CALIFORNIA HIGH-SPEED TRAIN

Project-Level Environmental Impact Report/Environmental Impact Statement

PROJECT-LEVEL ENVIRONMENTAL ANALYSIS METHODOLOGIES

VERSION 2

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Federal Railroad Administration

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California High-Speed Train Project EIR/EIS

Project-Level Environmental Analysis Methodologies

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1 INTRODUCTION

The California High-Speed Train Program consists of a more than 700-mile-long high-speed train system capable of speeds in excess of 200 miles per hour on a dedicated, fully grade-separated track with state-of-the-art safety, signaling, and automated train control systems. The system described is designed to connect and serve the major metropolitan centers of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego. The high-speed train system is projected to carry 88–117 million passengers annually by the year 2030.

In 2005, the California High-Speed Rail Authority (Authority) and the Federal Rail Administration (FRA) completed a Final Program Environmental Impact Report/Environmental Impact Statement for the Proposed California High Speed Train (HST) System (Statewide Program EIR/EIS), as the first-phase of a tiered environmental review process. The Authority certified the Final Program EIR under the state California Environmental Quality Act (CEQA) and selected the proposed HST system alternative for further project level environmental review over the No Project and Modal Alternatives, and made several corridor decisions. The Authority also issued a Notice of Determination and CEQA Findings of Fact (November 2005) (Appendix A), and adopted a Mitigation Monitoring and Reporting Plan (MMRP) (Appendix B). The FRA issued a Record of Decision (November 18, 2005) ((ROD) (Appendix C) under the National Environmental Policy (NEPA) on the Final Program EIS. The Statewide Program EIR/EIS established the purpose and need for the HST system, analyzed a HST alternative, compared the HST alternative to a No Project/No Action Alternative and a Modal Alternative, and evaluated several corridor and station options. The Authority and FRA are continuing program-level review to complete selection of corridor alignments and potential station locations with the preparation of the Bay Area to Central Valley HST Program EIR/EIS.

The Authority and FRA are now undertaking second-tier, project-level environmental evaluations for several sections of the statewide system. The project EIR/EIS documents for sections of the California HST system will be prepared to satisfy the environmental review requirements of state and federal laws and will enable the public and agencies to participate in the review of site-specific alternatives, as well as to help define appropriate project-level mitigation measures to minimize and mitigate adverse impacts that tier from the CEQA Findings of Fact (November 2005) (Appendix A) and the ROD (November 18, 2005) (Appendix C) for the statewide EIR/EIS. The information in the project environmental documents will be used to make decisions about the location of alignments, stations, and facilities to serve the HST and to seek permits and other needed approvals. In all cases, the project-level environmental analysis will reference and use the information contained in one or both of the Program EIR/EISs to ensure consistency with previous decisions and guidance provided by the Authority and FRA. In particular, relevant mitigation strategies for impacts identified at the program-level CEQA Findings of Fact (Appendix A) and the ROD (Appendix C) will be addressed in each Project EIR/EIS.

The Authority is both the project sponsor and the lead agency under CEQA. The Authority has determined that project EIRs for sections of the statewide HST system are the appropriate documents for this next stage of planning and decision making, which will involve further refining and evaluating alignment alternatives, station location options, maintenance facility locations, and phasing options. Coordination and consultation with local and regional agencies needed for project approvals will be part of the project-level environmental review process.

FRA is the federal lead agency for the preparation of the EIS. Other federal agencies with major actions or permits may choose to serve as cooperating agencies. The second-tier project EISs under NEPA for sections of the HST system are the appropriate NEPA documents for the nature and scope of the HST project, anticipated approvals and decisions by federal agencies, and the need to further examine alignment alternatives and station location options selected at the program level.

1.1 Purpose of These Methodologies

The purpose of the Project Environmental Analysis Methodologies is to establish the technical approach and guide the Authority's contractors in performing parallel analyses for each of the environmental resource areas in each of the project-level EIR/EISs. The date and version number on this document serve as the control number. These methodologies may be updated periodically to incorporate changes in approach, agency comments, and input regarding recent agency guidance or legislation for specific environmental topics.

A project environmental document provides more detail than a program environmental document. FRA's Procedures for Considering Environmental Impacts (64 FR 28545, March 26, 1999) state:

> *In preparing the site specific or component action documentation, the Program Office shall reference and summarize the programmatic document and shall limit the discussion to the unique alternatives and impacts of the site specific or component action.*

Under CEQA, the use of a project EIR enables the lead agency to:

> *…examine the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development project. The EIR shall examine all phases of the project including planning, construction, and operation.*

These environmental analysis methodologies define the level of analysis that will be undertaken at the project level of analysis. The methods for the project analysis build on work completed at the program level to further identify and describe impacts at a level of detail necessary for permits and approvals. The environmental analyses prepared using these methodologies will inform lead agency decisions on specific alignment and station locations, mitigation commitments, and future regulatory and other approvals.

2 ORGANIZATION OF THIS REPORT

The report is organized in summary/tabular format for each of the environmental study topics to be considered in a Project EIR/EIS. For each environmental topic, an outline for the topic is presented, and, within that outline, an approach is presented for establishing the study area, conducting field work, determining baseline conditions, and describing the methodology or models to be used for analyzing potential environmental impacts (including CEQA thresholds of significance, Appendix F) and identifying environmental benefits, refining mitigation approaches that are consistent with adopted mitigation strategies from the CEQA Findings of Fact (November 2005) (Appendix A) and the ROD (November 18, 2005) (Appendix C) for the statewide EIR/EIS, and identifying mitigation measures for individual sections of the proposed HST system. The appendices include detailed formatting and terminology to be used (Appendix D) and quality control instructions (Appendix E) for all of the technical analyses and documentation.

2.1 Description of Project Alternatives

The purpose and need established with the Program EIR/EIS, along with adopted project objectives and planning criteria for the statewide HST system, will be used to further define alignments and stations in each section of the system. Project-level studies and documents will include detailed descriptions of construction; operation and maintenance for all project facilities, including track and alignments bed or elevated guideways, tunnels, tracks, stations, storage and/or maintenance facilities, electrical substations, distribution, and catenary facilities; construction phasing; staging areas and access to construction locations; and spoils removal quantities and disposal.

2.1.1 No Project/No Action Alternative

The No Project/No Action (No Project) Alternative represents the existing conditions as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure. The No Project Alternative describes the state's transportation system that serves the same intercity travel market and project purpose and need as the HST Project alternatives. It describes the highway, air, conventional rail, and bus facilities and operations at the time the Project EIR/EIS is started for the section of the statewide HST system and as they will be after improvements that have been approved and funded in the fiscally constrained and conforming regional and state Transportation Improvement Programs (RTPs, STIP) and Airport Development Programs (ADPs) are in place by 2035. When this financially constrained level of infrastructure improvement is analyzed with the significant growth in population and transportation demand that is projected to occur by 2035, the data show that most highways and airports serving the intercity travel market would be at capacity, and the level of congestion that is expected would severely affect the reliability of travel and the travel time between major metropolitan cities in California.

As with each of the alternatives, the No Project Alternative will be assessed against the purpose and need/objectives for the HST system with regard to congestion, safety, reliability and travel times, air pollution, and other environmental impacts topics.

2.1.2 High-Speed Train Alternative

The Authority selected the HST alternative in the Statewide Program EIS/EIR and is advancing a statewide HST system capable of speeds in excess of 200 miles per hour (320 kilometers per hour) on dedicated, fully grade-separated tracks, with state-of-the-art safety, signaling and automated train control systems, using steel-wheel on steel rail technology to serve the major metropolitan centers of California (extending from Sacramento and the San Francisco Bay Area through the Central Valley, to Los Angeles and San Diego). Ridership estimates for this system vary between 88 and 117 million

passengers for 2030, and the system would have the potential for significantly higher ridership beyond 2030. Sensitivity analyses using assumptions of increased costs of air and automobile travel resulted in the high end of the range of potential ridership.

A system of HST corridors was defined and considered at the program level and specific corridor alignments and station location options were selected by the Authority and FRA for further evaluation at the project-level. Where project-level engineering results in significant alignment changes that deviate from the corridors selected at the program-level, the differences will be considered and clearly presented in the analysis of the alternatives. Project EIR/EIS analysis will evaluate combination of HST alignments and station location options and compare them to the No Project Alternative. The Authority may identify a preferred alignment or station location for a draft project EIS/EIS, or there may be no preference. The Authority will identify a preferred alternative in the final project EIR/EISs.

For purposes of clear organization and for comparative analysis, the HST corridors will be described from station-to-station within each region, except where a bypass option is considered when the point of departure from the corridor will define the end of the corridor segment. Corridors and HST design options will generally be shown on plans and profiles drawn on aerial photographs at a 1:500 foot scale.

2.2 Information to be Provided to Analysts

For the Section Environmental Teams to complete their work, engineering information for HST alignments, stations, maintenance and ancillary facilities, will be developed by the Section Engineering Teams. For alternatives to be fully evaluated in the project EIR/EISs, design information will include cut-and-fill earthworks, temporary and permanent access, electric traction facilities, related roads and railroad modifications, station parking facilities, construction equipment, and phasing and temporary staging areas and detours. Engineering criteria will be provided by the Program Management Team and will be used by the Section Engineering Teams. The engineering designs will include the information described below.

2.2.1 Alignment Plans and Profiles

Alignment plans and profiles will include location of alignment and station location options and profile section type (elevated, at-grade, trench or tunnel). This information will be provided by the Section Engineering Team based on the engineering criteria and parameters developed by the Program Management Team.

2.2.2 Typical Cross-Section Drawings

Typical cross-section drawings will include location of tracks and guideway facilities in relation to existing conditions and other adjacent facilities, including corridor width from centerline of alignment options, height and width of proposed infrastructure facilities (e.g., elevated guideway, tunnel, bridges, trenches, trackbed, catenary, transmission lines). This information will be provided by the Section Engineering Team based on the engineering criteria and parameters developed by the Program Management Team.

2.2.3 Station Plans and Profiles

Station plans and profiles will include station track and platform configuration/layout for intermediate and terminal locations, platform size parameters, parking requirements, access and egress improvements, and other "footprint" related parameters. This information will be provided by the Section Engineering Team for each alternative site.

2.2.4 Storage and Maintenance Facilities

Storage and maintenance facilities will include general track configuration, structures, access improvements, and land area needs (e.g., storage requirements) for each alternative site. The Section Engineering Team will develop this information based on general design parameters and engineering criteria provided by the Program Management Team.

2.2.5 Operational Assumptions

Operational assumptions will include train frequencies, operating hours and volumes per day, maximum operating speeds by location, relationship to other services (e.g., adjacent, shared), station track and platform arrangements, level of grade separation, separation/clearances, and track bed requirements.

The Program Management Team will provide ridership information from the California HST Forecasting Model, including boardings/alightings for general station locations, modal split, and access/egress trips. The ridership information will also identify other secondary ridership, such as improvements to other services from shared-use operations and the assumptions that should be made for these services.

The methodologies provide guidance on thresholds of significance, including uniform guidance for consistently and objectively interpreting and subsequently applying thresholds of significance for evaluating potential environmental impacts. The CEQA Thresholds of Significance, found in Appendix G of the CEQA Guidelines, and repeated in Appendix F of this document, should be considered a minimum set of criteria for project evaluation. Where the Program Management Team indicated will also develop and identify thresholds of significance. The Section teams will obtain concurrence from resources and permitting agencies on the identified thresholds of significance prior to conducting the resource evaluations.

The Section Environmental Teams will also evaluate conceptual transit-oriented joint development opportunities that have been defined by the Authority while working with engineering and design teams and local authorities.

2.3 Revisions from Previous Version

The environmental methodologies were re-numbered in the same order that would be presented in Section 3, Affected Environment, Environmental Consequences, and Mitigation Strategies of the EIR/EIS. The methodology on Section 4(f) and Section 6(f) Evaluations was re-numbered as a separate Section 4.0. The revisions to the individual methodologies are as follows:

- Transportation – No revisions.
- Air Quality – Updated State regulations with Senate Bill 375 and Governor's Executive Order S-13-08 and updated methodology for impact analysis, significance criteria, and environmental consequences to include CARB interim significance thresholds for greenhouse gases.
- Noise & Vibration – No revisions.
- EMI/EMF – No revisions.
- Public Utilities and Energy – Revised to include identifying utility provided for the HST service area in the definition of study area; adding to include maps of transmission lines in description of existing electrical system; and defining the existing capacity and demand servicing the grid.
- Biological Resources & Wetlands – Impact Analysis and Mitigation Strategies: clarified methodology to "list assumptions" Significance criteria: added substantial effect on riparian habitat and any other sensitive communities identified in local or regional plans, policies, regulations by CDFG or USFWS.

- Hydrology and Water Resources – Revised to include adding exposure of people to seiche or tsunami hazard to significance criteria; added coordination with design engineers to incorporate avoidance and minimization measures to the mitigation to the environmental team's mitigation task.
- Geology, Soils, Seismicity – No revisions.
- Hazardous Materials/Wastes – Hazards relating to accidents, emergency plans, wildland fires, conflicts with airports were moved to Safety and Security section.
- Safety and Security – Revised, expanding the safety and security considerations to include cyclists, train passengers (as well as employees), and bystanders; safety of passengers and employees on board of HST vehicle and on HST platforms and stations; considerations of potential incidents between HST and highway vehicles or other traffic; emergency response; emergency access including that by outside medical personnel; pedestrian safety to include schools and school districts as sources to address "safe school routes."
- Socioeconomics, Communities, and Environmental Justice – Revised to include: defining low-income household; methodology for Environmental Justice (EJ) to include identification of mitigation and enhancement measures, design measures, and other factors; significance criteria for economic impact; methodology for cumulative impact analysis to include combined list and plan method; mitigation measures to include design variations.
- Local Growth, Station Planning & Land Use – Revised to include Wild and Scenic Act and SB 375 to regulatory requirements; clarification of study area for HST study corridor as adjacent parcels/properties, addition of CEQA significance criteria; clarification of "station area development and character" with examples of long-established single-family neighborhoods, retail areas, and historic district; cross-referencing to other sections where applicable for land use impacts; addition of a combined list and plan approach to cumulative impact analysis.
- Agricultural Land – No revisions.
- Parks, Recreation, and Open Space – New methodology.
- Aesthetics & Visual Quality – Revised to include clarifications about required engineering information to include massing diagrams for stations and maintenance facilities, catenaries for the trains and transmission lines connecting the stations, and transit-oriented development in station locations and design and plans and profiles; clarifying that historic structures or districts are those identified in the cultural resources inventory; defining that shade and shadow studies are to be conducted in areas sensitive to such changes.
- Cultural Resources – Revised to include California Health and Safety Code and additional Public Resources Code sections in regulatory requirements; clarifying that significant historic structures can include bridges, culverts, and other engineering features, not just buildings.
- Cumulative Impacts – No revisions.
- Section 4(f) and Section 6(f) Evaluations – Clarification of the study area as follows: the study area is 1,000 feet on either side of the right-of-way and in a radius around the station.

3 ENVIRONMENTAL METHODOLOGIES

Methodologies for the environmental analyses to be completed for the project EIR/EISs are presented in summary form on the following pages. Each of the methodologies is organized in a similar fashion following the outline below. Following this format will allow for ease of review and modification during the review cycles with the environmental teams and resource agencies for each of the sections of the statewide HST System. In all cases, the analysis should begin with reference to the information and impact findings and mitigation strategies in the CEQA Findings of Fact and the FRA ROD for the two Program EIRs/EISs. The CEQA Findings of Fact and the ROD for the Statewide Program EIR/EIS are provided in Appendix A and Appendix B, respectively.

METHODOLOGY OUTLINE

- Regulatory Setting
- Baseline/Affected Environment
  - TOPIC AREAS TO ADDRESS
  - THE STUDY AREA
  - SOURCES OF INFORMATION AND FIELD WORK
- Environmental Impact Analysis
  - TOPIC AREAS TO ADDRESS FOR IMPACTS
  - *ANALYSIS METHODOLOGY (OPERATIONAL AND CONSTRUCTION) (IN ALL CASES A FUTURE 2035 NO-PROJECT WILL BE COMPARED WITH THE BASELINE AND WITH HST ALTERNATIVES--ALIGNMENT/STATION OPTIONS)
  - THRESHOLDS OF SIGNIFICANCE USED IN ANALYSIS
- Mitigation
  - MITIGATION MEASURES AND IMPROVEMENT MEASURES AND MITIGATION MONITORING AND REPORTING PLAN FOR PROJECT EIR/EIS; RELATIONSHIP TO FINAL PROGRAM EIR/EIS MITIGATION STRATEGIES*; IMPACTS OF MITIGATION
- Products
  - TECHNICAL REPORTS AND EIR/EIS SECTIONS
  - CUMULATIVE SECTION
  - SUMMARY FOR EXECUTIVE SUMMARY OF EIR/EIS

*[Mitigation should start with the mitigation strategies approved in the CEQA Findings (Appendix A) and the ROD (Appendix C), refine and apply them to the particular section, identify site specific mitigation for each significant adverse impact, and develop a project-level Mitigation Monitoring and Reporting Plan. Mitigation should include measures to avoid impacts, minimize the extent of impact, or replace/relocate the resource to mitigate for impacts.]

The environmental analyses will be completed by the Section Environmental Teams for each of the HST Project sections with guidance and review and comment by the Program Management Team. Agency coordination and access issues must be discussed with the Section Project Managers and the Program Management Team. The Program Management Team will remain the key coordination contact for state and federal resource agencies through continued Statewide Agency Group Meetings and individual contact with appropriate agency representatives, according to the issues at hand. Coordination with local and regional agencies is the responsibility of the Section Environmental Teams.

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3.1 Transportation

3.1.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Title VI of the Civil Rights Act of 1964, 42 U.S.C.
- Federal-Aid Highway Act of 1973, 23 U.S.C.
- Railroad Revitalization and Regulatory Reform Act of 1976, 49 U.S.C.
- Federal Transit Act, 49 U.S.C.

State Regulations

- State highways fall under the jurisdiction of the California Department of Transportation (Caltrans)

B. OTHER CONSIDERATIONS

- In urbanized counties, a designated congestion management agency (CMA) is responsible for implementing the Traffic Congestion Relief and Spending Limit Act to assist in the land-use decision-making process and to address transportation and air quality impacts in the county.
- Local jurisdiction general plan policies and ordinances (transportation elements)
- Consider whether the project conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

3.1.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Conceptual design and project plans and profiles and project description ▪ Station footprint and location	▪ Railroad lines, highways or roadways that are in shared transportation corridors with an HST project alignment ▪ Highways and roadways that serve as the primary means of access to proposed rail stations ▪ Critical intersections that are within a 1- mile radius of proposed rail station ▪ Existing or planned bicycle or pedestrian facilities crossed by the alignment or within one mile of a HST station ▪ Parking facilities within ½ mile of the HST stations ▪ Public transit systems and ground access systems serving the HST stations ▪ Regionally significant intersections beyond the 1-mile radius, as determined in consultation with the local jurisdiction ▪ At-grade crossings along HST corridors

Highways and Roadways

Key Information	Sources
▪ Characteristics of roadways within the study area ▪ Average daily a.m. peak, and p.m. peak hour traffic volumes ▪ Existing highway, roadway, and intersection levels of service ▪ Programmed/funded highway and roadway improvements within the study area	▪ Local jurisdiction general plan, specific/area plans ▪ Regional transportation plans ▪ State highway plan (name?) ▪ California Traffic and Vehicle Systems Unit ▪ Highway Capacity Manual (Transportation Research Board 2000)

Transit and Air Travel

Key Information	Sources
▪ Description of transit infrastructure (transit stops, stations) within the study area ▪ Summary of bus and/or rail transit service (routes, days/times of service, frequency) characterized under baseline scenario of impact analysis ▪ Description of airports located within the study area and/or location of nearest commercial airport outside of the study area	▪ Local/regional transit agencies ▪ Regional transportation plans ▪ Local jurisdiction general plan, specific/area plans

Non-Motorized

Key Information	Sources
▪ Description of existing walkways and trails in the study area ▪ Description of designated bikeways in the study area ▪ Location of major generators of pedestrian and/or bicycle traffic within the study area	▪ Local jurisdiction general plan, specific/area plans ▪ Local jurisdiction bicycle and/or walkway plans ▪ Regional transportation plans

Parking Facilities`

Key Information	Sources
▪ Description of parking supply of parking facilities within the study area ▪ Description of parking facilities to be provided for the HST system	▪ Local jurisdiction general plan, specific/area plans, ordinances ▪ Local parking inventories ▪ Field investigation

Freight and Goods

Key Information	Sources
▪ Description of designated freight truck routes in the study area ▪ Identify average percent volumes of trucks on designated freight routes ▪ Identification of freight rail lines that travel through or stop within the study area ▪ Summary of freight rail service (routes, frequency) ▪ Goods movement characterized under baseline scenario of impact analysis	▪ Local jurisdiction general plan, specific/area plans ▪ Local jurisdiction bicycle and/or walkway plans ▪ Regional transportation plans

Plans and Policies

Key Information	Sources
▪ Identify adopted LOS standard for local jurisdictions within the study area ▪ Identify local policies relevant to the project and/or alternative transportation modes	▪ Local jurisdiction general plan, specific/area plans, ordinances

3.1.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

Traffic Operational Standards

Level of service (LOS) is the primary unit of measure for stating the operating quality of a highway or roadway. LOS is calculated by comparing the actual number of vehicles using a roadway to its carrying capacity. In general, LOS is measured by the ratio of traffic volume to capacity (V/C) or by the average delay experienced by vehicles on the facility.

The Highway Capacity Manual (Transportation Research Board 2000) is a recognized source for the techniques used to measure transportation facility performance. Using the Highway Capacity Manual procedures, the quality of traffic operation is graded into one of six LOS designations: A, B, C, D, E, or F. LOS A represents the best range of operating conditions and LOS F represents the worst.

V/C ratios and LOS are defined quantitatively in Table 3.2-1. The Program Management Team will identify a standard for determining an impact.

Table 3.2-1
Level of Service and Volume-to-Capacity Ratio Definition

Level of Service	Volume-to-Capacity Ratio	Definition
A	0.000–0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601–0.700	VERY GOOD. An occasional approach phase is fully used; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701–0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801–0.900	FAIR. Delays may be substantial during portions of rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901–1.000	POOR. Represents the maximum vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.
Source: Transportation Research Board 2000.		

Baseline Operational Analysis

- Identify primary highways including those in the No-Project alternative and primary routes for intercity travel. Also all modes of travel to access to HST station sites.
- Identify screenlines or cordons combining segments of the primary routes that reasonably represent locations for evaluating in the aggregate baseline traffic and public passenger transportation conditions (using data for current year - 2007 or later depending upon when the HST section study was begun, and 2035 as available) in the a.m. or p.m. peak-hour.
- Collect new traffic counts where data are not available at critical and regionally significant intersections. The respective regional travel forecasting models will be assumed sufficiently accurate for purposes of forecasting traffic on the screen-lines and cordon lines chosen.
- Establish baseline (current year and 2035 as available data allows) ratios of demand to capacity across each screenline or cordon for roadway and public transportation facilities. Use Highway Capacity Manual (Transportation Research Board 2000) standards for capacity analysis.
- Characterize baseline conditions for goods movement (truck/freight) in the general area of study, primarily to identify key goods movement means/corridors based on published sources. Characterize rail freight and conventional passenger rail operations for shared corridor project alternatives.
- Document existing transit service (e.g., lines, headways, service characteristics, needs) within the project study area, including any and all local and regional transit service including campus shuttles.
- Evaluate transit services available for each project alternative including a summary of comparable transit service data (ridership by station, mode of arrival, service frequency, etc.).
- Characterize baseline conditions for parking within ½ mile of proposed HST stations for the No-Project alternative based on existing parking capacity, local plans for major parking expansion, and adequacy of local parking codes for meeting No-Project growth in demand. An existing

conditions assessment of on-street parking will be compiled to identify supply and occupancy within the neighborhood parking impact area at each proposed station site.

Operational Impacts

- Use the integrated statewide High-Speed Rail Travel Demand Forecasting Model results for HST ridership projections to remove trips from regional facilities to quantify trip reduction characteristics of HST alternatives. Coordinate with the Program Management Team on ridership projections, parking demand, etc.
- Evaluate the project horizon year (2035) conditions with the HST project and the No-Project alternative using the future base traffic conditions from the regional travel forecasting model to account for background growth in traffic due to land use development and population growth. Post-process highway traffic volume projections at each study intersection to develop the peak hour turning movement projections. Summarize the intersection levels of service to provide a baseline comparison for the project alternatives. Determine the differences with and without project by:

1. Use the statewide HST forecasting model to determine the number of external-to-external (XX), internal-to-external (IX) and external-to-internal (XI) trips using HST or (in the No-Project alternative) as trips to and from the external highway links,
2. Enter these figures into the local travel demand model as person-trip demand to and from the HST stations or (in the No-Project alternative) as trips to and from the external highway links, then
3. Run the local model to assign trips to routes including re-routing some traffic in response to increases/decreases in traffic stemming from the alternative under study.

- Describe future transit conditions (bus and fixed guideway) with the HST project, including new supporting services that would be developed for each project alternative, identifying the proposed realignment of existing transit services, new feeder bus lines required to service the project alternatives, as well as a transit interface plan that identifies the location of fixed guideway facilities, bus loading and unloading areas, layover areas, and transit operator support facilities. Existing bus stop locations and ridership data in the vicinity of the stations will be identified and documented.
- Evaluate station traffic flow including transit interface requirements and impacts including how the buses will provide feeder service to the HST stations. The analysis will include pedestrian access and egress, fixed guideway transit station interface, buses stopping/laying over at each station, station area pedestrian and vehicle circulation and access, bus stop locations, as well as kiss-and-ride areas. The projected bus trips at each station will be quantified and operational and service effects evaluated.
- Identify impacts generated by the HST alternative through comparing the results of the No-Project and with project alternatives through changes or differences in LOS and V/C.
- Evaluate parking impacts based on the existing and future supply and the projected demand based upon the patronage and mode of access forecasts at each proposed station, including parking and related circulation impacts for adjacent neighborhoods. For the No-Project Alternative the parking analysis will cover identifiable substitute parking facilities (airport or park and ride) and, to the extent practicable, parking demand at the destination end of auto trips. Analysis of the impacts associated with the potential loss of on-street parking will include the number and type of spaces displaced, as well as the identification of potential off-street replacement parking lots/structures.
- Identify the effects of new grade-separated crossings on highway/roadway LOS and commuter or freight rail operations.

- Identify the effects of at-grade crossing closures on highway/roadway traffic LOS, vehicular trip patterns, changes in VMT and changes in vehicular accessibility.
- Identify any disruptions to commuter or freight rail operations resulting from the project.
- Identify the effect of the project on existing or planned pedestrian and bicycle facilities.
- Identify the effect of the project on LOS of existing highways and local streets/roadways.
- Determine consistency with regional and local transportation plans. Assessment includes consistency of traffic under HST project conditions with locally adopted LOS standards.

Construction Impacts

- Identify vehicle trips resulting from project construction, including mobilization of construction equipment, delivery trips, commute trips, earthmoving trips
- Identify road closures requiring detours that would result from project construction
- Evaluate baseline traffic conditions with construction-generated traffic added. Analysis will be conducted during the projected time of peak construction-generated traffic.
- Identify any disruptions to commuter or freight rail operations resulting from construction of grade-separated crossings.
- Identify obstacles to existing or planned pedestrian and bicycle facilities, safety, and mobility resulting from project construction.
- Identify the effect of the project construction on LOS of existing highways and local streets/roadways.
- Identify cumulative construction impacts with other disruption to local streets and highways under construction within the 1-mile radius of the HST project.
- Develop a Traffic Control Plan to mitigate potential adverse effects to highways and roadways LOS, disruption to transit service, parking, emergency access, and non-motorized travel identified to a result during project construction.

B. SIGNIFICANCE CRITERIA

For the purposes of this analysis, an impact is considered to be significant and to require mitigation if it would result in any of the following (California Department of Transportation 2003).

- An increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the V/C, or congestion at intersections), as specified in guidance provided by the Program Management Team.
- Inadequate parking capacity.
- Substantial disruption of passenger or freight rail service.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Traffic volumes generated by project on highways and surface streets.	▪ Change in traffic volumes on surface streets located near stations. ▪ Change in traffic volumes on regional roadways that result from HST operations. ▪ Change in traffic volumes related to elimination of grade crossings. ▪ Effect of changed traffic volumes on operations (LOS) of roadways and critical intersections.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team
Parking generated by project.	▪ Parking demand near HST stations resulting from project during typical weekday and weekend peak hours. ▪ Potential for typical peak period parking demand to exceed planned parking supply.	Inadequate parking capacity
Effect of project on emergency access.	▪ Potential for traffic congestion resulting from project to change or disrupt access or circulation of emergency vehicles. ▪ Potential for physical design elements of project to interfere with emergency access.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team.
Effect of project on non-motorized mobility	▪ Consider non-motorized connections to and across HST facilities	None
Effect on buses at or near HST stations.	▪ Potential for inadequate capacity of feeder bus service. ▪ Potential for traffic congestion resulting from project to disrupt or delay bus service that serve or run near stations. ▪ Potential changes in bus routes due to roadway changes and elimination of at-grade crossings.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team.
Traffic generated by project construction	▪ Change in traffic volumes on regional roadways that result from HST section construction. ▪ Effect of changed traffic volumes on operations (LOS) of roadways and critical intersections.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team.

Topic	Issues to Evaluate	Threshold of Significance
Parking demand generated by project construction	▪ Potential for parking generated by project construction to exceed supply at staging areas.	▪ Parking demand near HST stations resulting from project during typical weekday and weekend peak hours. ▪ Potential for typical peak period parking demand to exceed available supply.
Effect of construction on emergency access.	▪ Potential for traffic congestion resulting from construction to disrupt access or circulation of emergency vehicles. ▪ Potential for road closures, lane closures, or detours to interfere with emergency access.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team. Inadequate emergency access
Effect of construction on non-motorized mobility	▪ Consider non-motorized connections to and across HST facilities during construction	None
Effect of construction on transit service.	▪ Potential for traffic congestion resulting from construction to disrupt or delay bus service. ▪ Potential for road closures, lane closures, or detours to interfere with transit routes.	Cause an increase in traffic that is substantial in relation to the existing traffic volumes causing traffic operations to exceed, either individually or cumulatively, a level of service standard as specified in guidance provided by the Program Management Team.

D. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify mitigation to address all significant adverse impacts related to project operations. Measures could include, but are not limited to capacity improvements of local roadways located near stations, increases in feeder bus service, establishment of permit parking districts around the stations, and identification of other off-site parking.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for transportation.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether transportation will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).

- Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for transportation. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.1.4 Products

A. TECHNICAL REPORT: TRAFFIC, TRANSIT, CIRCULATION, PARKING AND FREIGHT RAIL REPORT

B. PROJECT EIR/EIS
   1. Section: Transportation
   2. Cumulative Section
   3. Summary for EIR/EIS Executive Summary

3.2 Air Quality

3.2.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- U.S. Environmental Protection Agency—Federal Clean Air Act (42 USC 7401 et seq)
- Federal Clean Air Act Conformity Requirement (42 USC 7506 Section 176(c))
- National Ambient Air Quality Standards

State Regulations

- California Clean Air Act, Chapter 1568, Statutes of 1988; AB2595
- State Ambient Air Quality Standards
- California Global Warming Solutions Act (AB 32)
- Senate Bill No. 375, Chapter 728 (SB 375)
- Governor's Executive Order S-13-08

B. OTHER CONSIDERATIONS

- air quality management districts
- regional transportation agencies and metropolitan planning organizations

3.2.2 Affected Environment

A. DEFINITION OF STUDY AREA

Key Information	Study Area
▪ Regional ▪ Local ▪ Climate Change	▪ Regional—Air basins traversed by alternative HST corridors and No Project highways and airports ▪ Local—500 meters around stations (localized study area) and any affected intersections projected to operate at LOS C or worse ▪ Climate Change—State of California (subject to further review)

Local Meteorological Conditions

Key Information	Sources
▪ Provide short description of the local meteorological conditions within the study area.	▪ Western Regional Climate Center (http://www.wrcc.dri.edu)

Local Monitored Air Quality

Key Information	Sources
▪ Provide short description of the local monitored data within each study area (air basin) and summarize published monitoring data for the last 3	▪ http://www.arb.ca.gov ▪ See air quality monitoring data

Key Information	Sources
years from representative monitoring stations.	

Sensitive Receptors

Key Information	Sources
▪ Describe sensitive receptors (population groups, such as children, the elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases, are considered more sensitive to air pollution than others. [500 meters from stations and adjacent to intersections as identified above]).	▪ Field review ▪ Aerial images ▪ Interviews with local planners

Ambient Air Quality Standards/Attainment Status

Key Information	Sources
▪ State and National Standards ▪ Summarize attainment status-related information for air basins. ▪ Describe the emission sources included in the analysis (e.g., HST operations, traffic around stations, and electrical generation for the system). ▪ Conformity determination	▪ http://www.arb.ca.gov (standards, attainment status) ▪ Identify how local monitored data compares to state and national standards ▪ Emission sources: Project Description of HST system, traffic analysis report, energy analysis ▪ State Implementation Plan, regional transportation improvement plans

Air Toxics

Key Information	Sources
▪ For Mobile Source Air Toxics (MSAT), see FHWA Interim Guidance on Air Toxic Analysis. *There are no diesel sources for operation, which is the major toxic air, contaminate of concern for transportation projects.*	▪ Program EIS/EIR ▪ Conceptual engineering plans and profiles and project description ▪ FHWA Interim Guidance on Air Toxic Analysis

Relevant Pollutants

Key Information	Sources
▪ Describe the pollutants of concern and related health effects: carbon monoxide, sulfur oxides, oxides of nitrogen, ozone, particulate matter (PM10 and PM2.5), lead, and hydrocarbon levels (reactive organic gases and reactive organic compounds).	▪ http://www.arb.ca.gov ▪ Program EIS/EIR

Greenhouse Gases/Global Warming Effects

Key Information	Sources

Key Information	Sources
▪ Describe the composition of the state greenhouse gas emissions (transportation sources, stationary sources, natural occurring sources) Describe the welfare effect of climate change (such as, rising sea levels, snow pack in the Sierra Nevada's, low-lying areas, etc.)	▪ http://www.arb.ca.gov (see climate page)

3.2.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

The Program Management Team will:

- Review analyses conducted by regional teams to ensure overall project consistency.
- Act as a contact point for state and local agencies as well as for regional teams.
- Summarize attainment status-related information for each air basin. (see above)
- Describe the emission sources included in the analysis (e.g., HST operations, traffic around stations and electrical generation for the system). (see above) (Construction emissions to be addressed by section environmental teams.)
- Conformity analysis—explain requirements, including State Implementation Plan (SIP) and TIP status.
  - Analyze regional emissions within each air basin and for each alternative:
  - Quantify regional mobile source emissions using area wide projections of AADT and corresponding latest version of EMFAC emission burdens as supplied by the ARB.
  - Quantify regional rail and aircraft emissions using area wide projections of daily mileage and/or operational (landings/take-offs) and applicable emission factors from EPA's Compilation of Emission Factors (AP-42) for trains and FAA's EDMS model for aircraft.
  - Determine significance of potential regional air quality impacts and estimate air quality benefits.
  - Discuss whether project conforms with the adopted Regional Transportation Plan (RTP) and SIP.
- Prepare discussion of greenhouse gas emissions and discuss potential impacts taking into consideration the *Climate Action Program at Caltrans* (December 2006) (http://www.dot.ca.gov/docs/ClimateReport.pdf) and the *California Climate Action Registry, General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2 (March 2007)* (http://www.climateregistry.org/docs/PROTOCOLS/GRP%20V2-March2007.pdf). Compare emissions to the CARB's interim significance thresholds. *CARB is currently in the process of developing approaches for setting the thresholds. Preliminary draft staff proposal for recommended approaches for setting the thresholds for transportation projects is expected December 2008/ January 2009.*
- Estimate air quality emissions effects on a statewide level due to HST power requirements
- Compare the HST Alternative with the No Build/No Project Alternative to identify any potential air quality benefits from a mode-shift from auto to rail.
- Provide typical sequence of construction activities

The Section Environmental Teams will:

- Quantify criteria pollutant and greenhouse gas emissions for each project alternative using relevant VMT data and EMFAC2007 (or federally authorized version) emissions factors.
- Use FHWA Interim Guidance on Air Toxic Analysis in NEPA documents to determine MSAT analysis methodology. Potential air toxic impacts will be evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling) if necessary. The screening-level analysis consists of reviewing the proposed project's conceptual engineering plans and profiles and project description to identify any new or modified air toxic emissions sources. If it is determined that the proposed project would introduce a new source, or modify an existing air toxic emissions source, then downwind sensitive receptor locations are identified and site-specific dispersion modeling is conducted to determine proposed project impacts. (http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm)
- Use air quality screening methods for areas affected by stations and facilities, as prescribed in local air districts (consult with local districts), ARB, Caltrans, EPA and FHWA, documents to determine which areas have the potential to experience significant air quality impacts due to the project. (http://www.dot.ca.gov/ser/vol1/sec3/physical/ch11air/chap11.htm)
  - Conduct screening level analysis at locations selected because of high traffic volumes and/or levels of congestion and sensitive land uses around stations.
  - Evaluate local intersections (identified above) based on Caltrans CO Protocol and/or local air district criteria.
  - Evaluate localized PM10/PM2.5 hotspots using FHWA guidelines (FHWA PM2.5/PM10 Qualitative Analysis Guidance (March 2006).
- For this type of project, objectionable odor impacts are not an issue and are not discussed further.
- Analyze construction impacts:
  - Using the construction sequence provided by the Program Management Team, the regional construction emissions will be calculated according to the South Coast Air Quality Management District CEQA Air Quality Handbook (1993) (as updated per the AQMD website - http://www.aqmd.gov) (for the HST alignment) and the URBEMIS model (for station and facilities). Construction emissions should be calculated on a maximum daily basis and on an annual basis. Construction emissions will be calculated for the following types of emission sources:
  - Combustion emissions – construction equipment, mobile source from worker trips, haul truck trips
  - Fugitive emissions – site disturbance activities, off gassing from asphalt paving and the application of architectural coatings
  - For local construction impacts, a two-step analysis will be conducted. Construction will likely be temporary and transitory. The first step will include a screening of local sensitive receptors to determine if there would be impacts because of the distance to the receptor and anticipated length of local construction activity. If there is a potential for impact to occur, a quantitative assessment will be required at those locations utilizing a dispersion model (Industrial Source Complex –ISC EPA model). The results compared to the ambient air quality standards (PM10/PM2.5 and oxides of nitrogen). Consider potential cumulative impacts of HST construction emissions with other programmed and funded projects in study area planned for construction during the same time-frame.

B. SIGNIFICANCE CRITERIA

Under CEQA, impacts on air quality would be considered significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Exceed or contribute to an exceedance any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Conflict with the state requirements for reducing GHG emissions in California, including exceedance of interim significance thresholds for greenhouse gases (currently being developed by CARB (subject to update and will be discussed with PM team).

Presented below are the emission significance thresholds at which construction and operational emissions are considered to have a significant effect on air quality. These are from the South Coast Air Quality Management District CEQA Air Quality Handbook (1993) (as updated per the AQMD website (http://www.aqmd.gov). These would be the most conservative thresholds throughout the state.

Allowable Regional Emission Limits		
Air Pollutant	Construction Phase (pounds/day)	Operational Phase (pounds/day)
Reactive organic compounds	75	55
CO	550	550
Nitrogen oxides	100	55
Sulfur oxides	150	150
PM10	150	150
PM2.5	55	55
Source: South Coast Air Quality Management District 1993		

Under NEPA, impacts on air quality would be considered significant if the project criteria pollutant emissions would exceed the general conformity *de minimis* thresholds (dependent on attainment status of each air basin) and/or whether the project would result in the creation or worsening of PM10/PM2.5 or CO hot spots.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Regional Operations	Potential for regional operation emissions of alternatives to exceed allowable regional emission limits.	▪ Conflict with or obstruct implementation of the applicable air quality plan. ▪ Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
Regional Construction	Potential for regional construction emissions of alternatives to exceed allowable regional emission limits.	▪ Conflict with or obstruct implementation of the applicable air quality plan. ▪ Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
Local Operations	Potential for localized operation impacts at intersections and stations.	▪ Violate any air quality standard or contribute substantially to an existing or projected air quality violation. ▪ Expose sensitive receptors to substantial pollutant concentrations.
Local Construction	Potential for localized construction impacts at intersections and stations.	▪ Violate any air quality standard or contribute substantially to an existing or projected air quality violation. ▪ Expose sensitive receptors to substantial pollutant concentrations.
Greenhouse Gas Emissions	Potential for the project to increase or decrease greenhouse gas emissions.	▪ Conflict with the state requirements for reducing GHG emissions in California ▪ Exceed interim significance thresholds for greenhouse gases as established by the California ARB (*Subject to update and will be discussed with PM team*)
Air Toxic	Potential for construction and operations of the alternatives to result in generation of substantial air toxic emissions.	▪ Expose sensitive receptors to substantial pollutant concentrations.

D. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.

- Identify feasible mitigation measures and strategies to be incorporated into project designs to minimize air quality impacts to the greatest extent possible or to levels considered to be less than significant, provide support for emission reductions to be produced by mitigation, and explain expected level of emission reduction.

- Analyze impacts of mitigation

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for air quality.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether air quality will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts

- Identify if there is a significant cumulative impact without the project.
- Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
- Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for air quality. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.2.4 Products

A. TECHNICAL REPORT

B. PROJECT EIR/EIS

1. Section: Air Quality
2. Cumulative Impacts Section
3. Executive Summary
4. Conformity Documentation for Inclusion in RTP (coordinate with Program Management Team)

3.3 Noise and Vibration

3.3.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

There are a number of laws and guidelines at the Federal level relevant to the assessment of ground transportation noise and vibration impacts. These include:

- National Environmental Policy Act (42 U.S.C. 4321, et. seq.) (PL-91-190) (40 C.F.R. 1506.5)
- Noise Control Act of 1972 (42 U.S.C. 4910)
- FTA Guidelines (May, 2006)
- FRA Guidelines (October, 2005)
- HUD Environmental Standards (24 C.F.R. 51)
- OSHA Occupational Noise Exposure; Hearing Conversation Amendment (FR 48 (46), 9738—9785)
- EPA Railroad Noise Emission Standards (40 C.F.R 201)
- FRA Railroad Noise Emission Compliance Regulations (49 C.F.R. 210)

State Regulations

- Title 24, Part 2, California Code of Regulations

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan Noise and Land Use policies and ordinances
- Local jurisdiction noise ordinances and codes (and their requirements)
- Airport Land Use Compatibility Plans

3.3.2 Affected Environment

A. DEFINITION OF STUDY AREA

Key Information	Study Area
▪ Geo/Topo Information (Aerial Mapping, GIS Base if possible, topo maps) ▪ Conceptual engineering plans and profiles and project description ▪ Screening analysis for the Statewide Program EIR/EIS	**Noise** ▪ Station study area: 150 feet from station boundary ▪ Alignment study area: 300–1,500 feet, as appropriate, depending on train speed and sensitive receivers (including wildlife). ▪ Highway study areas: as determined in the Program EIR/EIS, or up to 500 feet from centerline as appropriate for highway type along HST corridors ▪ Vibration ▪ HST study areas, including existing rail: up to 100 feet ▪ Highway study areas: 50 feet

General Noise and Vibration Setting

Key Information	Sources
▪ Existing noise levels will be monitored at representative land uses and/or noise sensitive receivers within close proximity to the HST alignment. ▪ Where airport noise may be a substantial contributor to the ambient level of environmental noise or was identified as such in the Program EIR/EIS, use the existing noise contours provided in airport master plans or issued by the airport authority. ▪ Conduct existing vibration measurements where HST alignment shares the right-of-way of operating freight or passenger trains. Measurement to be conducted during passby events of existing rail operations at receivers closest to HST alignment. ▪ Coordinate with land use, biology, and cultural resources to identify sensitive receivers.	▪ Local / Regional study reports (i.e., SCAG, SANDAG studies) ▪ Local Noise Elements / Background Reports ▪ Local Land Use Elements / Maps ▪ FTA *Transit Noise and Vibration Impact Assessment* Guidance Manual, May 2006, ▪ FRA *High-Speed Ground Transportation Noise and Vibration Impact Assessment* Guidance Manual, October 2005 (FRA Manual) ▪ FRA Manual, Chapter 8 (General Vibration Assessment) ▪ FRA Manual, Chapter 9 (Detailed Vibration Assessment)

3.3.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

Impacts related to noise and vibration will be analyzed quantitatively, based on a review of published information for the proposed alignment, field noise / vibration measurements, quantitative analysis and comparison of alternatives for construction and operation of HSR using FTA- and FRA-approved methods, and on professional judgment, in accordance with the current standard of care for the practice.

- Use the FRA *High-Speed Ground Transportation Noise and Vibration Impact Assessment* Guidance Manual, October 2005 (FRA Manual) as the primary source of guidance for analysis of HST noise and vibration impacts and mitigation supplemented by guidance from FTA. Specifically for non-HST noise, Chapter 5 (Detailed Noise Analysis) will be followed for impact analyses of all alignments to be carried forward in a Project EIR/EIS.
- For the vibration impact and mitigation analyses of the HST alternatives carried into a Project EIR/EIS, the process presented in the FRA Manual, Chapter 8 (General Vibration Assessment) should be applied where vibration concerns were identified at the program level, during the scoping process, or during reconnaissance and field surveys, to identify locations that require a detailed vibration assessment. The FRA Manual, Chapter 9 (Detailed Vibration Assessment) shall be used for the preferred alternative to determine mitigation for the preferred alternative, as appropriate for the type and proximity of potentially affected land use.

Train Operation Noise and Vibration

Key Information	Sources
HST train operations noise and vibration impact shall use the FRA Manual, Chapter 5 (Detailed Noise Analysis) and Chapter 8 (General Vibration Assessment).	FRA *High-Speed Ground Transportation Noise and Vibration Impact Assessment* Guidance Manual, October 2005 (FRA Manual)

Station Noise

Key Information	Sources
Station noise impact analysis shall use the FTA *Transit Noise and Vibration Impact Assessment* Guidance Manual, May 2006 (FTA Manual) as discussed in Section 6.7 (Noise Impact Assessment) for a *detailed* assessment. Impact assessment of other "fixed" noise/vibration-producing project components (e.g., ventilation fans, electrical generating and/or substations) may be conducted using professionally accepted methods and practices.	FTA *Transit Noise and Vibration Impact Assessment* Guidance Manual, May 2006 (FTA Manual) as discussed in Section 6.7 (Noise Impact Assessment)

Traffic and Grade-Separation Noise

Key Information	Sources
Traffic and grade-separation noise modeling shall use the TNM® Version 2.5 as approved by FHWA and Caltrans. The highway noise study methodology shall be suitable for preparing a Caltrans Noise Study Report (NSR) and consistent with the Caltrans *Traffic Noise Analysis Protocol* (CaTNAP) and Technical Noise Supplement (TeNS), August 2006.	McTrans Center, PO Box 116585, Gainesville, FL 32611-6585 (352) 392-0378 http://mctrans.ce.ufl.edu.

Non-HST Sources

Key Information	Sources
Noise assessment for non-HST sources (e.g., freight rail, LRT) will utilize the FTA Manual methods, and the CREATE noise model, or an equivalent model	▪ FTA *Transit Noise and Vibration Impact Assessment* Guidance Manual, May 2006 ▪ http://www.fra.dot.gov/downloads/rrdev/020806

Key Information	Sources
approved by the Program Manager may be used.	%20Create%20Rail%20Noise%20Model.xls

Construction Noise and Vibration

Key Information	Sources
Construction noise and impacts may be assessed using the FRA Manual, FTA Manual, FHWA Roadway Construction Noise Model (RCNM), USEPA construction noise data (updated), a combination of these methods; or an equivalent method approved by the Program Manager. For joint-use corridors with existing rail, use FRA Horn Noise Model to assess benefits accrued by eliminating train horns at crossings; if considered a substantial noise source, the benefit of eliminating the highway-rail grade-crossing bell noise should also be evaluated.	▪ FTA *Transit Noise and Vibration Impact Assessment* Guidance Manual, May 2006 (FTA Manual) as discussed in Section 6.7 (Noise Impact Assessment) ▪ http://www.fhwa.dot.gov/environment/rcnm.htm ▪ http://www.fra.dot.gov/us/content/168

B. SIGNIFICANCE CRITERIA

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following:

- Exposure of persons to, or generation of, operational noise defined as severe by FRA or FTA.
- Exposure of persons to, or generation of, operational vibration levels that exceed the FRA and FTA Vibration Impact Criteria.
- Exposure of persons to, or generation of, noise or vibration levels during construction in excess of standards established by FTA and established thresholds for architectural and structural building damage.
- Exposure of wildlife to significant changes in noise levels. Significance criteria to be developed by PM team.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Train Operation Noise and Vibration	Potential for project to significantly increase noise /vibration levels at sensitive land uses.	Exposure of noise-sensitive land uses and/or receivers to severe noise impacts, as defined by FRA and FTA Exposure of noise-sensitive land uses and/or receivers to vibration levels in excess of FTA Vibration Impact thresholds.
Station Noise	Potential for noise from operation of transit stations to significantly increase noise /vibration levels at sensitive land uses.	Exposure of noise-sensitive land uses and/or receivers to severe noise impacts, as defined by FRA and FTA
Traffic Noise	Potential for project-related motor vehicle trips to significantly increase noise levels at sensitive land uses	Exposure of noise sensitive land uses and/or receivers to noise in excess of federal or state standards for traffic noise.

Non-HST noise sources	Potential for noise from rail yards, maintenance facilities, ancillary facilities such as traction power substations (TPSS), emergency diesel generators, and train horns or other warning devices.	Exposure of noise-sensitive land uses and/or receivers to severe noise impacts, as defined by FRA and FTA

D. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify specific feasible mitigation strategies and measures for avoidance and minimization of potential impacts related to noise and vibration.

The Program Management Team will:

- Develop policy guidance for determining feasibility of site specific noise mitigation measures.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for noise and vibration.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether noise and vibration will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for noise and vibration. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.3.4 Products

A. TECHNICAL REPORT: NOISE AND VIBRATION

The report shall conform to the requirements and topics set forth in Section 11.1 (The Technical Report on Noise and Vibration) and Section 11.1.1 (Organization of Technical Report) of the FRA Manual

B. PROJECT EIR/EIS

1. Section: Noise and Vibration
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

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3.4 Electromagnetic Fields and Electromagnetic Interference

3.4.1 Introduction

A. REGULATORY REQUIREMENTS

Use information under Regulatory Requirements in the Program EIR/EIS.

3.4.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
Technical features (e.g., frequency, field strengths, modulation system) of the right-of-way-to-train wireless communications system. EMCCP Location of substations and transmission lines	▪ For EMF, distance from centerline where EMFs reach existing environmental levels for each new high-voltage line between grid and substations and from the perimeter for each substation. ▪ For EMI, 500-foot on each side of the right-of-way limits for airport, military facilities, telecommunications, research labs, or other facilities with particular sensitivity to EMI impacts.

B. DEFINITION OF EMF/EMI/RFI

The Section Environmental Teams will define EMF/EMI/RFI consistent with the Program EIR/EIS and summarize program-level findings of potential for effects on people (workers and passengers with implanted medical devices, or with other electronic appliances), biota, endangered or protected species and agriculture, telecommunications, signaling, and other sensitive uses, referencing the measurements of overhead catenary in *EMF Monitoring on Amtrak's Northeast Corridor: Post-Electrification Measurements and Analysis* (DOT/FRA/RDV-06-01) October 2006.

Baseline

- The Section Teams will quantify existing levels of EMF/EMI/RFI by representative measurement in a "rural", "urban" and, as necessary, "special" location(s) along the selected alignment. Use methods consistent with *EMF Monitoring on Amtrak's Northeast Corridor: Post-Electrification Measurements and Analysis* (DOT/FRA/RDV-06-01) October 2006 and with the best currently applicable standards and recommended practices from ANSI/IEEE on EMF and EMR human exposure safety, measurement and control (e.g., C95.1-2005, C95.2-, C95.6-2002, C95.7-2005, IEEE Std. 644-1994, ACGIH occupational exposure levels and FCC rules for RF radiation under CFR 47, Parts 15 and 18).
- The Program Management Team will develop an electromagnetic compatibility control plan (EMCCP) as described in APTA SS-E-010-98, to guide HSR engineering and design that:
  - Characterizes potential EMI sources and potential radiated, conducted or inducted EMI hazards to rail operations;
  - Considers low-cost, no-cost options, or Best Practices (PB) for the prevention, control and mitigation techniques (such as posted warning signs, fencing, and shielding of substations, or grade crossing access, as needed);
  - Considers best practices (BP) in EMI susceptibility control procedures (fencing, active or passive shielding, cathodic protection, surge protection, fail-safe circuit redesign, changed location of antennas or susceptible equipment, redesign of equipment, enclosures for equipment);
  - Utilize current EMC guidance and resources for HSR electrification developed by EPRI, AAR and AREMA, including: a) "*Power System and Railroad Electromagnetic Compatibility Handbook*" (EPRI revised First Edition 10102652, Final Report, Nov. 2006)" and b) EPRI-sponsored, Enertech, Inc.-EMF modeling and prediction software, such as *EMF Workstation for predicting substations and power line lateral magnetic and electric field levels vs. distance (EMF Expert,, ENVIRO, EXPOCALC, Power Line Calculator and RESICALC modules); and c) Enertech, Inc. EPRI approved power-line EMF measurement equipment with associated software (EMDEX with EMCALC 2000);*
  - Includes a safety analysis and failure analysis of HSR components, subsystems and systems;
  - Addresses grounding or shorting hazards, prevents, controls or mitigates as needed stray currents (earth-return currents or induced currents in metallic structures and pipelines or along the return rails (where some fraction of the current finds its way back to substation or generating station through the earth for various regions and soil conditions), and the effects of different design and construction practices on these currents;
  - Characterizes the frequency bands, spectral characteristics of ELF/EMF and RF generated noise by the pantograph-catenary contact under operating conditions; and
  - Characterizes parameters (e.g., frequency spectrum, electric and magnetic field strengths, modulation system) for HST wireless communications, control, and power and propulsion system (including auxiliary power).
  - Define thresholds of significance using methods consistent with *EMF Monitoring on Amtrak's Northeast Corridor: Post-Electrification Measurements and Analysis* (DOT/FRA/RDV-06-01) October 2006 and with the best currently applicable standards and recommended practices from ANSI/IEEE on EMF and EMR human exposure safety, measurement and control (e.g., C95.1-2005, C95.2-, C95.6-2002, C95.7-2005, IEEE Std. 644-1994, ACGIH occupational exposure levels and FCC rules for RF radiation under CFR 47, Parts 15 and 18).
  - .

Populations Near High-Voltage Transmission Lines

Key Information	Sources
▪ Identify occupied structures within zone of potential EMF effects from substations and proposed high-voltage transmission/distribution lines connecting HST substations to the electric power grid. ▪ Identify and locate schools, hospitals, airport, military facilities, telecommunications, research labs, or other facilities with possibly greater sensitivity to EMI impacts.	▪ Utilize aerial images, maps, and field review to identify structures and facilities ▪ Review existing local planning documents for identification/location of sensitive receptors (like schools, hospitals, etc.)

Telecommunication and Other Sensitive Facilities Susceptible to EMF/EMI/RFI Effects

Key Information	Sources
▪ Identify telecommunication and other sensitive facilities susceptible to EMF/EMI/RFI effects	▪ Field review and aerial images, map facilities along alignment corridor and transmission lines

Railroad/Transportation Equipment Susceptible to EMF/EMI/RFI Effects from Airports, Military, or Other Commercial Transmitters along the ROW

Key Information	Sources
▪ Identify railroad/transportation equipment susceptible to EMF/EMI/RFI effects from airports, military, or other commercial transmitters along the ROW	▪ Field review and aerial images

Typical Effects of HST-Related EMF/EMI/RFI

Key Information	Sources
▪ Identify typical effects of HST-related EMF/EMI/RFI	▪ See Program EIR/EIS

3.4.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

The Section Environmental Teams will:

- Describe how the engineering design following the EMCCP have accounted for specific structures (e.g., pipelines, cables, fences) that are particularly susceptible to induced ELF currents, project signaling, safety and communications equipment that would be susceptible to EMF/EMI/RFI effects, the potential for EMI impacts to sensitive facilities, and what mitigation has been incorporated in the design.
- Identify critical interface areas that will not conform to the EMCCP.

- For those locations and where occupied structures are within 50 feet of a high voltage line or substation, compare the expected exposure levels from HSR traction power supply and electric utility systems on humans, biota, agriculture, sensitive species, telecommunications and signaling systems and equipment, or other sensitive uses by calculating voltage and current loads on lines or at substations to guidance in the EMCCP.
- Compare results to thresholds described in the EMCCP for values for the specific potentially affected populations/facilities and use to identify potential exposure and effect.
- Determine whether and where these exposures or effects are impacts that might be significant.

B. SIGNIFICANCE CRITERIA

For purposes of this discussion, an HST alternative would be considered to result in a significant effect on the environment if it would expose people to a documented health risk associated with EMFs or interfere with implanted biomedical devices.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Populations near high-voltage transmission lines	▪ Exposure of people occupying structures near high-voltage transmission lines ▪ Exposure of people occupying schools, hospitals, airport, military facilities, telecommunications, research labs, or other facilities with possibly greater sensitivity to EMI impacts	▪ EMCCP ▪ An HST alignment alternative would be considered to result in a significant effect on the environment if it would expose people to a documented health risk associated with EMFs or interfere with implanted biomedical devices
EMF at passenger stations	▪ Exposure of passengers to EMF	
EMFs in the vehicle compartment.	▪ Exposure of passengers to EMF	
EMFs at specific locations used by the train crew.	▪ Exposure of crews to EMF	
	▪	
Identification of specific structures (e.g., pipelines, cables, fences) that are particularly susceptible to induced ELF currents.	▪ Exposure of structures to ELF currents	
Receptors (e.g., telecommunications and research facilities) at specific locations with possibly greater sensitivity to EMI impacts.	▪ Effects of EMF/EMI/RLF on telecommunication and other sensitive facilities	

D. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify site-specific mitigation measures to address any significant effects.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for EMI/EMF.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether EMI/EMF will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects

(such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for EMI/EMF. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.4.4 Products

A. PROJECT EIR/EIS

1. Section: EMI/EMF
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

3.5 Public Utilities and Energy

3.5.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Corporate Average Fuel Economy Standards
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
- Section 403(b) of the Power Plant and Industrial Fuel Use Act of 1978 (PL 95-620)
- Executive Order 12185, Conservation of Petroleum and Natural Gas (December 17, 1979, 44 FR § 75093)
- Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation

State Regulations

- California Code of Regulations, Title 24, Part 6, Energy Efficiency Standards
- California Integrated Waste Management Board (Assembly Bill 939, Senate Bill 1374)

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan policies and ordinances

3.5.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Utilities– Project plans/profiles (including existing wet and dry utility plans) ▪ Energy– Conceptual design and project plans and profiles and project description (supply transmission lines, commercial grid connections, substations, and power demands and loads at connection points)	▪ Utilities: In the proposed HST right-of-way and adjacent to the project, at the surface, overhead and subsurface levels ▪ Utility provider for HST service area ▪ Energy: Same as travel demand forecast (see Traffic)

B. PUBLIC UTILITIES

Electrical Facilities

Key Information	Sources
▪ Describe the existing electrical substations and major transmission lines (66 kV and above) and electrical utility providers in and adjacent to alignment corridor; include maps of transmission lines. ▪ Describe the existing facilities that would provide power to the HST system (consult with project engineers); define the existing capacity and existing demand servicing the grid.	▪ Utility providers and field review

Natural Gas Lines (high pressure)

Key Information	Sources
▪ Identify major (high pressure) natural gas facilities and major (high pressure) natural gas distribution lines in or adjacent to the HST right-of-way	▪ Natural gas providers and field review ▪ State Fire Marshall or Office of Emergency (OES)

Petroleum and Fuel Pipelines

Key Information	Sources
▪ Identify petroleum and fuel facilities and major pipelines within 100 feet of the HST right-of-way	▪ Petroleum and fuel providers (may be security issue) and field review

Communications Facilities

Key Information	Sources
▪ Describe what type of communication facilities (relay stations, antennae farms, etc.) and services (cable, telephone, fiber optics, cellular, etc.) are in or adjacent to the HST right-of-way	▪ Utility providers, conceptual design and project plans and profiles and field review

Water Supply

Key Information	Sources
▪ Describe what type of major water supply facilities (treatment, reservoirs, pump plants, major pipelines [transmitting water from one region to another], canals, and aqueducts) are in or adjacent to the HST right-of-way. *Include those facilities where relocation would be difficult or infeasible.*	▪ conceptual design and project plans and profiles and field review

Waste Water Infrastructure

Key Information	Sources
▪ Describe what type of major waste water facilities (treatment plants, major pipelines [trunk lines], sewer drains) are in or adjacent to the HST right-of-way. *Include those facilities where relocation would be difficult or infeasible.*	▪ conceptual design and project plans and profiles and field review

Storm Drains

Key Information	Sources
▪ Describe what type of major stormwater facilities are in or adjacent to the HST right-of-way. *Include those facilities where relocation would be difficult or infeasible.*	▪ conceptual design and project plans and profiles and field review

Solid Waste Facilities

Key Information	Sources
▪ Describe waste recycling operations and identify municipal landfills within project communities	▪ Local and county general plans and/or providers

Energy

Key Information	Sources
▪ Summarize the overall state findings for existing energy and reference two program EIRs/EISs (Bay Area to Central Valley being the most current). Identify any changes in the existing conditions for HST section area energy resources, electricity demand, electricity generation capacity, electricity transmission capacity, electricity outlook, and transportation energy consumption. ▪ Identify locations for electrical grid connections and supply transmission lines. Describe existing power demands and loads at connection points.	▪ Program EIRs/EISs ▪ Conceptual engineering design information for HST electric power system (supply transmission lines, commercial grid connections, substations, and power demands and loads at connection points).

3.5.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

The Section Environmental Teams will review information on public utilities, HST electricity demand, and construction energy use contained in the Program EIR/EIS, ROD and CEQA Findings.

Most impacts to utilities would occur during construction of the project, when utility lines may require relocation. However, following construction, utility lines would be the same or have improved functionality over the existing lines.

Impacts to public utility services will be determined by analyzing direct impacts to utility lines (overhead and underground). This includes conflicts between HST alignments or facilities and

existing utilities (see list above) including natural gas, petroleum, and fuel pipelines and facilities or major distribution lines. Information about utility line locations should be obtained from the service providers, field review, project plans and profiles, and as-built drawings. Although every effort should be made to obtain available documentation (such as as-built drawings) for all known utilities and to map existing utility lines and facilities, other unidentified utilities may be located on project sites. Other conflicts that should be identified are those between HST electric traction power facilities and power provider electrical substations and major transmission lines. Analysis of utilities should be focused on the proposed project's potential to result in disruption of services, loss of access to utilities, require construction of new or expanded utility services or facilities, or affect solid waste land fill capacity. Coordination with all providers should continue through final design and construction of the project.

The energy analysis will focus on the project's demand on regional energy supply, need for additional capacity, and peak period electricity demand. The **Program Management Team** with the **Section Engineering Teams** will provide design standards and information regarding energy supply and distribution for the HST system. For the HST alternatives, peak-period electricity demand will be provided by the Section Engineering Teams as part of the preliminary design for the traction power supply systems. Data will be compared with energy consumption information presented in the Program EIR/EIS. The demand will be calculated in terms of megawatts and compared to current estimates of peak demand and supply capacity within the grid controlled by the California Independent State Operator (Cal-ISO).

Permits and approvals required from utility providers should also be specified, including coordination with the CPUC.

