

Supplemental Checkpoint B Summary Report

in Support of the
Merced to Fresno Section: Wye Alternatives
Section 404(b)(1) Analysis and
Draft Subsequent Environmental Impact
Report/Supplemental Environmental Impact
Statement

September 2013

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1.0 Introduction

In December 2010, the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), U.S. Environmental Protection Agency (EPA), and U.S. Army Corps of Engineers (USACE) signed a Tier 2 Memorandum of Understanding (MOU) for integrating the National Environmental Policy Act [12 U.S.C. 4321 et seq.] (NEPA), Section 404 of the Clean Water Act (CWA), and Rivers and Harbors Act Section 14 [33 U.S.C. 408] (Section 408) processes for the high-speed train (HST) project.¹ The MOU requires completion of three milestones prior to submittal of project Section 404 permit applications to ensure compliance with the Section 404(b)(1) Guidelines, to provide the basis for a future Section 401 water quality certification, and to integrate NEPA analysis and the 404(b)(1) analysis:

- Checkpoint A: Purpose and Need—completed (see Attachment 3 for concurrence letters from EPA and USACE).
- Checkpoint B: Range of Alternatives for Consideration—being initiated with submittal of this summary report.
- Checkpoint C: Determination of the preliminary Least Environmentally Damaging Practicable Alternative (LEDPA)—to be prepared after the public comment period for the Draft Subsequent Environmental Impact Report/Supplemental Environmental Impact Statement (SEIR/SEIS) closes.

This Supplemental Checkpoint B Summary Report is intended to assist the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (EPA) in selecting the alternatives to be further evaluated pursuant to 404(b)(1) guidelines of the Clean Water Act (CWA) as part of Section 404 permitting for the California High-Speed Train, Merced to Fresno Section, and eventually to support the State Water Resources Control Board (SWRCB) evaluation for Section 401 Certification. This submittal also assists the Authority and FRA in determining the range of wye alternatives that will be evaluated in a Merced to Fresno Section: Wye Alternatives Draft SEIR/SEIS.

The primary objective of Checkpoint B is to screen and reduce the number of alternatives to be analyzed in the Merced to Fresno Section of the High-Speed Train Supplemental NEPA document to those that are “reasonable” (under NEPA) and potentially “practicable” (under CWA Section 404) using the best available scientific information. Under the regulations interpreting the requirements of CWA Section 404, “practicable” means “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes” (40 C.F.R. § 230.10[a][2]; see also 33 C.F.R. § 320.4[b][4] [incorporating the same by reference]). Checkpoint B is not the actual 404(b)(1) evaluation of alternatives to identify the LEDPA, but rather the selection of high-speed train project alternatives (including alignments and options for ancillary facilities, including stations, maintenance facilities, energy generation facilities, road crossings, construction and staging areas) that will be rigorously and equally evaluated in the NEPA document and future 404(b)(1) analysis document. The focus of Checkpoint B is to determine a range of reasonable and potentially practicable alternatives that will be evaluated at a project level in the SEIR/SEIS and in the future 404(b)(1) analysis conducted to determine the LEDPA as a part of Checkpoint C.

Documentation for the Rivers and Harbors Act Section 408 component of the checkpoint integration process will be provided independently of this Supplemental Checkpoint B Summary Report, and as part of the Checkpoint C process. The Merced to Fresno Section: Wye Alternatives of the of the CAHST system crosses the following waterways that are subject to an effects determination under Section 408: the San

¹ Memorandum of Understanding regarding the National Environmental Policy Act (42 U.S.C. 4321 et seq.) and Clean Water Act Section 404 (33 U.S.C. 1344) and Rivers and Harbors Act Section 14 (33 U.S.C. 408) Integration Process for the California High-Speed Train Program (Dec. 2010).

Joaquin River, Eastside Bypass, Ash Slough, Berenda Slough, and Chowchilla River (see Figure 6 in Appendix C). These water features are too wide to clear-span with a bridge, and the design would require placement of concrete piers near or within the limits of the mean high water mark of each feature to support aerial structures. Early coordination with USACE indicates that authorization under Section 408 for minor, low-impact modifications will be required for the San Joaquin River, Eastside Bypass, Ash Slough, Berenda Slough, and Chowchilla River crossings. The Supplemental Checkpoint C will contain Section 408 Determination documents for these crossings.

Each of the three checkpoints has been completed for the range of alignments, stations, and maintenance facilities that compose the Merced to Fresno Section, exclusive of the wye alternatives addressed in this Supplemental Checkpoint B Summary Report (see Attachment 3 for concurrence letters from EPA and USACE on each of the three checkpoints). The range of alignments, stations, and maintenance facilities evaluated in these checkpoints was also fully evaluated in the August 2011 Merced to Fresno Section Draft EIR/EIS. The Draft EIR/EIS identified the Hybrid Alternative as the preferred north-south alternative between Merced and Fresno. The preferred alternative included two design options to accommodate the wye alternatives that were studied in the most detail: the Ave 24 Wye and South SR 152 (Ave 21) wye alternatives. However, in response to public and agency comment, neither alternative was adopted. Instead, the Authority and FRA directed staff to conduct additional review of the east-west wye alternatives, including consideration of additional alternatives, in combination with the east-west alternatives from the San Jose to Merced Section. These determinations have necessitated the development of this Supplemental Checkpoint B Summary Report. The range of wye alternatives recommended to be carried forward for further analysis will also be evaluated in a Merced to Fresno Section: Wye Alternatives Draft SEIR/SEIS.

This Supplemental Checkpoint B Summary Report contains information on the full range of alternatives identified and evaluated for initiation of the Merced to Fresno Section: Wye Alternatives Draft SEIR/SEIS and project-level 404(b)(1) analysis. This report provides: (1) a description of alternatives, (2) a description of the aquatic resource impacts for each alternative, (3) a comparison of aquatic resource impacts by alternative, and (4) an analysis, pursuant to 40 C.F.R. § 230.10(a), of each alternative that the Authority and FRA do not propose to carry forward due to significant aquatic impacts. Alternatively, if aquatic impacts are comparable among alignment alternatives, a recommendation to not carry forward some alternatives may be made due to other significant, non-aquatic impacts and/or because the alternative is not available or capable of being implemented after considering cost, existing technology, and logistics in light of overall project purposes.

Several alternatives analyses (AA) have been prepared for the Merced to Fresno Section and San Jose to Merced Section with information pertinent to the wye alternatives. However, there is no AA document that contains a comprehensive analysis of the wye alternatives, due to the shifting of responsibilities for the wye alternatives between the sections, revisions to alignment design, and shifts in the geographic extent of the analyses undertaken over time. As a result, this Supplemental Checkpoint B Summary Report is intended to provide a comprehensive and equal analysis of the wye alternatives. Figure 1-1 shows the alternatives carried forward for further evaluation and those recommended for elimination as a result of these analyses.

As discussed further under Section 2.0, Background, this Supplemental Checkpoint B Summary Report builds from previously prepared alternatives analyses and the identification of a preferred alternative for the Merced to Fresno Section of the HST. Section 2.0 also explains the interrelationship between the San Jose to Merced and Merced to Fresno Sections of the project since they intersect midsection in a configuration termed the "Wye." Section 2.0 also addresses the relationship between this Supplemental Checkpoint B Summary Report and a separate, but overlapping, San Jose to Merced Section Checkpoint B Summary Report that will focus on all alternatives within the subsections of the San Jose to Merced Section.

The engineering information used in this submittal reflects current conceptual-level engineering. A detailed list of the study area definitions and methodology used to evaluate impacts for each wye alternative is discussed in Section 2.6 and is also provided in Attachment 1.

As required by the NEPA/Section 404/408 Integration MOU, information regarding environmental and community resources potentially present within the study area for each wye alternative was obtained primarily from available geographic information databases. For example:

- The information provided on aquatic resources is based on the National Wetland Inventory (NWI), Holland vernal pool complex mapping, and the National Hydrography Dataset (NHD).
- The information provided on biological resources is based on the California Wildlife Habitat Relationship (CWHR), California Department of Fish and Wildlife Natural Diversity Database (CNDDDB), and United States Department of Fish & Wildlife (USFWS) Critical Habitat datasets.
- Cultural resources, including known archaeological sites, are assessed based on the California Historic Resource Inventory (CHRI) and prior cultural resources studies conducted in the vicinity of the proposed project.
- Agricultural resource impacts are assessed based on the Department of Conservation Farmland Mapping and Monitoring Program (FMMP), and Williamson Act information from each of the two counties within the study area (Madera and Merced). Direct impacts that would occur as a result of the proposed project are reported in this analysis.

A full list of the data sources used in this analysis is provided in Attachment 2. For the purposes of the analysis in this Supplemental Checkpoint B Summary Report, only direct impacts were considered in the recommendation to either carry forward or eliminate an alignment alternative from further consideration. Indirect impacts were not considered in this analysis because it is assumed they would be proportional to direct impacts and, therefore, would not affect the determination to either carry forward or eliminate an alternative from consideration.

Analysis of potential direct impacts that were identified in the Merced to Fresno Section Checkpoint C Summary Report (March 2012) were considered and included in this Supplemental Checkpoint B Summary Report for areas where the footprints of the wyes presented in the March 2012 Checkpoint C Report overlap with those presented in this Supplemental Checkpoint B Summary Report.

2.0 Background

To develop a statewide high-speed rail system that links the major metropolitan areas in northern and southern California, it is essential to build an east-west connection that ties the San Francisco Bay Area to the Central Valley. The San Jose to Merced Section will provide that east-west connection, and the wye will connect the San Jose to Merced Section to the Merced to Fresno Section. The process to determine the range of reasonable alternatives started several years ago, has been closely coordinated with EPA and USACE, and takes into account a number of past and current planning efforts.

2.1 Location

The wye alternatives range from approximately 80 to 110 miles in length, depending on the alternative (see Figure 1-1). The geographic extent of the wye alternatives generally spans the area between the San Luis Reservoir in western Merced County and the Hybrid Alternative at approximately SR 99 in Merced and Madera counties. The challenges to HST for the development of practicable alternatives include balancing wildlife concerns with potential impacts on agriculture, and consistency with land use plans and policies of the City of Chowchilla.

2.2 Relevant Prior and Concurrent Planning Efforts

2.2.1 Tier 1 Planning

A tiered planning and environmental review process has been employed for the HST project. The first tier (Tier 1), a program-level tier, addressed planning and environmental review at a Statewide and regional level with general levels of analysis. The second tier (Tier 2), a project-level tier, addresses planning and environmental review with current conceptual-level engineering and more specific project detail. See Table 2-1 for a summary of the planning history.

