

APPENDIX 2-B: APPLICABLE DESIGN STANDARDS

California High-Speed Rail Authority

Los Angeles to Anaheim *Project Section*

Draft Project Environmental Impact Report/ Environmental Impact Statement

Appendix 2-B Applicable Design Standards

December 2025



CALIFORNIA
High-Speed Rail Authority

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 22, 2024, and executed by the Federal Railroad Administration and the State of California.

APPENDIX 2-B: APPLICABLE DESIGN STANDARDS

Table 2-B-1 Transportation

Impact Category	Project Feature	Applicable Design Standards
Alteration of existing state and local roadways	Alignment (bridges and viaducts)	<p><i>Los Angeles to Anaheim Project Section: Transportation Technical Report</i></p> <p><i>California HSR Ridership and Revenue Business Plan Technical Report</i></p> <p><i>California HSR Technical Memoranda</i></p> <p><i>California HSR Design Criteria Manual (Ch 14, Stations only)</i></p> <p>Federal Railroad Administration Standards and Guidelines</p> <p>Federal Aviation Administration Design Standards</p> <p>Federal Emergency Management Agency Guidelines</p> <p>Federal Highway Administration Guidelines</p> <p>National Earthquake Hazards Reduction</p> <p>U.S. Army Corps of Engineers Guidelines</p> <p>U.S. Bureau of Land Management Surveying Manual</p> <p>United States Geological Survey Standards</p> <p>AASHTO Highway Drainage Guidelines</p> <p>AREMA Manual for Railway Engineering</p> <p>California Disabled Accessibility Guidebook</p> <p>California Seismic and Safety Commission Standards and Guidelines</p> <p>California Occupational Safety and Health Administration Standards</p> <p>Caltrans Bridge Design Manuals</p> <p>Caltrans Seismic Design Criteria</p> <p><i>Caltrans Highway Design Manual</i></p> <p>Caltrans Plans Preparation Manual</p> <p>Caltrans Project Development Procedures Manual</p> <p>Caltrans Standard Plans</p> <p>Caltrans Surveys Manual</p> <p>Caltrans Transportation Management Planning Guidelines</p> <p><i>Caltrans User's Guide to Photogrammetric Products and Services</i></p> <p>Caltrans Right-of-Way Manual, and Forms and Exhibits</p> <p>Transportation Research Board Highway Capacity Manual</p> <p>BNSF Railway Engineering Standards</p> <p>Union Pacific Railroad Engineering Standards</p> <p>Amtrak Standards and Guidelines</p> <p>Southern California Association of Governments 2016 Regional Transportation Plan/Sustainable Communities Strategy</p> <p>Southern California Regional Rail Authority Engineering Standards</p> <p>Public Utilities Commission(s)</p> <p>Regional Water Quality Control Boards</p> <p>Air Quality Districts</p> <p>Flood Control Districts</p> <p>Counties and Cities Design Criteria and Standards</p> <ul style="list-style-type: none"> ▪ Anaheim

Impact Category	Project Feature	Applicable Design Standards
		<ul style="list-style-type: none"> ▪ Bell ▪ Buena Park ▪ Commerce ▪ Fullerton ▪ La Mirada ▪ Los Angeles ▪ Los Angeles County ▪ Montebello ▪ Norwalk ▪ Orange County ▪ Pico Rivera ▪ Santa Fe Springs ▪ Vernon

AASHTO = American Association of State Highway and Transportation Officials; Amtrak = National Railroad Passenger Corporation; AREMA = American Railway Engineers and Maintenance of Way Association; Caltrans = California Department of Transportation; HSR = high-speed rail

