Staff Report
for the
Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the *Proposed* California High-Speed Train System

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AGENDA ITEM ___ Consideration of a Resolution (1) Certifying the Final Environmental Impact Report/Environmental Impact Statement for the proposed California High-Speed Train System, (2) Adopting California Environmental Quality Act Findings and a Statement of Overriding Considerations, (3) Approving a proposed high-speed train system for California, (4) Adopting a Mitigation Monitoring and Reporting Program, and (5) Directing Staff to File a Notice of Determination with the State Clearinghouse.

1.1 Summary

The adoption of the proposed resolution would complete the initial phase of California Environmental Quality Act compliance by certifying the first tier of program-level environmental review for, and by approving as a program, the proposed California High-Speed Train System for the State of California.

1.2 Recommended Action

The Authority adopts the attached Resolution No.05-01, which would certify the Final Program Environmental Impact Report/Environmental Impact Statement for the proposed California High-Speed Train System, adopt a Mitigation Monitoring and Reporting Program, adopt California Environmental Quality Act Findings and a Statement of Overriding Considerations, approve a high-speed train system for further evaluation to address California's intercity transportation needs.

1.3 Background Information

This section briefly describes the development of the proposed high-speed train (HST), the issues and benefits associated with the HST system, and the California Environmental Quality Act (CEQA) and National Environmental Policy Act of 1969 (NEPA) certification process.

1.3.1 California High-Speed Rail Authority

The California High-Speed Rail Authority (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 recommended 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.

1.3.2 Summary of the EIR/EIS Process

Following adoption of the Business Plan, the Authority commenced the preparation of a combined program environmental impact report/environmental impact statement (EIR/EIS) to comply with federal and state laws, in particular NEPA (42 U.S.C. § 4321 *et seq*.) and CEQA (Cal. Pub. Resources Code § 21000 *et seq.).* The Federal Railroad Administration (FRA) is the lead federal agency. The Federal Highway Administration (FHWA), U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), Federal Aviation Administration (FAA), U.S. Fish and Wildlife Service (USFWS), and Federal Transit Administration (FTA) are cooperating federal agencies for the preparation of the Program EIS. The FRA, FHWA, EPA, USACE, and FTA executed a memorandum of understanding (MOU) outlining roles and responsibilities for preparation of the Program environmental impact report (EIR)/EIS and the integration of Section 404 of the Clean Water Act (July 2003 Federal Agency MOU for the California HST Program EIR/EIS).

The Authority is both the project sponsor and the lead agency for CEQA compliance. The Authority and the FRA determined that a program EIR/EIS is appropriate to comply with CEQA and NEPA as a first-tier document at this conceptual stage of planning and decision-making.

The California High Speed Train Program EIR/EIS consists of the Draft Program EIR/EIS, oral and written comments on the Draft Program EIR/EIS, and the Final Program EIR/EIS. The Final Program EIR/EIS, which was released in August 2005, contains revised analysis and text and responses to comments on the Draft Program EIR/EIS. The Final Program EIR/EIS identifies preferred alignment and station locations. The EIR/EIS is the first phase of a tiered[1] environmental review process, and the analysis was prepared for the first and programmatic-level of review and consideration of early policy decisions on the HST system.

1.4 Decision before the High-Speed Rail Authority

1.4.1 Project Objectives, Purpose, and Need

Purpose of High-Speed Train System

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.

[1] *Tiering* refers to a multilevel approach where a first tier environmental document analyzes general matters and subsequent tiers analyze narrower projects/actions, referencing the more general document.

- 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.

Need for High-Speed Train System

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.

See Chapter 2 in the Final EIR/EIS for additional information on these factors, including transportation constraints and capacity limitations relevant to intercity travel in California.

1.4.2 Policy Level Nature of HST and Removal of Corridors/Alignment Options from Consideration

The California High Speed Train Program EIR/EIS is the first phase of a tiered environmental review process, and the analysis 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 will be used for the making following two decisions.

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; 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.

Both CEQA and NEPA require 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 will shape the parameters for the more detailed environmental documents for the second-tier of decisions. The project-level, second-tier environmental reviews will fully describe site-specific environmental impacts of alternatives within selected corridors and at station locations and mitigation measures will be refined and made more specific to address those impacts.

The project-level, second-tier evaluations will include preliminary designs for the project alternatives under consideration. 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 Program EIR/EIS

Figure 1
Initial Alignment and Station Options—Northern Portion

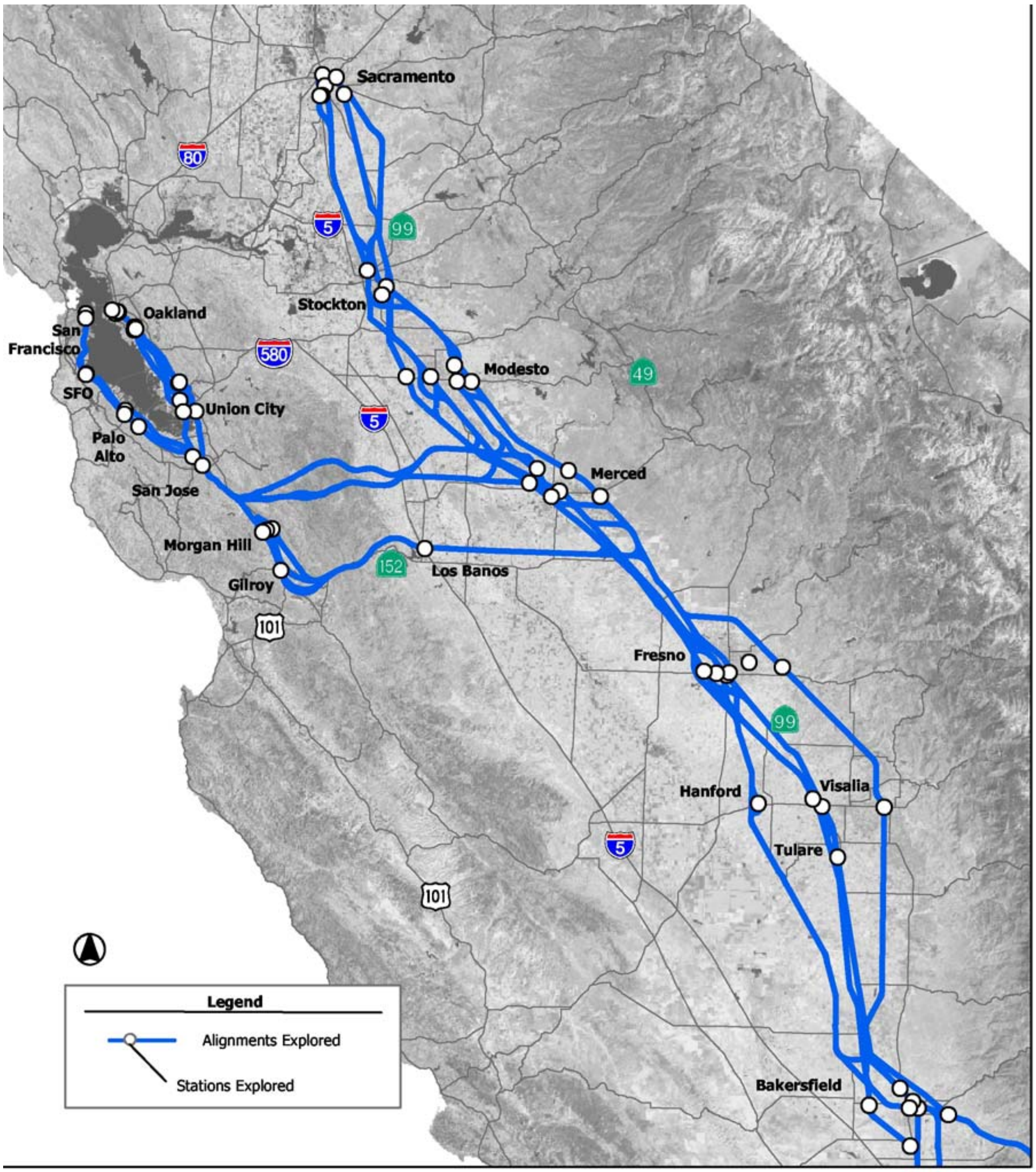
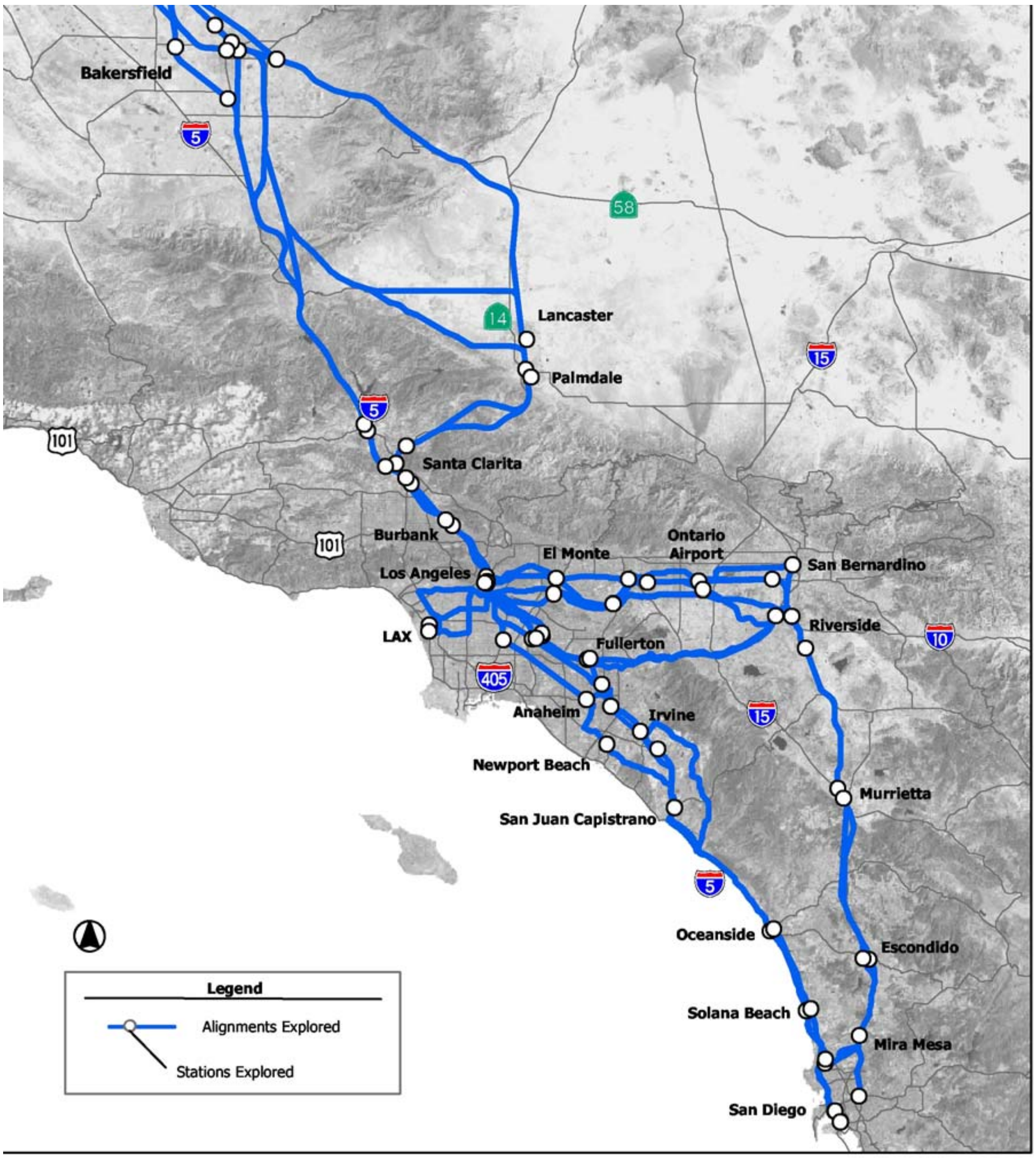