Table 2-1
 Summary of Planning History

Date	Activities
Tier 1 Programmatic Environmental Documents	
2005	<ul style="list-style-type: none"> • Authority and FRA complete 2005 Statewide Final Program EIR/EIS, which identifies three Diablo Range Direct Alignments (Northern Tunnel, Minimize Tunnel, and Tunnel Under Park) and two alignments through Pacheco Pass (Caltrain/Gilroy/Pacheco Pass, Morgan Hill/Caltrain/Pacheco Pass) through the Central Valley
2008/2012	<ul style="list-style-type: none"> • Authority and FRA complete <i>2008 Bay Area to Central Valley Program EIR/EIS</i> (PEIR subsequently revised by Authority and recertified in 2012 as Bay Area to Central Valley Partially Revised Final Program EIR/EIS), which identifies the preferred alternative through the Central Valley along the UPRR alignment from north of Madera to south of Stockton. • Recommends future study of two alignments for the San Jose to Merced Section in proximity to the wye: <ul style="list-style-type: none"> ○ An alignment adjacent to SR 140 until it reaches Merced ○ An alignment extending directly east from Santa Nella that follows Henry Miller Road to Ave 24.
Tier 2 Merced to Fresno Environmental Document	
Jan 2011	<ul style="list-style-type: none"> • EPA and USACE concur on Project Purpose & Need (Checkpoint A)

Date	Activities
Jan 2011	<ul style="list-style-type: none"> Authority/FRA submits initial environmental evaluation of alignment alternatives to EPA and USACE (Checkpoint B). Package evaluates Ave 24 Wye, South of SR 152 Wye, SR 140 Wye, SR 152, and South of GEA Wye connection alternatives Analysis concludes SR 140, SR 152 and South of GEA Wye connection alternatives to be impracticable; recommends that Ave 24 and South 152 (refined to follow Ave 21) wye connections be studied in the EIR/EIS.
Jun 2011	<ul style="list-style-type: none"> USACE agrees to study Ave 24 and Ave 21 wye alternatives but also recommends inclusion of SR 152 alignment due to lower aquatic and biological impacts. EPA concurs with USACE recommendations; urges Authority and FRA defer a decision on selecting a wye connection, indicating that the future San Jose to Merced EIS provides a forum for more detailed discussions about this important connection in the HST System.
Aug 2011	<ul style="list-style-type: none"> Authority/FRA releases for public comment the Draft EIR/EIS for the Merced to Fresno High-Speed Train Project. The EIR/EIS evaluates three north-south alternatives between Merced and Fresno: the UPRR/SR 99, BNSF, and Hybrid.
Nov 2011	<ul style="list-style-type: none"> Authority/FRA submits its detailed evaluation of impacts to waters of the U.S. to EPA and USACE (Checkpoint C).
Dec 2011	<ul style="list-style-type: none"> EPA and USACE request additional detail on potential impacts to waters of the U.S.
Feb 2012	<ul style="list-style-type: none"> Authority/FRA resubmit Checkpoint C package, including a recommendation for selection of the Preliminary LEDPA, and a draft Compensatory Mitigation Plan.
Mar 2012	<ul style="list-style-type: none"> EPA and USACE request additional information on identification of LEDPA.
Mar 2012	<ul style="list-style-type: none"> EPA and USACE issue concurrence letters on selection of the Hybrid alternative as the Preliminary LEDPA for the Merced to Fresno high-speed train section. The LEDPA does not include identification of a wye alignment.
Apr 2012	<ul style="list-style-type: none"> Authority/FRA releases the Final EIR/EIS for the Merced to Fresno High-Speed Train Project. The EIR/EIS identifies the Hybrid as the Preferred Alternative.
May 2012	<ul style="list-style-type: none"> The Authority certifies the EIR.
Sep 2012	<ul style="list-style-type: none"> The FRA approves the EIS and issues a Record of Decision concurring with selection of the Hybrid as the Preferred Alternative.
Tier 2 San Jose to Merced Environmental Document	
Jun 2010 thru Jul 2011	<ul style="list-style-type: none"> Authority considers a number of wye alternatives, including Henry Miller Road to Ave 24, Henry Miller Road to SR 152, Henry Miller Road to Ave 22, Henry Miller to Ave 21, SR 140/GEA, and South of GEA.
Nov 2011	<ul style="list-style-type: none"> EPA and USACE concur on Project Purpose & Need (Checkpoint A).
Dec 2012	<ul style="list-style-type: none"> Authority and FRA decide to advance EIR/EIS evaluation of the wye.

EPA and USACE have been actively involved in high-speed train planning activities since 2003, when they—along with the Authority, FRA, Federal Highway Administration (FHWA), and Federal Transit Administration (FTA)—signed the Tier 1 MOU that established procedures to integrate NEPA and Section 404 actions relating to the HST System (Tier 1) planning (MOU 2003). The NEPA/Section 404 integration process facilitated compliance with NEPA, CWA, and the Rivers and Harbors Act. In signing the MOU in July 2003, the federal agencies also agreed to be cooperating agencies during the NEPA review process. Although the U.S. Fish and Wildlife Service (USFWS) did not sign the MOU, it participated in the program-level NEPA coordination and integration process.

Two Tier 1 program-level planning efforts relevant to this Checkpoint B Summary Report were conducted by the Authority and FRA consistent with the Tier 1 MOU. The first culminated in the *2005 Statewide*

Final Program EIR/EIS for the Proposed California High-Speed Train System, which defined a broad corridor between the Bay Area and Central Valley for recommended additional review at the program level. The *2005 Statewide Program EIR/EIS* concluded that the preferred alternative through the Central Valley would be via the Pacheco Pass Network Alternative along the Burlington-Northern Santa Fe (BNSF) railroad alignment. On July 22, 2005, consistent with the Tier 1 MOU process, EPA and USACE provided written comments to the FRA. Those comments indicated concurrence with the preferred alignment alternatives and station location options being considered and agreed that they appeared most likely to contain the LEDPA, based on the level of data available at the programmatic level of analysis. All EPA and USACE correspondence required under the Tier 1 MOU and relevant to the identification of the Tier-1 LEDPA is included in Attachment 3.

The second Tier 1 planning effort culminated in the preparation of the *2008 Bay Area to Central Valley High-Speed Train Final Program EIR/EIS*. While the *2005 Statewide Program EIR/EIS* concluded that the preferred alternative through the Central Valley would be the Burlington-Northern Santa Fe (BNSF) railroad alignment, the *2008 Bay Area to Central Valley HST Program EIR/EIS* concluded that the Union Pacific Railroad (UPRR) alignment through the portion of the Central Valley from north of Madera to south of Stockton would be the preferred alternative. In addition, the EIR/EIS recommended future study of two alignments for the San Jose to Merced Section that affect the location of the Wye:

1. The first alignment traverses Pacheco Pass, turns north before reaching Santa Nella, avoids the Grasslands Ecological Area (GEA), and is situated adjacent to State Route (SR) 140 until the alignment reaches the city of Merced. This was referred to as the North of GEA alignment in the 2008 Program EIR/EIS, but would ultimately be referred to as the SR 140 Wye Alternative.
2. The second alignment extends directly east from Santa Nella and follows Henry Miller Road to Avenue 24, connecting with a future north-south alignment between Merced and the city of Fresno. This led to the various Henry Miller Road wye alternatives now under consideration.

On April 30, 2008, in compliance with the Tier 1 MOU process, EPA concurred that the corridor through Pacheco Pass is most likely to contain the LEDPA. Concurrence from USACE followed on May 8, 2008. As a result of litigation, the Authority subsequently revised and circulated revised versions of the *2008 Bay Area to Central Valley EIR/EIS* in 2010 and 2012, ultimately recertifying the Partially Revised Final Program EIR on April 19, 2012.

In summary, there are two joint Program EIR/EISs for the HST System (and also two Revised Program EIRs) as a result of the Tier 1 process. These documents include:

- 2005 Statewide Final Program EIR/EIS for the Proposed California High-Speed Train System (Authority and FRA 2005),
- 2008 Bay Area to Central Valley HST Final Program EIR/EIS (2008 Bay Area to Central Valley HST Program EIR/EIS) (Authority and FRA 2008),
- 2010 Bay Area to Central Valley HST Revised Final Program EIR (Authority 2010), and
- 2012 Bay Area to Central Valley HST Partially Revised Draft Program EIR (Authority 2012).

These documents are collectively referred to as the "programmatic documents" in this report. The Authority and FRA are now preparing project-level environmental documents for several HST sections, tiering from the programmatic documents.

The preferred station location option selected by the Authority and FRA through the *2005 Statewide Program EIR/EIS* and the *2008 Bay Area to Central Valley HST Program EIR/EIS* and 2012 Partially Revised Final Program EIR in Merced was analyzed in the Merced to Fresno Section Project EIR/EIS;

therefore, this Supplemental Checkpoint B Summary Report will not address the Merced station location options analysis.

2.2.2 Tier 2 Planning

Following completion of the Tier 1 documents, the Authority and FRA initiated Tier 2 project-level planning efforts. In December 2010, the Authority, FRA, EPA, and USACE signed an MOU integrating the NEPA, CWA, and Rivers and Harbors Act processes (MOU). Two Tier 2 project-level planning efforts are particularly relevant to this Supplemental Checkpoint B Summary Report:

1. One evaluating alternatives between Merced and Fresno; and
2. A second evaluating alternatives between San Jose and Merced.

Coordination between the two efforts was and continues to remain vital, since each includes overlapping portions of the area that make up the Wye² (the intersection of the two HST sections).

2.2.2.1 Merced to Fresno Planning

Planning for the Merced to Fresno Section has progressed in advance of the San Jose to Merced Section. USACE and EPA concurred on the Merced to Fresno Section purpose and need in January 2011 (Checkpoint A).

USACE and EPA concurred that the project purpose for the Merced to Fresno Section is:

[t]o implement the Merced to Fresno Section of the California HST System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the south San Joaquin Valley, and to connect the northern and southern portions of the system.

In January 2011, the Authority and FRA submitted their Checkpoint B initial preliminary environmental evaluation of these alignment alternatives to the USEPA and the USACE. In addition to evaluating north-south alternatives between Merced to Fresno, the analysis included an evaluation of wye connection alternatives linking the San Jose to Merced Section to the Merced to Fresno Section, with a common point of departure at the San Luis Reservoir to the west. These wye alternatives included:

1. Ave 24 Wye Connection
2. South of SR 152 Wye Connection
3. SR 140 Wye Connection
4. SR 152 Wye Connection
5. South of GEA Wye Connection

In summary, the analysis found the SR 140, SR 152, and South of GEA wye alternatives to be impracticable based on considerations of logistics and cost. Alternatively, both the Ave 24 Wye and the South of SR 152 wye alternatives were deemed practicable because they followed existing roadways with minimal disruption to existing services, and they minimized construction costs. As a result of the analysis,

² A wye is a configuration of train tracks that allows the tracks to change directions. The transition to a wye requires splitting two tracks into four tracks crossing over one another before the wye legs can diverge in opposite directions to allow bidirectional travel. The San Jose to Merced Wye will allow trains to travel to any combination of destinations, including Bay Area/San Jose to Los Angeles/Southern California; Bay Area/San Jose to Merced/Sacramento; or Los Angeles/Southern California to Merced/Sacramento.

the Authority and FRA recommended that only the Ave 24 and South of SR 152 (refined to follow Ave 21) wye alternatives be carried forward for detailed study in the Merced to Fresno EIR/EIS. (Refer to Appendix D for a detailed list of the nomenclature used throughout the development of the wye alternatives.)

During the environmental process for the Merced to Fresno Draft EIR/EIS, agencies and the public continued to raise concerns about potential impacts to aquatic sites, Waters of the United States, agricultural lands and other environmental resources. Additionally, on June 14, 2011, the USACE sent correspondence related to the Checkpoint B package for the proposed Merced to Fresno Section recommending that an SR 152 wye alternative be carried forward as it would not require SR 152 reconstruction costs and because the alignment could have lower impacts to aquatic and biological resources. Also, EPA recommended in its June 24, 2011, response to the Checkpoint B package, that "FRA and the CHSRA should defer a decision on the 'Wye' connection alignments between the Merced to Fresno Section and the San Jose to Merced Section at this time. The future San Jose to Merced EIS provides a forum for more detailed discussions about the important connection in the HSR System."