Address consistency with the general programwide mitigation strategies identified in the PEIR/PEIS prepared for the High-Speed Train Program, analysis as follows:

- The Authority will consult with the various utility providers during the detailed project-level analysis to minimize potential conflicts.
- Potential utility conflicts would be avoided to the extent possible. If conflicts are unavoidable, the next strategy focuses on reducing and minimizing the potential impact.
- For large utilities, such as wastewater treatment facilities, electrical substations, and pipelines, the strategy would be first to avoid crossing or using any of the utility right-of-way or facility footprint. Avoidance opportunities include consideration of modifying both the horizontal and vertical profiles of the proposed transportation improvements.
- During final design, the Authority will consult with each utility provider/owner to avoid or reduce potential impacts on existing and planned utilities through design refinements. If avoidance is not feasible and adjustment of alignments has not removed the potential conflict, relocation/reconstruction/restoration of the utility would be considered, in close consultation and coordination with the utility owner, as a second mitigation strategy. This type of mitigation could include combining several utilities into a single utility corridor, relocation, or reconstruction. Where feasible and cost-effective, consolidating several utilities, primarily underground electrical and communications utilities, into one conduit should be considered during utility relocation planning.
- The co-lead agencies will comply with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 in the acquisition of all property necessary for the proposed HST system.
- Reduce operational energy consumption by locating HST maintenance and storage facilities within proximity to major stations/termini

- Reduce construction energy by developing and implementing a construction energy conservation plan; using energy efficient construction equipment and vehicles; locating construction material production facilities on-site or in proximity to project construction sites; and developing and implementing a program encouraging construction workers to carpool or use public transportation for travel to and from construction sites.

B. SIGNIFICANCE CRITERIA

Public Utilities

According to the State CEQA Guidelines Appendix G, a project would have a significant impact on utilities and service systems if it would:

- Result in prolonged disruption of services due to relocation or improvements
- Result in the loss of or reduced access to public utility lines or pipes
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Need new or expanded entitlements to supply water to the project.
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to its existing commitments.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Not comply with federal, state, and local statutes and regulations related to solid waste.

Energy

According to Appendix F of the CEQA Guidelines, the means to achieve the goal of conserving energy include decreasing overall per capita energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. The significance criteria discussed herein are used to determine whether the HST alternatives would have a potentially significant effect on energy use, including energy conservation.

Significant long-term operational or direct energy impacts would occur if the HST Alternative would place a substantial demand on regional energy supply or require substantial additional capacity, or substantially increase peak and base period electricity demand.

Significant short-term construction energy impacts would occur if construction of the HST Alternative were judged likely to consume nonrenewable energy resources in a wasteful, inefficient, or unnecessary manner.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
All utilities	▪ Identify major utilities that would be affected by construction and operation of HST facilities ▪ Potential for HST facilities to result in the disruption and/or relocation of utilities that would result in prolonged service disruption ▪ Extent to which the disruption and/or relocation is assumed re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to utility services ▪ Other mitigation approaches/needs	Result in prolonged disruption of services due to relocation or improvements
All utilities	▪ Potential for construction and operation of HST facilities to result in the loss of or reduced access to utility lines/corridors ▪ Extent to which access is assumed re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to utility services ▪ Other mitigation approaches/needs	Result in the loss of or reduced access to public utility lines or pipes
Water Supply	▪ Potential for construction and operation of HST facilities to result in the need for new or expansion of water treatment facilities ▪ Extent to which the need for new facilities are addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to water supply ▪ Other mitigation approaches/needs	Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
Water Supply	▪ Potential water needs during construction and operation of the HST and its facilities compared to existing supply ▪ Extent to which design can be used to reduce or mitigate potential impacts to supply water ▪ Other mitigation approaches/needs	Need new or expanded entitlements to supply water to the project

Topic	Issues to Evaluate	Threshold of Significance
Wastewater	▪ Potential for construction and operation of HST facilities to exceed the capacity of a wastewater treatment facility in addition to its existing commitments ▪ Extent to which the capacity needs are addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts on wastewater treatment providers ▪ Other mitigation approaches/needs	Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to its existing commitments.
Wastewater	▪ Potential for construction and operation of HST facilities to result in the need for new or expansion of wastewater treatment facilities ▪ Extent to which the need for new facilities are addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to wastewater supply ▪ Other mitigation approaches/needs	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
Storm Drains	▪ Potential for construction and operation of HST facilities to result in the need for new or expansion of stormwater drainage facilities ▪ Extent to which the need for new facilities are addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to stormwater drainage facilities ▪ Other mitigation approaches/needs	Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
Solid Waste	▪ Potential for construction and operation of HST facilities to result in the disposal of solid wastes that exceed capacity of local landfills ▪ Extent to which recycling are addressed by assumptions re: programmatic mitigation and by how much demand is reduced by recycling ▪ Extent to which design can be used to avoid or mitigate potential impacts to stormwater drainage facilities ▪ Other mitigation approaches/needs	Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs

Topic	Issues to Evaluate	Threshold of Significance
Solid Waste	▪ Potential for construction and operation of the HST and facilities to conflict with regulations related to solid waste ▪ Extent to which recycling is addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to stormwater drainage facilities ▪ Other mitigation approaches/needs	Not comply with federal, state, and local statutes and regulations related to solid waste (would not implement measures to reduce the amount of solid waste entering landfills)
Regional Energy Supplies/ Resources	▪ Refer to Bay Area to Central Valley PEIR/PEIS Energy analysis ▪ Extent to which HST segment is addressed by assumptions re: programmatic mitigation ▪ Extent to which design can be used to avoid or mitigate potential impacts to energy supplies ▪ Other mitigation approaches/needs	Place a substantial demand on regional energy supply
Peak Demand for Electricity	▪ Analysis based on information developed for preliminary design of the traction power supply systems. Data will be compared with energy consumption factors from the PEIR/PEIS and the operations plan. The demand will be calculated in terms of megawatts and compared to current estimates of peak demand and supply capacity within the grid controlled by the California Independent State Operator (Cal-ISO). ▪ Extent to which peak electricity demand of the HST segment is addressed by assumptions re: programmatic mitigation ▪ Extent to which design or operations can be used to avoid or mitigate potential peak period demand ▪ Other mitigation approaches/needs	Substantially increase regional peak and base period electricity demand or require substantial additional capacity

D. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level

measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.

- Identify secondary impacts of mitigation.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for public utilities and energy.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether public utilities and energy will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.

- Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
- Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for public utilities and energy. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.5.4 Products

A. PROJECT EIR/EIS
   1. Section: Public Utilities
   2. Cumulative Impacts Section
   3. Summary for EIR/EIS Executive Summary

3.6 Biological Resources and Wetlands

3.6.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Federal Endangered Species Act
  - Section 9
  - Section 7
  - Section 10
- Magnuson-Stevens Fishery Conservation and Management Act
- Clean Water Act
  - Section 401
  - Section 402
  - Section 404
- Section 10 of the Rivers and Harbors Act
- Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
  - Bald and Golden Eagle Protection Act of 1947, as amended
- Coastal Zone Management Act
  - Executive Order 11990, Protection of Wetlands
  - Executive Order 13112, Invasive Species

State Regulations

- California Endangered Species Act
  - California Fish and Game Code
  - Fully Protected Species
  - Sections 3503 and 3503.5
  - Streambed Alteration Agreements (Section 1600 et seq.)
- California Native Plant Protection Act
- Porter-Cologne Water Quality Control Act
- California Coastal Act
- McAteer Petris Act (San Francisco Bay Conservation and Development Commission)

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan policies and ordinances and habitat conservation plans

3.6.2 Special Studies to be Conducted Prior to EIR/EIS

The methods used to identify biological resources in the study areas included prefield investigation, coordination with the resource agencies, and field surveys. Each of these elements is described below.

A. PREFIELD INVESTIGATION AND CONSULTATION WITH RESOURCE AGENCIES

To prepare for the field surveys, biologists reviewed existing resource information related to the project area and consult with resource specialists (USFWS, CDFG, species experts, BLM, Forest Service) to evaluate whether special-status species or their habitats could occur in the project area. Pertinent sources reviewed included the following.

- Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System (California High-Speed Rail Authority and Federal Railroad Administration 2005)
- Final Bay Area to Central Valley HST Program EIR/EIS (California High-Speed Rail Authority and Federal Railroad Administration 2008 [in progress])
- California Natural Diversity Database (CNDDB) records search for the associated quads including surrounding quads , Round Mountain, Sanger, Malaga, and Fresno South USGS 7.5-minute quadrangles (California Natural Diversity Database 2004)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (2001)
- U.S. Fish and Wildlife Service (USFWS) species list for applicable counties
- Applicable City and County General Plans
- Soil Survey for appropriate area, California (Huntington 1971)
- Any relevant CEQA/NEPA planning documents
- Habitat Conservation Plans

This information will be used to develop lists of special-status species and other sensitive biological resources that could be present in the project area. Species will be included in these lists if they were known to occur in the project region and if their habitats could be located in the project area. Prepare tables of Special-status plant and wildlife species identified as having potential to occur in the project region.

Special Status Wildlife and Plant Species Protocol / Focused Surveys	▪ Assist the Authority with compliance with state and federal Endangered Species Acts (ESAs). Potential for special-status species, and the level of effort to comply with ESAs, will ultimately be predicated on the presence or absence of potentially suitable habitat within and adjacent to the areas directly or indirectly impacted by the project (e.g., the results of the aforementioned habitat assessment and vegetation mapping). The Authority (with regional teams input) will initiate consultation with the USFWS under Section 7 of the Endangered Species Act and will prepare a Biological Assessment to support a Biological Opinion, where appropriate (proposed, threatened or endangered species are present or habitat is present in the study area). ▪ If determined to be necessary, the section environmental teams will conduct protocol level field surveys for special-status species pursuant to USFWS, USFS (are there FS lands in any of the action areas?), CDFG, or other appropriate regulatory agency approved methodologies. For permitting purposes it may be necessary to assume presence of special-status species in areas with suitable habitat but to which there is no access and in areas that cannot be effectively surveyed due to other factors such as time of year or the amount of rainfall.

	▪ Surveys for special status plants will be conducted according to the guidelines established by CDFG and/or USFWS. The guidelines require that surveys be conducted at the appropriate time of year by qualified individuals and require that all species encountered be identified to the lowest taxonomic level possible. ▪ Surveys for special status wildlife species will be conducted according to the guidelines established by CDFG and/or USFWS. These guidelines are often specific to individual species and often require that the surveyors possess or obtain the necessary permits to conduct the surveys.

B. FIELD SURVEYS

Methods and terms used to document special-status species and waters of the United States, including wetlands, are described below.

- Describe the team …. consisting of a wildlife biologist and a botanist/wetlands ecologist, conducted field surveys to support the project-level analysis by driving and walking the project study area on…give dates. In general, the purpose of the biological field surveys is to:
- characterize biological communities and their associated wildlife habitat uses;
- determine whether suitable habitat exists for common and special-status wildlife species;
- determine whether the study area contains suitable habitat for early- and late-blooming special-status plants; and
- identify areas that may qualify as potential waters of the United States and delineate potential waters of the United States to determine the extent of Corps jurisdiction.

C. HABITAT ASSESSMENT

Describe and map the vegetation communities in the study area. Vegetation classifications of the plant communities in the study area will be derived from the most current version of the List of Terrestrial Natural Communities of California prepared by CDFG or other classifications determined to be acceptable to CDFG and/or USFWS.

Conduct a habitat assessment to determine the potential presence of special-status species. The habitat assessment will be based on a comparison of the habitats in the study area with reported occupied habitats and/or comparisons with reported occupied habitats

Identify, evaluate, and map in GIS all habitat conditions, including potentially important landscape linkages, that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant/wildlife viability.

Habitat Assessment and Vegetation Mapping	▪ Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, access roads, temporary construction easements and so forth) plus a 500-foot study area for indirect impacts, to the maximum extent practical. ▪ Conduct a habitat assessment to determine the potential presence of special status species. The habitat assessment will be based on a comparison of the habitats in the study area with reported occupied habitats and/or comparisons with reported occupied habitats. ▪ Describe and map the vegetation communities in the study area. Vegetation classifications of the plant communities in the study area will be derived from the most current version of the List of Terrestrial Natural Communities of California prepared by CDFG or other classifications determined to be acceptable to CDFG and/or USFWS.

D. SPECIAL-STATUS SPECIES

Special-status species are plants, animals, and fish species that are legally protected under the federal Endangered Species Act (ESA), California Endangered Species Act (CESA), or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Special-status species include:

- Species listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12 [listed plants]; 50 CFR 17.11 [listed animals]; various notices in the FR [proposed species]);
- Species that are candidates for possible future listing as threatened or endangered under the ESA (69 FR 24876, May 4, 2004);
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- Species that meet the definitions of rare or endangered under CEQA (CEQA Guidelines Section 15380);
- Slants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.);
- Plants considered by CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2, California Native Plant Society 2001);
- Plants listed by CNPS as plants about which more information is needed to determine their status, and plants of limited distribution (Lists 3 and 4, California Native Plant Society 2001), which may be included as special-status species on the basis of local significance or recent biological information;
- Animal species of special concern to the CDFG (Remsen 1978 [birds]; Williams 1986 [mammals]; Jennings and Hayes 1994 [amphibians and reptiles]); and
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], and 5050 [amphibians and reptiles]).

E. PROTOCOL-LEVEL SURVEYS

If determined to be necessary, the section environmental teams will conduct protocol-level field surveys for special-status species pursuant to USFWS, USFS (if there are FS lands in any of the action areas), CDFG, or other appropriate regulatory agency approved methodologies. For permitting purposes it may be necessary to assume presence of special-status species in areas with suitable habitat but to which there is no access and in areas that cannot be effectively surveyed due to other factors such as time of year or the amount of rainfall.

Surveys for special-status plants will be conducted according to the guidelines established by CDFG and/or USFWS. The guidelines require that surveys be conducted at the appropriate time of year by qualified individuals and that all species encountered be identified to the lowest taxonomic level possible.

Surveys for special-status wildlife species will be conducted according to the guidelines established by CDFG and/or USFWS. These guidelines are often specific to individual species and often require that the surveyors possess or obtain the necessary permits to conduct the surveys.

Evaluate within a written Technical Report if special aquatic resources or habitat for proposed, state or federally listed species is present or absent within the study area. In general, the report will detail the following:

- Names of field investigator(s),
- Dates of field surveys,
- Weather conditions,
- Time spent performing the surveys,
- Species observed,
- Habitat types and vegetation communities within the study area,
- Map and location data for any special-status species observations (including GPS coordinates),
- Representative photos (if possible) and disturbance regime/land use within the study area,
- Complete CDFG California Natural Diversity Database forms for each special-status species found, and
- Record any deviations from the methods outlined in this document.
- If necessary, this information will be used to support preparation of a Biological Assessment and formal consultation with USFWS and CDFG. The BA will identify the action area (this can be different from the study area) and describe the project effects on listed species and identify measures to avoid, minimize, and compensate for those effects. The Biological Assessment will be suitable for submittal to the CDFG, USFS, and/or USFWS and inclusion in a technical appendix in the CEQA/NEPA document.

F. WATERS OF THE UNITED STATES, INCLUDING WETLANDS

A wetland delineation will be completed and a delineation report will be prepared presenting the results of the CWA and California Fish and Game Code 1600 (et seq) jurisdictional delineation. The report will be suitable for submittal to the Corps, Regional Water Quality Control Board (RWQCB), and CDFG for purposes of CWA Sections 401, 402, 404, and Streambed Alteration Agreement permit applications and inclusion in the EIR/EIS document. Accordingly, the report will quantify jurisdictional areas and include a breakdown of wetlands, non-wetland waters of the U.S., waters of the State, and other special aquatic resources discovered within the study area.

The wetland delineation report will include:

- A description of study methodologies;
- Background information on the CWA (e.g., Corps and RWQCB) and CDFG permitting;
- A description of vegetation, soils, and hydrology in the project study area pursuant to the Corps Wetland Delineation Manual (Environmental Laboratory, 1987) and the guidance detailed in A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (Environmental Services Division, January 1994);
- Map depicting the field survey results; and
- Corps Field data sheets from sampling locations.

3.6.3 Affected Environment

A. DEFINITION OF STUDY AREA

Key Information	Study Area
The Section Environmental Teams will assess and describe existing resources in the study area: ▪ "**biological resources**" are the plants, wildlife, and habitats that occur, or have the potential to occur, within the Project's study area; ▪ "**special-status species**" are defined as any species that has been afforded special recognition by federal, state, or local resources agencies (e.g., U.S. Fish and Wildlife Service [USFWS], United States Forest Service [USFS], California Department of Fish and Game [CDFG]), county and city Habitat Conservation Plans (HCPs), and conservation organizations (e.g., California Native Plant Society [CNPS]); and ▪ "**special aquatic resources**" (e.g., seasonal wetlands, vernal pools) are Clean Water Act (CWA) Section 404 and 401 or California Fish and Game Code (CFGC) 1600 (*et seq.*) jurisdictional features. ▪ **Critical habitats** are areas designated by the USFWS that are either occupied by species that are federally listed as threatened or endangered or that provide them with suitable habitat and within which are found the geographical and physical features that are essential to the conservation of the species. As defined under the ESA, conservation is defined as "any and all methods and procedures used to bring a species to recovery; the point at the protections of the ESA are no longer needed."	▪ The biological "study area" is defined as the Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, temporary access roads, and so forth) plus a 250-foot adjacent area on either side to address both direct and indirect impacts. Where access to the entire study area will not be possible as a result of private property or physical barriers, observations will be made from nearest appropriate vantage points with binoculars and/or via aerial photographs to attempt to document and verify the presence or absence of resources. ▪ The wetland delineation will be conducted for the project footprint (study area). Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, temporary construction easements and so forth) within or immediately adjacent to a wetland area. ▪ For wildlife movement corridors, project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, and so forth) plus a larger area based on the species likely to be present and determined in consultation with appropriate regulatory agencies and on property access. ▪

Regional Setting

Key Information	Sources
This will be a discussion of the Project's regional setting, which may vary by topical section, encompassing areas appropriate to the topic of analysis: county and/or city lines, watersheds, etc. The study area(s) used for regional analysis within each section will be defined and discussed here.	▪ California Natural Diversity Database (CNDDB) records search for the associated quads including surrounding quads , ….. USGS 7.5-minute quadrangles (California Natural Diversity Database 2007) ▪ California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (2001) ▪ U.S. Fish and Wildlife Service (USFWS) species list for applicable counties ▪ Applicable City and County General Plans ▪ Soil Survey for appropriate area, California ▪ Any relevant CEQA/NEPA planning documents ▪ Habitat Conservation Plans

Biological Communities (aka land cover types)

Key Information	Sources
Describe biological communities (assemblages of species, both plant and wildlife, forming communities) and wildlife habitats that occur in the study area	Results of pre-field review of aerial photographs and habitat assessment survey, using List of Terrestrial Natural Communities of California prepared by CDFG or other classifications determined to be acceptable to CDFG and/or USFWS

Special-Status Species

Key Information	Sources
Identify, evaluate, and map in GIS all habitat conditions, including potentially important landscape linkages that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant/wildlife viability.	▪ Results of habitat assessment and special-status plant and wildlife surveys ▪ Results of agency and species expert contacts ▪ Describe any USFWS recovery plans, including core areas for recovery. ▪ Results of previous environmental and planning documents

Critical Habitats

Key Information	Sources
Include a description of critical habitat in the project area (as defined by the USFWS)	Obtain information from USFWS website and recovery plans and use GIS if necessary to determine if critical habitat is present in the project area

Wildlife Movement/Migration Corridors

Wildlife movement/migration corridors link together areas of wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization tends to create isolated islands of wildlife habitat. The fragmentation of wildlife habitat into isolated islands is especially detrimental to threatened or endangered species that are subject to localized extinctions due to natural or human-induced causes. Wildlife movement and migration corridors allow for the recolonization of areas that may have experienced greatly reduced populations or localized extinctions. Wildlife movement/migration corridors also allow for genetic mixing and flow between otherwise segregated populations of a species.

Key Information	Sources
▪ Include a description of the location and type of movement or migration corridors and the species it would apply to. ▪ Identify, evaluate, and map in GIS all habitat conditions (including potentially important landscape linkages that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant/wildlife viability.	▪ USFWS and CDFG and specific species contacts ▪ Review literature on movement and migration corridors and habitat linkages ▪ Review of aerial photographs and field surveys to determine potential for movement or migration corridors

Wetlands and Other Waters of the United States

Wetlands and other waters of the United States, including lakes, rivers, and streams, are afforded protection under federal and state laws. Special aquatic resources, which include seasonal wetlands and vernal pools, are considered an important subset of these waters because of their importance to plant and wildlife species.

Key Information	Sources
▪ Description of study methodologies; ▪ Background information on the CWA (e.g., Corps and RWQCB) and CDFG permitting; ▪ Description of vegetation, soils, and hydrology in the project study area pursuant to the Corps Wetland Delineation Manual (Environmental Laboratory, 1987) and the guidance detailed in A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (Environmental Services Division, January 1994); ▪ Map depicting the field survey results ▪ Prepare wetland delineation report.	▪ Results of wetland delineation survey. ▪ Wetland Delineation Manual (Environmental Laboratory, 1987) ▪ A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (Environmental Services Division, January 1994)

3.6.4 Impact Analysis and Mitigation Strategies

- List assumptions

Potential for special-status species, and the level of effort to comply with ESAs, will ultimately be predicated on the presence or absence of potentially suitable habitat within and adjacent to the areas

directly or indirectly impacted by the project (e.g., the results of the aforementioned habitat assessment and vegetation mapping). A biological assessment (BA) will be prepared if it is determined during field surveys and coordination with state and federal agencies that there is potential to affect a proposed or state or federally listed species. The BA will identify the action area (this can be different from the study area) and describe the project effects on proposed and listed species as well as Critical Habitat and identify measures to avoid, minimize, and compensate for those effects. The BA will be suitable for submittal to the CDFG, USFS, and/or USFWS. The Authority (with regional team input) and FRA will initiate consultation with the USFWS under Section 7 of the Endangered Species Act to support a Biological Opinion.

A. SIGNIFICANCE CRITERIA

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following:

- Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulation or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404 (including marsh, vernal pool, and coastal wetlands) through direct removal, filling, hydrological 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 substantially impede the use of native wildlife nursery sites; or
- Conflict with the provisions of an adopted habitat conservation plan (HCP), natural communities conservation plan (NCCP), or other approved local, regional, or state conservation plans.

B. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Disturbance or Loss of Special-Status Wildlife species or their habitat	▪ Identify species and habitat affected ▪ Type of impact, including loss of habitat, effects on breeding, movement, seasonality – can the impact be avoided through the use of timing constraints ▪ Direct or indirect impact ▪ Temporary or permanent ▪ Construction and operation impacts ▪ Will this result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors ▪ Will this conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ▪ ▪	▪ Is this a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS? ▪ Will it 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? ▪ Will it conflict with the provisions of an adopted habitat conservation plan (HCP), natural communities conservation plan (NCCP), or other approved local, regional, or state conservation plan. ▪
Protected wetlands as defined by CWA Section 404 (marsh, vernal pool, and coastal wetlands)	Determine the type and amount of habitat through direct removal, filling, hydrological interruption, or other means. does it result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors	Will there be a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404, through direct removal, filling, hydrological interruption, or other means
Loss of Habitat	▪ Type and amount of habitat and any local or regional plans, policies or regulations. Indirect or direct effects? Permanent or temporary? does it result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors ▪ Will it conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Will it conflict with the provisions of an adopted habitat conservation plan (HCP), natural communities conservation plan (NCCP), or other approved local, regional, or state habitat conservation plan?

C. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify site-specific measures to avoid, minimize, and compensate for potential adverse effects and impacts to biological resources.
- For special-status plant and wildlife species with potential to occur in the study area; describe implementation of specific measures to avoid, minimize, and compensate for adverse project related impacts to these species and their habitats.
- For special aquatic resources and important landscape linkages that support and facilitate the movement and dispersal of substantial numbers of common and special-status species that connect blocks of open space essential for long-term plant/wildlife viability regionally, identify specific strategies (e.g., on-site modified project features [e.g., bridge instead of a culvert] or off-site compensation, mitigation banking, and so forth) to avoid, minimize, and compensate for potential adverse effects and impacts.

D. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for biological resources and wetlands.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether biological resources and wetlands will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for biological resources and wetlands. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.6.5 Products

A. TECHNICAL REPORT

B. WETLAND DELINEATION REPORT

C. BIOLOGICAL ASSESSMENT (if needed)

D. PROJECT EIR/EIS

   1. Section: Biological Resourcess and Wetlands

2. EIR/EIS Cumulative Analysis
3. EIR/EIS Summary

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3.7 Hydrology and Water Resources

3.7.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Clean Water Act Section 402[p]
  - Section 404 Permit for Fill Material in Waters and Wetlands (reference Biology)
  - Section 402 NPDES Program
  - Section 401 Clean Water Quality Certification
  - Section 303(d) Water Quality Impairments
- Rivers and Harbors Act (33 U.S.C. 401 et seq.)
  - Section 10
- Floodplain Management
  - Executive Order 11988—Floodplain Management (U.S. DOT Order 5650.2; 23 C.F.R. 650, Subpart A)
  - Flood Disaster Protection Act (42 U.S.C. 4001–4128; DOT Order 5650.2, 23 C.F.R. 650 Subpart A; and 23 C.F.R. 771)
  - Federal National Flood Insurance Program

State Regulations

- Porter-Cologne Water Quality Act (Water Code § 13000 et seq.)
- State Water Resources Control Board
- Regional Water Quality Control Boards
  - Basin Plans and Water Quality Objectives
  - Construction Activities – NPDES General Construction Permit
  - Dewatering Activities – Permit varies by RWQCB
  - Stormwater Discharges – MS4 NPDES Permits
  - Cobey-Alquist Flood Plain Management Act (Water Code § 8400 et seq.)
- California Department of Fish and Game Code (§ 1601–1603 [Streambed Alteration]) (reference Biology)

B. OTHER CONSIDERATIONS

- Local Jurisdiction Stormwater Management Programs (see also Stormwater Discharges – MS4 NPDES Permits above)
- Local Jurisdiction General Plan Policies and Ordinances (that use water resources as the basis for land use planning decisions [stream setbacks, flood management, etc.])
- Local Jurisdiction Grading Codes (and their requirements)

3.7.2 Affected Environment

A. DEFINITION OF STUDY AREA

Key Information	Study Area
▪ Conceptual design and project plans and profiles and project description ▪ Drainage report (if available)	▪ Surface hydrology and water quality: Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, temporary construction easements and so forth), plus receiving waters of project runoff to evaluate indirect impacts. Particular attention should be given to any areas where facilities would be located within or cross surface water bodies. ▪ Hydrogeology and groundwater quality: Aquifer(s) underlying project footprint. Particular attention should be given to areas of high groundwater which could be encountered during excavation and grading activities, as well as connectivity to underlying aquifers which may be used as a water supply. ▪ Flooding: FEMA-designated flood hazard areas located within project footprint, as well as any areas where flood frequency, extent and duration could be affected by the project (considering both volume of runoff and project-related structures which could impede or redirect flood flows)

Under CEQA, by definition, baseline conditions are the conditions that exist at the time that the Notice of Preparation is filed. Affected environment should reflect those conditions.

Climate, Precipitation, and Topography

Key Information	Sources
▪ Average, minimum and maximum temperature in region ▪ Annual average precipitation, type (rain or snow), seasonality (months of greatest/least rainfall) ▪ Major topographic features, range of elevations, slope steepness, etc.	▪ Climate and Precipitation – Program EIS/EIR; California Data Exchange Center (http://cdec.water.ca.gov/), Western Regional Climate Center (http://www.wrcc.dri.edu/), CIMIS (http://wwwcimis.water.ca.gov/cimis/welcome.jsp), California Climate Data Archive (http://www.calclim.dri.edu/) ▪ Topography (cross reference Geology and Soils Section and Program EIS/EIR) - USGS Topographic Maps and DEMS (GIS data), conceptual design and project plans and profiles and project description

Regional Hydrology and Water Quality

Key Information	Sources
▪ Broad-scale surface water hydrology – major lakes, reservoirs, rivers, streams, canals, floodplains (refer to GIS maps showing and labeling each of these) ▪ Surface water quality – major water quality impairments ▪ Groundwater basins – major aquifers, volume, depths, quality, overdraft conditions if any	▪ Use information, where possible, from Program EIS/EIR and technical reports prepared by regions for statewide system. ▪ Water features - USGS Topographic Maps, Hydro 24 blueline and Layer 610 ▪ Floodplains – FEMA maps and FIRMs ▪ Water quality – Clean Water Act Section 303(d) list of water quality impaired segments, maintained by SWRCB and RWQCBs ▪ Groundwater – DWR Bulletin 118 (http://www.groundwater.water.ca.gov/bulletin118/); USGS Ground Water Atlas of United States

Study Area Hydrology and Water Quality

Key Information	Sources
▪ Floodplain - Identify 100-year floodplains within study area using FEMA maps and FIRMS to show Special Flood Hazard Areas (SFHAs) - Map as overlay using GIS and SPOT imagery - Provide narrative summary of floodplains in study area, referencing appendix containing mapping ▪ Surface Waters (includes impaired bodies) - Identify surface waters (lakes, rivers, streams) within study area - Map as overlay using GIS and SPOT imagery - Provide narrative summary of surface waters within the study area, referencing appendix containing mapping - Identify CWA 303 (d) listed water bodies ▪ Erosion - Identify soils susceptible to erosion within the study area. - Map as overlay using GIS and SPOT imagery - Provide narrative summary of soil erosion potential within the study area, referencing appendix containing mapping	▪ Same as under Regional Hydrology and Water Quality, above ▪ STATSGO GIS databases for identifying highly erodible soils

Key Information	Sources
▪ Groundwater - Identify site-specific conditions with respect to aquifers and areas with shallow groundwater - Map as overlay using GIS and SPOT imagery - Narrative summary of any known groundwater quality impairments or threats	

3.7.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

Analyze direct and indirect impacts related to hydrology and water resources through quantitative analysis, and where necessary with qualitative analysis. The analysis should consider both construction and operation of the HST system. Where possible, the analysis should be based on a review of available reports and discussions with agency representatives in the region, on field investigation, and hydrology and hydraulic modeling (prepared by the Section Engineering Teams) and on professional judgment. Analysis should focus on the proposed project's potential to alter drainage patterns, the volume or characteristics of site runoff, and the risk of personal injury, loss of life, and damage to property resulting from hydrologic and flooding conditions in the study area.

For all impacts, determine significance of impacts and where permit applications will be needed; provide analysis to support future permit review. GIS databases will be developed for each project alignment segment. All GIS data would be developed: (a) as part of project design; (b) from available federal, state and local sources (specific source would depend on the layer in question).

Construction activities with potential for impacts to hydrology and water quality include:

- soil-disturbing activity (e.g., excavation and grading), which can lead to erosion and sedimentation;
- use of construction-related hazardous materials, which could result in spills that would impact surface waters;
- excavation in areas of high groundwater, which could result in impacts to groundwater quality or quantity from dewatering activities and direct exposure of groundwater to sediment and other contaminants; and
- construction within a designated flood zone, which could pose a risk to workers.

Operational impacts result from either ongoing activities of the HST system or the physical impact on the landscape by project facilities such as the stations, parking structures/lots, support facilities, and columns supporting elevated structures. Situations that could potentially lead to an impact include:

- increases in impervious surfaces as a result of the project, leading to increases in the timing and volume of water runoff;
- changes to or interruptions in the local drainage infrastructure as a result of the proposed project design, potentially leading to localized or regional drainage impacts (e.g., flooding);

- creation of significant new sources of pollutants (e.g., parking lots and maintenance facilities), leading to new sources of contaminated runoff;
- location of project facilities below the naturally occurring water table, with potential impacts related to flooding of project facilities and changes in groundwater quality and/or quantity; and
- location of project facilities within a designated floodplain, exposing the project to risks related to flooding, as well as subjecting other areas to impacts resulting from changes in the location and or direction of flood flows.

Utilize the following methods for analyzing floodplains, surface water hydrology, surface water quality, and groundwater.

Floodplains

- Identify the potential impacts to 100-year floodplains, using the GIS database layers for the proposed alternative alignments and the database layer for floodplains.
  - Quantify impacts and present in tabular form.
  - Discuss qualitatively the potential of each alternative alignment to increase flood height.
  - Qualitatively address incompatibility with floodplain development and preservation of floodplain values– prepare Floodplain Risk Assessment for alternatives.

Surface Water Hydrology

- Identify the potential impacts to surface waters, using the GIS database layers for the proposed alternatives and the database layer for surface waters.
- Quantify potential impacts (linear impact for streams, area impacts for other water bodies) and present in tabular form.
- Identify and incorporate design practices to avoid or minimize project impacts.

Surface Water Quality

- Describe impacts to surface water quality from discharges associated with HST construction. Consider accidental releases of construction-related hazardous materials, ground disturbance and associated erosion and sedimentation, stormwater discharges, and dewatering discharges (where applicable). Provide particular attention and detail in areas where work would be conducted within a surface water body, due to direct mechanism for contaminants to enter surface waters.
  - Describe practices from SWPPP (including spill prevention plan) that will avoid or minimize construction impacts.
  - Describe impacts to surface water quality from discharges associated with operation and maintenance activities. Primarily focus on stormwater runoff from facilities.

Groundwater

- Identify the potential impacts to groundwater, using the GIS database layers for the proposed alternatives and the database layer for groundwater.
- For construction-related impacts, consider (a) potential for contaminated site runoff to percolate to aquifer (particularly the case where there is shallow groundwater); (b) areas where excavation activities would result in excursions below the groundwater table, and direct mechanism for contaminants to enter groundwater; (c) volumes of dewatering and potential depletion of groundwater supplies.

- For operational impacts, consider (a) effects on groundwater recharge, with particular attention given to identified recharge areas (b) potential for contaminated stormwater runoff to percolate to aquifer (particularly the case where there is shallow groundwater).
- Describe potential significance of area impacts and present in tabular for comparative table and GIS maps, and relate these to CEQA significance criteria.

Beneficial Impacts

- Describe potential benefits for reducing non-point source pollutants from reduced VMTs (mode shift from automobile). Refer to the Transportation section for VMT data.

B. SIGNIFICANCE CRITERIA

An impact is considered to be significant and to require mitigation if it would result in any of the following.

a) Cause or contribute to a violation of any water quality standards or waste discharge requirements.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

f) Otherwise substantially degrade water quality.

g) Cause housing to fall within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

h) Place structures within a 100-year flood hazard area which would impede or redirect flood flows.

i) Expose people to innundation by seiche or tsunami hazard (covered under Geological Resources).

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Floodplains	▪ Extent that the project is within 100-year floodplains. ▪ Potential for the project to increase flood height. ▪ Potential for the project to result in incompatibility with floodplain development. ▪ Are there design practices to avoid or minimize project impacts?	d, e, g, h, i

Topic	Issues to Evaluate	Threshold of Significance
Surface Water Hydrology	▪ Extent that the project may affect surface waters. ▪ Are there design practices to avoid or minimize project impacts?	c, d, e
Surface Water Quality	▪ Potential for the project to affect surface water quality from discharges associated with HST construction. ▪ Potential for the project to affect surface water quality from discharges associated with operation and maintenance activities.	a, c, e, f
Groundwater	▪ Extent that the project may affect groundwater during construction and operation of the HST.	Primarily b, but also a and f
Beneficial Impacts	▪ Potential benefits for reducing non-point source pollutants from reduced VMTs (mode shift from automobile).	e, f

D. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify mitigation measures for avoidance and minimization of impacts to be incorporated into project designs to reduce impacts related to hydrology and water quality.
- Coordinate with design engineers to incorporate avoidance and minimization measures.

Resources for design approaches, mitigation measures and BMPs include the following:

- Caltrans stormwater program: http://www.dot.ca.gov/hq/env/stormwater/index.htm
- Caltrans stormwater design guidance: http://www.dot.ca.gov/hq/oppd/stormwtr/
- Caltrans construction stormwater control: http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm
- Caltrans maintenance manual (including a section on water quality): http://www.dot.ca.gov/hq/maint/manual/maintman.htm

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine whether a cumulative impact analysis will be required for hydrology and water resources.

- Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether hydrology and water resources will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential

cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

8. Document results.
   - Summarize the results of the cumulative impact analysis for hydrology and water resources. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.7.4 Products

A. TECHNICAL REPORT: HYDROLOGY AND WATER QUALITY

B. PROJECT EIR/EIS

1. Section: Hydrology and Water Quality
2. Cumulative Section
3. Summary for EIR/EIS Executive Summary

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3.8 Geology, Soils, and Geologic Resources

3.8.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Clean Water Act Section 402[p]
- Antiquities Act
- National Environmental Policy Act Protection for Paleontological Resources

State Regulations

- Alquist-Priolo Earthquake Fault Zoning Act
- Seismic Hazards Mapping Act
- Surface Mining and Reclamation Act
- California Public Resources Code
- California Environmental Quality Act Protection for Paleontological Resources

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan policies and ordinances (include any that use geology as a basis for land use planning decisions [geologic hazards policies, hillside ordinances, etc.]; any that implement SMARA; and also any that protect paleontological resources, or heritage resources generally [note potential for overlap with regulations covered in *Cultural Resources* chapter])
- Local jurisdiction grading codes (and their requirements)

3.8.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Conceptual engineering plans and profiles and project description ▪ Project-specific geotechnical report, if available	▪ Topography: regional setting at geomorphic province level, more detailed information along project alignment ▪ Geology: regional geologic setting at geomorphic province/2-degree sheet scale, plus more detailed info along project alignment ▪ Soils: project alignment ▪ Landslide hazards: areas at risk within and adjacent to project alignment ▪ Surface fault rupture: faults intersecting with and adjacent to project alignment ▪ Groundshaking: all faults sufficiently close to pose strong groundshaking risk (depends on fault MCE, substrate, and modeled PGA at site)

Required Engineering Information	Study Area
	▪ Liquefaction, other ground failure, seismically induced landslides: hazard zones within and adjacent to project alignment ▪ Tsunami, seiche, dam failure inundation: features located such that they pose a risk to alignment (distance will vary depending on type of hazard, topography, etc.) ▪ Subsurface gas hazard: 0.5 mile of alignments and stations. ▪ Mineral resources: 0.5 mile of alignments and 2 miles of stations. ▪ Oil and natural gas resources: within 0.5 mile of alignments and 2 miles of stations. ▪ Paleontological resources: area of ground disturbance due to site preparation, project earthwork, and any boring, drilling, or tunneling; includes project alignment plus laydowns) ▪ Width of study area: ▪ At-grade sections: 150 feet each side of project right-of-way ▪ Tunnel and cut-and-cover sections: 200 feet each side of project right-of-way ▪ Cut and fill sections: 150 feet each side of project right-of-way ▪ Aerial sections: 150 feet each side of project right-of-way

Physiography and Regional Geologic Setting

Key Information	Sources
▪ Geomorphic province in which alignment is located ▪ Overview of topography in region and along alignment, including typical, maximum and minimum elevations, slope steepness, etc. ▪ Description of alignment's regional geologic and tectonic setting; structural framework and key structural elements; bedrock units; Quaternary stratigraphy	▪ Geomorphic province—see Norris and Webb 1990 ▪ Topography—use USGS topographic maps and DEMS (see project GIS)., conceptual engineering plans and profiles and project description (rely on at least 5 data points per alignment)

Geology of Proposed Alignment

Key Information	Sources
▪ Provide focused information on geology along proposed project alignment and any alternative alignments. Discussion should identify and briefly describe the geologic units present, along with any key structural features [Note that this section must be complete enough to provide the background for later discussions of geologic hazards and geological resources, so it needs to include information on state MRZ zoning, and enough information on site stratigraphy to support later discussion of project alignment's paleo resources.]	▪ Most recent available mapping published by USGS and CGS (the new 30 x 60 compilation quads are a good regional source) ▪ Existing GIS layers from Program-level analysis and technical reports ▪ Published geologic literature

Site Soils

Key Information	Sources
▪ Identify all soil units present along the proposed alignment and provide descriptions per the relevant County-level NRCS survey or SSURGO (STATSGO data are too generalized for project level). Descriptions should include erosion potential, expansion (shrink-swell) potential, and corrosivity to concrete and uncoated steel	▪ NRCS/SCS County surveys ▪ SSURGO data (STATSGO data are too generalized for project-level documents)

B. GEOLOGIC HAZARDS

Landslide Hazards

Key Information	Sources
▪ Identify and describe any areas of potential slope instability and landsliding. [Note that this section will require a cross-reference to the section on seismically induced landslide hazards below, but is intended to cover non-seismic landslide hazards.]	▪ Project geotechnical studies, when available ▪ USGS landslide hazards information ▪ CGS landslide information ▪ Where available, CGS Seismic Hazards Zones Maps will provide additional information (if these are used, be careful about overlap/redundancy with focused section on seismically induced landslide hazards below).

C. PRIMARY SEISMIC HAZARDS

Surface Fault Rupture

Key Information	Sources
▪ Identify any State-delineated Earthquake Fault Zones within or adjacent to the proposed alignment any alternative alignments ▪ Identify any other faults that may pose a risk of surface rupture (i.e., other faults known or believed to be Holocene-active based on credible evidence) ▪ To the extent feasible, data review and discussion should include recurrence interval, magnitude of anticipated rupture displacement, and type of slip/separation ▪ Identify Pleistocene-active structures as a rupture risk.	▪ CGS Official Maps of Alquist-Priolo Earthquake Fault Zones of California (faults zoned by State of California) ▪ UBC Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada (faults not zoned by State but recognized as active seismic sources by UBC) ▪ Local jurisdiction zoning (additional faults not zoned by state but treated as active in local permitting process) (examples of areas where this will likely be needed include Santa Clara County and Los Angeles County). ▪ Current geologic literature, websites of Southern California Earthquake Center (www.data.scec.org) and Northern California Earthquake Data Center (www.ncedc.org) (faults with substantial evidence suggesting Holocene activity/surface rupture hazard, but not yet zoned or included in UBC maps)

Groundshaking

Key Information	Sources
▪ Identify faults that pose a strong groundshaking hazard in the vicinity of the proposed alignment and alternatives. ▪ Discussion should include MCE and recurrence interval, as well as maximum anticipated groundshaking intensity. ▪ Include a table showing length/location of the proposed alignment and the sites of proposed stations vs. anticipated groundshaking intensity. Identify high ground motion areas based on a probabilistic PGA having a 10% probability of exceedence in 50 years.	▪ For seismogenic faults in project vicinity—same sources listed above for surface fault rupture. ▪ For groundshaking intensity, use CGS and USGS groundshaking maps.

D. SECONDARY SEISMIC HAZARDS

Liquefaction and Other Types of Ground Failure

Key Information	Sources
▪ Identify areas at risk of liquefaction and other types of seismically induced ground failure (differential settlement, ridgetop shattering, etc.) ▪ Discussion should include any State-delineated zones of liquefaction hazard, along with any other relevant information. Other sources will be especially important in areas where State seismic hazards mapping has not been completed yet.	▪ Where CGS Seismic Hazards Zones Maps area available, these should be the primary source to identify areas of liquefaction hazard. Where they are not available, use local jurisdiction hazard zoning if judged reliable, or Statewide geologic map unit susceptibility in conjunction with probabilistic seismic hazard maps that provide the PGA having a 10% probability of exceedence in 50 years. Where published groundwater information is not available assume shallow groundwater and saturated conditions. ▪ For other types of ground failure, use geologic context based on published geologic mapping, plus PGA with 10% probability of exceedence in 50 years

Seismically Induced Landslide Hazards

Key Information	Sources
▪ Identify areas at risk of seismically induced landsliding, including (but not necessarily limited to) State-delineated zones of seismically induced landslide hazard. [Note that any area at risk of landslides and strong groundshaking is likely to be at risk of seismically induced landslides, even if the State has not (yet) delineated a seismic hazard zone; in many cases, this section will need to cross-reference the *Landslide Hazards* section above.]	▪ Where available, use CGS Seismic Hazards Zones Maps published by the CGS to identify landslide hazard zones. ▪ Where these maps are not available characterize the potential for slope instability based on statewide geologic map unit susceptibility in conjunction with slope gradients derived from DEMs; compare results to any available existing landslide mapping, to verify use of appropriate unit strength/slope gradient criteria

Seismically Induced Flood Hazards

Key Information	Sources
▪ Identify areas at risk of tsunami or seiche-related flooding ▪ Identify any areas at risk of dam failure inundation	▪ CGS and USGS tsunami and seiche hazard assessments ▪ Tsunami and Seiche – NOAA Center for Tsunami Research (http://nctr.pmel.noaa.gov/inundation_mapping.html); seiche mapping generally not available, but potentially available through California Geological Survey ▪ Dam Inundation – California Office of Emergency Services maintains maps. County General Plan Background Reports frequently contain this information as well ▪ Local jurisdiction general plans ▪ Geologic and land use context information

Areas of Difficult Excavation

Key Information	Sources
▪ Identify any portions of the alignment and alternatives where project tunneling or excavation is likely to be difficult	▪ If available, use project geotechnical report ▪ If geotech report is not available, evaluation should be based on geologic conditions as identified from published geologic mapping.

E. GEOLOGICAL RESOURCES

Mineral Resources

Key Information	Sources
▪ Characterize any mineral resources within or adjacent to the project alignment ▪ Identify any applicable MRZ zoning under SMARA	▪ State of California Mineral Land Classification reports ▪ Local jurisdiction general plan, specific/area plans, and ordinances

Fossil Fuel Resources

Key Information	Sources
▪ Identify the location and extent of any oil and/or natural gas fields intersected by the project alignment ▪ Identify any related subsurface gas hazards	▪ Geologic mapping and literature ▪ California Department of Conservation, Division of Oil, Gas, and Geothermal Resources website (www.consrv.ca.gov/DOG/index.htm)

Geothermal Resources

Key Information	Sources
▪ Identify any known geothermal resources along the project alignment	▪ Geologic mapping and literature ▪ California Department of Conservation, Division of Oil, Gas, and Geothermal Resources website

Paleontological Resources

Key Information	Sources
▪ Identify/discuss paleontological resources within project alignment and laydown areas. Include information for surface-exposed geologic units as well as those present in subsurface and potentially affected by earthwork and/or tunneling. ▪ Evaluate sensitivity of each unit, using SVP methods/criteria (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).	▪ Geologic and paleontologic literature ▪ Published and project-specific geologic mapping ▪ Museum databases (PaleoPortal, UC Berkeley Museum of Paleontology, Los Angeles County Museum of Natural History) ▪ SVP methods as presented in SVPCIMGC 1995.

3.8.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

Geology, Soils, Geologic Hazards, Mineral and Energy Resources Methods

Impacts related to geology, soils, and geologic resources were analyzed qualitatively, based on a review of published soils and geologic information for the proposed alignment and on professional judgment, in accordance with the current standard of care for geotechnical engineering and engineering geology. Analysis focused on the proposed project's potential to increase the risk of personal injury, loss of life, and damage to property, including new facilities, as a result of existing geologic conditions in the project area.

Paleontological REsources Methods

Impacts on paleontological resources were analyzed qualitatively, based on professional judgment, consistent with the methods recommended by the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee).

Because many fossil materials are buried in subsurface geologic units rather than exposed at the ground surface, a lead agency often cannot be certain until project earthwork has made substantial progress whether any such resources will actually be encountered. Thus, impact analysis for paleontological resources operates based on probabilities of impact, with the goal of developing flexible strategies to support adaptive management based on information that may quite literally "come to light" during project construction. Given these uncertainties, the SVP guidelines delineate a two-phase process, as follows:

1. Assess the likelihood that the project's area of potential effect contains significant nonrenewable paleontological resources that could be directly or indirectly impacted, damaged, or destroyed as

a result of the project. This is referred to as an area's *paleontological sensitivity* or *sensitivity for paleontological resources*.

2. Based on the identified degree of sensitivity, formulate and implement measures to mitigate potential adverse impacts.
3. Table 3.7-1 defines the SVP's sensitivity categories for paleontological resources and summarizes SVP's recommended treatments to avoid adverse impacts in each sensitivity category.

Table 3.7-1. Society of Vertebrate Paleontology's Recommended Treatment for Paleontological Resources, by Sensitivity Category

Sensitivity Category	Definition	Recommended Treatment
High potential (High sensitivity)	Areas underlain by geologic units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered.	▪ Preliminary survey and surface salvage before construction begins. ▪ Monitoring and salvage during construction. ▪ Specimen preparation; identification, cataloging, curation, and storage of materials recovered. ▪ Preparation of final report describing finds and discussing their significance. ▪ All work should be supervised by a professional paleontologist who maintains the necessary collecting permits and repository agreements.
Undetermined potential (Undetermined sensitivity)	Areas underlain by geologic units for which little information is available.	▪ Preliminary field surveys by a qualified vertebrate paleontologist to assess project area's sensitivity ▪ Design and implementation of mitigation if needed, based on results of field survey
Low potential (Low sensitivity)	Areas underlain by geologic units that are not known to have produced a substantial body of significant paleontologic material.	▪ Protection and salvage are generally not required. However, a qualified paleontologist should be contacted if fossils are discovered during construction, in order to salvage finds and assess the need for further mitigation.

Source: Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995.

As used in Table 3.7-1, the term *significant* refers to paleontological resources that fulfill one or more of the following criteria (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).

- Provides important information shedding light on evolutionary trends and/or helping to relate living organisms to extinct organisms.
- Provides important information regarding the development of biological communities.
- Demonstrates unusual circumstances in the history of life.
- Represents a rare taxon or a rare or unique occurrence; is in short supply and in danger of being destroyed or depleted.
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type.

- Provides important information used to correlate strata for which it may be difficult to obtain other types of age dates.

  In California, paleontological resources that meet these criteria and thus are considered significant include all vertebrate remains as well as some invertebrate and plant fossils.

3.8.4 Assumptions

Consistent with the general programwide mitigation strategies identified in the PEIR/PEIS prepared for the High-Speed Train Program, analysis assumed the following.

- A site-specific geotechnical and engineering geologic study would be conducted for the proposed project, covering the entire project alignment, performed by appropriately state-licensed personnel with appropriate experience and skills.
- Earthwork will be designed and conducted in accordance with all relevant requirements of Section 19 (*Earthwork*) of the most current Caltrans Standard Specifications.
- All structures will be designed consistent with Caltrans Seismic Design Criteria (reference) or equivalent standards.
- Passive or active gas venting systems and gas collection systems will be installed in areas of subsurface gas hazard, consistent with standards identified by the HST Project section engineer.
- Expansive soil hazards can be addressed through overexcavation and replacement with nonexpansive fill, or other measures consistent with Caltrans Standard Specifications.
- Corrosive soil hazards can be address by overexcavation and replacement with noncorrosive fill, by use of corrosion-protected materials, or by other measures consistent with Caltrans Standard Specifications.
- Construction will proceed in accordance with requirements of a SWPPP, as discussed in hydrology/water resources.
- Post-construction soil erosion hazard will be addressed by overexcavation and replacement with nonerosive engineered fill, or by the use of geosynthetics, vegetation, rip rap, or other suitable measures consistent with Caltrans Standard Specifications.
- Where appropriate, more detailed mitigation, or alternate methods more applicable to the proposed alignment should be discussed.

A. SIGNIFICANCE CRITERIA

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving:
- Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map or based on other substantial evidence of active faulting?
- Strong seismic groundshaking?
- Seismically induced ground failure, including but not limited to liquefaction?
- Seiche or tsunami hazard?
- Dam failure inundation hazard?

- Landslides, including seismically induced landslides?
- Construction on a geologic unit or soil that is unstable or that would become unstable as a result of the project, with the potential to result in on- or offsite landslide, subsidence, or collapse.
- Construction on expansive soil, as defined in Table 18-1-B of the current Uniform Building Code, creating substantial risks to life or property.
- Construction on corrosive soils, creating substantial risks to life or property.
- Substantially accelerated soil erosion or substantial loss of topsoil.
- Loss or substantial reduction in availability of a known mineral, petroleum, or natural gas resource of regional or statewide value.
- Loss or substantial reduction in availability of a locally important mineral resource recovery site.
- Construction in an area of subsurface gas hazard, creating substantial risks to life or property.
- Substantial damage to or destruction of significant paleontological resources, as defined by the Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee (1995).

B. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Surface fault rupture	• Potential for facilities damage as a result of surface fault rupture • Potential for financial losses related to facilities damage (NEPA) • Potential life and safety hazards as a result of damage and/or failure related to surface fault rupture • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs • NB: Analysis should consider creep (where applicable) as well as seismogenic rupture	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map or based on other substantial evidence of active faulting • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology.
Seismic groundshaking hazard	• Potential for facilities damage as a result of seismic groundshaking • Potential for financial losses related to facilities damage (NEPA) • Potential life and safety hazards as a result of damage and/or failure related to seismic groundshaking • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs • NB: Faults at a substantial distance from the project alignment may have potential to generate damaging levels of groundshaking.	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving strong seismic groundshaking • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology.

Topic	Issues to Evaluate	Threshold of Significance
Liquefaction and other types of seismically induced ground failure	• Potential for facilities damage as a result of seismically induced ground failure, including but not limited to liquefaction • Potential for financial losses related to facilities damage (NEPA) • Potential life and safety hazards as a result of damage and/or failure related to liquefaction or other seismically induced ground failure • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving seismically induced ground failure, including but not limited to liquefaction? • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology.
Slope failure hazards associated with cut or fill slopes (during and following construction)	• Potential for construction of cut or fill slopes to create or exacerbate slope instability • Associated potential for facilities damage, and corollary financial impacts • Associated risks to life and property • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs	• Construction on a geologic unit or soil that is unstable or that would become unstable as a result of the project, with the potential to result in on- or offsite landslide, subsidence, or collapse. • NB: Definition of *unstable*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology.
Slope failure hazards associated with pre-existing landslide hazard, including seismically induced landslides	• Potential for landslides to affect project facilities; corollary risks to property, finances, life, and safety • Extent to which design can be used to mitigate property and safety risks • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving landslides, including seismically induced landslides? • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology.
Tsunami and seiche hazards	• Potential for tsunami to affect project facilities; corollary risks to property, finances, life, and safety • Potential for seiches to affect project facilities; corollary risks to property, finances, life, and safety • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs •	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving seiche or tsunami hazard? • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology, including Office of Emergency Services (OES) and local jurisdiction guidelines, policies, or ordinances related to tsunami, seiche, and other relevant flood hazards, whichever is more conservative.

Topic	Issues to Evaluate	Threshold of Significance
Seismically induced dam failure hazards	• Potential for inundation related to seismically induced failure of dam or other impoundment to affect project facilities; corollary risks to property, finances, life, and safety • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs	• Exposure of people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death—involving dam failure inundation hazard? • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology, and local jurisdiction guidelines, policies, or ordinances related to dam failure and relevant flood hazards.
Expansive soils	• Is the project alignment located on expansive soils? • If so, potential for facilities damage, and any corollary risks to property, project operation, finances, or life and safety • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs	• Construction on expansive soil, as defined in Table 18-1-B of the current Uniform Building Code, creating substantial risks to life or property. • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology,
Corrosive soils	• Is the project alignment located on corrosive soils? • If so, potential for facilities damage, and any corollary risks to property, project operation, finances, or life and safety • Extent to which risks are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate property and safety risks • Other mitigation approaches/needs •	• Construction on corrosive soil, creating substantial risks to life or property. • NB: Definition of *substantial*, and identification of acceptable (less than significant) risk level, should reflect prevailing standard of care for geotechnical engineering and engineering geology,
Soil erosion	• Potential for project construction to result in accelerated erosion • Extent of mitigation provided by project SWPPP • Potential for accelerated erosion on project site during operation • Loss of topsoil resources—would the project occupy an undeveloped or minimally developed footprint with a fairly intact soil profile, including intact topsoil resource • Extent to which erosion issues are addressed by assumptions re: programmatic mitigation • Extent to which design can be used to mitigate post-construction changes in erosion rate (NB: Discussion may cross-reference to analyses in hydrology/water quality chapter) • Other mitigation approaches/needs	• Substantially accelerated soil erosion • Substantial loss of topsoil resources • NB: For soil erosion rates, definition of *substantial*, and identification of acceptable (less than significant) erosion effects, should reflect prevailing standard of care for civil engineering. For loss of topsoil resources, definition of *substantial*, and identification of acceptable (less than significant) losses, will be based on baseline condition (condition of soils in and around the project alignment), existing and likely future adjacent land uses, and local jurisdiction planning priorities.

Topic	Issues to Evaluate	Threshold of Significance
	•	
Mineral resources	• Potential for project operation to affect availability of mineral, petroleum, or natural gas resources • Potential mitigation needs/approaches • NB: Effects may be direct (e.g., alignment crosses known resource), or indirect (e.g., project would result in changed land use patterns, such that mineral resource extraction becomes an incompatible land use and is discontinued).	• Loss or substantial reduction in availability of a known mineral, petroleum, or natural gas resource of regional or statewide value. • Loss or substantial reduction in availability of a locally important mineral resource recovery site.
Subsurface gas hazards	• Is any part of the project alignment (particularly subsurface segments) within an area of known or likely subsurface gas hazard? • If so, extent to which risks are addressed by assumptions re: programmatic mitigation; and • Other site- or project-specific mitigation approaches/needs	• Construction in an area of subsurface gas hazard, creating substantial risks to life or property.
Paleontological resources	• Potential for project-related activities to damage or destroy significant paleontological resources; analysis should consider paleontological sensitivity of surface and subsurface geologic units, along with extent and depth of anticipated disturbance. •	• Substantial damage to or destruction of significant paleontological resources, as defined by the Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee (1995).

C. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.

D. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for geology, soils, and geologic resources.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether geology, soils, and geologic resources will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).

- Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for geology, soils, and geologic resources. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.8.5 Products

A. TECHNICAL REPORT: GEOLOGY IMPACTS, GEOLOGIC RESOURCES (MINERAL AND PALEONTOLOGICAL RESOURCES)

B. PROJECT EIR/EIS
   1. Section: Geology, Soils, Seismicity
   2. Cumulative Impacts Section
   3. Summary for EIR/EIS Executive Summary

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3.9 Hazardous Wastes and Materials

3.9.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Resource Conservation and Recovery Act (RCRA)
  - Regulation of the identification, generation, transportation, storage, treatment, and disposal of hazardous materials and hazardous wastes.
- Comprehensive Environmental Response, Compensation & Liability Act (CERCLA)
  - Regulation of former and newly discovered uncontrolled waste disposal and spill sites. Established the National Priorities List (NPL) of contaminated sites, and the "Superfund" cleanup program.
- Clean Water Act (CWA)
  - Regulation of discharges and spills of pollutants (including hazardous materials) to surface waters and groundwater.
- Safe Drinking Water Act (SDWA)
  - Regulation of discharges of pollutants to underground aquifers.
- Toxic Substances Control Act (TSCA)
  - Regulation of manufacturing, inventory, and disposition of industrial chemicals including hazardous materials.
- Federal Insecticide, Fungicide & Rodenticide Act (FIFRA)
  - Regulation of the manufacturing, distribution, sale, and use of pesticides.
- Hazardous Materials Transportation Act (HMTA)
  - Regulation of the transport of hazardous materials by motor vehicles, marine vessels, and aircraft.
- Emergency Planning & Community Right To Know Act (EPCRA)
  - Regulation of facilities that use hazardous materials in quantities that require reporting to emergency response officials.
- Executive Order 12088, Federal Compliance with Pollution Control
  - Requires federal agencies to take necessary actions to prevent, control, and abate environmental pollution from federal facilities and activities under control by federal agencies.

B. STATE REGULATIONS

Porter-Cologne Water Quality Act

- Regulates water quality through the State Water Resources Control Board and Regional Water Quality Control Boards, including oversight of water monitoring and contamination cleanup and abatement.
- Hazardous Materials Release Response Plans & Inventory Act
  - Requires facilities using hazardous materials to prepare Hazardous Materials Business Plans.
- Hazardous Waste Control Act

  - Similar to RCRA on the federal level in regulating the identification, generation, transportation, storage and disposal of materials deemed hazardous by the State of California.
- Safe Drinking Water & Toxic Enforcement Act
  - Similar to the SWDA and CWA on the federal level in regulating the discharge of contaminants to groundwater.
- California Government Code § 65962.5
  - Requires the Department of Toxic Substances Control (DTSC) to compile and maintain lists of potentially contaminated sites located throughout the State of California (includes the Hazardous Waste and Substances Sites [Cortese] List).

3.9.2 Affected Environment

A. DEFINITION OF STUDY AREA

Key Information	Study Area
▪ Conceptual engineering plans and profiles and project description ▪ Borrow areas	▪ Alignment: existing conditions and locations where right-of-way may need to be acquired. Proximity to hazardous materials sites of potential concerns ▪ Vertical construction profile: potential areas requiring excavation, trenching, or other subsurface work that would require assessment of potential hazardous materials contamination ▪ Structures, roadways, borrow areas: similar lateral and vertical considerations as rail alignment, assessing proximity to hazards and potential for hazardous materials contamination ▪ Borrow areas: large potential sources of fill material that would require assessment of potential hazardous materials contamination

Under CEQA, by definition, baseline conditions are the conditions that exist at the time that the Notice of Preparation is filed. Affected environment should reflect those conditions.

Information regarding historic development, historic land use, past use, storage, release, and disposal of hazardous materials, and government records of hazardous materials storage, use, release, disposal, and potential contamination will be obtained, at a minimum, using a records search through Environmental Data Resources, Inc (EDR) or equivalent. The following information at a minimum will be procured and reviewed by each regional team for each segment:

- Corridor-based search of government databases, using search distances listed in Section 8.2.1 of ASTM Standard E1527-05, from the anticipated centerline of the HSR alignment (generally 0.5 to 1.0 miles from alignment centerline)
- Current USGS 7.5 Minute Topographic Maps or equivalent
- Historic USGS Topographic Maps. 7.5 minute maps are preferred
- Historic aerial photos via decade service (minimum one photo for each 10 year period) beginning with earliest readily available aerial photo, through aerial photos representing current development

Geology, Hydrogeology, topography, surface water, ground water

Key Information	Sources
▪ Summary of regional geology, soils, and hydrogeology, with descriptions of how these conditions change across the study area, focused on major changes that would affect hazards and hazardous materials ▪ Description of historic and current topography and surface water bodies within study area, in proximity to alignment and other project improvements ▪ Representative groundwater conditions (such as depth, extent, water quality) within study area	▪ Regional and study area geology, hydrogeology, soils: Geology Study ▪ Surface water bodies and groundwater: Hydrology and Water Quality Study ▪ Historic and current topographic maps

Historic and current state of development and USE

Key Information	Sources
▪ General type of land use, from first developed use, or 1940, whichever is earlier, to the present within the study area ▪ Past and current use of representative areas within the study area, such as areas that are predominantly industrial, commercial, agricultural, residential, railroads, highway, etc. ▪ Identification of readily identifiable hazardous materials associated with such uses. ▪ Uses in the surrounding area, to the extent this information is revealed in the course of researching the above project area	▪ Historic and current aerial photographs, minimum of decade service from date of first readily available ▪ Historic and current topographic maps ▪ Current land use maps from general plans within project area jurisdictions ▪ Site Reconnaissance. Visual survey of current development and uses obtained by viewing project area from publicly accessible locations. Entrance of private property and interior surveys of buildings, systems, and structures are not included in this methodology

Potential Environmental Concerns

For purposes of this methodology, Potential Environmental Concerns (PEC) are defined using the definition provided in the Caltrans Initial Site Assessment Guidance Document dated 2006, referenced back to ASTM Standard Practice E1528-06 (Transaction Screens):

> "the possible presence of any hazardous substances or petroleum products on a property under conditions that indicate the possibility of an existing release, a past release, or a threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws."

Key Information	Sources
▪ Identity of sites with potential environmental concerns (PEC) within the project area. ▪ Site name ▪ Address/location ▪ Summary of conditions representing concern (database results, files findings, visual observations, etc) ▪ Summary of current regulatory status of the PEC site ▪ Current conditions related to routine transport, use, and disposal of hazardous materials within the project area ▪ Summary of past upsets or accidents within the project area, resulting in release of hazardous materials into the environment ▪ Existing or proposed schools within one-quarter mile of the project area	▪ Government database search results ▪ Review of readily available regulatory agency files and consultation with agency personnel as needed to determine current conditions and regulatory status ▪ Review of historic aerial photographs and topographic maps ▪ Site reconnaissance from publicly accessible areas, documented with photographs of observed PEC ▪ FRA Railroad Property Special Waste Screening Form ▪ Caltrans Transaction Screen Form, Appendix A of Caltrans ISA Guidance Document, 2006 ▪ Department of Conservation's Division of Oil, Gas and Geothermal Resources lists of old and abandoned facilities. ▪ Observation or records of commercial vehicle traffic for indications of vehicles transporting hazardous materials (fuel trucks, supply trucks, rail tanker cars, etc) ▪ Accident records or statistics related to incidents of hazardous materials spills or releases within the project area, such as review of emergency response or fire department records or databases and CHP accident records ▪ Schools: land use study, public services study

3.9.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

The purpose of this methodology is to assess potential project-level hazards and hazardous materials impacts as defined by the significance criteria listed below. Specific to hazardous materials, this assessment would be accomplished by applying a screening-level assessment of potential environmental concerns (PEC) based on a government records database search and historical records review, regulatory agency files review, and site reconnaissance as described in Section 3.11.6, Subsequent Analysis, of the Program EIR/EIS and further defined below. This methodology is not intended to be a parcel-level due diligence assessment for the purpose of property acquisition or transfer. While this methodology incorporates some of the investigation methods, it is not intended to represent or satisfy the requirements of a Phase I Environmental Site Assessment as defined by ASTM Standard Practice E1527-05, nor is it intended to satisfy the requirements of *All Appropriate Inquiry* (AAI) as defined in Title 40 CFR Part 312. This methodology does not include field sampling or analysis or investigation of individual buildings or structures. Detailed hazardous materials assessment of individual parcels potentially subject to property transfer or acquisition would occur after completion of the NEPA/CEQA environmental review process, as part of final design and project implementation.