Figure 2
Initial Alignment and Station Options—Southern Portion



describes design practices and policies that are to be included in the HST system and will be used to develop detailed alternatives at the project-level to avoid impacts and to help shape specific mitigation measures.

The analysis provided in the Program EIR/EIS addresses potential impacts based on defined “envelopes” (bandwidths) for the impact zones in order to broadly recognize potentially affected resources and to opt, given uncertainties of planning level analysis, to assume the maximum potential for impacts—please see Standard Response 3.15.7 and Final Program EIR/EIS Section S.6.

The Program EIR/EIS analysis shows that the HST system would have fewer environmental impacts than the Modal Alternative and, depending on the particular resource areas, more or fewer impacts than the No Project Alternative. Without this evaluation of a comprehensive new transportation network that addresses regional and statewide impacts (the proposed HST system), the expansion of highways and airports to meet increased statewide transportation demand would likely have only been considered in separate and uncoordinated planning and project environmental documents.

1.4.3 Elements of the CEQA and NEPA Decisions

FRA—Record of Decision and Compliance with NEPA

At the time of its decision, NEPA requires the FRA to prepare a “concise public record of decision.” (40 Code of Fed. Regs. (CFR) § 1505.2.) The FRA will likely issue its Record of Decision (ROD) for the EIS after the Authority has considered and reached its decisions on the Final EIR. The ROD issued by the FRA will do the following:

a. State what the decision is.

b. Identify the alternatives considered by the agency in reaching its decision.

c. Identify and discuss the factors considered and balanced by the agency in making its decision, including economic and technical considerations and agency statutory missions, and how those considerations entered into its decision.

d. Specify the alternative or alternatives which were considered environmentally preferable, which ordinarily means the alternative that causes the least damage to the biological and physical environment and also best protects, preserves, and enhances historic, cultural, and natural resources.

e. State whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted, and, if not, why they were not.

f. Adopt and summarize a monitoring and enforcement program where applicable for any mitigation.

California High-Speed Rail Authority—Certification and Compliance with CEQA

At the time of its decision on the Final Program EIR/EIS, CEQA requires the Authority, as the lead agency, to take various actions.

a. **Certification.** Before approving a proposed high speed train system, the Authority must certify that (1) the final EIR/EIS has been prepared in compliance with CEQA; (2) the final EIR has been reviewed and considered by the agency; and (3) the Final EIR reflects the lead agency's independent judgment and analysis. (Pub. Resources Code § 21100; CEQA Guidelines § 15090.)

b. **Findings.** If an EIR/EIS identifies one or more significant effects on the environment that would occur as a result of the proposed program, the lead agency must make one of three findings with respect to each significant effect (Public Resources Code § 21081(a); CEQA Guidelines § 15091):

    1) Changes have been made to the project, or incorporated into the project, which mitigate or avoid the identified significant effects on the environment.

    2) Those changes or alterations (i.e., mitigation measures) are within the responsibility and jurisdiction of another public agency, and have been or can and should be adopted by that other agency.

    3) The agency finds that the mitigation measures or alternatives are infeasible for specific "economic, legal, social, technological, or other considerations."

c. **Overriding Considerations**. If significant effects cannot be mitigated to a less-than-significant level, the lead agency must also adopt findings indicating the specific overriding economic, legal, social, technological, or other benefits of the project which are viewed as outweighing each of the significant adverse effects. (Pub. Resources Code § 21081(b).)

d. **Mitigation Monitoring Plan Report.** Section 21081.6 of 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.

e. **Decision and Notice of Determination**. After consideration of the Final Program EIR, comments and other information in the record as a whole, the lead agency may make a decision to approve a proposal and the approval would include (i) adopting findings, as described above; (ii) incorporating as conditions of approval feasible mitigation measures which will reduce significant adverse environmental impacts to a less-than-significant level; and (iii) adopting a statement of overriding considerations for any expected adverse environmental effects which would remain significant even after the adoption/inclusion of feasible mitigation measures/strategies.

    Finally, to complete the process, if an approval decision is made by a state agency, a Notice of Determination must be filed with the Governor's Office of Planning and Research. (CEQA Guidelines § 15094.)

1.5 Issues Raised during CEQA and NEPA Process

1.5.1 Nature of Program EIR/EIS and Programmatic Decisions

Use of Tiering

As described above, this is the first phase of a tiered environmental review process. Tiering refers to a multilevel approach where a first tier environmental document analyzes general matters and subsequent tiers analyze narrower projects/actions, referencing the more general document.

Preparation of a program-level document followed by more detailed project-specific documents that "tier" off the program document offers a number of advantages. As described in Council on Environmental Quality (CEQ) regulations (40 C.F.R. § 1508.28), FHWA Guidelines (23 C.F.R. Part 771; 52 F.R. § 32646 [August 1987]), and the state CEQA Guidelines (14 C.C.R. § 15168[b]), this approach offers the following advantages.

- More exhaustive consideration of impacts and alternatives than would be practical in an individual or project-specific EIR/EIS.
- Consideration of cumulative impacts that might be slighted in a case-by-case analysis.
- An opportunity for decision-makers to consider broad policy alternatives and program-level mitigation strategies at an early stage, when the flexibility to incorporate them is greater.
- Avoiding reconsideration of policy issues in subsequent documents.
- Early coordination with USACE and EPA to identify avoidance and minimization opportunities that are likely to yield or will lead to the selection of a least environmentally damaging practicable alternative (LEDPA) under Section 404 of the Clean Water Act.
- Less paperwork by encouraging the reuse of data through incorporation by reference in subsequent tiered documents.

Level of Detail

The required contents of a program EIR/EIS are the same as those of a project-level document. However, the level of detail provided in the two types of documents differs substantially because a program-level document analyzes a general conceptual design of the proposed program and alternatives rather than providing detailed analysis of a specific project proposal.

The degree of specificity required in an EIR or EIS corresponds to the degree of specificity involved in the underlying activity described in the document and the decisions to be made.

A program-level document is appropriate at this conceptual stage of planning and decision-making for the HST system, which includes selecting a preferred corridor and station locations and identifying options for phasing the development of the new system. The Program EIR/EIS for the proposed California HST system is a planning-level document, in which the environmental analysis and engineering design rely primarily on existing data. More detailed site-specific studies of potential environmental impacts will be completed as part of future project-level analyses should the HST system be approved by the Authority.

Methods

The methods of impact evaluation were developed with input from state and federal resource agencies. The agencies acknowledged that this is a planning-level EIR/EIS aimed at making broad policy decisions about whether to pursue a high-speed train as a means of intercity travel in California, and if pursued, to help determine the corridors and alignments to carry forward for project-level environmental evaluation. Key differences in potential impacts for each of the alternatives are described in the Program EIR/EIS. The analysis in the Program EIR/EIS addresses potential impacts based on defined "envelopes" for the impact zones in order to broadly recognize potentially affected resources, to provide a comparison of impacts from the alternatives considered, and to opt, given the uncertainties inherent in planning level analysis, to capture the maximum potential for impacts. (See Final Program EIR/EIS, Section S.6 and standard response 3.15.7.)

Significance Criteria

CEQA requires that an EIR identify the potentially significant environmental effects of the project. (CEQA Guidelines Section 15126.) CEQA Guidelines Section 15064(b) states that "the determination…calls for careful judgment on the part of the public agency involved…" and that "an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting." The fundamental definition of significant effect under CEQA is "a substantial adverse change in physical conditions." This criterion underlies the evaluation of environmental impacts for most of the impact issues identified in the State CEQA Guidelines (Section 15065), and the CEQA Environmental Checklist Form (Guidelines Appendix G) provides general guidance for determining levels of significance when an agency has not adopted thresholds of significance for its use. The thresholds of significance for the Program EIR/EIS are described in qualitative terms and provide guidance for developing significance criteria for the next tiers of environmental review.