Following EPA and USACE concurrence with Checkpoint B, the Authority and FRA initiated work on preparing Checkpoint C for the Merced to Fresno Section, which consisted of steps listed in Table 2-2.

Following completion of Checkpoint C, the Authority Board on May 3, 2012, certified the Merced to Fresno High-Speed Train Project EIR/EIS and on September 18, 2012, the FRA issued its Record of Decision (ROD) on the document. The EIR/EIS identified the Hybrid Alternative as the preferred north-south alternative between Merced and Fresno. The preferred alternative included two design options to accommodate the wye alternatives that were studied in the most detail: the Ave 24 Wye and South of SR 152 (Ave 21) wye alternatives. However, in response to public and agency comment, neither alternative was adopted. Instead, the Authority directed staff to conduct additional review of the east-west wye alternatives, including consideration of additional reasonable alternatives. It was determined that this additional review would best fit under the San Jose to Merced Section planning process to facilitate the evaluation of a suitable range of wye alternatives connecting to the north-south Hybrid Alternative.

2.2.2.2 San Jose to Merced Planning

Over the last several years, the Authority and FRA have been working to refine a set of study alternatives for the San Jose to Merced Section. The San Jose to Merced Section Checkpoint B package includes alignment alternatives and design options that have been identified for the entire San Jose to Merced Section (i.e., San Jose Station Approach, Morgan Hill to Gilroy, Pacheco Pass, and wye alternatives) as the result of many months of coordination with stakeholders, USACE and EPA.

On September 22, 2011, the Authority and FRA submitted MOU Checkpoint A (Purpose and Need) materials for the San Jose to Merced Section of the California HST to EPA and USACE for final review and concurrence. Concurrence on the San Jose to Merced Section purpose and need was received from the USACE on October 28, 2011, and from EPA on November 30, 2011.

USACE and EPA concurred that the project purpose for the San Jose to Merced Section is:

[t]o implement the San Jose to Merced section of the California HST system to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the south San Francisco Bay Area and the Central Valley, and connect the Northern and Southern portions of the statewide HST system.

The Authority and FRA developed and considered potential alternatives and screened them against standard evaluation criteria to eliminate alternatives that would not meet the project's purpose and need,

would result in unacceptable adverse environmental impacts, or that were not practicable. In order of importance, the criteria for the decision to eliminate or carry forward an alternative are as follows:

- Aquatic impacts—wetlands, vernal pools, etc.;
- Environmental impacts—non-aquatic;
- Practicability considerations;
 - Meeting the project purpose and need and design objectives;
 - Feasibility of construction, considering logistics, cost and current technology;
 - Compatibility with land use plans and local community integrity; and
 - Right-of-way acquisition issues and opportunities—determined if an alternative could be constructed and at what cost in acquiring real estate.

Once the primary criteria were taken into account, other aspects of the alternatives were reviewed and taken into consideration, such as positions of agencies, stakeholders, and the public (as it relates to environmental impacts and practicability) and beneficial impacts of the alternatives.

The qualitative and quantitative screening results are documented in alternatives analyses reports and summarized in this report and attachments. Attachments to this report include the following:

- Details of the methods used to evaluate environmental impacts (Attachment 1).
- Details of the sources used in the evaluation of environmental impacts (Attachment 2).
- Correspondence from EPA and USACE concurring that the corridor “Pacheco Pass, San Francisco and San Jose Termini” is most likely to contain the LEDPA (Attachment 3).
- Correspondence from EPA and USACE concurring on the Purpose and Need Statement (Attachment 3).

The wye alternatives are an integral part of the San Jose to Merced Section project purpose, as well as being an integral part of the Merced to Fresno Section. As a result of the direction that has developed from the Merced to Fresno planning process, the San Jose to Merced Section approach was modified to include a more comprehensive evaluation of wye alternatives connecting to the Merced to Fresno Section Hybrid Alternative. In the vicinity of Chowchilla, three primary east-west wye alternatives were considered—Avenue 24, SR 152, and South of SR 152 (Avenue 21)—along with a number of north-south options in the vicinity of Chowchilla. Although the evaluation in the prior Merced to Fresno Section Checkpoint B document found the SR 140 and South of GEA wye alternatives to be impracticable based on considerations of logistics and cost, the San Jose to Merced Section Checkpoint B Summary Report includes an analysis of the SR 140 and South of GEA wye alternatives to confirm that they do not contain the LEDPA. All wye alternatives evaluated in the San Jose to Merced Section Checkpoint B Summary Report would connect to the Merced to Fresno Hybrid Alternative.

2.2.2.3 Advancing Evaluation of the Wye Alternatives

In the summer of 2013, the Authority issued a Notice to Proceed for the Design/Build Contractor to initiate the design/build process for the first portion (referred to as Construction Package #1) of the Initial Operating Segment (IOS) of the HST (within the Merced to Fresno Section), which ultimately will extend 130 miles from the City of Madera south toward Bakersfield (Kern County). Given the favorable economic climate and the potential for receiving construction bids below the engineers’ estimate, the Authority is considering options for extending the IOS construction limits north to Merced. To reach Merced and build this portion of the track by September 2017, however, the Authority would need to accelerate the identification and selection of a preferred wye alternative.

To accomplish this, the Authority and FRA are pursuing a planning process focused solely on the wye alternatives. This planning process will include the preparation of a Merced to Fresno Section: Wye Alternatives Subsequent EIR/Supplemental EIS (SEIR/SEIS) that will evaluate the wye alternatives that have been developed through this Supplemental Checkpoint B process. Following the identification of a preferred wye alternative through the Merced to Fresno Section: Wye Alternatives SEIR/SEIS process, the San Jose to Merced Section EIR/EIS will include this preferred wye alternative to connect the alignment alternatives in the Pacheco Pass Subsection to the Merced Station. Although both the Merced to Fresno Section and the San Jose to Merced Section require the selection of a wye alternative to construct a complete alignment to the Merced Station, both sections have independent utility because they can be constructed and operated independently of each other.

The alignments through Pacheco Pass are constrained as a result of the topography in the Pacheco Pass, and these alignments were designed to follow an existing transportation corridor (SR 152) to minimize environmental impacts. East of the common point linking Pacheco Pass to the wye alternatives, alignments were considered that follow SR 152 as well as those that are north and south of the Grasslands Ecological Area. As such, the western extent of the wye alternatives, as shown on Figure 1-1, was chosen as a logical terminus for both sections because at this location the alternatives from each section (the Pacheco Pass alternatives of the San Jose to Merced Section and the wye alternatives of the Merced to Fresno Section) come to a common point and do not constrain the consideration of reasonable alternatives in the other section.

The planning process for the wye alternatives requires development of this Merced to Fresno Section: Wye Alternatives Supplemental Checkpoint B package that identifies and recommends to EPA and the USACE wye alternatives for evaluation in the SEIR/SEIS. A Supplemental Alternatives Analysis (SAA) for the wye alternatives was prepared for the Merced to Fresno Section and was presented to the Authority Board in April 2013 (see Attachment 4).

Following receipt of public comment on the Draft SEIR/SEIS, preparation of a Merced to Fresno Section: Wye Alternatives Supplemental Checkpoint C package would also be required to identify a preferred wye alternative that satisfies the Section 404(b)(1) criteria for selecting the LEDPA. This same preferred wye alternative would be incorporated into a Checkpoint C package for the San Jose to Merced Section to similarly satisfy the Section 404(b)(1) criteria for selecting the LEDPA.

2.3 Relevant Public Comments Received During NEPA Scoping Related to Alternatives

2.3.1 Outreach to Agencies and the Public

Early and continuing outreach with the general public and appropriate public agencies has been an essential part of the overall environmental review process. Agency consultation and public participation activities have been accomplished through a variety of formal and informal methods, including:

- Interagency Technical Working Group (TWG) meetings;
- Public Information Meetings (PIMs);
- Informal meetings with key community leaders, select members of the public, and local/resource agency staff;
- Informal resource-specific agency meetings;
- Informational open houses and informal presentations to community organizations and groups;
- Letter, email, and phone requests for information and informal consultation; and

- Distribution of public notices, fact sheets, and a Frequently Asked Questions (FAQ) document with project information and updates on the ongoing studies.

Throughout the environmental review process for both the Merced to Fresno and San Jose to Merced Sections, stakeholder input has been solicited regarding the wye alternatives. A variety of stakeholders, ranging from landowners, farm owners, residents, organizations, public agencies and elected officials have expressed opinions on the selection of a wye alternative. During this time, several key themes have emerged and are described below. These comments are summarized below by topic, and the original comments are available for review upon request to the Authority.

2.3.1.1 Select an Alignment along an Existing Transportation Corridor

Many stakeholders call for a wye alternative that follows existing transportation corridors to minimize agricultural and community impacts.

- The State Route (SR) 152 alignment alternative is commonly cited by stakeholders as an appropriate option to address this concern.
- Property owners in Merced and Madera counties expressed concerns that the Authority was considering routes that do not follow existing corridors, specifically, the A2/Hybrid Alternatives with the West Chowchilla Design Option Wye (which would have been located between Road 12 and Road 13, west of Chowchilla). The Refined Avenue 24 Wye connection was originally used for the A3 alternative, which was opposed by many stakeholders because of its impacts to agricultural land.
- Commenters stated that the Refined Avenue 24 Wye and West Chowchilla Design Option should not have been included in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Merced to Fresno Section because all public agencies present at the June 2010 TWG meeting in Merced were opposed to a wye connection north of Chowchilla.
- Los Banos residents expressed support for the Henry Miller to Avenue 24 Wye Alternative.

2.3.1.2 Minimize Impacts to the City of Chowchilla

Since the Chowchilla area will be in the vicinity of the junction of the north-south Merced to Fresno Section and east-west San Jose to Merced Section via the wye, comments have been submitted with the general theme of minimizing impacts to the area.

- The City of Chowchilla expressed resistance to the wye area because it would surround the city with high-speed rail track.
- The City of Chowchilla strongly opposed any alignment that divides the city east-west or north-south.
- Numerous commenters also opposed the West Chowchilla Design Option, instead indicating a preference for a wye connection south and/or east of Chowchilla. If the north-south alignment were to follow the wye legs³, it would eliminate track through Chowchilla, and the alternative would no longer surround Chowchilla on all sides.
- West Chowchilla alternatives were not received favorably, but the East Chowchilla alternatives received more mixed opinions.

³ Each wye alternative has three "legs," or curvatures, that transition the high-speed train from one alignment to the next. Their function for the high-speed train is equivalent to that of a highway interchange for motor vehicles.

2.3.1.3 Minimize Impacts to Agricultural Land

Commenters indicated a preference that the alignment studied and ultimately selected has minimal impacts on farmland.

- Comments state that impacting farmland will have a negative effect on the local and statewide agricultural economy.
- Some stakeholders expressed strong concerns about the Avenue 24 Wye with the West Chowchilla Design Option, as some felt Avenue 21 and SR 152 were more viable options. These concerns included loss of usable farmland, and the impact to farm operations and irrigation infrastructure from parcel severance.
- The farming community felt road closures would result in limited agricultural goods movement opportunities and a reduced access in impacted areas.
- Madera County property owners disputed the assertion in the Draft EIR/EIS that temporary use of agricultural land for construction would be negligible under NEPA and less than significant under CEQA. These property owners claimed that many farming operations along the footprint and in the proposed staging areas of the proposed Avenue 21 and Avenue 24 wye alternatives rely on year-round access to equipment, fields, infrastructure and other utilities that would be detrimental if interrupted at any point throughout the year. Some farmland owners felt that the West Chowchilla Design option should not have been considered because the A3 Alternative was rejected.

