP	NP	NP	NP
Union Station South	P	NP	NP	NP	NP	NP

**Table 3.13-A-4**  
**Summary Table: Geology and Soils, Los Angeles to San Diego via Inland Empire**

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<b>No Project Alternative</b>						
Region-wide	L	L	L	L	L	L
<b>Modal Alternative</b>						
<i>Highways</i>						
Union Station to March Air Reserve Base (I-10, I-15, I-215)	H	H	L	H	L	H
March Air Reserve Base to Mira Mesa (I-15, I-215)	H	H	L	H	L	H
Mira Mesa to San Diego (I-15, I-8, SR-163)	H	H	L	H	L	H
<b>High-Speed Train Alternative</b>						
<b>Union Station to March Air Reserve Base</b>						
<i>Alignments</i>						
UPRR/Colton Line (1A1, 1A2, 1A3, 1A4)	H	H	L	M	L	H
UPRR/Colton Line via San Bernardino (1A1, 1A2, 1C1, 1A4)	H	H	L	M	L	H
UPRR/Riverside Line – UPRR/Colton Line (1B1, 1A2, 1A3, 1A4)	H	L	L	M	M	H
UPRR/Riverside – UPRR/Colton Line via San Bernardino (1B1, 1A2, 1C1, 1A4)	H	H	L	M	M	H
<i>Stations</i>						
El Monte Station	P	NP	NP	NP	NP	NP
Pomona Station	P	NP	NP	NP	NP	NP
Ontario Station	P	NP	NP	NP	NP	P
Colton Station	P	NP	NP	NP	NP	NP
University of California Riverside Station	P	NP	NP	P	NP	NP
South El Monte Station	P	NP	NP	P	P	NP
City of Industry Station	P	NP	NP	NP	NP	NP
San Bernardino Station	P	NP	NP	NP	NP	NP
<b>March Air Reserve Base to Mira Mesa</b>						
<i>Alignments</i>						
San Jacinto to I-15 via Escondido (2A1, 2A2, 2A3)	H	H	L	H	L	L
San Jacinto to I-15 via Escondido Transit Center (2A1, 2B1, 2A3)	H	H	L	H	L	L



<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<i>Stations</i>						
March Air Reserve Base Station	P	NP	NP	NP	NP	NP
Temecula Station	P	P	NP	NP	NP	NP
Escondido Station	NP	NP	NP	P	NP	NP
Escondido Transit Center Station	NP	NP	NP	P	NP	NP
<b>Mira Mesa to San Diego</b>						
<i>Alignments</i>						
I-15 to Coast via Miramar Road (3C1, 3B2)	H	H	L	H	L	L
I-15 to Coast via Carroll Canyon (3B1, 3B2)	H	H	L	H	L	L
I-15 to Qualcomm Stadium (3A1)	M	M	L	H	L	L
<i>Stations</i>						
Mira Mesa Station	NP	NP	NP	P	NP	P
Qualcomm Stadium Station	P	NP	NP	P	NP	NP
University Transit Center Station	P	NP	NP	P	NP	NP
San Diego International Airport Station	P	NP	NP	NP	NP	NP
San Diego Station at Santa Fe Depot	P	NP	NP	NP	NP	NP

**Table 3.13-A-5**  
**Summary Table: Geology and Soils, Los Angeles to San Diego via Orange County (LOSSAN)**

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<b>No Project Alternative</b>						
Region-wide	L	L	L	L	L	L
<b>Modal Alternative</b>						
LAX to Union Station	There are no Modal improvements proposed for this segment.					
Union Station to Irvine	H	L	L	L	L	L
Irvine to Oceanside	M	L	L	L	L	L
Oceanside to San Diego	M	H	L	L	L	L
Long Beach Airport	H	L	L	L	H	L
<b>High-Speed Train Alternative</b>						
<b>LAX to Union Station</b>						
Alignment	H	H	L	L	M	L
LAX Station	H	L	L	L	L	L
<b>Union Station to Irvine</b>						
<i>Alignment</i>						
Union Station To Anaheim Station via UPRR	H	L	L	L	M	L
<i>Stations</i>						
Norwalk	H	L	L	L	L	L
Anaheim	H	L	L	L	L	L
Union Station To Irvine Station via LOSSAN	H	L	L	L	M	L
<i>Stations</i>						
Norwalk	H	L	L	L	L	L
Fullerton	H	L	L	L	L	L
Anaheim	H	L	L	L	L	L
Santa Ana	H	L	L	L	L	L
Irvine	H	L	L	L	L	L
Higher Level Infrastructure Improvements	H	L	L	L	M	L
Lower Level Infrastructure Improvements	H	L	L	L	M	L
<i>Stations</i>						
Fullerton	H	L	L	L	L	L
Anaheim	H	L	L	L	L	L
Santa Ana	H	L	L	L	L	L
Irvine	L	L	L	L	L	L

<b>Improvement Location</b>	<b>Seismic Hazards</b>	<b>Active Fault Crossings</b>	<b>Slope Stability</b>	<b>Difficult Excavation</b>	<b>Oil and Gas Fields</b>	<b>Mineral Resources</b>
<b>Irvine to Oceanside</b>						
<i>Alignments</i>						
Higher Level Infrastructure Improvements	M	L	L	M	L	L
Lower Level Infrastructure Improvements	M	L	H	L	L	L
<i>Stations</i>						
San Joan Capistrano (Lower Level Improvements Only)	H	L	L	L	L	L
San Clemente	H	L	L	H	L	L
<b>Oceanside to San Diego</b>						
<i>Alignments</i>						
Higher Level Infrastructure Improvements	M	H	M	L	L	L
Lower Level Infrastructure Improvements	M	H	M	L	L	L
<i>Stations</i>						
Oceanside	H	L	L	L	L	L
Solana Beach	H	L	L	L	L	L
University Towne Centre (Higher Level Improvements Only)	H	L	L	H	L	L
Santa Fe Depot	H	L	L	H	L	L