This methodology also incorporates hazardous materials site screening protocols and forms from the Federal Rail Administration (FRA) CREATE Railroad Property Special Waste Procedures (2006) and the California Department of Transportation (Caltrans) Initial Site Assessment Guidance Document (2006).

Impacts related to hazards and hazardous materials are generally analyzed qualitatively, by considering the proximity of features such as PEC sites, airports, schools, and wildland areas, and operations such as routine and upset hazardous materials transport, use, and disposal, in relation to the project alternatives. The analysis considers how proximity and conditions of these features would potentially affect the construction and operation of project alternatives. The analysis is generally divided into two subject areas: potential impacts associated with hazardous materials (PEC) sites, and potential impacts associated with other hazards as described in the significance criteria. The significance criteria, incorporated from the CEQA Guidelines, Appendix G, Section VII, *Hazards and Hazardous Materials*, are qualitative, using terms such as "create a significant hazard", "result in a safety hazard" and "impair implementation". As a result, this methodology combines objective information such as locations of hazardous materials sites, airports, and schools, together with qualitative hazard assessment and applies professional judgment to consider whether a potential significant impact would result.

Consistent with the Program EIS/EIR mitigation strategies prepared for the Statewide High-Speed Train Program, this analysis assumes the commitment to use design practices to minimize impacts, and to use best practices and mitigation strategies to substantially lessen or avoid impacts associated with hazardous materials. Program level mitigation strategies from the Program EIS/EIR include:

- Investigate soils for contamination and prepare environmental site assessments (ESA) when necessary.
- Prior to demolition of buildings for project construction, survey for lead-based paint and asbestos containing materials.
- Acquire necessary permits if ground dewatering is required
- When indicated by project level ESA's, perform a Phase II ESA (e.g., hydrogeologic investigation) to identify specific mitigation measures. Perform Phase II ESA's in conformance with the ASTM Standards Related to the Phase II Environmental Site Assessment Process (E1903-01)
- Prepare a Site Management Program/Contingency Plan (SMP/CP) prior to construction to address known and potential hazardous material issues SMP/CP including:
- Measures to address management of contaminated soil and groundwater
- Site-specific Health and Safety Plan (HASP) including measures to protect construction workers and general public
- Procedures to protect workers and the general public in the event that unknown contamination or buried hazards are encountered
- Where appropriate, more detailed mitigation, or alternate methods more applicable to the proposed alignment, would be identified based on project-level analysis.

B. SIGNIFICANCE CRITERIA

An impact is considered to be significant and to require mitigation if it would result in any of the following.

a. Creates a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials

b. Creates a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment

c. Emits hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school

d. Is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, results in a safety hazard for people residing or working in the project area

f. For a project within the vicinity of a private airstrip, results in a safety hazard for people residing or working in the project area

g. Impairs implementation of or physically interferes with an adopted emergency response plan or emergency evacuation plan

h. Exposes people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands

C. ENVIRONMENTAL CONSEQUENCES

For all impacts, determine significance of impacts and whether impacts can be avoided by modification of project alternative or use of best practices based on the significance criteria a through h listed above.

Topic	Issues to Evaluate	Threshold of Significance
Impacts associated with PEC sites	▪ Identify proximity of project alternatives to PEC sites. ▪ Identify potential impacts associated with PEC sits based on the following: ▪ Anticipated construction methods (particularly methods with extensive subsurface construction such as trenching, tunneling, cuts) compared against PEC site conditions ▪ Geology, hydrogeology, surface and ground waters in the vicinity of the alternative ▪ Regulatory and response status of PEC sites ▪ Likelihood that construction or operation would encounter, cause, or worsen hazardous materials contamination	d
Hazardous materials transport, use, disposal; routine operations and upsets/accidents	▪ Identify whether project alternatives would involve the generation, use, transport, or disposal of substantial new quantities of hazardous materials ▪ Identify whether project alternatives would likely result in increased transportation of hazardous materials or relocation of hazardous materials transport such that it creates increased hazard to the public or the environment ▪ Identify whether project alternatives would potentially increase the likelihood of upsets or accidents that would result in the release of hazardous materials	a, b

Topic	Issues to Evaluate	Threshold of Significance
	▪ Conversely, identify whether the project alternatives would reduce the likelihood of upsets or accidents through features such as new grade separations	
Emissions or handling of hazardous materials near schools	▪ Identify proximity of project alternatives to nearby existing or proposed schools ▪ Identify whether project alternatives would result in new emissions of hazardous materials or handling of hazardous or acutely hazardous materials within one-quarter mile of existing or proposed schools	c
Hazards associated with airports or airstrips	▪ Identify proximity of project alternatives to public airports, public use airports, and private airstrips ▪ Airports with airport land use plans: Review project alternatives design and operation characteristics against adopted airport land use plans to determine whether hazards would be created such as proximity and/or height of proposed facilities in relation to airport surfaces and airspace. Also consider characteristics such as lighting hazardous to aircraft operations and hazardous materials use by airports or in proximity to airports ▪ Airports and airstrips without airport land use plans: Review project alternatives design and operation characteristics against FAA airport planning criteria and Caltrans Division of Aeronautics land use guidance to determine whether hazards would be created such as proximity and/or height of proposed facilities in relation to airport surfaces and airspace. Also consider characteristics such as lighting hazardous to aircraft operations and hazardous materials use by airports or in proximity to airports and airstrips	e, f
Interference with emergency response plans or emergency evacuation plans	▪ Identify emergency response plans and emergency evacuation plans in jurisdictions containing the project alternatives ▪ Consider whether the project alternatives would negatively affect these plans during construction and operation, such as: ▪ Creating roadway interference from new facilities that would disrupt or substantially increase the response times of first-responders such as fire and police services ▪ Increasing or new public use of facilities or surface traffic, resulting in increased vehicle or pedestrian congestion that would interfere with emergency response or evacuation ▪ Closing or otherwise restricting roadways identified as evacuation routes ▪ Consider whether project alternative features such as high-capacity high-speed trains, public assembly facilities such as stations, and local	g

Topic	Issues to Evaluate	Threshold of Significance
	roadway improvements such as grade separations would improve emergency response and provide enhanced evacuation capabilities	
Wildland fire hazards	▪ Identify whether wildland proximity to populated areas including urban areas and intermixed wildland/residential areas would change as a result of project alternatives ▪ Identify whether project alternative features such as power lines and facilities, or storage and maintenance facilities would potentially increase wildland fire hazards ▪ Consider whether changes in proximity, construction, and operations of project alternatives would expose people or structures to increased potential hazard from wildland fires	h

D. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify mitigation measures for avoidance and minimization of impacts to be incorporated into project designs to reduce impacts.
- Develop a Mitigation Monitoring and Reporting Plan for both construction and operation of the HST project, that addresses identification of hazardous materials and mitigation measures.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for hazards and hazardous materials.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether hazards and hazardous materials will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (eg., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions

about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.

- Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

8. Document Results.
   - Summarize the results of the cumulative impact analysis for hazards and hazardous materials. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.9.4 Products

A. TECHNICAL REPORT: HAZARDS AND HAZARDOUS MATERIALS

B. PROJECT EIR/EIS

   1. Section: Hazards and Hazardous Materials
   2. Cumulative Impacts Section
   3. Summary for EIR/EIS Executive Summary

3.10 Safety and Security

3.10.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Rail Safety Improvement Act of 2008 (P.L. Public Law 110-432)
- Federal Railroad Administration 49 CFR Volume 4, Chapter 2, Part 200–299
- Federal Rail Safety Act (FRSA) 49 U.S.C. 20109 (http://www.osha.gov/dep/oia/whistleblower/acts/frsa.html)

State Regulations

- California Public Utilities Code
- Emergency Services Act
    - Similar to EPCRA on the federal level regarding reporting requirements to response agencies.

B. OTHER CONSIDERATIONS

- Local fire and police jurisdictions, general plan policies and ordinances (include any related to safety and security)

3.10.2 Affected Environment

A. DEFINITION OF STUDY AREA

▪ Conceptual engineering plans and profiles and project description ▪ Safety plans developed by Program Management Team	▪ Areas within the right-of-way and immediately adjacent to the right-of-way. ▪ Station grounds and platforms ▪ ½ mile around stations (for pedestrian/cyclist safety) ▪ Location of fire and police emergency services. ▪ Location of area police, fire and rescue, hospitals and emergency treatment centers.

Pedestrian Safety

Key Information	Sources
▪ Identify existing pedestrian traffic conditions around proposed stations and facilities, including problems, patters and accessibility concerns (see Transportation). ▪ Identify if pedestrian accidents are a concern in the study area and determine factors contributing to pedestrian accidents. ▪ Identify present and future local pedestrian safety initiatives within the study area	▪ Interviews with local jurisdiction planning agencies ▪ California State Office of Traffic Safety ▪ Local schools and area school districts.

Cyclist Safety

Key Information	Sources
▪ Identify existing bicycle traffic conditions around proposed stations and facilities, including problems, patterns and accessibility concerns. Identify bike designated bike routes and lanes in area surrounding station locations. (see Transportation). ▪ Identify if cyclist accidents are a concern in the study area and determine factors contributing to cyclist accidents. ▪ Identify present and future local cyclist safety initiatives within the study area.	▪ Interviews with local jurisdiction planning agencies ▪ California State Office of Traffic Safety ▪ Local schools and area school districts ▪ Local/regional cycling advocacy and commuter groups.

Vehicular Safety

Key Information	Sources
▪ Identify existing vehicular traffic conditions around proposed stations and facilities, including congestion, accident patterns and station accessibility concerns. (see Transportation) ▪ Identify if vehicular accidents are a concern in the study area and determine common factors contributing to vehicular accidents. ▪ Describe traffic accident and congestion statistics within the cities in the study area	▪ Interviews with local jurisdiction planning agencies ▪ California Highway Patrol Statewide Integrated Traffic Records System

Train Passenger/Employee Safety

Key Information	Sources
▪ Identify major passenger safety issues in rail cars and identified safety hazards. ▪ Identify major system safety risks	▪ Accident statistics reports and rail car maintenance reports. ▪ System Safety Plan

Platform/Station Safety

Key Information	Sources
▪ Identify any platform/station safety issues, including accident or injury risks and identified safety hazards. ▪ Identify criminal behavior risks at station locations.	▪ System safety plan ▪ Interview with local jurisdiction police.

Security

Key Information	Sources
▪ General description of security and law enforcement services in areas planned for HST service, stations, and facilities. ▪ Identify and describe emergency lockdown/evacuation and emergency communication plans ▪ Airports and private airstrips within two miles of the project area ▪ Summary of adopted airport land use plans, with focus on potential hazards to people residing or working within the project area ▪ Identification and summary of emergency response plans and emergency evacuation plans within the project area ▪ Location of wildlands adjacent to urbanized areas within the project area, and history of or potential for wildland fires within the project area	▪ Interviews with county and local law enforcement services. This may include services already provided at stations where the HST will coexist with other transit agencies. ▪ System Safety Plan ▪ Local transit providers emergency and safety plans ▪ Airport and airstrip locations: maps of project area ▪ Airport Land Use Plans: airport operators or authorities; municipal airport or aviation departments ▪ Emergency plans: fire departments; county or municipal emergency planning departments ▪ Wildlands and fire records/potential: Biological Resources study; fire departments; CalFire records and/or consultation

3.10.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

For seismic safety, see Geology. For safety issues related to hazardous materials, see Hazardous Materials.

Safety relates to protection from accidents, including protection of people and property. For this analysis, it includes:

- the safety of passengers and employees on board HST vehicles and on HST platforms and in stations;
- the safety of HST workers, both those operating vehicles and those maintaining the vehicles and HST rights-of-way; and
- the safety of motorists, pedestrians and cyclists in locations or access points where they would or could cross HST rights-of-way, enter HST stations, or encounter other HST facilities.

Security relates to protection from intentional acts, including protection of people and property from such deliberate acts and the foreseeable effects of these acts. Topics include crime prevention, emergency response, law enforcement, and protection against terrorism.

Many safety and security elements would be designed into the HST project to protect people and property against accidental or intentional injury and to comply with safety regulations. In several ways, the safety of the motorists would be ensured through the project design (HST would be grade-separated from automobile traffic). In some areas, the HST would be located in an exclusive right-of-way, eliminating potential conflict with trains or other vehicles. Other street improvements included in the project may improve vehicular safety. These improvements may include street widening, intersection improvements, traffic restrictions, and/or new traffic signals. Some elements of

the HST project may also improve pedestrian and cyclist safety. New traffic lights may be included at intersections, including ones used by pedestrians. In other locations, widened sidewalks may also improve pedestrian safety.

Potential impacts should be evaluated by comparing similar systems including other HST systems (where information is available), intercity rail (Amtrak), commuter rail, heavy rail (Metro Red Line, BART), and light rail. In addition, previous studies and reports related to public transit safety and security issues should be reviewed.

The Program Management Team will:

- Develop a safety plan in accordance with American Public Transportation Association (APTA) guidelines that addresses emergency response….
- Develop the guidelines and analysis for security and safety to produce standards safety and security procedures mandated by local, state or federal regulations.
- Develop a Fire Life Safety Program and a System Security Plan. Under guidelines and criteria set forth in the Federal Rail Safety Act, The Fire Life Safety Plan would address the safety of passengers and employees as it relates to emergency response. The System Security Plan would address design features of the project intended to maintain security at Stations, within the trackwork right-of-way, and on board trains. Compliance with these measures would maximize the safety and security of passengers and employees of the HST project so that adverse safety and security impacts would be less than significant.
- Coordinate with local agencies and local/regional transit providers (at intermodal stations) and provide guidance for considering their plans for safety, security and emergency response?

B. SIGNIFICANCE CRITERIA

A significant safety or security impact would occur if:

- construction would expose workers, passengers or bystanders to hazards that are not addressed by standard safety procedures mandated by state or federal regulations;
- operation of the project would expose workers, passengers or bystanders to hazards that are not addressed by standard safety procedures mandated by local, state, or federal regulations;
- operation of the project would result in motor vehicle accident rates that would be greater than current motor vehicle accident rates;
- operation of the project would introduce a hazardous situation that would encourage people to violate safety laws or common sense related to safety (such as providing a circuitous route for pedestrians, thereby encouraging them to jaywalk);
- construction of the project would remove or hinder operation of currently established safety features without remediation, resulting in a more hazardous condition;
- operation or construction would create an opportunity for terrorism with a moderate to high likelihood that such an act would be perpetrated; or
- operation or construction would interfere with emergency response plans or emergency evacuation plans or emergency services routes.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Construction safety	▪ Exposure of workers and others to hazards not addressed in standard safety procedures ▪ Potential for dangerous crossings (conflict with vehicle or rail traffic resulting from project) or inadequate non-motorized connections ▪ Potential for temporary or permanent removal of established safety features.	Exposure of workers or others to hazards during construction that are not addressed by standard safety procedures mandated by state or federal regulations. Introduce a hazardous situation that would encourage people to violate safety laws or common sense related to safety. Removal of safety features, resulting in a hazardous condition.
Operational safety	▪ Exposure of workers and passengers to hazards not addressed in standard safety procedures ▪ Potential for dangerous crossings or incidents (conflict between HST and highway vehicle or other rail traffic) or inadequate non-motorized connections	Hazards exceeding acceptable risk levels in state, or federal regulations. Introduce a hazardous situation that would encourage people to violate safety laws or common sense related to safety.
Motor vehicle, pedestrian and cyclist accidents	▪ Potential for dangerous conditions around the HST alignment, stations, and facilities that could lead to an increase in vehicle, pedestrian or cyclist accidents	Result in motor vehicle accident rates that would be greater than current motor vehicle accident rates.
Security	▪ To be developed by the Program Management Team.	To be developed by the Program Management Team.
Emergency Response	▪ Emergency access and response to fires and terrorist threats. ▪ Emergency right-of-way access by outside medical personnel.	Interfere with emergency response plans or emergency evacuation plans. To be determined by Program Management Team

D. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop specific project-level measures consistent with strategies that avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Suggest modifications to conceptual design of track right-of-way, stations, and parking facilities to avoid potential safety and security impacts.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for safety and security.

- Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether safety and security will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact under the no-project alternative.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for safety and security. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.10.4 Products

A. PROJECT EIR/EIS

1. Section: Safety and Security
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

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3.11 Socioeconomics, Communities, and Environmental Justice

3.11.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- National Environmental Policy Act: [42 U.S.C. 4331(b)(2)]
- Title VI of the Civil Rights Act of 1964
- Executive Order 12898 (1994)
- Executive Order 13166 (August 11, 2000)
- U.S. Department of Transportation Order 5610.2
- Federal Highway Act of 1970: 23 USC 109 (h)
- Americans with Disabilities Act of 1990
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended
- National Trails System Act (P.L. 90-543, as amended through P.L. 109-418)
- Park Preservation Act
- Section 4(f) of the Department of Transportation Act of 1966
- Section 6(f) — Describe Section 6(f) of the Land and Water Conservation Fund Act of 1965 and the Describe the Section 6(f) requirements

State Regulations

- California Environmental Quality Act of 1970 - The CEQA Guidelines [Article 9, 15126.2(a)]
- Government Code 65040.12e
- California Public Resources Code Section 5400–5409 (Also known as the Public Park Preservation Act of 1971)

B. OTHER CONSIDERATIONS

- Local jurisdiction policies, including general plans (often found in Population, Land Use, Infrastructure, Parks and Recreation, Open Space, and other facilities and services or similar elements), Specific Plans, Redevelopment Plans, etc. applicable to the study area.
- Local jurisdiction ordinances and codes (including development and design standards, etc.)

3.11.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Conceptual Engineering Plans and Profiles ▪ Aerial Maps, GIS base if possible ▪ Right-of-way data showing potential parcel acquisitions	▪ Study area may vary depending on topic being analyzed, which should be informed by the scoping process, but should generally cover the following: ▪ 1/2 mile around station locations or access points ▪ 1/2 mile from centerline of project alignment ▪ For socioeconomic issues, the study area may also include: ▪ Affected TAZs or Census Tracts/Block Groups; also include areas identified to have low income and/or minority populations ▪ Buildings: Residences, businesses, schools, government offices, and other buildings that would be made more or less accessible, or otherwise affected by the proposed project. Include structures that may be subject to removal or relocation. ▪ Transportation Facilities: Streets, railroad lines, bikeways, and parking facilities that may be closed or otherwise affected. Also consider pedestrian overcrossings and sidewalks. ▪ Neighborhood and Community Features: Communities, neighborhoods, parks and recreation areas, and business centers that may be affected.

B. Community Profile

Social Setting

Key Information	Sources
▪ Describe demographic characteristics (regional and study area). Existing and projected population and the relevant demographic characteristics of the study area and the associated city, county, and region. The demographic characteristics include ethnic group, age, income, and low mobility status (elderly and/or disabled). Also include the following: ▪ Household Size and Composition: The existing number of households and average household size should be discussed in the context of how these have changed in recent years. Discuss the composition of households in terms of number of single heads of households, female heads of households, and families. ▪ Ethnic Mix: The ethnic composition of the existing population, as well as recent trends or changes in ethnic composition should be identified. ▪ Age Distribution: The distribution of the population by general age groups should be discussed. ▪ Income: The median income of the study area (and compared to the city/region) should be identified. The number of households with incomes below the officially-defined poverty level should also be listed. Low income means a person whose median household income is at or below the Department of Health and Human Services poverty guideline (for a family of four). ▪ Environmental Justice Block Groups: Examine the census blocks within a two-mile radius of the alignment. Environmental justice block groups are census blocks which meet at least one of the following criteria: (1) low-income population that is greater than 25 percent of the total population of the community, or minority population that is greater than 50 percent of the total population of the community; or (2) low-income or minority population is more than 10 percentage points higher than the City or County average. Respondents to the 2000 Population Census that did not identify themselves as white in the racial identity question of the census is considered part of a minority population. ▪ Minority Populations: Where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the majority population percentage in the general population or other appropriate	▪ See Section 3-4 in Caltrans Environmental Handbook Volume 4: Community Impacts Assessment; http://www.dot.ca.gov/ser/envhand.htm ▪ Program EIR/EIS ▪ U.S. Census Data ▪ U.S. Department of Commerce ▪ General and regional plans ▪ Field Surveys ▪ Aerial and ground photography ▪ Topographic maps ▪ GIS Data ▪ Planning and Redevelopment agencies, including Housing and Urban Development ▪ Public service providers ▪ Scoping Comments ▪ Outreach efforts to low-income and minority populations ▪ Section 2.19 Parks, Recreation, and Open Space Impact Methods

Key Information	Sources
unit of geographic analysis. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds." Census blocks are considered to have substantial minority populations if the percent of low-income residents within them is: greater than 50 percent, or 10 percentage points higher than the county average. The more conservative criterion (the criterion resulting in a lower percentage of low-income residents) is used for this analysis. ▪ Low-Income Populations: Census blocks are considered low-income populations if the percent of low-income residents within them is: greater than 25 percent, or 10 percentage points higher than the county average. The more conservative criterion (the criterion resulting in a lower percentage of low-income residents) is used for this analysis. ▪ Describe community/neighborhood characteristics ▪ Describe population growth policies ▪ Use maps and tables to help describe the setting.	

Housing and Business Setting

Key Information	Sources
▪ Describe residential characteristics. This is of particular concern if there is the potential for displacements and the need for subsequent relocations. Characteristics include types of housing in study area and associated city or county (single family, multifamily, apartments, mobile homes, owner occupied/rented, sizes, range of prices, and general age). ▪ Discuss projections and trends of housing stock ▪ Describe local housing policies and programs ▪ Describe business characteristics (if they are likely to be affected by the project). This includes number, general size, types of businesses, ▪ Use maps and tables to help describe the setting. ▪ Describe public services/facilities (schools, parks and recreation [including trails and bikeways], churches, hospitals, police and fire protection, other) ▪ Describe circulation/access within the study area	▪ See Section 3-5 in Caltrans Environmental Handbook Volume 4: Community Impacts Assessment; http://www.dot.ca.gov/ser/envhand.htm ▪ Program EIR/EIS ▪ U.S. Department of Commerce ▪ General and regional plans ▪ Field Surveys ▪ Local Realtors; Electronic Real Estate Services (e.g., DataQuick) ▪ U.S. Census Data ▪ Aerial and ground photography ▪ Topographic maps ▪ GIS Data ▪ California Housing and Community Development and local Planning and Redevelopment agencies ▪ Outreach efforts to low-income and minority populations, which should be defined in the public involvement plan

Economic Setting

Key Information	Sources
▪ Describe population and employment in the region, county, local jurisdictions, and study area for the baseline year and projected year. ▪ Describe employment by industry in the region, county, and local jurisdictions. ▪ Describe employment and unemployment for the local jurisdictions located in the study area, as well as the state and county. ▪ Describe revenue generated from property tax and sales tax for the local jurisdictions located in the study area, as well as the county. ▪ Use maps and tables to help describe the setting.	▪ See Section 3-6 in Caltrans Environmental Handbook Volume 4: Community Impacts Assessment; http://www.dot.ca.gov/ser/envhand.htm ▪ Program EIR/EIS ▪ California Employment Development Department ▪ California State Board of Equalization ▪ U.S. Census Data ▪ General and regional plans ▪ Aerial and ground photography ▪ Topographic maps ▪ GIS Data ▪ Planning and Redevelopment agencies ▪ Outreach efforts to low-income and minority populations

3.11.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

This methodology is generally based on the Caltrans Environmental Handbook Volume 4: Community Impacts Assessment. For the impact analysis methods also see Sections 4-6, 4-7, and 4-8 in the Caltrans guidance (http://www.dot.ca.gov/ser/envhand.htm). The impact analyses should be conducted, based upon the existing data gathered, as noted above. Both construction-related and operational impacts need to be discussed, as well as direct impacts and indirect impacts. The environmental justice analysis is also based on Caltrans guidance (http://www.dot.ca.gov/ ser/vol1/sec3/community/ch25ej/chap25ej.htm).

Social Impacts

Identify and discuss the direct and indirect impacts of the proposed project, including:

- Changes in neighborhoods or community cohesion for various social groups as a result of the proposed project, including displacements of residents or businesses, as well as past action and reasonably foreseeable future actions.
- Effects on community setting, character, physical boundaries, and land uses.
- Any physical barriers the project would create (or perceived barriers) in neighborhoods, isolating a portion of a neighborhood or ethnic group, or separating residents from community facilities.
- Changes in access and parking for businesses, residences, and community facilities
- Impacts on school districts, recreation areas, religious institutions, businesses, police and fire protection, including direct and indirect impacts resulting from displacement of households and businesses.
- Effects on the density and distribution of people throughout the study corridor, the location of employers in relationship to employees, and the characteristics of population groups in relation to opportunities for access to transportation options and systems.

- Conflicts with existing and future non-motorized access and circulation as identified by the number and location of potential major conflicts with existing and future facilities (i.e. Would the alternative prevent the continued use of an existing non-motorized transportation facility, by requiring the removal of an existing bicycle facility over a roadway or highway)
- Impacts on recreational facilities: amount of land to be used, facilities and functions affected, noise, visual, etc. (see other sections for impacts).
- Long-term impacts and short-term interruptions of use of the recreational resource.
- Any project-related increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Where an alternative (or alternatives) uses land from more than one park or recreational resource, prepare a summary table comparing the park and recreation impacts of the alternatives. Those impacts that can be quantified should be quantified while others should be described (see also Section 2.17 4[f] Methods).

Identify the construction impacts of the proposed project.

- Changes to access of businesses, residences, and community facilities
- Disruption of commercial, community, emergency services (e.g. police, fire protection, etc.) and other services during construction.
- Disruption of businesses, residents, and community activities due to temporary construction easements
- Construction impacts upon community facilities.

Displacements/Relocation

The displacement and relocation methodology is generally based on the Caltrans Right-of-Way Manual for relocation impact documents (http://www.dot.ca.gov/hq/row/rowman/manual/ch10.pdf).

- Identify residential and non-residential properties that would need to be acquired using aerial photographs, conceptual engineering plans and profiles and right-of-way data showing parcel acquisitions (based on agreed upon corridor study width). Verify by conducting field surveys and tabulate the types of land uses (e.g., residential, commercial, and institutional) and numbers of units to be acquired. Use assessor parcel data and street addresses for this analysis. Suggest obtaining assessor parcel data in GIS for ease of calculation (and recalculation). Use a property data service to obtain specific property information (e.g., DataQuick or other vendor). Take photographs of potential acquisitions for future use in the analysis. Use the aerial photographs to identify and map the potential acquisitions.
- In general, potential full non-residential property acquisition should be evaluated if the project would physically intrude on existing buildings, or remove enough of a portion of available use of the site (such as parking) so that the business would be unable to operate. Full residential acquisition should be evaluated if the project facilities would physically interrupt existing residential structures, or take a substantial portion of the front yard or other important residential amenities (e.g., driveway or garage) that would affect the continued use of the property.
- Estimate the number of households to be displaced including information such as owner/tenant status, estimated value and rental rates of properties to be acquired, family characteristics, and special consideration of the impacts on minorities, the elderly, large families, and the handicapped when applicable.

- Estimate resident displacements based on the number of units and a factor for persons per household based on the average for the U.S. Census block group (the smallest unit of information available) for the city (or county if in unincorporated area).
- Estimate the number, type, and size of the businesses, farms, and nonprofit organizations to be displaced and the approximate number of employees that may be affected (number of employees can be based on square footage for the respective land uses [i.e., retail, industrial, and office]).
- Identify residential and non-residential relocation resources within the study area (consider using the city as the relocation area). Sources of information include local Real Estate professionals, newspapers, or data services.
- Estimate the number of comparable replacement dwellings in the area (including price ranges and rental rates) that are expected to be available to fulfill the needs of those households displaced. Identify if an adequate supply of comparable housing will be available at the time of relocation.
- Estimate of the availability of replacement business sites. Identify if an adequate supply of replacement business sites is expected to be available at the time of relocation, the impacts of displacing the businesses should be considered and addressed. Planning for displaced businesses which are reasonably expected to involve complex or lengthy moving processes or small businesses with limited financial resources and/or few alternative relocation sites should include an analysis of business moving problems.

Environmental Justice

- Identify temporary and permanent, direct and indirect adverse effects to populations from the HST alternatives in the corridor section. Examples of potential topics: air, noise, water pollution, hazardous waste, aesthetic values, community cohesion, economic vitality, employment effects, displacements/relocations, farmland impacts, accessibility, traffic congestion, safety and construction impacts. See other sections/technical reports for information.
- Identify mitigation and enhancements measures and potential offsetting benefits to the affected communities from the HST alternatives as well as the design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas.
- Summarize the effectiveness and feasibility of the mitigation measures to reduce impacts to a less than significant level.
- If the preferred alternative will cause disproportionate high and adverse impacts to the protected populations, identify additional avoidance alternatives and impact minimization strategies.
- Prepare an Impact Significance Conclusion taking into account mitigation and enhancements measures and all offsetting benefits as well as the design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas.

Economic and Fiscal

- Fiscal transactions potentially associated with the project that would result in direct revenue to the city should be calculated. The majority of these funds are produced from taxable transactions (i.e., sales taxes) and property taxes. A smaller amount of revenue is generated by the cities through business fees, fuel taxes, licenses, fees, and fines. These lesser taxes are not included in the analysis because they cannot be precisely estimated and represent a very small portion of total revenue. For property tax, calculate revenues lost from full property acquisitions. For sales tax calculations, only those businesses that collect sales tax for products, goods, or services should be included in the analysis.

- Identify the level of long-term (permanent) employment generated by the project and short-term (temporary) employment generated by project construction using the Regional Input-Output Modeling System (RIMS II) (http://www.bea.gov/regional/rims/brfdesc.cfm).

B. SIGNIFICANCE CRITERIA

Social

The project would have a significant impact under CEQA if it would result in:

- Conflict with established recreational, educational, religious, or scientific uses of the area; or
- Result in adverse changes in the character and cohesion of an established neighborhood, such as increased noise, traffic, access restrictions, parking loss or intrusion, or pedestrian safety hazards, so that the integrity of the neighborhood as a whole is changed (but not necessarily individual properties).
- Disrupt or adversely affect a property of cultural significance to a community or ethnic or social group;
- Displace residents and businesses;
- Disrupt or divide the physical arrangement of an established community or removal of neighborhood amenities;
- Add social impact if it results in a physical impact.

A significant impact on public services (fire, police, schools, parks, other public facilities) under CEQA would occur if the project would result in:

- substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services.
- acquisition of a recreational resource that would result in a diminished capacity to use the resource for specific and defined recreational activities. The acquisition of a portion of a recreational facility that is oriented toward passive use would not constitute a significant impact, unless the passive nature of the resource is the primary reason that the resource is valued and the amount being acquired would substantially diminish that value. In such a case, a significant impact would occur.

For thresholds of significance for indirect impacts to community facilities, such as visual quality and aesthetics and noise/vibration, see those sections; for treatment of 4(f) and 6(f) resources see that section.

Displacements and Relocations

The project would have a significant impact under CEQA if it would result in:

- displacement of existing housing where adequate, comparable, or better (when applicable) replacement housing is not available within the vicinity;
- displacement of businesses or employees without adequate replacement within the same or similar market; or

- temporary or permanent disruption of local businesses that results in the loss of those businesses.

Environmental Justice

- In accordance with DOT Order 5610.2, determine if the HST alternatives will have a disproportionately high and adverse impact on low income and/or minority populations that:
  - Is predominantly borne by a minority and/or low-income population, or
  - Will be suffered by the minority and/or low income population and is appreciably more severe or in greater magnitude than the adverse effect that will be suffered by non-minority and/or non-low income population.
  - Typically, impacts that may be disproportionate are relocations and temporary, partial takings for construction easements.

Economic

The project would be considered to result in a significant economic and fiscal impact under CEQA if it would result in one or more of the following:

- Direct or indirect elimination of employment or population, thereby causing deterioration of the environment either directly or indirectly; what about relocation?
- result in population growth in an area through additional employee demand that could not be met by the existing local labor force, which would result in environmental impacts related to the need for additional housing, infrastructure, or public services; or
- loss or shift of local tax revenue that would reduce social spending or local community services, thereby indirectly causing deterioration of the environment.

C. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide Program EIR/EIS, and the Bay Area to Central Valley Program EIR Findings of Fact, July 9, 2008, and when available, the related Record of Decision, and develop project-level measures consistent with strategies to avoid or minimize harm from air quality impacts, noise impacts, visual and aesthetic impacts and others where applicable. Assess need for additional mitigation, including design variations.
- Consider and integrate input from the affected communities of concern and community leaders.
- Describe requirements of the Uniform Relocation and Assistance Program (include as an appendix). This is not considered mitigation, but a requirement.

D. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for community impacts.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether community impacts will be considered in the cumulative impact analysis. This process is initiated during

project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basin wide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method), appropriate plan(s) (if using plan method), or major projects and appropriate plans if using combined list and plan method.
   - The Section Environmental Team Cumulative Lead will identify what projects and/or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document). The analysis may use a combined list and plan approach with planning departments in all affected local jurisdictions, plus service providers and Caltrans to be contacted for information/verification.
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for community impacts. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.11.4 Products

A. TECHNICAL REPORT: COMMUNITY IMPACT ASSESSMENT REPORT

The Community Impact Assessment will generally follow the guidance provided in Caltrans Standard Environmental Reference Volume 4. The Community Impact Assessment (CIAR) will describe the relevant existing conditions, the potential impacts of the project on the community and its neighborhoods, the significance of the identified impacts, and potential mitigation measures to best avoid significant adverse impacts resulting from the project. The CIA will include assessment of social impacts, economic impacts, relocation impacts, public service and facility impacts, and non-motorized transportation impacts. Land use data will be described in the land use technical report (or EIR/EIS).

B. PROJECT EIR/EIS

1. Section: Socioeconomics, Communities, and Environmental Justice
2. Cumulative Section
3. Summary for EIR/EIS Executive Summary

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3.12 Local Growth, Station Planning, and Land Use

3.12.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Farmland Protection Policy Act of 1981 (7 USC 4201)
- Wilderness Act of 1964
- Coastal Zone Management Act of 1972 as amended through the Coastal Zone Protection Act of 1996
- Wild and Scenic Rivers Act

State Regulations

- California Land Conservation Act of 1965 (The Williamson Act)
- California Coastal Act (California Public Resources Code Sections 30000-39000)
- California Coastal Commission implementing regulations (California Code of Regulations, Title 14, Division 5.5)
- Senate Bill No. 375, Chapter 728

B. OTHER CONSIDERATIONS

- Local jurisdiction policies (including general plans (particularly Land Use, Community Character, Transportation/Circulation, Housing, Growth Management, or similar elements of the general plan) Specific Plans, Redevelopment Plans, etc. applicable to the study area)
- Local jurisdiction ordinances and codes (including development and design standards, etc.)
- Local Coastal Program Regulations

C. DEFINITION OF STUDY AREA

Required Information	Study Area
▪ Aerial Maps, GIS base if possible ▪ Conceptual engineering plans and profiles and project description ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans ▪ Regional planning documents (RTIP, Coastal Zone Management Plan, habitat conservation plans, etc.) ▪ Community impact technical report	▪ Half mile around station locations or access points ▪ HST study corridor (adjacent parcels/properties) ▪ Plans and policies consistency

Study Area Setting

Key Information	Sources
▪ Applicable policy and plans (including coastal zone management plans and programs) ▪ Existing and planned land uses ▪ Local growth (historic and projected) ▪ Environmental constraints to future development ▪ Land use density and character ▪ Parcels available for development ▪ Parking supply ▪ Planned, approved, and reasonably foreseeable (project opening date/project description) development projects in study area	▪ General and regional plans ▪ Field surveys ▪ Socioeconomic data ▪ Aerial and ground photography ▪ Topographic maps ▪ GIS ▪ Planning and development agencies ▪ Chambers of Commerce ▪ California Coastal Commission (CCC) ▪ NAVTEQ Parcel Boundaries

3.12.2 Impact Analysis and Mitigation Strategies

Based on the CEQA, Appendix G, the following effects will be considered significant:

- Physically divide an established community
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect
- Cause change in pattern or intensity of land use compared to local plans and policies

In particular, the following analyses will be conducted, based on the existing data gathered, as noted above. Both construction-related and operational impacts will be discussed and quantitatively analyzed, as well as direct impacts and indirect impacts.

The potential for local growth will determined as follows:

- Consideration of the proposed alternatives in relationship to other planned projects and whether the project would facilitate planned growth or induce unplanned growth
- Consideration of whether the project would causes changes in population distribution, population concentration, and the human use of the land, including commercial and residential development (see the growth-inducement discussions in the statewide EIR/EIS and the Bay Area to Central Valley EIR/EIS).
- Consideration of whether the project would cause changes in travel patterns and accessibility.
- Consider indirect impacts of increased density of development around stations.

Compatibility for station planning will be determined as follows:

- Evaluation of existing station area development and character (e.g., long-established single-family neighborhood, industrial area, retail area, historic district)
- Evaluation of existing station area parking supply and existing regional parking policies (See also, Transportation Section)

- Evaluation of plans and policies to increase station area development
- Evaluation of plans and policies to enhance transit-friendly character of station area development
- Evaluation of supportive zoning regulations near transit stations
- Evaluation of zoning ordinances that enhance transit-oriented character of station area development
- Evaluation of conceptual transit-oriented joint development opportunities that have been defined by the Authority working with engineering and design teams and local authorities

The potential for land use impacts will be determined as follows (cross reference to other section where applicable):

- Consistency with land use plans and policies will be assessed through review and comparison of the project alternatives to the adopted plans and policies of local cities and regional jurisdictions within the study area that have authorities for land use, transportation and other relevant infrastructure, and consideration of densities in and around stations.
- Land use compatibility will be assessed by identifying existing and planned land uses to proximate locations affected by project alternatives, and analyzing the relative sensitivity of these land uses to conditions arising from construction, operation or maintenance of the HST alternatives.
- Each alternative will be evaluated for the effects on future development.

A. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS Program EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize harm from land use impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS. Identify potential mitigation measures that government agencies could take to reduce negative land use impacts and to enhance positive land use development in support of transit.
- Identify other land use circumstances, conditions, or constraints under which the Authority operates that influence local and regional land use policies, plans, and implementation.
- Consider land use planning conducted in the study area, as well as other relevant planning and development studies and reports.

B. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for local growth, station planning, and land use.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether local growth, station planning, and land use will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these

impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method), or appropriate plan(s) (if using plan method), or use a combined project list and plan approach.
   - The Section Environmental Team Cumulative Lead will identify what projects or/and plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, or on analysis of combined project list and existing plans assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for local growth, station planning, and land use. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.12.3 Products

A. PROJECT EIR/EIS

1. Section: Local Growth, Station Planning and Land Use
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

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3.13 Agricultural Land

Evaluation of impacts on agricultural lands is requirements of the Farmland Protection Policy Act and the California Environmental Quality Act. The Program EIR/EIS included an agricultural land evaluation that was broad and general for the Statewide System. Each project EIR/EIS will list all the farmlands in the corridor as known (based on the Agricultural Resources/ Farmlands and Land Use of the environmental document and the Farmland Mapping and Monitoring Program (FMMP). In addition, the analysis will describe prior and on-going efforts to avoid conversion of agricultural land.

3.13.1 Introduction and Overview

A. REGULATORY REQUIREMENTS

Federal Regulations

- National Environmental Policy Act (NEPA)
- Farmland Protection Policy Act of 1981 (FPPAs) – 7 U.S.C. 4201-4209 and 7 CFR 658)

State Regulations

- California Environmental Quality Act (CEQA)
- California Land Conservation Act of 1965 [Cal. Govt. Code S.51200-51295], also known as the Williamson Act
- California Coastal Act

Other Considerations

- Local jurisdiction general plan policies
- Local Agricultural protection zoning ordinances (APZ)

3.13.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Information	Study Area
▪ Conceptual design and project plans and profiles ▪ Right of way requirements ▪ Potential temporary construction easements	▪ Same as for right-of-way and temporary easements for the alternatives. ▪ Refer to the Community Facilities and Services; Cultural Resources; Aesthetics and Visual Quality; Noise and Vibration; sections of the EIR/EIS.

Key Information	Sources
▪ Agricultural *land* identification (includes prime and unique farmland and other farmland of statewide or local importance) ▪ Resource Conservation Districts	▪ Local jurisdiction general plans ▪ U.S. Bureau of the Census (agricultural census data) ▪ Farmland Mapping and Monitoring Program (FMMP) database ▪ County Farm Bureaus ▪ University of California Cooperative Extension Service (farm advisors) ▪ Natural Resource Conservation Service ▪ American Farmland Trust

B. METHODOLOGY

- Identify Prime Farmlands, Farmlands, Farmlands of Statewide Importance, and Unique Farmlands as established by the Department of Conservation, using the FMMP database.
- Identify Farmlands of Local Importance, and Williamson Act lands as established by the Department of Conservation, using the FMMP database.
- Identify other lands subject to FPPA requirements including forest land, pastureland, cropland, or other land.
- Identify Resource Conservation Districts, as established by the Department of Conservation, using California's Resource Conservation Districts Table.
- Contact local agencies to determine if there are any established policies concerning farmland conversion to other land uses
- Document local policies for farmland conversion.
- Describe existing farmlands and consultation done to identify them.
- Submit Form AD-1006 to the Natural Resource Conservation Service (NRCS) office which handles that particular county and requests that a determination as to whether the project location has farmland that is subject to the Farmland Protection Policy Act.
- Summarize appropriate parts of NRCS form AD 1006 farmland determination.
- Cross-Reference all sections of the EIR/EIS that describe the resources.

The following information should be provided in the environmental document:

- A detailed map or drawing of sufficient scale to identify the relationship of the alternatives to the agricultural properties
- Size (acres or square feet) and location (maps or other exhibits such as photographs, etc.) of the affected agricultural property.
- Function of or type of agricultural activities on the property (etc.).
- Applicable clauses affecting the ownership, such as lease, easement, covenants, restrictions, or conditions, including forfeiture and Williamson Act contracts.
- Early coordination with the Natural Resources Conservation Service.

3.13.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

Government Code Section 51291(b) requires an agency to notify the Director of the California Department of Conservation and the planning department of the local governing body responsible for the administration of the preserve of Williamson Act contracted land proposed for acquisition for a public improvement project (regardless of whether it is a state or federally funded project, or the amount of total acreage involved).

- Discuss the impacts on prime farmlands and agricultural resources for each alternative: amount of land to be used, facilities and functions affected, noise, visual, etc.
- Where an alternative (or alternatives) uses land from more than one agricultural property, prepare a summary table comparing the impacts of the alternatives. Those impacts that can be quantified should be quantified while others should be described.
- Determine the number of acres/hectares of Prime Farmland that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Prime Farmland database and the conceptual design and project plans and profiles.
- Determine the number of acres/hectares of Farmlands of Statewide Importance that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Statewide Importance database and the conceptual design and project plans and profiles.
- Determine the number of acres/hectares of Unique Farmland that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Unique Farmland database and the conceptual design and project plans and profiles.
- Determine the number of acres/hectares of Farmlands of Local Importance and Williamson Act lands that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Local Importance database and the conceptual design and project plans and profiles.
- Determine the number of acres/hectares of Resource Conservation District lands that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Resource Conservation Districts and the conceptual design and project plans and profiles.
- Coordinate with NRCS and prepare Farmland Conversion Impact Rating (provide data to NRCS)

The following information should be provided in the environmental document:

- Contain a map showing the location of all farmlands in the project area
- Discuss the effects of the various alternatives
- Identify measures to avoid or reduce the impacts.
- Provide the rationale for decisions made during the farmland evaluation.
- Total Prime, of Statewide Importance, and Unique Farmlands Area Acquired/Converted
- Total of Local Importance and Williamson Act Farmlands Area Acquired/Converted
- Total Resource Conservation District Lands Area Acquired/ Converted
- Identification of Areas of Concern and Comparison of Impacts (Displacement, Severance, and Associated Costs)

- Farmland Conversion Impact Rating (per National Resource Conservation Service Coordination)

B. SIGNIFICANCE CRITERIA

NEPA requires farmland to be analyzed for impacts, but does not provide the same level of impact determination criteria as CEQA. Considering this, the CEQA impact criterion is used to determine farmland impacts. Under the Appendix G of CEQA (2002 version) a farmland impact would be determined by the following criteria:

- Would the project Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to a non-agricultural use?
- Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?
- Would the project involve other changes (including severance impacts) in the existing environment which due to their location or nature, could result in conversion of Farmland to non-agricultural use?

C. MITIGATION

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.

D. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for agricultural land.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether agricultural land will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
   - Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the

cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

3. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysiss (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
4. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
5. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
6. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
7. Document results.
   - Summarize the results of the cumulative impact analysis for agricultural land. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.13.4 Products

E. PROJECT EIR/EIS

1. Section: Agricultural Land

   2. Cumulative Impacts Section

3. Summary for EIR/EIS Executive Summary
4. Consultation
   - Discuss the results of preliminary consultation with the NRCS. Generally, the consultation should include discussion of avoidance alternatives, impacts to the property, and measures to minimize harm. In addition, the consultation should include, where necessary, a discussion of significance and primary use of the property.
   - The conversion of farmland requires approval of the NRCS. No permits are required.

3.14 Parks, Recreation, and Open Space

3.14.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- National Environmental Policy Act: [42 U.S.C. 4331(b)(2)]
- National Trails System Act (P.L. 90-543, as amended through P.L. 109-418)
- Park Preservation Act
- Wilderness Act of 1964

State Regulations

- California Environmental Quality Act of 1970 - The CEQA Guidelines [Article 9, 15126.2(a)]
- California Public Resources Code Section 5400–5409 (Also known as the Public Park Preservation Act of 1971)
- California Coastal Act (California Public Resources Code Sections 30000-39000)

B. OTHER CONSIDERATIONS

- Local jurisdiction policies, including general plans (especially open space, land use, and conservation elements), Specific Plans, Redevelopment Plans, etc. applicable to the study area.
- Local Coastal Programs and Local Coastal Programs regulations
- Local jurisdiction ordinances and codes (including development and design standards, etc.)

2.19.1 Affected Environment

A. DEFNITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Conceptual engineering plans and profiles ▪ Aerial maps, GIS base if possible ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional plans, in particular open space, land use, and conservation elements of local general plans ▪ Regional planning documents (RTIP, Coastal Zone Management Plan, etc.)	▪ Study area may vary depending on topic being analyzed, which should be informed by the scoping process, but should generally cover the following: ▪ 1/2 mile around station locations or access points ▪ HST study corridor (adjacent parcels/properties) ▪ National, regional, and local open space, parks, recreation areas and facilities (including schools if available to public for recreational use), that may be affected ▪ Scoping comments ▪ Cross reference to section listing 4f resources which defines the study area as 1,000 feet on either side of the right-of way and radius around the station, and to other appropriate section where the study area is different for parks, recreation areas, or recreation facilities

B. Study Area Setting

Key Information	Sources
▪ Describe existing regional and local study area open space, parks, and recreation areas (including trails and bikeways), and recreation facilities. Include schools to the extent they are available for public recreation purposes. ▪ Describe planned, approved, and reasonably foreseeable open space, parks, and recreation facilities in study area ▪ Describe vehicular and pedestrian access to public open space areas, parks, and recreation areas and facilities ▪ Use maps and tables to help describe the setting ▪ Cross-reference all sections of the EIR/EIS that describe open space, parks, and recreation resources	▪ EIR/EIS sections: Local Growth, Station Planning, and Land Use; Socioeconomics, Communities and Environmental Justice; Section 4(f) and (6f) Evaluations; and Aesthetics and Visual Resources ▪ Program EIR/EIS ▪ General and regional plans ▪ Field surveys ▪ Aerial and ground photography ▪ GIS data

2.19.2 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

This section of the EIR/EIS is closely related to the Local Growth, Station Planning, and Land Use; and Socioeconomics, Communities and Environmental Justice sections, and to the Section 4(f) and (6f) Evaluations with regards to the 4(f) public park and recreation area properties. The Parks, Recreation, and Open Space section together with the Local Growth, Station Planning, and Land Use; and

Socioeconomics, Communities and Environmental Justice sections will jointly provide information constituting the Community Impacts Assessment (CIA). Therefore, as with those related sections, methodology is generally based on the Caltrans Environmental Handbook Volumes 4: Community Impacts Assessment and the Caltrans guidance impact analysis methods (see Sections 4-6, 4-7, and 4-8 in the Caltrans guidance at http://www.dot.ca.gov/ser/envhand.htm). Also refer to each related section methodologies as appropriate for cross-referencing. The impact analyses should be conducted, based upon the existing data gathered, as noted above. Both construction-related and operational impacts need to be discussed, as well as direct impacts and indirect impacts. Those impacts that can be quantified should be quantified while others should be described.

Identify and discuss the direct and indirect impacts of the proposed project, including:

- Any physical barriers the project would create (or perceived barriers) separating users and visitors from recreation areas or facilities, including hiking, biking, and equestrian trails
- Changes in access and parking for recreation facilities
- Impacts on recreational areas and facilities: amount of land to be used, facilities and functions affected, noise, visual, etc. (see other sections for impacts).
- Long-term impacts and short-term interruptions of use of the open space or recreational resource
- Any project-related increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Identify the construction impacts of the proposed project.

- Changes to access and reduction in parking capacity for parks, recreation areas, and recreation facilities
- Disruption of established community and visitor use of open space, parks, recreation areas and facilities due to temporary construction easements and general construction activity
- Construction impacts on parks and recreation areas and facilities, including air pollutant emissions, noise and vibration, traffic and pedestrian circulation and access, traffic and pedestrian safety, visual (including shade and shadow effects), etc.

B. SIGNIFICANCE CRITERIA

The project would have a significant impact under CEQA if it would:

- Conflict with established or planned open space, parks, or recreational use of the area
- Result in acquisition of an open space resource (including hiking, biking, and equestrian trails), that would result in a diminished capacity to use that resource or a substantially reduced value of that resource
- Create a physical barrier (or a perceived barrier) to the access to or established use of open space, park, recreation area (including trails), or recreation facility
- Result in acquisition of a recreational resource that would result in a diminished capacity to use the resource for specific and defined recreational activities. The acquisition of a portion of a recreational facility that is oriented toward passive use would not constitute a significant impact, unless the passive nature of the resource is the primary reason that the resource is valued and the amount being acquired would substantially diminish that value. In such a case, a significant impact would occur. Thresholds of significance for indirect impacts to community facilities are defined in other sections such as noise/vibration, diminished access, visual quality

and aesthetics (including shade and shadows) see those sections; for treatment of 4(f) and resources.

- Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated

- Result in the physical alteration of the existing or a need to provide new parks or other recreation facilities the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives

C. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide Program EIR/EIS, and the Bay Area to Central Valley Program EIR Findings of Fact, July 9, 2008, and when available, the related Record of Decision, and develop project-level measures consistent with strategies to avoid or minimize parks, recreation, and open space impacts.
- Address obligations to replace or fund a replacement for certain park properties, payment of fees, and other similar requirements. These mandatory requirements need to be addressed to provide context for the identification of mitigation measures for both project-specific and cumulative impacts.
- Identify all feasible mitigation measures to reduce the impacts, and assess need for additional mitigation, including design variations.
- Identify needed permits and approvals, including permits or determinations from CCC or a local jurisdiction.
- Consider and integrate input from the affected agencies, communities, and organizations.

D. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for parks, recreation, open space impacts.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether parks, recreation, and open space impacts will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for open space you may have different RSA than for that for local parks or recreation facilities). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.

- Submit RSA(s) to the Section Environmental Team Cumulative Lead.

3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list, plan, or list and plan). A combined plan and project list approach may be necessary for the parks, recreation, and open space cumulative impact analysis.

4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method), appropriate plan(s) (if using plan method), or major projects and appropriate plans (if using combined list and plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects and/or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document). The analysis may use a combined list and plan approach.

5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

6. Identify cumulative impacts.
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3), based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project; or on analysis of the project in relation to existing plans; or on analysis of combined project list and existing plans approach.
   - Identify mitigation for significant cumulative impacts. Address obligations to replace or fund a replacement for certain park properties, payment of fees, and other similar requirements. These mandatory requirements are not mitigation measures, but need to be addressed to provide context for the identification of mitigation measures for both project-specific and cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead, also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

7. Document results.
   - Summarize the results of the cumulative impact analysis for community impacts. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team

Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

2.19.2 Products

E. PROJECT EIR/EIS

1. Section: Parks, Recreation, and Open Space
2. Cumulative Section
3. Summary for EIR/EIS Executive Summary

3.15 Aesthetics and Visual Quality

3.15.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

No federal regulations apply to this resource.

State Regulations

California Scenic highway program (HTTP://WWW.DOT.CA.GOV/HQ/LANDARCH/SCENIC_HIGHWAYS/SCENIC_HWY.HTM)

B. OTHER CONSIDERATIONS

Local jurisdiction policies, including general plans (often found in Land Use, Community Character, Urban Design, Scenic Resources, or similar elements), Specific Plans, Redevelopment Plans, etc. applicable to the study area.

Local jurisdiction ordinances and codes (including lighting standards, grading standards, oak tree ordinances, etc.)

3.15.2 Affected Environment

A. DEFINITION OF STUDY AREA (VIEWSHED)

Required Engineering Information	Study Area
▪ Project Description (note, consult Section Engineering team on assumptions for missing information) ▪ Conceptual design and project plans and profiles and project description (massing diagrams for stations and maintenance facilities) ▪ Structures (substations; catenaries for the trains and transmission lines connecting the stations) ▪ Maintenance facility ▪ Station locations and designs, plans and profiles (including transit-oriented development) ▪ Street Modifications ▪ Other visible project-related components ▪ Construction easements and staging areas	▪ Identify viewshed of project using GIS ▪ Map viewshed within up to 3 miles of any project feature (representing approximate limits of human eyesight to see project features of this type) (note: for large visible changes such as tunnel portals or large cuts/fills that could be seen from a long distance, consider expanding viewshed as appropriate) ▪ Identify limiting factors, such as distance, climate, air quality, topography, vegetation, existing development blocking views, etc.

Inventory of Visual Resources

Key Information	Sources
▪ Identify, inventory, and map the visual resources within the study area. o Determine if any roadways in the viewshed are scenic highways or corridors o Address any historic structures or districts identified in the cultural resources inventory o Inventory important visual or scenic resources within the viewshed o Identify any astronomical observatories or viewing locations that may be affected by changes in illumination levels related to the project o Identify any structures or properties specifically oriented to views within the viewshed (restaurants, hotels, residences, public parks)	▪ Federal Highway Administration (FHWA) Visual Impact Assessment of Highway Projects (FHWA-HI-88-054) (currently not available from FHWA website, but available from Caltrans at http://www.dot.ca.gov/ser/downloads/visual/ FHWA Visual ImpactAssmt.pdf) ▪ Caltrans Standard Environmental Reference, Environmental Handbook Volume 1, Chapter 27 – Visual and Aesthetic Review was also referred to in the preparation of this methodology (available at http://www.dot.ca.gov/ser/vol1/sec3/community/ch27via/chap27via.htm) ▪ Program EIR/EIS; review GIS mapping for scenic resource areas along corridor ▪ General plans, specific plans, redevelopment plans, public lands plans, etc. for references to important visual or scenic resources ▪ Local policy documents and Caltrans list of Eligible and Officially Designated Routes (http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm) ▪ Coordinate with cultural resources team ▪ Site visits (take color photos and map resources showing viewpoint and angle of view)

Identify Viewer Groups

Key Information	Sources
▪ Identify viewer groups within the viewshed (roadway/highway users, resident, other development, parks/trail users, viewers from other development within viewshed, etc.) Include a viewer group for the future HST rider. ▪ Evaluate the viewer groups' relative exposure to the view and relative sensitivity to visual change, by considering such factors as distance from view, position of viewers, direction of view, number of viewers, duration of view, viewer activity and awareness, local values, cultural or natural significance of the view, and uniqueness of the view. ▪ Document the viewer group evaluation.	▪ Same as above

Landscape Units and Key Viewpoints

Key Information	Sources
▪ Divide the study area into appropriate landscape units that are spatially enclosed and/or visually bounded, having distinct landscape character and interrelated visual elements ▪ Select key viewpoints representative of each landscape unit. Select additional viewpoints to represent scenic resources, parks, historical districts/ structures, and any viewer groups not otherwise represented ▪ Map landscape units and key viewpoints ▪ Take color photos FROM key viewpoints, and OF key viewpoints	▪ Same as above

Evaluate Existing (Baseline) Visual Character

Key Information	Sources
▪ Define existing visual character of each viewpoint's view, including natural and man-made features that dominate the landscape (foreground, middle ground, and background), in terms of dominant form, line, color, texture, and pattern character (form, scale, diversity, and continuity) ▪ Describe this character analysis qualitatively.	▪ Same as above

Evaluate Existing (Baseline) Visual Quality

Key Information	Sources
▪ Evaluate the existing visual quality of each viewpoint's view in terms of vividness, intactness, and unity, as described in the FHWA Visual Impact Assessment of Highway Projects. ▪ Document the existing visual quality in matrix form (such as described in the FHWA guidance), and score each view as a numeric score (1 to 5 with 5 being the highest) or using qualitative "very high, high, moderate, low, very low" method.	▪ Same as above

3.15.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

The aesthetics and visual quality analysis will generally follow the methodology described in U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA) Visual Impact Assessment of Highway Projects (FHWA-HI-88-054) (currently not available from FHWA website, but available from Caltrans at HTTP://WWW.DOT.CA.GOV/SER/DOWNLOADS/VISUAL/ FHWA Visual ImpactAssmt.pdf). Also see the Caltrans Standard Environmental Reference, Environmental Handbook Volume 1, Chapter 27 – Visual and Aesthetic Review (available at HTTP://WWW.DOT.CA.GOV/SER/VOL1/SEC3/COMMUNITY/CH27VIA/CHAP27VIA.HTM).

Additional analyses may be required at specific locations, such as:

- Illumination studies in areas that potentially affect observatories
- Visibility analysis near airports or military bases (coordinated with Section Environmental Air Quality Specialist)
- Light and glare studies
- Oak tree surveys (see Biological Resources and Cultural Resources)
- Shade and shadow studies in areas sensitive to such changes,
- Special analyses required by affected public land agencies
- Assess aesthetics and visual quality impact, considering short-term, construction-period-only impacts, impacts shortly after construction (before revegetation and/or landscaping has fully grown in), and at full landscape maturity and during operation of the project.

Inventory of Visible Physical Changes

- Referring to the project description, briefly describe the visual characteristics of the project alternatives, including the rail line, support structures; stations; landform alterations; auxiliary facilities, parking areas; lighting and signage, roadway realignments, removal of vegetation, removal of existing structures, new landscaping and revegetation, as well as short-term construction-related components such as construction staging areas, temporary structures, construction equipment, lighting, detours, etc. Also consider the visual characteristics of other mitigation measures, such as noise walls, hazardous materials remediation, or traffic improvements (coordinate with other Section Environmental Team specialists).
- For any visible physical changes that have not been designed yet, work with Section Engineering Team to make logical assumptions; document assumptions.
- Create appropriate graphic illustrations of the proposed project alternatives at key viewpoints, including massing studies, sketches, photographs of similar facilities, and/or photo-simulations. If necessary in highly sensitive areas, include graphic representations at various stages of the project implementation, during construction, just after construction without landscaping, etc., with landscape at half maturity, with landscaping at full maturity.

Changes in Visual Character

- Describe changes to the visual character of each viewpoint with each alternative, in terms of changes to natural and man-made features that dominate the landscape (foreground, middle ground, and background); and changes in dominant form, line, color, texture, and pattern character (form, scale, diversity, and continuity).
- Compare qualitatively to existing visual character.

Changes in Visual Quality

- Evaluate changes in the visual quality in terms of vividness, intactness, and unity, as described in the FHWA Visual Impact Assessment of Highway Projects, and compare these to the existing visual quality.
- Document the proposed visual quality in matrix form (such as described in the FHWA guidance), and score each view as a numeric score or using qualitative "very high, high, moderate, low, very low" method.
- Compare existing and proposed visual quality at each viewpoint for each alternative, and determine the level of visual quality change (expressed as a numeric score or using qualitative "low, medium, high" score).

Viewer Group Responses

- Evaluate viewer response based on viewer exposure and sensitivity, visual character changes, and visual quality changes.
- Document the proposed visual quality in matrix form (such as described in the FHWA guidance), and score each view as a numeric score or using qualitative "very high, high, moderate, low, very low" method.
- Compare existing and proposed visual quality at each viewpoint for each alternative, and determine the level of visual quality change (expressed as a numeric score or using qualitative "low, medium, high" score)

Aesthetics and Visual Quality Impact

- Based on the analysis above, evaluate whether visual quality impacts would occur, considering changes in visual character, changes in visual quality, and viewer group response at each viewpoint for each project alternative.
- Determine the significance of the impacts (expressed as no impact, less-than-significant impact, or significant impact) when considering the thresholds of significance.

Additional Studies as Necessary

- Conduct additional special studies to address specific locations, such as illumination studies in areas that affect observatories, visibility analysis near airports or military bases (coordinated with Section Environmental Team Air Quality Specialist), oak tree surveys (coordinated with Section Environmental Team Biological Specialist), shade and shadow studies in areas sensitive to such changes, or special analyses required by affected public land agencies.
- Determine the significance of the impacts (expressed as no impact, less-than-significant impact, or significant impact) when considering the thresholds of significance for special studies.

B. SIGNIFICANCE CRITERIA

A permanent or long-term significant visual impact under CEQA would occur if:

- the project would introduce a incompatible visual element visible from a sensitive viewing location;
- the project would block, screen, obstruct, or otherwise interfere with views of an important visual landmark, including properties on or eligible for the National Register of Historic Places, properties that contribute to a historic district or cited in local historic registers, general plans, or other policy documents, or properties specifically designed to take advantage of existing views
- the project would introduce permanent or long-term elements that would be inconsistent with the surrounding visual character in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually;
- the project would remove visual elements such as landscaping, hardscaping, or other decorative features that are included in a specific plan, design guideline, streetscape plan, or other policy document, would preclude similar planned elements from being installed, or would fail to include such elements in its design;
- the elements proposed by the project would screen or block views of commercial land uses (or their signage) from the adjacent roadways, when that land use is dependent upon their visibility for customers; or
- the project would alter lighting, shade, or shadow conditions in areas sensitive to such changes.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Construction period visual impacts	▪ Potential for the construction or construction area to be visible to sensitive viewers ▪ Potential for the construction or construction area lighting to spill over into adjacent sensitive land uses. ▪ Potential for construction area dust to result in substantial impacts related to visibility (airborne dust) or cleanup (i.e., after dust settles) for sensitive viewers.	▪ Introduction of an incompatible visual element visible from a sensitive viewing location. ▪ Introduction of elements that would be inconsistent with the surrounding visual character in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually. ▪ Alternation of lighting, shade, or shadow conditions in areas sensitive to such changes. ▪ Substantially alter views from a scenic highway or roadway.
Introduce incompatible visual elements	▪ Potential for the project to introduce land form changes, structures, lighting, etc., that are incompatible with land uses within the viewshed for sensitive viewers.	▪ Introduction of an incompatible visual element visible from a sensitive viewing location. ▪ Introduction of elements that would be inconsistent with the surrounding visual character in a historic district, specific plan area, or other area that is designated in a policy document or is otherwise identified as being important visually. ▪ Alternation of lighting, shade, or shadow conditions in areas sensitive to such changes. ▪ Substantially alter views from a scenic highway or roadway.
Remove important visual elements	▪ Potential for the project to remove important features, such as important buildings, land forms, vegetation, or other scenic resources	▪ Removal of visual elements such as landscaping, hardscaping, or other decorative features that are included in a specific plan, design guideline, streetscape plan, or other policy document, would preclude similar planned elements from being installed, or would fail to include such elements in its design.
Block important views	▪ Potential for the project elements, such as land form changes and structure to block important features, such as important buildings, land forms, vegetation, or other scenic resources	▪ Block, screen, obstruct, or otherwise interfere with views of an important visual landmark, including properties on or eligible for the National Register of Historic Places, properties that contribute to a historic district or cited in local historic registers, general plans, or other policy documents, or properties specifically designed to take advantage of existing views.