2.3.1.4 Other Comments

- Commenters generally expressed concerns over the potential environmental impacts with the proposed alternative alignments and cited the project cost as being too high and lacking funding.
- The school districts expressed concerns about possible area road closures and the potential impacts on school bus safety and increased costs associated with travel distances and fuel consumption.
- Public outreach meetings identified the need for the development of the Merced to Fresno Section Hybrid Alternative to take advantage of the West Chowchilla design option and the Avenue 24 Wye connection to the BNSF Alternative. By following the wye legs connecting the UPRR/SR 99 Alternative to the San Jose to Merced Section, and then continuing to follow the wye leg to the BNSF Alternative, the Hybrid Alternative takes advantage of necessary wye connections and also avoids four communities that are adjacent to the other alternatives: Le Grand, Chowchilla, Fairmead, and Madera. Community and political support for the Hybrid Alternative was mixed, with continuing concern about impacts on farmland, wildlife, and biological resources.

2.4 Merced to Fresno Section High-Speed Train Design, Operations and Maintenance

The following discussion provides information on the profile types and additional project elements that would be a part of the wye alternatives in the Merced to Fresno Section of the HST System. This information is included to provide an understanding of the components and potential footprints of an HST alignment design as it is refined for evaluation in the Merced to Fresno Section: Wye Alternatives Draft SEIR/SEIS. Generalized footprints based on current conceptual-level engineering were used in analyses for each of the wye alternatives.

The alignment alternative footprints evaluated in this Supplemental Checkpoint B Summary Report are based on current conceptual-level engineering and generally range in length from approximately 80 to 110 miles. The widths of the footprints typically range from approximately 100 to 1,900 feet, with some

extending to a width of 2,500 feet in some places. This would occur, for example, at the wyes where four tracks merge to two tracks or two tracks diverge to four tracks to allow changes in the direction of travel. The footprints conservatively represent the entirety of the project that could have an impact on the physical environment: permanent right-of-way, construction areas, grade separations, cut-and-fill, and traction power facilities. A detailed list of the study area definitions and methodology used to evaluate impacts for each wye alternative is provided in Section 2.6 and in Attachment 1.

The infrastructure and systems of the HST alternatives are composed of rolling stock, tracks, stations, train control, power systems, and maintenance facilities. The proposed California HST System has been designed for optimal performance and to conform to all federal and state safety regulations. The HST System would be a fully grade-separated and access-controlled guideway with intrusion detection and monitoring systems where required. This means that the HST infrastructure (e.g., mainline tracks and maintenance and storage facilities) would be designed to prevent access by unauthorized vehicles, persons, animals, and objects. The capital cost estimates will be presented in Chapter 5 of the Draft SEIR/SEIS, and will include allowances for appropriate barriers (fences and walls), state-of-the-art communication, access-control, and monitoring and detection systems. The HST System is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which would include the latest technology safety, signaling, and automated train-control systems.

2.4.1 Profile Types and Sensitive Area Designs

Profile types currently under consideration for the wye alternatives include the following: at-grade, retained fill, elevated (aerial), straddle bents, cut-and-cover (trench), and cut-and-fill. Preliminary profile types that are known at the current conceptual-level engineering, along with an identification of the corridors used to evaluate potential impacts related to those profiles, are included in the description of each alternative in Section 2.6.

2.4.1.1 Infrastructure Components

The dedicated, fully grade-separated right-of-way needed to operate high-speed trains has more stringent alignment requirements than needed for lower-speed trains. Alignments consist of horizontal and vertical profile configurations. The horizontal profile configuration refers to where the HST tracks and infrastructure are placed on the ground. This is influenced by HST design criteria, including minimum curve radius; existing land use; topography; and specific environmental conditions, including, but not limited to, unique habitats, historic buildings or districts, and areas of special archaeological interest. The vertical profile configuration refers to how the HST relates to the existing ground level. The following vertical profiles are considered for the wye alternatives within the Merced to Fresno Section.

- **At-Grade Profile.** At-grade track profiles (Figure 2-1) are best suited in areas where the ground is relatively flat, as in the Central Valley, and in rural areas where interference with local roadways is minimal. If the track is on structure (bridge, aerial, approach), it would be built on slab. Otherwise, the at-grade track would be built on compacted soil and ballast material (a thick bed of angular rock) to prevent subsidence or changes in the track surface from soil movement. For at-grade track, the top of the rail would be constructed at a minimum of 4.5 feet above the 100-year floodplain, or higher when transitioning to an elevated structure. The height of the at-grade profile may vary to accommodate slight changes in topography, and to provide clearance for storm water culverts and structures in order to allow water flow, and sometimes wildlife movement.

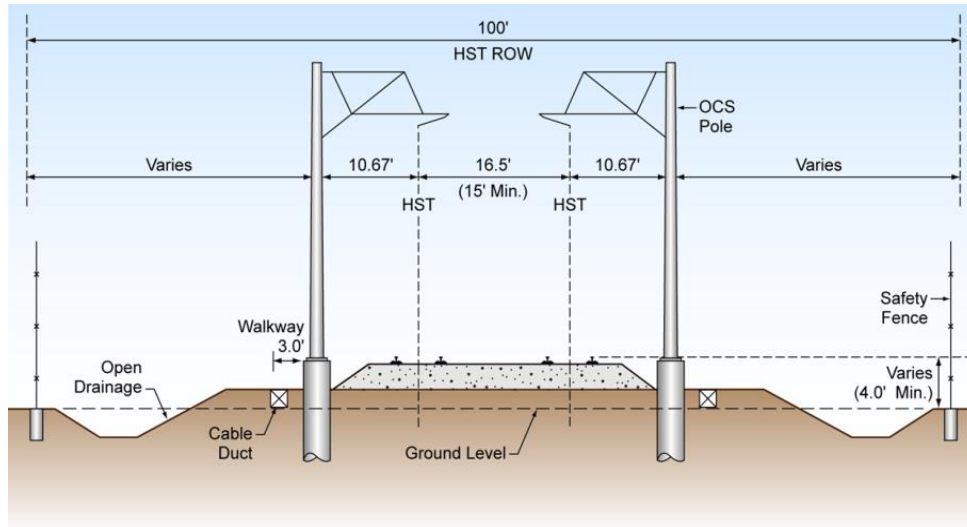


Figure 2-1
 At-Grade Typical Cross Sections

- Retained Fill Profile.** Retained fill profiles are used when it is necessary to narrow the right-of-way within a constrained corridor to minimize property acquisition or to transition between an at-grade and elevated profile. The guide way would be raised off the existing ground on a retained fill platform supported by reinforced concrete walls, much like a freeway ramp (Figure 2-2). Short retaining walls would provide the same effect and would protect the adjacent properties from a slope extending beyond the rail guide way. Retained fill profile is typically used to transition between at-grade and elevated profiles and can be high enough to allow road undercrossings. Use of retained fill would be evaluated on a case-by-case basis in the more detailed design stage that will be conducted during the environmental process.

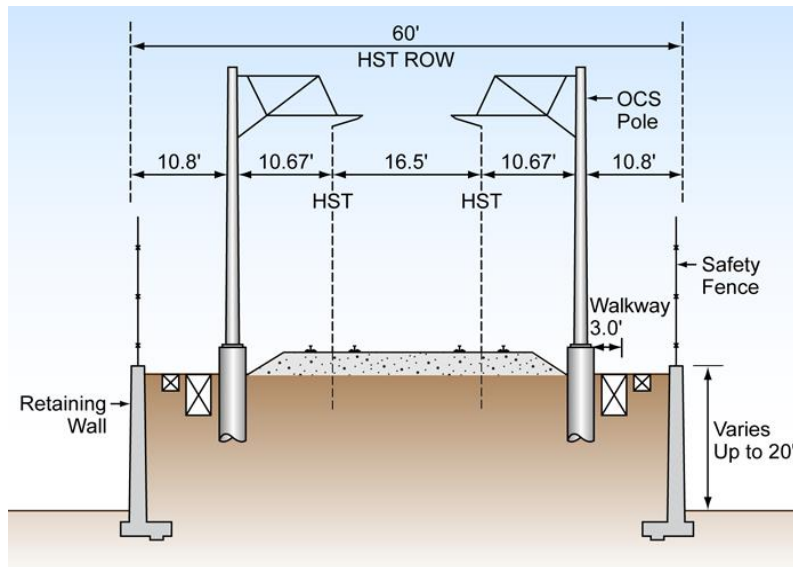


Figure 2-2
 Retained Fill Typical Cross Section

- Elevated Profile.** Elevated profile structures (Figure 2-3) can be used in urban areas where extensive road networks must be maintained. An elevated profile must have a minimum clearance of approximately 16.5 feet over roadways and 26 feet over railroads. Pier supports are typically approximately 10 feet in diameter at the ground. Such structures could also be used to cross water bodies; even though the guide way might appear at-grade, the width of the water channel could require a bridge, which would be built in the same way as the elevated profile.

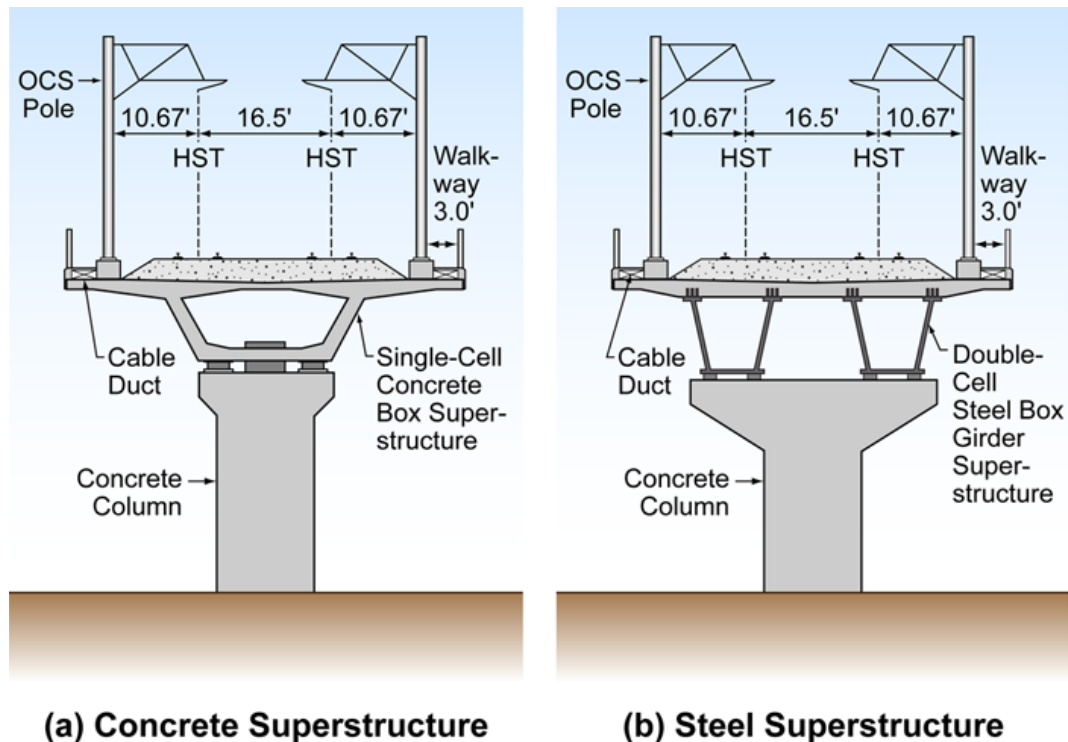


Figure 2-3
 Elevated Structure Typical Cross Sections

- Straddle Bents.** Where the HST elevated profile crosses over a roadway or a railway on a very sharp skew (degree of difference from the perpendicular), a straddle bent ensures that the piers are outside of the roadway or railway right-of-way.
- As shown in Figure 2-4, a straddle bent is a pier structure that spans (or “straddles”) the functional/operational right-of-way limit of a roadway, highway, or railway. Typical roadway and highway crossings that have a larger skew angle (i.e., the crossing is nearly perpendicular) generally use intermediate piers in medians and span the functional right-of-way. However, for small-skew-angle crossing conditions, median piers would result in excessively long spans that are not feasible. Straddle bents that clear the right-of-way can be spaced as needed (typically 110 feet apart) to provide feasible span lengths for bridge crossings at small skew angles. Use of straddle bents would be evaluated on a case-by-case basis in the more detailed design stage that will be conducted as the environmental process progresses. Locations and extents of straddle bent profiles were not defined at the current conceptual-level engineering that was used for the analysis in this Supplemental Checkpoint B Summary Report.