Environmental Consequences

The environmental consequences discussions describe the potential environmental impacts (both adverse and beneficial) of the Modal and HST Alternatives in comparison to the No Project Alternative and compared to each other. Each discussion begins by comparing existing conditions with 2020 No Project conditions to describe the consequences of No Project and how environmental conditions are expected to change during the timeframe required to bring the proposed HST system online. As described above, existing (2003) conditions were used as a proxy for 2020 No Project conditions where 2020 baseline information was unavailable, could not be projected, or would be overly speculative. Using 2020 No Project conditions as a basis for comparison, the analysis of impacts then addresses potential direct and indirect impacts for the proposed HST and Modal Alternatives, as well as potential cumulative impacts. Measures that already have been included as part of the proposed HST Alternative to reduce or avoid potential environmental impacts were incorporated into the analysis; examples include locating the alignment within an existing transportation corridor, and tunneling to avoid surface disruption in sensitive areas such as parklands and wildlife habitat areas. The impact analysis first compares alternatives on a system-wide basis and then compares alternatives regionally. In addition, the alignment and station options within segments of the HST Alternative are compared with one another.

Mitigation and Commitments

Design practices have been included in each section of Chapter 3 of the Final Program EIR/EIS that have been used to define the proposed HST system and would be used further to guide project development while avoiding and minimizing potential adverse environmental impacts. The mitigation strategies discussed in the Program EIR/EIS describe mitigation approaches for a program-level decision and are to be used to avoid, minimize, or reduce any potentially significant environmental impacts. These strategies can be refined and applied in future project-level documents to address site-specific issues and potentially significant effects, based on the more precise information that will then be available regarding location and design of proposed facilities.

The Authority has focused in the Program EIR/EIS on avoiding and minimizing potential impacts through rigorous planning and thoughtful design. The Authority has minimized overall impact potential by defining alignments to stay within existing public and railroad rights-of-way to the extent feasible while still accommodating the appropriate features and design standards for the alternatives. The level of engineering detail associated with the project-level environmental analysis would enable the Authority to further investigate ways to avoid, minimize and mitigate potential impacts (e.g., physical configuration [elevated, at-grade], specific location, right-of-way footprint, catenary design features, fencing type and station access configuration).

Unique Issues

The unique issues related to the proposed HST system are the magnitude and complexity of the project and the interdependence of each segment of the system, noting that the project-level environmental assessment and construction will be phased. In addition, the system would traverse a wide variety of geography and involve many different communities. Finally, while HST technology with maximum speeds exceeding 150 mph has been used successfully for decades in other countries, the proposed California HST system would be the first of this type in the United States.

Areas of Controversy

In considering a choice of alignment and station options, the Authority has taken take into account potential impacts on natural resources, cost, effects on travel time and ridership, and public and agency input. The principal areas of controversy from public and agency comments are the summarized below (see Section S.4.4 of the Final Program EIR/EIS for more details).

- Northern Mountain Crossing——During screening, the Altamont Pass corridor was removed from further consideration for the HST Alternative, which prompted many questions. Many comments were received urging further evaluation of the Altamont Pass as a potential alignment option. Federal agency comments and others noted the limitations of available environmental resource information regarding the Diablo Range mountain crossing. Therefore, a broad corridor between the Bay Area to Merced that includes the Altamont Pass Corridor (I-580) has been identified as part of the preferred HST Alternative. Subsequent to the Program EIR/EIS, the Authority and FRA intend to undertake further study of the broad corridor, including the Altamont Pass, to select a preferred HST alignment.

- Southern Mountain Crossing—In the Bakersfield to Los Angeles region, the Antelope Valley communities are actively seeking HST service to the Antelope Valley area and to connect with the Palmdale Airport. Compared to the more direct Interstate 5 (I-5) alignment, the Antelope Valley State Route 58 (SR-58)/Soledad Canyon alignment option would add travel time (10–12 minutes) between Bakersfield and Los Angeles and would have less potential for intercity ridership. However, the Antelope Valley SR-58/Soledad Canyon alignment would provide superior connectivity and accessibility to the Antelope Valley, would have a higher potential for serving long-distance commuters to Los Angeles, would require less tunneling, and is estimated to have approximately the same capital cost. Following receipt of comments on the Draft Program EIR/EIS and further review of southern mountain crossing tunneling and seismic issues, the Authority identified the SR-58/Soledad Canyon alignment option as preferred. The limited constructability of the I-5 alignment option combined with a high risk of seismic impacts makes it likely that the I-5 alignment option would be impracticable.

- Impacts on Public Parks, Wildlife Areas, and Recreation Resources— Numerous comments were received about the potential for the HST to have adverse effects on wildlife movement and sensitive habitats, including potential impacts to Henry Coe State Park, the Taylor Yard and Cornfield properties, and a wide group of State parks. The preferred HST alignments and stations principally follow already disturbed transportation corridors, and thereby avoid and minimize many potential adverse effects to waters, wildlife, habitat, and parklands. The broad corridor that has been identified as preferred for future investigation of the northern mountain pass allows for avoidance of Henry Coe State Park[2], and the preferred alignment between Oakland and San Jose (Hayward Line to I-880) avoids impacts to Don Edwards San Francisco Bay Wildlife Refuge. In addition, the Authority has identified a relatively wide corridor identified for future investigation of the alignment between Burbank and Los Angeles Union Station.

  The preferred HST alignment would not run through any State Parks, and only five State Parks are within 900 feet of the preferred high-speed rail alignment: San Luis Reservoir State Recreation Area, Old Town San Diego, Colonel Allensworth, Taylor Yard, and McConnell State Recreation Area. Subsequent preliminary engineering and project-level environmental review will provide further opportunities to avoid and minimize the potential effects to water resources, wildlife, habitat and 4(f)/6(f) resources.

- Impacts on Coastal Communities— Concerns have been raised regarding potential impacts on coastal bluffs, beaches, views, historic areas, parklands, and sensitive communities along the coast for HST improvements to the existing LOSSAN rail corridor between South Orange County and San Diego. The proposed HST Alternative would extend no further south than Irvine, and options between South Orange County and San Diego along the coast were eliminated.

- Station Locations— The selection of preferred station locations is anticipated to be controversial. There are trade-offs in comparing the alternative station options. For example, downtown terminals that promote high ridership and connectivity often have considerable construction issues and high costs. Potential HST stations at Visalia and Los Banos were not included as part of the preferred HST Alternative. Visalia, Tulare County and Kings Counties as well as public comments from these counties strongly support a potential HST station at Visalia. The City of Los Banos supports a potential HST station to serve Los Banos.

Next Steps

After completing the program environmental process, should the State of California decide to proceed with the development of the proposed HST system, preliminary

[2] The Authority will not pursue alignment options Henry Coe State Park.

engineering and project-level environmental review would commence to assess site-specific issues and potential environmental impacts not already addressed in the Program EIR/EIS. Project-level environmental review would focus on a portion or portions of the proposed HST system and would provide further analysis of potential impacts and issues at an appropriate site-specific level of detail in order to obtain needed permits and to implement HST projects. Also, after completing the program environmental process, the Authority would begin working with local governments, transportation agencies, and private parties toward right-of-way preservation.

A next-tier program environmental process would address the northern mountain crossing segment of the proposed HST system, including such issues as HST design options, costs, operational issues (such as frequency of service and the potential for splitting trainsets), design and cost for a Dumbarton HST bridge crossing, and potential environmental impacts and will consider additional ridership data to the extent that it is available.

1.5.2 Range of Alternatives Studied

Relationship of Purpose and Need/Objectives to Reasonable Range

Purpose and need are closely linked but subtly different. Need may be thought of as the problem and purpose as an intention to address the problem. Purpose describes why the sponsoring agency is proposing an action that may have environmental impacts and provides the basis for selecting reasonable and practicable alternatives for consideration, comparing the alternatives, and selecting the preferred alternative (40 C.F.R. § 1502.13; see also NEPA § 102.). CEQA requires that an EIR identify the project sponsor's objectives, which are similar to the purpose required by NEPA (CEQA Guidelines, C.C.R., Title 14, § 15124 [b]). The objectives provide benchmarks for selecting a reasonable range of alternatives for analysis, as required by CEQA.

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 and that provides an interface with commercial airports, mass transit, and the highway network and relieves capacity constraints of the existing transportation system, in a manner sensitive to and protective of California's unique natural resources. With the initiation of the HST program environmental review, the Authority and the FRA began the process of defining reasonable and feasible alternatives to be considered in the Program EIR/EIS. This effort involved the development of an HST Alternative (including design options), a Modal Alternative focused on other intercity modes of transportation, and a No Project Alternative. The development of the alternatives involved consideration of the purpose and need for the proposed action and consultation with public agencies and the public, as described in Chapter 2 of the Final Program

EIR/EIS. A range of feasible alignment and station options were developed through review of previous studies discussed in Section 2.1.1 of the Final Program EIR/EIS, review of scoping comments, and engineering evaluation of alignment and station options within the most promising potential corridors.

There are currently two primary modes of intercity travel between the major urban areas of Oakland/San Francisco, San Jose, Sacramento, the Central Valley, Los Angeles, and San Diego: vehicles on the interstate highway system and state highways, and commercial airlines. The Modal Alternative is a combination of potentially feasible highway and aviation system improvements that focus on quantifiable capacity enhancements, primarily additional through lanes, passenger terminal gates, runways, and associated improvements.