Topic	Issues to Evaluate	Threshold of Significance
		▪ Screen or block views of commercial land uses (or their signage) from the adjacent roadways, when that land use is dependent upon their visibility for customers.

D. MITIGATION

The Section and Program Management Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Identify and evaluate site-specific feasible and practicable mitigation measures to be incorporated into project design to avoid or reduce significant impacts to aesthetics and visual quality (state which alternative requires mitigation or if the measures are applicable to all) (consult with PM Team about feasibility of mitigation)
- Consider such mitigation as changes in the project (location, construction method, or surface treatments), additional or changed landscaping, screening of views, enhancement of views, shielding of lights (in accordance with the International Dark Sky Association standards), noise wall treatments, rock aging techniques, artwork, special design features, temporary screening of construction areas and/or staging areas, etc.
- Using the same methodology as for project impacts, evaluate whether visual quality impacts with mitigation would occur, considering changes in visual character, changes in visual quality, and viewer group response at each viewpoint for each project alternative when compared to the existing (baseline) condition.
- Determine the significance of the impacts after mitigation (expressed as no impact, less-than-significant impact, or significant impact) when considering the thresholds of significance.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for aesthetics and visual quality.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine whether aesthetics and visual quality will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.

2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts:
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
   - Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
7. Document results.
   - Summarize the results of the cumulative impact analysis for aesthetics and visual quality. This summary should include the identification of resources considered in the analysis, the

RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.15.4 Products

A. TECHNICAL REPORT: AESTHETICS AND VISUAL QUALITY

B. PROJECT EIR/EIS

1. Section: Aesthetics and Visual Quality
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

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3.16 Cultural Resources

3.16.1 Introduction

A. REGULATORY REQUIREMENTS

Federal Regulations

- Section 106 of the National Historic Preservation Act

State Regulations

- California Register of Historical Resources
- CEQA Regulations (SECTION 15064.5)
- Public Resources Code 21083.2
- Public Resources Code 21084.1
- California Health and Safety Code 7050.5-7055
- Public Resources Code 5024.5
- Public Resources Code 5097

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan policies and ordinances

3.16.2 Affected Environment

A. DEFINITION OF STUDY AREA

Required Engineering Information	Study Area
▪ Conceptual engineering plans and profiles and project description	▪ For the archaeology area of potential effect (APE) the Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, temporary construction easements and so forth); and ▪ For the architectural history APE properties in or adjacent to each side of the Project's proposed physical ground disturbance footprint (e.g., stations, track, equipment storage areas, temporary construction easements and so forth). Significant historic structures can include bridges and culverts and other engineering features, not just buildings.

Prehistoric and Historical Archaeological Sites, Ethnographic and Multi-Component Cultural Resources

Key Information	Sources
▪ Review the regulatory requirements of Section 106 of the National Historic Preservation Act (NHPA) and the California Public Resources Code Sections 5024.1 and 21084.1 ▪ Review all maps, drawings, photographs, and related materials outlining the extent of the project including stations, track, equipment storage areas, temporary construction easements	▪ Conceptual Engineering Plans and Profiles at an appropriate scale to show project alignment, ancillary facilities, and temporary construction easements ▪ Contextual photographs, maps and related materials. ▪ Information contained at the Regional Centers of the California Historical Resources Information

Key Information	Sources

and so forth.
▪ Review Program EIR/EIS for known culturally sensitive areas, project-specific identification and evaluation requirements, and mitigation strategies that were previously identified.
▪ Review existing studies, documentation, and consultation records from the Program EIR/EIS and decision documents or Programmatic Agreements or Memorandum of Agreements between the Authority/FRA and the State Historic Preservation Officer (SHPO) and any applicable technical studies related to the project
▪ Review previous technical documents to determine previous levels of study; agency involvement and individuals/groups contacted; applicable laws, ordinances, and regulations; methodologies; historic themes and contexts; data results; affected resources; types of impacts; and proposed mitigation measures.
▪ Assess project's potential to effect cultural resources including:
  ▪ Archaeology - prehistoric and historical archaeological sites, historic architectural properties (including adjacent properties along alignment alternatives and around facilities) and isolated artifacts and features;
  ▪ Traditional Cultural Properties (TCPs) – resources of importance to Native Americans and other ethnic groups.
▪ Determine site-specific regulatory requirements based on land ownership, local or regional regulatory requirements, federal or state permits, and requirements for other agreements, such as easements or land acquisition.
▪ Identify all potential parties (signatories and interested parties) to the Section 106 process including federal and state land owning or permitting agencies and Native American tribes.
▪ Consult federal agencies with jurisdiction, for example: U.S. Forest Service, BLM, or FHWA (Caltrans), to determine special requirements and permits, as needed. Consider if any federal or state Programmatic Agreements (PAs) and Memoranda of Agreement/Understanding (MOA/MOUs) exist between agencies that may affect historic properties. Agency consultation efforts will be consistent to the California High Speed Train Agency Involvement Plan.
▪ In compliance with Section 106 of the NHPA, initiate consultation with the California SHPO to define the area of potential effect (APE) and obtain agreement on level of effort for resource identification and evaluation.
▪ Initiate consultation with potentially interested parties including Native American tribes and
	System, as well as local historical societies, libraries, and other historic resource repositories.
	▪ Section 106 of the National Historic Preservation Act (NHPA) and the California Public Resources Code Sections 5024.1 and 21084.1
	▪ Native American Heritage Commission (NAHC), Sacred Lands Files
	▪ Program EIR/EIS
	▪ Environmental documents within study area

Key Information	Sources
groups, other ethnic groups, historical societies, local landmarks Boards, as appropriate for each project. ▪ If the project crosses land owned by federally recognized Native American tribes, the FRA will consult with these tribes as outlined by Section 106. If the federally recognized tribes have a Tribal Historic Preservation Officer (THPO) the FRA will initiate consultation with the THPO. ▪ For federally recognized tribes with an interest in the project but where there is no tribal land, FRA will consult with Native tribes regarding the locations or concerns about archaeological resources and traditional cultural properties. ▪ To identify non-federally recognized Native American groups and individuals who might have knowledge or concerns about resources that could be affected by the project, contact the Native American Heritage Commission (NAHC) to request a search of their Sacred Lands Files and to obtain a list of Native American contacts for each project	

Historic Structures and Buildings

Key Information	Sources
▪ Review the regulatory requirements of Section 106 of the National Historic Preservation Act (NHPA) and the California Public Resources Code Sections 5024.1 and 21084.1 ▪ Review all maps, drawings, photographs, and related materials showing the extent of the project including stations, track, equipment storage areas, temporary construction easements and so forth. ▪ Review Program EIR/EIS for known historic architectural sensitive areas, project-specific identification and evaluation requirements, and mitigation strategies that were previously identified. ▪ Review existing studies, documentation, and consultation records from the Program EIR/EIS and decision documents or Programmatic Agreements or Memorandum of Agreements between the Authority/FRA and the State Historic Preservation Officer (SHPO) and any applicable technical studies related to the project. ▪ Review previous technical documents and recent environmental document for other projects in the study area (APE) to determine previous levels of study; agency involvement and individuals/groups contacted; applicable laws, ordinances, and regulations; methodologies; historic themes and contexts; data results; affected resources; types	▪ Conceptual Engineering Plans and Profiles at an appropriate scale to show project alignment, ancillary facilities, and temporary construction easements ▪ Contextual photographs, maps and related materials. ▪ Information contained at the Regional Centers of the California Historical Resources Information System. ▪ Section 106 of the National Historic Preservation Act (NHPA) and the California Public Resources Code Sections 5024.1 and 21084.1 ▪ Program EIR/EIS ▪ Environmental documents within study area

Key Information	Sources
of impacts; and proposed mitigation measures. ▪ Assess project's potential to affect historic architectural resources including: ▪ Architectural History - buildings, structures, including various linear features (e.g., roads, railroads, canals). ▪ Determine project-specific regulatory requirements based on land ownership, local or regional regulatory requirements, federal or state permits, and requirements for other agreements, such as easements or land acquisition. ▪ Identify all potential parties (signatories and interested parties) to the Section 106 process including federal and state land owning or permitting agencies and Native American tribes and local Landmarks Boards. ▪ Consult with federal agencies, including U.S. Forest Service, BLM, and FHWA (Caltrans) to determine special requirements and permits, as needed. Consider if any federal or state Programmatic Agreements (PAs) and Memoranda of Agreement/Understanding (MOA/MOUs) exist between agencies that may affect historic properties. Agency consultation efforts will be consistent to the California High Speed Train Agency Involvement Plan. ▪ In compliance with Section 106 of the NHPA, initiate consultation with the California SHPO to define the area of potential effect (APE) and obtain agreement on level of effort for resource identification and evaluation.	

3.16.3 Impact Analysis and Mitigation Strategies

A. METHODOLOGY FOR IMPACT ANALYSIS

In consultation with the SHPO and other parties to the Section 106 process, implement the resource identification and evaluation processes outlined by Section 106 36 CFR 800 following guidance developed by the National Park Service and in conformance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation 1983 (48 FR 44716, as amended).

- Conduct Background Research
  - To identify known locations of archaeology resources within the APE, review the records for previously recorded archaeological sites and historic buildings at the local Information Center (IC) of the California Historical Resources Information System (CHRIS). While at the IC, collect information on recorded sites within the APE, for the range of alternative HST project alignments, right-of-ways, dumping and borrow pits, access roads and staging areas. Review previous survey Technical reports conducted within APE for historic contexts, bibliography, and determination of significance of sites. Review historic USGS maps. Review properties listed in the National Register of Historic Places and the California Register of Historical Resources, the California Historical Landmarks and Points of Historical Interest lists, Land

Grant maps, Online Archive of California, Government Land Office Plat Maps, and Sanborn Fire Insurance Maps for urban areas as appropriate.

- Review subdivision maps, assessor maps, county/city directories, utility records, building permits, photographs, newspapers, diaries/journals, architectural drawings, Agency Records, Residential- and Commercial-Building Records, oral histories, thesis/dissertations, and preferred local and credible history studies. Research should be conducted with the appropriate agencies, knowledgeable individuals, local and regional historical societies, archives, and libraries.
- Develop relevant historic themes and contexts for the identification and evaluation efforts within the APE. Use National Register Bulletin No. 15 for guidance.

- Prepare Archaeological Inventory and Evaluation Plan
  - Based on the background research and previous studies, prepare an inventory and evaluation plan including a text excavation research design. Consult with SHPO and other appropriate parties regarding the proposed plan to identify historic properties.

- Implement Archaeological Inventory and Evaluation Plan for Preferred Alternative
  - Employ standard archaeological inventory methods as outlined in the plan. Conduct presence/absence testing where subsurface remains may be present. For resources that cannot be avoided conduct test excavations to determine resource significance in accordance with the research design.
  - Following the methods outlined in the National Register Bulletin 42, identify and evaluate any potential TCPs that could be affected by the project.

- Prepare Architectural Inventory and Evaluation Plan
  - Based on the background research and previous studies, an architectural inventory and evaluation plan will be prepared that defines the APE, provides the methodology that will be used to inventory and evaluate buildings and structures. The plan will include the age range for properties to be inventoried and the criteria that will be used to determine which buildings or building types might be excluded from inventory.
  - This plan will outline the relevant historic themes and contexts for the identification and evaluation efforts within the APE. Understanding the themes and context of an area or resource-type will aid in determining the eligibility of a property. National Register Bulletin No. 15 provides guidance on the development of historic themes and contexts for historical property research. This plan will be used to consult with SHPO and other appropriate parties regarding the proposed plan to identify historic architectural properties in the APE.

- Implement Architectural Inventory and Evaluation Plan
  - Perform an intensive survey to identify, record, and evaluate architectural properties adjacent to the proposed alignment, stations and support facilities built within the time period identified in the plan to document and inventory all historic buildings, structures, objects, districts, and cultural landscapes in sufficient detail to permit evaluation for the NRHP (per Section 106 of the NHPA) and the California Register of Historic Resources (CRHR) (per California Public Resources Code Section 5024.1 and 21084.1). Use field maps at 1″ = 250′ scale that have delineated parcel boundaries, APE boundaries, Assessor Parcel Numbers (APNs), street names, prominent natural and man-made features, and previously recorded sites. Based on the number of historic properties within the APE, a field database may be required. Documentation and evaluation efforts will follow the guidelines of National Register Bulletin No. 15 and the California Office of Historic Preservation (OHP) Instructions for

Recording Historic Properties (DPR 523 series forms). Private spaces (i.e., building interiors), suburban backyards, and restricted areas will not be surveyed. Surveys will occur from public vantage points, and if access is infeasible, then the property will be evaluated solely on available information or right-of-entry will be coordinated by the Agency.

- Prepare Resource Inventory and Evaluation Reports (Archeological Survey Report, Historic Architectural Property Report)
  - After completion of the archaeological and architectural inventories and evaluations, prepare reports meeting the reporting standards outlined in the resource inventory and evaluation plans.
- Obtain Concurrence from SHPO and Other Parties on Significance of Resources
  - Submit the inventory and evaluation reports to the SHPO and other responsible agencies and interested parties to obtain concurrence of the significance of identified resources in accordance with the federal National Register of Historic Places and state California Register of Historical Resources.
- Assess Effects of the Project on Significant Resources
  - Using Section 106 criteria of adverse effects and CEQA impacts criteria and considering local impacts criteria, describe the direct or indirect effects of construction and operation to archaeological resources and to historic architectural resources in the APE and prepare a Finding of Effect Report. Lead agencies will make determinations of affect and provide them to SHPO for concurrence.
- Develop Project Agreement Documents to Resolve Adverse Effects
  - In consultation with the SHPO and other parties, develop feasible mitigation measures to reduce or eliminate adverse effects and develop draft agreement documents (PA or MOA) to resolve adverse effects.
- Coordinate Section 106 Findings with NEPA/CEQA Environmental Documents
  - After consultation to resolve adverse effects/significant impacts or simultaneously with consultation, coordinate results of Section 106 consultation with NEPA/CEQA process to that there mitigation measures are consistent for all regulations.
- Prepare and Implement Archaeological and Architectural Treatment Plans for Affected Resources
  - As attachments to the agreement document, prepare treatment plans to address the effects of the project on historic properties.

B. SIGNIFICANCE CRITERIA

Federal Criteria

According to the NEPA regulations, in considering whether an action may "significantly affect the quality of the human environment," an agency must consider, among other things the unique characteristics of the geographic area such as proximity to historic or cultural resources (40 CFR 1508.27(b)(3)), and the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)).

Under Section 106 of the NHPA, an impact occurs when a property that is eligible for NRHP is adversely affected. An adverse effect alters, directly or indirectly, the characteristics of a historic

property that qualify it for inclusion in or eligibility for the NRHP by diminishing the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association.

State Criteria

Section 21084.1 of the Public Resources Code provides that "[a] project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Substantial adverse change is defined as the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.

C. ENVIRONMENTAL CONSEQUENCES

Topic	Issues to Evaluate	Threshold of Significance
Prehistoric Archaeological Sites	Identify prehistoric archaeological sites (including impacts to human remains) and determine whether project will adversely effect them using state and federal criteria	An adverse effect or substantial adverse change occurs.
Historical Archaeological Sites	Identify historic archaeological sites (including impacts to human remains) and determine whether project will adversely effect them using state and federal criteria	An adverse effect or substantial adverse change occurs.
Historic Structures and Buildings	Identify historic structures and buildings and determine whether project will adversely effect them using state and federal criteria	An adverse effect or substantial adverse change occurs.
Ethnographic Resources	Identify ethnographic resources and determine whether project will adversely effect them using state and federal criteria	An adverse effect or substantial adverse change occurs.
Multi-Component Cultural Resources	Identify multicomponent cultural resources and determine whether project will adversely effect them using state and federal criteria	An adverse effect or substantial adverse change occurs.

D. MITIGATION

The Section Environmental Teams will:

- Review mitigation strategies described in the CEQA Findings of Fact (November 2005) and the Record of Decision (November 18, 2005) for the statewide EIR/EIS Program EIR/EIS and develop project-level measures consistent with strategies to avoid or minimize harm from air quality impacts. Also review the same documents for the Bay Area to Central Valley EIR/EIS.
- Draft an agreement document for the Authority and SHPO that identifies site-specific mitigation to be incorporated into project design to reduce impacts related to significant cultural resources.

E. CUMULATIVE

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). The following steps serve as guidelines for identifying and assessing cumulative impacts:

1. Determine if a cumulative impact analysis will be required for Cultural Resources.
   - Prior to conducting the analysis of the project, coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine if Cultural Resources will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis. This may result in more than one RSA per resource (e.g., for biology you may have more than one habitat or species RSA; for air quality you may have a CO impact with a small RSA or a basinwide RSA for other impacts). Do not make arbitrary decisions about the boundary of the RSA; you should be able to explain why the boundary was chosen based on environmental characteristics.
   - Submit RSA(s) to the Section Environmental Team Cumulative Lead.
3. Determine method for cumulative impact analysis.
   - Coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).
4. Determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).
   - The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future projects (such as for projects in the early planning stages or without a certified environmental document).
5. Describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
6. Identify cumulative impacts
   - Identify if there is a significant cumulative impact without the project.
   - Identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - Based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts described above for the proposed HST project, or on analysis of the project in relation to existing plans, assess the potential cumulative impacts and state whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).

7. Identify mitigation for significant cumulative impacts. Coordinate with the Section Environmental Team Cumulative Lead (also see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).
8. Document results.
   - Summarize the results of the cumulative impact analysis for Cultural Resources. This summary should include the identification of resources considered in the analysis, the RSA(s) for each resource, the conclusions concerning the health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact, and the conclusions of the analysis. The Section Environmental Team Cumulative Lead will describe the other reasonably foreseeable actions considered in the cumulative impact analysis as part of the Cumulative Impacts section of the EIR/EIS.

3.16.4 Products

A. ARCHAEOLOGICAL SURVEY REPORT, HISTORIC ARCHITECTURAL SURVEY REPORT, FINDING OF EFFECT REPORT, AGREEMENT DOCUMENT, TREATMENT PLANS

Compile technical reports that follow Section 106 guidance including an Archaeological Survey Report and the Historic Architectural Survey Report. Prepare a finding of Effect, mitigation agreement and treatment plan. The content of the technical reports will include (but are not limited to):

1. A summary of findings,
2. A description of the project and its alternatives,
3. Research methods,
4. An analysis of the baseline/affected environment (i.e., historic context/overview),
5. Methodology for analysis,
6. Types of historic properties,
7. Significance criteria,
8. Types of impacts to archaeological resources and to historic architectural properties (if any),
9. Mitigation measures (if necessary),
10. References, and
11. Preparer qualifications.

The team will prepare appropriate maps and figures and DPR forms to convey the survey data results and to show the extent of the undertaking.

B. PROJECT EIR/EIS

1. Section: Cultural Resources
2. Cumulative Impacts Section
3. Summary for EIR/EIS Executive Summary

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3.17 Cumulative Impacts

3.17.1 Introduction

See the Caltrans Cumulative Impact Assessment Guidance, which is applicable to non-highway projects: (http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm).

A. REGULATORY REQUIREMENTS

Federal Regulations

- National Environmental Policy Act (40 CFR, Sections 1500-1508)
- Executive Order 13274 Indirect and Cumulative Impacts

State Regulations

- California Environmental Quality Act Guidelines, Section 15130 and 15355

B. OTHER CONSIDERATIONS

- Local jurisdiction general plan policies, ordinances, and growth management plans

3.17.2 Methods of Cumulative Impact Analysis

1. Determine if a cumulative impact analysis will be required for specific resources.
   - Section Environmental Resource Specialists will coordinate with the Program Management Team and Section Environmental Team Cumulative Lead to determine what resources will be considered in the cumulative impact analysis. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis. Assume cumulative impact analysis will be required for any impacts even if these impacts are small or are mitigated to a less than significant level. Only resources with no or beneficial impacts (before or after mitigation) will not be required to be included in the cumulative impact analysis.
2. Determine method for cumulative impact analysis.
   - Section Environmental Resource Specialists will coordinate with the Section Environmental Team Cumulative Lead on the method of analysis (project list and/or plan). In general a project list approach will be taken in conducting the cumulative impact analysis, however for some topics a plan or combined approach may be necessary (e.g., air, transportation, and land use).

3.17.3 Resource Study Areas and Cumulative Projects/Growth Forecasts

A. DEFINITION OF RESOURCE STUDY AREA(S)

- There will be a separate study area for each resource (i.e. individual Resource Study Areas [RSAs]), rather than a single consolidated study area for all resources combined.
- Depending on the technical issue, the RSA for cumulative impacts analysis may be broader than the boundary used for analyzing the projects direct impacts.
- Section Environmental Resource Specialists will identify the RSA(s) as described in individual methods and coordinate with the Section Environmental Team Cumulative Lead in the identification of projects/plans for the RSA(s).

B. DEFINITION OF CUMULATIVE PROJECTS

1. Section Environmental Team Cumulative Lead will determine list of past, present, and reasonably foreseeable projects to include in the cumulative impact analysis (if using project list method) or appropriate plan(s) (if using plan method).

2. The Section Environmental Team Cumulative Lead will identify what projects or plans will be used in the analysis. If the analysis is to use a project list approach, the Section Environmental Team Cumulative Lead will provide the Resource Specialist with the database of information for those projects. In some cases the Section Environmental Team Cumulative Lead will coordinate with the Resource Specialists to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future impacts (such as for projects in the early planning stages or without a certified environmental document).

   - Sources of information: Regional Transportation Plan (RTP); Regional Transportation Improvement Plan (RTIP); local long-range transportation plan or other local land use plans, general plans, specific plans, conversations/ interviews with local and regional planning agencies; and recent environmental documents for other large-scale project near stations and corridor alternatives.

3. Describe projects included in the list for cumulative analysis (major development projects, major infrastructure projects, highway, transit, airport, rail improvements, projects in the RTP, etc.)

   - Project descriptions (location, size, implementation dates, etc.)
   - Reference sources (environmental documents, etc., from which data is obtained to include in cumulative analysis.
   - Explain any projects that are not being included and why.

4. Following Council of Environmental Quality (CEQ) Guidelines, identify other current and reasonably foreseeable future actions or projects and their associated environmental impacts. Reasonable foreseeable future projects are those that are likely to occur in the future and will add to the cumulative impact on a particular resource. Generally, projects will be considered "reasonably foreseeable" if they:

   - Have applications pending with a government agency
   - Are included in an agency's budget or capital improvement program
   - Are foreseeable future phases of existing projects
   - Occur within 20 years of operation of the project.

5. Coordinate with local land use agencies and officials, including the review of adopted plans and similar documents to identify reasonable foreseeable project.

   - Survey and consult with local landowners, developers, real estate agencies, or other individuals with special expertise within the proximity of the project study area.

3.17.4 Analysis of Cumulative Impacts

The Section Environmental Team Cumulative Lead will use the information developed by the Section Environmental Resource Specialists for each resource section: health and historical context of understanding the resource; the proposed project impacts that might contribute to a cumulative impact by alternative, and the conclusions of the analysis. Mitigation measures will be reviewed and developed with the Section Environmental Team Cumulative Lead.

1. Section Environmental Resource Specialists will describe the current health and the historical context of each resource (see http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm). This will be provided to the Section Environmental Team Cumulative Lead.
2. Identify cumulative impacts
   - The Section Environmental Resource Specialist will provide the impact analysis to the Section Environmental Team Cumulative Lead.
   - The Section Environmental Resource Specialist will identify if there is a significant cumulative impact without the project for their resource(s).
   - The Section Environmental Resource Specialist will identify the direct and indirect impacts of the proposed HST project that might contribute to a cumulative impact on the identified resources (this is information that should come from the impact analysis of the proposed HST project). The Resource Specialist will determine if the project contributes to an existing significant cumulative impact – or – result in a new cumulative impact when the project's impacts are added to the previously less than significant impacts of the other projects (i.e., one that tips the scales from less than significant to significant cumulative impact).
   - The Section Environmental Resource Specialist will assess the potential cumulative impacts based on the list of past, present, and reasonably foreseeable projects and the impacts of those projects and the direct and indirect impacts for each resource, or on analysis of the project in relation to existing plans. State whether the project's contribution to a cumulative impact is "cumulatively considerable" as defined in Guidelines 15065(a)(3).
3. Identify mitigation measures for cumulative impacts.
   - The Section Environmental Resource Specialist will coordinate with the Section Environmental Team Cumulative Lead in identifying mitigation for significant cumulative impacts. Detailed discussions of mitigation measures in the EIR/EIS should be referenced and appropriately summarized.

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4.0 Section 4(f) and Section 6(f) Evaluations

Section 4(f) and Section 6(f) evaluations are requirements of the Department of Transportation Act of 1966 and Land and Water Conservation Fund Act of 1965 respectively. The Program EIR/EIS included a broad and general Section 4(f)/6(f) section. Each project EIR/EIS will identify all the Section 4(f) and 6(f) resources in the corridor (based on the Cultural Resources, Parks, and Land Use sections of the environmental document), and the Section Environmental Teams will complete detailed Section 4(f) evaluations and initiate the process for securing any needed Section 6(f) conversion approvals. In addition, the analysis will describe prior and on-going efforts to avoid Section 4(f) and Section 6(f) resources.

4.0.1 Introduction and Overview

A. REGULATORY REQUIREMENTS

- Define regulatory framework: DOT Act 49 U.S.C. 303(c) and Section 1653(f)

Federal Regulations

- Section 4(f)—Describe Section 4(f) of the Department of Transportation Act of 1966 and the Section 4(f) evaluation process; and amended legislation at Section 138 of Title 23 and Section 303 of Title 49 to include "de Minimis" Impacts.
- Section 6(f)— Describe Section 6(f) of the Land and Water Conservation Fund Act of 1965 and the Describe the Section 6(f) requirements

4.0.2 Identify Section 4(f) Properties and Section 6(f) Properties

A. DEFINITION OF STUDY AREA

Required Information	Study Area
▪ Conceptual engineering plans and profiles and project description ▪ Cultural resources identification (National Register eligible/listed historic property resources) ▪ Public Parks/Recreation resources ▪ Wildlife Refuges ▪ Noise/Vibration impacts to parks and historic resources/ mitigation ▪ Visual impacts/mitigation ▪ Potential temporary construction easements ▪ Access to stations, maintenance yards, facilities	▪ Study area is 1,000 feet on either side of the right-of-way and in a radius around the station ▪ Conceptual engineering plans and profiles and temporary easements for the HST alternatives. ▪ Noise and Visual resource study areas ▪ Refer to the Community Facilities and Services, Cultural Resources, Aesthetics and Visual Quality, and Noise and Vibration sections of the EIR/EIS.

B. METHODOLOGY

- Review information on Section 4(f) and Section 6(f) properties contained in the Program EIR/EIS, ROD and CEQA Findings
- Follow U.S. DOT guidance for preparing Section 4(f) and 6(f) analysis and documentation. http://environment.fhwa.dot.gov/projdev/impTA6640.asp#f4
- Review the Section 4(f) Policy Paper, Office of Planning, Environment and Realty, Project Development and Environmental Review (March 2005). http://environment.fhwa.dot.gov/projdev/4fpolicy.asp

- Identify Section 4(f) resources within the study area and determine if Section 6(f) of the Land and Water Conservation Fund Act (L&WCF) applies to any resources by checking the list of grants through the National Park Service and through interviews with the park authority/owner having jurisdiction over the property.
- List the Section 4(f) and Section 6(f) resources within the study corridor [include federal, state, regional and local]: public parks, recreation areas, or wildlife and waterfowl refuges, historic properties listed on or eligible for inclusion on the National Register of Historic Places (include only archaeological sites that warrant preservation in place). Create a table listing the following characteristics: location, current ownership, L&WCF Application, National Register status, current uses and values.
- Cross-Reference all sections of the EIR/EIS that describe the resources.
- If resources potentially used[1] by any alternative under consideration are not described in other sections, the following information should be provided (see also *de minimis* below):
  - A detailed map or drawing of sufficient scale to identify the relationship of the alternatives to the Section 4(f) property.
  - Size (acres or square feet) and location (maps or other exhibits such as photographs) of the affected Section 4(f) property.
  - Ownership (city, county, State, etc.) and type of Section 4(f) property (park, recreation, historic, etc.).
  - Function of or available activities on the property (hiking, pedestrian trails, ball playing, swimming, golfing, etc.).
  - Description and location of all existing and planned facilities (ball diamonds, tennis courts, etc.).
  - Access (pedestrian, vehicular) and usage (approximate number of annual users/visitors, etc.).
  - Applicable clauses affecting the ownership, such as lease, easement, covenants, restrictions, or conditions, including forfeiture.

4.0.3 Impact Analysis and Mitigation Strategies on Section 4(f)/Section 6(f) Properties

A. METHODOLOGY FOR IMPACT ANALYSIS

- Determine if any 4(f) or 6(f) resources would be used by a project alternative.
- Determine if each use is *de minimis*[2]. If the project would have a *de minimis* impact on a Section 4(f) resource, state that in the appropriate section of the EIR/EIS where the resources are discussed and reference this discussion in the Section 4(f).

[1] Use occurs when 1) the property is acquired for a transportation project, 2) there is an occupancy of land that is adverse to the preservationist purpose of Section 4(f), or 3) there is (are) proximity impact(s) that substantially impair the purpose of the land (constructive use). An example of constructive use would be excessive noise near an amphitheater. NOTE: Consult with FRA, early to determine whether constructive use may be an issue. For the purposes of Section 4(f), temporary construction easements do not normally constitute "use." See 23 CFR 771.135(p)(7) and http://www.fhwa.dot.gov/environment/4f_apps/22.htm.

[2] *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not adversely affect the activities, features, and attributes of the 4(f) resource. The *de minimis* finding considers avoidance, minimization, compensation or enhancement measures. The official(s) with jurisdiction over the property must provide written concurrence. *De minimis* impacts on historic sites are defined as the determination of either "no adverse effect" or "no historic properties impacted" in compliance with Section 106 regulations, including SHPO's written concurrence, and ACHP's written concurrence, when applicable. FRA will make the final determination on the *de minimis* finding.

- Discuss the use of the Section 4(f)/Section 6(f)[3] each property: amount of land to be used, facilities and functions affected, noise, visual, etc.
- Where anticipated proximity effects raise an issue of constructive use of a Section 4(f) property, coordinate with Program Management team and with FRA to determine if Section 4(f) applies. In these cases, the EIR/EIS should contain sufficient analysis and information to demonstrate that the resource(s) is/is not substantially impaired.
- For EIR/EISs where a use of Section 4(f) property is anticipated, prepare a summary table comparing the impacts of the project alternatives. Those impacts that can be quantified should be quantified while others should be described.

4.0.4 Avoidance Alternatives

A. METHODOLOGY FOR AVOIDANCE ALTERNATIVES

- When a use of Section 4(f) property is anticipated, identify and evaluate location and design alternatives that would minimize impacts or avoid the Section 4(f)/6(f) resources.
- Where an alternative would use land from more than one Section 4(f) property, the analysis needs to evaluate alternatives which avoid each and all properties (23 CFR 771.135(i)).
- The design alternatives should be in the immediate area of the property and consider minor alignment shifts, a reduced facility, retaining structures, noise walls, etc. individually or in combination, as appropriate.
- Referenced the detailed descriptions of project alternatives already described in the EIR/EIS. For alternatives that avoid Section 4(f) resources but have been eliminated from detailed study a discussion shall be provided as to whether these alternatives are feasible and prudent and, if not, the reasons why.
- Section Environmental Team will need to work with the Section Engineering Team to identify avoidance alternatives and design these to a level that is sufficient for impact analysis; need to describe reasons why some alternatives are not feasible or prudent. Also, if Section 6(f) property is required, identify replacement property which must be of at least equal value, must be of reasonably equivalent usefulness and location to that be converted, and meet the eligibility requirements for L&WCF assisted acquisition.

4.0.5 Measures to Minimize Harm

A. METHODOLOGY FOR MEASURES TO MINIMIZE HARM

Discuss all feasible measures to minimize the impacts of the proposed action on the Section 4(f) property(ies). Detailed discussions of mitigation measures in the EIR/EIS should be referenced and appropriately summarized. If the potential impacts been reduced to a "de Minimus" level and the responsible agency concurs (owner-manager for parkland; SHPO for historic resources), this is reported in the Project EIS/EIR and the Section 4(f) process is complete. No further approval is necessary.

Coordination with Public Agencies and Property Owners Regarding Section 4(f) Properties Discuss the results of preliminary coordination with the public official having jurisdiction over the Section 4(f) property and with regional (or local) offices of DOI and, as appropriate, the Regional Office of National Park Service and the Forest Supervisor of the affected National Forest. Generally, the

[3] Section 6(f) prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the National Park Service. If L&WCF funds were used for acquisition or improvement, certain requirements must be met before the land can be acquired (see Avoidance Alternatives).

coordination should include discussion of avoidance alternatives, impacts to the property, and measures to minimize harm. In addition, the coordination with the public official having jurisdiction should include, where necessary, a discussion of significance and primary use of the property.

Where Section 6(f) land is involved, summarize the National Park Service's position on land transfers and include a copy of the NPS letter.

B. FOR FINAL SECTION 4(F) EVALUATION

When the preferred alternative uses Section 4(f) land, the final Section 4(f) evaluation must contain (23 CFR 771.135(i) and (j)):

- Information from the draft evaluation.
- A discussion of the basis for concluding that there are no feasible and prudent alternatives to the use of the Section 4(f) land. The supporting information must demonstrate that "there are unique problems or unusual factors involved in the use of alternatives that avoid these properties or that the cost, social, economic, and environmental impacts, or community disruption resulting from such alternatives reach extraordinary magnitudes" (23 CFR 771.135(a)(2)). This language should appear in the document together with the supporting information.
- A discussion of the basis for concluding that the proposed action includes all possible planning to minimize harm to the Section 4(f) property. When there are no feasible and prudent alternatives that avoid the use of Section 4(f) land, the final Section 4(f) evaluation must demonstrate that the preferred alternative is a feasible and prudent alternative with the least harm on the Section 4(f) resources after considering mitigation to the Section 4(f) resources.
- A summary of the appropriate formal coordination with the Headquarters Offices of DOI (and/or appropriate agency under that Department) and, as appropriate, the involved offices of USDA and HUD.
- Copies of all formal coordination comments and a summary of other relevant Section 4(f) comments received an analysis and response to any questions raised. Where new alternatives or modifications to existing alternatives are identified and will not be given further consideration, the basis for dismissing these alternatives should be provided and supported by factual information. Where Section 6(f) land is involved, the NPS's position on the land transfer should be documented.
- Add concluding statement: "Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the (identify Section 4(f) property) and the proposed action includes all possible planning to minimize harm to the (Section 4(f) property) resulting from such use."

APPENDIX A

2005 CEQA FINDINGS OF FACT

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CALIFORNIA ENVIRONMENTAL QUALITY ACT

FINDINGS OF FACT

and

STATEMENT OF OVERRIDING CONSIDERATIONS

for the

CALIFORNIA HIGH-SPEED TRAIN SYSTEM

California High-Speed Rail Authority

November 2005

Adopted by Resolution No. 05-01

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I.
INTRODUCTION

The California High-Speed Rail Authority (the "Authority") and the Federal Railroad Administration (the "FRA") prepared a joint programmatic environmental impact report/environmental impact statement ("EIR/EIS") to analyze the impacts of approving a high-speed train system ("HST" system) for California. As a joint document, the EIR/EIS was prepared in compliance with both the California Environmental Quality Act ("CEQA") and the National Environmental Policy Act ("NEPA"). The Authority is the State lead agency for purposes of compliance with CEQA and these findings fulfill the Authority's responsibilities in considering the Final EIR/EIS as an EIR for purposes of CEQA.

CEQA provides that no public agency shall approve a project or program as proposed, if it would result in significant environmental effects as identified in an EIR, but must instead adopt and incorporate feasible mitigation to avoid and reduce such effects and adopt appropriate findings. In section 21081 of the Public Resources Code, CEQA provides as follows:

> Pursuant to the policy stated in Sections 21002 and 21002.1, no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur:
>
> (a) The public agency makes one or more of the following findings with respect to each significant effect:
>
> (1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
>
> (2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
>
> (3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the environmental impact report.
>
> (b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

These findings include a description of the proposed HST system being approved, an explanation of the programmatic nature of this EIR/EIS, findings concerning potentially significant

environmental impacts and mitigation strategies to address such impacts, a discussion of cumulative and growth-inducing impacts, and a statement of overriding considerations.

II.
PROJECT DESCRIPTION

Background

A series of planning and feasibility studies, as well as the Authority's Business Plan, which was adopted in 2000, were prepared in California before the Authority and the FRA began the preparation of the Program EIR/EIS for a proposed California high speed train (HST) system. These previous studies and the Authority's Business Plan informed the description of the proposed HST system for study in the Program EIR/EIS. The Authority was authorized and formed in 1996, pursuant to legislation making it responsible for the planning, construction and operation of a high speed passenger train service/network for California which is integrated with the state's existing transit and rail network, and authorizing it to, among other things, select a high speed rail system, as well as proposed routes and proposed station sites. (Pub. Utilities Code, §§ 185030, 185032, 185034.) "High speed rail" is defined by statute to mean "intercity passenger rail service that utilizes and alignment and technology that makes it capable of sustained speeds of 200 miles per hour or greater." (Pub. Utilities Code, § 185012(c).)

The Authority's Business Plan describes an economically viable HST system for California, envisioning a system over 700-miles long with electrically propelled trains capable of speeds in excess of 200 mph (322 kph) on a mostly dedicated system of fully grade-separated, access-controlled tracks and with state-of-the-art safety, signaling, communication and automated train control systems. The system would connect and serve the major metropolitan areas of California, and would significantly increase the state's transportation capacity, carrying a projected minimum of 42 million passengers annually. The Business Plan recommended corridors, comprised of routes, potential alignments and potential station locations for further study. Having examined existing transportation facilities for intercity travel, state and local plans, the state's future intercity transportation needs, and the financial feasibility of a proposed HST system, the Authority's Business Plan concluded that a high speed train system would be a smart investment for California.

Proposed HST System

At the beginning of the EIR/EIS process, in order to describe a proposed HST system and alternatives for analysis in the EIR/EIS, the Authority and FRA reviewed previous studies and considered the purpose and need (for NEPA) and the project objectives (for CEQA). The purpose and primary objective of the proposed HST system is to provide a reliable mode of travel that links the major metropolitan areas of the state and delivers predictable and consistent travel times. A further purpose and objective of the system is to provide an interface with commercial airports, public transit services, and the highway network and relieve capacity constraints of the existing transportation network as increases in intercity travel demand in

California occurs, in a manner sensitive to and protective of California's unique natural resources.

To implement the Legislature's direction that a proposed HST system be coordinated with the state's existing transportation network, and to further describe a proposed HST system that would be economically viable, the Authority adopted policies and objectives for the HST system, which are listed in the Final Program EIR/EIS [1-4] and include among them the following:

- maximize intermodal transportation opportunities
- preserve environmental quality by reducing emission and VMT [vehicle miles traveled] for intercity trips
- maximize use of existing transportation corridors and rights-of-way, as feasible
- meet a portion of intercity travel demand; increase capacity for intercity mobility
- develop a practical and economically viable transportation system that can be implemented in phases by the year 2020

The Authority also set forth performance criteria for the proposed HST system that would meet the time and service quality goals necessary for an economically viable system and consistent with the Legislature's definition of a high speed rail service. To further guide the definition of HST system corridors, additional engineering criteria and parameters were described for the proposed HST system analyzed in the Program EIR/EIS. These criteria include general design parameters and requirements for shared use corridors, that is locations where the proposed HST service may share infrastructure with non-HST services. The Authority also set forth criteria for tunnels within the HST system, which would chiefly be within the northern or southern mountain crossing corridors, and criteria for potential intermediate and terminus station sites.

Preferred Program Alternative - HST System

The following HST system description is programmatic in nature and provides a broad planning and conceptual outline of the proposed train system. These findings provide a brief description of the component parts of the proposed HST system and the corridors for its location, which is based on the detailed information contained in the Final EIR/EIS and other reports included or referenced in the Final EIR/EIS.

The proposed HST system is a system over 700-miles long with electric propulsion and steel-wheeled trains capable of speeds in excess of 200 mph (322 kph) on a mostly dedicated system of fully grade-separated, access-controlled steel tracks and with state-of-the-art safety, signaling, communication and automated train control systems. The preferred corridors of the proposed HST system are largely within or adjacent to existing transportation facilities or rights of way. These corridors connect and serve the state's major metropolitan areas, and provide linkage with public transit services and the state's major commercial airports using multi-modal hub stations. The preferred HST system includes shared use corridors on the San Francisco Peninsula (Caltrain) and in southern California from Union Station in Los Angeles to Anaheim and Irvine. The preferred HST system also includes design practices to minimize impacts to resources, HST station development principles to foster smart growth, increase land use efficiency and minimize impacts to resources, and mitigation strategies to avoid and reduce environmental impacts. These practices, strategies and policies are described below in the discussion of impacts to resources.

The basic physical components of the proposed system include the trains and various structures. The trains are considered to include trainsets, communications, signal and train control systems. The various structures that will make up part of the HST system include tracks and supporting structures, HST stations, and the electrical power system and facilities. These features may be briefly described as follows:

- Tracks and supporting structures include steel tracks for an HST system over 700 miles long, aerial structures and tunnels, grade separation and access-control features (fences, berms, signals, etc.)

- The electric propulsion and distribution system consisting of a 2x25KV overhead catenary system of poles and wires, as well as electric supply and booster stations

- HST multi-modal stations, intermediate and terminus, at thirty identified potential locations, that will generally include platforms, passenger facilities, baggage facilities, connections with public transit services, parking, and landscaping

- Cleaning, maintenance and storage facilities for the trains, at locations generally identified as facilities for light cleaning and maintenance located near termini in northern and southern California and facilities for heavy cleaning and maintenance located in the Central Valley.

The corridors proposed for the location of the preferred HST system are areas containing proposed alignments and identified potential multi-modal station sites. The corridors are conceptually described and represent routes for an over 700-mile long system providing for high-speed intercity passenger rail service between the major metropolitan areas of Sacramento and the San Francisco Bay Area in Northern California, through the Central Valley, to the Los Angeles area and Orange County and to San Diego via the Inland Empire. The preferred

alignment and station locations are described briefly in the Summary in the Final Program EIR/EIS (section S.7) and depicted in the Final Program EIR/EIS.

The preferred alignment and station locations are described in detail in Chapter 6A of the Final Program EIR/EIS and can be briefly described by reference to five regional segments of the HST system as described below. All the potential HST stations would be multi-modal transportation hubs.

Bay Area to Merced:

San Francisco to San Jose: Caltrain Corridor with potential stations at Transbay Terminal as the northern terminus, Millbrae to connect to SFO, and either Redwood City or Palo Alto.

Oakland to San Jose: Hayward Line railroad right-of-way to Interstate Highway I-880 with potential stations at a northern terminus in downtown Oakland, at the Coliseum Bay Area Rapid Transit (BART) station, Union City station in Alameda County, and a downtown San Jose terminus at Diridon Station.

San Jose to Merced (Northern Mountain Crossing): A broad corridor containing a number of feasible route options has been identified for further study. The corridor is roughly bounded by (and includes) the Pacheco Pass (SR 152) to the south, the Altamont Pass (I-580) to the north, the BNSF rail corridor to the east and the Caltrain rail corridor to the west, excluding alignment options through Henry Coe State Park and station options at Los Banos. The future additional study will also further consider the above Bay Area to Merced alignment and station locations.

Sacramento to Bakersfield:

Sacramento to Stockton: Union Pacific or California Traction (CCT) alignment option with potential stations at Downtown Sacramento and Downtown Stockton.

Stockton to Merced: Burlington Northern Santa Fe (BNSF) alignment option with potential stations at Modesto (Amtrak Briggsmore) and Merced (Castle Air Force Base or Downtown Merced.

Merced to Fresno: BNSF alignment with a potential station at Downtown Fresno.

Fresno to Bakersfield: BNSF alignment option with a potential station at Downtown Bakersfield (Truxton), an additional study of an alignment option to serve a potential Visalia station.

Bakersfield to Los Angeles (Southern Mountain Crossing):

Bakersfield to Sylmar: SR 58/Soledad Canyon Corridor (Antelope Valley) with a potential station at Palmdale and at the Sylmar Metrolink station.

Sylmar to Los Angeles: MTA/Metrolink is the preferred option between Sylmar and Los Angeles with a potential station at Burbank Metrolink Media City station in downtown Burbank and at Los Angeles Union Station (LAUS), in downtown Los Angeles. The MTA/Metrolink between Burbank and Los Angeles refers to a relatively wide corridor within which alignment variations will be studied at the project level.

Los Angeles to San Diego via the Inland Empire:

Los Angeles to March Air Reserve Base: UPRR Riverside/UPRR Colton Line alignment with potential stations at East San Gabriel Valley (City of Industry), Ontario Airport, and Riverside (UC Riverside).

March Air Reserve Base to Mira Mesa: I-215/I-15 alignment with potential stations at Temecula Valley (Murrieta) and Escondido.

Mira Mesa to San Diego: Carroll Canyon or Miramar Road alignment option with potential stations at University City and Downtown San Diego (Santa Fe Depot).

Los Angeles to Orange County:

Los Angeles to Anaheim/Irvine: Los Angeles to San Diego rail corridor (LOSSAN) to Anaheim/Irvine with potential stations at Norwalk, Anaheim Transportation Center, and Irvine Transportation Center.

III.
PROGRAMMATIC EIR/EIS

The Programmatic Nature of the Environmental Impact Report for the proposed California High-Speed Train System

In legislation creating the California High-Speed Rail Authority, the Legislature made a finding that it in order to have a comprehensive network of high-speed intercity rail by the year 2020, it was necessary to prepare a high-speed intercity rail plan similar to California's former freeway plan. The Authority, in consultation with the Federal Railroad Administration (FRA), determined that the appropriate initial CEQA document for the proposed HST system would be a programmatic EIR/EIS, considering the comprehensive nature and scope of the HST system, and the conceptual stage of planning and decision-making. The programmatic level of environmental review would allow for the broadest disclosure of impacts, and improve the opportunity for the Authority and the public to consider alternatives to an HST system, and different conceptually defined corridors and station options. Identifying and analyzing a proposed HST system at the very early conceptual planning stage also provides the Authority with the best opportunity to develop design practices and mitigation strategies to avoid and minimize identified impacts. (CEQA Guidelines, § 15168, subd. (b).) This Programmatic EIR/EIS, or "program EIR" as used in CEQA, will be used to tier more detailed environmental documents to assess site-specific impacts of reasonable and foreseeable alignment and station options in segments of the system that are ready for implementation.

The degree of specificity required in an EIR corresponds to the degree of specificity involved in the underlying activity that is described in the EIR. "An EIR on a project such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan should focus on the secondary effects that can be expected to follow from the adoption, or amendment, but the EIR need not be as detailed as an EIR on the specific construction projects that might follow." (CEQA Guidelines, § 15146; see also *Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351, 371.)

Based on the direction in the CEQA Guidelines, this Program EIR presents information at a broad planning level of detail. The overall and long-term environmental consequences of building and operating the HST system over the next 20-year time span are described. The analysis of environmental effects at a generalized level provides the Authority with sufficient information to make the basic policy decisions being considered:

(1) whether to continue to pursue an HST system (as described in section II)

(2) which of the conceptual corridors, alignments, and stations options evaluated in the EIR/EIS can be eliminated from further consideration, and which will be studied further in tiered EIRs.

In particular, the programmatic EIR/EIS is useful because it allows the Authority to address the broad environmental consequences associated with a determination of whether to proceed with

an HST system or not, prior to engaging in more detailed, and expensive, environmental analysis for segments of the HST system and addressing particular locations with specificity.

The *alternatives* examined in the EIR/EIS represent basic approaches to intercity travel to relieve increasing congestion and capacity constraints. Included within each of these alternatives are a multitude of potential activities for which details are not yet known, and about which individual decisions remain to be made. The detailed impacts analysis necessary to make decisions about future site-specific actions to implement the HST System Alternative will be provided in tiered environmental documents.

The *thresholds of significance* for most of the environmental resources discussed in the EIR/EIS impacts analysis are based on the CEQA Appendix G Environmental Checklist questions and are described in qualitative terms. The thresholds are intended to identify potentially significant impacts at a programmatic level. For future analyses, the measure of significance will vary depending on the nature and type of the proposed action, the site characteristics where the actions take place, and how they affect the existing conditions at the time of the proposed actions.

The programmatic *impacts analysis* focuses on the potential direct and indirect impacts associated with building and operating an HST system along the conceptual corridors discussed in the EIR. The anticipated environmental impacts are identified based on methodologies specific to the particular resource area. Information sources included existing data and studies, such as GIS maps and data bases. No field studies were performed for this program-level analysis beyond limited site visits, and the buffer area used for the analysis was many times larger than the actual right-of-way in most instances. (See EIR, p. 7-2.)

Because this program-level EIR/EIS does not assess the impacts of future actions to implement an HST system at specific locations, it cannot predict with certainty which impacts will occur and which more detailed project-specific mitigation measures will be appropriate for mitigating those impacts. Consequently, the EIR/EIS identifies *mitigation strategies*, which are an array of actions that can be used to avoid or minimize the types of environmental impacts anticipated as a result of implementation of the HST system. These mitigation strategies provide the basis to tailor more specific mitigation measures that can be applied to and refined for specific projects, and for purposes of CEQA, they serve as mitigation measures at a programmatic level. The Authority's expectation is that these mitigation strategies are, and will be, adequate to address the identified environmental impacts. In some areas additional measures were suggested by comments, and although they may not have been adopted at the program level, they will be further considered at the project level. Some mitigation strategies may cause other adverse environmental impacts at the same time that they mitigate impacts addressed in this Program EIR/EIS. At this programmatic level of analysis, it is impractical to analyze the specific impacts of mitigation measures or the measures that may be needed to mitigate those secondary impacts. During review of site-specific project proposals, the additional impacts created by the application of mitigation strategies, if any, will be analyzed, and further measures added as necessary to avoid or reduce those impacts.

This Program EIR/EIS is structured to be used as a tiering document. Individual environmental reviews of second-tier projects to implement the HST system can incorporate by reference and use relevant provisions of the Program EIR/EIS as a basis from which to supplement this analysis and refine the level of detail. Tiering will assist the Authority in focusing on issues that are ripe for decision at each stage of environmental review and to exclude from consideration issues that have already been decided or that are not ready for decision. Second-tier documents will be prepared to concentrate on issues specific to the individual project being implemented and site(s) chosen for the action before construction can be initiated. The environmental review and initial studies for site-specific, second-tier projects can incorporate by reference the discussions in the program EIR, and "concentrate on the environmental effects which (a) are capable of being mitigated, or (b) were not analyzed as significant effects on the environment in the prior environmental impact report." (Pub. Resources Code Section 21068.5)

At the project-level of environmental review, the Authority will assess the site characteristics, size, nature, and timing of proposed actions to determine whether the impacts of the specific projects are potentially significant or can be avoided or mitigated to a less-than significant level. However, since it is not possible to precisely assess the site-specific impacts or precisely measure the potential for mitigation to avoid or reduce project-level impacts as part of this programmatic analysis, and due to this uncertainty the Program EIR/EIS treats some of these impacts as potentially significant at a programmatic level. Where it is anticipated that feasible mitigation measures may not be available to avoid or reduce these impacts to a less-than-significant level, based on currently available information, this Program EIR/EIS document treats these impacts at the programmatic level as potentially significant and unavoidable, even where this conclusion is not certain. Future review in tiered environmental documents will be needed to determine the impacts of specific actions and appropriate mitigation for site-specific actions.

Where a second-tier project involves impacts that are addressed in the Program EIR/EIS, the Authority will use the mitigation strategies adopted in these findings as a basis to formulate project-level mitigation measures and enforcement programs. Because all the potential actions and impacts for tiered projects to implement an HST system cannot be anticipated at a programmatic level, the Authority will select those strategies applicable to the impacts associated with the specific location and type of action and refine them into mitigation measures. In addition, the Authority will add additional mitigation measures as necessary, and will monitor the effectiveness of mitigation used for second-tier projects.

IV.
FINDINGS ON SPECIFIC IMPACTS AND MITIGATION STRATEGIES

Chapter 3 of the Program EIR/EIS sets forth the environmental effects of the HST Alternative that would be potentially significant or significant in the absence of mitigation strategies. These impacts are set forth below, along with mitigation strategies that the Authority adopts, that will avoid or substantially lessen those potentially significant or significant impacts. As environmental studies for actual project implementation go forward, these mitigation strategies will be refined into actual mitigation measures. These findings recognize that the strategies are not an exclusive list of mitigation, and that additional mitigation measures may be added at the project-level. In addition, as mitigation is developed at the project-level, some mitigation included herein as programmatic mitigation strategies may be found to be the responsibility of other public agencies instead of, or in addition to, the Authority.

Also set forth in these findings are those impacts that the Authority finds cannot with certainty be avoided or reduced to a less-than-significant level even with the adoption of all feasible mitigation strategies proposed in this EIR. In adopting these findings and mitigation strategies, the Authority also adopts a Statement of Overriding Considerations setting forth the economic, social, and other benefits of the HST Alternative that will render these impacts acceptable.

The Authority is not required to make findings or adopt mitigation strategies or policies as part of this decision for impacts that are less than significant. For some resource areas, however, the Authority is choosing to include findings to provide context and rationale about the less-than-significant impact conclusion at the programmatic level. In addition, while the Program EIR/EIS includes a discussion of certain issues necessary to satisfy the National Environmental Policy Act, these issues do not necessarily represent environmental impacts for which findings are required under CEQA. The Authority has determined that the following areas discussed in the Program EIR/EIS do not require findings:

- travel considerations
- mineral resources
- movement of goods
- emergency access

Additionally, the following listed areas are discussed in the findings to provide additional information and context, although the Authority has concluded that these impacts will be less than significant even without the adoption of mitigation strategies:

- public transit
- parking
- EMI/EMF
- public utilities
- severance impacts to agricultural lands

3.1 Traffic and Circulation

Impact 1. Traffic and Circulation

The HST system would add capacity to the state's transportation infrastructure which would result in a volume to capacity ratio improvement (V/C) and would relieve congestion on certain intercity highways linking major metropolitan areas of the state to the extent that trips taken by HST would otherwise have used highways. By providing another mode of intercity travel in California the HST would also improve reliability and increase mobility within the state's transportation system as a whole. The HST system would result in traffic improvement in areas where grade separation for the HST system would replace an at-grade crossing which was responsible for periodic local traffic delays.

Despite some expected improvement in highway conditions in areas to be served by the HST system, the level of service (LOS) on local roadways in many of these areas is currently poor (ratios of more than 1.0 on average for each of the five regions) and would remain so even with the HST system. The operation of the HST system would result in increased traffic around HST station locations and increased congestion on highway and roadway segments which would provide access to stations.

The construction of the HST system would result in short-term impacts of increased traffic in areas affected by the construction process for the duration of the construction in that area. In a few areas the HST system would result in closure, either temporary or permanent, of local roadways, that in turn would result in increased traffic on nearby roads and longer travel routes for some travelers.

The Authority finds that the localized increases in traffic and congestion near HST station areas and during construction are significant at the programmatic level of analysis. The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Require that HST system stations serve as multi-modal transportation hubs providing easy connection to local/regional bus, rail and transit services, as well as providing bicycle and pedestrian access.
2. Require the HST system to be grade-separated from all roadways to allow vehicular traffic to flow without impediment from the HST system.
3. Work with local and regional agencies to develop and implement transit-oriented development strategies, as described in chapter 6B, around HST stations.
4. Work with local and regional agencies to identify, plan, coordinate, and implement traffic flow improvements around HST station locations during project-level planning. Such improvements may include:
    a. a construction phasing and traffic management plan for construction periods

b. improving capacity of local streets with upgrades in geometrics such as providing standards roadway lane widths, traffic controls, bicycle lanes, shoulders and sidewalks
c. modifications at intersections, such as signalization and/or capacity improvements (widening for additional left-turn and/or through lanes), and turn prohibitions
d. signal coordination and optimization (including retiming and rephasing)
e. designation of one-way street patterns near some station locations
f. truck route designations
g. coordination with Caltrans regarding nearby highway facilities

5. Work with public transportation providers to coordinate services and to increase service and/or add routes, as necessary, to serve the HST station areas.

6. Avoid parking impacts by developing and coordinating implementation at the project-level of parking improvement strategies consistent with local policies, including shared parking, off-site parking with shuttles, parking and curbside use restrictions, parking permit plans for neighborhoods near HST stations, and other parking management strategies.

The Authority finds that the foregoing strategies will reduce this impact to a less-than-significant level, although the specific measures to be applied at each location are to be determined at the project-level for areas expected to experience traffic congestion due to the HST system and are to be implemented in coordination with local and regional land use and transportation authorities, and in consultation with Caltrans as appropriate.

Impact 2. Transit/Public Transportation

The EIR's treatment of traffic impacts included analysis of public transportation services in the vicinity of proposed HST system station locations and concluded that the proposed HST system would not result in adverse impacts on public transportation services. HST stations would be multi-modal hubs which would provide for connectivity with other services. The HSRA will consult and coordinate with public transit service providers regarding feeder services to HST stations during project-level studies.

The Authority finds this impact less than significant viewed on a system-wide basis. The Authority intends to work with public transportation providers to provide coordination of services so as to enhance use of such services along with use of the HST system.

Impact 3. Parking

The EIR analysis of traffic included consideration of parking near the locations of proposed HST stations. HST stations are assumed to include parking at a level consistent with local plans and policies and adequate for the increment of parking demand attributable to HST service at a multi-modal hub, also taking into account conditions at specific locations during project-level studies.

Coordination and integration of the HST system with public transportation services will reduce demand for parking, and result in shared parking in some areas for public transportation services.

The Authority finds this impact less than significant viewed on a system-wide basis. During project-level studies, environmental analyses will provide more detailed review of parking demand and parking to be included with proposed HST stations, plus identify coordination needed with local/regional public transportation providers. To assure parking impacts will be avoided the Authority will develop and coordinate implementation at the project level of parking improvement strategies consistent with local policies, including share parking, off-site parking with shuttles, and parking and curbside use restrictions parking permit plans for neighborhoods near HST stations. (See Traffic and Circulation, Impact 1, mitigation strategies, 6.).

3.3 Air Quality

Impact 1. Localized Air Quality Impacts due to Congestion/Traffic near HST Stations

The HST system would result in air quality improvement across the state in areas served by the HST system. The use of the HST system by passengers who would otherwise drive results in a reduction of vehicle miles traveled and thus, a reduction in air pollution generated by automobile combustion engines. The HST system would be powered by electricity which is expected to be provided by the state's electrical grid. Taking into account both reductions in vehicle miles and the amount of air pollution generated by producing electricity to power the HST system (considering this pollution as an average based on power plants supplying the state's electrical grid), the HST system would result in a net air quality improvement. Design practices included in the HST system include the use of energy efficient trains and power distribution systems. Air quality improvement would also result from congestion relief afforded by the use of HST to the extent (1) that congested highway traffic would be relieved on intercity highway segments, (2) that grade separations for the HST system improve local traffic flow by removing traffic impediments that cause congestion and delays, and (3) that public transportation use increases. With the HST system, however, around certain HST stations an increase in traffic and congestion is expected along with a related localized increase in vehicle-generated air pollution. At the program level this localized impact is considered significant, because of uncertainty, since it is not possible to know the exact location, extent, and characteristics of increased traffic and congestion that will be generated around various HST station sites.

The Authority finds that the following mitigation strategies can be refined and applied at the project-level and will reduce this impact:

1. Assure that HST stations are multi-modal hubs and include appropriate parking(see the mitigation strategies for Traffic and Circulation, Impact 1.).
2. Coordinate with local and regional public transportation providers to increase opportunities for connection between the HST system and other public transportation services.

3. Work with local and regional agencies to implement local street and roadway improvements, including various traffic flow improvements and congestion management techniques, and parking management strategies to reduce localized pollution from traffic related to the HST system (see the mitigation strategies for Traffic and Circulation, Impact 1.)

The Authority finds the mitigations strategies listed above will reduce this impact to a less than significant level.

Impact 2. Short-term Air Quality Impacts due to Construction

Construction impacts associated with the HST system include emissions from various activities, such as the use of diesel equipment, soil disturbance, and congestion-related traffic and route changes, all of which are expected to generate temporary short-term localized increases in air pollution. This impact is considered significant at the program level.

The Authority finds that the following mitigation strategies can be refined and applied at the project-level and will reduce this impact:

1. Water all active construction areas at least twice daily.
2. Require that all trucks hauling soil, sand, and other loose materials be covered or maintain at least two feet of freeboard.
3. Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at active construction sites.
4. Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at active construction sites.
5. Sweep nearby streets daily (with water sweepers) if visible soil materials from HST system construction are carried onto adjacent public streets.
6. Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
7. Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles of dirt, sand, etc.
8. Limit traffic speeds on unpaved roads to 15 mph
9. Install sand bags or other erosion control measures to prevent silt runoff to public roads.
10. Replant vegetation in disturbed areas as quickly as possible.
11. Use alternative fuels for construction equipment when feasible.
12. Minimize equipment idling time.
13. Maintain properly tuned equipment.

The Authority finds that the above mitigation strategies will reduce this impact to a less than significant level.

3.4 Noise

Impact 1 Increased Noise from Train Operations and Construction

The EIR evaluated noise and vibration impacts in a study area of 1000 feet from the centerline of the alignment options. The HST could create long-term noise impacts along the alignment segments from train operations by creating intermittent increased noise. As a new noise source the HST system would be far quieter than typical passenger and freight trains. The HST segments have noise impact ratings ranked as low, medium, and high. Construction of the HST could also cause short-term construction-related noise impacts. Considering CEQA Appendix G and the FRA's noise impact criteria as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis. The significant noise impact from operations will not occur along the entire HST system alignment. Rather, the impact would be localized, because certain areas along the proposed HST system alignment have no sensitive receptors, and because trains speeds are slower in some places leading to lower noise impact ratings.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Grade separations to eliminate grade crossing related noise.
2. Noise barriers, such as sound walls, trenches or earth berms, where there are severe noise impacts.
3. Require noise reduction in HST equipment design and track structures design
4. Use of enclosures or walls to surround noisy construction equipment, and installation of mufflers on engines; substitution of quieter equipment or construction methods, minimizing time of operation and locate equipment farther from sensitive receptors.
5. Where not already included, consider placing alignment sections in tunnel or trenches or behind berms where possible and where other measures are not available to reduce significant noise impacts.
6. Suspend construction between 7:00 pm and 7:00 am and/or on weekends or holidays in residential areas where there are severe noise impacts.
7. In managing construction noise take into account local sound control and noise level rules, regulations and ordinances.
8. Ensure that each internal combustion engine would be equipped with a muffler of a type recommended by the manufacturer.
9. Specify the use of the quietest available construction equipment where appropriate and feasible
10. Turn off construction equipment during prolonged periods of non-use .