Table 2-B-2 Air Quality

Impact Category	Project Features	Applicable Design Standards
Construction	HSR civil work and track construction (alignment, bridges, and viaducts)	<p><i>Los Angeles to Anaheim Project Section: Air Quality and Global Climate Change Technical Report</i></p> <p>The Authority would comply with the California Air Resources Board, including the South Coast Air Quality Management District.</p> <p>Emissions would be tracked by the California Air Resources Board and include ozone, carbon monoxide, carbon dioxide, hydrogen sulfate, methane, NO_x, PM_{2.5}, PM₁₀, sulfur dioxide, and lead.</p>
Operations	HSR operations	<p><i>Los Angeles to Anaheim Project Section: Air Quality and Global Climate Change Technical Report</i></p> <p>The Authority would comply with the California Air Resources Board, including the South Coast Air Quality Management District.</p> <p>Emissions would be tracked by the California Air Resources Board and include ozone, carbon monoxide, carbon dioxide, hydrogen sulfate, methane, NO_x, PM_{2.5}, PM₁₀, sulfur dioxide, and lead.</p>

Authority = California High-Speed Rail Authority; HSR = high-speed rail; NO_x = nitrogen oxides; PM₁₀ = particulate matter smaller than or equal to 10 microns in diameter; PM_{2.5} = particulate matter smaller than or equal to 2.5 microns in diameter

Table 2-B-3 Noise and Vibration

Impact Category	Project Features	Applicable Design Standards
Construction	HSR civil work and track construction (alignment, bridges, and viaducts)	<p><i>Los Angeles to Anaheim Project Section: Noise and Vibration Technical Report</i></p> <p><i>FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment Guidelines</i></p> <p><i>Federal Transit Administration Transit Noise and Vibration Assessment</i></p>

Impact Category	Project Features	Applicable Design Standards
Operations	Alignment (bridges and viaducts)	<i>Los Angeles to Anaheim Project Section: Noise and Vibration Technical Report</i> <i>FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment Guideline</i> <i>Federal Transit Administration Transit Noise and Vibration Assessment</i>

HSR = high-speed rail; FRA = Federal Railroad Administration

Table 2-B-4 Electromagnetic Fields/Electromagnetic Interference

Impact Category	Project Features	Applicable Design Standards
Electromagnetic compatibility of HSR equipment and facilities with themselves, and with equipment and facilities of HSR neighbors	HSR systems	46 CFR 15, Subpart B, Sections 15.107(a) and 15.109(b) for Class A digital devices European Committee for Electrotechnical Standardization Standard EN 50121-4, Railway Applications – Electromagnetic Compatibility, Part 4: Emissions and Immunity of Signaling and Telecommunications Apparatus
Electromagnetic compatibility of HSR equipment and facilities with passengers, workers, and neighbors of the HSR	HSR systems	IEEE Standard C95.6-2002 – IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz IEEE Standard C95.1-2005 – IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz FCC OET Bulletin 65 Edition 91-01 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

CFR = Code of Federal Regulations; FCC = Federal Communications Commission; GHz = gigahertz; HSR = high-speed rail; IEEE = Institute of Electrical and Electronic Engineers; kHz = kilohertz; OET = Office of Engineering and Technology

Table 2-B-5 Public and Local Utilities and Energy

Impact Category	Project Features	Applicable Design Standards
New construction and the protection, support, restoration, and rearrangement of utilities	Alignment (bridges and viaducts)	<p>California Public Utilities Commission General Orders, Public Utility Codes, Rules of Practice and Procedure, and the Policies and Guidelines</p> <p>National Fire Protection Association Standards</p> <p>Caltrans <i>Highway Design Manual</i></p> <p>Caltrans Plans Preparation Manual</p> <p>Caltrans Project Development Procedures Manual</p> <p>AREMA Manual for Railway Engineering</p> <p>Conformance with the latest technical specifications and practices of the respective utility owner</p> <p>American National Standards Institute Standards:</p> <ul style="list-style-type: none"> ▪ Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications ▪ Standard for Outside Plant Communications Cable ▪ Communications Wire and Cable for Wiring of Premises ▪ Standard for Fiber Optic Premises Distribution Cable ▪ Human Factors Engineering Requirements for Visual Display Terminal Work Stations ▪ Standard for Tolerance of Radiated Electromagnetic 1 Frequency Interference <p>Electronic Industries Association/Telecommunications Industry Association Standards</p> <p>Underwriters' Laboratories Inc. Publications</p> <p>U.S. Department of Defense Standards: MIL-STD-1472: Human Engineering, MIL-STD-781: Reliability, Test Methods, Plans, and Environments for Engineering, 12 Development, Qualification and Production, MIL-STD-810: Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests</p> <p>National Transportation Communications for Intelligent Transportation Systems Protocol Standards</p> <p>Telecommunication Standardization Sector Standards</p> <p>Local Utilities Standards:</p> <ul style="list-style-type: none"> ▪ Anaheim Public Works ▪ California W.D. (water) ▪ Kinder Morgan ▪ Los Angeles Department of Water and Power ▪ Metropolitan Water District ▪ Southern California Edison ▪ Southern California Gas Company ▪ Southern California Water Company