Description of Proposed High-Speed Train System

The Authority was created pursuant to state legislation in 1996 and reauthorized in 2000 to plan, construct, and operate high-speed passenger trains offering intercity service (California Public Utilities Code § 185000 et seq.).

The proposed HST system is more than 700 miles long (1,127-kilometer-long), is electrically powered, has more than 30 potential stations (including termini and intermediate stations), and uses trainsets of multiple cars, and includes maintenance/cleaning/storage facilities. This system would be capable of speeds in excess of 200 mph (322 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, Orange County, the Inland Empire, 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.

Performance Criteria

The Authority defined performance criteria for the HST Alternative that would meet the purpose of and need for a proposed HST system, using 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[3]	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).

Engineering Criteria

To guide the further definition of alignment and station options, additional engineering criteria and parameters were necessary. The additional criteria and parameters developed and defined in the Engineering Criteria Report (January 2004) and considered in the program-level environmental analysis are summarized below.

The electrified steel-wheel-on-steel-rail high-speed (VHS) trains must be capable of maximum operating speeds near 220 mph (350 km/h) on dedicated, fully grade-separated lines with more stringent alignment requirements than those needed for lower speed lines. These trains must also be capable of integrate into existing conventional rail lines in the congested urban areas given resolution of certain equipment and operating compatibility issues. Shared use corridors would meet the following general criteria:

[3] Engineering Criteria, January 2004

- Electrified
- Full grade separation
- Uniform control/signal system
- Four tracks at stations (allow for through/express services and local stopping patterns)
- May require three to four mainline tracks (depending on capacity requirements of HST and other services)
- Separation (either physical or temporal) from conventional freight traffic

Freight operating potential and infrastructure are not addressed in the Program EIR/EIS.

The main engineering design parameters and criteria for VHS trains are summarized in Table 3.0-1 of the Engineering Criteria Report.

In addition, the following criteria and assumptions apply to the use of tunnels in the northern and southern mountain crossings:

- The extent of tunneling should be minimized. Tunnels lengths should be limited to less than 6 miles, where possible and not to exceed 12 miles overall length.
- Tunnel boring machines should be the assumed excavation method for all tunnels, with the exception of specific areas such as fault crossings that have very difficult geology
- Twin single track tunnels should be assumed for lengths of 0–6 miles. For lengths greater than 6 miles, a third tunnel is required for ventilation, evacuation, and construction access.
- Tunnels should be fully lined, as reflected in the unit costs included in Chapter 6.

There are two principal types of stations: terminus and intermediate. Terminus stations are those where all trains are planned to stop and perhaps lay-over during non-peak periods. San Diego, Los Angeles Union Station, LAX, San Francisco, Oakland, and Sacramento are all planned as terminus stations; however, Los Angeles Union Station would also have the characteristics of an intermediate station and is treated differently. All other potential stations are intermediate stations. Intermediate stations would provide off-line passenger platforms allowing for pass-through express services on the dual track mainline.

Other design issues include station platform specifications (e.g., size and height), track and platform configuration, storage and maintenance requirements and configuration, parking requirements, and passenger facility requirements.

The proposed HST system would use steel-wheel-on-steel-rail electrified technology. This type of HST technology includes steel-wheel-on-steel-rail trains capable of sharing tracks at reduced speeds with other compatible services. All existing systems with this very high-speed capability use electric propulsion. This state-of-the-art, high-speed, steel-wheel-on-steel-rail technology would operate in the majority of the statewide system in dedicated (exclusive track) configuration. However, where the construction of new separate HST infrastructure would be infeasible, shared track operations would use improved rail infrastructure and electrical propulsion. Potential shared-use corridors would be limited to sections of the statewide system with extensive urban constraints.

Using this technology, the proposed system would be constructed with consistent dual tracking in a variety of construction sections (e.g., at grade, elevated structure, tunnel), as appropriate for the constraints of each specific section.

To provide maximum opportunity for station area development in accordance with the purpose and need and objectives for the HST system, the preferred HST station locations are all multi-modal hubs and are typically in traditional city centers.

Design Practices

Design practices have also been identified that would be employed as the project is developed further in the project specific environmental review, final design and construction stages. These practices will be applied to the implementation of the HST system to avoid, minimize, and mitigate potential impacts. Some key design practices are summarized 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 (TOD) 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.

HST Alternatives Eliminated from Further Consideration

The following HST alternative technologies, corridors, alignments, and stations were eliminated from further consideration.

High-Speed Train Technology Options Considered and Rejected

<u>Steel-Wheel-on-Steel-Rail At Lower Speed (below 200 mph)</u>

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 mph (320 kph) or greater."

Previously, the California Intercity High-Speed Rail Commission investigated three types of HST technology: HS, VHS, and maglev. Based on this analysis, the Commission directed staff to focus the technical studies on the VHS and maglev technologies. This direction is consistent with foreign HST experience, the experience of the northeast corridor (Boston-New York-Washington, D.C.), and HST studies done elsewhere in the U.S., which show that to compete with air transportation and generate high ridership and revenue, the intercity HST travel times between the major transportation markets must be below 3 hrs.

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 prohibit 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 [LAUS] 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. Sharing track with existing passenger rail services on these heavily constrained corridors would allow for direct HST service without passenger transfer. However, the HST system would need to be compatible with the other trains sharing the tracks.[4] Maglev technology requires separate and distinct guideway configurations that would preclude the sharing of rail infrastructure.

In contrast, by taking advantage of the existing rail infrastructure, a shared-use configuration would be mostly at grade. Shared-use options would be less costly and would result in fewer environmental impacts. In addition, for these alignment options improved regional commuter service—electrified, fully grade-separated, with additional tracks and fencing—would help mitigate the impacts of additional rail service along the existing rail corridors. Shared-use improvements in these corridor would potentially result in safety and service improvements for commuter rail and potentially improve automobile traffic flow at rail crossings and reduce noise impacts, since a grade-separated system could eliminate trains blowing warning horns throughout the alignment. Shared-use options would provide the opportunity for a partnership with the owner of the right-of-way, and operator of the Caltrain service, and would provide the opportunity to incrementally improve a portion of the network. On the San Francisco Peninsula, the Caltrain Joint Powers Board has indicated support for the general concept of a proposed HST system sharing tracks with Caltrain service, it has also commented that a dedicated (exclusive guideway) high-speed rail service along its existing right-of-way would be infeasible, because there would not be enough space for both types of services to operate separately.

Improvements to these heavily constrained urban corridors would be most effectively implemented in an incremental manner to maintain existing services, allow for corresponding improvements to the existing services, limit construction impacts, and reduce immediate funding needs. By contrast, infrastructure for completely dedicated (separate track) steel-wheel-on-steel-rail or maglev technology would not lend itself to incremental improvement.

[4] Current FRA safety requirements for rolling stock preclude the use of non-compliant rolling stock (such as off-the-shelf European equipment, which is constructed to different structural design standards) unless otherwise waived.

Previously Identified Alternative HST Corridor Options Considered and Rejected

The following HST Alternative corridor options were evaluated and eliminated from further consideration during the alternatives screening process based on the consideration of available information, primarily data from previous studies. The previous studies applied GIS databases and analysis methods that have been refined, updated, and applied in the Program EIR/EIS. The reasons for elimination of each of the corridor options evaluated in the previous studies are categorically summarized in Table 2 and further described in the Section 2.6.8 of the Final Program EIR/EIS.

Table 2
Review of Previous Studies of High-Speed Train Alternatives

Corridor	Reason for Elimination						
	Construction	Incompatibility	Right-of-Way	Connectivity / Accessibility	Revenue / Ridership	Environment	Environmental Concerns
Los Angeles to San Francisco Bay only				P	P		
Coastal Corridor (San Jose to Los Angeles)	S				P	S	Natural resources along coast, cultural, visual, geology, property displacement
I-5 Corridor (Sacramento to Bakersfield)		S		P	P		
Capitol Rail Corridor (Sacramento to Oakland)				P	P		
Panoche Pass (Central Valley to Bay Area)	S			P	P		
LAX as LA Terminus	S			P	P		
LOSSAN Corridor dedicated high-speed service	P		P			P	Natural resources, coastal habitats and communities, wetlands/lagoons, visual, geology, biology
Extension to San Diego from East Mission Valley	P		P			P	Land use, property displacement
Peñasquitos Canyon (I-15 to I-5)						P	Natural resources, parkland, open space, wetlands preserve, biology

Definitions:

Reason: Primary (P) and Secondary (S) reasons for elimination.

Construction: Engineering and construction complexity, initial and/or recurring costs that would render the project impracticable and logistical constraints.

Environment: High potential for considerable impacts to natural resources, including waters, streams, floodplains, wetlands, and habitat of threatened or endangered species that would fail to meet project objectives.

Corridor	Reason for Elimination: Construction	Incompatibility	Right-of-Way	Connectivity / Accessibility	Revenue / Ridership	Environment	Environmental Concerns
Incompatibility: Incompatibility with current or planned local land use as defined in local plans that would fail to meet project objectives.							
Right-of-Way: Lack of available rights-of-way or extensive right-of-way needs would result in high acquisition costs and/or delays that would render the project impracticable.							
Connectivity/Accessibility: Limited connectivity with other transportation modes (aviation, highway and/or transit systems) would impair the service quality, could reduce ridership of the HST system, and would fail to meet the project purpose.							
Ridership/Revenue: The corridor would result in longer trip times and/or have suboptimal operating characteristics and would have low ridership and revenue and would fail to meet the project purpose.							

Additional HST Alignment and Station Options Considered and Rejected

Additional HST alignment and station options were evaluated and screened using the objectives and criteria established by the Authority to identify reasonable and practicable options for further consideration in the Program EIR/EIS. The Authority's performance criteria (as summarized previously in Table 1) were applied in the 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. Options considered and reject are summarized in Table 3. See Section 2.6.9 of the Final Program EIR/EIS for more details.