11. Require contractors to maintain all equipment and to train their equipment operators.
12. Locate noisy stationary equipment away from noise sensitive receptors.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 2 Exposure to Ground-borne Vibration

Ground-borne vibration from trains is the fluctuating motion experienced by people on the ground and in buildings near railroad tracks. Vibration can create impacts to adjacent buildings, and therefore adjacent buildings were considered as receptors for the EIR's analysis. The HST system could cause an increase in ground-borne vibrations when the HST passes by an area. The ground-borne vibration impact would not occur along the entire length of the HST system alignment. Rather, the EIR identified 10-60 miles of the HST alignment that could be subject to vibration impacts. Construction activities can also cause some short-term ground-borne vibration. Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, this impact on some adjacent buildings is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Specify the use of train and track technologies that minimize ground vibration such as state of the art suspensions, resilient track pads, tie pads, ballast mats or floating slabs.
2. Phase construction activity, use low impact construction techniques and avoid use of vibrating construction equipment where possible to avoid vibration construction impacts.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

3.5 Energy

Impact 1. Increased Energy Use and Electricity Demand with the HST System

The HST System would result in decreased vehicle miles traveled (VMT) for intercity trips in the areas served by the HST System and a decrease in overall energy consumed for intercity trips. The energy savings would be larger than those shown in the EIR/EIS to the extent that the HST System would relieve congestion on intercity highway links, since congestion contributes to increases in fuel consumed per mile by vehicles on the highway. The HST would result in an increase in energy consumption by 9% over existing conditions, an increase which would be

smaller and would grow more slowly than the increase in energy consumption that would be associated with either the 2020 No Project Alternative or the Modal Alternative. The HST System would result in decreased overall per capita energy consumption for intercity travel. With the HST System overall direct energy use for intercity travel would be equivalent to 5.2 million barrels of oil less per year than the 2020 No Project Alternative, which would represent a 22 % energy savings. The HST System would have a beneficial effect on overall statewide transportation-related energy use, considering overall energy as a combination of both energy from petroleum fuels and electrical energy.

The HST System would be constructed in phases and is expected to draw power from the statewide electrical grid, which receives power from many sources. The HST system would result in an increase in demand on the statewide electricity supply that could reach 480 MW or 0.6% of projected statewide electricity demand in 2020. With proper planning and design of the power distribution facilities for the HST system in relation to the overall state electrical grid, localized impacts from providing electricity to the HST system can be avoided. At the program level, this impact is considered significant due to the uncertainty of future projections of energy demand and generation capacity to 2020.

The Authority finds that the following mitigation strategies can be refined and applied at the project-level and will reduce this impact:

1. HST stations will be multi-modal hubs providing linkage for various transportation modes, which will contribute to increased efficiency of energy use for intercity trips and by commuters, and the stations will be required to be constructed to meet Title 24 California Code of Regulations energyefficiency standards.
2. Design practices will require that the electrically powered HST technology be energy efficient, include regenerative braking to reduce energy consumption, and minimize grade changes in steep terrain to reduce energy consumption
3. Design practices will require that localized impacts be avoided through planning and design of the power distribution system for the HST System
4. Locate HST maintenance and storage facilities within proximity to major stations/termini.

The Authority finds that the above mitigation strategies will reduce this impact to a less than significant level.

Impact 2. Energy Use During Construction of the HST System

Construction of the HST System would result in one-time non-recoverable energy consumption costs that would be similar in scale to the energy consumption requirements that would be needed for the Modal Alternative, and would be in addition to energy consumed by the planned transportation improvements included in the No Project Alternative. The result of the construction of the HST system would be a new transportation mode that would reduce fuel consumption as compared to the 2020 No Project Alternative. At the program level this impact

is considered significant due to the uncertainty of future projections of energy demand and generation capacity to 2020.

The Authority finds that the following mitigation strategies can be refined and applied at the project-level and will reduce this impact:

1. Develop and implement a construction energy conservation plan.
2. Use energy efficient construction equipment and vehicles.
3. Locate construction material production facilities on-site or in proximity to project construction sites.
4. Develop and implement a program encouraging construction workers to carpool or use public transportation for travel to and from construction sites.

The Authority finds that the above mitigation strategies will reduce this impact to a less than significant level.

3.6 Electromagnetic Fields and Electromagnetic Interference

Impact 1 Exposure of electromagnetic fields to HST system workers, passengers, and nearby residents, schools and other facilities.

Electromagnetic fields (EMFs) are produced by, among other things, the generation, transmission, and use of electric power. The electromagnetic fields result from the flow of current through wires or electrical devices, and the strength of the magnetic fields depends on equipment design and level of current. The health effects of long-term exposure to low frequency magnetic fields remain unresolved, although the California Department of Health Services in a 2002 study found no evidence to substantiate a relationship between extremely low frequency magnetic fields and cancer or other diseases. Neither the federal government nor the State of California has established regulatory limits for EMF exposure, and there are no established standards or levels of exposure that are known to be either safe or harmful.

The operation of the HST system could generate additional levels of exposure to electromagnetic fields. The level of exposure will depend on a number of factors that will vary depending on the alignments and operations, including design of power supply systems and vehicles, to be decided at the project-level of design.

Depending on the configuration of the source, the strength of an EMF decreases in proportion to distance or distance squared, or even more rapidly. EMFs are measured in terms of their frequency. The HST catenary and distribution systems will operate primarily at 60-Hz fields, which is considered an extremely low frequency (ELF). Because of their rapid decrease in strength with distance, EMFs in excess of background levels are likely to be experienced only relatively near sources.

There is no scientific consensus that there are adverse effects of low-level EMF. Numerous studies have addressed but failed to establish any significant adverse health effects, and various industry, government and scientific organizations with expertise in electromagnetic fields technology have produced a range of voluntary standards that represent their best judgment of what levels are considered safe. The extremely low frequency EMF that result from the operation of the HST system is substantially below any of the standards examined by these experts. Consequently, based on the Authority's review of the scientific evidence, and considering the CEQA Appendix G thresholds of significance for effects on human beings, the Authority has determined that that the increased level of EMF as a result of the HST system operation will be less-than-significant at a programmatic, system-wide level.

The following design practices and mitigation strategies can be refined and applied at the project-specific level and will avoid or reduce EMF exposure:

1. Use standard design practices for overhead catenary power supply systems and vehicles, including appropriate materials, location and spacing of facilities and power supply systems to minimize exposure to receptors over distance, and shielding with vegetation and other screening materials.
2. Design overhead catenary system, substations, and transmission lines to reduce the electromagnetic fields to a practical minimum.

The Authority finds that the above avoidance strategies are to be included in the HST system.

Impact 2 Electromagnetic Interference with Electronic and Electrical Devices.

The HST would generate incidental radiofrequency (RF) fields, and would also use wireless communications that generate radiofrequency fields. Radiofrequency fields would also be produced at the right of way by intermittent contact (unintentional arcing) between the pantograph power pickup and catenary wire. The Federal Communications Commission (FCC) has adopted regulations that apply to intentional radiators such as the proposed HST wireless systems. The EMFs may interfere with HST maintenance workers' implanted biomedical devices, but there is little potential to interfere with implanted biomedical devices of other workers, passengers or nearby residents.

The HST Alternative would introduce additional electromagnetic interference at levels for which there are no established adverse impacts. Extensive studies have failed to establish any specific levels of additional EMI/EMF exposures which result in adverse health effects, and considering the Appendix G thresholds of significance for effects on human beings, this EIR does not treat this impact as significant at the programmatic level.

The following design practices and mitigation strategies can be refined and applied at the project-specific level and will avoid or reduce EMF exposure.

1. Design the overhead catenary system, substations, and transmission lines to reduce electromagnetic interference to a practical minimum
2. Design the project component to minimize arcing and radiation of radiofrequency energy.
3. Choose devices generating radiofrequency with a high degree of electromagnetic compatibility.
4. Where appropriate, add electronic filters to attenuate radiofrequency interference.
5. Relocate receiving antennas and use antenna models with greater directional gain where appropriate, particularly for sensitive receptors near the HST system.
6. Comply with the FCC regulations for intentional radiators, such as the proposed HST wireless systems.
7. Establish safety criteria and procedures and personnel practices to avoid exposing employees with implantable medical devices to EMF levels that may cause interference with such implanted biomedical devices.

The Authority finds that the above avoidance strategies are to be included in the HST system.

3.7 Land Use Impacts

Impact 1 Incompatibility with Land Uses and Disruption to Communities

The EIR examined the impact of placing a new HST system next to existing and planned land uses using GIS databases, along with local and regional planning documents. This includes the impacts of laying new track and installing electric power distribution facilities for the HST system and of providing multi-modal transit stations as part of the HST system. Maintenance, storage and cleaning facilities will be part of the HST system, and general potential locations for these facilities were identified in order consider the representative impacts of such facilities in the program analysis. Locations for these facilities will be determined in conjunction with future project-level studies and decisions on implementation phasing. The strategies of placing the proposed HST system in or along existing transportation corridors (existing railroad or highway rights of way) and requiring stations to be multi-modal transit hubs serve to reduce the extent of land acquisition needed for the proposed new HST system, and serve to limit the extent to which adjacent land uses would be inconsistent or incompatible with the HST system. Nearly 70% of the preferred HST system corridor alignments identified in the Final EIR are either within or adjacent to existing transportation corridors.

In the EIR/EIS land use compatibility of the HST system with adjacent uses was ranked low, medium or high, with compatibility being inversely related to the sensitivity of the land use to the HST system (e.g, business, commercial and industrial areas would have high compatibility, while single family residential areas and habitat preservation areas would have low compatibility with the HST system). The HST system would be compatible with policies to support multi-modal transportation and use of public transportation, and the HSRA would work closely with local and regional agencies to implement the system.

In many areas the HST system would improve an existing transportation corridor with grade separation, and thus would improve local access and traffic patterns, and not serve as a community divider or barrier. In other areas, however, the installation of the HST system could affect land uses by creating a new barrier dividing or disrupting existing communities. This is considered a significant impact at the program level.

The following strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Continue to apply design practices to minimize property needed for the HST system and to stay within or adjacent to existing transportation corridors to the extent feasible.
2. Work with local governments to consider local plans and local access needs, and to apply design practices to limit disruption to communities.
3. Work with local governments to establish requirements for station area plans and opportunities for transit oriented development.
4. Work with local governments to enhance multi-modal connections for HST stations.
5. Coordinate with cities and counties to ensure that HST facilities would be consistent with land use planning processes and zoning ordinances.
6. Provide opportunities for community involvement early in project-level studies.
7. Hold design workshops in affected neighborhoods to develop understanding of vehicle, bicycle, and pedestrian linkages in order to preserve those linkages through use of grade-separated crossings and other measures.
8. Ensure that connectivity is maintained across the rail corridor (pedestrian/bicycle and vehicular crossings) where necessary to maintain neighborhood integrity.
9. Develop facility, landscape and public art design standards for HST corridors that reflect the character of adjacent affected neighborhoods.
10. Maintain high level of visual quality of HST facilities in neighborhood areas by implementing such measures as visual buffers, trees and other landscaping, architectural design and public artwork.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less than significant impact in all circumstances. The Authority finds that this impact is also within the purview of local government agencies to address with local planning and additional mitigation measures, but at the program level, such additional measures and the process for their implementation cannot be determined. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

Impact 2 Impacts to Neighborhoods During Construction

In addition to the above noted potential impacts of the HST system resulting in a new barrier or dividing some established communities, short term impacts of the HST system during

construction include potential neighborhood disruption and division. This impact would be reduced by phasing the construction of segments of the system and by the use of in-line construction techniques where appropriate. Due to uncertainty at the program level, this impact is considered significant.

The following mitigation strategies, along with mitigation identified for construction impacts on other resources (e.g., air quality, noise) can be refined and applied at the project-specific level and will reduce this impact:

1. Develop a traffic management plan to reduce barrier effects during construction.
2. To the extent feasible maintain connectivity during construction.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less than significant impact in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

3.8 Agricultural Lands

Impact 1 Conversion of Prime, Statewide Important, and Unique Farmlands, and Farmlands of Local Importance, to Project Uses

The conversion of farmland is the change in the use of important farmland (i.e., farmland listed as prime, statewide important, unique, and farmland of local importance on the Department of Conservation's Farmland Mapping and Monitoring Program (FMMP)) to non-agricultural uses. The HST could convert approximately 2445 acres of important farmland along the proposed alignment under the "least potential impact" scenario to HST uses. This scenario measured alignment combinations that would result in the least potential impact on agricultural lands per region.

The HST could convert approximately 3860 acres of important farmland along the proposed alignment under the "greatest potential impact" scenario to HST uses. This scenario measures alignment combinations that would result in the greatest potential impact on agricultural lands per region. The number of farmland acres anticipated to be converted with the Preferred HST System Alternative would fall between the acreage estimates for the "least" and the "greatest" potential impact scenarios.

Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Avoid farmland whenever feasible during the conceptual design stage of the project.
2. Reduce the potential for impacts by sharing existing rail rights-of-way where feasible or by aligning HST features immediately adjacent to existing rail rights-of-way.
3. Reduce the potential for impacts by reducing the HST right-of-way width to 50 feet in constrained areas.
4. Increase protection of existing important farmlands by securing easements or participating in mitigation banks.
5. Coordinate with and support the California Farmland Conservancy Program to secure conservation easements on farmland in geographic areas where the HST project creates impacts.
6. Coordinate with private agricultural land trusts, local programs, mitigation banks, and Resource Conservation Districts to identify additional measures to limit important farmland conversion or provide further protection to existing important farmland.

The Authority finds that while the mitigation strategies described above will substantially lessen this impact, it is unclear absent site-specific information that this impact can be mitigated to a less-than-significant level over the entire HST system. Therefore, for purposes of this programmatic EIR, the impact is considered significant and unavoidable.

Impact 2 Severance of Prime, Statewide Important, and Unique Farmlands, and Farmlands of Local Importance, to Project Uses

Farmland severance is the division of one farmland parcel into two or more areas of operation by the placement of a barrier through the parcel. The HST would cause some farmland severance in the Sacramento to Bakersfield region. It is not possible at the programmatic level of analysis to estimate the number of parcels or acres that could be affected by severance, and will not be possible until the HST system alignments are more refined. This impact could arise where the HST alignment options considered in the EIR would bypass urban areas on new corridors traveling mainly north-northwest to south-southwest, thereby diagonally dividing a number of north-south oriented farming parcels. Considering CEQA Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis. The potential for this impact has been reduced because few bypass options have been identified for further study in the preferred alignment and station locations listed in the Final EIR

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Avoid farmland whenever feasible during the conceptual design stage of the project
2. Minimize severance of agricultural land by constructing underpasses and overpasses at reasonable intervals to provide property access

3. Work with landowners during final design of the system to enable adequate property access
4. Provide appropriate severance payments to landowners.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level over the entire HST system. The Authority concludes that these severance impacts are primarily economic rather than environmental. Where severance impacts could lead to significant environmental impacts at the project level of review, they will be analyzed and appropriate mitigation will be considered.

3.9 Aesthetics and Visual Resources

The construction and operation of the HST system would alter existing scenic landscapes and cause impacts on visual resources related to the addition of infrastructure in, or removal of infrastructure from, the existing landscape. The infrastructure may include construction and improvements of the HST system, tunnels, fences, noise walls, elevated guideways, catenaries (support-pole systems for power supply for trains), and stations. Visual impacts will have a higher sensitivity in areas of scenic open space and mountain crossings. The programmatic analysis of the visual impacts included photo simulations of conceptual design of the facilities associated with the HST system for a set of types of representative landscapes for each segment of the proposed corridors, and concentrated on the locations where the plans show elevated structures, tunnel portals, or areas with extensive cut or fill.

Considering the Appendix G thresholds of significance for aesthetics and visual impacts, the impacts as a result of construction and operation of the HST system are considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. At the project-level, design proposed facilities that are attractive in their own right and that would integrate well into landscape contexts, so as to reduce potential view blockage, contrast with existing landscape settings, light and shadow effects, and other potential visual impacts.
2. Design bridges and elevated guideways with graceful lines and minimal apparent bulk and shading effects.
3. Design elevated guideways, stations, and parking structures with sensitivity to the context, using exterior materials, colors, textures, and design details that are compatible with patterns in the surrounding natural and built environment, and that minimize the contrast of the structures with their surroundings.
4. Use neutral colors and dulled finishes that minimize reflectivity for catenary support structures, and design them to fit the context of the specific locale.

5. Use aesthetically appropriate fencing along rights-of-way, including decorative fencing, where appropriate, and use dark and non-reflective colors for fencing to reduce visual contrast.
6. Where at-grade or depressed route segments pass through or along the edge of residential areas or heavily traveled roadways, install landscape treatments along the edge of the right-of-way to provide partial screening and to visually integrate the right-of-way into the residential context.
7. Use the minimum amount of night lighting consistent with that necessary for operations and safety.
8. Use shielded and hooded outdoor lighting directed to the area where the lighting is required, and use sensors and timers for lights not required to be on all the time.
9. Design stations to minimize potential shadow impacts on adjacent pedestrian areas, parks, and residential areas, and site all structures in a way that minimizes shadow effects on sensitive portions of the surrounding area.
10. Seed and plant areas outside the operating rail trackbed that are disturbed by cut, fill or grading to blend with surrounding vegetated areas, where the land will support plants. Use native vegetation in appropriate locations and densities.
11. Use strategic plantings of fast-growing trees to provide partial or full screening of elevated guideways where they are close to residential areas, parks, and public open spaces.
12. Where elevated guideways are located down the median strips or along the edge of freeways or major roadways, use appropriate landscaping of the area under the guideway to provide a high level of visual interest. Landscaping in these area should use attractive shrubs and groundcovers, and emphasize the use of low-growing species to minimize any additional shadow effects or blockage of views.
13. Plan hours of construction operations and locate staging sites to minimize impacts to adjacent residents and businesses.

The Authority finds that while the mitigation strategies described above will substantially lessen impacts to aesthetics and visual resources, it is uncertain absent site-specific information that this impact can be mitigated to a less-than-significant level over the entire HST system. This is of greatest concern in areas where changes in scenic open space and mountain crossing areas are anticipated. As part of the site-specific design, many of the impacts on aesthetics and visual resources can be avoided or substantially mitigated. However, because of the size of the project and the variety of types of terrain it affects, the Authority does not have sufficient evidence to make that determination on a program-wide basis at this stage of design. Therefore, for purposes of this programmatic EIR, this impact is considered significant and unavoidable.

3.10 Public Utilities

Improvements associated with the proposed HST system could cause conflicts between a proposed alignment or station for the HST system and a pipeline or facility associated with a utility, including crossings. Because utilities are so prevalent throughout the study area, the

analysis could not practically assess each potential conflict. This evaluation considered three of the most common major facilities that may pose construction challenges as representative utility conflicts: electrical transmission lines, natural gas facilities, and wastewater treatment facilities. For purposes of this programmatic analysis, the alternative alignments and related facilities were overlaid over the available utility maps for the locations of infrastructure for these three utilities. The analysis divided the potential conflicts into two broad categories: those considered high-impact conflicts, which were those with fixed facilities such as electrical substations, power plants, and wastewater treatment facilities; and those considered low-impact conflicts, such as pipelines and transmission lines, which are easier to avoid by modifying the HST system route or by relocating the utility lines.

The HST system could result in up to 21 potential fixed-facility conflicts (high-impact conflicts), and up to 821 conflicts with utility transmission or pipelines (low-impact conflicts). These low-impact conflicts are not considered significant because they could generally be avoided, minimized, or mitigated by routing either the public utility or the HST system around, over, or under the facility. Where necessary, they can be relocated. Using current construction practices, these relocations would not pose significant adverse environmental impacts.

Considering the CEQA Appendix G thresholds of significance for public utilities and service systems, the conflicts of the HST system alternative with fixed facilities are considered significant when viewed on a system-wide basis, and less-than-significant for conflicts with low-impact conflicts.

The following mitigation strategies can be refined and applied at the project-specific level, and will avoid or reduce this impacts.

1. Make adjustments to the HST system alignments and vertical profiles to avoid crossing or using major utility right-of-way or fixed facilities during engineering design.
2. If avoidance is not feasible, in consultation and coordination with the utility owner, relocate or protect in place transmission lines, substations, and any other affected facilities.
3. For acquisition projects which result in utility relocation, follow the uniformity and equitable treatment policies, and comply with the requirements, of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 for all property necessary for the proposed HST system.

The Authority finds that the mitigation strategies described above will avoid or reduce impacts of the HST system alternative to utilities to a less-than-significant level.

3.11 Hazardous Materials and Wastes

Construction and operation of the HST system could cause impacts to existing hazardous materials or waste sites. For this programmatic analysis, a potential hazardous waste impact is considered wherever the route of a proposed alignment or location of an HST station or maintenance facility conflicts with a known contaminated site. For this analysis of potential impacts, the assessment was limited to hazardous materials sites and hazardous waste sites listed on the federal National Priorities List (Superfund list), the State Priority List, and the California Integrated Waste Management Board's list of solid waste landfills in the State of California. The sites that pose the greatest concern are those with soil or groundwater contamination within or adjacent to the right-of-way for a proposed alignment or a station facility, and those with groundwater contamination near areas where excavation down to groundwater would be necessary.

Considering the Appendix G thresholds of significance for hazardous materials, the impacts to the public or the environment as a result of construction or operation of the HST system are considered significant at the programmatic level.

The following mitigation strategies can be refined and applied at the project-specific level and will avoid or reduce this impact:

1. Investigate soils and groundwater for contamination and prepare environmental site assessments when necessary.
2. Design realignment of the HST corridors to avoid identified sites.
3. Relocate HST associated facilities such as stations to avoid identified sites.
4. Remediate identified hazardous materials and hazardous waste contamination.
5. Prior to demolition of buildings for project construction, survey for lead-based paint and asbestos-containing materials.
6. Follow BMP's for testing, treating, and disposing of water, and acquire necessary permits from the regional water quality control board, if ground dewatering is required.
7. When indicated by project level environmental site assessments, perform Phase II environmental site assessments in conformance with the ASTM Standards related to the Phase II Environmental Site Assessment Process to identify specific mitigation measures.
8. Prepare a Site Management Program/Contingency Plan prior to construction to address known and potential hazardous material issues, including
    a. Measures to address management of contaminated soil and groundwater;
    b. Site-specific Health and Safety Plan (HASP), including measures to protect construction workers and general public; and
    c. Procedures to protect workers and the general public in the event that unknown contamination or buried hazards are encountered.

9. As part of the second-tier environmental review, consider impacts to the environment on sites identified on the Cortese list (Government Code section 65962.4) at that time.

The Authority finds that the mitigation strategies described above will avoid or reduce impacts to the public and the environment as a result of construction or operation of the HST system to a less-than-significant level.

3.12 Cultural and Paleontological Resources

The EIR analyzed the occurrence of cultural and paleontological resources within an "Area of Potential Effect" or "APE." The APE was defined as: (1) 500 feet on each side of the centerline of proposed new rail routes where additional right-of-way could be needed; (2) 100 feet on each side of the centerline for routes along existing highways and railroad rights-of-way; and (1) 100 feet around station locations. For paleontological resources, the APE was defined as 100 feet on each side of the centerline of proposed rail routes and station locations in both urban and nonurban areas. For each resource type, the HST system was ranked as having low, medium, or high occurrence of the resource within the APE.

Impact 1 Impacts to Archaeological Resources and Traditional Cultural Properties

The HST could impact archaeological resources and traditional cultural properties by causing physical destruction or damage during construction. Archaeological resources include both prehistoric and historic sites. The EIR estimated the number of archaeological sites per linear mile identified in the APE for each corridor segment, and divided it by the total length of the corridor segment to reach an average number of sites per mile to obtain a rating of sensitivity for archaeological resources. The HST system has medium to high sensitivity for archaeological sites that have the potential to be impacted, which ranges from .26 to .75 sites per mile (medium) to .76 or more sites per mile (high). Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Avoid the impact, or when avoidance cannot be accommodated, minimize the scale of the impact.
2. Incorporate the site into parks or open space.
3. Provide data recovery for the archaeological resources, which may include excavation of an adequate sample of the site contents so that research questions applicable to the site can be addressed.
4. Develop procedures for fieldwork, identification, evaluation, and determination of potential effects to archaeological resources in consultation with SHPO and Native American tribes. Procedures may include on-site monitoring when sites

are known or suspected of containing Native American human remains and be reflected in Memoranda of Agreement with appropriate bodies.

5. Coordinate and consult with tribal representatives.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

Impact 2 Impacts to Historic Properties/Resources

The HST could impact historic properties and resources by causing physical destruction or damage. The EIR estimated the linear miles of development that occurred during each historic period to determine the sensitivity of a particular segment for historic resources and properties. The HST system has medium and high sensitivity for historic resources and properties along the various segments, which is defined as 26%-75% of the corridor passing through areas of historic development (medium) and 76% to 100% of the corridor passing through areas of historic development (high). Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Avoid the impact through project design. Prepare and utilize a treatment plan for protection of historic properties/resources that would describe methods to preserve, stabilize, shore/underpin, and monitor buildings, structures, and objects.
2. Avoid high vibration construction techniques in sensitive areas.
3. Record and document cultural resources that would be adversely affected by the project to the standards of the Historic American Building Survey or Historic American Engineering Record.
4. Develop design guidelines to ensure sympathetic, compatible, and appropriate designs for new construction.
5. Consult with architectural historians or historical architects to advise on appropriate architectural treatment of the structural design of proposed new structures. Prepare interpretive and/or educational materials and programs regarding the affected historic properties/resources. Materials may include: a popular report, documentary videos, booklets, and interpretive signage.
6. Make interpretive information available to state and local agencies, such as salvage items, historic drawings, interpretive drawings, current and historic photographs, models, and oral histories. Also assist with archiving and digitizing the documentation of the cultural resources affected, and disseminating material to the appropriate repositories.
7. Relocate and rehabilitate historic properties/resources that would otherwise be demolished because of the project.

8. Monitor project construction to ensure it conforms to design guidelines and any other treatment procedures agreed to by the parties consulting pursuant to Section 106 of the National Historic Preservation Act. Repair inadvertent damage to historic properties/resources in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties.
9. Salvage selected decorative or architectural elements of the adversely affected historic properties/resources, and retain and incorporate salvaged items into new construction where possible. If reuse is not possible, make salvaged items available for use in interpretive displays near the affected resources or in an appropriate museum.
10. Implement an agreement with appropriate bodies specifying procedures for addressing historic resources which may be affected by the HST system.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 3 Impacts to Paleontological Resources

The HST could impact paleontogical resources as a result of construction, including grading, cutting, tunneling, erecting pylons for elevated track, and due to station construction. The EIR identified the areas within the paleontological resources APE as having high, low, or undetermined sensitivity for paleontological resources based on the number of recorded resource localities and formations, as well as professional assessments of the significance of recovered resources from exposed rock units and the likelihood of recovering additional resources. The HST segments have both undetermined and high sensitivity. Considering CEQA Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Educate workers.
2. Recover fossils identified during the field reconnaissance.
3. Monitor construction.
4. Develop protocols for handling fossils discovered during construction, such as temporary diversion of construction equipment so that the fossils could be recovered, identified, and prepared for dating, interpreting, and preserving at an established, permanent, accredited research facility.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in

all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

3.13 Geology and Soils

Impact 1 Seismic Hazards

Seismic hazards evaluated for this EIR include ground shaking and ground failure. The HST could cause risks to workers and public safety due to the collapse or toppling of facilities, either during construction or after completion, due to strong earthquakes. The HST also could create risks to public safety from automobile accidents or the interruption of automobile circulation, if strong earthquakes cause a derailment. HST facilities could sustain damage due to secondary hazards (settlement) over soft or filled ground. Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Design structures to withstand anticipated ground motion, using design options such as redundancy and ductility.
2. Prevent liquefaction and resulting structural damage and traffic hazards using: (a) ground modification techniques such as soil densification; and (b) structural design, such as deep foundations.
3. Utilize motion sensing instruments to provide ground motion data and a control system to temporarily shut down HST operations during or after an earthquake to reduce risks.
4. Design and engineer all structures for earthquake activity using CalTrans Seismic design Criteria.
5. Design and install foundations resistant to soil liquefaction and settlement.
6. Identify potential serpentinite bedrock disturbance areas and implement a safety plan.
7. Apply Section 19 requirements from the most current CalTrans Standard Specifications to ensure geotechnically stable slopes are planned and created.
8. Install passive or active gas venting systems and gas collection systems in areas where subsurface gases are identified.
9. Remove corrosive soil and use corrosion protected materials in infrastructure.
10. Address erosive soils through soil removal and replacement, geosynthetics, vegetation, and or rip/rap, where warranted.
11. Remove or moisture condition shrink/swell soils.
12. Utilize stone columns, grouting, and deep dynamic compaction in areas of potential liquefaction.
13. Utilize buttress berms, flattened slopes, drains, and/or tie-backs in areas of slope instability.

14. Avoid settlement through preloading, use of stone columns, deep dynamic compaction, grouting, and/or special foundation designs.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 2 Surface Rupture Hazards

The HST could cause risks to workers and public safety due to ground rupture along active faults, either during construction or after completion. The HST also could create secondary public safety risks caused by damage to highways or airports, or interruption of these transportation services, in the event of train derailment caused by ground rupture along active faults. Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Install early warning systems triggered by strong ground motion associated with ground rupture, such as linear monitoring systems (i.e., time domain reflectometers) along major highways and rail lines within the zone of potential rupture to provide early warnings and allow for temporary control of rail and automobile traffic to avoid and reduce risks.
2. Continue to modify alignments to avoid crossing known or mapped active faults within tunnels.
3. Avoid active faults to the extent possible. Where avoidance is not possible, cross active faults at grade and perpendicular to the fault line.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 3 Slope Instability

The HST could cause risks to workers and public safety due to the failure of natural or construction cut slopes or retention structures. Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Install temporary and permanent slope reinforcement and protection, based on geotechnical investigations, and review of proposed earthwork and foundation excavation plans.
2. Conduct geotechnical inspections during construction to verify that no new, unanticipated conditions are encountered

3. Incorporate slope monitoring in final design.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 4 Difficulty in Excavation

The HST alignment could cross areas with hard, unfractured bedrock that will be difficult to excavate using methods other than blasting, which may pose a safety risk. Faulted materials that may be present can result in instability in the face of a tunnel area, another hazard. Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Identify areas of potentially difficult excavation to ensure safe practices.
2. Focus future geotechnical engineering and geologic investigations in areas of potentially difficult excavation.
3. Monitor conditions during and after construction.
4. Employ tunnel excavation and lining techniques to ensure safety.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

Impact 5 Hazards Related to Oil and Gas Fields

The HST could create the potential for migration of potentially explosive and/or toxic gases into subsurface facilities, such as tunnels or underground stations. Considering CEQA Appendix G as a basis for thresholds of significance, this impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Follow federal and state Occupational Safety and Health Administration regulatory requirements for excavations.
2. Consult with other agencies such as the Department of Conservation's Division of Oil and Gas, or the Department of Toxic Substances Control regarding known areas of concern.
3. Use safe and explosion-proof equipment during construction.
4. Test for gases regularly.
5. Install monitoring systems and alarms in underground construction areas and facilities where subsurface gases are present.
6. Install gas barrier systems.

The Authority finds that the foregoing mitigation strategies will reduce this impact to a less-than-significant level.

3.14 Hydrology and Water Quality Impacts

Impact 1 Impacts on Floodplains

The HST system could encroach on floodplains in each segment. For purposes of the EIR analysis, the floodplain area of impact was estimated to include the area within 100 feet on each side of the alignment centerline. Encroachment into the flood plain by the HST system is anticipated to be between 1865 and 3873 acres system wide. Floodplain encroachment may result in increased flood height from earthen berms or linear barriers to surface water flow. Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Avoid or minimize construction of facilities within floodplains where feasible.
2. Minimize the footprint of facilities within the floodplain, through design changes or the use of aerial structures.
3. Restore the floodplain to be equivalent to its prior function in instances where the floodplain is impacted by construction.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

Impact 2 Impacts on Surface Waters

The HST system could encroach on surface water resources. For purposes of EIR analysis, the area of impact for streams and lakes was estimated to include an area including the representative facility footprint, defined as within 50 feet on each side of the centerline. For the representative footprint, encroachment onto streams would be approximately in the range of 22,600 to 32,400 linear feet, while encroachment onto lakes would be approximately 7 to 27 acres. The HST would also add impervious surface area, which can reduce water infiltration, contribute to runoff, and negatively affect surface water quality. The HST could cause erosion, which can negatively affect water quality, where the alignment options would extend to or along the coast along highly erodable slopes. Considering CEQA Appendix G as a basis for thresholds of significance, these impacts are considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Use construction methods and facility designs to minimize the potential encroachments onto surface water resources.
2. Minimize sediment transport caused by construction by following best management practices (BMPs) as part of National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan requirements that will be included in construction permits. BMPs may include measures such as:
    a. providing permeable surfaces where feasible;
    b. retaining and treating stormwater onsite using catch basins and filtering wet basins;
    c. minimizing the contact of construction materials, equipment, and maintenance supplies with stormwater;
    d. reducing erosion through soil stabilization, watering for dust control, installing perimeter silt fences, placing rice straw bales, and installing sediment basins;
    e. maintaining water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips that are designed to convey and treat either fallow flow (swales) or sheetflow (filter strips) runoff.
3. Use methods such as habitat restoration, reconstruction of [habitat] onsite, and habitat replacement offsite to minimize surface water quality impacts.
4. Comply with mitigation measures included in permits issued under sections 404 and 401 of the federal Clean Water Act.
5. Comply with requirements in the Storm Water Pollution Prevention Plan to reduce pollutants in storm water discharges and the potential for erosion and sedimentation.
6. Comply with requirements of section 10 of the federal Rivers and Harbors Act for work required around a water body designated as navigable and applicable permit requirements.
7. Comply with the requirements of a state Streambed Alteration Agreement for work along the banks of various surface water bodies.
8. Implement a spill prevention and emergency response plan to handle potential fuel or other spills.
9. Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils or steep slopes.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

Impact 3 Impacts on Groundwater

The HST system may encounter groundwater during construction of at- and above-grade structures, tunnels and tunnel portals, and dewatering may be necessary. In addition, construction and operation of the HST system components may affect groundwater recharge.

Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Minimize development of facilities in areas that may have substantial groundwater discharge or affect recharge.
2. Apply for, obtain, and comply with conditions of applicable waste discharge requirements as part of project-level review.
3. Develop facility designs that are elevated, or at a minimum are permeable, and would not affect recharge potential where construction is required in areas of potentially substantial groundwater discharge or recharge.
4. Apply for and obtain a Storm Water Pollution Prevention Plan for grading, with Best Management Practices that would control release of contaminants nears areas of surface water or groundwater recharge. Best Management Practices may include constraining fueling and other sensitive activities to alternative locations, providing drip plans under some equipment, and providing daily checks of vehicle condition.
5. Use and retain native materials with high infiltration potential at the ground surface in areas that are critical to infiltration for groundwater recharge.

The Authority finds that the mitigation strategies described above will reduce this impact to a less-than-significant level.

3.15 Biological Resources and Wetlands

For purposes of assessing the HST system's direct impacts to biological resources, a GIS analysis was completed for the approximate footprint of the facilities, called the representative facility footprint. This was defined to be 50 feet total width along the alignment both at-grade and on aerial structures. To capture the HST system's potential for indirect effects on species and habitats due to noise, light, or shadows, a larger area was evaluated. This larger area varied depending on the nature of the location. Sensitive habitat areas included a study envelope that was .50 mile on either side of the alignment centerline, or a 1-mile wide corridor. In urbanized areas, the study envelope was 1000 feet on either side of the alignment centerline.

Impact 1 Impacts to Sensitive Habitat and Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities and wildlife habitat that are unique, of relatively limited distribution in a region, or of particularly high wildlife value. The HST system could directly impact 1201 to 1568 acres of habitat. The HST system could also fragment existing habitats. The study area for the HST system indicates that there is between 9773 to 17,619 acres of sensitive vegetation, which may be indirectly affected by the HST system. The sensitive vegetation acreage range is based on the buffer areas included in the HST study area,

which were designed to provide context to the impacts analysis, and are likely to be much larger than the actual indirect effect. Considering Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Use large diameter tunnels as part of the design to limit surface access needs in tunnels for ventilation or evacuation, as a method to avoid or limit impacts to vegetation and habitat above tunnels.
3. Use in-line construction (i.e., use new rail infrastructure as it is built) to transport equipment to/from the construction site and to transport excavated material away from the construction to appropriate re-use or disposal sites to minimize impacts from construction access roads on vegetation/habitat.
4. Accomplish necessary geologic exploration in sensitive areas by using helicopters to transport drilling equipment and for site restoration to minimize surface disruption.
5. Use and reuse excavated materials within the confines of the project.
6. Participate in or contribute to existing or proposed conservation banks or natural management areas, including possible acquisition, preservation, or restoration of habitats.
7. Revegetate/restore impacted areas, with a preference for on-site mitigation over off-site, and with a preference for off-site mitigation within the same watershed or in close proximity to the impact where feasible.
8. Comply with the Biological Resources Management Plan(s) developed or identified during project-level studies, as reviewed by the USFWS, CDFG, and USACE.
9. Conduct pre-construction focused biological surveys.
10. Conduct biological construction monitoring.
11. Undertake plant relocation, seed collection, plant propagation, and outplanting at suitable mitigation sites.
12. Prevent the spread of weeds during construction and operation by identifying areas with existing weed problems and measures to control traffic moving out of those areas such as cleaning construction vehicles or limiting the movement of fill.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 2 Impacts to Wildlife Movement Corridors

Wildlife movement/migration corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. These corridors are important for species survival. The HST system has the potential to affect wildlife

movement/migration corridors where the alignment crosses wildlife movement corridors. In addition, fences that will be required for at-grade tracks will introduce a new barrier to animal movement. The actual impact will depend on the selection of final alignment and the final design of structures for the HST system. Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a systemwide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Construct wildlife underpasses, bridges, and/or large culverts, to facilitate known wildlife movement corridors.
2. Ensure that wildlife crossings are of a design, shape, and size to be sufficiently attractive to encourage wildlife use.
3. Provide appropriate vegetation to wildlife overcrossings and undercrossings to afford cover and meet other species requirements.
4. Establish functional corridors to provide connectivity to protected land zoned for uses that provide wildlife permeability.
5. Design protective measures for wildlife movement corridors using the following process in consultation with resource agencies:
    a. Identify the habitat areas the corridor is designed to connect
    b. Select several species of interest from the species present in the area
    c. Evaluate the relevant needs of each selected species
    d. For each potential corridor, evaluate how the area will accommodate movement by each species of interest
    e. Draw the corridors on a map
    f. Design a monitoring program
6. Utilize existing transportation corridors and rail lines to minimize potential impacts.
7. Use aerial structures or tunnels to allow for unhindered crossing by wildlife.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 3 Impacts to Non-wetland Jurisdictional Waters

Within the larger study envelope for the HST system (1-mile wide corridor in sensitive areas) there are up to 1.2 million linear feet of non-wetland jurisdictional waters (lakes, rivers, streams, and other water bodies). The HST system has the potential to directly or indirectly affect some of these resources. Considering Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a systemwide basis.

The following mitigation strategies can be refined and applied at the project level and will reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Return degraded habitat to pre-existing conditions.
3. Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
4. Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
5. Provide for passive revegetation by allowing a disturbed area to revegetate naturally.
6. Purchase credits in an existing wetlands or aquatic habitat mitigation bank.
7. Provide in-lieu fee payments to an agency or other entity who will provide aquatic habitat conservation or restoration.
8. Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that located within the same watershed or as close in proximity to the area of impact as possible.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level.

Impact 4 Impacts to Wetlands

The HST system could directly impact 30-89 acres of wetlands. The study area for the HST system indicates there is between 3996 and 18,356 acres of wetlands in the study area, which may be indirectly effected by the HST system. Considering Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project level and will reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Return degraded habitat to pre-existing conditions.
3. Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
4. Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
5. Provide for passive revegetation by allowing a disturbed area to revegetate naturally.
6. Purchase credits in an existing wetlands or aquatic habitat mitigation bank.
7. Provide in-lieu fee payments to an agency or other entity who will provide aquatic habitat conservation or restoration.
8. Develop and implement measures to address the “no net loss” policy for wetlands.

9. Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that located within the same watershed or as close in proximity to the area of impact as possible.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 5 Impacts to Marine and Anadromous Fishery Resources

The HST system has the potential to affect fishery resources during construction due to the need to cross streams and rivers. Construction activities could increase sediment loads in stormwater during rain, or be a source of chemicals, both of which could be released into creeks and harm aquatic resources. Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Comply with the terms of a Streambed Alteration Agreement for work along banks of surface water bodies.
3. Implement a spill prevention and emergency response plan to handle potential fule or other spills.
4. Incorporate bio-filtration swales to intercept runoff.
5. Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however sufficient information is not available at the programmatic level to conclude with certainty that mitigation will reduce this impact to a less-than-significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

Impact 6 Impacts to Special Status Species

The HST system could directly impact 67-84 special status species based on the representative facility footprint. The study area for the HST system indicates the possible presence of 279 to 350 special status species within the area of potential indirect effect from the HST system. Some of these species could be affected by the construction and the operation of the HST system. Considering CEQA Guidelines Appendix G as a basis for thresholds of significance, the impact is considered significant when viewed on a system-wide basis.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Utilize existing transportation corridors and rail lines to minimize potential impacts.
2. Relocate sensitive species.
3. Conduct pre-construction focused surveys.
4. Conduct biological construction monitoring.
5. Restore suitable breeding and foraging habitat.
6. Purchase credits from an existing mitigation bank.
7. Participate in an existing Habitat Conservation Plan.
8. Phase construction around the breeding season.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Accordingly, the Authority finds this impact remains significant at the programmatic level after the application of mitigation strategies.

3.16 Public Parks and Recreation Resources

To analyze the potential for the HST system to result in impacts to parks and recreation resources, including publicly owned parks, wildlife and waterfowl refuges, historic sites of national, state or local significance, and other recreational resources, the EIR examined the occurrence of these resources within 900 feet from the location of proposed HST facilities and considered both direct and proximity (indirect) impacts. The recreation resources identified in the analysis are covered by either section 4(f) of the federal Transportation Act or section 6(f) of the federal Land and Water Conservation Fund Act. The two referenced federal statutes require special efforts to be made in planning proposed transportation projects to avoid using and limit adverse impacts to publicly owned park and recreation lands and will require findings to be made by FRA in future project-level reviews to address federal statutory requirements. Impacts to historic resources from the HST system are addressed in section 3.12.

Impact 1 Impacts to Parks and Recreational Resources

The HST system could result in direct impacts to lands containing publicly owned parks and recreational resources by causing use of such lands for the placement of HST facilities, and could result in indirect impacts to these resources due to construction activities or HST system operations which adversely affect the use of publicly owned parks and recreational resources. In addition to addressing noise, biology, and air quality impacts in other sections of these Findings, the EIR identifies the park and recreational resources located within 900 feet of the centerline of HST alignments or facilities, and notes that the HST system would affect fewer such facilities than the Modal Alternative. The use of existing transportation corridors for the location of HST facilities and the direction that HST stations serve as multi-modal transportation hubs has

minimized the potential for the HST system impacts to parks and recreational resources. No state parks would be crossed or bisected by the HST system. The EIR, however, identified five state parks that may be within 900 feet of the HST system. Additionally, certain local, regional or federal recreational resources could be affected. At the program level it is not possible to know precisely the location, extent and particular characteristics of impacts to park resources. Due to this uncertainty, for the purposes of system-wide review at the programmatic level, this impact is considered significant.

The following mitigation strategies can be refined and applied at the project-specific level and will reduce this impact:

1. Continue to apply design practices to avoid impacts to park resources, and when avoidance cannot be accommodated, minimize the scale of the impact.
2. Apply measures at the project level to reduce and minimize indirect/proximity impacts as appropriate for the particular sites affected, while avoiding other adverse impacts (e.g., visual), such as noise barriers, visual buffers and landscaping.
3. Apply measures to modify access to/egress from the recreational resource [first paragraph 3.16.8] to reduce impacts to these resources.
4. Design and construct cuts, fill, and aerial structures to avoid and minimize visual impacts to units of the state park system.
5. Incorporate wildlife under or over crossings at appropriate intervals as necessary
6. Where public parklands acquired with public funds would be acquired for non-park use as part of the HST system, commit as required by law to providing funds for the acquisition of substantially equivalent substitute parkland or to acquiring/providing substitute parkland of comparable characteristics.
7. Restore affected parklands to natural state and replace or restore affected park facilities.
8. If park facilities must be relocated, provide planning studies as well as appropriate design and replacement with minimal impact on park use.
9. Use local native plants for revegetation.
10. Develop and implement construction practices, including scheduling, to limit impacts to wildlife, wildlife corridors and visitor use areas within public parks.
11. For temporary unavoidable loss of park and recreation facility uses consider providing compensation.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances. Therefore, at the programmatic level the potential for indirect impacts to parks and recreational facilities is considered significant.

V.
CUMULATIVE IMPACTS

Impact 1 Impacts on Traffic and Circulation and Travel Conditions

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to surface streets leading to and from the intercity highways and airports.

The following program level mitigation strategies can be developed, in consultation with state, federal, regional, and local governments and affected transit agencies, to improve the flow of intercity travel on the primary routes and access to the proposed stations or airports and will reduce this impact:

1. Regional strategies would include coordination with Regional Transportation planning and Intelligent Transportation System Strategies.
2. Local improvements could employ TSM/Signal Optimization; local spot widening of curves; and major intersection improvements.

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to localized travel conditions.

The following program level mitigation strategies can be developed, in consultation with state, federal, regional, and local governments and affected transit agencies, to improve the flow of intercity travel on the primary routes and access to the proposed stations or airports and will reduce this impact:

1. Regional strategies would include coordination with Regional Transportation planning and Intelligent Transportation System Strategies.
2. Local improvements could employ TSM/Signal Optimization; local spot widening of curves; and major intersection improvements.

The Authority finds that the foregoing strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable. The specific measures to be applied at each location are to be determined at the project-level for areas expected to experience traffic congestion due to the HST system and are to be implemented in coordination with local and regional land use and transportation authorities, and in consultation with Caltrans as appropriate.

Impact 2 Impacts on Air Quality

Implementation of the HST system, in combination with the air quality impacts of other highway projects or airport improvements identified for the cumulative impact analysis and those projects considered in the state implementation plan for air quality, could lead to a considerable contribution to the cumulative impact related to air quality within the six-basin study area.

The project level mitigation strategies to address localized impacts can consider the following and will reduce this impact:

1. For power plants dedicated to supplying power for the HST system, if any, consider reducing emissions by increasing emission controls.
2. Design the system to utilize energy efficient, state-of-the-art equipment.
3. Promote increased use of public transit, alternative fueled vehicles, and parking for carpools, bicycles, and other alternative transportation methods.
4. Alleviate traffic congestion around passenger station areas.
5. Minimize construction air emissions.

The Authority finds the mitigations strategies listed above will reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 3 Impacts on Noise and Vibration

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to noise and vibration.

The program level mitigation strategies will reduce this impact:

1. design practices emphasizing the use of tunnels or trenches
2. use of electric powered trains, higher quality track interface, and smaller lighter and more aerodynamic trainsets; and
3. full grade separations from all roadways.

The project level mitigation strategies include the following and will reduce this impact:

1. treatments for insulation of buildings affected by noise and vibration;
2. sound barrier walls within the right-of-way;
3. track treatments to minimize train vibrations; and
4. construction mitigation.

The Authority finds the mitigations strategies listed above will reduce the HST system's contribution to these impacts to less than cumulatively considerable.

Impact 4 Land Use Impacts

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to community and neighborhood cohesion and property loss. Combined with other transit (light rail and commuter rail) and roadway projects considered for this cumulative impact analysis these localized impacts could contribute to cumulative community/neighborhood impacts. These impacts, in combination with other transit extension and roadway projects, could cause a considerable contribution to potential cumulative impacts on various property types, neighborhoods, and communities.

The program level mitigation strategies for HST system contributions to the land use impacts, include the following and will reduce this impact:

1. design practices to maximize use of existing rights-of-way and incorporating strategies for stations to incorporate transit oriented design; and
2. coordination with cities and counties in each region to ensure that project facilities would be consistent with land use planning processes and zoning ordinances.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. The Authority finds that to the extent that other projects contribute to this impact they are within the purview of local government agencies to address with local planning and additional mitigation measures, but at the program level, such additional measures and the process for their implementation cannot be determined. Accordingly, due to this uncertainty, the HST system's contribution to this impact is treated as cumulatively considerable.

Impact 5 Impacts on Agricultural Lands

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to the conversion of agricultural land to non-agricultural use within the study area for the HST System Alternative.

The program level mitigation strategies include the following and will reduce this impact:

1. design practices to avoid agricultural land conversion through maximizing use of existing rights-of-way to minimize encroachment on additional agricultural lands
2. utilizing aerial structure or tunnel alignments to allow for vehicular and pedestrian traffic access across the alignment; and
3. reducing the new right-of-way to 50 feet in constrained areas.

The project level mitigation strategies include the following and will reduce this impact:

1. securing easements,
2. participating in mitigation banks,
3. increasing permanent protection of farmlands at the local planning level, and
4. coordinating with various local, regional, and state agencies support farmland conservation programs.

The Authority finds that while the mitigation strategies described above will substantially lessen this impact, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, the impact is considered cumulatively considerable.

Impact 6 Impacts on Aesthetics and Visual Resources

Implementation of the HST system could lead to a considerable contribution to the short- and long-term cumulative impact related to visual resources.

The program level mitigation strategies include the following and will reduce this impact:

1. design practices that will incorporate local agency and community input during subsequent project level environmental review in order to develop context sensitive aesthetic designs and treatments for infrastructure.

The project level mitigation strategies include the following and will reduce this impact:

1. design of facilities that integrate into landscape contexts, reducing potential view blockage, contrast with existing landscape settings, and light and shadow effects.

The Authority finds that the mitigation strategies described above will avoid or substantially lessen impacts to aesthetics and visual resources. However, because of the size of the project and absence of site-specific information related to the types of terrain affected and facilities design, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 7 Impacts on Public Utilities

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to public utilities and future land use opportunities because of right-of-way needs, extensive utility relocation, and property restrictions associated with construction of multiple linear facilities and other reasonably foreseeable future projects in the study area.

The program level mitigation strategies include the following and will reduce this impact:

1. design practices that will avoid potential conflicts, at the project level analysis, to the extent feasible and practical. These practices include: design methods to avoid crossing or using utility rights-of-way include modifying both the horizontal and vertical profiles of proposed transportation improvements. Emphasis would be placed on detailed alignment design to avoid potential contribution to cumulative impacts from linear facilities on land use opportunities and to minimize conflicts with existing major fixed public utilities and supporting infrastructure facilities.

The project level mitigation strategies include the following and will reduce this impact:

1. coordination with utility representatives during construction in the vicinity of critical infrastructure will occur.

The Authority finds that the mitigation strategies described above will avoid or reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 8 Impacts on Cultural and Paleontological Resources

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to cultural and paleontological resources.

The program level mitigation strategies include the following and will reduce this impact:

1. Continued consultation with SHPO would occur to define and describe general procedures to be applied in the future for fieldwork, method of analysis, and the development of specific mitigation measures to address effects and impacts to cultural resources, resulting in a programmatic agreement between the Authority, FRA and SHPO.
2. Consultation with Native American tribes would occur.

The project level mitigation strategies include the following and will reduce this impact:

1. avoidance measures through identification of sensitive resources within the project level analysis and project design refinement and careful selection of alignments.
2. Subsequent project level field studies to verify the location of cultural resources would offer opportunities to avoid or minimize direct impacts on resources, based on the type of project, type of property, and impacts to the resource.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 9 Impacts on Geology and Soils

Implementation of the HST system could lead to a considerable contribution to the cumulative impact to geology and soils related to slope stability in various proposed locations of cut and fill and areas susceptible to slope failure; and subsidence if other projects under construction in the area also needed to dewater from the same drainage basin.

The program level mitigation strategies include the following and will reduce this impact:

1. Design practices will be used while preparing extensive alignment studies to ensure that potential effects related to major geologic hazards such as major fault crossings, oil fields, and landslide areas, will be avoided.
2. Mitigation for potential impacts will be developed on a site-specific basis, based on detailed geotechnical studies to address ground shaking, fault crossings, slope

stability/landslides, areas of difficult excavation, hazards related to oil and gas fields, and mineral resources.

The Authority finds that the foregoing mitigation strategies will reduce the HST system's contribution to this impact to less than cumulatively considerable.

Impact 10 Impacts on Hydrology and Water Resources

Implementation of the HST system could lead to a considerable contribution to the cumulative impact related to hydrologic resources.

The program level mitigation strategies include the following and will reduce this impact:

1. design practices to maximize use of existing rights-of-way to minimize potential impacts on water resources.

The project level mitigation strategies include the following and will reduce this impact:

1. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases.
2. Close coordination will occur with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, erosion control measures, sediment controlling excavation/fill practices, and other best management practices.
3. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to flood plains; surface waters, runoff, and erosion; and groundwater.

The Authority finds that the mitigation strategies described above will substantially reduce the HST system's contribution to this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 11 Impacts on Biological Resources and Wetlands

Implementation of the HST Alternative could lead to a considerable contribution to the cumulative impact related to sensitive biological resources and wetlands.

The program level mitigation strategies include the following and will reduce this impact:

1. design practices to maximize use of existing rights-of-way to minimize potential impacts on biological resources and wetlands.

The project level mitigation strategies include the following and will reduce this impact:

1. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases.
2. Close coordination will occur with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, monitoring during construction, and other best management practices.
3. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to wetlands.
4. Field studies would be conducted to verify the location, in relation to the HST alignments, of sensitive habitat, wildlife movement corridors, and wetlands. These studies would provide further opportunities to minimize and avoid potential impacts on biological resources through changes to the alignment plan and profile in sensitive areas. For example, the inclusion of design features such as elevated track structures over drainages and wetland areas and wildlife movement corridors would minimize potential impacts to wildlife and sensitive species.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 12 Impacts on Public Parks and Recreation Resources (Section 4(f) and 6(f) Resources)

Implementation of the HST system could lead to a considerable contribution to the cumulative impact of indirect effects related to parklands and recreational resources.

The program level mitigation strategies include the following and will reduce this impact:

1. Incorporation of sound barriers (e.g., walls, berms or trenches), visual buffers/landscaping, and modification of transportation access to/egress from the public lands and recreational resource.

2. Incorporation of design modifications or controls on construction schedules, phasing, and activities.

The project level mitigation strategies include the following and will reduce this impact:

1. Beautification measures.

2. Replacement of land or structures or their equivalents on or near their existing site(s).

3. Tunneling, cut and cover, cut and fill of right-of-ways.

4. Treatment of embankments.

5. Planting, screening, creating wildlife corridors, acquisition of land for preservation, installation of noise barriers.

6. Establishment of pedestrian or bicycle paths.

7. Other potential mitigation strategies could be identified during the public input process.

In the event that HST alignments or facilities are located within or in close proximity to public parks, the following mitigations for natural, cultural, aesthetic and recreational impacts may be considered to offset the contribution to the cumulative impact, including but not limited to:

1. Compensation for temporary and loss of park and recreation use.

2. Recordation of any historic features removed.

3. If necessary, provide alternative shuttle access service to park visitors.

4. Restore directly impacted park lands to a natural state.

5. If any facilities must be relocated, provide planning studies as well as design and appropriate replacement with minimal impact on park use.

6. Inventory and record affected historic structures. Provide appropriate mitigation for adverse effects to historic structures.

7. Require appropriate vehicle cleaning for all construction equipment used near units of the California State Park System to protect against spreading exotic plants or disease.

8. Use local native plants for revegetation.

9. Design and construct cuts, fills, and aerial structures to avoid and minimize visual impact to units of the State Park System.

10. In addressing impacts to wildlife movement corridors and habitat directly related to California State Park System units, consult with the California Department of Parks and recreation.

11. Incorporate wildlife under- or over-crossings as necessary.

12. Adopt construction practices to protect critical wildlife corridors and visitor use areas within public parks.

The Authority finds that the mitigation strategies described above will substantially lessen or avoid this impact; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to this impact

to less than cumulatively considerable in all circumstances. Therefore, for purposes of this programmatic EIR, this impact is considered cumulatively considerable.

Impact 13 Impacts from Indirect Effects Related to Growth

Implementation of the HST system could result in indirect effects related to the increment of growth associated with the HST system which was projected for the period from now until 2035, recognizing that growth related to the HST system would occur in the future after early implementation steps for the HST system have been taken. As noted in Chapter 3, the EIR addressed cumulative impacts related to growth at a landscape level in Chapter 5. Incremental growth associated with the HST system would be distributed across the various communities in which HST stations are located, and would be reflected primarily in increased infill development and increased development densities in areas already slated for development in local general plans. The growth anticipated by local general plans was taken into account in the analysis in Chapter 5. At the program level, given the timeframe proposed for the construction of an HST system and the timelag in growth associated with an HST system, except as indicated in the Program EIR/EIS reasonably foreseeable future projects could not be identified for this program analysis. The incremental growth associated with the HST system is not expected to result in a significant increase in demand for municipal services. The timeframe within which incremental growth associated with the HST system would be expected is within normal planning horizons and within the purview of the local and regional agencies responsible for planning for municipal services to address.

The Authority finds that the implementation of the HST system could lead to a considerable contribution to cumulative impacts to waterways, wetlands, sensitive habitat and sensitive species associated with growth. The extent and location of such potential growth effects cannot be predicted and examined at the program-level of analysis. To assure that such potential effects will be examined in the future, the Authority will incorporate in project level studies analyses of impacts to waterways, wetlands, sensitive habitat and species based on appropriate regional study areas. In order to address cumulative impacts to such resources project level analyses must look beyond the affected project sites. To assure that appropriate planning for HST station areas is undertaken so as to avoid indirect effects associated with growth related to the HST system, the Authority has adopted the station area development strategies described in Chapter 6B of the Final EIR.

VI.
GROWTH-INDUCING IMPACTS AND INDIRECT IMPACTS RELATED TO GROWTH

Transportation investments can lead to reduced travel time or cost, improved accessibility to regions or parts of regions, or reduced accidents or air pollution. These effects contribute to economic growth by allowing time and money previously spent on travel to be used for other purposes, attracting businesses and residents to places with increased accessibility or improved quality of life, and reducing overall costs to society. The population and employment growth that result from economic growth comprise the growth-inducing effects of transportation investments such as the HST system. This growth can contribute to additional impacts beyond those directly attributable to the changes in the transportation system, which the EIR refers to as growth-related indirect impacts.

Growth-Inducing Effects of the HST System Alternative

The EIR's discussion of growth-inducing impacts was based on a multi-phased analytical process that combined the Regional Economic Models, Inc.'s macroeconomic model, with a business attraction model, an employment allocation model, and a residential spatial allocation model. The analytical process considered the potential effects that changes in transportation congestion and delay between existing conditions and future years would have on the state's economic growth, as well as the possible indirect impacts on jobs, population, and land development.

The following summarizes the analysis in the EIR:

Population Effects: Statewide population is expected to grow by about 54% between 2002 and 2035 under the No Project Alternative. Compared to the No Project Alternative, the statewide population growth is projected to be roughly 2% higher under the HST System Alternative. These population differences among alternatives represent the increased accessibility provided by the transportation investments. An investment in HST is projected to lead to greater economic growth within the state than the No Project Alternative. These statewide figures follow the same general pattern at the regional level, with the exception of the Northern Central Valley, where population growth is projected to be about 4% higher under the HST System Alternative than under the No Project Alternative.

Employment Effects: Statewide employment is expected to increase by about 46% between 2002 and 2035 under the No Project Alternative. Compared to the No Project Alternative, statewide employment growth is projected to be roughly 2% higher under the HST System Alternative.

Urbanized and Non-urbanized Areas: Urbanized areas in California are expected to grow by 48% between 2002 and 2035 under the No Project Alternative, representing an increase of about 1.5 million acres over the approximately 3.1 million acres in the existing urbanized areas in the study area of core analysis counties. These are the counties in which HST facilities would be

located, grouped by regions and excluding other California counties. Compared to the No Project Alternative, the HST System Alternative is expected to have about 0.1% less growth in urbanized areas, which is about 2600 fewer acres. The HST System Alternative compared to the Modal Alternative would use 68,100 fewer urbanized acres than the Modal Alternative. The HST System Alternative would therefore be able to accommodate more population and employment growth on less land than the No Project Alternative.

Location of Growth: The EIR provided county-level population growth rates for the No Project Alternative, Modal Alternative, and the HST System Alternative. The results show that both the Modal and HST System Alternatives may reverse the historic trend in California toward dispersed population growth, with portions of the Bay Area and Southern California exhibiting strong population growth rates. At the same time, under the HST System Alternative, Merced, San Francisco, and Sacramento counties are projected to achieve the highest growth rates. These results suggest that additional population growth under the HST System Alternative is driven by internal job growth due to the initiation of HST service, rather than due to long-term population shifts from the Bay Area and Southern California based on long-distance commuting. For the HST System Alternative, population in the Central Valley is expected to experience a small increase in both net growth and distributive effects as compared to the No Project Alternative. Because such growth would occur attendant to or after the initiation of HST service, the locations in which such growth may occur could not be predicted at this time for the programmatic analysis.

Effect of Authority Station Area Development Policies: When making decisions regarding both the final selection of station locations and the timing of station development, the Authority would consider the extent to which appropriate Station Area Plans and development principles have been adopted by local authorities. In addition to potential benefits from minimizing land consumption needs for new growth, dense development near HST stations will concentrate activity in areas conveniently located near stations. This would increase the utilization of the HST system, generating additional HST ridership and revenue to benefit the entire state. Reducing the land needed for new growth should reduce pressure for new development on nearby habitat areas and agricultural lands.

Denser development allowances would also enhance joint development opportunities at and near the station, which in turn could increase the likelihood of private financial participation in construction related to the HST system. A dense development pattern can better support a comprehensive and extensive local transit system that can serve the local communities as well as providing access to and egress from HST stations. The Authority's adopted policies will ensure that implementation of the HST in California would maximize the potential for station area development. HST station area development principles draw upon transit-oriented development (TOD) strategies that have been successfully applied to focus compact growth within walking distance of rail stations and other transit facilities. Applying TOD measures around HST stations is a strategy that works for large, dense urban areas, as well as smaller central cities and suburban areas. TOD can produce a variety of other local and regional benefits by encouraging walkable compact and infill development. Local governments would play a significant role in implementing station area development by adopting plans, policies, zoning provisions, and

incentives for higher densities, and by approving a mix of urban land uses. Almost all TOD measures adopted by public agencies involve some form of overlay zoning that designates a station area for development intensification, mixed land uses, and improvements to the pedestrian environment. TOD measures are generally applied to areas within one-half mile of transit stations and this principal would be followed for HST stations.

Indirect Effects Related to Growth from the HST Alternative

The HST Alternative may have a positive (i.e., result in an increase), but small, statewide effect on population and employment growth compared to the No Project Alternative. Despite the relatively small magnitude of the expected growth, the growth could contribute to indirect impacts on the human and natural environment. Many of these indirect, growth-related impacts derive from increased urbanization needed to accommodate the additional population and employment. However, the additional growth expected from the HST System Alternative over the No Project Alternative in 2035 is expected to be accommodated on a similar amount of land, and the growth of urbanized area in acres would be smaller under the HST System Alternative, than under the Modal Alternative.

The following summarizes the analysis in the EIR:

No indirect, growth-related impacts from implementing the HST system are expected to the following resource areas: noise and vibration; exposure to EMF or EMI; public utilities; exposure to hazardous materials or wastes; cultural resources; geology and soils; and public parks and recreation. Indirect aesthetic impacts from induced growth under the HST System Alternative are considered speculative at the programmatic level.

Overall traffic conditions are expected to improve with the HST system, despite the estimated 2% increase in population and employment under the HST System Alternative. Some increase in local traffic around HST stations, consistent with this increased growth, is expected.

Air quality is expected to improve with the HST system, however, the increased population and employment growth may contribute to increased mobile-source air pollutants due to increased traffic around stations.

There are no significant differences in energy consumption expected statewide between the HST System Alternative and the No Project Alternative when considering growth. However, the HST System Alternative could result in less overall demand for transportation energy, despite the expected small increase in growth under the HST System Alternative.

Socioeconomic changes from growth under the HST System Alternative are expected to be small, and therefore indirect land use compatibility impacts from induced growth are also expected to be small. Growth under the HST System Alternative would be distributed across various communities, would be reflected in infill development and increased development densities, and is not expected to result in a significant increase in demand for municipal services.

Planning for such services is within the purview of local and regional agencies and expected growth in the future would be within typical planning horizons for such services.

Growth under the HST System Alternative is expected to impact 4100 fewer acres of important farmland on a statewide basis than the No project Alternative.

Growth under the HST System Alternative is expected to impact about 270 miles more of waterways than the No Project Alternative, or about 7% more. The largest percentage of this increase is expected to occur in Southern California. The HST System Alternative is expected to affect fewer waterways in the Northern Central Valley region than the No Project Alternative due to induced growth. The Northern Central Valley is projected to experience a decrease in acreage of habitats potentially affected by induced growth.