AREMA = American Railway Engineers and Maintenance of Way Association; Caltrans = California Department of Transportation

Table 2-B-6 Hydrology

Impact Category	Project Features	Applicable Design Standards
Alteration of stream flows and water surface elevations from the placement of structures (e.g., piers and abutments) within stream channels	Alignment (bridges and viaducts)	<i>Los Angeles to Anaheim Project Section: Floodplain, Hydrology, and Hydraulics Technical Report</i> <i>Caltrans Highway Design Manual</i> FHWA Hydraulic Design Series: <ul style="list-style-type: none"> HDS-1- Hydraulics of Bridge Waterways HDS-5- Hydraulic Design of Highway Culverts AREMA Manual for Railway Engineering AASHTO Highway Drainage Guidelines
Alteration of drainage patterns from placement any type of project feature in any location, including changes from impervious surfaces and floodplain impacts	All project features	Stormwater Pollution Prevention Plan <i>Los Angeles to Anaheim Project Section: Floodplain, Hydrology, and Hydraulics Technical Report</i> <i>Los Angeles to Anaheim Project Section: Stormwater Management Plan</i> <i>Caltrans Highway Design Manual</i> FHWA Hydraulic Design Series No. 2 (Hydrology) FHWA Hydraulic Engineering Circular No. 22 (Urban Drainage Design Manual) AREMA Manual for Railway Engineering AASHTO Highway Drainage Guidelines Los Angeles County Flood Control Orange County Flood Control San Bernardino County Flood Control
Generation of pollution from roadways	State highway and local roadway modifications and crossings	Stormwater Pollution Prevention Plan: <ul style="list-style-type: none"> Construction BMPs Post-Construction Controls <i>Los Angeles to Anaheim Project Section: Stormwater Management Plan</i> <i>Caltrans Storm Water Quality Handbook:</i> <ul style="list-style-type: none"> Project Planning and Design Guide Stormwater Pollution Prevention Plan and Water Pollution Control Program Preparation Manual AASHTO Highway Drainage Guidelines

AASHTO = American Association of State Highway and Transportation Officials; AREMA = American Railway Engineers and Maintenance of Way Association; BMP = best management practice; Caltrans = California Department of Transportation; FHWA = Federal Highway Administration