Table 3
High-Speed Train Alternative Alignment and Station Options Considered and Eliminated

	Reason for Elimination							
Alignment or Station	**Construction**	**Incompatibility**	**Right-of-Way**	**Connectivity/ Accessibility**	**Revenue/ Ridership**	**Alignment Eliminated***	**Environment**	**Environmental Concerns**
BAY AREA TO MERCED								
San Francisco to San Jose								
US-101 Alignment (exclusive guideway)	P	S	P				P	Visual, land use (right-of-way acquisition)
Caltrain Corridor (exclusive guideway)	P	P	P				P	Visual, land use (right-of-way acquisition), cultural resources
Station Locations								
Millbrae–San Francisco Airport (US-101)						P		
Redwood City (US-101)						P		
Oakland to San Jose								
Mulford Line (Note: only Oakland to Newark portion to be eliminated)	P	P	P				S	Visual, land use
I-880 (Note: only Oakland to Fremont portion to be eliminated)	P		P					
Former Western Pacific Railroad (WPRR) Rail Line to Hayward Line to I-880 (WPRR alignment/Hayward/I-880)	P							
Former WPRR Rail Line through Niles Junction to Mulford Line (WPRR/Niles/Mulford alignment)	P							

Alignment or Station	Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated*	Environment	Environmental Concerns
	Reason for Elimination							
Hayward Line via tunnel to Mulford Line (Hayward/Tunnel/Mulford alignment)	P	S	P				S	Land use, seismic constraints
Former WPRR Rail Line via tunnel to Mulford Line (WPRR/Tunnel/Mulford alignment)	P	S	P				S	Land use, seismic constraints
Station Locations								
Lake Merritt		P		P				
Jack London Square	P			P				
I-880 Hegenberger						P		
Coliseum BART (WPRR)						P		
Fremont–Warm Springs	P							
Mowry Avenue	P					P		
San Jose to Merced								
Merced Southern alignment (Central Valley Portion of San Jose-Merced section for Diablo Range Direct options)							P	San Luis National Wildlife Refuge impacts
Direct Tunnel Alignment (Northern or Southern Connection to Merced	P						S	Seismic constraints
Caltrain/Morgan Hill/Foothill/Pacheco Pass Alignment	P	P		P			P	Visual, land use
Caltrain/Morgan Hill/East US-101/Pacheco Pass Alignment		P		P				
Station Locations								
Morgan Hill (Foothills)				P		P		
Morgan Hill (East of US-101)				P		P		
SACRAMENTO TO BAKERSFIELD								
Sacramento to Stockton								
Southern Pacific (SP) River Line/WPRR)	P		S				S	Parklands, farmlands
Station Locations								
Curtis Park		S				P	P	Land use, cultural resources, visual, parks
Executive Airport					S	P		
Freeport West		S			S	P		Land use
Cal Expo Fairgrounds	S		P	P				
Stockton to Modesto								

Alignment or Station	Reason for Elimination: Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated*	Environment	Environmental Concerns
W99				P			P	Farmlands, water resources, floodplains
Station Locations								
Farmington Road				P			S	Water resources, farmlands
Stockton Metropolitan Airport				P			S	Floodplains, farmlands
Modesto to Merced								
E99				P			P	Farmlands
W99				S	P		P	Farmlands
Station Locations								
Modesto West				P	S		P	Farmlands
Modesto Empire		P		P				
Modesto East				P	S			
Merced to Fresno								
W99				P			P	Farmlands
E99/BNSF				P	S		P	Farmlands, parks
Station Locations								
University of California at Merced						P	S	Farmlands, wetlands
Plainsburg				P		P	S	Farmlands
Fresno to Tulare								
W99				P			P	Farmlands
E99				P			P	Farmlands
Station Locations								
Fresno West				P	S		P	Farmlands
Chandler Field		P		P				
Fresno Amtrak Station	P	S	P	S				
Fresno Yosemite International Airport		P	P	P				
Fresno East				P	S	P	S	Farmlands, water resources
Tulare to Bakersfield								
W99 (extension of Fresno to Tulare W99 option)						P		
E99 (extension of Fresno to Tulare E99 option)						P		
Station Locations								

Alignment or Station	Reason for Elimination: Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated*	Environment	Environmental Concerns
Tulare West				S		P		
Tulare Airport				P	P			
Tulare East County				S	S	P	S	Water resources, parks
Bakersfield to Los Angeles Connectors								
Bakersfield Station to I-5 via Comanche Point Connector						P		
Bakersfield Station to I-5 via Comanche Point Connector via Union Ave						P		
Station Locations								
Bakersfield West		P				P	P	Farmlands
Bakersfield East					P	P	P	Farmlands
Bakersfield South					S	P		
Old Amtrak Station		P						
BAKERSFIELD TO LOS ANGELES								
Bakersfield to Sylmar								
I-5 (2.5% grade)	P						S	Seismic constraints
I-5 via Comanche Point	P						S	Seismic constraints
SR-58/Soledad Canyon (2.5% grade)	P						S	Seismic constraints
SR-138/Soledad Canyon	P						S	Seismic constraints
SR-138/SR-14	P						S	Seismic constraints
Aqueduct/Soledad Canyon	P						S	Lengthy run adjacent and parallel to San Andreas fault zone, seismic constraints
Aqueduct/SR-14	P						S	Lengthy run adjacent and parallel to San Andreas fault zone, seismic constraints
Station Locations								
Santa Clarita (SR-126/I-5)	P			P			S	Santa Clara River Floodplain, visual
Santa Clarita (Magic Mountain Parkway/I-5)				P				
Santa Clarita (Via Princessa/SR-14)	P							
Santa Clarita (The Old Road/I-5)	P	S	P	P			P	Significant Ecological Area, steep terrain, visual

Alignment or Station	Reason for Elimination: Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated*	Environment	Environmental Concerns
Santa Clarita (San Fernando Road/SR-14)	P	S					P	Significant Ecological Area, national forest land, steep terrain, visual
Lancaster Metrolink	S				P			
Palmdale Boulevard			P	P	P			
Sylmar to Los Angeles								
I-5 Freeway	P	S	P				P	Socioeconomics, land use, visual, parks
Station Locations								
LAUS (LAUS South–Stub)					P			*operational issues with stub-end station
LAUS (Los Angeles River West)		P	P					
LAUS (Cornfield Site)		P		S	P			*operational issues for northern and southern connections
LOS ANGELES TO SAN DIEGO VIA INLAND EMPIRE								
Los Angeles to March Air Reserve Base								
UPRR Riverside Line					P		S	Cultural resources, wildlife refuges
I-10	P						S	
SR-60	P						S	Water resources, wetlands
BNSF Fullerton Line/SR-91	P	S			S		P	Water resources, wetlands, visual, parks, cultural
Station Locations								
Ontario International Airport (South side)						P		
Downtown Riverside						P		
Fullerton Transportation Station						P		
March Air Reserve Base to Mira Mesa								
I-215/I-15 Alignment—Long Tunnel	P							
Station Locations								
Temecula/Murrieta Border (I-15 near Winchester Interchange)				P				
Mira Mesa to San Diego								

	Reason for Elimination							
Alignment or Station	**Construction**	**Incompatibility**	**Right-of-Way**	**Connectivity/ Accessibility**	**Revenue/ Ridership**	**Alignment Eliminated***	**Environment**	**Environmental Concerns**
SR-163 to Santa Fe Station	P	P					P	Balboa Park, cultural resources
SR-52		P	P				S	4(f), Marian Bear Memorial Natural Park
SR-163/I-8	P	S						
Station Locations								
Kearny Mesa						P		
South of University City option						P		
LOS ANGELES TO SAN DIEGO VIA ORANGE COUNTY								
LAUS to LAX								
I-405 and I-10	P		P				S	Environmental justice, community impacts, parks
I-105 and I-110	P		P				S	Environmental justice, community impacts
Upgrade MTA Green Line to Support HSTs	P							
LAUS to Orange County								
I-5 Freeway	P		P					
Pacific Electric Right-of-Way	P			S				
Station Locations								
Paramount (San Pedro Branch at I-105)						P		
Norwalk (I-5 at Imperial Highway)						P		
Garden Grove (PE ROW at SR-22)		P		S		P	S	Community and neighborhood impacts
Anaheim I-5		P		S			S	Community and neighborhood impacts
Orange County to Oceanside								
I-5 Freeway	P		P					
San Joaquin Corridor (SR-73) with I-5	P			S				
I-5 and Foothill Corridor (SR-241)	P						S	Wetlands, threatened and endangered species, visual

Alignment or Station	Reason for Elimination: Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated*	Environment	Environmental Concerns
LOSSAN Corridor (south of Irvine)	~~P~~						P	Visual, community impacts, and coastal resources.
Station Locations								
Irvine (I-5 at Jeffery Road)						P		
Oceanside (I-5 at Oceanside Boulevard)						P		
Oceanside Transportation Center						P		
Newport Beach						P		
Oceanside to San Diego								
LOSSAN Corridor							P	Visual, community impacts, and coastal resources.
I-5 Freeway			P	S				
Station Locations								
Solana Beach (I-5 at Lomas Santa Fe Drive)						P		
Solana Beach (LOSSAN)						P		
UTC (La Jolla and Genesee Ave.)						P		
BART = San Francisco Bay Area Rapid Transit District.								
Definitions:								
Reason: Primary (P) and secondary (S) reasons for elimination.								
Construction: Engineering and construction complexity, initial and/or recurring costs that would render the project impracticable and logistical constraints.								
Environment: High potential for significant impacts on natural resources, including streams, floodplains, wetlands, and habitat of threatened or endangered species that would fail to meet project objectives.								
Incompatibility: Incompatibility with current or planned local land use as defined in local plans that would fail to meet project objectives.								
Right-of-Way: Lack of available rights-of-way or extensive right-of-way needs would result in high acquisition costs and/or delays that would render the project impracticable.								
Connectivity/Accessibility: Limited connectivity with other transportation modes (aviation, highway and/or transit systems) would impair the service quality, could reduce ridership of the HST system, and would fail to meet the project purpose.								
Ridership/Revenue: The alignment or station would result in longer trip times and/or have suboptimal operating characteristics and would have low ridership and revenue and would fail to meet the project purpose.								
Alignment Eliminated: Station or connection eliminated because the connecting alignment option was eliminated.								
* Alignment Eliminated column only applies to station locations. If an alignment is eliminated, a specific station location may no longer be necessary.								