Growth under the HST System Alternative has the potential to affect up to 8400 acres more of land which may contain some threatened and endangered species habitat on a system-wide basis than the No Project Alternative. The largest percentage increase is expected to occur in the Bay Area, while the largest acreage increase is expected in the Southern Central Valley. Growth under the HST System Alternative has the potential to affect about 330 acres more containing some wetlands on a system-wide basis than the No Project Alternative, or about 1% more. The largest acreage and percentage increase is project to occur in the Northern Central Valley, whereas Southern California is expected to exhibit a reduction in wetland loss due to future urbanization.

At the program level it is not possible to predict the specific location(s) where the increment of future growth related to the HST System Alternative may occur or is likely to occur in order to recommend mitigation strategies to other agencies; nor is it within the purview of the Authority to adopt such strategies. Additionally, the size, scope and attributes of specific projects that may be proposed in the future cannot be predicted, nor can the outcome of public agency approval processes and the ultimate configuration of any approved projects be predicted. However, the general requirements of CEQA, the Endangered Species Act, other measures required by the Department of Fish and Game and the permit requirements of other regulatory agencies can be expected to apply to both public and private projects in the future and to require avoidance and minimization strategies to reduce potentially significant impacts to environmental resources. These strategies can be expected to substantially reduce and avoid adverse environmental impacts to these resources.

VII.
FEASIBILITY OF POTENTIAL ALTERNATIVES

CEQA requires the lead agency, the High Speed Rail Authority, to consider a reasonable range of potentially feasible alternatives to the proposed Program. See Public Resources Code sections 21002 and 21081; see also CEQA Guidelines section 15126.6. "Feasible" means capable of being accomplished in a successful manner within a reasonable time, taking into account economic, environmental, legal, social and technological factors. CEQA Guidelines section 15364. The range of alternatives to be considered is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. CEQA Guidelines section 15126.6(f). Additionally, CEQA does not require the consideration of alternatives that are incompatible with the fundamental objectives of the Program or alternatives that would change the basic nature of the Program. See *Save San Francisco Bay Association v. San Francisco Bay Conserv. & Dev. Commission* (1992) 10 Cal.App 4th 908, 919; *Marin Mun. Water Dist. v. KG Land Cal.Corp.*(1991) 235 Cal.App. 3d 1652.

A. Alternatives Considered and Not Taken Forward

1. Evaluation of Alternatives Against the Program Objectives, Purpose and Need

The purpose and objectives of the HST System. With the enactment of the California High Speed Rail Act in 1996, the Legislature recognized, among other things, that the state's existing network of highways and airports is not adequate to meet the mobility needs of the population, and that both the state's population and the travel demands of its citizens are expected to continue to grow at a rapid rate. Noting that an intercity high-speed rail service connected with urban transit and airports could provide an efficient, practical, and less-polluting transportation mode to help meet the gap between existing capacity and future travel demand, the Legislature charged the Authority to develop a proposed HST system that is integrated with the state's existing rail and transit services and uses common station facilities. See Public Utilities Code sections 185010, 185030.

The analysis in the Final Program EIR/EIS confirms that the capacity of California's intercity transportation system is insufficient to meet existing and future demand, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The state's intercity transportation system has not kept pace with the tremendous increase in the population and tourism in the state. The interstate highway system, commercial airports, and the conventional passenger rail system serving the intercity travel market are currently operating at or near capacity, and will require large public investments for maintenance and expansion in order to serve existing and future demand. The need for improvements serving intercity travel within California is described further in the Final Program EIR/EIS and summarized in the October 2005 Staff Report on the Final Program EIR/EIS.

As described in the Final Program EIR/EIS the purpose and objectives of the HST System, or program, which is identified as the Preferred System Alternative, is to provide a reliable mode of travel that links the major metropolitan areas of the state and delivers predictable and consistent travel times, while also providing an interface with major commercial airports, public transit services, and the highway network and relieving capacity constraints in the existing transportation system in a manner sensitive to and protective of California's unique natural resources. It is called the Preferred System Alternative to distinguish it from the preferred alignment and station locations which are identified in the Final Program EIR/EIS. Along with the stated purpose and objectives, and to implement the directives of the California High-Speed Rail Act, the Authority adopted the following policies and objectives for the proposed HST System:

- provide intercity travel capacity to supplement critically over-utilized interstate highways and commercial airports

- meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility

- maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.

- improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel

- provide a sustainable reduction in travel time between major urban centers

- increase the efficiency of the intercity transportation system

- preserve environmental quality and protect California'ss sensitive environmental resources by reducing emissions and vehicle kilometers/vehicle miles traveled for intercity trips

- consult with resource and regulatory agencies during the tier 1 environmental review and use all available information for assessing the alternative that it most likely to yield the least damaging practicable alternative by avoiding sensitive natural resources (wetlands, habitat areas, conservation areas) where feasible

- maximize the use of existing transportation corridors and rights-of-way, to the extent feasible

- develop a practical and economically viable transportation system that can be implemented in phases by 2020, which would generate revenues in excess of operations and maintenance costs

The above policies and objectives were important in the Authority's initial broad consideration of alternatives, in considering train technologies that could provide the desired high-speed service, in framing the alternatives for analysis in the EIR, and also in selecting preferred corridor alignments and station locations, as discussed below. The Final EIR describes this process in detail. The Authority evaluated a wide range of alternative corridor alignments for the proposed system in order to determine which corridors would best meet the program objectives while also minimizing potential adverse environmental impacts. The evaluation of both alternative technologies and alternative corridors for the proposed HST system was considered by the Authority in numerous public meetings which provided extensive opportunities for public participation and input for the Authority to consider. The system alternatives and the design options (corridors/alignments and station locations) for the proposed HST system that are described in the EIR are based on previous feasibility studies, the scoping process, and the HST screening evaluation.

2. Elimination of Alternative Technology, Alternative Systems and Alternative Corridors

a. Initial Considerations

The Authority and the FRA developed a range of potential HST corridors, and alignment and station options within the corridors, informed by previously prepared feasibility studies, as well as comments received from the public and from public agencies during the scoping process for the preparation of the Draft Program EIR/EIS. The Authority reviewed the Los Angeles to Bakersfield Preliminary Engineering Feasibility Study completed by the California Department of Transportation (Caltrans) in 1994; the Corridor Evaluation and Environmental Constraints Analysis completed by the High Speed Rail Commission in 1996; the High Speed Rail Corridor Evaluation completed by the Authority in 1999; and the Authority's Business Plan, completed in 2000. The Final EIR explains in Chapter 2 the consideration of these reports and additional criteria that were applied to evaluate potential HST corridors, technologies, alignments and stations.

For purposes of organizing the information and evaluating the HST options, the state was divided in to five geographic regions or travel markets, as shown in Figure 2.1-1 of the EIR. The previously prepared studies mentioned above were reviewed and reevaluated to develop HST alignment and station options in each of the five regions. Technical studies gathered data to assist in evaluating the range of HST options, as reflected in the Authority's California High Speed Train Screening Report (2002), and provided information to help focus further studies for the Program EIR/EIS HST options to meet the project/program purpose and attain the objectives established by the Authority.

Prior to completing the screening evaluation the Authority directed specific alignment refinement studies in order to gather additional technical information to assist in its review of northern and southern mountain pass crossing options for the proposed HST system. In these mountain areas, due to the vast potential for variation in specific alignments (horizontal and vertical), and with related variation in costs and potential environmental impacts, the Authority undertook further review of tunneling considerations in a two-day technical conference and an alignment refinement and optimization study.

The range of potential HST corridors was reduced during a "screening" process in which the Authority and FRA further considered the potential HST corridors, received additional public comment during public meetings, and eliminated from detailed consideration in the EIR/EIS potential alternatives that were: (i) unable to meet most of the basic project objectives; (ii) infeasible; or (iii) unable to avoid significant environmental impacts.

b. Eliminated technology

Four primary technology groups were considered in the development of the HST System alternative. These groups were classified by their speed (both currently obtainable speeds as well as targeted speeds that may result from further research and development) and by their similar design characteristics. Three groups were eliminated from further consideration for reasons discussed in more detail in the EIR and the Authority's screening evaluation documentation. Magnetic levitation technology was eliminated principally due to the unique guideway it requires, which would not allow it to share track with conventional steel wheel systems and such separation would prevent direct HST service in certain heavily constrained urban terminus sections, e.g., San Francisco and Los Angeles. Shared use within such

constrained urban corridors would help to mitigate the impacts of adding additional tracks and would provide an opportunity for incremental improvement of portions of the existing rail network.

High-speed steel wheel on steel rail electrified technology, which is designed to operate at speeds of 100 to 150 mph (160-240 kph), and non-electrified conventional rail, which is capable of speeds up to 100 to 150 mph with diesel technology, were eliminated because they would not be able to produce the sustained speeds needed for a viable HST system in California. Studies showed that a travel time of three hours or less between San Francisco and Los Angeles would be needed in order to provide a travel time competitive with other modes and to attract riders to the system. The costs to implement the slower train technology would be similar to those for the HST system.

c. Eliminated system alternatives

The modal alternative which is considered in the EIR consists of a combination of highway and airport components, as described below. In developing the modal alternative, the Authority considered both a highway-improvement only system alternative and an airport-improvement only system alternative. These alternatives were rejected because neither would be practical or feasible to serve the range of intercity trip lengths to be served by the HST system, and neither would meet the purpose and need and objectives for the system with regard to predictable and reliable travel times, safety, and protection of natural resources through avoidance of environmental impacts. Consideration was also given to improving the conventional passenger rail system to stand alone or serve as part of the modal alternative. This was rejected because it would not provide or assist in providing a competitive option to satisfy intercity travel demand. Even with the implementation of improvements, travel time between Los Angeles and San Francisco would not be sufficiently improved (time reduced from about ten hours to eight hours and 30 minutes) for conventional to provide a competitive alternative mode and would continue to require transfer to buses for a portion of the trip.

d. Eliminated HST Corridors

The HST corridor options which were evaluated and eliminated from further consideration based on previous studies, the information provided in the screening evaluation studies, and public and agency input, are described in detail in the EIR and are listed in the staff report presented at the Authority's November 1-2, 2005, meeting in Table 2.6-3 which notes the primary reason(s) for elimination of the corridors. The eliminated corridors include a San Francisco to Los Angeles only corridor, which would not meet the objective of linking the major metropolitan areas of the state; coastal corridors generally following Highway 101 and Highway 1, which would result in greater impacts to sensitive natural and cultural resources, higher costs and slower travel due to challenging topography waters; and an Interstate Highway 5 corridor, which failed to meet basic project objectives of maximizing intermodal opportunities, maximizing connectivity and accessibility, and providing transit connections and multi-modal stations, and additionally would result in increased incompatibility with land use planning. Also eliminated were the Capitol Rail Corridor (Sacramento to Oakland) and the Panoche Pass because they would not meet basic project objectives. For additional discussion of these corridors see chapter 2 in the EIR.

Additional HST alignment and station options were evaluated and eliminated from further consideration in the EIR as a result of the Authority's screening process, which consisted of using the objectives and criteria established by the Authority to identify reasonable and practicable options for further investigation in the Program EIR. Briefly described, the criteria used for this evaluation are the following, which are presented and described in more detail in the EIR:

- maximize ridership/revenue potential
- maximize connectivity and accessibility
- minimize operating and capital costs
- maximize compatibility with existing and planned development
- minimize impacts on natural resources
- minimize impacts on social and economic resources
- minimize impacts on cultural and parks/wildlife refuge resources
- maximize avoidance of areas with geologic and soil constraints
- maximize avoidance of areas with potential hazardous materials

In addition the Authority's performance criteria were applied. Using cost and travel time as primary indicators of engineering viability and ridership potential, capital costs and travel times were estimated and quantified for the options considered. Other engineering criteria, such as operational, construction, and right of way issues, and environmental concerns were evaluated qualitatively. The HST alignment and station options eliminated through the screening evaluation are discussed in detail in Section 2.6.9 of the Final Program EIR/EIS, are listed in Table 2.6-6 in the EIR and in the October 2005 Staff Report, and are depicted in maps included in Section 2.6.9 of the EIR.

3. Elimination of Alternatives Recommended in Comments that Would Not Meet One or More Primary Program Objectives

a. Other Technologies

A few comments on the Draft EIR suggested that technologies other than those investigated be used for the HST System. However, these other technologies are, without exception, unproven, largely conceptual technologies which have not been tested in service. These technologies include the suggested "Underground Express" technology (e.g., see comment letter I003 in the Final EIR) and other conceptual concepts for intercity transportation. These technologies cannot be used for the construction of an HST System within an appropriate timeframe to be in service by the year 2020, and are not assured of being able to share infrastructure in the very constrained urban areas within the Preferred HST System Alternative. The Authority finds these technologies are infeasible to meet the purpose and objectives for the program.

b. Other Routes

Some comments suggested other route ideas for the proposed HST System, i.e., additional routes and destinations beyond the major metropolitan areas discussed in the EIR and identified as part of the Preferred HST System Alternative. For example, suggestions included routes to the

Imperial Valley, to areas north of Sacramento, to Mexico, etc. Additional routes could be considered in the future based upon further environmental and economic analyses, but are not proposed at this time as part of the HST System. Such additional routes do not meet the program objectives of serving the state's major metropolitan areas. Further, these routes do not meet the objective of providing economically viable transportation system that would generate revenues in excess of operations and maintenance costs, and they could result in substantial additional environmental impacts. The Authority finds these additional routes are infeasible to meet the purpose and objectives of the initial HST Program.

B. Comparison of Alternatives Studied in the EIR

These findings compare all alternatives considered in the EIR where appropriate in order to provide a basis for selection of the finally approved Preferred System Alternative. In rejecting certain alternatives, the Authority has considered the purpose and need and basic program objectives and weighed the ability of the various alternatives to meet these objectives. While each alternative represents trade-offs, the Preferred HST System Alternative strikes a balance of benefits while considering environmental impacts, uncertainty, and other factors.

The discussion that follows compares the No Project Alternative and the Modal Alternative to the Preferred HST System Alternative on the basis of the relative ability of each alternative to meet program purpose and objectives, to reduce or avoid potential environmental impacts and its practicability. The Preferred HST System Alternative is described more fully in Chapter 2 of the Final Program EIR/EIS, Section II of these Findings, and in Subsection C below. The purpose of this comparison of alternatives is to highlight the changes to the environment that would take place as a result of implementing the different system alternatives.

1. Comparison to No Project Alternative

The No Project Alternative consists of the state's transportation system (highway, air, and conventional rail) in 1999-2000 and as it would be after the implementation of improvements, programs or projects, that are currently projected in regional transportation plans (RTPs), for which implementation funds have been identified, and that are expected to be in place by 2020 in the same general geographic area that would be served by the proposed HST System.

Compared to the No Project Alternative and existing conditions, the Preferred HST System Alternative provides significant improvements in terms of air quality, energy efficiency in transportation uses, reduced overall fuel use, and improving travel conditions (including mobility, reliability, safety, connectivity, travel times, and capacity). Air quality improvements with the HST System Alternative would result from reduced VMT for intercity travel and from reduced congestion. The No Project Alternative would not meet the intercity travel needs projected for the future (2020 and beyond) as population continues to grow. Under the No Project Alternative fuel use and congestion would increase, along with travel delays and air quality impacts, and travel times would be longer and less reliable than under existing conditions. Peak travel time congestion would be significantly extended in some areas of the system under the No Project Alternative. The No Project Alternative would not produce

improvements in connectivity with and access to public transit or otherwise serve to increase integration of the transit system. Under the No Project Alternative intercity travel would remain subject to limited flexibility and reliability related to weather events, congestion and accidents. The No Project Alternative would result in adverse environmental impacts on air quality, energy use, and other resources, but would not offer travel improvements compared to the HST System Alternative.

After full consideration of the No Project Alternative, as discussed in the EIR/EIS, the Authority finds that taking no action under the No Project Alternative would not meet the intercity travel needs projected for the future (2020) as population continues to grow, and would fail to meet purpose and need, and would fail to meet the objectives of a statewide HST system. The No Project Alternative would result in an intercity transportation network that would not be as safe as, would have increased travel times, and would be significantly less reliable than existing conditions. The No Project Alternative would also exacerbate existing transportation system constraints, energy use, and dependence on petroleum as demand for intercity travel in California increases. The No Project Alternative would result in environmental impacts but would not offer travel improvements compared to the Modal and HST Alternatives. The No Project Alternative is neither a viable nor realistic alternative for California's future intercity travel demands. For these reasons the Authority rejects the No Project Alternative.

2. Comparison to Modal Alternative

The Modal Alternative consists of a combination of future transportation improvement options in both the highway and aviation modes of intercity travel. Because the majority of intercity travel is split between aviation and highway modes, the Modal Alternative consists of hypothetical improvements to the highway and aviation system that were identified based on an appropriate forecast of representative demand for each modes and designed to provide a quantifiable capacity improvement equivalent to the capacity that would be provided by the HST System Alternative to meet a representative demand for intercity trips (58 million) and some commuter trips (10 million) as described in Chapter 2 of the Final Program EIR/EIS.

The capacity improvements included in the Modal Alternative are considered hypothetical and have been reviewed at the program-level of the analysis for their potential feasibility in order to provide a comparison of potential environmental impacts from a system of theoretical improvements which could serve the same level of intercity travel demand as could be served by the proposed HST system. Such improvements, however, are not proposed by the Authority, nor are they within the Authority's purview to pursue or to implement.

The Modal Alternative would meet the projected needs for intercity travel in 2020 and would result in reduced highway travel times and congestion as compared to both the No Project and HST Alternatives. However, congestion would still increase on highways and airports compared to existing conditions for both the Modal and HST Alternatives. The Modal Alternative would also create slightly fewer impacts to visual quality resources as compared to the Preferred HST System Alternative.

The Modal Alternative would create somewhat greater impacts on air quality, noise, biology and wetlands, cultural resources, hydrology, water quality, and land uses, both from construction and operations, as compared to the Preferred HST System Alternative. The Modal Alternative would also result in increased energy use, continued reliance on petroleum and would contribute to increases in suburban sprawl. The Modal Alternative would provide an intercity transportation network that would not be as safe or as reliable as the HST System Alternative and would not improve connectivity between exiting modes.

The capital cost of the Modal Alternative would be over two times the estimated capital cost of the HST System Alternative, yet the Modal Alternative would have considerably less sustainable capacity than the HST System Alternative to serve California's intercity travel needs beyond 2020. Improvements within the Modal Alternative represent fixed additional capacity to the transportation system, whereas with the same basic system infrastructure and with little, if any, additional construction, and related impacts, the capacity of the Preferred HST System Alternative can be expanded, e.g., by the addition of trains for more service or longer trains for greater capacity at certain times and locations.

Finally, while the improvements for the Modal Alternative were reviewed for their potential feasibility in order to prepare an appropriate comparative impact analysis at the program level, there is no assurance that these improvements would be proposed, implemented or funded by the agencies responsible for the affected facilities within the time frame for the implementation of the Preferred HST System Alternative.

The Authority has fully considered the Modal Alternative discussed in the Final Program EIR/EIS. The Authority finds that while the Modal Alternative would meet the projected intercity travel needs for 2020, it would be much less effective that the Preferred HST System Alternative in doing so and it would result in significant environmental impacts. The Modal Alternative would not meet objectives related to interconnecting transit services and increasing the efficiency of the transportation system, would not meet objectives related to reducing VMT and improving air quality, and would not improve energy efficiency in transportation use.

For the above reasons the Authority rejects the Modal Alternative.

3. Conclusion

For the above stated reasons the Authority rejected the No Project Alternative and the Modal Alternative. The Authority finds that the Preferred HST System Program Alternative is more effective in meeting the program objectives within the time frame needed and would result in fewer adverse impacts than the Modal Alternative. The Preferred HST System Alternative is also more effective in meeting the program objectives than the No Project Alternative and would result in energy savings, air quality improvement and transportation capacity improvements, as compared to the No Project Alternative. In addition to meeting the program objectives the Preferred HST System Alternative would also provide environmental benefits in the form of increased efficiency in energy use for transportation, decreased energy consumption [e.g., oil fuels consumption], improved air quality, improved travel conditions (including mobility, safety, reliability, travel times, and connectivity and accessibility) and reduced vehicle-miles-traveled

for intercity trips. Given the environmental benefits it would provide, the Preferred HST System Program Alternative is the environmentally superior alternative among all of the alternatives considered, including the No Project Alternative.

C. Benefits of the Preferred Program Alternative

As noted above, expected increases in population and intercity travel demand in California will result in increased travel times, increased vehicle-related air pollution emissions, increased congestion and delays, while transportation flexibility, reliability and safety will likely decline in the future. The proposed HST system is the Preferred Program Alternative and is most effective in meeting the program purpose and objectives in order to provide a new mode of transportation to help meet increasing demand for intercity travel while connecting with public transit and other travel modes and protecting sensitive environmental resources.

The Preferred HST System Alternative consists of a system over 700-miles long capable of sustained speeds of 200 mph with electric-powered steel-wheeled trains on a mostly dedicated system of fully grade-separated, access-controlled steel tracks with state-of-the-art safety, signaling, communication and train control systems which would connect the major metropolitan areas of the state and connect with other transportation modes at multi-modal stations. The Preferred HST System Alternative meets the multiple objectives set forth for the program, reduces adverse environmental effects, and provides multiple benefits, including the following:

- New safe, reliable mode of intercity travel with competitive travel times.
- Improved connectivity and accessibility to other travel modes.
- Air quality improvements from reduced VMT for intercity trips, grade-separated crossings that remove local traffic delays and decreased congestion.
- Reduced energy consumption and increased energy efficiency in transportation.

- Multi-modal hub stations that support transit oriented development and increased land use efficiency to decrease sprawl and decrease urban area growth.
- Increased intercity travel options, particularly in the Central Valley.
- Opportunities for expanded service and capacity with little infrastructure change.
- Noise reductions where grade separations result in removing train horn noise.

As proposed, the Preferred HST System Alternative would largely use existing transportation corridors and railroad rights of way in order to minimize impacts to environmental resources. The Authority has adopted design practices to be included in the Preferred HST System, and to be applied in the next steps of planning for the HST System, that would further minimize and avoid adverse environmental impacts described in Section IV of these findings. These design practices are described in the foregoing findings and in the Final EIR, and are incorporated into the Preferred HST System Alternative.

In addition to incorporating design practices to minimize potential impacts, the Authority has adopted mitigation strategies to avoid or minimize adverse environmental impacts described in Section IV of these Findings. The adopted mitigation strategies will be refined and applied in

future project-level studies as site specific mitigation measures to address the potential impacts of proposed alignments at locations identified with more specificity than is possible at the program-level of analysis. The Authority finds that the Preferred HST System Alternative incorporates all feasible mitigation strategies identified at the program-level of analysis and that the Preferred HST System Alternative with the identified design practices and mitigation strategies best meets the purpose and objectives of the program while minimizing and avoiding environmental impacts. The design practices and mitigation measures will be refined and applied further during project level studies, and in project level studies additional mitigation measures may be identified and applied. Due to uncertainty from the fact that these mitigation strategies cannot be fully defined at the program-level and, thus, their ability to reduce potential impacts cannot be fully measured at the program level, the Authority finds that the Preferred Program Alternative could result in significant and unavoidable impacts. Accordingly a statement of overriding considerations has been prepared and included in these Findings.

D. Selection of Preferred Corridor Alignments and Station Locations

Chapter 6A of the EIR/EIS identifies HST alignment and station location preferences based upon information contained in the EIR/EIS, supporting technical reports, and comments received from agencies and the public. In identifying preferred alignment and station locations the Authority has considered the relative differences among alignments and station locations within each of the conceptual corridors studied with regard to physical and operational characteristics, and potential environmental impacts. The Authority was guided by the objectives and criteria applied for the screening evaluations which is summarized above [Table 2.6-5 in the EIR], in considering the more detailed information provided by the EIR/EIS. Staff reports presented to the Authority in public meetings provided detailed information concerning the relative differences between the alignment and station locations being considered and made recommendations for selection of those that would best satisfy the screening evaluations. In considering station locations, the Authority was seeking multi-modal hub locations.

The Authority reviewed the staff recommendations, and approved them with a few modifications as preferred alignment and station locations to be identified in the Final EIR. Further review during the preparation of the Final EIR resulted in slight changes broadening the study areas described for future analysis in three locations [inclusion of the CCT alignment between Sacramento and Stockton, additional planning studies for a potential Visalia station, and defining the segment between Burbank to LAUS as a relatively wide corridor]. In its action approving staff recommendations, the Authority approved the identification of a broad corridor for the HST segment linking the Bay Area with the Central Valley for further study of potential northern mountain crossing alignment options, excluding routes crossing Henry Coe State Park. By selecting these preferred alignment and station locations the Authority is indicating it does not intend to investigate further in project level studies the alignment and station options that have <u>not</u> been identified as preferred. After future study of the broad northern mountain corridor along with connections in the Bay Area and the Central Valley, the Authority intends to identify a preferred northern mountain crossing alignment. The preferred alignment and station locations are identified conceptually to indicate the locations for future more specific study that will provide the information needed to determine precise alignment and station locations. The Authority approves the preferred alignment and station locations, as identified in Chapter 6A of

the Final EIR, to be the focus of future more detailed studies to implement the Preferred HST System Alternative.

VIII.
STATEMENT OF OVERRIDING CONSIDERATIONS

The program-level environmental impact report/ environmental impact statement (EIR/EIS) prepared for the California High-Speed Train (HST) project concluded that significant and unavoidable impacts would occur as a result of the proposed project. In keeping with CEQA Section 21081 and the requirements of the State CEQA Guidelines 15093, this statement of overriding considerations has been prepared. The significant and unavoidable impacts and the benefits related to the HST project are described below. The California High-Speed Rail Authority (Authority) Board has weighed these impacts and benefits of the HST system. As described below, the Authority has found that the transportation, environmental, economic, and social benefits of the HST project outweigh the significant and unavoidable environmental impacts.

The level of analysis provided in this program EIR is less detailed than that typically provided in a project-level EIR, such as for approval of a development project like a hotel at a particular location. Because a program EIR necessarily provides less detailed analysis and less detail concerning mitigation measures, it is more difficult to conclude with certainty that the inclusion of identified mitigation measures or strategies in the program approval will necessarily reduce adverse impacts to a less-than-significant level. For example, the program EIR notes that implementing the train system would result in some loss of agricultural land (i.e., conversion of land currently in agricultural use to urban use), but it cannot be determined at the program level of analysis exactly where and how much agricultural land would be needed for the train system. For such areas of uncertainty, a statement of overriding considerations is needed.

General Findings

Potentially significant/unavoidable impacts associated with the following resource areas might occur as a result of the HST System Alternative:

- Land Use:
  - Incompatibility with Land Uses and Disruption to Communities
  - Impacts to Neighborhoods During Construction
- Agricultural Lands:
  - Conversion of prime, statewide important, and unique farmlands, and farmlands of local importance, to project uses
- Aesthetics and Visual Resources
- Cultural and Paleontological Resources
  - Impacts to Archaeological Resources and Traditional Cultural Properties
  - Impacts to Historic Properties/Resources
  - Impacts to Paleontological Resources
- Biological Resources and Wetlands

- Impacts to Sensitive Habitat and Sensitive Vegetation Communities
  - Impacts to Wildlife Movement Corridors
  - Impacts to Non-wetland Jurisdictional Waters
  - Impacts to Wetlands
  - Impacts to Marine and Anadromous Fishery Resources
  - Impacts to Special Status Species
- Public Parks and Recreation Resources—Impacts to Parks and Recreational Resources

Overriding Considerations

The Authority has determined that the need for a high-speed train system is directly related to the expected growth in population and resulting increases in intercity travel demand in California over the next twenty years and beyond. As a result of this growth in travel demand, there will be increases in travel delays from the growing congestion on California's highways and at airports. In addition, there will be effects on the economy and quality of life from a transportation system that is less and less reliable as travel demand increases and from deteriorating air quality in and around California's metropolitan areas. The intercity highway system, commercial airports, and conventional passenger rail serving the intercity travel market are currently operating at or near capacity, and will require large public investments for maintenance and expansion in order to meet existing demand and future growth.

The proposed high-speed train system would provide a new mode of high-speed intercity travel that would link the major metropolitan areas of the state; interface with international airports, mass transit, and highways; and provide added capacity to meet increases in intercity travel demand in California projected for the year 2020 and beyond in a manner sensitive to and protective of California's unique natural resources.

The evaluation and findings indicate that the Modal Alternative, improvement to existing highway and air modes of intercity travel, would help meet projected needs for intercity travel in 2020, but would not satisfy the purpose and objectives of the program as well as the HST alternative. In addition, although the capital cost of the Modal Alternative would be over two times the estimated capital cost of the HST Alternative, the Modal Alternative would have considerably less sustainable capacity than the HST Alternative to serve California’s intercity travel needs beyond 2020.

The evaluation and findings of the Final Program EIR/EIS also indicate that taking no action under the No Project Alternative would not meet the intercity travel needs projected for the future (2020 and beyond) as population continues to grow, and would fail to meet the purpose and objectives of the program which can be met by the Preferred HST Alternative. The No Project Alternative would result in environmental impacts but would not offer travel improvements compared to the Modal and HST Alternatives.

As informed by the analysis presented in the Draft Program EIR/EIS, public and agency comments, and additional analysis described in the Final Program EIR/EIS, the Authority and

the FRA have concluded that the HST alternative is the preferred system alternative and have identified preferable alignments and stations. In addition, the HST Alternative is identified as environmentally preferable under NEPA as well as the environmentally superior alternative under CEQA.

BENEFITS OF THE CALIFORNIA HIGH-SPEED TRAIN SYSTEM

Benefits to the Transportation System

Highway traffic conditions are currently highly congested and are projected to further deteriorate under the No Project Alternative. In every region studied, the No Project Alternative would not add sufficient capacity to accommodate the projected growth in highway travel, including both the existing large urban areas (i.e., the San Francisco Bay Area and Los Angeles basin) and the growing urban areas in the Central Valley. Future forecast increases in travel demand will lead to greater congestion, increased total travel time delay, and reduced reliability on the primary highway corridors throughout the study area. Of the highway segments analyzed, over half are already operating beyond their capacity with "stop-start" conditions during peak periods, and congestion is estimated to increase by nearly 40% under the No Project Alternative. Between Los Angeles and Bakersfield, highway traffic congestion is forecasted to increase by over 70%, with portions of I-5 burdened during peak periods with more than three times the volume of traffic than highway capacity to carry it. Typically, this would cause the morning peak period of congestion in urban areas to extend from two hours under existing conditions, to four hours by 2020. Because this program-level analysis could not attempt to quantify localized capacity restriction (e.g., bottlenecks at given interchanges) and incidents on the highways—accidents, breakdowns, and highway maintenance that are unpredictable and are responsible for a majority of the congestion on California's urban highway networks—congestion would be likely considerably greater than forecast under the No Project Alternative.

Likewise, many of the airports in the study area are currently at or near capacity and could become severely congested under the No Project Alternative. The number of passengers that enplaned and deplaned in California in 1999 (almost 173 million) is expected to more than double by 2020. However, the aviation component of the No Project Alternative consists primarily of additional gates, access improvements, and parking expansion. No additional runways or other major capacity expansion projects are included. Capacity constraints are likely to result in considerable future aircraft delays, particularly at California's three largest airports.[1] San Francisco International Airport (SFO) has "one of the worst flight delay records of major U.S. airports—only 64 percent of SFO flights were on time during 1998."[2] According to the Web site for SFO, within 10 years, the three Bay Area airports will not, even during good weather, have sufficient capacity to meet regional air traffic demand. Los Angeles International Airport projects a demand of 19.2 million more annual passengers than their 78.7 million total passenger capacity by 2015, and San Diego International-Lindbergh Field expects to be at

[1] California High Speed Rail Commission 1996. Working Paper #3, Cost Comparison of Mode Alternatives. June 20.

[2] San Francisco International Airport. 2003. Building the future. Available at: <www.flysfo.com>. Accessed: December 2003.

capacity prior to 2020.[3] The projected delays at heavily used airports and forecasted highway congestion would continue to delay travel, negatively affecting the California economy and quality of life.

The HST System Alternative would meet the need for a safe and reliable mode of travel that would link the major metropolitan areas of the state and deliver predictable, consistent travel times sustainable over time. The HST System Alternative also would provide quick, competitive travel times between California's major intercity markets. Table S.5-1 shows examples of door-to-door travel times between several city-pairs for 2020, comparing the automobile and air transportation travel times estimated for the No Project Alternative to the travel times estimated for the HST System Alternative. For longer distance intercity markets such as San Francisco to Los Angeles, the HST System Alternative would provide door-to-door travel times that would be comparable to air transportation and less than one half as long as automobile travel times. For intermediate intercity trips such as Fresno to Los Angeles, the HST System Alternative would provide considerably quicker travel times than either air or automobile transportation, and would bring frequent HST service to many parts of the state that are not well served by air transportation. In addition, the passenger cost for travel via the HST service would be lower than for travel by automobile or air for the same intercity markets.

The HST System Alternative would provide a new intercity, interregional, and regional passenger mode—the high-speed train—, which would improve connectivity and accessibility to other existing transit modes and airports compared to the other alternatives. The proposed HST system is the only alternative that would improve the travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips. The HST system also provides system redundancy in cases of extreme events such as adverse weather or petroleum shortages (HST trains are powered by electricity which can be generated from non-petroleum or petroleum-fueled sources; automobiles and airplanes currently require petroleum). The HST System Alternative would provide a predominantly separate transportation system that would be less susceptible to many factors influencing reliability, such as capacity constraints, congestion, and incidents that disrupt service. In addition, since high-speed trains are able to operate in all weather conditions, the on-time reliability of this mode of travel would be superior to travel by either auto or air. Based on experience with HST systems in other countries, HST has a lower accident and fatality rate than automobile travel. In terms of sustainable capacity, the HST System Alternative would offer greater opportunities to expand service and capacity with minimal expansion of infrastructure, than either the No Project or Modal Alternatives.

[3] San Diego Airport. 2001. The San Diego Airport Economic Analysis and Public Information Program. San Diego, CA.

Table S.5-1
Estimated Total Travel Times (Door to Door) between City Pairs by Auto, Air, and HST in 2020 (Hours:Minutes)

City Pairs	Auto[1] (No Project Alternative)	Air (No-Project Alternative)		HST (HST Alternative) (Optimal Express Time)	
	Total	Line Haul[2]	Total	Line Haul[2]	Total
Los Angeles downtown to San Francisco downtown	7:57	1:20	3:32	2:35	3:30
Fresno downtown to Los Angeles downtown	4:30	1:05	3:02	1:22	2:33
Los Angeles downtown to San Diego downtown	2:49	0:48	3:00	1:13	2:16
Burbank (Airport) to San Jose downtown	6:50	1:00	3:14	1:49	2:52
Sacramento downtown to San Jose downtown	2:40	No service	No service	0:50	1:53

Auto trips are assumed to be "point to point" and therefore do not have a line-haul (time in vehicle) time associated with their travel times.
Time in airplane or train.
Source: Parsons Brinckerhoff.

The HST System Alternative would add capacity to the state's transportation infrastructure and reduce traffic on certain intercity highways and around airports to the extent that intercity trips are diverted to the HST system. It also would eliminate delays at existing at-grade crossings where the HST system would provide grade separation. The HST System Alternative would reduce travel time, improve reliability, and divert auto and air traffic and thereby reduce highway congestion. The HST System Alternative also would decrease injuries and fatalities due to diversion of trips from highways, improve connectivity, and add a variety of connections to existing modes, additional frequencies, and greater flexibility.

Benefits to the Environment

The Authority has made a serious commitment to utilize existing transportation corridors and railroad rights of way to minimize the impacts on California's treasured landscape. Furthermore, a key objective to avoid and/or minimize the potential impacts to cultural, park, recreational and wildlife refuges has been largely met. The preferred HST alignment and station locations best meet the objectives and criteria for minimizing potential environmental impacts while maximizing HST ridership potential and connectivity and accessibility.

The USEPA and USACE have participated in the development of both the Draft and Final Program EIR/EIS and in accordance with the memorandum of understanding among Federal agencies for this environmental review, were consulted concerning the selection of the preferred corridor and route most likely to yield the least environmentally damaging practicable alternative (LEDPA) and as identified as preferred in the Final Program EIR/EIS. The USEPA and USACE have concurred that the preferred HST alignment and station options identified in the Final Program EIR/EIS are most likely to contain the LEDPA.

The HST System Alternative would provide air quality, energy consumption, and noise benefits. The HST system would decrease air pollutants statewide and in all air basins analyzed by reducing pollution generated by automobile combustion engines. This reduction would be a result of decreased vehicle miles traveled by automobiles and decreased automobile congestion.

The HST system would also lower total energy consumption because a HST system uses less energy to move passengers than either airplanes or automobiles: the HST system would use about one-third the energy needed by an airplane, about one-half the energy needed by an automobile for an intercity automobile trip, and one-fifth the energy needed by an automobile for a commuter automobile trip.

In addition, noise reduction would occur in locations where grade separations eliminate horn and crossing gate noise at existing grade crossings.

Land Use Planning Benefits

The HST System Alternative would be highly compatible with local and regional plans that support rail systems and transit-oriented development (TOD) and would offer opportunities for increased land use efficiency (i.e., higher density development and reduced rate of farmland loss). The HST System Alternative would also meet the need for improved inter-modal connectivity with existing local and commuter transit systems. In contrast, the highway improvement options under the Modal Alternative would encourage dispersed patterns of development and would be inconsistent with the objectives of many local and regional planning agencies to promote transit-oriented, higher-density development around transit nodes as the key to stimulate in-fill development that makes more efficient use of land and resources and can better sustain population growth. Urbanized areas in California are expected to grow by 47% between now and 2035 under the No Project Alternative. Under the Modal Alternative, urbanized area growth is expected to be about 1.4% (65,500 ac [26,507 ha]) higher than the No Project Alternative, while the HST System Alternative would result in a slight decrease in urban area growth (2,600 ac [1,052 ha]) compared to the No Project Alternative. However, the HST System Alternative is expected to result in a slightly greater increase in population than the No Project and Modal Alternatives.

HST stations in California will be multi-modal transportation hubs. All the selected high-speed rail station locations would provide linkage with local and regional transit, airports, and highways. In particular, convenient links to other rail services (heavy rail, commuter rail, light rail, and conventional intercity) will promote TOD at stations by increasing ridership and pedestrian activity at these “hub” stations. A high level of accessibility and activity at the stations can make the nearby area more attractive for additional economic activity. Most of the

potential stations identified for further evaluation are located in heart of the downtown/central city area of California's major cities minimizing potential impacts on the environment and maximizing connectivity with other modes of transportation. These locations also would have the most potential to support infill development and TOD.

Increased density of development in and around HST stations provides a means to increase public benefits beyond the benefits of access to the HST system itself. Such benefits could include relief from traffic congestion, improved air quality, promotion of infill development and preservation of natural resources, increased stock of affordable housing, promotion of job opportunities, reduction in energy consumption, and improved cost-effectiveness of public infrastructure. The Authority and local government working together will need to determine which mechanisms best suit each community and could be implemented to enhance the benefits possible from potential HST station development.

Significant growth is expected in large areas of California with or without an HST system. The proposed HST system, however, would be consistent with and promote the State's adopted smart growth principles,[4] and should be a catalyst for wider adoption of smart growth principles in communities near HST stations. It should encourage infill development, help to protect environmental and agricultural resources by encouraging more efficient land use, and encourage efficient and compact development, along with infrastructure that provides adequate transportation and other utilities and minimizes ongoing cost to taxpayers.

Economic Benefits

The HST System Alternative would generate economic benefits related to revenue generated by the system, economic growth generated by construction and operation of the system, benefits from reduced delays to air and auto travelers, reduced air pollution, reduced accidents and fatalities and economic advantages related to proximity to the HST system.

According to the Authority's Business Plan (June 2000), the market for intercity travel in California that the high-speed train system can serve is projected to grow by almost 40 percent over the next 20 years. By the year 2020, the HST system is forecast to carry at least 32 million intercity passengers and generate $888 million in revenue (calculated in 1999 dollars). This revenue will more than cover operating costs, resulting in an annual surplus of nearly $340 million, while using HST fares significantly lower than current airfares. Moreover, the benefit-cost analysis done as part of the Business Plan concluded that through the year 2050, direct benefits from HST would be more than twice the costs.

The Business Plan estimated that the construction of the HST system would generate the equivalent of almost 300,000 job-years of employment. In addition, the construction spending is estimated to generate in present value more than $11 billion in personal income, almost $28 billion in industrial output, and $871 million in tax revenue. The industries in California that are expected to benefit most are construction ($10.4 billion in total added output), services ($6.6 billion in added output), and manufacturing ($2.7 billion in added output). Also, the system

[4] As expressed in the Wiggins Bill (AB857, 2003), and in government code 65041.1

would generate thousands of permanent jobs through the ongoing operations of high-speed trains.

The Business Plan concluded that Californians who continue to travel by air and automobile will also benefit from the HST system. By diverting some passengers to high-speed trains, the system will reduce the otherwise expected delays in major airports and highways. Reductions in airport delay will, in turn, reduce aircraft operating costs. At California's nine largest airports, the present value of these benefits is estimated at over $12 billion. Benefits to automobile users (both intercity and commuter) are estimated at over $13.6 billion.

Although the HST System Alternative would induce slightly more economic growth than the No Project or Modal Alternative, the HST System Alternative is forecasted to result in denser development, which would accommodate more population and employment on less land. The HST Alternative would result in a slight decrease in urban area growth and a statewide increase of 450,000 jobs over the No Project Alternative and 200,000 jobs over the Modal Alternative between 2002 and 2035.

Experiences in other countries have shown that an HST system can provide a location advantage to those areas that are in proximity to an HST station because an HST system would improve accessibility to labor and customer markets, thereby potentially improving the competitiveness of the state's industries and the overall economy. Businesses that locate in proximity to an HST station could operate more efficiently than businesses that locate elsewhere. This competitive advantage may be quite pronounced in high-wage employment sectors that are frequently in high demand in many communities.

Social Benefits

The HST System Alternative would provide a new intercity, interregional, and regional passenger mode that would improve connectivity and accessibility to other existing transit modes and airports compared to the other alternatives. HST would improve the travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips and the passenger cost for travel via the HST service would be lower than for travel by automobile or air for the same intercity markets.

According to the Business Plan, an HST system would provide an opportunity for some people who would not otherwise make trips to do so, e.g., where travel options are currently limited. In addition, high-speed rail is a mode of transportation that can enhance and strengthen urban centers. In combination with appropriate local land use policies, the increased accessibility afforded by the high-speed service could encourage more intensive development and may lead to higher property values around stations.

Conclusion

Although the HST System Alternative would have potentially significant environmental impacts on resources, including noise, biology, wetlands, and farmlands, the HST System Alternative would have distinct benefits in travel conditions, land use planning, energy savings, and reduced air emissions. In addition, although the HST System Alternative would induce slightly more

economic growth, the HST System Alternative is forecasted to result in denser development, which would accommodate more population and employment on less land. The HST System Alternative would result in a slight decrease in urban area growth and a statewide increase of 450,000 jobs. The HST System Alternative is identified as environmentally preferable under NEPA as well as environmentally superior under CEQA.

The Authority has found that the transportation, environmental, land use, economic, and social benefits of the HST project outweigh the significant and unavoidable environmental impacts. This statement of overriding considerations is based on the Authority Board's review of the Final Program EIR/EIS and other information in the administrative record.

APPENDIX B

MITIGATION MONITORING AND REPORTING PLAN

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Mitigation, Monitoring, and Reporting Plan for the California High-Speed Rail Program EIR/EIS

This mitigation, monitoring, and reporting plan is designed to fulfill Section 21081.6 of the California Environmental Quality Act (CEQA), which requires public agencies to adopt a reporting or monitoring program whenever a project or program is approved that includes mitigation measures identified in an environmental document. The mitigation strategies described below are for a program-level decision and are to be used to avoid, minimize, or reduce any potentially significant environmental impacts. Project-level activities will undergo future environmental analysis as required by NEPA and CEQA tiering from this EIS/EIR. As part of these second-tier environmental reviews, the lead agency for each of these projects will use the mitigation strategies identified in the program document as starting points to determine their applicability to a specific project and to develop additional mitigation measures for significant adverse impacts identified in the project-specific analysis. Because all the potential actions and impacts for tiered projects cannot be anticipated at a programmatic level, each project needs to select those strategies applicable to the impacts associated with the specific location and type of action. For purposes of CEQA, the mitigation strategies in the Final EIS/EIR also serve as mitigation measures at a programmatic level. The NEPA/CEQA monitoring process includes review, guidance, and reporting components. The lead agencies for second tier documents will note which applicable programmatic mitigation strategies are being adopted and used for mitigation measures and explain why others are not. The lead agencies will provide a schedule for implementing the adopted mitigation measures and for reviewing the implementation of those measures.

As a programmatic-level document, the Program EIR/EIS does not analyze site-specific impacts of potential alignments or stations; therefore, it cannot predict with certainty which impacts will occur and what site-specific mitigation measures are appropriate for the second-tier level of actions. Consequently, the Program EIR/EIS describes mitigation strategies that are approaches tailored to address the types of impacts anticipated as a result of construction of the HST system. These strategies will provide the basis to structure more site-specific measures when more detailed data on the impacts is available at the second-tier. In addition, the Authority has committed to design practices and policies that will be used to develop alignment alternatives at the project-level to avoid impacts and to help shape specific mitigation measures.

At this program level of planning, the Authority is responsible for tracking the mitigation and incorporating it into future studies that it undertakes, but a monitoring plan cannot yet be developed. For the next tiers of environmental analysis, a monitoring plan will be developed as part of each project-level analysis that includes more specific timing for the mitigation measures, and additional parties may be identified with responsibility for implementing the measures.

Resource Area	Impact Area	Mitigation Measure
Traffic and circulation	Traffic and circulation	Require that HST system stations serve as multi-modal transportation hubs providing easy connection to local/regional bus, rail and transit services, as well as providing bicycle and pedestrian access.
		Require the HST system to be grade-separated from all roadways to allow vehicular traffic to flow without impediment from the HST system.
		Work with local and regional agencies to develop and implement transit-oriented development strategies, as described in Chapter 6B, around HST stations.
		Work with local and regional agencies to identify, plan, coordinate, and implement traffic flow improvements around HST station locations during project-level planning. Such improvements may include: a. a construction phasing and traffic management plan for construction periods b. improving capacity of local streets with upgrades in geometrics such as providing standards roadway lane widths, traffic controls, bicycle lanes, shoulders and sidewalks c. modifications at intersections, such as signalization and/or capacity improvements (widening for additional left-turn and/or through lanes), and turn prohibitions d. signal coordination and optimization (including retiming and rephasing) e. designation of one-way street patterns near some station locations f. truck route designations g. coordination with Caltrans regarding nearby highway facilities
		Work with public transportation providers to coordinate services and to increase service and/or add routes, as necessary, to serve the HST station areas.
		Avoid parking impacts by developing and coordinating implementation at the project-level of parking improvement strategies consistent with local policies, including shared parking, off-site parking with shuttles, parking and curbside use restrictions, parking permit plans for neighborhoods near HST stations, and other parking management strategies.
Air quality	Localized air quality impacts due to congestion/traffic near HST stations	Assure that HST stations are multi-modal hubs and include appropriate parking
		Coordinate with local and regional public transportation providers to increase opportunities for connection between the HST system and other public transportation services.
		Work with local and regional agencies to implement local street and roadway improvements, including various traffic flow improvements and congestion management techniques, and parking management strategies to reduce localized pollution from traffic related to the HST system
	Short-term air quality impacts due to construction	Water all active construction areas at least twice daily.
		Require that all trucks hauling soil, sand, and other loose materials be covered or maintain at least two feet of freeboard.
		Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at active construction sites.
		Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at active construction sites.
		Sweep nearby streets daily (with water sweepers) if visible soil materials from HST system construction are carried onto adjacent public streets.
		Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

Resource Area	Impact Area	Mitigation Measure
		Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles of dirt, sand, etc.
		Limit traffic speeds on unpaved roads to 15 mph
		Install sand bags or other erosion control measures to prevent silt runoff to public roads.
		Replant vegetation in disturbed areas as quickly as possible.
		Use alternative fuels for construction equipment when feasible.
		Minimize equipment idling time.
		Maintain properly tuned equipment.
Noise	Increased noise from train operations and construction	Grade separations to eliminate grade crossing related noise.
		Noise barriers, such as sound walls, where there are severe noise impacts.
		Require noise reduction in HST equipment design and track structures design.
		Use of enclosures or walls to surround noisy equipment, and installation of mufflers on engines; substitution of quieter equipment or construction methods, minimizing time of operation and locate equipment farther from sensitive receptors.
		Where not already included, consider placing alignment sections in tunnel or trenches or behind berms where possible and where other measures are not available to reduce significant noise impacts.
		Suspend construction between 7:00 pm and 7:00 am and/or on weekends or holidays in residential areas where there are severe noise impacts.
		In managing construction noise take into account local sound control and noise level rules, regulations and ordinances.
		Ensure that each internal combustion engine would be equipped with a muffler of a type recommended by the manufacturer.
		Specify the use of the quietest available construction equipment where appropriate and feasible.
		Turn off construction equipment during prolonged periods of non-use.
		Require contractors to maintain all equipment and to train their equipment operators.
		Locate noisy stationary equipment away from noise sensitive receptors.
	Exposure to ground-borne vibration	Specify the use of train and track technologies that minimize ground vibration such as state of the art suspensions, resilient track pads, tie pads, ballast mats or floating slabs.
		Phase construction activity, use low impact construction techniques and avoid use of vibrating construction equipment where possible to avoid vibration construction impacts.
Energy	Increased energy use and electricity demand with the HST system	HST stations will be multi-modal hubs providing linkage for various transportation modes, which will contribute to increased efficiency of energy use for intercity trips and by commuters, and the stations will be required to be constructed to meet Title 24 California Code of Regulations energy efficiency standards.
		Design practices will require that the electrically powered HST technology be energy efficient, include regenerative braking to reduce energy consumption, and minimize grade changes in steep terrain to reduce energy consumption
		Design practices will require that localized impacts be avoided through planning and design of the power distribution system for the HST System.

Resource Area	Impact Area	Mitigation Measure
		Locate HST maintenance and storage facilities within proximity to major stations/termini.
	Energy use during construction of the HST system	Develop and implement a construction energy conservation plan.
		Use energy efficient construction equipment and vehicles.
		Locate construction material production facilities on-site or in proximity to project construction sites.
		Develop and implement a program encouraging construction workers to carpool or use public transportation for travel to and from construction sites.
Electromagnetic fields and electromagnetic interference	Exposure of electromagnetic fields to HST system workers, passengers, and nearby residents, schools and other facilities	Use standard design practices for overhead catenary power supply systems and vehicles, including appropriate materials, location and spacing of facilities and power supply systems to minimize exposure to receptors over distance, and shielding with vegetation and other screening materials.
		Design overhead catenary system, substations, and transmission lines to reduce the electromagnetic fields to a practical minimum.
	Electromagnetic interference with electronic and electrical devices	Design the overhead catenary system, substations, and transmission lines to reduce the electromagnetic fields to a practical minimum.
		Design the project component to minimize arcing and radiation of radiofrequency energy.
		Choose devices generating radiofrequency with a high degree of electromagnetic compatibility.
		Where appropriate, add electronic filters to attenuate radiofrequency interference.
		Relocate receiving antennas and use antenna models with greater directional gain where appropriate, particularly for sensitive receptors near the HST system.
		Comply with the FCC regulations for intentional radiators, such as the proposed HST wireless systems.
		Establish safety criteria and procedures and personnel practices to avoid exposing employees with implantable medical devices to EMF levels that may cause interference with such implanted biomedical devices.
Land use	Incompatibility with land uses and disruption to communities	Continue to apply design practices to minimize property needed for the HST system and to stay within or adjacent to existing transportation corridors to the extent feasible.
		Work with local governments to consider local plans and local access needs, and to apply design practices to limit disruption to communities.
		Work with local governments to establish requirements for station area plans and opportunities for transit oriented development.
		Work with local governments to enhance multi-modal connections for HST stations.
		Coordinate with cities and counties to ensure that HST facilities would be consistent with land use planning processes and zoning ordinances.
		Provide opportunities for community involvement early in project-level studies.
		Hold design workshops in affected neighborhoods to develop understanding of vehicle, bicycle, and pedestrian linkages in order to preserve those linkages through use of grade-separated crossings and other measures.
		Ensure that connectivity is maintained across the rail corridor (pedestrian/bicycle and vehicular crossings) where necessary to maintain neighborhood integrity.
		Develop facility, landscape and public art design standards for HST corridors that reflect the character of adjacent affected neighborhoods.

Resource Area	Impact Area	Mitigation Measure
		Maintain high level of visual quality of HST facilities in neighborhood areas by implementing such measures as visual buffers, trees and other landscaping, architectural design and public artwork.
	Impacts to neighborhoods during construction	Develop a traffic management plan to reduce barrier effects during construction.
		To the extent feasible maintain connectivity during construction.
Agricultural lands	Conversion of prime, statewide important, and unique farmlands, and farmlands of local importance, to project uses	Avoid farmland whenever feasible during the conceptual design stage of the project.
		Reduce the potential for impacts by sharing existing rail rights-of-way where feasible or by aligning HST features immediately adjacent to existing rail rights-of-way.
		Reduce the potential for impacts by reducing the HST right-of-way width to 50 feet in constrained areas.
		Increase protection of existing important farmlands by securing easements or participating in mitigation banks.
		Coordinate with and support the California Farmland Conservancy Program to secure conservation easements on farmland in geographic areas where the HST project creates impacts.
		Coordinate with private agricultural land trusts, local programs, mitigation banks, and Resource Conservation Districts to identify additional measures to limit important farmland conversion or provide further protection to existing important farmland.
	Severance of prime, statewide important, and unique farmlands, and farmlands of local importance, to project uses	Avoid farmland whenever feasible during the conceptual design stage of the project
		Minimize severance of agricultural land by constructing underpasses and overpasses at reasonable intervals to provide property access
		Work with landowners during final design of the system to enable adequate property access
		Provide appropriate severance payments to landowners.
Aesthetics and visual resources		At the project-level, design proposed facilities that are attractive in their own right and that would integrate well into landscape contexts, so as to reduce potential view blockage, contrast with existing landscape settings, light and shadow effects, and other potential visual impacts.
		Design bridges and elevated guideways with graceful lines and minimal apparent bulk and shading effects.
		Design elevated guideways, stations, and parking structures with sensitivity to the context, using exterior materials, colors, textures, and design details that are compatible with patterns in the surrounding natural and built environment, and that minimize the contrast of the structures with their surroundings.
		Use neutral colors and dulled finishes that minimize reflectivity for catenary support structures, and design them to fit the context of the specific locale.
		Use aesthetically appropriate fencing along rights-of-way, including decorative fencing, where appropriate, and use dark and non-reflective colors for fencing to reduce visual contrast.
		Where at-grade or depressed route segments pass through or along the edge of residential areas or heavily traveled roadways, install landscape treatments along the edge of the right-of-way to provide partial screening and to visually integrate the right-of-way into the residential context.
		Use the minimum amount of night lighting consistent with that necessary for operations and safety.

Resource Area	Impact Area	Mitigation Measure
		Use shielded and hooded outdoor lighting directed to the area where the lighting is required, and use sensors and timers for lights not required to be on all the time.
		Design stations to minimize potential shadow impacts on adjacent pedestrian areas, parks, and residential areas, and site all structures in a way that minimizes shadow effects on sensitive portions of the surrounding area.
		Seed and plant areas outside the operating rail trackbed that are disturbed by cut, fill or grading to blend with surrounding vegetated areas, where the land will support plants. Use native vegetation in appropriate locations and densities.
		Use strategic plantings of fast-growing trees to provide partial or full screening of elevated guideways where they are close to residential areas, parks, and public open spaces.
		Where elevated guideways are located down the median strips or along the edge of freeways or major roadways, use appropriate landscaping of the area under the guideway to provide a high level of visual interest. Landscaping in these area should use attractive shrubs and groundcovers, and emphasize the use of low-growing species to minimize any additional shadow effects or blockage of views.
		Plan hours of construction operations and locate staging sites to minimize impacts to adjacent residents and businesses.
Public utilities		Make adjustments to the HST system alignments and vertical profiles to avoid crossing or using major utility right-of-way or fixed facilities during engineering design.
		If avoidance is not feasible, in consultation and coordination with the utility owner, relocate or protect in place transmission lines, substations, and any other affected facilities.
		For acquisition projects which result in utility relocation, follow the uniformity and equitable treatment policies, and comply with the requirements, of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 for all property necessary for the proposed HST system.
Hazardous materials and wastes		Investigate soils and groundwater for contamination and prepare environmental site assessments when necessary.
		Design realignment of the HST corridors to avoid identified sites.
		Relocate HST associated facilities such as stations to avoid identified sites.
		Remediate identified hazardous materials and hazardous waste contamination.
		Prior to demolition of buildings for project construction, survey for lead-based paint and asbestos-containing materials.
		Follow BMP's for testing, treating, and disposing of water, and acquire necessary permits from the regional water quality control board, if ground dewatering is required.
		When indicated by project level environmental site assessments, perform Phase II environmental site assessments in conformance with the ASTM Standards related to the Phase II Environmental Site Assessment Process to identify specific mitigation measures.
		Prepare a Site Management Program/Contingency Plan prior to construction to address known and potential hazardous material issues, including a. Measures to address management of contaminated soil and groundwater; b. Site-specific Health and Safety Plan (HASP), including measures to protect construction workers and general public; and c. Procedures to protect workers and the general public in the event that unknown contamination or buried hazards are encountered.

Resource Area	Impact Area	Mitigation Measure
		As part of the second-tier environmental review, consider impacts to the environment on sites identified on the Cortese list (Government Code section 65962.4) at that time.
Cultural and paleon-tological resources	Impacts to archaeological resources and traditional cultural properties	Avoid the impact, or when avoidance cannot be accommodated, minimize the scale of the impact.
		Incorporate the site into parks or open space.
		Provide data recovery for the archaeological resources, which may include excavation of an adequate sample of the site contents so that research questions applicable to the site can be addressed.
		Develop procedures for fieldwork, identification, evaluation, and determination of potential effects to archaeological resources in consultation with SHPO and Native American tribes. Procedures may include on-site monitoring when sites are known or suspected of containing Native American human remains and be reflected in Memoranda of Agreement with appropriate bodies.
		Coordinate and consult with tribal representatives.
	Impacts to historic properties/ resources	Avoid the impact through project design. Prepare and utilize a treatment plan for protection of historic properties/resources that would describe methods to preserve, stabilize, shore/underpin, and monitor buildings, structures, and objects.
		Avoid high vibration construction techniques in sensitive areas.
		Record and document cultural resources that would be adversely affected by the project to the standards of the Historic American Building Survey or Historic American Engineering Record.
		Develop design guidelines to ensure sympathetic, compatible, and appropriate designs for new construction.
		Consult with architectural historians or historical architects to advise on appropriate architectural treatment of the structural design of proposed new structures. Prepare interpretive and/or educational materials and programs regarding the affected historic properties/resources. Materials may include: a popular report, documentary videos, booklets, and interpretive signage.
		Make interpretive information available to state and local agencies, such as salvage items, historic drawings, interpretive drawings, current and historic photographs, models, and oral histories. Also assist with archiving and digitizing the documentation of the cultural resources affected, and disseminating material to the appropriate repositories.
		Relocate and rehabilitate historic properties/resources that would otherwise be demolished because of the project.
		Monitor project construction to ensure it conforms to design guidelines and any other treatment procedures agreed to by the parties consulting pursuant to Section 106 of the National Historic Preservation Act. Repair inadvertent damage to historic properties/resources in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties.
		Salvage selected decorative or architectural elements of the adversely affected historic properties/resources, and retain and incorporate salvaged items into new construction where possible. If reuse is not possible, make salvaged items available for use in interpretive displays near the affected resources or in an appropriate museum.
		Implement an agreement with appropriate bodies specifying procedures for addressing historic resources which may be affected by the HST system.

Resource Area	Impact Area	Mitigation Measure
	Impacts to paleontological resources	Educate workers.
		Recover fossils identified during the field reconnaissance.
		Monitor construction.
		Develop protocols for handling fossils discovered during construction, such as temporary diversion of construction equipment so that the fossils could be recovered, identified, and prepared for dating, interpreting, and preserving at an established, permanent, accredited research facility.
Geology and soils	Seismic hazards	Design structures to withstand anticipated ground motion, using design options such as redundancy and ductility.
		Prevent liquefaction and resulting structural damage and traffic hazards using: (1) ground modification techniques such as soil densification; and (2) structural design, such as deep foundations.
		Utilize motion sensing instruments to provide ground motion data and a control system to temporarily shut down HST operations during or after an earthquake to reduce risks.
		Design and engineer all structures for earthquake activity using CalTrans Seismic design Criteria.
		Design and install foundations resistant to soil liquefaction and settlement.
		Identify potential serpentinite bedrock disturbance areas and implement a safety plan.
		Apply Section 19 requirements from the most current CalTrans Standard Specifications to ensure geotechnically stable slopes are planned and created.
		Install passive or active gas venting systems and gas collection systems in areas where subsurface gases are identified.
		Remove corrosive soil and use corrosion protected materials in infrastructure.
		Address erosive soils through soil removal and replacement, geosynthetics, vegetation, and or rip/rap, where warranted.
		Remove or moisture condition shrink/swell soils.
		Utilize stone columns, grouting, and deep dynamic compaction in areas of potential liquefaction.
		Utilize buttress berms, flattened slopes, drains, and/or tie-backs in areas of slope instability.
		Avoid settlement through preloading, use of stone columns, deep dynamic compaction, grouting, and/or special foundation designs.
	Surface rupture hazards	Install early warning systems triggered by strong ground motion associated with ground rupture, such as linear monitoring systems (i.e., time domain reflectometers) along major highways and rail lines within the zone of potential rupture to provide early warnings and allow for temporary control of rail and automobile traffic to avoid and reduce risks.
		Continue to modify alignments to avoid crossing known or mapped active faults within tunnels.
		Avoid active faults to the extent possible. Where avoidance is not possible, cross active faults at grade and perpendicular to the fault line.
	Slope instability	Install temporary and permanent slope reinforcement and protection, based on geotechnical investigations, and review of proposed earthwork and foundation excavation plans.
		Conduct geotechnical inspections during construction to verify that no new, unanticipated conditions are encountered.

Resource Area	Impact Area	Mitigation Measure
		Incorporate slope monitoring in final design.
	Difficulty in excavation	Identify areas of potentially difficult excavation to ensure safe practices.
		Focus future geotechnical engineering and geologic investigations in areas of potentially difficult excavation.
		Monitor conditions during and after construction.
		Employ tunnel excavation and lining techniques to ensure safety.
	Hazards related to oil and gas fields	Follow federal and state Occupational Safety and Health Administration regulatory requirements for excavations.
		Consult with other agencies such as the Department of Conservation's Division of Oil and Gas, or the Department of Toxic Substances Control regarding known areas of concern.
		Use safe and explosion-proof equipment during construction.
		Test for gases regularly.
		Install monitoring systems and alarms in underground construction areas and facilities where subsurface gases are present.
		Install gas barrier systems.
Hydrology and water resources	Impacts on floodplains	Avoid or minimize construction of facilities within floodplains where feasible.
		Minimize the footprint of facilities within the floodplain, through design changes or the use of aerial structures and tunnels.
		Restore the floodplain to its prior operation in instances where the floodplain is impacted by construction.
	Impacts on surface waters	Use construction methods and facility designs to minimize the potential encroachments onto surface water resources.
		Minimize sediment transport caused by construction by following best management practices (BMPs) as part of National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan requirements that will be included in construction permits. BMPs may include measures such as: a. providing permeable surfaces where feasible; b. retaining and treating stormwater onsite using catch basins and filtering wet basins; c. minimizing the contact of construction materials, equipment, and maintenance supplies with stormwater; d. reducing erosion through soil stabilization, watering for dust control, installing perimeter silt fences, placing rice straw bales, and installing sediment basins; e. maintaining water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips that are designed to convey and treat either fallow flow (swales) or sheetflow (filter strips) runoff.
		Use methods such as habitat restoration, reconstruction of [habitat] onsite, and habitat replacement offsite to minimize surface water quality impacts.
		Comply with mitigation measures included in permits issued under sections 404 and 401 of the federal Clean Water Act.
		Comply with requirements in the Storm Water Pollution Prevention Plan to reduce pollutants in storm water discharges and the potential for erosion and sedimentation.