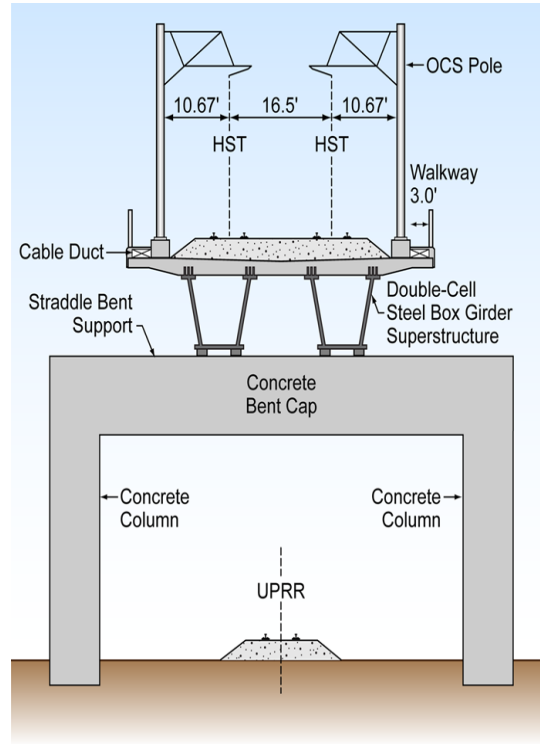


Figure 2-4
Straddle Bent Typical Cross Section

- **Cut-and-Cover Profile.** A cut-and-cover profile places the HST into a covered trench, more commonly known as a cut-and-cover tunnel. As shown in Figure 2-5, cut and cover is used when the continuous width of surface activity is sufficiently large to require continuous support by a tunnel roof slab. This can be where the HST is placed under a street, passes at an oblique angle under a wide highway or freeway, or where future conditions enclose the HST trench for overlying development or park uses. Use of cut-and-cover profiles would be evaluated on a case-by-case basis in the more detailed design stage that will be conducted as the environmental process progresses.

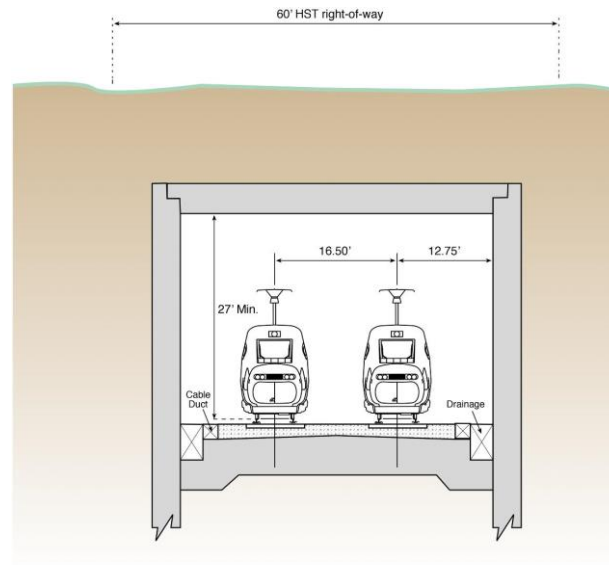


Figure 2-5
Cut-and-Cover Profile

- **Cut-and-Fill Profile.** Cut-and-fill profiles are utilized where the HST passes through rolling topography of small valleys and hills. Cuts, as shown in Figure 2-6, are where the HST profile is below the original ground level. Fills, as shown in Figure 2-7, are where the HST profile is above the original ground. Culverts carry small watercourses under the fill sections. The slopes perpendicular to the HST are generally graded at a 2:1 slope; as a result, the width of the right-of-way increases with the depth of the cut or fill.

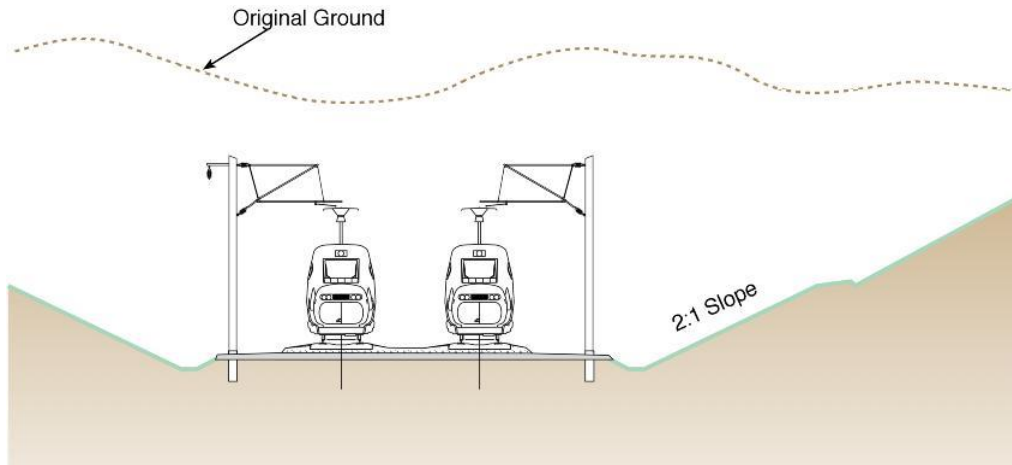


Figure 2-6
Cut Profile

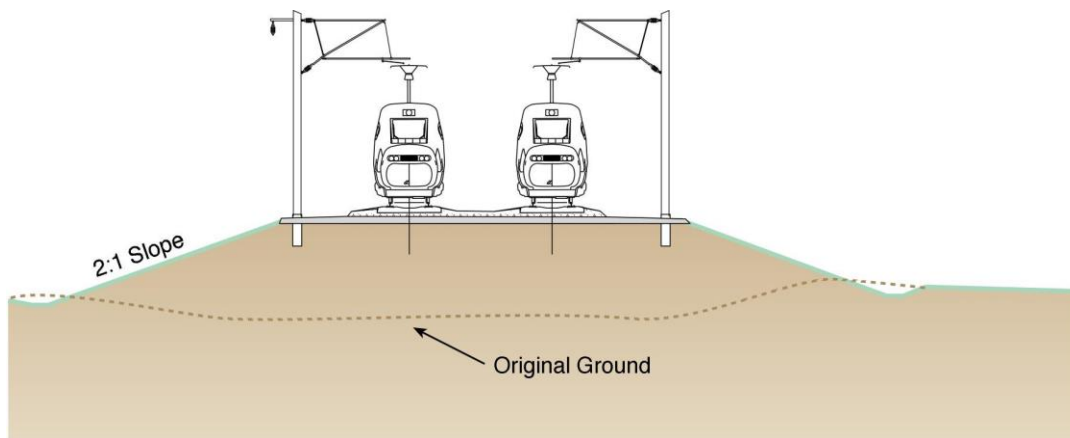


Figure 2-7
Fill Profile

- **Tunnel Profile.** Tunnels are used where the HST passes through a hill or mountain in a situation where the profile is too deep to use an open cut to pass through the topography. Tunnels, as shown in Figures 2-8 and 2-9, are constructed from one or both portals (where the tunnel ends) and in the cases of very long tunnels, from a shaft or shafts at midpoints of the tunnel. Tunnel construction does not disturb the ground under which it passes, but does require construction facilities to be created at the locations from which the tunnel is dug. At least one portal of each tunnel needs to be served by an access roadway for ongoing maintenance and safety operations. Tunnels can also be used in dense, urban situations where clearing a right-of-way for the HST would be prohibitively expensive or would create significant impacts on the area's land use. The

disadvantage is that tunneling is extremely expensive and requires significant additional safety infrastructure.

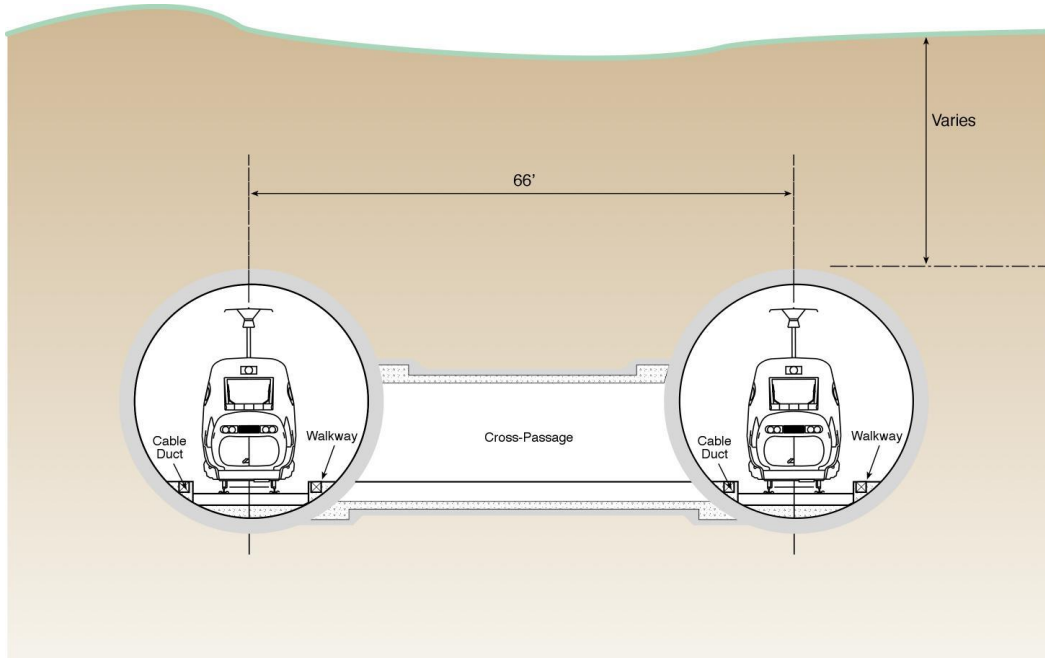


Figure 2-8
Tunnel Profile



Figure 2-9
HST Emerging from Tunnel

2.4.2 *Grade Separations*

A safely operating HST system consists of a fully grade-separated and access-controlled guide way. The following describes possible scenarios for HST grade separations.