Table 2-B-7 Geology, Soils, and Seismicity

Impact Category	Project Features	Applicable Design Standards
Construction	Backfilling of borings, test pits, Cone Penetration Tests, resonant holes, wells, and probe holes	<p>AASHTO Guidance:</p> <ul style="list-style-type: none"> ▪ AASHTO LRFD Bridge Design Specification with Caltrans Amendments ▪ AASHTO Guide Specifications for Design and Construction of Segmental Concrete bridges ▪ AASHTO Guide Specifications for Thermal Effects in Concrete Bridge Superstructures <p>Caltrans:</p> <ul style="list-style-type: none"> ▪ Caltrans Seismic Design Criteria <p>California Building Code</p> <p>FHWA Guidelines:</p> <ul style="list-style-type: none"> ▪ FHWA Drilled Shaft Construction Procedures and LRFD Design Methods, FHWA-NHI-22 10-016 ▪ FHWA Design and Construction of Driven Pile Foundations, Vols. 1 and 2, FHWA-HI-24 97-013 & 0-14 ▪ FHWA Drilled Shafts: Construction and Procedures and Design Methods, FHWA-IF-99-26 02 ▪ FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slope Design and Construction Guidelines, FHWA-NHI-00-043 ▪ FHWA Earth Retaining 1 Structures, FHWA-NHI-99-025 ▪ FHWA Soil Slope and Embankment Designs, FHWA-NHI-01-026 ▪ FHWA Rock Slopes Reference Manual, FHWA-HI-99-00 ▪ FHWA Geosynthetics Design and Construction Guidelines, FHWA HI-95-038 <p>California Well Standards, Water Wells, Monitoring Wells, Cathodic Protection Wells:</p> <ul style="list-style-type: none"> ▪ Bulletins 74-81 and 74-90

Impact Category	Project Features	Applicable Design Standards
Construction	Restoration of pavement	<p>AASHTO Guidance:</p> <ul style="list-style-type: none"> AASHTO LRFD Bridge Design Specification with Caltrans Amendments AASHTO Guide Specifications for Design and Construction of Segmental Concrete bridges AASHTO Guide Specifications for Thermal Effects in Concrete Bridge Superstructures <p>Caltrans:</p> <ul style="list-style-type: none"> Caltrans Seismic Design Criteria <p>FHWA Guidelines:</p> <ul style="list-style-type: none"> FHWA Drilled Shaft Construction Procedures and LRFD Design Methods, FHWA-NHI-22 10-016 FHWA Design and Construction of Driven Pile Foundations, Vols. 1 and 2, FHWA-HI-24 97-013 & 0-14 FHWA Drilled Shafts: Construction and Procedures and Design Methods, FHWA-IF-99-26 02 FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slope Design and Construction Guidelines, FHWA-NHI-00-043 FHWA Earth Retaining 1 Structures, FHWA-NHI-99-025 FHWA Soil Slope and Embankment Designs, FHWA-NHI-01-026 FHWA Rock Slopes Reference Manual, FHWA-HI-99-00 FHWA Geosynthetics Design and Construction Guidelines, FHWA HI-95-038

AASHTO = American Association of State Highway and Transportation Officials; Caltrans = California Department of Transportation; FHWA = Federal Highway Administration; LRFD = Load and Resistance Factor Design

Table 2-B-8 Hazardous Materials

Impact Category	Project Features	Applicable Design Standards
Construction	HSR civil work and track construction (alignment, bridges, and viaducts)	<p><i>Los Angeles to Anaheim Project Section: Hazardous Materials and Wastes Technical Report</i></p> <p>Title 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"</p> <p>Title 49 Part 195, "Transportation of Hazardous Liquids by Pipeline"</p>
Operations	Alignment (bridges and viaducts)	<p><i>Los Angeles to Anaheim Project Section: Hazardous Materials and Wastes Technical Report</i></p>

CFR = Code of Federal Regulations; HSR = high-speed rail

Table 2-B-9 Safety and Security

Impact Category	Project Features	Applicable Design Standards
Construction	HSR civil work and track construction (alignment, bridges, and viaducts)	49 CFR Part 213, Section 316 for protection of the right-of-way for Class 8 and 9 tracks 49 CFR Part 214, Railroad Workplace Safety California Public Utilities Commission General Order No. 26-D FRA guidelines regarding the separation and protection of adjacent transportation systems and conventional railroads High-Speed Passenger Rail Safety Strategy published by FRA (November 2009) AREMA Manual for Railway Engineering Caltrans Highway Design Manual Caltrans Plans Preparation Manual Caltrans Project Development Procedures Manual
Operations	Alignment (bridges and viaducts)	Incorporate supervisory control and data acquisition system Incorporate climatic and seismic monitoring systems Crime Prevention Through Environmental Design principles would be employed in the design of the HSR system

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