Resource Area	Impact Area	Mitigation Measure
		Comply with requirements of section 10 of the federal Rivers and Harbors Act for work required around a water body designated as navigable and applicable permit requirements.
		Comply with the requirements of a state Streambed Alteration Agreement for work along the banks of various surface water bodies.
		Implement a spill prevention and emergency response plan to handle potential fuel or other spills.
		Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils or steep slopes.
	Impacts on groundwater	Minimize development of facilities in areas that may have substantial groundwater discharge or affect recharge.
		Apply for, obtain, and comply with conditions of applicable waste discharge requirements as part of project-level review.
		Develop facility designs that are elevated, or at a minimum are permeable, and would not affect recharge potential where construction is required in areas of potentially substantial groundwater discharge or recharge.
		Apply for and obtain a Storm Water Pollution Prevention Plan for grading, with Best Management Practices that would control release of contaminants nears areas of surface water or groundwater recharge. Best Management Practices may include constraining fueling and other sensitive activities to alternative locations, providing drip plans under some equipment, and providing daily checks of vehicle condition.
		Use and retain native materials with high infiltration potential at the ground surface in areas that are critical to infiltration for groundwater recharge.
Biological resources and wetlands	Impacts to sensitive vegetation communities	Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Use large diameter tunnels as part of the design to limit surface access needs in tunnels for ventilation or evacuation, as a method to avoid or limit impacts to vegetation and habitat above tunnels.
		Use in-line construction (i.e., use new rail infrastructure as it is built) to transport equipment to/from the construction site and to transport excavated material away from the construction to appropriate re-use or disposal sites to minimize impacts from construction access roads on vegetation/habitat.
		Accomplish necessary geologic exploration in sensitive areas by using helicopters to transport drilling equipment and for site restoration to minimize surface disruption.
		Use and reuse excavated materials within the confines of the project.
		Participate in or contribute to existing or proposed conservation banks or natural management areas, including possible acquisition, preservation, or restoration of habitats.
		Revegetate/restore impacted areas, with a preference for on-site mitigation over off-site, and with a preference for off-site mitigation within the same watershed or in close proximity to the impact where feasible.
		Comply with the Biological Resources Management Plan(s) developed or identified during project-level studies, as reviewed by the USFWS, CDFG, and USACE.
		Conduct pre-construction focused biological surveys.
		Conduct biological construction monitoring.
		Undertake plant relocation, seed collection, plant propagation, and outplanting at suitable mitigation sites.

Resource Area	Impact Area	Mitigation Measure
		Prevent the spread of weeds during construction and operation by identifying areas with existing weed problems and measures to control traffic moving out of those areas such as cleaning construction vehicles or limiting the movement of fill.
	Impacts to wildlife movement corridors	Construct wildlife underpasses, bridges, and/or large culverts, to facilitate known wildlife movement corridors.
		Ensure that wildlife crossings are of a design, shape, and size to be sufficiently attractive to encourage wildlife use.
		Provide appropriate vegetation to wildlife overcrossings and undercrossings to afford cover and other species requirements.
		Establish functional corridors to provide connectivity to protected land zoned for uses that provide wildlife permeability.
		Design protective measures for wildlife movement corridors using the following process in consultation with resource agencies: a. Identify the habitat areas the corridor is designed to connect b. Select several species of interest from the species present in the area c. Evaluate the relevant needs of each selected species d. For each potential corridor, evaluate how the area will accommodate movement by each species of interest e. Draw the corridors on a map f. Design a monitoring program
		Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Use aerial structures or tunnels to allow for unhindered crossing by wildlife.
	Impacts to non-wetland jurisdictional waters	Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Return degraded habitat to pre-existing conditions.
		Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
		Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
		Provide for passive revegation by allowing a disturbed area to revegetate naturally.
		Purchase credits in an existing wetlands or aquatic habitat mitigation bank.
		Provide in-lieu fee payments to an agency or other entity who will provide aquatic habitat conservation or restoration.
		Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that located within the same watershed or as close in proximity to the area of impact as possible.
	Impacts to wetlands	Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Return degraded habitat to pre-existing conditions.
		Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.
		Enhance existing habitats by increasing one or more functions through activities such as plantings or non-native vegetation eradication.
		Provide for passive revegation by allowing a disturbed area to revegetate naturally.
		Purchase credits in an existing wetlands or aquatic habitat mitigation bank.
		Provide in-lieu fee payments to an agency or other entity who will provide aquatic habitat conservation or restoration.

Resource Area	Impact Area	Mitigation Measure
		Develop and implement measures to address the “no net loss” policy for wetlands.
		Prefer on-site mitigation over off-site mitigation, and for off-site mitigation prefer that located within the same watershed or as close in proximity to the area of impact as possible.
	Impacts to marine and anadromous fishery resources	Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Comply with the terms of a Streambed Alteration Agreement for work along banks of surface water bodies.
		Implement a spill prevention and emergency response plan to handle potential fuel or other spills.
		Incorporate bio-filtration swales to intercept runoff.
		Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
	Impacts to special status species	Utilize existing transportation corridors and rail lines to minimize potential impacts.
		Relocate sensitive species.
		Conduct pre-construction focused surveys.
		Conduct biological construction monitoring.
		Restore suitable breeding and foraging habitat.
		Purchase credits from an existing mitigation bank.
		Participate in an existing Habitat Conservation Plan.
		Phase construction around the breeding season.
Public parks and recreation resources	Impacts to parks and recreational resources	Continue to apply design practices to avoid impacts to park resources, and when avoidance cannot be accommodated, minimize the scale of the impact
		Apply measures at the project level to reduce and minimize indirect/proximity impacts as appropriate for the particular sites affected, while avoiding other adverse impacts (e.g., visual), such as noise barriers, visual buffers and landscaping.
		Apply measures to modify access to/egress from the recreational resource to reduce impacts to these resources.
		Design and construct cuts, fill, and aerial structures to avoid and minimize visual impacts to units of the state park system.
		Incorporate wildlife under or over crossings at appropriate intervals as necessary.
		Where public parklands acquired with public funds would be acquired for non-park use as part of the HST system, commit as required by law to providing funds for the acquisition of substantially equivalent substitute parkland or to acquiring/providing substitute parkland of comparable characteristics for construction impacts.
		Restore affected park lands to natural state and replace or restore affected park facilities.
		If park facilities must be relocated, provide planning studies as well as appropriate design and replacement with minimal impact on park use.
		Use local native plants for revegetation.
		Develop and implement construction practices, including scheduling, to limit impacts to wildlife, wildlife corridors and visitor use areas within public parks.
		For temporary unavoidable loss of park and recreation facility uses consider providing compensation.

Resource Area	Impact Area	Mitigation Measure
Cumulative	Impacts on traffic and circulation and travel conditions	The following program level mitigation strategies can be developed, in consultation with state, federal, regional, and local governments and affected transit agencies, to improve the flow of intercity travel on the primary routes and access to the proposed stations or airports and will reduce this impact: 1. Regional strategies would include coordination with Regional Transportation planning and Intelligent Transportation System Strategies. 2. Local improvements could employ TSM/Signal Optimization; local spot widening of curves; and major intersection improvements.
		The following program level mitigation strategies can be developed, in consultation with state, federal, regional, and local governments and affected transit agencies, to improve the flow of intercity travel on the primary routes and access to the proposed stations or airports and will reduce this impact: 1. Regional strategies would include coordination with Regional Transportation planning and Intelligent Transportation System Strategies. 2. Local improvements could employ TSM/Signal Optimization; local spot widening of curves; and major intersection improvements.
	Impacts on air quality	The project level mitigation strategies to address localized impacts can consider the following and will reduce this impact: 1. Increase emission controls from power plants supplying power for the HST Alternative. 2. Design the system to utilize energy efficient, state-of-the-art equipment. 3. Promote increased use of public transit, alternative fueled vehicles, and parking for carpools, bicycles, and other alternative transportation methods. 4. Alleviate traffic congestion around passenger station areas. 5. Minimize construction air emissions.
	Impacts on noise and vibration	The program level mitigation strategies relate to the following and will reduce this impact: 1. design practices emphasizing the use of tunnels or trenches 2. use of electric powered trains, higher quality track interface, and smaller lighter and more aerodynamic trainsets; and 3. full grade separations from all roadways.
		The project level mitigation strategies include the following and will reduce this impact: 1. treatments for insulation of buildings affected by noise and vibration; 2. sound barrier walls within the right-of-way; 3. track treatments to minimize train vibrations; and 4. construction mitigation.
	Impacts on land use and planning, communities and neighborhoods, property, and environmental justice	The program level mitigation strategies for HST Alternative contributions to the land use impacts, include the following and will reduce this impact: 1. Design practices to maximize use of existing rights-of-way and incorporating strategies for stations to incorporate transit oriented design. 2. Coordination with cities and counties in each region to ensure that project facilities would be consistent with land use planning processes and zoning ordinances.

Resource Area	Impact Area	Mitigation Measure
	Impacts on agricultural lands	The program level mitigation strategies include the following and will reduce this impact: 1. design practices to avoid agricultural land conversion through maximizing use of existing rights-of-way to minimize encroachment on additional agricultural lands 2. utilizing aerial structure or tunnel alignments to allow for vehicular and pedestrian traffic access across the alignment; and 3. reducing the new right-of-way to 50 feet in constrained areas.
		The project level mitigation strategies include the following and will reduce this impact: 1. securing easements, 2. participating in mitigation banks, 3. increasing permanent protection of farmlands at the local planning level, and 4. coordinating with various local, regional, and state agencies support farmland conservation programs.
	Impacts on aesthetics and visual resources	The program level mitigation strategies include the following and will reduce this impact: 1. design practices that will incorporate local agency and community input during subsequent project level environmental review in order to develop context sensitive aesthetic designs and treatments for infrastructure.
		The project level mitigation strategies include the following and will reduce this impact: 1. design of facilities that integrate into landscape contexts, reducing potential view blockage, contrast with existing landscape settings, and light and shadow effects.
	Impacts on public utilities	The program level mitigation strategies include the following and will reduce this impact: 1. design practices that will avoid potential conflicts, at the project level analysis, to the extent feasible and practical. These practices include: design methods to avoid crossing or using utility rights-of-way include modifying both the horizontal and vertical profiles of proposed transportation improvements. Emphasis would be placed on detailed alignment design to avoid potential contribution to cumulative impacts from linear facilities on land use opportunities and to minimize conflicts with existing major fixed public utilities and supporting infrastructure facilities.
		The project level mitigation strategies include the following and will reduce this impact: 1. coordination with utility representatives during construction in the vicinity of critical infrastructure will occur.
	Impacts on cultural and paleontological resources	The program level mitigation strategies include the following and will reduce this impact: 1. Continued consultation with SHPO would occur to define and describe general procedures to be applied in the future for fieldwork, method of analysis, and the development of specific mitigation measures to address effects and impacts to cultural resources, resulting in a programmatic agreement between the Authority, FRA and SHPO. 2. Consultation with Native American tribes would occur.

Resource Area	Impact Area	Mitigation Measure
		The project level mitigation strategies include the following and will reduce this impact: 1. avoidance measures through identification of sensitive resources within the project level analysis and project design refinement and careful selection of alignments. 2. subsequent project level field studies to verify the location of cultural resources would offer opportunities to avoid or minimize direct impacts on resources, based on the type of project, type of property, and impacts to the resource.
	Impacts on geology and soils	The program level mitigation strategies include the following and will reduce this impact: 1. Design practices will be used while preparing extensive alignment studies to ensure that potential effects related to major geologic hazards such as major fault crossings, oil fields, and landslide areas, will be avoided. 2. Mitigation for potential impacts will be developed on a site-specific basis, based on detailed geotechnical studies to address ground shaking, fault crossings, slope stability/landslides, areas of difficult excavation, hazards related to oil and gas fields, and mineral resources.
	Impacts on hydrology and water resources	The program level mitigation strategies include the following and will reduce this impact: 1. design practices to maximize use of existing rights-of-way to minimize potential impacts on water resources.
		The project level mitigation strategies include the following and will reduce this impact: 1. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases. 2. Close coordination will occur with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, erosion control measures, sediment controlling excavation/fill practices, and other best management practices. 3. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to flood plains; surface waters, runoff, and erosion; and groundwater.
	Impacts on biological resources and wetlands	The program level mitigation strategies include the following and will reduce this impact: 1. design practices to maximize use of existing rights-of-way to minimize potential impacts on biological resources and wetlands.

Resource Area	Impact Area	Mitigation Measure
		The project level mitigation strategies include the following and will reduce this impact: 1. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases. 2. Close coordination will occur with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, monitoring during construction, and other best management practices. 3. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to wetlands. 4. Field studies would be conducted to verify the location, in relation to the HST alignments, of sensitive habitat, wildlife movement corridors, and wetlands. These studies would provide further opportunities to minimize and avoid potential impacts on biological resources through changes to the alignment plan and profile in sensitive areas. For example, the inclusion of design features such as elevated track structures over drainages and wetland areas and wildlife movement corridors would minimize potential impacts to wildlife and sensitive species.
	Impacts on Section 4(f) and 6(f) resources (public parks and recreational resources)	The program level mitigation strategies include the following and will reduce this impact: 1. Incorporation of sound barriers (e.g., walls, berms or trenches), visual buffers/landscaping, and modification of transportation access to/egress from the public lands and recreational resource. 2. Incorporation of design modifications or controls on construction schedules, phasing, and activities.
		The project level mitigation strategies include the following and will reduce this impact: 1. Beautification measures. 2. Replacement of land or structures or their equivalents on or near their existing site(s). 3. Tunneling, cut and cover, cut and fill of right-of-ways. 4. Treatment of embankments. 5. Planting, screening, creating wildlife corridors, acquisition of land for preservation, installation of noise barriers. 6. Establishment of pedestrian or bicycle paths. 7. Other potential mitigation strategies could be identified during the public input process.

Resource Area	Impact Area	Mitigation Measure
		In the event that HST alignments or facilities are located within or in close proximity to public parks, the following mitigations for natural, cultural, aesthetic and recreational impacts may be considered to offset the contribution to the cumulative impact, including but not limited to: 1. Compensation for temporary and loss of park and recreation use. 2. Recordation of any historic features removed. 3. If necessary, provide alternative shuttle access service to park visitors. 4. Restore directly impacted park lands to a natural state. 5. If any facilities must be relocated, provide planning studies as well as design and appropriate replacement with minimal impact on park use. 6. Inventory and record affected historic structures. Provide appropriate mitigation for adverse effects to historic structures. 7. Require appropriate vehicle cleaning for all construction equipment used near units of the California State Park System to protect against spreading exotic plants or disease. 8. Use local native plants for revegetation. 9. Design and construct cuts, fills, and aerial structures to avoid and minimize visual impact to units of the State Park System. 10. In addressing impacts to wildlife movement corridors and habitat directly related to California State Park System units, consult with the California Department of Parks and Recreation. 11. Incorporate wildlife under- or over-crossings as necessary. 12. Adopt construction practices to protect critical wildlife corridors and visitor use areas within public parks.

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APPENDIX C

FEDERAL RAILROAD ADMINISTRATION RECORD OF DECISION

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U.S. Department of Transportation
Federal Railroad Administration

Record of Decision
California High-Speed Train System

This Record of Decision (ROD) records the decision of the Federal Railroad Administration (FRA), an operating administration of the U.S. Department of Transportation, with regard to the California High-Speed Train (HST) System proposed by the California High-Speed Rail Authority (Authority), at the initial programmatic phase of environmental review. In making this decision, FRA considered the information, and analysis, contained in the Draft and Final Program Environmental Impact Report/Environmental Impact Statements (EIR/EIS) for the Proposed California High-Speed Train System and public and agency comments.

This ROD has been drafted in accordance with the Council on Environmental Quality's (CEQ) regulations implementing the National Environmental Policy Act (NEPA), (40 CFR § 1505.2) and FRA Environmental Procedures (64 Fed. Reg. 28545, May 26, 1999). Specifically, this ROD:

- States FRA's decision on the proposed California HST system.
- Provides background on the proposed HST system and the NEPA tiering process.
- Describes FRA's role in the HST program.
- Describes the factors considered by the FRA in making this decision.
- Identifies the alternatives considered by the FRA.
- Summarizes environmental benefits and adverse impacts.
- Summarizes the comments received on the Final Program EIR/EIS.
- Discusses measures to minimize environmental harm.
- Describes compliance with other federal regulations.
- Describes some initial next steps in the tiered environmental review process.

1. Decision

The California High Speed Train Program EIR/EIS is the first programmatic phase of a tiered environmental review process and the FRA, in cooperation with the Authority, is making initial and basic decisions on the proposed HST system. The Authority is the agency of California state government charged under California law (California Public Utilities Code § 185000 et seq.) with the exclusive responsibility for planning, construction, and operation of high-speed passenger train service at speeds exceeding 125 miles per hour. As Federal co-lead agency for the Program EIR/EIS, FRA has

worked jointly with the Authority to carry out the analyses and evaluations included in the Draft and Final Program EIR/EIS's. The FRA makes the following decisions:

1. To select the HST Alternative and to reject the No Action Alternative as well as the Modal Alternative (highway/aviation improvements); and

2. To eliminate certain conceptual HST corridors, alignments, and station options evaluated in the Program EIR/EIS from further consideration; and

3. To select for further consideration in the tiered environmental reviews to be prepared subsequent to the Program EIR/EIS, the preferred conceptual corridor, alignment, and station options for the HST as described in the Final Program EIR/EIS.

The Program EIR/EIS considers the comprehensive nature and scope of the proposed HST system, at the conceptual stage of planning and decision-making, including potential route and station locations. FRA's decisions select conceptual corridors and station locations for further analysis.

The Authority considered and made similar decisions when certifying the Final Program EIR/EIS under CEQA on November 2, 2005. The Authority may also pursue preservation of right-of-way in selected corridors and at station locations through protective advance acquisition consistent with the Federal Uniform Relocations Assistance and Real Property Acquisitions Policies Act and Federal and State law.

Subsequent future tiers of project-level environmental review will examine a range of HST project alternatives as portions of the proposed HST system are advanced within corridors and at station locations selected in the Program EIR/EIS, as well as a no action alternative. Project-level reviews will fully describe site-specific environmental impacts and will identify specific mitigation measures to address those impacts. The FRA and the Authority will assess the site characteristics, size, nature, and timing of proposed specific projects to determine whether the impacts are potentially significant and whether impacts can be avoided or mitigated.

Because the Program EIR/EIS does not assess future actions to implement an HST system at specific locations, the FRA cannot predict site-specific impacts with certainty and cannot determine more specific mitigation measures appropriate for mitigating those impacts. Consequently, the Program EIR/EIS identifies design practices and mitigation strategies, which are an array of actions that can be applied at the project-level to avoid, minimize, or mitigate the types of environmental impacts anticipated as a result of implementation of the HST system. To minimize potential future environmental harm from implementation of the proposed HST system, the FRA adopts the design practices and mitigation strategies in the Mitigation Monitoring and Reporting Plan (MMRP) included as Appendix A.

2. Introduction

The Authority was created pursuant to state legislation in 1996 to develop a plan for the construction, operation, and financing of a statewide, intercity high-speed passenger train system offering intercity service (California Public Utilities Code § 185000 et seq.). The Authority's enabling legislation, Senate Bill (SB) 1420 (chaptered 9/24/96, Chapter 796, Statute of 1996), defines high-speed rail as "intercity passenger rail service that utilizes an alignment and technology that makes it capable of sustained speeds of 200 miles per hour (mph) (320 kilometers per hour [kph]) or greater." Based on the results of initial feasibility studies, the Authority advanced the evaluation of a proposed HST system as the logical next step in the development of California's transportation infrastructure.

In June 2000, the Authority adopted the final business plan (Business Plan) (California High Speed Authority 2000) describing an economically viable HST system over 700 miles long (1,127-kilometers). This system would be capable of speeds in excess of 200 miles per hour (mph) (322 kilometers per hour [kph]) and would travel on a mostly dedicated system with fully grade-separated tracks with state-of-the-art safety, signaling, and automated train control systems. It would connect and serve the major metropolitan areas of California, extending from Sacramento and the San Francisco Bay Area through the Central Valley to Los Angeles and San Diego. Such a system would be expected to carry a minimum of 42 million passengers annually, representing 32 million intercity trips and 10 million commuter trips, by the year 2020 and would have revenues in excess of operations and maintenance costs.

At the beginning of the EIR/EIS process, in order to describe a proposed HST system and alternatives for analysis in the EIR/EIS, the Authority and FRA reviewed previous studies and considered the purpose and need of the HST system. The Authority and the FRA determined that the appropriate initial California Environmental Quality Act (CEQA) and NEPA document for the proposed HST system would be a programmatic EIR/EIS, considering the comprehensive nature and scope of the HST system, to support conceptual decision-making. The programmatic level of environmental review allows for the broadest disclosure of impacts, and has provided the opportunity for the Authority, the FRA, and the public to consider alternatives to an HST system, and different conceptually defined HST corridor alignment and station options. Analyzing a proposed large-scale transportation system at the conceptual planning stage also provides the Authority and FRA with the best opportunity to develop design practices and mitigation strategies to avoid and minimize identified impacts.

The California High Speed Train Program EIR/EIS is the first phase of a tiered environmental review process, and was prepared for the first and programmatic-level of review and consideration of early policy decisions on the HST system. The program-level Program EIR/EIS was developed to make two levels of decision.

1. To decide whether to pursue a high speed train system, involving steel-wheel-on-steel-rail technology along certain conceptual corridors shown in Figures 1 and 2 and designed to help meet California's increasing demand

for transportation, versus doing nothing, or recommending a modal alternative (highway/aviation improvements); and

2. To determine which of the conceptual corridors, alignments, and station options evaluated in the Program EIR/EIS can be eliminated from consideration and which to select for further consideration in the tiered environmental reviews to be prepared subsequent to the Program EIR/EIS, if the high-speed train system is pursued.

NEPA requires that an agency consider the environmental effects of its actions at the earliest point in time when the analysis is meaningful, and it is within the agencies' discretion to fashion an environmental process appropriate to the type of decisions they are considering. The Program EIR/EIS shapes the parameters for the site-specific environmental documents to support second-tier project decisions. The tiered project-level environmental reviews will fully describe site-specific environmental impacts of a range of project alternatives within selected corridors and at station locations and will define specific mitigation measures to address those impacts.

Pursuant to the requirements of NEPA and CEQA, a comprehensive public and agency involvement effort was conducted as part of the program environmental process. Public and agency involvement was accomplished through a variety of means, including the following: scoping process that included a series of public and agency scoping meetings; consultation meetings with federal and state resource agency staff representatives throughout the environmental process; informational meetings with interest groups and agencies; presentations and briefings to a broad spectrum of interest groups; information materials, including a series of region-specific fact sheets; the Authority's Web site (www.cahighspeedrail.ca.gov) presenting information about the proposed project and study evaluations; noticed public meetings of the Authority's governing board at which key policy issues and decisions were raised and discussed and opportunities for public comment were provided; public circulation of the Draft Program EIR/EIS; and posting on the Authority's website, including technical studies, public information sessions and seven public hearings on the Draft Program EIR/EIS, as well as written comments received during the public comment period from January 27, 2004 to August 31, 2004; and public circulation of the Final Program EIR/EIS. The FRA's website was linked to the Authority's website throughout the program environmental process.

As part of the agency involvement in the environmental process, the Federal Highway Administration, U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), Federal Transit Administration, Federal Aviation Administration, and U.S. Fish and Wildlife Service served as cooperating agencies under NEPA for the preparation of the Program EIR/EIS.

The announcement of the availability of the Draft and Final Program EIR/EIS and the Authority's website listed the 32 libraries across the state having a hard copy of the documents available for review. Participating libraries were located in the following cities: Anaheim, Bakersfield, Burbank, Escondido, Fremont, Fresno, Gilroy, Irvine, Los Angeles, Merced, Modesto, Mountain View, Norwalk, Oakland, Oceanside, Ontario, Palmdale, Palo Alto, Riverside, Sacramento, San Clemente, San Diego, San Francisco, San Gabriel, San Jose, Santa Clarita, Stockton, Sylmar, Temecula, and Tulare.

The release of the Draft Program EIR/EIS and the release of the Final Program EIR/EIS were also announced through a display ad distributed in 16 statewide newspapers. The display ads were published in the following newspapers: *Sacramento Bee, Daily Republic*, *Oakland Tribune*, *San Francisco Chronicle*, *San Jose Mercury*, *Modesto Bee*, *Merced Sun Star*, *Fresno Bee*, *Bakersfield Californian*, *Los Angeles Times*, *Orange County Register*, *Antelope Valley Press*, *The Press-Enterprise*, *North County Times*, *San Diego Tribune*, and *Stockton Record*.

A notice of availability of the Final Program EIR/EIS was published in the Federal Register by the Environmental Protection Agency on September 23, 2005.

3. FRA's Role in the HST Program

The FRA is serving as the lead Federal agency for the preparation of this joint State/Federal environmental review of the HST program. The Authority envisions seeking possible future federal financial support for the system that might be provided through the FRA. The FRA and the U.S. Department of Transportation have several loan and loan guarantee programs that might be potential sources of future financial assistance. Although no existing grant or federal bond financing programs provide the type of support envisioned, several proposals to create such programs, are pending before Congress. In addition to possible funding, a Rule of Particular Applicability may be required from the FRA to establish safety standards for the proposed HST system for operating speeds over 200 mph (322 kph) and for operations in shared-use rail corridors.

4. Purpose and Need for the Proposed Action

The purpose of the proposed HST system is to provide a reliable mode of travel that links the major metropolitan areas of the state and delivers predictable and consistent travel times. A further purpose is to provide an interface with commercial airports, mass transit, and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

The Authority's statutory mandate is to plan, build, and operate an HST system that is coordinated with the state's existing transportation network, particularly intercity rail and bus lines, commuter rail lines, urban rail transit lines, highways, and airports. The Authority has responded to this mandate by adopting the following objectives and policies for the proposed HST system.

- Provide intercity travel capacity to supplement critically over-utilized interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility.

- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Preserve environmental quality and protect California's sensitive environmental resources by reducing emissions and vehicle kilometers/vehicle miles traveled for intercity trips.
- Consult with resource and regulatory agencies during the tier 1 environmental review and use all available information for assessing the alternative that is most likely to yield the least damaging practicable alternative by avoiding sensitive natural resources (wetlands, habitat areas, conservation areas) where feasible.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020, which would generate revenues in excess of operations and maintenance costs.

The capacity of California's intercity transportation system is insufficient to meet existing and future demand, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population and tourism in the state. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are currently operating at or near capacity and will require large public investments for maintenance and expansion in order to meet existing demand and future growth over the next 20 years and beyond. Moreover, the ability to expand many major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, and other factors. Simply stated, the *need* for improvements serving intercity travel within California relates to the following issues.

- Future growth in demand for intercity travel.
- Capacity constraints that will result in increasing congestion and travel delays.
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California.
- Increasing frequency of accidents on intercity highways and passenger rail lines in congested corridors of travel.
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state.

- Poor and deteriorating air quality and pressure on natural resources as a result of expanded highway and airports.

5. Factors Considered in Making This Decision

The analysis in the Final Program EIR/EIS confirms that the capacity of California's intercity transportation system is insufficient to meet existing and future demand, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The state's intercity transportation system has not kept pace with the tremendous increase in the population and tourism in the state. The interstate highway system, commercial airports, and the conventional passenger rail system serving the intercity travel market are currently operating at or near capacity, and will require large public investments for maintenance and expansion in order to serve existing and future demand. The need for improvements serving intercity travel within California is described further in the Final Program EIR/EIS.

As described in the Final Program EIR/EIS, the purpose and objectives of the HST System, or program, which is identified as the Preferred HST Alternative, is to provide a reliable mode of travel that links the major metropolitan areas of the state and delivers predictable and consistent travel times, while also providing an interface with major commercial airports, public transit services, and the highway network and relieving capacity constraints in the existing transportation system in a manner sensitive to and protective of California's unique natural resources.

The need for a high-speed train system is directly related to the expected growth in population and resulting increases in intercity travel demand in California over the next twenty years and beyond. As a result of this growth in travel demand, congestion is expected to grow on California's highways and at airports. In addition, there will be effects on the economy and quality of life from diminishing reliability of the transportation system as travel demand increases. Air quality in and around California's metropolitan areas continues to be impaired and would worsen with more congestion. The intercity highway system, commercial airports, and conventional passenger rail serving the intercity travel market are currently operating at or near capacity, and will require large public investments for maintenance and expansion in order to meet existing demand and future growth.

The proposed high-speed train system would provide a new mode of high-speed intercity travel that would link the major metropolitan areas of California; interface with international airports, mass transit, and highways; and provide added capacity to meet increases in intercity travel demand projected for the year 2020 and beyond in a manner sensitive to and protective of California's unique natural resources.

The evaluation indicates that the Modal Alternative, improvement to existing highway and air modes of intercity travel, would help meet projected needs for intercity travel in 2020, but would not satisfy the purpose and objectives of the program as well as the HST alternative. In addition the capital cost of the Modal Alternative would be over two

times the estimated capital cost of the HST Alternative, and the Modal Alternative would have considerably less sustainable capacity than the HST Alternative to serve California's intercity travel needs beyond 2020.

The evaluation of the Final Program EIR/EIS also indicates that taking no action under the No Project Alternative would not meet the intercity travel needs projected for the future (2020 and beyond) as population continues to grow, and would fail to meet the purpose and objectives of the program which can be met by the Preferred HST Alternative. The No Project Alternative would result in environmental impacts but would not offer travel improvements compared to the Modal and HST Alternatives.

The evaluation of the Final Program EIR/EIS indicates that the HST Alternative is more effective in meeting the program objectives within the time frame needed and would result in fewer adverse impacts than the Modal or No Project Alternatives. The Preferred HST System Alternative would result in energy savings, air quality improvement and transportation capacity improvements, as compared to the No Project Alternative. In addition to meeting the program objectives, the Preferred HST System Alternative would also provide environmental benefits in the form of increased efficiency in energy use for transportation, decreased energy consumption [e.g., oil fuels consumption], improved air quality, improved travel conditions (including mobility, safety, reliability, travel times, and connectivity and accessibility) and reduced vehicle-miles-traveled for intercity trips. Given the environmental benefits it would provide and relative potential for adverse environmental impact, the HST Alternative is the environmentally preferable alternative.

6. Alternatives Considered

The Authority defined the HST Alternative through performance criteria building on information gathered in previous feasibility and corridor evaluation studies. To meet the travel time and service quality goals, the proposed statewide HST system would be capable of speeds in excess of 200 mph (320 kph) on fully grade-separated tracks with state-of-the-art safety, signaling, and automated train control systems. The criteria are based on accepted engineering practices, the criteria and experiences of other existing railway and HST systems, and the comments of HST manufacturers. These performance criteria are summarized in Table 1.

Table 1
HST Performance Criteria

Category	Criteria
System Design Criteria	Electric propulsion system. Fully grade-separated guideway. Fully access-controlled guideway with intrusion monitoring systems. Track geometry must maintain passenger comfort criteria (smoothness of ride, lateral acceleration less than 0.1 g).
System Capabilities	All-weather/all-season operation. Capable of sustained vertical gradient of 3.5% without considerable degradation in performance. Capable of operating parcel and special freight service as a secondary use. Capable of safe, comfortable, and efficient operation at speeds over 200 mph. Capable of maintaining operations at 3-minute headways. Capable of traveling from San Francisco to Los Angeles in approximately 2.5 hrs. Equipped with high-capacity and redundant communications systems capable of supporting fully automatic train control.
System Capacity	Fully dual track mainline with off-line station stopping tracks. Capable of accommodating a wide range of passenger demand (up to 26,000 passengers per hour per direction). Capable of accommodating normal maintenance activities without disruption to daily operations.
Level of Service	Capable of accommodating a wide range of service types (express, semi-express/limited stop, and local).

To guide the further definition of alignment and station options, additional engineering criteria and parameters were necessary. The additional criteria and parameters considered in the program-level environmental analysis are defined in the Engineering Criteria Report (January 2004). The Authority also set forth criteria for tunnels within the HST system, which would chiefly be within the northern or southern mountain crossing corridors, and criteria for potential intermediate and terminus station sites.

The performance criteria were applied in the initial broad consideration of possible HST corridors, alignments, and station locations, in the consideration of train technologies that could provide the desired high-speed service, in the framing of the system alternatives for analysis in the Program EIR/EIS, and also in selecting preferred corridor alignments and station locations, as discussed below.

6.1 HST Alternatives Eliminated from Further Consideration During the Scoping Phase

The following HST alternative technologies, corridors, alignments, and stations were eliminated from further consideration during the scoping phase of the project and prior to detailed programmatic environmental review:

- Steel-Wheel-on-Steel-Rail At Lower Speed (below 200 mph)—The Authority's enabling legislation defines *high-speed rail* as "intercity passenger rail service that utilizes an alignment and technology that makes it capable of sustained speeds of 200 mph (320 kph) or greater."
- Magnetic Levitation Technology and Steel-Wheel-on-Steel-Rail Electrified, Fully Dedicated Service—While a completely dedicated train technology using a separate track/guideway would be required on the majority of the proposed system, requiring such separation everywhere in the system would likely preclude direct HST service to certain heavily constrained terminus sections (i.e., San Francisco Peninsula from San Jose to San Francisco, and the existing [LOSSAN] rail corridor between Los Angeles Union Station and Orange County). Because of extensive urban development and severely constrained right-of-way, HST service in these terminus sections would need to share physical infrastructure (tracks) with existing passenger rail services in existing or slightly modified corridors.
- Corridors— HST corridor options evaluated and eliminated from further consideration are described in detail in Section 2.6.8 of the Final Program EIR/EIS. The eliminated corridors included a San Francisco to Los Angeles only corridor, which would not meet the objective of linking the major metropolitan areas of the state; coastal corridors generally following Highway 101 and Highway 1, which would result in greater impacts to sensitive natural and cultural resources, higher costs and slower travel due to challenging topography and waters; and an Interstate Highway 5 corridor, which failed to meet basic project objectives of maximizing intermodal opportunities, maximizing connectivity and accessibility, and providing transit connections and multi-modal stations, and additionally would result in increased incompatibility with land use planning. Also eliminated were the Capitol Rail Corridor (Sacramento to Oakland) and the Panoche Pass because they would not meet basic project objectives.

  Alignment and Station Options— Additional HST alignment and station options were evaluated and eliminated from further consideration using criteria related to the purpose and need and program objectives as described in detail in Section 2.6.9 of the Final Program EIR/EIS. The Authority's performance criteria (as summarized in Table 1) were applied through a screening evaluation, which focused on cost and travel time as primary indicators of engineering viability and ridership potential. Capital costs were estimated and travel times were quantified for each alignment and station option considered. Other engineering criteria such as operational, construction, and right-of-way issues were evaluated qualitatively.

6.2 Alternatives Considered in the Program EIR/EIS

No Project Alternative

The No Project/No Action (No Project) Alternative represents the state's transportation system, that serves the same intercity travel market as the proposed HST system, (highway, air, and conventional rail) as it is today and would be after implementation of programs or projects that are currently in regional transportation plans and have identified funds for implementation by 2020. Improvements that have been approved and funded in the fiscally constrained and conforming Regional Transportation Plans, State Transportation Improvement Plans, and airport development programs were considered part of the No Project Alternative.

Modal Alternative

The Modal Alternative represents a hypothetical, reasonable build alternative to the proposed HST system consisting of expansion of highways and airports serving the same geographic areas. Under this alternative, the proposed HST system would not be implemented, and the existing transportation infrastructure would be expanded to accommodate the anticipated future intercity travel demand in the same geographic markets as the HST Alternative. The Modal Alternative was developed to provide an equivalent capacity to serve a representative demand for intercity travel (an estimate based on the independent ridership and revenue forecasts prepared for the Authority also used to define the HST Alternative).

During the screening evaluation process, the Authority and the FRA considered both a highway-improvement only modal alternative and an airport-improvement only modal alternative. These alternatives were rejected because neither would be practical or feasible to serve the range of intercity trip lengths to be served by the HST system, and neither would meet the purpose and need and objectives for the system with regard to predictable and reliable travel times, safety, and protection of natural resources through avoidance of environmental impacts. Consideration was also given to improving the conventional passenger rail system to stand alone or serve as part of the modal alternative. This was rejected because it would not provide or assist in providing a competitive option to satisfy intercity travel demand. .

The Modal Alternative evaluated in the Program EIR/EIS includes a combination of potentially feasible highway and aviation system improvements that focus on quantifiable capacity enhancements. The improvements included: additional traffic lanes for highways with associated interchange reconfiguration and ramp improvements; additional gates and runways for airports with associated taxiways, parking, and passenger terminal facilities. For purposes of this analysis, the projected travel demand was allocated to the highways and airport facilities described under the No Project Alternative, to identify these improvements that would be necessary to serve the representative intercity travel demand in lieu of HST service. Existing conventional passenger rail was not included in this alternative because it would not meet the same intercity demand that would be served by the proposed HST system.

Proposed HST Alternative

The proposed HST system is a system over 700-miles long with electric propulsion and steel-wheeled trains capable of speeds in excess of 200 mph (322 kph) on a mostly dedicated system of fully grade-separated, access-controlled steel tracks and with state-of-the-art safety, signaling, communication and automated train control systems. The corridors considered in the Program EIR/EIS for the HST system are largely within or adjacent to existing transportation facilities or rights of way. These corridors connect and serve the state's major metropolitan areas, and potential station locations that could provide linkage with public transit services and the state's major commercial airports at multi-modal hubs.

Scoping and the screening evaluation led to identification of many HST alignment and station options for analysis in the Program EIR/EIS (See Section 2.6.9 of the Final Program EIR/EIS for more details). A range of HST design options are evaluated in the Program EIR/EIS, and key differences are addressed in the comparison of alternatives. Several major design option choices considered included the following:

- Northern Mountain Crossing: Mountain crossing options through the Coastal Mountain Range between the Central Valley and the Bay Area. Primarily two options: the Pacheco Pass through Gilroy and a northern crossing more directly aligned with San Jose.
- Southern Mountain Crossing: Mountain crossing options through the Tehachapi Mountain Range between Los Angeles and Bakersfield. Primarily two options: the I-5 corridor and a route through the Antelope Valley.
- Bay Area: Service options to the Bay Area along the peninsula to San Francisco and/or the East Bay to Oakland.
- Southern California: Service to Orange County in addition to service to San Diego via Inland Empire and the I-15 corridor.
- Shared-Use Options: Service to the urban centers on shared tracks with other passenger rail services. Based on the screening evaluation, the state-of-the-art high-speed steel-wheel-on-steel-rail technology considered for the system must also be capable of sharing tracks with other services at reduced speeds in heavily urbanized areas (i.e., San Jose to San Francisco, and Los Angeles to Orange County).
- Link to LAX: Direct or transfer to other transit system.

6.3 Preferred Program Alternative—HST Alternative

The following description of the HST Alternative is programmatic in nature and provides a broad planning and conceptual outline of the proposed train system, which is based on the information contained in the Final Program EIR/EIS and other reports included or referenced in the Final Program EIR/EIS.

The preferred HST system includes shared use corridors on the San Francisco Peninsula (Caltrain) and in southern California from Union Station in Los Angeles to Anaheim and Irvine. The preferred HST system also includes design practices to minimize impacts to resources, HST station development principles to foster smart growth, increase land use efficiency and minimize impacts to resources, and mitigation strategies to avoid and reduce environmental impacts. These practices, strategies and policies are described below in the discussion of impacts to resources.

The basic physical components of the proposed system include the trains and various structures. The trains are considered to include trainsets, communications, and signal and train control systems. The various structures that will make up part of the HST system include tracks and supporting structures, HST stations, and the electrical power system and facilities. These features may be briefly described as follows:

- Tracks and supporting structures include steel tracks for an HST system over 700 miles long, aerial structures and tunnels, grade separation and access-control features (fences, berms, signals, etc.)
- The electric propulsion and distribution system consisting of a 2x25KV overhead catenary system of poles and wires, as well as electric supply and booster stations
- HST multi-modal stations, intermediate and terminus, at thirty identified potential locations, that will generally include platforms, passenger facilities, baggage facilities, connections with public transit services, parking, and landscaping
- Cleaning, maintenance and storage facilities for the trains, at locations generally identified as facilities for light cleaning and maintenance located near termini in northern and southern California and facilities for heavy cleaning and maintenance located in the Central Valley.

The corridors proposed for the location of the preferred HST system are areas containing proposed alignments and multi-modal station sites. The corridors are conceptually described and represent routes for an over 700-mile long system providing for high-speed intercity passenger rail service between the major metropolitan areas of Sacramento and the San Francisco Bay Area in Northern California, through the Central Valley, to the Los Angeles area and Orange County and to San Diego via the Inland Empire. The preferred alignment and station locations are described briefly in the Summary in the Final Program EIR/EIS (section S.7) and depicted in the Final Program EIR/EIS.

The preferred alignment and station locations are described in detail in Chapter 6A of the Final Program EIR/EIS and can be briefly described by reference to five regional segments of the HST system as described below. The identification of preferred alignments was guided by public comments on the Draft Program EIR/EIS, the purpose and need of the HST system, and the Authority's objectives and criteria for evaluating alignments and station locations that were applied in scoping and the screening evaluation, as documented in Section 2.6.9 of the Final Program EIR/EIS.

Several factors were considered in identifying potential station stops, including speed, cost, local access times, potential connections with other modes of transportation, ridership potential, and the distribution of population and major destinations along the route.

The preferred station sites are all multi-modal transportation hubs that would provide links with local and regional transit, airports and highways. It is assumed that parking at the stations would be provided at market rates (no free parking). Each station site would have the potential to promote higher density, mixed-use, pedestrian-oriented development around the station. As the project proceeds to more detailed study, local governments would be expected to provide (through planning and zoning) for transit-oriented development around HST station locations, and to finance (e.g., through value capture or other financing techniques) and to maintain the public spaces needed to support the pedestrian traffic generated by hub stations if they are to have a HST station.

Preferred Alignment and Station Options

The preferred HST alignment and station options are listed by region as follows:

Bay Area-Merced

A broad preferred corridor between the Bay Area and the Central Valley containing a number of feasible route options within which further study will permit the identification of a single preferred alignment option. This corridor is generally bounded by (and includes) the Pacheco Pass (SR-152) to the south, the Altamont Pass (I-580) to the north, the BNSF Corridor to the east, and the Caltrain Corridor to the west (Highway route numbers are provided only as a convenient reference for the reader, not as a limitation on the corridor to be considered). The future additional study will also further consider the selected alignments and station locations in the Bay Area described below.

San Francisco Peninsula: Caltrain Corridor with potential stations at downtown San Francisco (Transbay Terminal), SFO (Milbrae), and Redwood City or Palo Alto.

East Bay Alignment: "Hayward Line to I-880" alignment with potential stations at Oakland (West Oakland) or 12th Street/City Center, Union City, and San Jose.

Sacramento-Bakersfield

Sacramento-Stockton: Union Pacific alignment option or the CCT alignment with potential stations at Downtown Sacramento and Downtown Stockton.

Stockton-Merced: Burlington Northern Santa Fe (BNSF) alignment option with potential stations at Modesto (Amtrak Briggsmore), and Merced (Castle Air Force Base or Downtown Merced).

Merced-Fresno: BNSF alignment option with a potential station at Downtown Fresno.

Fresno-Bakersfield: BNSF alignment option with a potential station at Downtown Bakersfield (Truxtun)

Bakersfield-Los Angeles

Bakersfield-Sylmar: SR-58/Soledad Canyon Corridor (Antelope Valley) with a potential station at Palmdale Airport/Transportation Center.

Sylmar-Los Angeles: MTA/Metrolink with potential stations at Downtown Burbank (Burbank Metrolink Media Station) and Los Angeles Union Station.

Los Angeles to San Diego via the Inland Empire

Los Angeles to March AFB: UPRR Riverside/UPRR Colton Line alignment option with potential stations at East San Gabriel Valley (City of Industry), Ontario Airport, and Riverside (UC Riverside).

March AFB-Mira Mesa: I-215/I-15 alignment with potential stations at Temecula Valley (Murrieta), and Escondido.

Mira Mesa-San Diego: Carroll Canyon or Miramar Road alignment option with potential stations at University City and Downtown San Diego (Santa Fe Depot).

Los Angeles to Orange County

Los Angeles to Irvine: LOSSAN Corridor with potential stations at Norwalk, Anaheim Transportation Center, and Irvine Transportation Center.

6.4 Environmentally Preferred Alternative

The HST Alternative would have similar types of adverse environmental impacts as the Modal Alternative. However, the HST Alternative would provide environmental benefits in the form of increased efficiency in energy use for transportation, decreased energy consumption [e.g., oil fuels consumption], improved air quality, improved travel conditions (including mobility, safety, reliability, travel times, and connectivity and accessibility) and reduced vehicle-miles-traveled for intercity trips. For these reasons, the HST Alternative was identified as the preferred system alternative in the Draft Program EIR/EIS, and is identified as the environmentally preferable alternative under NEPA as well as the environmentally superior alternative under CEQA.

7. Summary of Potential Beneficial Environmental Effects

The potential environmental, transportation, land use, economic, and social beneficial effects of the HST Alternative are summarized below.

The HST Alternative would benefit the transportation system by:

- Meeting the need for a safe and reliable mode of travel that would link the major metropolitan areas of the state and deliver predictable, consistent travel times sustainable over time.
- Providing quick, competitive travel times between California's major intercity markets (Table 2).

- Providing door-to-door travel times for longer distance intercity markets that would be comparable to air transportation and less than one half as long as automobile travel times.
- Providing considerably quicker travel times for intermediate intercity trips than either air or automobile transportation and bringing frequent HST service to many parts of the state that are not well served by air transportation.
- Providing a new intercity, interregional, and regional passenger mode—the high-speed train—, which would improve connectivity and accessibility to other existing transit modes and airports compared to the other alternatives.
- Improving the travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips.
- Providing system redundancy in cases of extreme events, such as adverse weather or petroleum shortages
- Providing a predominantly separate transportation system that would be less susceptible to many factors influencing reliability, such as capacity constraints, congestion, and incidents that disrupt service.
- Providing superior on-time reliability.
- Providing a lower accident and fatality rate than automobile travel.
- Offering greater opportunities to expand service and capacity with minimal expansion of infrastructure.
- Adding capacity to the state's transportation infrastructure and reducing traffic on certain intercity highways and around airports to the extent that intercity trips are diverted to the HST system.
- Eliminating delays at existing at-grade crossings where the HST system would provide grade separation.
- Decreasing injuries and fatalities due to diversion of trips from highways, improving connectivity, and adding a variety of connections to existing modes, additional frequencies, and greater flexibility.

Table 2
Estimated Total Travel Times (Door to Door) between City Pairs by Auto, Air, and HST in 2020 (Hours:Minutes)

City Pairs	Auto[1] (No Project Alternative)	Air (No-Project Alternative)		HST (HST Alternative) (Optimal Express Time)	
	Total	Line Haul[2]	Total	Line Haul[2]	Total
Los Angeles downtown to San Francisco downtown	7:57	1:20	3:32	2:35	3:30
Fresno downtown to Los Angeles downtown	4:30	1:05	3:02	1:22	2:33
Los Angeles downtown to San Diego downtown	2:49	0:48	3:00	1:13	2:16
Burbank (Airport) to San Jose downtown	6:50	1:00	3:14	1:49	2:52
Sacramento downtown to San Jose downtown	2:40	No service	No service	0:50	1:53

1 Auto trips are assumed to be "point to point" and therefore do not have a line-haul (time in vehicle) time associated with their travel times.
2 Time in airplane or train.
Source: Parsons Brinckerhoff.

The HST Alternative would benefit the environment by:

- Using existing transportation corridors and rail lines to minimize the impacts on California's landscape.
- Avoiding and/or minimizing the potential impacts to cultural, park, recreational and wildlife refuges to the greatest extent possible.
- Decreasing air pollutants statewide and in all air basins analyzed by reducing pollution generated by automobile combustion engines.
- Lowering total energy consumption (HST system uses less energy to move passengers than either airplanes or automobiles).
- Reducing noise in locations where grade separations eliminate horn and crossing gate noise at existing grade crossings.

The HST Alternative would provide land use benefits by:

- Being highly compatible with local and regional plans that support rail systems and transit oriented development and offering opportunities for increased land

use efficiency (i.e., higher density development and reduced rate of farmland loss).

- Meeting the need for improved inter-modal connectivity with existing local and commuter transit systems.
- Providing multi-modal transportation hubs that link with local and regional transit, airports, and highways.
- Increasing public benefits beyond the benefits of access to the HST system itself, including relief from traffic congestion, improved air quality, promotion of infill development and preservation of natural resources, increased stock of affordable housing, promotion of job opportunities, reduction in energy consumption, and improved cost-effectiveness of public infrastructure.
- Promoting the State's adopted smart growth principles and being a catalyst for wider adoption of smart growth principles in communities near HST stations.
- Encouraging infill development and thereby helping to protect environmental and agricultural resources by encouraging more efficient land use and efficient and compact development.

The HST Alternative would create economic benefits by:

- Providing revenue generated by the system, economic growth generated by construction and operation of the system, benefits from reduced delays to air and auto travelers, reduced air pollution, reduced accidents and fatalities and economic advantages related to proximity to the HST system.
- Reducing airport delays (by diverting some airline passengers to high-speed trains), thereby reducing aircraft operating costs.
- Creating denser development, which would accommodate more population and employment on less land. The HST Alternative would result in a slight decrease in urban area growth.
- Creating a statewide increase of 450,000 jobs between 2002 and 2035.
- Providing a location advantage to those areas that are in proximity to an HST station through improved accessibility to labor and customer markets, thereby potentially improving the competitiveness of the state's industries and the overall economy.

The HST Alternative would create social benefits by:

- Providing a new intercity, interregional, and regional passenger mode that would improve connectivity and accessibility to other existing transit modes and airports.
- Improving the travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips.
- Providing travel options for some people who would not otherwise make trips.

- Enhancing and strengthening urban centers. In combination with appropriate local land use policies, the increased accessibility afforded by the high-speed service could encourage more intensive development and may lead to higher property values around stations.

8. Summary of Potential Adverse Environmental Impacts

Potential adverse environmental impacts from the HST Alterative are identified in the Final Program EIR/EIS and are summarized in the following sections. Temporary and construction related impacts are addressed in each appropriate resource topic. The Program EIR/EIS considers the potential for environmental impact related to travel conditions, movement of goods, and emergency access and found that the HST Alternative would have beneficial attributes system-wide.

8.1 Traffic and Circulation

Despite some expected improvement in highway conditions in areas to be served by the HST system, the level of service (LOS) on local roadways in many of these areas is currently poor (ratios of more than 1.0 on average for each of the five regions) and would remain so even with the HST system. The operation of the HST system would result in increased traffic around HST station locations and increased congestion on highway and roadway segments which would provide access to stations.

The construction of the HST system would result in short-term impacts of increased traffic in areas affected by the construction process for the duration of the construction in that area. In a few areas the HST system would result in closure, either temporary or permanent, of local roadways, that in turn would result in increased traffic on nearby roads and longer travel routes for some travelers.

While localized increases in traffic and congestion near HST station areas and during construction are significant at the programmatic level of analysis, mitigation strategies have been identified that can reduce this impact below the level of significance. Adverse impacts related to parking or public transportation are not expected because mitigation strategies have been identified that can avoid these impacts.

8.2 Air Quality

With the HST system, around certain HST stations an increase in traffic and congestion is expected along with a related localized increase in vehicle-generated air pollution. At the program level this localized impact is considered significant, because of uncertainty, since it is not possible to know the exact location, extent, and characteristics of increased traffic and congestion that will be generated around various HST station sites. While potential localized increases in vehicle-generated air pollution are considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

Construction impacts associated with the HST system include emissions from various activities, such as the use of diesel equipment, soil disturbance, and congestion-related traffic and route changes, all of which are expected to generate temporary short-term localized increases in air pollution. While this impact is considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

8.3 Noise & Vibration

The HST could create long-term noise impacts along the alignment segments from train operations by creating intermittent increased noise. As a newly constructed system, the HST system would be far quieter than typical passenger and freight trains. Construction of the HST could also cause short-term construction-related noise impacts. Significant noise impact from operations will not occur along the entire HST system alignment. Rather, the impact would be localized, because certain areas along the proposed HST system alignment have no sensitive receptors, and because trains speeds are slower in some places leading to lower noise impact ratings. While this impact is considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

The HST system could cause an increase in ground-borne vibrations when the HST passes by an area. The ground-borne vibration impact would not occur along the entire length of the HST system alignment. Rather, the EIR identified 10-60 miles of the HST alignment that could be subject to vibration impacts. Construction activities can also cause some short-term ground-borne vibration. While this impact is considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

8.4 Energy

The HST System would be constructed in phases and is expected to draw power from the statewide electrical grid, which receives power from many sources. The HST system would result in an increase in demand on the statewide electricity supply that could reach 480 MW or 0.6% of projected statewide electricity demand in 2020. With proper planning and design of the power distribution facilities for the HST system in relation to the overall state electrical grid, localized impacts from providing electricity to the HST system can be avoided. Electric power impacts are not expected because mitigation strategies have been identified that can avoid these impacts.

Construction of the HST System would result in one-time non-recoverable energy consumption costs that would be similar in scale to the energy consumption requirements that would be needed for the Modal Alternative, and would be in addition to energy consumed by the planned transportation improvements included in the No Project Alternative. The result of the construction of the HST system would be a new transportation mode that would reduce fuel consumption as compared to the 2020 No Project Alternative. While this impact is considered significant at the program level,

mitigation strategies have been identified that can reduce this impact to a less than significant level.

8.5 Electromagnetic Fields and Electromagnetic Interference

The operation of the HST system could generate additional levels of exposure to electromagnetic fields. The level of exposure will depend on a number of factors that will vary depending on the alignments and operations, including design of power supply systems and vehicles, to be decided at the project-level of design. The HST catenary and distribution systems will operate primarily at 60-Hz fields, which is considered an extremely low frequency (ELF). Because of their rapid decrease in strength with distance, EMFs in excess of background levels are likely to be experienced only relatively near sources.

There is no scientific consensus that there are adverse effects of low-level EMF. Numerous studies have addressed but failed to establish any significant adverse health effects, and various industry, government and scientific organizations with expertise in electromagnetic fields technology have produced a range of voluntary standards that represent their best judgment of what levels are considered safe. The extremely low frequency EMF that result from the operation of the HST system is substantially below any of the standards examined by these experts. The EMFs may interfere with HST maintenance workers' implanted biomedical devices, but there is little potential to interfere with implanted biomedical devices of other workers, passengers or nearby residents. Consequently, based on the review of the scientific evidence, the increased levels of EMF as a result of the HST system operation are less-than-significant at a programmatic, system-wide level, without mitigation and mitigation strategies have been identified that can avoid or reduce EMF exposure.

The HST would generate incidental radiofrequency (RF) fields, and would also use wireless communications that generate radiofrequency fields. Radiofrequency fields would also be produced at the right of way by intermittent contact (unintentional arcing) between the pantograph power pickup and catenary wire. The HST Alternative would introduce additional electromagnetic interference at levels for which there are no established adverse impacts and RF regulations would be complied with. Mitigation strategies have been identified that can avoid EMI.

8.6 Land Use, Communities, Property and Environmental Justice

The HST system would involve laying new track and installing electric power distribution facilities for the HST system and of providing multi-modal transit stations as part of the HST system. Maintenance, storage and cleaning facilities will be part of the HST system, and general potential locations for these facilities were identified in order consider the representative impacts of such facilities in the program analysis. Locations for these facilities will be determined in conjunction with future project-level studies and decisions on implementation phasing. The strategies of placing the proposed HST system in or along existing transportation corridors (existing railroad or highway rights of way) and requiring stations to be multi-modal transit hubs serve to reduce the extent of

land acquisition needed for the proposed new HST system, and serve to limit the extent to which adjacent land uses would be inconsistent or incompatible with the HST system. While 70% of the preferred HST system corridor alignments identified in the Final Program EIR/EIS are either within or adjacent to existing transportation corridors, some property acquisition and relocations will be necessary.

In some areas, the installation of the HST system could affect land uses by creating a new barrier dividing or disrupting existing communities. In addition to the above noted potential impacts of the HST system resulting in a new barrier or dividing some established communities, short term impacts of the HST system during construction include potential neighborhood disruption and division. This impact would be reduced by phasing the construction of segments of the system and by the use of in-line construction techniques where appropriate.

Potential impacts to low-income and minority populations located near the HST system. Using a study area of .25 mile [.40 km, about 1200 feet] and information from the U.S. Census for the year 2000, the Program EIR/EIS identified areas along the HST system likely to have at least 50% low income or minority populations and areas in which the percentage of low-income or minority populations may be at least 10% greater than the average for the area. These will be areas for further study during project-level environmental analyses when more detailed and specific information will be developed for the HST alignments and designs (e.g., whether aerial, at-grade, or below grade). The number and location of people affected and the extent of impacts cannot be determined without the additional information to be provided in project-level studies. Viewed on a systemwide basis, the proposed HST system is not expected to result in disproportionate impacts on minority and low-income populations. The HST system would cross a wide variety of community types in widely varied geographic settings, including rural, urban, and suburban, with various levels and mixes of development. The design practices and engineering criteria used in developing the HST system also serve to reduce impacts to people, including low-income and minority populations near HST facilities, by, among other things, placing the HST system in or along existing transportation corridors. Also, the installation of grade separations will reduce existing horn noise and help maintain local access and community connections.

The identified mitigation strategies will substantially lessen or avoid land use impacts; however, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce this impact to a less than significant impact in all circumstances.

8.7 Agricultural Lands

The HST could convert to non-agricultural uses between approximately 2445 to 3860 acres of important farmland (i.e., farmland listed as prime, statewide important, unique, and farmland of local importance on the Department of Conservation's Farmland Mapping and Monitoring Program (FMMP)).

The HST would cause some farmland severance (division of one farmland parcel into two or more areas of operation by the placement of a barrier through the parcel) in the

Sacramento to Bakersfield region. This impact could arise where the HST alignment options considered in the EIR would bypass urban areas on new corridors traveling mainly north-northwest to south-southwest, thereby diagonally dividing a number of north-south oriented farming parcels. The potential for this impact has been reduced because few bypass alignment options have been selected for further study.

While the identified mitigation strategies described above will substantially lessen this impact, it is unclear absent site-specific information that this impact can be mitigated to a less-than-significant level over the entire HST system.

8.8 Aesthetics and Visual Resources

The construction and operation of the HST system would alter existing scenic landscapes and cause impacts on visual resources related to the addition of infrastructure in, or removal of infrastructure from, the existing landscape. The infrastructure may include construction and improvements of the HST system, tunnels, fences, noise walls, elevated guideways, catenaries (support-pole systems for power supply for trains), and stations. Visual impacts will have a higher sensitivity in areas of scenic open space and mountain crossings. The programmatic analysis of the visual impacts included photo simulations of conceptual design of the facilities associated with the HST system for a set of types of representative landscapes for each segment of the proposed corridors, and concentrated on the locations where the plans show elevated structures, tunnel portals, or areas with extensive cut or fill.

While the mitigation strategies described above will substantially avoid and lessen impacts to aesthetics and visual resources, it is uncertain absent site-specific information that this impact can be mitigated to a less-than-significant level over the entire HST system.

8.9 Public Utilities

Improvements associated with the proposed HST system could cause conflicts with a pipeline or facility associated with a utility. This programmatic evaluation considered three of the most common major fixed facilities that may pose construction challenges as representative utility conflicts: electrical transmission lines, natural gas facilities, and wastewater treatment facilities. The HST system could result in up to 21 potential fixed-facility conflicts (high-impact conflicts), and up to 821 conflicts with utility transmission or pipelines (low-impact conflicts). These low-impact conflicts are not considered significant because they could generally be avoided, minimized, or mitigated by routing either the public utility or the HST system around, over, or under the facility. While this impact is considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

8.10 Hazardous Materials and Wastes

Construction and operation of the HST system could cause impacts to existing hazardous materials or waste sites. Operation of the HST system is not expected to generate hazardous waste. Potentially significant impacts are expected from HST station or maintenance facility conflicts with a known contaminated sites (listed on the federal National Priorities List (Superfund list), the State Priority List, and the California Integrated Waste Management Board's list of solid waste landfills in the State of California). While this impact is considered significant at the program level, mitigation strategies have been identified that can reduce this impact to a less than significant level.

8.11 Cultural and Paleontological Resources

The HST could impact prehistoric or historic archaeological resources and traditional cultural properties by causing physical destruction or damage during construction. Archaeological resources include both sites. The HST could impact historic properties and resources by causing physical destruction or damage. The HST could also impact paleontogical resources as a result of construction, including grading, cutting, tunneling, erecting pylons for elevated track, and due to station construction. While mitigation strategies have been identified that will substantially lessen or avoid these impacts, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances.

8.12 Geology and Soils

Seismic hazards evaluated include ground shaking and ground failure. The HST could cause risks to workers and public safety due to the collapse or toppling of facilities, either during construction or after completion, due to strong earthquakes. The HST also could create risks to public safety from automobile accidents or the interruption of automobile circulation, if strong earthquakes cause a derailment. HST facilities could sustain damage due to secondary hazards (settlement) over soft or filled ground

The HST could cause risks to workers and public safety due to ground rupture along active faults, either during construction or after completion. The HST also could create secondary public safety risks caused by damage to highways or airports, or interruption of these transportation services, in the event of train derailment caused by ground rupture along active faults.

The HST could also cause risks to workers and public safety due to the failure of natural or construction cut slopes or retention structures. The HST alignment could cross areas with hard, unfractured bedrock that will be difficult to excavate using methods other than blasting, which may pose a safety risk. Faulted materials that may be present can result in instability in the face of a tunnel area, another hazard. The HST could create the potential for migration of potentially explosive and/or toxic gases into subsurface facilities, such as tunnels or underground stations.

While the above impacts are considered significant at the program level, mitigation strategies have been identified that can reduce these impacts to a less than significant level.

8.13 Hydrology and Water Quality Impacts

The HST system could encroach on floodplains in each segment. Encroachment into the flood plain by the HST system is anticipated to be between 1865 and 3873 acres system wide. Floodplain encroachment may result in increased flood height from earthen berms or linear barriers to surface water flow.

The HST system could encroach on surface water resources. The representative footprint of the HST system would encroach on between 22,600 to 32,400 linear feet of streams, while encroachment onto lakes would between 7 to 27 acres. The HST would also add impervious surface area, which can reduce water infiltration, contribute to runoff, and negatively affect surface water quality. The HST could cause erosion, which can negatively affect water quality, where the alignment options would extend to or along the coast along highly erodable slopes.

The HST system may encounter groundwater during construction of at- and above-grade structures, tunnels and tunnel portals, and dewatering may be necessary. In addition, construction and operation of the HST system components may affect groundwater recharge.

While the above impacts are considered significant at the program level, mitigation strategies have been identified that can reduce these impacts to a less than significant level.

8.14 Biological Resources and Wetlands

The HST system's direct impacts to biological resources was assessed along alignments using a representative 50 feet total facility footprint for both at-grade and aerial structures. The HST system's potential for indirect effects on species and habitats due to noise, light, or shadows, a larger area was evaluated using a larger area that varied depending on the nature of the location. Sensitive habitat areas included a study envelope that was ½ mile on either side of the alignment centerline, or a 1-mile wide corridor. In urbanized areas, the study envelope was 1000 feet on either side of the alignment centerline.

The HST system could directly impact between 1201 to 1568 acres of natural communities and wildlife habitat that are unique, of relatively limited distribution in a region, or of particularly high wildlife value habitat. The HST system could also fragment existing habitats. The Final Program EIR/EIS indicates there are between 9773 to 17,619 acres of sensitive vegetation that may be indirectly affected by the HST system. The sensitive vegetation acreage range is based on the buffer areas included in the HST study area, which were designed to provide context to the impacts analysis, and are likely to be much larger than the actual indirect effect.

Wildlife movement/migration corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The HST system has the potential to affect wildlife movement/migration corridors where the alignment crosses wildlife movement corridors. In addition, fences that will be required for at-grade tracks will introduce a new barrier to animal movement. The actual impact will depend on the selection of final alignment and the final design of structures for the HST system.