- **Roadway overcrossings.** This would be the same as many at-grade roadway and state route facilities that currently cross over the UPRR or BNSF railroad tracks.
- **Local road overcrossings.** This could occur when an at-grade HST alignment crosses rural roads adjacent to farmland. Typical roadway overcrossing of the HST tracks would generally occur at 1- to 2-mile intervals to provide continued mobility for local residents and farm operations.
- **Elevated HST road crossings.** In urban areas, it may be feasible to raise the HST as shown in Figures 2-2 and 2-3. This may be especially relevant in downtown urban areas where use of an elevated HST guide way would minimize impacts on the existing roadway system.
- **HST depressed or underground.** Similar to some situations described above in Section 2.4.1 for elevated HST, depressing the HST beneath intersecting roadways can provide a succession of grade separations. A disadvantage is that the cost of excavating and supporting a long trench for the HST, including pumping facilities, is very high. Putting a roof on the trench, for a cut-and-cover tunnel, as described above, further increases the cost, but allows for utilization of the covered right-of-way.

2.4.3 *Railroad Wyes*

Another component of HST tracks is how the tracks are configured to change directions. The transition to a wye would require splitting two tracks into four tracks crossing over one another before the wye legs can diverge in opposite directions to allow bidirectional travel. Based on HST design criteria, this transition would require a distance of approximately 2 miles, with an estimated 120-foot-wide right-of-way for the transition before the tracks have fully diverged from each other. According to HST design criteria, the rail might have to be separated so that the crossing angle can be sharp.

2.4.4 *Traction Power Distribution*

California's electricity grid would power the proposed HST System. The HST System is expected to require less than 1% of the state's future electricity demand. The project would not include construction of a separate power source, although it would include the extension of power lines to a series of power substations positioned along the HST corridor. These power substations are needed to evenly feed power to the train system.

Traction Power Supply Stations. Based on the HST System's estimated power needs, traction power supply stations (TPSSs) would each need to be approximately 32,000 square feet (200 feet by 160 feet) and be placed at approximately 30-mile intervals.

The TPSSs would accommodate the power supply stations and would require a substantial buffer area around them for safety purposes. The TPSSs could be screened from view with a wall or fence. Each TPSS site would have a 20-foot-wide access road (or easement) from the street access point to the protective fence perimeter at each location. Each site would require one 2-acre parcel. Each TPSS would include an approximately 450-square-foot control room (each alternative design includes these facilities, as appropriate).

Traction Power Supply Switching and Paralleling Stations. Switching and paralleling stations work together to balance the electrical load between tracks, and to switch power off or on to either track in the event of an emergency. Switching stations would be required at approximately 15-mile intervals, midway

between the TPSSs. These stations would need to be approximately 9,600 square feet (120 feet by 80 feet). Paralleling stations would be required at approximately 5-mile intervals between the switching stations and the TPSSs. The paralleling stations would need to be approximately 8,000 square feet (100 feet by 80 feet). Each station would include an approximately 6,450-square-foot (30 feet by 215 feet) control room. TPSS, traction power supply switching, and paralleling stations are included in each alternative design as appropriate.

Signalizing and Train Control Elements. Signalizing and train control elements include small signal hubs/bungalows within the right-of-way that house signal relay and microprocessor components, cabling to the field hardware and track, signals, and switch machines on the track. These would be located in the vicinity of track switches, and would be grouped with other power, maintenance, station and similar HST facilities, where possible.

Track Structure. The track structure would consist of either a direct fixation system, with rail fasteners and concrete slab, or ballasted track with rail, ties and crushed rock ballast, depending on local conditions and decisions to be made later, as design progresses.

2.4.5 Maintenance Facilities

California's HST System includes three types of maintenance facilities. Each section would have a maintenance of equipment (MOE)/maintenance-of-infrastructure (MOI) facility. A number of MOE facilities for overnight layover and servicing would be located near the system termini; however an MOE would not be required in the vicinity of the wye alternatives because they are not located near an HST terminus. In addition, the system would have a single heavy maintenance facility (HMF).

2.4.6 Heavy Maintenance Facilities

One Heavy Maintenance Facility (HMF) site will be required for operation of the entire HST System. The HMF, to be located within the Central Valley, would serve two functions: (1) support train arrival, assembly, testing, and commissioning to operations and (2) become the state's system-wide heavy maintenance workshop (Merced to Fresno Section Final EIR/EIS, § 2.2.9.2.). In 2009, the Authority issued a request for expressions of interest (RFEI) from communities and other interested parties for potential HMF locations that could meet the Authority's siting needs, minimize environmental impacts, and offer benefits to the community and the State. Based on responses to the RFEI, and further screening of the proposed sites during the alternatives analysis and Checkpoint B processes for the Merced to Fresno and Fresno to Bakersfield sections, the Authority and FRA thoroughly evaluated ten HMF site alternatives: five in the Merced to Fresno Section Final EIR/EIS, and five in the Fresno to Bakersfield Section Revised Draft EIR/Supplemental Draft EIS. The HMF site alternatives evaluated in each environmental document represent alternatives that are appropriate to the different north-south alignment alternatives studied.

2.4.7 Decision Making Process for the HMF Site

Because only one HMF will be required for full HST operations, FRA and the Authority are in the process of evaluating the proposed HMF alternatives to determine which is the most appropriate. Both FRA and the Authority anticipate that selection of the HMF location will be made after completion of the Fresno to Bakersfield Section Final EIR/EIS process and the Merced to Fresno Section: Wye Alternatives SEIR/SEIS. These agencies may choose to engage in further environmental, economic, or engineering analysis of one or more of the leading HMF alternatives prior to making a final decision.

The purpose of this discussion is to explain the staff recommendation for further study of HMF alternatives within the study area for the wye alternatives. From an engineering, planning, and logistics perspective, the ultimate selection of the HMF site must be consistent with Authority and FRA decisions

on the north-south alignment through the Central Valley and the wye alternative. This is because the approximately 290 miles of track constituting the north-south alignment in the Merced to Fresno and Fresno to Bakersfield sections and the wye alternatives in the Merced to Fresno Section are subject to greater siting limitations than an HMF facility site. The selected north-south and wye alignments are the drivers for establishing the HST system, and a decision on these alignments will greatly influence the process for determining which HMF alternatives continue to be viable. Conversely, the location of any one HMF alternative does not influence selection of HST alignment alternatives or the LEDPA.

Of the five HMF site alternatives in the Merced to Fresno Section, four are located within the study area for the wye alternatives (Harris-DeJager, Kojima, Fagundes, and Gordon Shaw). The fifth site, the Castle Commerce Center HMF site, was fully evaluated in the Merced to Fresno Final EIR/EIS and is outside the study area for the wye alternatives and the SEIR/SEIS. The Authority and FRA will continue to consider the Castle Commerce Center HMF site, but it will not be discussed further in this document, which is focused on the wye alternatives.

2.4.7.1 Practicability Analysis

At this time, the Authority and FRA propose to include the Kojima, Fagundes, and Gordon Shaw sites in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS. As discussed below, the Harris-De Jager site is proposed to be dropped for no longer being practicable.

Harris-De Jager

The proposed Harris-De Jager HMF site alternative was included in the Merced to Fresno Section Final EIR/EIS. The Authority received communication from the site sponsor that it was withdrawing all De Jager properties from consideration, including this site. This site is no longer practicable from a Clean Water Act Section 404 perspective because the landowner is no longer a willing participant to host the HMF site. Therefore, the Authority and FRA deem this site to be no longer appropriate from a NEPA/CEQA perspective and the Harris-De Jager site alternative does not merit further consideration in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS.

2.4.7.2 Plans for Additional Consideration of HMF Site Alternatives in Wye Area

As discussed above, the evolution of the Merced to Fresno Section has resulted in four HMF site alternatives remaining within the section that meet the Authority's siting criteria and are otherwise practicable and reasonable: Castle Commerce Center, which is outside the study area of the wye alternatives and therefore outside the scope of this Checkpoint B document, and the Kojima, Gordon-Shaw, and Fagundes sites.

2.5 Alternatives Considered but Eliminated Prior to the Merced to Fresno Preliminary Alternatives Analysis

2.5.1 Alternatives Considered but Eliminated during Programmatic EIR/EIS Evaluation

The *2005 Statewide Program EIR/EIS* was completed in November 2005 as the first phase of a tiered environmental process for the proposed HST system. A Programmatic HST Alternative was selected by the Authority and FRA during this first tier. As part of this selection, the Authority and FRA defined a broad corridor between the Bay Area and Central Valley for additional review, also at the program level.

Following certification of the statewide program EIR/EIS, the Authority initiated the Bay Area to Central Valley HST Program EIR/EIS (2008 Program EIR/EIS) to further examine this region as the next phase of the tiered environmental review process.

The Bay Area to Central Valley study region is generally bounded by (and includes) the Caltrain corridor to the west, the BNSF corridor to the east, the Pacheco Pass (SR 152) to the south, and the Altamont Pass (I-580) to the north. The 2008 Program EIR/EIS evaluated the potential impacts of proposed alignment alternatives and station location options in the study region and defined general mitigation strategies to address potentially significant adverse impacts. At the conclusion of this process, the Authority and FRA selected the Pacheco Pass to San Francisco Network Alternative as the Preferred Alternative because it would best meet the purpose and need of the proposed HST system. The San Jose to Central Valley Corridor, part of the Pacheco Pass to San Francisco Network Alternative, includes the wye alternatives.

The EPA and USACE concurred in letters dated April 30, 2008, and May 8, 2008, respectively, that the Pacheco Pass to San Francisco Network Alternative is most likely to contain the LEDPA.

The 2008 Bay Area to Central Valley Program EIR/EIS evaluated several corridors connecting the Bay Area to the Central Valley. Of the corridors evaluated in this program document, the San Jose to Central Valley Corridor includes the preferred Pacheco Pass to San Francisco Network Alternative, which is composed of several program alignment alternatives connecting San Jose through the Pacheco Pass to the Central Valley. These program alignment alternatives are relevant to the wye alternatives and are listed below.

2.5.1.1 Program Alignment Alternatives

- Caltrain/Pacheco/Henry Miller Avenue.
- Caltrain/Pacheco/Grasslands Ecological Area (GEA) North/Merced.
- Merced Southern Alignment (Central Valley Portion of San Jose-Merced Section for Diablo Range Direct options).
- Direct Tunnel Alignment (Northern or Southern Connection to Merced).
- Diablo Range Direct Alignments (Northern Alignment and alignments through Henry Coe State Park).

Table 2-2 lists the alignment alternatives considered in the 2008 Bay Area to Central Valley Program EIR/EIS. The table shows whether they were carried forward for further study or withdrawn from further consideration (X) and, if eliminated, the primary (P) and secondary (S) reasons for elimination. A table illustrating the progression of program-level to project-level wye alternatives is provided in Appendix D.