Preferred HST Alignment and Station Options

The HST alignment and station location preferences described below are based on the data presented in the Final Program EIR/EIS and supporting technical reports, and the comments received on the Draft Program EIR/EIS (the comment period concluded on August 31, 2004).

The identification of preferred alignments was guided by the adopted objectives and criteria for selecting preferred alignments and station locations that were applied in the screening evaluation, as documented in Section 2.6.9 of the Final Program EIR/EIS.

Chapter 6 of the Final Program EIR/EIS summarizes and compares the physical and operational characteristics and potential environmental consequences associated with the HST alignment and station options where relative differences were identified, including alignment, length, capital cost, travel time, ridership, constructability, and operational issues.

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.

The EPA and USACE have concurred that the preferred HST alignment and station options are most likely to contain the LEDPA. The High-Speed Train Alternative represents the proposed action, was identified as the preferred system alternative in the Draft Program EIR/EIS, and is identified as the environmentally preferable under NEPA as well as the environmentally superior alternative under CEQA.

Bay Area-Merced

The Authority, in consultation with the FRA, has identified 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[5]. (See page 13 above for more detail.) 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.[6] The future additional study will also further consider the below Bay Area to Merced alignment and station locations.

San Francisco Peninsula: Caltrain Corridor[7] 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[8].

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[9] 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.

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5 Future studies would involve a next-tier EIR/EIS to identify and select a single preferred alignment option between the Central Valley and the San Francisco Area. The FRA consulted with the Council on Environmental Quality (CEQ), and CEQ concurred that the proposed approach would be consistent with NEPA and would provide for compliance with Section 404 of the Clean Water Act.

6 Highway route numbers are provided only as a convenient reference for the reader, not as a limitation on the corridor to be considered.

7 Future studies would determine how much of the Caltrain alignment between San Francisco and San Jose would be included.

8 The Union Pacific alignment is the CHSRA and FRA preferred option. The CCT alignment will be further evaluated at the project level due to Clean Water Act federal regulations because the UPRR alignment option has more potential impacts to waters and biological resources.

9 However, an additional study of an alignment option between Fresno and Bakersfield, or variations thereof, to serve a potential Visalia station located in an existing and/or planned urbanized area, is to be conducted prior to the commencement of project-level environmental documents for this segment.

Sylmar-Los Angeles: MTA/Metrolink with potential stations at Downtown Burbank (Burbank Metrolink Media Station) and Los Angeles Union Station[10].

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.

Changes to the HST Alternative between the Draft and Final Program EIR/EIS

Between the draft and final Program EIR/EIS, three changes were made to the proposed HST system.

- The proposed HST system would extend no further south than Irvine (as a result of environmental constraints along the coast and in coastal communities between South Orange County and San Diego). For this region, non-electric "conventional" rail improvements to the existing state-supported "Surfliner" (Amtrak) service were the only design options considered between Irvine and San Diego in the Draft Program EIR/EIS. The Authority has recognized that implementation of "non-electric" improvements in the Irvine to San Diego portion of the LOSSAN corridor for intercity service is the current responsibility of Caltrans Division of Rail and the Authority decided to take no further action in the Program EIR/EIS regarding conventional improvements in this area. Sections relating to potential non-electric improvements in the LOSSAN corridor were removed from the Final Program EIR/EIS.
- The Authority has determined that alignment options through Henry Coe State Park should not be pursued in any subsequent environmental analysis. HST alignments through Henry Coe State Park would have greater potential environmental impacts than alignment options through the Diablo Range that

[10] Between Burbank and Los Angeles Union Station, the MTA/Metrolink refers to a relatively wide corridor within which alignment variations will be studies at the project level.

would avoid the park to the north. Alignments through Henry Coe State Park would have the highest impacts to Section 4(f) and 6(f) Resources (both long-term and construction impacts). In addition, the considerable amount of public and agency input in regards to these alignment options has been overwhelmingly opposed to any construction through Henry Coe State Park.

- The Authority has determined that the HST station at Los Banos (Western Merced County) on the Pacheco Pass alignment should not be pursued in subsequent environmental reviews because of low intercity ridership projections for this site, limited connectivity and accessibility, and potential impacts to water resources and threatened and endangered species.

Summary of Impacts

The Program EIR/EIS analysis shows that the No Project, Modal, and HST Alternatives would have differences in both potential adverse and beneficial environmental impacts at the system-wide level. These differences, summarized in Table 4, are based on the analysis presented in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Strategies. For some environmental areas discussed in Table 4, only quantification of potentially affected resources are presented, representing areas within which potential impacts might occur. For example, the area of floodplains includes all floodplains within 100 feet (ft) (30 meters [m]) of either side of the centerline of the alignment considered. However, the actual right-of-way necessary for the improvements considered is much smaller (e.g., only 25 ft [8 m] on either side of centerline for HST). Whenever possible, representative impacts have been quantified based upon estimated areas of direct impact. For instance impacts to wetlands were estimated from a footprint analysis of the HST alignments or Modal highway lanes. It is expected that the magnitude of potential impacts reported is larger than the eventual impacts that would be expected from either the HST or Modal Alternative after design refinement during the project level reviews and associated incorporation of avoidance and minimization measures.

The analysis for the Program EIR/EIS used the best available information concerning environmental resources as applied in a statewide geographic information systems (GIS) database. No significant adverse impacts or key differences among the alternatives are expected related to geology, electromagnetic interference (EMF/EMI), public utilities, or hazardous materials. Environmental impacts related to other resources are described in Table 4.

Table 4
Summary of Key Environmental Impacts and Benefits for System Alternatives

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
Traffic and Circulation	Capacity is insufficient to accommodate projected growth. Over half of 68 intercity highway segments considered would operate at unacceptable levels of service with increased congestion, travel delays, and accidents compared to existing conditions. Congestion would increase.	Congestion reduction on intercity highways compared to the No Project and HST Alternatives. However, the analysis could not account for potential use of the excess capacity by non-intercity (commuter and short-distance) trips. Congestion and travel delays on surface streets leading to and from highways/ airports.	Congestion reduction on intercity highways compared to the No Project Alternative. However, the analysis could not account for potential use of excess capacity by non-intercity (commuter and short-distance) trips. 34 million fewer long-distance automobile passengers on highways. Localized traffic conditions around stations impacted.	Encourage use of transit to stations. Work with transit providers to improve station connections.
Travel Conditions (travel time, reliability, safety, connectivity, sustainable capacity, passenger cost)	Longer travel times, more delay. Lower reliability due to dependence on the automobile. Increase in injuries and fatalities due to increase in highway travel. No net improvement to connectivity options. No significant increase in capacity for highway or air infrastructure, and significant worsening of congestion due to increased demand.	Travel time reduction compared to the No Project Alternative. Improved reliability over No Project due to increased capacity. Increase in injuries and fatalities due to more highway travel. No new modes introduced; additional air frequency. Modal improvements would provide sufficient capacity to meet representative demand, but would have little or no capacity beyond that level. Passenger costs approximately the same as the No Project Alternative.	Travel time reduction compared to the No Project Alternative. Greatest improvement in reliability due to high reliability of HST mode; significant levels of diversion to HST from auto and air result in reduced congestion; and additional modal option improves reliability for overall transportation system. Decrease in injuries and fatalities due to diversion of trips from highways. Highest level of connectivity. New mode would add a variety of connections to existing modes, additional frequencies, and greater flexibility. HST system would provide sufficient capacity to meet representative demand	N/A

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
			and would provide substantial additional capacity with minimal additional infrastructure. HST system would provide a release valve for the existing intercity modes. Overall savings in passenger costs of 8% to 44% compared to No Project, depending on the origin and destination of travel. HST passenger costs are competitive with the automobile travel and less expensive than air travel.	
Air Quality (Conformity Rule; tons of pollutants)	Emissions predicted to decrease in 2020 due to low emission vehicles; PM10 to increase statewide. Estimated CO 806,300 tons/year, NO_x 188,000 tons/year, TOG 121,000 tons/year; CO_2 374.1 million tons/year.	Vehicle miles traveled increase by 1.1% over 2020 No Project. CO 812,800 tons/year; NO_x189,200 tons/year; TOG 122,000 tons/year; CO_2 374.2 million tons/year.	Air quality benefit. Decrease in pollutants compared to No Project: CO 799,200 to 803,100 tons/year; NO_x 185,200 to 186,400 tons/year; TOG 120,500 to 120,900 tons/year; CO_2 368 to 372.4 million tons/year (0.45% to 1.4% less than No Project). (Range based on low- to high-end ridership forecasts.)	Control of construction-related emissions.
Energy Use	24.3 million barrels of oil consumed annually in 2020; 6.8 million over existing conditions.	Higher total energy consumption: 24.5 million barrels of oil in 2020. Higher construction energy consumption 241 MMBtus.	Energy benefit. Lower total energy consumption: 19.1 million (high-end ridership) and 22.3 million (low-end) barrels of oil in 2020; overall decrease of 2.0 to 5.2 million barrels of oil compared to No Project. Increase in electric power demand/use of natural gas. Lower construction energy consumption: 152 MMBtus (high-end ridership) and 127 MMBtus (low-end	Develop and implement energy conservation plan for construction.