Within the larger study envelope for the HST system (1-mile wide corridor in sensitive areas) there are up to 1.2 million linear feet of non-wetland jurisdictional waters (lakes, rivers, streams, and other water bodies). The HST system has the potential to directly or indirectly affect some of these resources.

The HST system could directly impact 30-89 acres of wetlands. The Final Program EIR/EIS indicates there are between 3996 and 18,356 acres of wetlands in the study area, which may be indirectly affected by the HST system.

The HST system has the potential to affect fishery resources during construction due to the need to cross streams and rivers. Construction activities could increase sediment loads in stormwater during rain, or be a source of chemicals, both of which could be released into creeks and harm aquatic resources.

The HST system could directly impact 67-84 special status species based on the representative facility footprint. The study area for the HST system indicates the possible presence of 279 to 350 special status species within the area of potential indirect effect from the HST system. Some of these species could be affected by the construction and the operation of the HST system.

While the mitigation strategies identified will substantially lessen or avoid this impact, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances.

8.15 Public Parks, Recreation, and 4(f) Resources

The HST system could to result in impacts to parks and recreation resources, including publicly owned parks, wildlife and waterfowl refuges, historic sites of national, state or local significance, and other recreational resources covered by either section 4(f) of the Department of Transportation Act (49 U.S.C. § 303(c) or section 6(f) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. § 460l-8).

The HST system could result in direct impacts to lands containing publicly owned parks and recreational resources by causing use of such lands for the placement of HST facilities, and could result in indirect impacts to these resources due to construction activities or HST system operations which adversely affect the use of publicly owned parks and recreational resources. In addition to addressing noise, biology, and air quality impacts in other sections of these Findings, the Program EIR/EIS identifies the park and recreational resources located within 900 feet of the centerline of HST alignments or facilities. No state parks would be crossed or bisected by the HST

system. The EIR, however, identified five state parks that may be within 900 feet of the HST system. Additionally, certain local, regional or federal recreational resources could be affected.

At the program level it is not possible to know precisely the location, extent and particular characteristics of impacts to park resources. Due to this uncertainty, for the purposes of system-wide review at the programmatic level, this impact is considered significant. While mitigation strategies have been identified that would substantially lessen or avoid these impact, sufficient information is not available at the program level to conclude with certainty that mitigation will reduce this impact to a less than significant level in all circumstances.

8.16 Cumulative Impacts

Implementation of the HST system could lead to local and regional cumulative effects related to:

- Surface streets leading to and from the intercity highways and airports;
- Localized travel conditions;
- Air quality within the six-basin study area (in combination with the air quality impacts of other highway projects or airport improvements identified for the cumulative impact analysis and those projects considered in the state implementation plan for air quality);
- Noise and vibration;
- Community and neighborhood cohesion and property loss;
- Community/neighborhood impacts (in combination with other transit and roadway projects these localized impacts could contribute to cumulative);
- Land use impacts to various property types, neighborhoods, and communities (in combination with other transit extension and roadway projects);
- Conversion of agricultural land to non-agricultural use;
- Visual resources;
- Public utilities and future land use opportunities (because of right-of-way needs, extensive utility relocation, and property restrictions associated with construction of multiple linear facilities and other reasonably foreseeable future projects in the study area);
- Cultural and paleontological resources;
- Geology and soils related to slope stability in various proposed locations of cut and fill and areas susceptible to slope failure; and related to subsidence if other projects under construction in the area also needed to dewater from the same drainage basin;
- Hydrologic resources;

- Sensitive biological resources and wetlands;
- Parklands and recreational resources; and
- Indirect effects (such as to waterways, wetlands, sensitive habitat and sensitive species) related to the increment of growth associated with the HST system, but anticipated by local general plans, which was projected for the period from now until 2035, recognizing that growth related to the HST system would occur in the future after early implementation steps for the HST system have been taken.

While identified mitigation strategies will substantially lessen or avoid these effects, sufficient information is not available at the program-level to conclude with certainty that mitigation will reduce the HST system's contribution to cumulative effects in all circumstances. To assure that potential cumulative effects will be fully examined in the future, project level studies will incorporate analyses of impacts to waterways, wetlands, sensitive habitat and species based on appropriate regional study areas beyond the sites immediately affected by the HST project. To assure that appropriate planning for HST station areas is undertaken so as to avoid indirect effects associated with growth, station area development strategies are described in Chapter 6B of the Final Program EIR/EIS and are included in the MMRP.

8.17 Growth-Inducing Effects

Transportation investments can lead to reduced travel time or cost, improved accessibility to regions or parts of regions, or reduced accidents or air pollution. These effects contribute to economic growth by allowing time and money previously spent on travel to be used for other purposes, attracting businesses and residents to places with increased accessibility or improved quality of life, and reducing overall costs to society. The population and employment growth that result from economic growth comprise the growth-inducing effects of transportation investments such as the HST system. This growth can contribute to additional impacts beyond those directly attributable to the changes in the transportation system, which the EIR refers to as growth-related indirect impacts. The incremental growth associated with the HST system is not expected to result in a significant increase in demand for municipal services. The timeframe within which incremental growth associated with the HST system would be expected is within normal planning horizons and within the purview of the local and regional agencies responsible for planning for municipal services to address.

Population Effects: Statewide population is expected to grow by about 54% between 2002 and 2035 under the No Project Alternative. Compared to the No Project Alternative, the statewide population growth is projected to be roughly 2% higher under the HST System Alternative. These population differences among alternatives represent the increased accessibility provided by the transportation investments. An investment in HST is projected to lead to greater economic growth within the state than the No Project Alternative. These statewide figures follow the same general pattern at the regional level, with the exception of the Northern Central Valley, where population growth is projected to be about 4% higher under the HST System Alternative than under the No Project Alternative.

Employment Effects: Statewide employment is expected to increase by about 46% between 2002 and 2035 under the No Project Alternative. Compared to the No Project Alternative, statewide employment growth is projected to be roughly 2% higher under the HST System Alternative.

Land Urbanization Effects: Urbanized areas in California are expected to grow by 48% between 2002 and 2035 under the No Project Alternative, representing an increase of about 1.5 million acres over the approximately 3.1 million acres in the existing urbanized areas in the counties where HST facilities would be located. Compared to the No Project Alternative, the HST System Alternative is expected to have about 0.1% less growth in urbanized areas, which is about 2600 fewer acres. The HST System Alternative compared to the Modal Alternative would use 68,100 fewer urbanized acres than the Modal Alternative. The HST System Alternative would therefore be able to accommodate more population and employment growth on less land than the No Project Alternative and is not expected to have an adverse effect on urbanization statewide.

Regional Growth Effects: For the HST System Alternative, population in the Central Valley is expected to experience a small increase in both net growth and distributive effects as compared to the No Project Alternative. Because such growth would occur well in the future after the initiation of HST service, the locations in which such growth may occur cannot be predicted, although potential regional effects were considered in the land urbanization analysis.

Indirect/Secondary Effects from Growth: The HST Alternative may have a positive (i.e., result in an increase), but small, statewide effect on population and employment growth compared to the No Project Alternative. Despite the relatively small magnitude of the expected growth, the growth could contribute to indirect impacts on the human and natural environment. Many of these indirect, growth-related impacts derive from increased urbanization needed to accommodate the additional population and employment. However, the additional growth expected from the HST System Alternative over the No Project Alternative in 2035 is expected to be accommodated on a similar amount of land, and the growth of urbanized area in acres would be smaller under the HST System Alternative, than under the Modal Alternative.

No indirect, growth-related effects from implementing the HST system are expected to the following resource areas: energy, noise and vibration; exposure to EMF or EMI; public utilities; exposure to hazardous materials or wastes; cultural resources; geology and soils; and public parks and recreation. Indirect aesthetic impacts from induced growth under the HST System Alternative are considered speculative.

Overall traffic conditions are expected to improve with the HST system, despite the estimated 2% increase in population and employment under the HST System Alternative. Some increase in local traffic around HST stations, consistent with this increased growth, is expected.

Air quality is expected to improve with the HST system, however, the increased population and employment growth may contribute to increased mobile-source air pollutants due to increased traffic around stations.

Socioeconomic changes from growth under the HST System Alternative are expected to be small, and therefore indirect land use compatibility impacts from induced growth are also expected to be small. Growth under the HST System Alternative would be distributed across various communities, would be reflected in infill development and increased development densities, and is not expected to result in a significant increase in demand for municipal services. Planning for such services is within the purview of local and regional agencies and expected growth in the future would be within typical planning horizons for such services.

Growth under the HST System Alternative is expected to impact 4100 fewer acres of important farmland on a statewide basis than the No project Alternative.

Growth under the HST System Alternative is expected to impact about 270 miles more of waterways than the No Project Alternative, or about 7% more. The largest percentage of this increase is expected to occur in Southern California. The HST System Alternative is expected to affect fewer waterways in the Northern Central Valley region than the No Project Alternative due to induced growth. The Northern Central Valley is projected to experience a decrease in acreage of habitats potentially affected by growth.

Growth under the HST System Alternative has the potential to affect up to 8400 acres more of land which may contain some threatened and endangered species habitat on a system-wide basis than the No Project Alternative. The largest percentage increase is expected to occur in the Bay Area, while the largest acreage increase is expected in the Southern Central Valley. Growth under the HST System Alternative has the potential to affect about 330 acres more containing some wetlands on a system-wide basis than the No Project Alternative, or about 1% more. The largest acreage and percentage increase is project to occur in the Northern Central Valley, whereas Southern California is expected to exhibit a reduction in wetland loss due to future urbanization.

The specific location(s), size, scope and attributes of specific growth related projects that may be proposed in the future cannot be predicted, nor can the outcome of public agency approval processes and the ultimate configuration of any approved projects be predicted. When making future decisions regarding both the final selection of station locations and the timing of station development, the extent to which appropriate Station Area Plans and development principles have been adopted by local authorities will be considered. Denser development near HST stations will concentrate growth in areas conveniently located near stations, reducing the need to convert land to urban use and improving conditions for comprehensive and extensive local transit systems. Local governments would play a significant role in implementing station area development by adopting plans, policies, zoning provisions, and incentives for higher densities, and by approving a mix of urban land uses. Station Area Plans and development principles are included in the MMRP and can be expected to substantially avoid and reduce adverse environmental effects related to growth.

9. Measures to Minimize Harm

The Authority has committed to use all practicable means, including design practices and mitigation strategies, to avoid or minimize adverse effects on the environment that would result from the implementation of the HST Alternative. To minimize potential future harm from implementation of the proposed HST system, future project-level environmental analysis and documentation will review and prescribe the design practices and mitigation strategies described in the Authority's adopted Mitigation Monitoring and Reporting Plan included as Appendix A.

Chapter 3 of the Final Program EIR/EIS describes program-level mitigation strategies to minimize or mitigate adverse environmental impacts. The monitoring and enforcement program is to apply this plan during the project-level environmental compliance process. Some mitigation strategies may cause other adverse environmental impacts at the same time that they mitigate impacts addressed in this Program EIR/EIS. Future tiered project-level environmental reviews will determine appropriate site-specific mitigation measures.

9.1 Design Practices

The Authority would employ design practices identified in the Final Program EIR/EIS as the HST Alternative is developed further in the project-level environmental review, final design and construction stages. These practices will be applied to avoid and minimize potential adverse environmental impacts. Design practices are incorporated in the Mitigation Monitoring and Reporting Plan and are illustrated below.

- Existing transportation corridors would be used. Nearly 70% of the adopted preferred HST alignments are either within or adjacent to a major existing transportation corridor (existing railroad or highway right-of-way).
- Tracks that are fully grade separated from all roadways would be used.
- Multi-modal transportation hubs would be used.
- Some of the preferred alignments would be in a tunnel or trench section, which would reduce noise.
- Electric power, high-quality track interface, and smaller, lighter and more aerodynamic trainsets would be used, which would result in less noise than existing commuter and freight trains because HST do not have the rumble associated with diesel engines and use a design that greatly minimizes track noise.
- Transit-oriented design and smart growth land use policies would be used. Station area development principles that would be applied at the project-level for each HST station and the areas around the stations would include:
    - Higher density development.
    - A mix of land uses (retail, office, hotels, entertainment, residential, etc.) and housing types to meet the needs of the local community.

  - A grid street pattern and compact pedestrian-oriented design that promotes walking, bicycle and transit access.
  - Context-sensitive building design that considers the continuity of the building sizes and coordinates the street-level and upper-level architectural detailing, roof forms, and rhythm of windows and doors.
  - Limits on the amount and location of development-related parking, with a preference that parking be placed in structures.
- Portions of the system would be in tunnel or on aerial structure, which would avoid and/or minimize impacts to surface water resources.
- Measures to avoid water infiltration would be taken.
- Underpasses or overpasses or other appropriate passageways would be designed to avoid, minimize and/or mitigate any potential impacts to wildlife movement.
- In-line construction would be used for sensitive areas.

10. Relationship to Other Plans

The No Project Alternative included planned and programmed transportation improvements in fiscally constrained plans. Proposed improvements to the LOSSAN corridor from Los Angeles to San Diego for passenger train services at speeds under 125 miles per hour, and not under the jurisdiction of the Authority, are being considered by the FRA and the California Department of Transportation, and were studied cooperatively with the Authority. These improvements are the subject of a separate Program EIR/EIS. While local governments and private entities have made other proposals for other high-speed passenger train services, none have been adopted or approved and none are developed enough, nor is their progress predictable enough, to have been integrated or coordinated with the HST system.

The USEPA commented that "FRA has proposed a separate network using magnetic levitation technology for high speed train service in southern California. ... A full discussion of this issue and potential duplication of efforts and incompatibilities should have been included in the Final PEIS." The Southern California Association of Governments (SCAG) has proposed a regional network of magnetic levitation (maglev) high speed trains in southern California that would be privately financed. The FRA has not proposed, advocated, nor considered advancing such a maglev system. Beginning in 1999, the FRA implemented the maglev transportation technology deployment program provisions of TEA-21 [23 U.S.C. § 322] by soliciting proposals for a maglev project suitable for deployment in the United States. The California Department of Business, Transportation and Housing submitted the SCAG proposal to FRA for consideration; however, the FRA did not select the SCAG project preferring instead projects in Maryland and Pennsylvania. However, Congress continued to provide funds for SCAG's maglev activities.

The proposed maglev network was developed separately by SCAG to address regional transportation and without integrating the maglev network with the HST system. SCAG has proposed to locate the maglev network in many of the same corridors and to offer comparable high speed transportation services as the HST system, however, the maglev network would not connect major metropolitan areas of the state. The similar and extensive level of investment necessary to implement either the HST system or maglev network makes construction of both unlikely in common corridors serving the same travel markets.

The FRA also considered a proposal as part of the maglev transportation technology deployment program from the State of Nevada through the California-Nevada Super Speed Train Commission. As with the California proposal, FRA did not select this project as part of the program, but it continued to receive funding from Congress. On May 20, 2004 the FRA issued a Notice of Intent to prepare a programmatic EIS for the entire Anaheim, California to Las Vegas, Nevada maglev proposal. At this time, only scoping has been completed for this EIS. This proposal would not share any corridors or travel markets with the HST system. Should this project be built, it would likely complement the HST system, connecting at common stations both in Anaheim and Ontario and offering passengers a wider range of destinations. In section 1307 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy For Users (P.L. 109-59), Congress has extended continued financial support for maglev only to the Las Vegas to Prim, Nevada segment of this proposal and one other project in the Eastern half of the country.

11. Compliance with Other Federal Regulations

11.1 Section 4(f) and 6(f) Approvals

Findings under sections 4(f) [49 U.S.C. § 303(c)] and 6(f) [16 U.S.C. § 460l-8] will be prepared as part of project level environmental review when site-specific information about the HST system and location alternatives are known.

11.2 Section 404 of the Clean Water Act

The USEPA and USACE have participated in the development of both the Draft and Final Program EIR/EIS and in accordance with the MOU among Federal agencies for this environmental review, were consulted concerning the selection of the preferred corridor and route most likely to yield the least environmentally damaging practicable alternative (LEDPA) and as identified as preferred in the Final Program EIR/EIS. The USEPA and USACE have concurred that the preferred HST alignment and station options are most likely to contain the LEDPA. Future project-level environmental review will include further consultation with USEPA and USACE regarding the Clean Water Act leading to USACE permit applications.

11.3 Endangered Species Act

Preparation of the Program EIR/EIS involved informal consultation and information sharing with the US Fish and Wildlife Service (USFWS) of the U.S. Department of Interior (DOI). Project-level environmental review would involve consultation with USFWS, as needed, for potential impacts on federally listed plant and wildlife species, including the preparation of a biological assessment or assessments, and biological opinions for each phase of project implementation. Formal consultation under Section 7 of the Endangered Species Act for project study areas of concern would accomplish the following steps identified by DOI: 1) identifying the conservation needs of each listed species with the potential to be impacted by the proposal; 2) identifying the threats to each listed species' conservation related to the proposed action; 3) identifying species conservation or management units and the threats affecting those units; 4) identifying species' conservation goals framed within the context of the HST program; and 5) developing conservation/management unit strategies. The FRA and the Authority would prepare Biological Assessments to address the affected conservation/management units identified.

12. Comments Received on the Final Program EIR/EIS

Some public comments on the Final Program EIR/EIS were received and addressed by the Authority as part of their decisions on the HST system, and are included in Appendix B. Substantive comments made in letters written to the FRA are addressed below (and may also have been addressed separately by the Authority).

12.1 U.S. Environmental Protection Agency

The USEPA submitted comments on the Final Program EIR/EIS for the proposed California HST System focused primarily on the cumulative impacts assessment in the Final Program EIR/EIS and made recommendations for the "Bay Area to Central Valley PEIS", and for "Future Project-level Tier 2 NEPA Analyses".

Cumulative impacts assessment: USEPA commented that the Final Program EIR/EIS did not contain a landscape–level cumulative impact assessment for all sensitive resources, and did not address a comprehensive set of reasonably foreseeable projects. USEPA suggested that a different cumulative impacts analysis may have resulted in different conclusions or different mitigation options, and recommended that future environmental documents consider Caltrans guidance on cumulative impact assessments. *Reasonably foreseeable future actions:* USEPA suggested that additional projects, such as large-scale developments and approved urban planning documents identified within and around the proposed high speed train system, should have been included in the cumulative impacts analysis as reasonably foreseeable future actions.

Past and present actions: USEPA disagreed with the Final Program EIR/EIS's characterization of past actions in the context of cumulative impacts analysis, and asserted that a landscape cumulative impacts analysis should include large scale

mitigation, citing for example USEPA's assumption that a continuously-fenced high speed rail system would impede wildlife movement, and when considered with other past, present, and future project impacts to wildlife movement in California, would be potentially significant to a number of species.

Relationship to other plans: USEPA commented that "FRA has proposed a separate network using magnetic levitation technology for high speed train service in southern California. ... A full discussion of this issue and potential duplication of efforts and incompatibilities should have been included in the Final PEIS." USEPA recommended that FRA clarify the relationship between the need for this project and the need for other magnetic levitation technology proposals by FRA. FRA has addressed this comment in section 10, above, in this record of decision.

Response

USEPA's recommendations for the Bay Area to Merced Program EIR/EIS and for future NEPA/CEQA review will be considered for these activities and efforts to coordinate with USEPA will continue. Future cumulative impacts analysis and identification of mitigation will be based on appropriate study areas identified for individual resources. These study areas will be largely regional and local and they cannot be adequately identified until further information is known about alignment locations and the time period of implementation. Additional cumulative impacts analysis and identification of more refined mitigation will accompany project-level review. The Authority and the FRA find the Final Program EIR/EIS applied appropriate methodology to evaluate cumulative impacts from the proposed HST system at the program level and for decisions to be made on the Program EIR/EIS.

Cumulative impacts assessment: The USEPA letter does not raise new issues about cumulative assessment in the Final EIR/EIS that were not already addressed in response to USEPA's comments on the Draft EIR/EIS (Comment Letter AF008 in the Final EIR/EIS, dated August 31, 2004).

The cumulative impact analysis in the Program EIR/EIS focused on the resources potentially affected by the proposed action and alternatives and identified where there may be added impacts to these resources, when considering past, present, and reasonably foreseeable future actions. The Program EIR/EIS described the current conditions that incorporate past and present effects of other recent projects in analyzing the potential for direct, indirect and cumulative impacts. The cumulative impact analysis considered reasonably foreseeable highway improvements and transit projects within the study area and extensively analyzed the potential for economic growth related cumulative and secondary effects for each of the three system alternatives. In addition, consideration of the indirect effects related to the reasonably foreseeable population and employment growth that could result from the proposed action and alternatives, as identified using local agency general plans and other planning documents, is addressed in the Final EIR/EIS (see Chapter 5, *Economic Growth and Related Impacts),* and is considered part of the cumulative impacts analysis.

The methodology used is appropriate for this Program EIR/EIS due to the future time frame for the proposed HST system and the speculative nature of information about potential projects some 10 to 15 years in the future, and is consistent with CEQ Guidance. CEQ Guidance suggests that where evaluating reasonable foreseeable adverse effects and where there is incomplete information or unavailable information ..."that cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known . . . the agency shall include ... the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." [CEQ Guidance "Considering Cumulative Effects," p. 20; 40 CFR 1502.22]

Past and reasonably foreseeable future actions: USEPA's suggested approach to future projects is not appropriate for this program analysis, and would be speculative for a proposed system that will not be implemented for at least 10 years. Thorough analysis of site-specific, local area, and focused regional cumulative effects, including specific urban development projects, will be undertaken as part of future project-level environmental review, when this information will be available and more relevant to substantive impact analysis.

For the Program EIR/EIS, the costs of attempting to collect detailed, timely, accurate data on projects, which could be considered "reasonably foreseeable" some 10 to 15 years in the future across all the jurisdictions represented by the HST Alternative conceptual corridors and the Modal Alternative components would be exorbitant and the means to obtain it are not assured. Given the limitations of available information, and the need to assess a future timeframe, the use of the growth analysis to address impacts from future development is an appropriate theoretical approach to cumulative impacts for this programmatic analysis.

USEPA's suggestion that local general plans be used to identify reasonably foreseeable projects is not appropriate for this Program EIR/EIS. Every city and county is required by California law to adopt a general plan, but, except for housing elements, general plans are not comprehensively updated on a regular periodic basis pursuant to a statutory schedule. Each city and county determines when to update its general plan. Comprehensive updates are both unpredictable and irregular. Because at the beginning of the Program EIR/EIS process in 2001 the general plans for many of the jurisdictions with potential locations for HST facilities or components of the modal alternative were more than 10 years old, and some were more than fifteen or twenty years old, they were useful for identifying land use patterns and growth projections, but not individual projects. For preparing a cumulative impact analysis for thousands of miles of alternative transportation corridors, the general plans did not provide a reliable and consistent information base for identifying reasonably foreseeable future projects to use in analyzing cumulative impacts in a consistent manner for the system as a whole. The economic growth analysis in Chapter 5 addressed the relevant statewide and regional consequences of future actions that may be influenced by the choice of system alternative, and accounted for anticipated growth according to general plans without listing specific projects. The growth analysis properly considered available information, the timeframe for the implementation of the proposed HST system, the timelag in related projects potentially affecting resources, and the estimated secondary environmental impacts in jurisdictions in which HST facilities could potentially be located. In addition,

appropriate mitigation was identified in Chapter 6B, Station Area Development, that could avoid, minimize, and mitigate potential cumulative and secondary effects.

Cumulative Impact Analysis: USEPA suggests using Caltrans guidance. This may be considered for future project-level documents. The Caltrans documents provide no guidance on cumulative impact analysis in programmatic EIS's or EIRs, and no guidance on the temporal relationship of future projects to the proposed project, other than noting that reasonably foreseeable projects should be considered based on proximity in time and location

Circumstances at locations across the proposed HST system vary widely; therefore identification of statewide or large-scale mitigation for cumulative effects is not appropriate. The Final Program EIR/EIS explains that the proposed HST system would traverse widely varied terrain with different soils, climate, topography, habitat conditions and species. It will be at grade, on aerial structures and in tunnels. It will include features to facilitate wildlife movement. However, because of the varied terrain it will cross, the impacts from the HST system will differ in different locations. Habitat for individual wildlife species is not continuous across the state but exists in distinct ecosystems. Movement requirements differ for individual species and in different locations. For example, there are great differences between the separate and distinct habitat types found in coastal Orange County, Soledad Canyon, Palmdale, and the Central Valley alignments. While coastal sage scrub habitat is a concern in Orange County, in the Central Valley there are different species and habitats of concern (e.g., San Joaquin Kit Fox). Each area has its own mix of habitat types, species, waters, climate and topography, as well as its own array of land uses and human population. The Program EIR/EIS included a broad analysis of the potential for cumulative impact by resource type. The Final Program EIR/EIS also identifies design practices and mitigation strategies for each resource/impact area, based on potential impacts identified in Chapter 3, Environmental Consequences. These mitigation strategies are also appropriate for the general types of impacts anticipated from cumulative effects. Additional analysis of cumulative impacts in local and regional contexts, and more refined mitigation measures, will be addressed during project-level reviews.

12.2 State Parks

The California Department of Parks and Recreation (State Parks) commented on the analysis of three issues in the Final Program EIR/EIS: (1) potential impacts to the five units of the State Park System that lie within 900 feet of the preferred HST north-south alignment, (2) impacts to wildlife corridors and connectivity between State Park System units and other open space or protected lands, and (3) potential impacts of the Bay Area to Central Valley (i.e., Merced) alignment that will be analyzed in a Second Tier Program EIR/EIS. Detailed comments were included on mitigation measures, alternatives, aesthetics, noise, environmental justice, recreation resources, cultural resources, geology and soils, biological resources, and cumulative impacts that substantially restate previously raised concerns, seek additional detailed studies and are critical of the responses provided to earlier State Parks comments on the Draft Program EIR/EIS. Finally, State Parks provided for use in future documents the new names given to the

Taylor Yard and Cornfield park properties, and noted that Orestimba Wilderness had been misspelled in the Final Program EIR/EIS.

Response

Parkland Analysis: The requested additional analysis of the state park system and particularly the five units that are identified as potentially affected by the selected HST corridor alignments, will appropriately be conducted during project-level environmental review. The Program EIR/EIS provides a consistent level of analysis for alternatives within the entire HST system, including thousands of corridor miles, includes design practices and mitigation strategies to avoid and minimize impacts to parks, and identifies steps for subsequent studies. The additional detailed analysis sought by State Parks would have been costly and speculative had it been performed at this time for the Program EIR/EIS. The potential for adverse impacts to parks that may not be fully avoided or reduced by mitigation is acknowledged in the Final Program EIR/EIS.

Level of Detail: In detailed comments State Parks fails to distinguish between the program level of analysis appropriate for the HST proposal due to its large scale and the more detailed, site specific studies that are appropriate for project level EIR/EIS's or other more limited programmatic EIR/EIS's, and fails to recognize that site-specific analysis are not necessary or required for the program decisions to be made based on the Final Program EIR/EIS. Future tiered environmental documents will be sufficiently comprehensive, and are the appropriate studies, to incorporate the additional information provided by State Parks (e.g., data from 2005 preliminary planning documents for the Rio de Los Angeles State Park (formerly known as Taylor Yard)) and to address the concerns raised by State Parks' comments in greater detail. The Preferred HST Alternative avoids impacts to many parks and, where potential impacts remain, the Final Program EIR/EIS incorporates mitigation strategies to avoid, reduce and minimize the potential impacts to parks.

As State Parks' comments recognize, potential impacts to park units may vary widely depending upon the rural or urban location, the resources at each park, the ambient noise environment, and other factors, all of which are appropriate for study in future environmental documents. Additionally, Section 4(f) and 6(f) findings will be made at the project level when alignments have been defined in more detail and after considering further variations to reduce and avoid impacts. Regarding wildlife movement, the Final Program EIR/EIS notes that up to 24% of the preferred HST system would be at-grade in new corridors and could present a barrier to wildlife movement, unless adequate features for wildlife crossings are included and incorporated in the system. The mitigation strategies in the Final Program EIR/EIS include underpasses or overpasses or other appropriate passageways at reasonable intervals to be designed during project level studies in order to avoid, minimize and mitigate potential impacts to wildlife movement. The design and placement details for features to facilitate wildlife movement are appropriately determined in the project level studies when more detailed information is available for alignments, HST facilities, and wildlife resources.

Environmental justice: Environmental justice, which was noted as a concern by State Parks, was addressed for the proposed HST system as a whole in the Program EIR/EIS,

which satisfies all applicable requirements for program level review, and the topic will receive additional study in future tiered environmental documents for the HST system.

EMF: Measurable low-level EMF's occur only in very close proximity to electric power facilities, and would generally be within the HST system right-of-way. Low-level EMF's occur with all electric power facilities and are not unique to the HST system. A variety of studies that have examined the effects of low-level EMF exposures on animals have found that general physiological status is relatively unaffected by low-level EMF exposures. Also, FRA data measuring EMF exposures after the Northeast Corridor Electrification Project found very low exposures levels in proximity to the train system. Further evaluation of potential EMF exposures will occur at the project level when specific species and locations can be examined along with more detailed project design information.

Bay Area to Central Valley: After consultation with CEQ and the California Resources Agency, the Authority and the FRA determined that subsequent tiered environmental documents could address the additional study needed of the proposed HST system connection between the Bay Area and the Central Valley and the identification of a preferred alignment for this portion of the system. This decision represents appropriate recognition of the limits of available data and need for further study, which will include review of connections in the Bay Area and the Central Valley, before additional decisions are made to select a preferred route in this area.

12.3 State Parks Foundation

The California State Parks Foundation (Foundation) commented that: (1) the Final Program EIR/EIS "remains inadequate in its response to potentially significant park impacts and inappropriately defers critical analysis for land management, habitat preservation, cultural and biological resource management and noise and visual impacts to future project-level analysis"; (2) the Foundation disagrees with response ASO051-1, which states that the use of existing rail corridors for HST operations is not expected to greatly alter the environmental effect of these existing rail lines; (3) the Foundation disagrees with response ASO051-3, which states that that it is premature at this level of design to develop more specific mitigation measures for potential effects; (4) the Foundation does not believe that sufficient information has been disclosed that would lead to a thorough assessment of the proposed project, particularly as it relates to potentially significant impacts on state parks; (5) the Authority should establish an official Advisory Committee for Burbank to Los Angeles Union Station similar to that proposed for the Bay Area study.

Response

Adequacy of the Final Program EIR/EIS: Please see responses to the letter from State Parks above on the level of detail of the Final Program EIR/EIS. This comment was also addressed as part of the Final Program EIR/EIS, particularly in the Summary and in Standard Response 3.15.13. Please also see Standard Responses 3.15.2, 3.15.4, 3.14.6 regarding biological resource evaluation.

Conclusions on environmental effect of co-location with existing rail lines: In alignments near parks where existing nearby passenger and freight trains are part of the ambient noise and visual environment, it is important to recognize that while the HST system is different than those services, the added impact may not be great, and the combined HST and conventional rail facility may improve existing local environments. In dense urban areas (such as at Taylor Yards and Old Town San Diego) the urban environment has elevated ambient noise levels, particularly where there are also freeways nearby and/or existing rail lines. When traveling at reduced speeds the HST is quieter than existing freight and conventional passenger trains. Moreover, when the HST shares rights-of-way with conventional rail, grade separation improvements and/or sound walls or other mitigation measures will reduce existing noise levels and other existing environmental impacts in these corridors.

Mitigation measures for potential effects: The need for further study is inherent to the first phase of a tiered environmental process that is followed by further studies and it is entirely proper for further study of discrete issues to be included in future project-level environmental documents, which will be more detailed. The Final Program EIR/EIS contains mitigation strategies appropriately identified at the program level and notes that such strategies will be refined and applied at the project level. Additional steps will be taken at the project-level to avoid impacts to parks by considering alignment variations. The Authority is committed to avoiding Henry Coe State Park, and will continue to apply avoidance and mitigation strategies in future studies regarding other State Parks.

13. Corrections to the Final Program EIR/EIS

A number of corrections to the Final Program EIR/EIS were identified during the NEPA waiting period, the CEQA certification process, and in public and agency comments. These errata are included in this record of decision as Appendix C as well as one additional erratum in Appendix B, section 1.3. These corrections make minor modifications to the EIR/EIS, are not considered significant new information, and do not change the analysis or conclusions of the Program EIR/EIS. These corrections merely clarify and amplify issues adequately addressed in the Final Program EIR/EIS. These corrections do not trigger the need to prepare a supplement, per the requirements of the CEQ's NEPA regulations (40 CFR 1502.9(c)(1)).

14. Conclusion

The need for an HST system is directly related to the expected growth in population and resulting increases in intercity travel demand in California over the next twenty years and beyond. As a result of this growth in travel demand, there will be increases in travel delays from the growing congestion on California's highways and at airports. In addition, there will be effects on the economy and quality of life from deteriorating reliability of the transportation system as travel demand increases and from worsening air quality in and around California's metropolitan areas. The intercity highway system, commercial airports, and conventional passenger rail serving the intercity travel market are currently

operating at or near capacity, and will require very large public investments for maintenance and expansion in order to meet existing demand and future growth.

The proposed HST system would provide a new mode of high-speed intercity travel that would link the major metropolitan areas of the state; interface with international airports, mass transit, and highways; and provide added capacity to meet increases in intercity travel demand in California projected for the year 2020 and beyond in a manner sensitive to and protective of California's unique natural resources. In addition, the HST Alternative is identified as environmentally preferable under NEPA.

The evaluation and findings indicate that the Modal Alternative, improvement to existing highway and air modes of intercity travel, would help meet projected needs for intercity travel in 2020, but would not satisfy the purpose and objectives of the program as well as the HST alternative. In addition, although the capital cost of the Modal Alternative would be over two times the estimated capital cost of the HST Alternative, the Modal Alternative would have considerably less sustainable capacity than the HST Alternative to serve California's intercity travel needs beyond 2020.

The evaluation and findings of the Final Program EIR/EIS also indicate that taking no action under the No Project Alternative would not meet the intercity travel needs projected for the future (2020 and beyond) as population continues to grow, and would fail to meet the purpose and objectives of the program which can be met by the Preferred HST Alternative. The No Project Alternative would result in environmental impacts but would not offer travel improvements compared to the Modal and HST Alternatives.

Based on the factors outlined above and as informed by the analysis presented in the Draft Program EIR/EIS, public and agency comments, and additional analysis described in the Final Program EIR/EIS, the FRA selects the HST alternative and selects for further analysis the preferred alignments and stations.

Joseph H. Boardman
Administrator
Federal Railroad Administration

Date: 11/18/2005

Attachments: Appendix A – Mitigation Monitoring and Reporting Plan

Appendix B – Summary of Public Comments from CEQA Certification

Appendix C – Errata for the Final Program EIR/EIS

APPENDIX D

TECHNICAL REPORT ORGANIZATION AND FORMAT INSTRUCTIONS

1 HEADING 1 (Ctrl+1) (NOTE: THE NUMBER FOR THIS HEADING MUST BE SET UNDER "SET NUMBER VALUE" SO THAT CHAPTER NUMBER IS GENERATED AUTOMATICALLY IN FOOTER PAGE NUMBER)

Body Text (Alt+Shift+X)

1.1 Heading 2 (Ctrl+2)

1.1.1 Heading 3 (Ctrl+3)

A. HEADING 4 (Ctrl+4)

Heading 5 (Ctrl+5)

Body Text Indent (Alt+X)

Heading 6 (Ctrl+6)
Heading 7 (Ctrl+7)

- HST Bullet 1 (Alt+Shift+B)
  - HST Bullet 2 (Alt+B)

CALIFORNIA HIGH-SPEED TRAIN
PROJECT-LEVEL EIR/EIS STYLE SHEET (IN PROGRESS)

Style Specifications

	Template to use:
ABC ▪ alignment vs. alignment alternative ▪ alternative ("under" an alternative, not "in") ▪ bulleted lists—uppercase first letter and use period at end of each item	**DEF** ▪ federal (lowercase)
GHI ▪ high-speed rail (general type of train technology) ▪ high-speed train (train system proposed for California)	**JKL** ▪
MNO ▪ Multimodal ▪ No Project Alternative (see acro list below)	**PQR** ▪ % (use symbol, not percent [e.g., 53%]) (use percentage without numeral [e.g., percentage of land affected is…] ▪ project area (DO NOT USE)
STU ▪ shall—avoid (see discussion for *will*) ▪ state (lowercase) ▪ station location options ▪ study area ▪ statewide program EIR/EIS ▪ Terms should be set off with italics, not quotation marks (e.g., *Tiering* refers to a multilevel approach…) ▪ turnouts ▪	**VWXYZ** ▪ would—use in impact discussion (e.g., The project would reduce congestion…) because the project is hypothetical ▪ will—use in mitigation measures (e.g., The Authority will construct a noise wall…)
Numbers ▪ units: standard (metric) Ex: 25 ft (7.6 m) ▪ spell out numbers less than 10 unless except with units of measure and at beginning of sentences	**Other Information** ▪ When referring to a section within the document, please include the section number and title, highlight them, and don't restate document name (e.g., use Section 3.5, Energy, [not Section 3.5 in this EIR/EIS]). ▪ No periods after acros (e.g., 35 ft [not 35 ft.] ▪ Do not use acros in headings ▪ Use "would" in impact discussion and "will" in mitigation discussions.
Geographic and Alignment Terminology ▪ Should have a list of road names,acros, and geographic names (e.g., SFO, OAK)	**<u>For other terms, see the Glossary from the BA-CV programmatic EIR/EIS.</u>**

TERMS AND WRITING STYLES

With more than five project-level consultant teams preparing environmental and public documents in addition to the Authority and Program Manager (PM), a common understanding of key program terms is needed. A number of terms with specific meaning for the HST program have been defined below. It is easy to become confused by mixing terms defined in contracts or other documents with those that have been defined in the public record. For instance, regional team contractors have been hired for segments of the HST System but their areas of responsibility do not correspond with geographic regions and segment has a particular and problematic meaning in NEPA case law. Segment is best not used at all except to refer to subcomponents of HST sections being studied and the project-level teams are better thought of as corridor teams. Some terms with specific meanings have been defined (below).

Although the Chicago Manual of Style and other resources from the contractors will be essential to these materials, the FRA also maintains a list of common words used in FRA program publications which generally follows the U.S. Government printing Office (GPO) style manual. One of the most nettlesome issues is the treatment of compound terms. The GPO Style Manual general rule is to omit hyphens when words appear in regular order. "Where meaning is clear and readability is not aided, it is not necessary to use a hyphen to form a temporary or made compound." (Part 6.16) However, where a compound is used as a modifier, a hyphen is normally needed.

HST Specific Terms

HST alternative—Represents the HST system selected at the program level and to be further evaluated at the project level. Project-level EIRs/EISs will evaluate sections of the SHT Alternative

HST corridor alignment—The corridor selected at the program level also referred to as an alignment in the statewide program EIR/EIS.

No Project Alternative—Represents the region's (and state's) transportation system (highway, air, and conventional rail) as it is today and with implementation of programs or projects that are in regional transportation plans and have identified funds for implementation by 2030.

Project—A component of the HST program or system. There are many projects to be built, but only one program to implement the HST system. For many project-level environmental documents this will mean the section of the HST system being evaluated and permitted for construction. Later in the implementation process there may be other components of the system that are treated as distinct projects such as maintenance facilities.

Program-level—The program or planning level. This term is hyphenated where a unit modifier and not when used alone such as …at the program level.

Project-level—The site-specific level leading to permits for construction. This term is hyphenated where a unit modifier and not when used alone such as …at the project level. In a title both parts are capitalized as in Project-Level.

Section of the HST system—A corridor or set of corridors between logical termini addressed as a single project component of the HST System in a project-level EIR/EIS.

Study area—The area defined for study of a particular resource such as archeology, wetlands, or noise receptors.

Study corridor—A linear geographic belt or band connecting different parts of the study region that follows the corridor alignment selected for the HST system at the program level for evaluation at the project level.

Study region—A geographic region that encompasses one or more selected corridors of the HST system such as the Bay Area to Central Valley, the Central Valley, Southern Mountain Crossing, and Los Angels Basin.

Common Words

- a.m. and p.m. (NOT AM and PM or A.M. and P.M.)
- at-grade (as a unit modifer such as at-grade crossing)
- Cleanup (NOT clean-up or clean up)
- Decisionmaking or some variation of decisionmak*** (always one word, not hyphenated or two words)
- Groundwater (NOT ground water or ground-water)
- High-Speed (high-speed is hyphenated when a modifier such as high-speed rail or high-speed train
- Indepth (as unit modifier, not in-depth)
- Industrywide (NOT industry-wide or industry wide)
- Long-distance (As a unit modifier, this should be hyphenated, as in long-distance trip. However, when using in other contexts, it should be long distance.)
- Multi (almost always omit hyphen: multibody, multicar, multiplane, etc. Use the hyphen when the word after "multi" begins with a vowel; then a hyphen is used.)
- Non (almost always omit hyphen [nonlinear]. Check GPO for instances where a hyphen is used.)
- Nonlinear (NOT non-linear)
- Off-peak (NOT offpeak or off peak)
- Onboard (as unit modifier) (in other instances, use on board.)
- Onsite (NOT on-site or on site)
- Offsite (NOT off-site or off site)
- Passholders (NOT pass holders)
- Post-accident (NOT post accident)
- PTC-equipped (NOT PTC equipped)
- Recordkeeping (always one word, not hyphenated or two words)
- Right-of-way
- Risk based/risk-based (Hyphenate when used as a unit modifier; otherwise, two words)
- Site-specific (hyphenated as a unit modifier such as 'site-specific analyses.')
- Standby (NOT stand-by or stand by)
- Systemwide (NOT system-wide or system wide)
- Unticketed (NOT un-ticketed)

GRAPHIC FORMAT

The size, scale, *and reproduction requirements of report graphics must be of primary consideration in their composition*. Maps plotted for use as figures in reports should be designed for black-and-white copying. To differentiate features on the maps, use different line weights and types, patterns and grayscale polygon fills, and symbols for point data. These must be tested and reproduced on a copier to ensure the graphics hold and reproduce well. Graphics using maps as bases, usually produced in a GIS, should be formatted similar to the example on the following page. Other types of graphics (photos, diagrams, etc.) should be formatted like the figures in this document.

Due to the small size of report maps, 8½ by 11 inches or 11 by 17 inches, economy of information shown must be the goal. Too many base map features, different attributes, or call-outs will make the map confusing and unreadable. For report graphics, precise accuracy and the ability to measure features are not possible, nor are they expected. Report maps are used to present the overall theme of the coverage, not in detail and not with precision. Symbology can, and often needs to be, exaggerated to communicate the intended message in such a small size. For instance, a grade crossing might need to be represented by very thick lines that are out of scale. For this reason, it is important to include a note in the legend that the information portrayed is for illustrative purposes only.

Report graphics should include the following:

- A view frame that contains the map with a one-inch border on the binding edge and a 0.5-inch border on all others
- The project title right-justified under view frame
- The figure name and figure number right-justified and located in the lower right corner
- Creation/publication date of the graphic centered below the view frame
- A legend located directly below the date
- The source left-justified under the view frame
- The scale bar located directly below the view frame and left-justified, with one scale in English units (feet, miles, etc.) and one in metric (meters, kilometers, etc.) (if graphic is not to scale, state "Not to Scale" in place of legend.)
- A north arrow located to the right of the scales
- There will be no logos (Authority, FRA, or company) on the graphics
- Tahoma font for all text except corridor names, which may be in a different, but non-serif, font
- Text must be readable

The many graphic composition scenarios that will arise during the project cannot be prescribed effectively here. A number of examples that comply with these standards will be provided to the Regional Teams to aid in composing their maps and graphics.

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APPENDIX E

QUALITY CONTROL PLAN

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PROGRAM

QUALITY ASSURANCE and QUALITY CONTROL PLAN

FOR

California High Speed Rail

PB AGREEMENT NO. 13259

August 2008

Submitted by: _____ Date: _____
Gary Kennerley
QA/QC Manager

Approved by: _____ Date: _____
Anthony Daniels
Program Manager

Approved by: _____ Date: _____
Tom Prendergast
Principal in Charge

Reviewed by: _____ Date: _____
Tom Willoughby
Program Management

FOREWORD

This document shall serve as the Program Quality Control Plan for the California High Speed Rail and covers all aspects and applicable elements of the individual plans. Coupled with the Contract and the Scope of Services (Scope) for this project, this document describes the quality assurance and quality control responsibilities and defines the various roles, responsibilities, issues and guidelines for the successful completion of this project.

This document is stored on our ProjectSolve² website. Revisions to this document may be required as the project progresses. **No hardcopy revisions will be issued.** For the latest revision of this document, please refer to the project website noted above.

www.projectsolve2.com

CAHSR_Program Mgt (13259)
7. Active Working Documents
A. Statewide Activities
01. Project Mgmt and Admin
- 10 Mobilization
- 20 QA / QC
- 30 Contract Admin
- 40 Accounting Audits
- 50 Schedule & WBS
- 60 Budget Control
- 65 Progress Reports
- 70 Document Control
- 80 PMP
- 90 Risk Management Plan

Revision History:

Rev	***Date***	***Description***	***Prepared by:***	***Reviewed by:***
0	23MAR07	Issue	GK	AD
0.3	19May08	Updated for CA HSR	RF	

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1 QUALITY CONTROL

1.1 Quality Objectives

It is PB's policy to provide quality professional services and project deliverables to its clients, consistent with the scope of services. PB's Quality System shall be followed by all PB staff to assure the control of quality during the development of this project. All work performed under the Program Management contract will be conducted in accordance with the Project Quality Assurance and Control Plan

PB's subconsultants shall document their quality control measures. At a minimum, the subconsultant's Quality Control Plan shall acknowledge adoption of the requirements of Section 2.2 below, and shall include the identification of key personnel (task leader, originator and checker) for the work performed by them.

The entire PB Team will be required to comply with established quality control procedures by producing evidence that:

- reports, specifications, calculations and drawings are prepared according to the design requirements and are reviewed, checked, and back-checked
- information received from third parties (e.g., subconsultants) is sufficient to satisfy Project requirements
- field data is collected and retained in an organized manner
- All Authority contracts have provisions for QA/QC checks that are consistent with the overall PM QA/QC procedures.

No document shall be released or officially transmitted to the Authority or any third party without having received a suitable quality review."

1.2 Design Element Preparation and Review Procedures

Each design element that is incorporated into a deliverable shall be prepared and reviewed prior to submittal. The minimum requirements for preparation and review of calculations, drawings, specifications, and reports are described below. If applicable, the more stringent requirements of the responsible firm's quality control program shall also apply.

1.2.1 DATA COLLECTION AND FIELD INVESTIGATION

The PD defines the scope of data collection and a field investigation activity required for the project and identifies the task leader responsible for such activities.

Data collection is performed by obtaining appropriate source materials, contacting identified sources and soliciting input, and reviewing and assessing the data when received for its suitability to the project and its completeness for project needs.

Prior to initiating the field investigation an investigation plan is prepared. The plan may be a simple statement of the objectives of the investigation, but if necessary addresses personnel assignments, team composition, work hours, emergency and daily contacts, site access procedures, equipment requirements, schedule, training, safety procedures, quality control measures and investigation procedures, including data formats and recording media, as applicable.

The quality control section of the plan defines the roles and responsibilities of each of the investigation team members and describes the methods that will be used to verify the information being collected. The field investigation plan is provided to all members of the investigation team.

Training is provided as required to review the responsibilities of each team member, the investigation procedures to be implemented, the records to be maintained and any safety issues related to the field activities. Task leaders are responsible for ensuring that all team members receive the materials necessary for them to understand their responsibilities.

The task leader oversees the field activities, evaluates the effectiveness of the investigations relative to the project requirements and prepares a summary of the investigation findings.

Where field investigation is not a defined scope activity, and for projects where follow-up field visits are required after the completion of the initial investigations, the investigator informs the task leader of the findings, and prepares an investigation memorandum. The memorandum describes the purpose of the visit, summarizes the information obtained and attaches field notes prepared during the trip.

The following documents shall be retained in the project files:

- Documents collected.
- The field investigation plan and list of recipients.
- Records of training documents.
- Field notes and other documents generated during the site investigations including any electronic data files.
- The field investigation summary report and memoranda.

1.2.2 CALCULATION PREPARATION AND REVIEW

This procedure applies to manual and computer-generated calculations.

The task leader is responsible for identifying project discipline-related criteria and for designating an originator and a checker.

The calculation originator is responsible for preparing the calculations in accordance with generally accepted guidelines, codes, criteria, and standards. At a minimum, the calculations shall include the subject of the calculations; the design assumptions; references and back-up materials, if any; and dimensional units.

The checker is responsible for verifying the correctness of the assumptions upon which the calculations are based and compliance with the guidelines, codes, criteria and standards. Calculations shall be checked for clarity and legibility, proper documentation, technical concept and numerical accuracy.

For manual calculations, each page of the calculations shall be numbered consecutively, and signed/initialed and dated by the originator and the checker. For computer-generated calculations, the originator and checker shall sign/initial and date the front page of finished output document.

Structural design calculations require independent check calculations in lieu of line-item check calculations. Independent check calculations shall be prepared in the manner outlined for original calculations.

Completed calculations, signed and dated by the originator and checker, shall be forwarded to the Task Lead for verification of completeness and technical adequacy. The Task Lead shall initial and date the cover sheet of the calculations as evidence of verification. The completed calculations shall be retained in the project files.

1.2.3 DRAWING PREPARATION AND REVIEW

Design drawings are prepared under the supervision of the task leader. The preparer and drafter are responsible for developing the drawings in conformance with the project requirements. The preparer reviews and back-checks the drawings during the various stages of preparation.

The task leader is responsible for ensuring that the drawings are checked by a project team member who is independent of the preparer. They are checked for conformance to design and the requirements of the drawing standards applicable to the project. The checker clearly marks the drawing with any alterations or corrections. The drafter incorporates any alterations or corrections on the drawing, and indicates that each correction has been completed.

Prior to each deliverable submittal, a final check print is prepared for each drawing. The drawing designated as the final check print contains the following

- Final Check print designation
- Indication of “Checked By” with signature or initials of checker and date of the check.
- Indication of “Reviewed By” with signature or initials of reviewer and date, as evidence of review.

- Indication of "Corrected By" with signature or initials of drafter and date, as evidence of incorporation of corrections on the final check print.

Prior to each submittal, completed drawings and final check prints shall be forwarded to the Task Lead for verification of completeness and technical adequacy. The Task Lead shall initial and date the each of the final check prints, as evidence of verification. The completed drawings and final check prints shall be retained in the project files.

1.2.4 SPECIFICATION PREPARATION AND REVIEW

The task leader collects available standards or sample documents from the client to form a basis for the project specifications. The specification format follows the client's specified standards. If the client has defined no standards, industry standards appropriate to the type of work performed are used, as defined by the task leader. The task leader prepares a summary list of items of work that identifies which items conform to standard specifications, which items require project-specific specifications, and the preparer and checker responsible for each section.

The preparer develops the specifications addressing, at a minimum, the following elements:

- Description of work
- Material requirements
- Construction requirements
- Measurement and payment

The task leader shall ensure that the specifications are checked. The following provides a basis for checking:

- Design assumptions, where applicable
- A clear and complete definition of work of the section
- Identification of items of work and all products/materials required.
- Current code and manufacturer references, where applicable.
- No internal inconsistencies.
- Consistency between the contract drawings and the specifications
- No superfluous material that could cause confusion during construction.
- Identification of measurement and payment terms for each item, consistent with the computed quantities
- Clear and consistent language.

If the "Boiler Plate" is written or modified by the preparer, the task leader shall arrange for the modified sections to be checked by a specification specialist. The task leader shall forward the entire construction bid package to the specialist for the check. The specialist shall discuss any comments with the task leader and furnish comments in writing. A marked up copy of the affected pages will be sufficient to communicate the comments.

When changes are proposed during the checking process, the marked document shall be reviewed by the originator, who shall initial each acceptable change in black pencil prior to incorporation of the proposed changes.

The project specifications shall be reviewed by the PD to verify completeness and consistency with client and project requirements and to verify that all specification sections are coordinated among the various disciplines on the project. Any changes necessary as a result of that review shall be communicated to the originators and checkers.

The following records shall be maintained in the project files.

- A list of items of work required for the project.
- A record copy of the completed specifications with each section signed/initialed and dated by the checker, along with the comments and disposition of comments and originator initials indicated.

- A record copy of the completed specifications as submitted to the client, with the PD's signature on the transmittal or on the specification cover sheet.

1.2.5 REPORT PREPARATION AND REVIEW

The task leader communicates the objectives of the report and any specific requirements for content or format to the preparer, contributors and checker. Report preparation includes the following activities:

- For elaborate reports, the preparer develops an outline or table of contents and distributes it to the contributors.
- The contributors develop their designated sections conforming to the outline, format and style established, collecting technical information as required. Technical input involving calculations is subject to the requirements of the procedures for preparation of calculations. Graphs, figures and other supporting materials are included as required.
- The preparer collects the contributors' input and assembles the draft report.

The task leader is responsible for ensuring that the report is checked. The checker investigates materials included in the report and verifies that the information presented conforms to the requirements established for the project, that the presentation is effective and orderly, and that the material included has been checked for accuracy.

The checker also evaluates the report to establish that the material presented justifies any conclusions drawn and that the report addresses the appropriate issues in accordance with the scope of the assignment.

For brief reports, such as letter reports, a single person customarily prepares the report and the report is checked by the task leader, or if prepared by the task leader, checked by the Task Lead, prior to submittal to the client.

Revisions resulting from the internal checking process are incorporated into the report.

Prior to each submittal, completed reports and a copy of comments or notes made during the checking process shall be forwarded to the Task Lead for verification of completeness and technical adequacy. The TAsk Lead shall sign/initial and date the cover of the report, as evidence of verification.

The following records shall be maintained in the project files:

- For elaborate reports, the table of contents or outline of the report, with the names of the preparer, the contributors and the checker
- A copy of comments or notes made during the checking process, signed and dated by the checker
- A record copy of the report as it was submitted to the client.

1.3 Deliverable Review

The PD is responsible for establishing the level of review required for the project, for selecting appropriately qualified personnel to perform the required reviews and for defining the level of review and the review. The PD is also responsible for maintaining a record of each review and the disposition of the review comments.

A review is performed for each project deliverable prior to its submittal to the client. Internal QC reviews will be conducted two weeks prior to submittal of the final deliverables. A tentative Milestone Schedule showing dates for the design of deliverables in included in the schedule, see Appendix C. Deliverable review evaluates the overall validity of the deliverable with respect to the project requirements and is independent of document checking, which takes place prior to the review. The intensity of the review is commensurate with the size and complexity of the deliverable. The PQCP, developed by the PD, specifies the schedule for reviews, the type and intensity of the review required for each project deliverable, and the appropriate personnel to perform the reviews, which may include experience staff actively involved in other aspects of the

project, PB staff not involved in the project or independent consultants called in solely for the purpose of the review.

The deliverable review assesses the project deliverable against the following:

- General completeness
- Conformance with Caltrans standards and with accepted standards of practice
- Conformance with applicable project design criteria and requirements
- Conformance with applicable codes, technical guidelines and professional standards
- Incorporation of previous review comments, if applicable
- Interfaces with other system elements
- Cost effectiveness

The PD or delegate reviews and incorporates, as applicable, the comments or suggestions made by the reviewers, and retains a record of the comments, and their disposition, along with any marked documents resulting from the review. The review comments and/or marked review documents shall be retained in the project file. A record of the disposition of the comments shall be retained in the project file.

The schedule of the various design reviews described above is depicted in the overall project schedule. (See Appendix C - Project Schedule.)

1.4 Design Issues Requiring Special Attention

Some project issues require special attention, to minimize risks with a potential to impact project quality or profitability or client satisfaction. Task leads are responsible for identifying project issues, within their respective disciplines, that require special attention, and for developing specific quality procedures and/or implementing the quality control measures necessary to ensure that the design issues are adequately addressed. Evidence of implementation/review shall be documented. At a minimum, the following project issues shall be addressed by the responsible individual:

Project Design Issue Requiring Special Attention	Responsible Individual
Technically difficult aspects	EM
Application of an unproven technology or products	EM
Ill-defined existing conditions	RM
Other special issues	TBD

1.5 Approval

Project documents, including reports, shall not be submitted to anyone outside of the PB Team without prior review and approval by the Project Director or his delegate.

1.6 Client/Third Party Review Process

External reviews of project deliverables will be performed by CAHSR and other regulatory agencies. In addition, work affecting their facilities may be conducted by other agencies. The transmittal letter to the agency should include copies of the standard Review Comment form for information and the agency should be encouraged to use the form for ease of response and documentation. External review comments will be received, however, in whatever format the reviewer wishes to submit them. The responsible Task Lead shall ensure that a formal response is documented for every comment received.

1.7 Change Control Procedure

Changes to completed, or partially completed, work products shall be controlled. Any changes which may require a change to the project scope, schedule or budget are to be brought to the attention of the respective Task Lead, who will report such changes to the Project Director. The Project Director is responsible for documenting and controlling such changes, to ensure that the client and all project staff are informed of the changes and have the opportunity to properly incorporate any implications into the

work product. Any changes that have no impact to the project scope, budget, and schedule are to be handled by the affected Task Lead with the knowledge of the Project Director.

1.8 Technical Specialists

TBD if needed

1.9 Resolving Technical Differences

Differences of opinion regarding design elements or details shall be brought to the attention of the respective Task Lead and resolved and documented among the various TAsk Leads, as appropriate. If the issue can not be resolved among the Task Leads, then it should be brought to the attention of the Project Director. The Project Director, in consultation with other professionals within PB, will render and document a decision. The Project Director's decision will be final unless overturned by appeal to the Principal-in-Charge.

1.10 Requirements for Work Performed by Other PB Cost Centers

Work performed by other PB cost centers shall be in accordance with the requirements of the PBQD Quality System and this document.

2 Project Quality Audit

2.1 Project Quality Audit

Project Quality Audits (PQAs) are performed to evaluate the effectiveness of the project's implementation of the PBQD Quality System as it pertains to the project. A PQA shall be performed at least once a year for the functionally active life of the project as outlined in the PB Quality System. At a minimum the initial PQA shall include a review of the following elements:

- The PIP/PQCP
- Implementation of applicable Quality Procedures
- The most recent PQA Report, including verification that corrective and preventive actions have been implemented and are effective (if applicable).

The Internal Auditor selected to perform the PQA shall not be significantly involved in the project. The Auditor shall perform a PQA using the audit procedures as established by the PB Quality System. At the completion of the audit, the auditor discusses the results of the review with the auditee, including any identified nonconformances, and prepares an audit report that includes the following:

- The annotated PQA Checklist
- Any NCRs identified during the audit

The auditor may provide observations suggesting possible preventive actions in areas where there appears to be the potential for future nonconformances. The PQA Report is closed and posted to the database by the auditor. The auditor notifies the AQM for tracking of NCRs, and the PIC and MOP for review if significant issues have been identified in the audit.

If Non-Conformances (NCR's) or Observations (OBS's) are identified by the Auditor, the PM shall inform the Auditor by e-mail notification within four weeks of receipt of the project quality audit report identifying any corrective or preventive actions taken or planned. The PM shall complete the "likely cause" and "corrective action" sections within two weeks of receipt of non-conformity reports and submit them to the Project Auditor.

Audits conducted using the automated audit programs are processed using the current electronic version and all documentation is maintained electronically on a centralized database for analysis purposes. The PM shall have access to the Automated Audit Program and be able to address any NCR and OBS as indicated in the report.

2.2 Internal Quality System Audit

Audits performed on a project, as part of the internal quality system audit and quality audits performed by the client or a third party on a project that include the elements of the scope of this procedure, shall

be considered as fulfillment of the requirement of this procedure, provided that such audits are documented and the results reviewed in accordance with paragraph 3.3.1 or 3.3.2, above.

2.3 Records

Copies of the project quality review report and the corrective/preventive action memoranda shall be placed in quality database or the project files for at least three years in accordance with the PB Record Retention Manual.

2.4 Other References

External Standards to be used in the development of project deliverables to be defined

2.5 PB References

PB Quality System

APPENDIX D

Log of Third Party Supplied Materials

California High Speed Rail Program Management

3 Client/Third Party Supplied Materials

Description	Location	Doc No.	Received From	Suitable for Use	Disposition

APPENDIX F

CEQA THRESHOLDS OF SIGNIFICANCE

Each Section Environmental Team will have responsibility for interpreting and subsequently applying in a consistent and objective basis thresholds of significance for evaluating potential environmental impacts. The CEQA Thresholds of Significance, found in Appendix G of the CEQA Guidelines and described below, should be considered a minimum set of criteria for project evaluation. It is expected that the section teams will also consider locally and/or regionally adopted criteria and procedures to assist in determining the environmental significance of a project. Once the thresholds of significance have been identified, the section teams shall obtain concurrence from resources and permitting agencies prior to conducting the resource evaluations.

Issues:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	❒	❒	❒	❒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	❒	❒	❒	❒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	❒	❒	❒	❒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❒	❒	❒	❒
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	❒	❒	❒	❒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	❒	❒	❒	❒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	❒	❒	❒	❒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	❒	❒	❒	❒
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	❒	❒	❒	❒
d) Expose sensitive receptors to substantial pollutant concentrations?	❒	❒	❒	❒
e) Create objectionable odors affecting a substantial number of people?	❒	❒	❒	❒
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, 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?	❒	❒	❒	❒
b) Have a substantial adverse effect 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 US Fish and Wildlife Service?	❒	❒	❒	❒
c) Have a substantial adverse effect 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,	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
filling, hydrological interruption, or other means?				
d) 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?	❒	❒	❒	❒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❒	❒	❒	❒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	❒	❒	❒	❒
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	❒	❒	❒	❒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	❒	❒	❒	❒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❒	❒	❒	❒
d) Disturb any human remains, including those interred outside of formal cemeteries?	❒	❒	❒	❒
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	❒	❒	❒	❒
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
ii) Strong seismic ground shaking?	❒	❒	❒	❒
iii) Seismic-related ground failure, including liquefaction?	❒	❒	❒	❒
iv) Landslides?	❒	❒	❒	❒
b) Result in substantial soil erosion or the loss of topsoil?	❒	❒	❒	❒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	❒	❒	❒	❒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	❒	❒	❒	❒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	❒	❒	❒	❒
VII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❒	❒	❒	❒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	❒	❒	❒	❒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❒	❒	❒	❒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	❒	❒	❒	❒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	❒	❒	❒	❒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❒	❒	❒	❒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	❒	❒	❒	❒
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	❒	❒	❒	❒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	❒	❒	❒	❒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
river, in a manner which would result in substantial erosion or siltation on- or off-site?				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	❒	❒	❒	❒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	❒	❒	❒	❒
f) Otherwise substantially degrade water quality?	❒	❒	❒	❒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	❒	❒	❒	❒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	❒	❒	❒	❒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	❒	❒	❒	❒
j) Inundation by seiche, tsunami, or mudflow?	❒	❒	❒	❒
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?	❒	❒	❒	❒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	❒	❒	❒	❒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❒	❒	❒	❒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	❒	❒	❒	❒
XI. NOISE -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❒	❒	❒	❒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	❒	❒	❒	❒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❒	❒	❒	❒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❒	❒	❒	❒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❒	❒	❒	❒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	❒	❒	❒	❒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	❒	❒	❒	❒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	❒	❒	❒	❒
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	❒	❒	❒	❒
Police protection?	❒	❒	❒	❒
Schools?	❒	❒	❒	❒
Parks?	❒	❒	❒	❒
Other public facilities?	❒	❒	❒	❒
XIV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	❒	❒	❒	❒
XV. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	❒	❒	❒	❒
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	❒	❒	❒	❒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	❒	❒	❒	❒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❒	❒	❒	❒
e) Result in inadequate emergency access?	❒	❒	❒	❒
f) Result in inadequate parking capacity?	❒	❒	❒	❒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	❒	❒	❒	❒
XVI. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❒	❒	❒	❒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❒	❒	❒	❒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	❒	❒	❒	❒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	❒	❒	❒	❒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	❒	❒	❒	❒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	❒	❒	❒	❒
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	❒	❒	❒	❒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental	❒	❒	❒	❒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❒	❒	❒	❒

Note: Authority cited: Sections 21083 and 21087, Public Resources Code. Reference: Sections 21080(c), 21080.1, 21080.3, 21082.1, 21083, 21083.3, 21093, 21094, 21151, Public Resources Code; Sundstrom v. County of Mendocino, 202 Cal.App.3d 296 (1988); Leonoff v. Monterey Board of Supervisors, 222 Cal.App.3d 1337 (1990).