Table 2-2
 2008 Bay Area to Central Valley Program EIR/EIS Alternatives
 Considered for the San Jose to Central Valley Corridor

Alternatives / Stations	Program EIR/EIS Decision		Reasons for Elimination						
	Carried Forward	Withdrawn	Feasibility of Construction	Incompatibility with Existing or Planned Development	Right-of-Way	Connectivity/ Accessibility (to Connecting Transit Services or Service Areas)	Alignment Eliminated*	Environment	Environmental Concerns
Caltrain/ Pacheco/ Henry	X								

Alternatives / Stations	Program EIR/EIS Decision		Reasons for Elimination						
	Carried Forward	Withdrawn	Feasibility of Construction	Incompatibility with Existing or Planned Development	Right-of-Way	Connectivity/ Accessibility (to Connecting Transit Services or Service Areas)	Alignment Eliminated*	Environment	Environmental Concerns
Miller Avenue									
Caltrain/ Pacheco/ Grasslands Ecological Area (GEA) North/ Merced	X								
Merced Southern alignment (Central Valley Portion of San Jose to Merced Section for Diablo Range Direct options)		X						P	San Luis National Wildlife Refuge impacts, including sensitive wetland impacts outside this refuge
Direct Tunnel Alignment (Northern or Southern Connection to Merced)		X	P					S	Seismic constraints
Diablo Range Direct Alignments (Northern Alignment and alignments through Henry Coe State Park)		X	P					P	Parklands, habitat fragmentation, high value aquatic resources, visual, noise impacts
Source: 2008 Final Bay Area to Central Valley Program EIR/EIS for the Proposed California High-Speed Train System, California High-Speed Rail (Authority and FRA 2008). Notes: Reason: Primary (P) and secondary (S) reasons for elimination. *Alignment Eliminated column only applies to station location options. If an alignment is eliminated, a specific station location may no longer be necessary.									

Reasons for eliminating alignment alternatives from further consideration in the San Jose to Central Valley Corridor based on the *2008 Bay Area to Central Valley Program EIR/EIS* are discussed below.

- Merced Southern Alignment Alternative (Central Valley portion) was eliminated from further investigation primarily because of potential environmental impacts. The alignment alternative would pass through approximately 4.4 miles of sensitive wetlands, including the San Luis National Wildlife Refuge. It would also pass through floodplains, farmlands of statewide importance and sensitive habitats.
- Direct Tunnel Alignment Alternative was eliminated from further investigation primarily because of the impracticability of the construction of such a long tunnel. The secondary reason for elimination was because of potential environmental impacts. The alignment alternative would cross three active or potentially active fault areas in a tunnel, including the Ortigalita fault, the southern extension of the Greenville fault trend, and the Calaveras fault zone, resulting in potential impacts to the tunnel from a seismic event. The direct tunnel alignment would use a 3.5 percent gradient to minimize tunneling length and would likely cost at least \$3 billion more to construct than the minimize tunnel option. This higher construction cost would be due largely to the long tunnel and the high unit cost per mile associated with tunnels that exceed 6 miles in length. The direct tunnel concept would involve construction of a tunnel that would be among the longest in the world (31 miles) through mixed soil and geology types. The results of the Authority's technical tunnel conference indicated that, while not impossible, a tunnel of this length in California would be extremely expensive to construct, operate and maintain, and would therefore be impracticable.
- Diablo Range Direct Alignment Alternatives (Northern Tunnel Alignment Alternative and alignments through Henry Coe State Park, the Minimize Tunnel and Tunnel Under Park Alignment Alternatives) were eliminated from further investigation primarily for constructability concerns and potential environmental impacts including impacts to parklands, high value aquatic resources and visual resources, habitat fragmentation, and noise impacts. These alignment alternatives would have a station at the existing San Jose (Diridon) Station and head south on the Caltrain/UPRR, just north of I-85 turning east through the Diablo Range to the San Joaquin Valley to reach Merced using the northern alignment alternative (near Castle AFB). Three alignment alternatives were developed to better define this general corridor: the northern tunnel, minimize tunnel, and tunnel under park. The Diablo Range alignment alternatives would involve construction of a long tunnel (16 to 20 miles). Due to the length of the tunnel required, construction of any of these alignment alternatives would be extremely complex and expensive and, therefore, impracticable.

The Diablo Range Direct HST alignment alternatives through (or under) Henry Coe State Park (which includes the Orestimba State Wilderness Preserve), the Minimize Tunnel and Tunnel Under Park Alignment Alternatives, would have greater potential environmental impacts than alignment alternatives that would avoid the park. Alignment alternatives through Henry Coe State Park would have the highest impacts to Section 4(f)/6(f) Resources (both long-term and short-term [construction] impacts). In addition, the considerable amount of public and agency input in regard to these alignment alternatives has been overwhelmingly opposed to any construction through Henry Coe State Park.

The Diablo Range Direct Northern Tunnel Alignment Alternative would have high potential impacts to the natural environment, including habitat fragmentation and visual, noise, and high value aquatic resources. Construction of an alignment alternative through this remote area would bisect sensitive ecosystems in an alignment that does not follow an existing transportation corridor across the Mt. Hamilton/Diablo Range. The EPA's scoping comments recommend eliminating from further analysis "any alternatives that impact the designated aquatic resources

of national importance in Del Puerto Creek, Salado Creek, Crow Creek, and Orestimba Creek watersheds in the Diablo Range." Any alignment alternative through the Diablo Range north of Henry Coe State Park will impact these resources. The EPA also stated, "Considering the high value aquatic resources and the potential for large scale habitat fragmentation, EPA continues to believe that the Diablo Direct alignments do not appear to exhibit characteristics of the LEDPA, the only alternative that can be permitted under the CWA Section 404 regulations (40 CFR 230.10 [a] and [c])." Scoping comments from the California Department of State Parks state, "Habitat degradation and wildlife corridor fragmentation between SPS units and other open space lands, such as The Nature Conservancy's Mount Hamilton Project conservation lands, are two of our highest concerns." US Department of the Interior Fish and Wildlife Service scoping comments state, "The portion of the Diablo Range to be impacted by these proposed crossings has been recognized for its important natural resources," and "there are significant natural resource concerns related to the proposed Northern Mountain crossings. The Diablo Range alignments would result in substantial direct and indirect impacts to federally listed wildlife species in the region, including the endangered kit fox, the threatened California red-legged frog, the threatened bay checkerspot butterfly, and the threatened California tiger salamander, as well as various threatened and endangered plant species." In addition, the considerable amount of input from the public and organizations and other agencies in regard to this portion of the Diablo Range north of Henry Coe State Park was and continues to be overwhelmingly opposed to any construction through this area because of potential environmental impacts to this remote and environmentally sensitive area.

- The Caltrain/Pacheco/GEA North/Merced (referred to as the SR 140 Wye Alternative in this Supplemental Checkpoint B Summary Report, in the June 2010 PAA, and in the San Jose to Merced Checkpoint B Summary Report) alignment alternative was carried forward for further analysis from the programmatic to project level analysis. However, with further evaluation in the environmental process for both the Merced to Fresno Section and San Jose to Merced Section, this alternative was found to be impracticable based on considerations of logistics and cost. This alternative would also have greater impacts to aquatic resources and other environmental resources when compared to the project-level Henry Miller Avenue alternatives. Additional factors contributing to the withdrawal of the SR 140 Alignment Alternative include high visual intrusiveness by adding a train river crossing within a state park and the addition of 4 minutes of travel time between San Francisco and Los Angeles, which would likely make it inconsistent with the maximum travel time requirements of Proposition 1A of 2 hours and 40 minutes between Los Angeles Union Station and the Transbay Terminal in San Francisco. Please refer to Appendix D for a list of all environmental documents prepared for the Merced to Fresno Section and San Jose to Merced Section in which this alternative was evaluated.

2.5.2 Other Alternatives Considered but Eliminated Prior to San Jose to Merced Section Preliminary Alternatives Analysis

As part of the environmental process conducted for the San Jose to Merced Section, several alternatives along Henry Miller Road were identified and eliminated prior to being evaluated in the San Jose to Merced Section PAA. These are included in this Supplemental Checkpoint B Summary Report and described below, along with the reasons for their elimination. They are included because of the overlap of the wye alternatives between the two HST sections (San Jose to Merced Section and Merced to Fresno Section). In addition, the wye alternatives developed through the San Jose to Merced Section environmental process are some of the predecessors to the wye alternatives presented in this document (see Appendix D).

2.5.2.1 SR 152 East of Los Banos

The SR 152 East of Los Banos Alternative would turn from the Program Alignment near the intersection of Hereford Road and Henry Miller Avenue. It would run at-grade, curving to the south, cutting across

resource areas to enter the median of SR 152 west of the Dos Palos Y. The median of SR 152, as it crosses Merced County, is generally over 100 feet wide. This width would accommodate both Caltrans' ultimate configuration of the highway as a six-lane freeway and the operation of HST in the median. As SR 152 is already a limited-access facility, the introduction of HST would not affect access to property along the corridor. Incorporation of the HST into the median would allow SR 152 to be upgraded to a full freeway, as major cross-streets would be grade-separated across both the highway and railway. In the area of the Dos Palos Y, the highway would require slight realignment to conform to the geometry of the HST, including reconstruction of the SR 33 interchange as an overcrossing. Near Island Road, the alignment would ascend to an aerial structure to pass out of the freeway median and over the San Joaquin and Fresno rivers. It would descend back to grade to cut across an agricultural area and cross the Eastside Bypass on a viaduct. At Road 4, it would reenter the median of SR 152. Here, either the eastbound or westbound lanes would need to be moved to create a median wide enough to accommodate the high-speed train facilities. Again, new overcrossings of both the railway and highway would allow conversion of SR 152 to a full freeway. This alternative would continue in the median until reaching the junction with the Merced to Fresno corridor.

This alternative would have additional environmental effects on the Grasslands Ecological Area as it would introduce an additional corridor with the new crossing to SR 152. It was not supported by local officials in the City of Los Banos due to possible impacts to existing and proposed Los Banos facilities through the disruption of existing truck routes and the disruption of food processing facilities.

2.5.2.2 Henry Miller Road to SR 152 (Median Variation)

An early variation of the Henry Miller Road to SR 152 Alternative was considered that would divert from the Program Alignment at the east end of Henry Miller Avenue. It would curve to the south, crossing various sloughs and drains parallel to the San Joaquin River. After crossing the main channel of the San Joaquin River, the alignment would turn to run due east, to align with SR 152. It would enter the median of SR 152 just east of the interchange with SR 59. To accommodate the HST, either the eastbound or westbound lanes would need to be moved to create a median wide enough to accommodate the HST. Again, new overcrossings of both the railway and highway would allow conversion of SR 152 to a full freeway. The HST alignment would continue in the median until the junction with the Merced to Fresno corridor.

The Henry Miller Road to SR 152 Alternative was initially withdrawn from further evaluation due to constructability issues involved with reconstruction of 14 miles of SR 152; the median of SR 152 for the eastern portion of the alignment leading to the wye is too narrow for the HST. However, due to an EPA and USACE request for the Authority to continue to evaluate an HST alignment parallel to SR 152 in the San Joaquin Valley, and public request for an alignment that would avoid more agricultural land than the other proposed alignment alternatives, this earlier alternative was re-designed and introduced as the SR 152 in the July 2011 San Jose to Merced Section SAA. This alternative was designed to offset SR 152 by 500 to 700 feet to the south. This 500-to 700-foot-offset reduces costs compared to the PAA version. This alignment alternative is discussed further as the SR 152 (South) Wye Alternative in Section 2.6.

The Henry Miller Road to SR 152 evaluated in the San Jose to Merced Section July 2011 SAA was designed to offset SR 152 by 500 to 700 feet to the south. This 500- to 700-foot-offset would reduce costs compared to the PAA Version. This alignment alternative is discussed further as SR 152 (South) in Section 2.6.