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
			ridership).	
Land Use (compatibility and property impacts)	Expansion of urban sprawl as population grows and congestion increases; development on open space and agricultural lands.	Improved access to outlying areas and communities; sprawl; incompatible with transit-first policies. High property acquisition impacts along constrained existing rights-of-way in heavily urbanized areas; 309 mi (497 km) (20% of corridor) would affect high-impact land uses.	Controlled growth around stations, urban in-fill; compatible with transit-first policies. Majority of property acquisition along existing rights of way, some acquisition along new rights of way in undeveloped areas; between 53 and 88 mi (85 and 142 km) of HST would affect high impact land uses. (Range based on alignment options selected to comprise the HST system.)	Continued coordination with local agencies. Explore opportunities for joint and mixed-use development at stations. Relocation assistance during future project-level review.
Visual Quality	No predictable change to existing landscape.	Low to moderate contrasts along existing highways and airports; high contrasts through mountain crossings and natural open space landscapes.	Moderate to high visual contrasts for elevated structures; high sensitivity in scenic open space and mountain crossings.	Design strategies to minimize bulk and shading of bridges and elevated guideways. Use neutral colors and materials to blend with surrounding landscape features.
Noise	More traffic and more air operations from growth in the intercity demand generate more noise.	210 mi (338 km) or 14% of total highway corridor miles improved would have high impacts on noise-sensitive land use/populations. The Modal Alternative would include five additional runways statewide in heavily urbanized areas. Noise is one of the most prominent factors in the environmental acceptability of airport improvement expansion and is often the limiting factor in approval of	21 to 107 mi (34 to 172 km) or 3% to 14% of alignment length statewide would have high impacts on noise-sensitive land use/populations; with mitigation, 0% of alignment would have high impacts. Noise increase due to additional high-speed train frequencies. Noise reduction from existing conditions due to elimination of horn and crossing gate noise resulting from grade separation of existing grade crossings.	Consider sound barriers along noise-sensitive corridors; track treatment for vibration.

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
		such improvements.	(Range based on alignment options selected to comprise the HST system.)	
Farmland (includes area within 50 ft [15 m] on each side of alignment centerline [100 ft or 30 m total])	No predictable change from existing conditions as a result from the No Project transportation improvements. Continued loss of farmland in California at rate of 49,700 ac (20,113 ha) per year from population growth and urbanization (845,000 ac [341,960 ha] by 2020).	Right-of-way needs of the improvements could potentially impact a total of 1,118 ac (452 ha) of farmlands.	Right-of-way needs of the HST could potentially impact a total of 2,445 to 3860 ac (989 to 1,562 ha) of farmlands. New corridor alignments through farmlands could have potential severance impacts. (Range based on alignment options selected to comprise the HST system.)	Avoid or reduce impacts by sharing existing rail rights-of-way to the maximum extent possible and avoiding alignment options in established farmlands. Consider farmland preservation strategies.
Biological Resources and Wetlands (Includes area within 50 ft [15 m] on each side of alignment centerline; 100 ft or 30 m total])	No predictable change from existing conditions.	1,476 ac (597 ha) of sensitive habitat; 100ac (40 ha) of wetland; 90 special-status species.	1,201 to 1,568 ac (486 to 635 ha) of sensitive habitat; 30 to 89 ac (12 to 36 ha) of wetland; 67 to 84 special-status species. (Range based on alignment options selected to comprise the HST system.)	Work with resource agencies to develop site-specific mitigation and impact avoidance strategies for project-level review in coordination with local and regional plans and policies.
Hydrology and Water Resources (floodplains include area within 100 ft [30 m] on each side of alignment centerline [200 ft or 61 km total]; streams and lakes include area within 50 ft [15 m] on each side of centerline [100 ft or 30 m total])	No predictable change from existing conditions.	5,540 ac (2,242 ha) of floodplains, 39,520 linear ft (12,045 m) of streams, 25 ac lakes (10 ha) within 50 ft (15 m).	1,865 to 3,873 ac (755 to 1,567 ha) of floodplains; 22,600 to 32,400 linear ft. (6,888 to 9,875 m) of streams; 7 to 27 ac (3 to 11 ha) of lakes within 50 ft (15 m). (Range based on alignment options selected to comprise the HST system.)	Avoid or minimize footprint in floodplains; conduct project-level analysis of surface hydrology and coastal lagoons; BMPs for construction as part of Storm Water Pollution Prevention Plan.
Section 4(f) and 6(f) (Public Parks and Recreation)	No predictable change from existing conditions.	132 Section 4(f) properties potentially affected;	54 to 89 Section 4(f) properties potentially affected;	Consider design options to avoid parkland and

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
(includes area within 900 ft [274 m] on each side of alignment centerline [1,800 ft or 549 m total])		8 wildlife refuges.	1 to 6 wildlife refuges. (Range based on alignment options selected to comprise the HST system.)	wildlife refuges; identify potential site-specific mitigation measures.
Cultural Resources (including Section 4(f) historical resources)	Low ranking for impacts on archaeological resources and historic property.	Medium ranking for potential impacts on archaeological resources and historic properties.	Medium to high ranking for potential impacts on archaeological resources and historic properties (HST would use existing rail corridors and some stations and nearby resources developed in historic period).	Develop procedures for fieldwork, identification, evaluation, and determination of effects for cultural resources in consultation with State Historic Preservation Office and Native American Tribes.
Growth Potential	Statewide population is expected to grow by about 54%, statewide employment is expected to increase by 46%, and urbanized areas are expected to increase by 48% between 2002 and 2035.	Statewide population is expected to grow by 55% between 2002 and 2035 (360,000 more than No Project), statewide employment is expected to increase by 47% (250,000 jobs more than the No Project), and urbanized areas are expected to increase by 50% (65,500 ac [26,507 ha] more than the No Project) between 2002 and 2035. Increased development at major interchanges along highways and around airports; sprawl, particularly in Central Valley region.	Statewide population is expected to grow by 56% between 2002 and 2035 (700,000 more than No Project), statewide employment is expected to increase by 48% (450,000 jobs more than the No Project), and urbanized areas are expected to increase by 48% (2,600 ac [1,052 ha] less than the No Project). Transit-oriented development around stations; planned growth consistent with RTPs; growth around Merced.	Work with local communities to encourage higher density development around stations.
Cumulative Effects	Air quality effects of increased highway congestion and land use (sprawl) related to growth.	Visual effects of expanded and new facilities (paved surfaces, long linear features); cut and fill through mountain crossings. Impacts	Visual effects of new linear feature along existing transportation facilities; electric power lines/catenary; construction-related short-term visual	See specific environmental areas of concern.

Key Environmental Issues	Alternative			Mitigation Strategy for HST
	No Project	Modal	HST	
		on farmlands. Surface runoff impacts and added impervious surface impacts on groundwater.	impacts. Impacts on farmlands.	

ac = acres
CO = carbon monoxide
CO_2 = carbon dioxide
ha = hectares
MMBtus = million British thermal units
NO_x = oxides of nitrogen
PM10 = particulate matter 10 microns in diameter or less
RTPs = regional transportation plans
TOG = total organic gases

In addition, the Final Program EIR/EIS considered 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 alignment and the HST design (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.

Growth

In regards to growth, 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 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 Alternative than under the No Project Alternative.

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 conveniently located to 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 and egress to HST stations. (See Design Practices in Section 1.5.2 above for further description of TOD measures.)

Urbanization

Table 5 presents projections for increases in urbanized areas for each region and county being analyzed. The five counties that comprise the Southern California region would account for 60% of the future increase in urbanized acreage under the No Project Alternative for the counties included in this analysis. Outside of Southern California, the Southern Central Valley is projected to experience the most urbanization, followed by the Northern Central Valley and the Bay Area. Kern, Fresno, and San Joaquin are the only counties outside of Southern California that are projected to each experience an urbanization increase greater than 50,000 acres (ac) (20,234 hectares [ha]) under the No Project Alternative; all five Southern California Counties are projected to exceed the 50,000 ac (20,234 ha) threshold.

Compared to the No Project Alternative, the Modal Alternative is projected to exhibit an increase in urbanization for all counties, with the greatest relative urbanization increase in Riverside, San Diego, Fresno, and San Joaquin Counties. The HST Alternative, on the other hand, is projected to experience a decrease in the extent of future urbanization, compared to the No Project Alternative in seven counties (Madera, San Joaquin, Stanislaus, Yolo, Tulare, Los Angeles, and Orange), the Northern Central Valley and Southern California regions, and the state as a whole.

Table 5
Year 2035 Size of Urbanized Area by Alternative County and Regional Totals

County	Urbanized Area (Acres)			
	2002 Existing Conditions	2035 No Project	2035 Modal	2035 HST (Base)
Alameda	141,654	170,941	171,868	171,225
Contra Costa	142,467	163,617	164,216	164,874
San Francisco	23,277	27,921	28,081	28,345
San Mateo	70,869	80,517	80,930	81,267
Santa Clara	184,481	232,167	233,601	235,404
Solano	53,757	75,121	75,791	76,634
Bay Area*	**616,505**	**750,284**	**754,488**	**757,749**
Madera	23,255	46,926	47,047	45,329
Merced	31,712	55,964	56,242	57,212
Sacramento	157,101	197,843	198,820	202,471
San Joaquin	74,250	142,650	144,711	137,960
Stanislaus	55,426	96,993	97,968	93,562
Yolo	26,342	37,874	38,002	37,022
North Central Valley*	**368,086**	**578,250**	**582,790**	**573,557**
Fresno	96,977	186,908	189,641	189,503
Kern	111,468	221,030	222,407	226,851
Kings	29,479	43,576	43,655	44,910
Tulare	48,656	98,077	98,192	97,841
South Central Valley*	**286,580**	**549,590**	**553,895**	**559,105**
Los Angeles	763,373	916,904	926,720	881,982
Orange	273,713	328,269	328,795	323,189
Riverside	255,230	516,122	549,163	539,816
San Bernardino	237,905	496,637	497,983	498,004
San Diego	340,837	510,542	518,224	510,567
Southern California*	**1,871,058**	**2,768,473**	**2,820,884**	**2,753,557**
Statewide Total	**3,142,229**	**4,646,596**	**4,712,057**	**4,643,968**

* Only includes counties within a region that have a high-speed train station with the HST Alternative, or highway or aviation improvements within the Modal Alternative.

Source: Cambridge Systematics, Inc. 2003.

Summary of Effects

Overall, the alternatives and proposed HST alignment options would represent very similar levels of growth effects in terms of potential changes in urbanized area size and land consumption needs. The additional effect of the Modal and HST

Alternatives relative to the No Project Alternative is small compared to the difference between the No Project Alternative relative to 2002 existing conditions.

The HST Alternative would stimulate additional growth relative to the other alternatives in some Central Valley counties between Sacramento and Fresno. In all cases except Merced County, the incremental employment effect is much larger than the incremental population effect, suggesting that the HST Alternative might be more effective at distributing employment throughout the state. Also, this result suggests that the HST Alternative would not stimulate large shifts in residential location from the Bay Area and Los Angeles into the Central Valley.

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, while at the same time facilitating broader economic expansion for a much wider geographic region. The HST Alternative would contribute to a potential economic boost in two ways.

- An HST system would provide user benefits (travel-time savings, cost reductions, accident reductions) and accessibility improvements for California's citizens; in addition to HST travelers, travelers on other modes of transportation can accrue these user benefits, as trips are diverted from highways and airports resulting in reduced congestion.
- 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. With this second effect, businesses that locate in close proximity to an HST station could operate more efficiently than businesses that locate elsewhere. Experience from overseas suggests that this competitive advantage may be quite pronounced in high-wage employment sectors that are frequently in high demand in many communities. This second effect would be much stronger under the proposed HST Alternative than under the other alternatives.

Public Participation

Pursuant to the requirements of CEQA and NEPA, 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.

The announcement and website listed the 32 libraries across the state with a hard copy of the document 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 on September 23, 2005.

For more details on the public participation process, see Standard Response 8.1.1 and Chapters 8 and 9 in the Final Program EIR/EIS.

Economic Issues

The costs associated with the proposed HST system (i.e., capital costs and operations and maintenance costs [O&M]) are described in Chapter 4 of the Program EIR/EIS.

Two types of costs are associated with the proposed HST system: capital costs and operations and O&M costs. To be consistent with the definition of the HST Alternative (Chapter 2, *Alternatives)*, the capital and O&M costs associated with the HST Alternative comprise the costs associated with only the alignment and station options that most closely reflect the "highest return on investment system" as presented in the Business Plan (California High Speed Rail Authority 2000). The O&M costs for the HST Alternative were developed based on an operations plan and network simulation model that represents the physical characteristics of the proposed HST alignment options and the performance of the proposed HST equipment.

Capital costs represent all aspects of implementation of a proposed HST system, including construction, right-of-way, environmental mitigation, and design and management services. Because of the variations in alignment and station options being considered in the Program EIR/EIS process, there is potentially a wide range of capital costs associated with a complete statewide system. For a system of alignment and station options similar to the "highest return on investment system," as presented in the Business Plan, the costs could range from $33 to $37 billion. This is more than the estimated costs for a complete statewide system in the Business Plan; at least $2 billion of the cost increase over the previous estimate in the Business Plan is due to inflation.[11] Other differences result from the different alignment (horizontal and vertical) and station configurations being evaluated that were not considered in the Business Plan. The proposed alignment and station configuration options and design assumptions would be reviewed at the project level to identify cost savings through application of value engineering practices.

The investment in a HST system should be viewed within the context of what the state and its subdivisions will raise and spend on transportation infrastructure over the next 20 years. According to the Business Plan, assuming the current rates for fuels and sales taxes dedicated to transportation purposes, California will generate nearly $220 billion in the next two decades. In addition, the importance of the state's transportation infrastructure to the economic vitality of the state cannot be underestimated. Failure to manage congestion and provide efficient and effective higher-speed transportation alternatives could serve as a drag on the state's economic growth. By 2020, a 1% decline in the state's economic output could equate to some $50 billion in lost activity.

The annual O&M costs of the HST Alternative are based on system indicators, including operating speed, travel time, station configuration, maintenance and storage facility, and operating schedule. All of these system indicators are outputs of the California high-speed rail simulation model as documented in the operations report. (Parsons Brinckerhoff 2003.)

The total annual operating cost for the proposed HST system, including operation and maintenance costs for both the infrastructure and the system, is estimated to be $703.2 million.

Previous investigations concluded that while freight services on the HST tracks could operate at a surplus, the revenue contribution from such freight would be small in comparison to passenger services. The Authority's June 2000 Business Plan assumed an operating income from freight of about $10 million by 2020, and more than $16 million by 2030 (Financial Plan, PFM, November 2, 1999). Freight service is not included in the proposed HST system and is not addressed by the Program EIR/EIS.

[11] This reflects an 8.36% increase in construction costs from early 2000 to September 2003, based on *Engineering News Record Construction Cost Index*.

The proposed system would be designed to compete with air and auto travel. Independent ridership and revenue forecasts (Charles River Associates) prepared for the Business Plan show that competitive travel times and frequent service are essential to attract travelers to an HST system. For the HST Alternative to be economically feasible, operating speeds over 200 mph (322 kph), high frequencies of service, and efficient operations are necessary. For example, the projected travel time by HST between San Francisco and Los Angeles (via the Antelope Valley) would be about 2 hrs and 35 min, and between Los Angeles and downtown San Diego it would be about 1 hour and 13 minutes. Table 6 shows additional samples of express travel times between cities. Ridership for this system was estimated to vary between 42 million passengers on the low end and 68 million passengers on the high end for 2020, with a potential for considerably higher ridership beyond 2020. The detailed ridership and revenue investigations of both the Authority and the California Intercity High-Speed Rail Commission concluded that a statewide HST system would generate substantial ridership and that revenue from the HST system would be significantly higher than the cost to operate the system under a variety of fare assumptions.

Table 6
Optimal Express Trip Times between City Pairs (220 mph [350 kph] maximum speed)

	Travel Time (Hrs:Min)							
	Los Angeles	**San Francisco**	**San Jose**	**San Diego**	**Sacramento**	**Fresno**	**Bakersfield**	**Riverside**
Los Angeles	N/A	2:25	1:56	1:06	2:00	1:12	0:41	0:30
San Francisco	2:25	N/A	0:30	3:30	1:27	1:18	1:47	2:55
San Jose	1:56	0:30	N/A	3:02	0:50	0:49	1:19	2:26
San Diego	1:06	3:30	3:02	N/A	3:07	2:19	1:49	0:39
Sacramento	2:00	1:27	0:50	3:07	N/A	0:53	1:23	2:30
Fresno	1:12	1:18	0:49	2:19	0:53	N/A	0:35	1:42
Bakersfield	0:41	1:47	1:19	1:49	1:23	0:35	N/A	1:12
Riverside	0:30	2:55	2:26	0:39	2:30	1:42	1:12	N/A

N/A = not available.

Note: Travel times based on I-5 alignment option between Los Angeles and Bakersfied (add 10 minutes for the Antelope Valley option) and the Qualcomm alignment option in San Diego (add 7 minutes for the Miramar Road or Carroll Canyon alignment options).

1.5.3 Benefits of the Preferred Program

The benefits described in the Statement of Overriding Considerations 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.
- 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 lower passenger costs than for travel by automobile or air for the same intercity markets.
- 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.

The HST Alternative, which has been identified as the least environmentally damaging practicable alternative, would benefit the environment by:

- Using existing transportation corridors and rail lines to minimize the impacts on California's treasured 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 TOD 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[12] 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:

[12] As expressed in the Wiggins Bill (AB857, 2003), and in government code 65041.1

- 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 and a

- 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 and lowering passenger cost for travel, compared to travel by automobile or air for the same intercity markets.

- Inducing travel; that is, some people who would not otherwise make trips will now do so because of the availability of high-speed rail.

- 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.

1.6 Corrections to the Final Program EIR/EIS

As a part of the Authority's and the FRA's review of the Final Program EIR/EIS, several minor corrections were identified (attached). These corrections make insignificant 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 recirculate the document, per the requirements of CEQA and the State CEQA Guidelines (CA Pub. Res. Code Section 21092.1; CA Code of Regulations, Title 14, Section 15088.5), and do not trigger the need to prepare a supplement, per the requirements of the U.S. Council on Environmental Quality National Environmental Policy Act regulations (40 CFR 1502.9(c)(1)).

1.7 Fiscal Information

The decision to pursue an HST system for California involves a commitment to further study this alternative to meet transportation needs, rather than a modal alternative or no project. The Authority's decision to choose the HST system for further study involves no obligation to expend funds. The Authority will make separate future decisions regarding any expenditure of funds to support further studies of the HST system.

1.8 List of Attachments

- Staff Summary of and Brief Response to Comments on the Final Program EIR/EIS.
- Corrections to the Final Program EIR/EIS
- Proposed Resolution No. 05-01
- Proposed California Environmental Quality Act Findings and Statement of Overriding Considerations
- Proposed Mitigation Monitoring and Reporting Program

1.9 Contact

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