In the spring of 2012, another variation of the SR 152 Alternative was developed by the San Jose to Merced Section, this one with an 85-foot offset to the north of Henry Miller Road. This alignment is referred to as the SR 152 (North) Wye Alternative and is also discussed further in Section 2.6. Refer to Appendix D for a detailed list of the nomenclature used throughout the development of the wye alternatives.

2.6 Identification of Alternatives within the Study Area

The wye alternatives are located between I-5, near Santa Nella Village in western Merced County, and the Merced to Fresno Section Hybrid Alternative at approximately SR 99 in Merced and Madera counties (Figures 2-8 through 2-15). As shown in the figures and described below, the western endpoint is common to all of the wye alternatives, while the eastern endpoints vary.

The wye alternatives being considered are shown in Table 2-3 and described below.

Table 2-3
 Merced to Fresno Section: Wye Alternatives

Wye Alternatives	Carried Forward	Withdrawn
SR 140 Wye	-	X
Avenue 24 to Road 11 Wye	-	X
Avenue 24 to East of Road 12 Wye	-	X
Avenue 24 to Road 13 Wye	-	X
SR 152 (North) to Road 11 Wye	-	X
SR 152 (North) to Road 13 Wye	X	-
SR 152 (North) to Road 18 Wye	X	-
SR 152 (North) to Road 19 Wye	-	X
SR 152 (South) to Road 18 Wye	X	-
SR 152 (South) to Avenue 21 to SR 99 Wye	-	X
SR 152 (South) to Avenue 21 to Road 19 Wye	-	X
Avenue 22 Wye	-	X
Avenue 21 to Road 11 Wye	-	X
Avenue 21 to Road 13 Wye	X	-
Avenue 21 to SR 99 Wye	-	X
Avenue 21 to Road 19 Wye	-	X
South of GEA Wye	-	X

The area of disturbance for the wye alternatives was defined based on a conservative footprint that incorporates all features of the project with the potential for impacts to environmental resources, as shown in the current conceptual-level engineering. The widths of the footprints typically range from approximately 100 to 1,900 feet, with some extending to a width of 2,500 feet to accommodate location of a traction-power substation.

The distances for evaluating noise and vibration impacts are based on FRA screening procedures established in the *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT, FRA 2005). Based on these screening procedures, potential noise impacts were evaluated at a distance of 1,300 feet from the alignment centerline in rural areas and 700 feet from the alignment centerline in urban areas. Similarly, potential vibration impacts were evaluated within 275 feet of the wye alternative centerline in rural areas and 200 feet from the alignment centerline in urban areas.

Of the 17 wye alternatives that are evaluated in this document, 15 are along Henry Miller Road. The Henry Miller Road study corridor was first identified in the *2008 Bay Area to Central Valley Program EIR/EIS* as part of the "Caltrain/Pacheco/Henry Miller Avenue" alignment. Since this alignment was first introduced, several east-west alternatives and variations to those alternatives have been identified; all generally follow Henry Miller Road and then diverge at Avenue 24, SR 152, Avenue 22, or Avenue 21. North-south connection options were also considered for these alignments as they traverse the area in the vicinity of Chowchilla. These connections generally follow Road 11, Road 12, Road 13, SR 99, Road 18, or Road 19. Intermixing the east-west and north-south variations has resulted in a number of potential alignments. The other two wye alternatives are located north and south of the Henry Miller Road study corridor.

Please see Appendix D to this document for a complete history of the nomenclature utilized for the wye alternatives as they were identified during the various design and planning stages.

The wye alternatives considered in this document are described below in order from north to south. A brief background of each alternative is included with the description.

2.6.1 SR 140 Wye Alternative

The SR 140 Wye Alternative has evolved throughout the HST design and planning stages. While the alignment has generally followed SR 140, the specific route and design now being considered has changed from the initial route. Initially, this general alignment was the preferred program alignment identified during the 2005 Statewide planning process. In the *2008 Bay Area to Central Valley Program EIR/EIS*, it was identified as the "Caltrain/Pacheco/Grassland Ecological Area (GEA) North/Merced" alignment. Although the 2008 EIR/EIS identified the Henry Miller Avenue network alternative as the preferred program alignment, the SR 140 alternative was recommended for continued evaluation. It was subsequently evaluated in the Merced to Fresno Section environmental process and was found to be impracticable based on considerations of logistics and cost. An analysis of the SR 140 Wye Alternative is included in this Supplemental Checkpoint B Summary Report to confirm that it does not represent the LEDPA.

The SR 140 Wye Alternative would begin in the Romero Creek Valley northeast of the San Luis Reservoir and approximately 5.5 miles west of Interstate (I) -5. From this western terminus, the alternative would curve to the northeast and pass through a tunnel to emerge before crossing the California Aqueduct, then I-5, and lastly the Delta-Mendota Canal on an aerial structure. It would pass to the east of Gustine and meet SR 140, where it would run immediately west of the roadway. It would pass through a section of the GEA alongside the existing highway, between the North Grasslands Wildlife Area and Great Valley Grasslands State Park. It would turn to the east at Fremont Ford State Recreation Area as it crosses the San Joaquin River, leaving SR 140. It would then arc north to cross SR 165 near 1st Avenue. It would return to SR 140 near Sultana Drive and cross the highway to follow immediately to the south of SR 140. At North Quinley Avenue, the SR 140 Wye Alternative would cross SR 140 to curve to the north and then south to meet the Merced to Fresno corridor at the Merced HST Station. From Ranch Road north of Chowchilla, the SR 140 Wye Alternative would follow the Hybrid Alternative south through Chowchilla to Avenue 17 in Madera Acres, where it would end (see Figure 2-10).

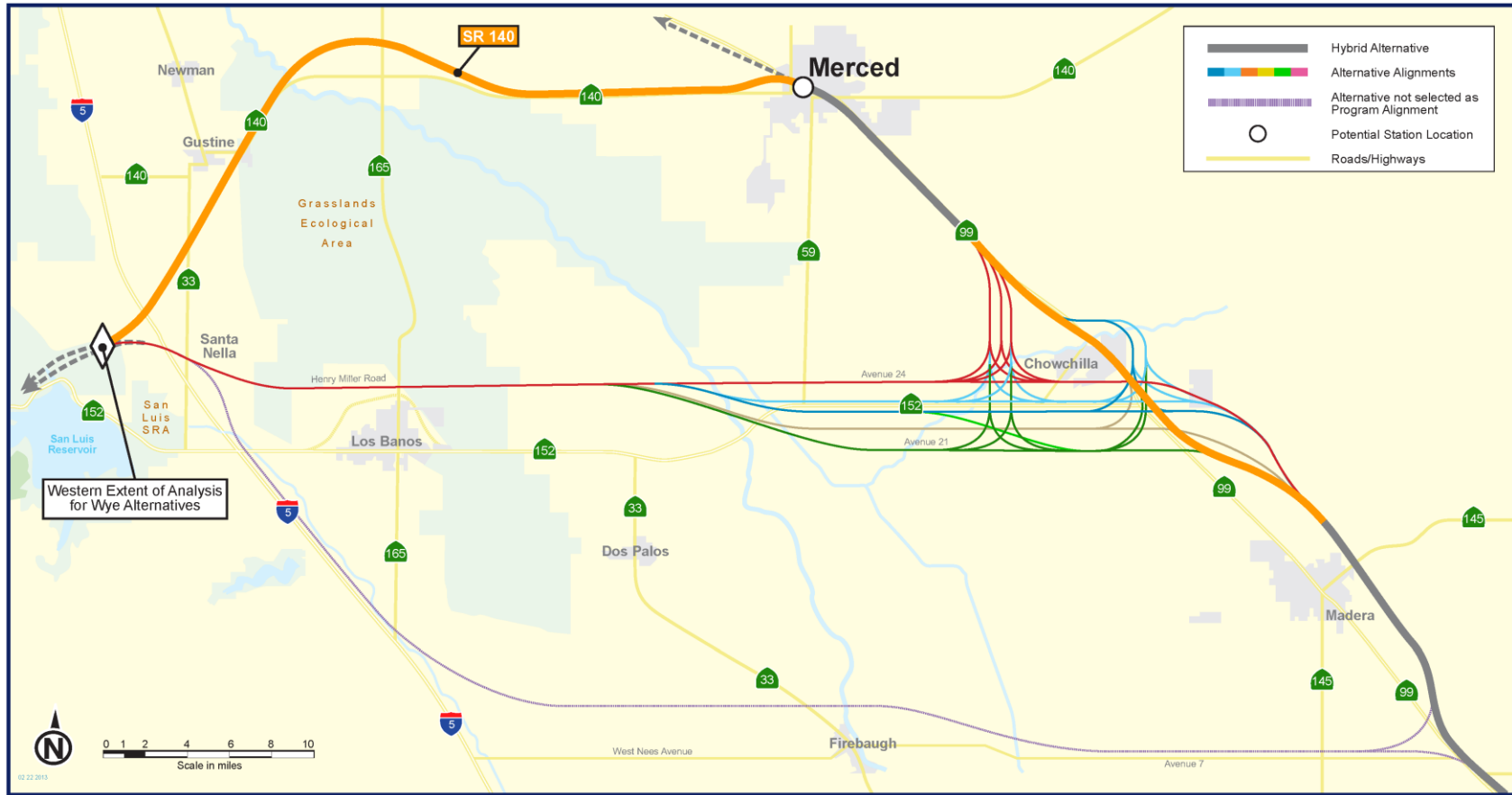


Figure 2-10
 SR 140 Wye Alternative

2.6.2 Avenue 24 to Road 11 Wye Alternative

The Avenue 24 to Road 11 Wye Alternative would begin in the Romero Creek Valley northeast of the San Luis Reservoir, approximately 5.5 miles west of I-5. It would extend eastward on a combination of cut-and-fill and aerial structure to Santa Nella Village. From Santa Nella Village, the alignment would connect to Chowchilla along Henry Miller Road and Jefferson Road/Avenue 24 (see Figure 2-11). This alternative would be at-grade along the south side of Henry Miller Road, crossing various sloughs and drains parallel to the San Joaquin River. After crossing the main channel of the San Joaquin River, this alternative would run just to the south of Jefferson Road, which becomes Avenue 24 upon crossing into Madera County. It would continue along the south side of Avenue 24 to about Road 9, west of Chowchilla. Here, the San Jose to Merced leg of the wye would curve northward to Road 11, then continue north to connect to the Hybrid Alternative, ending at Ranch Road. The San Jose to Fresno leg of the wye would continue eastward along Avenue 24, cross the UPRR/SR 99 corridor, then curve south to meet the Hybrid Alternative and continue to Avenue 17 in Madera Acres, where the alternative would end. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 24 and Road 11 segments of the alternative.

2.6.3 Avenue 24 to East of Road 12 Wye Alternative

The Avenue 24 to East of Road 12 Wye Alternative would essentially be the same as the Avenue 24 to Road 11 Wye Alternative, except the San Jose to Merced leg of the wye would extend east of Road 12 rather than along Road 11 to reach the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 24 and Road 12 segments of this alternative (Figure 2-11).

2.6.4 Avenue 24 to Road 13 Wye Alternative

The Avenue 24 to Road 13 Wye Alternative would essentially be the same as the Avenue 24 to Road 11 Wye Alternative, except the San Jose to Merced leg of the wye would curve north to follow Road 13 rather than Road 11 to connect to the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 24 and Road 13 segments of this alternative (Figure 2-11).

2.6.5 SR 152 (North) to Road 11 Wye Alternative

The SR 152 (North) to Road 11 Wye Alternative would begin in the Romero Creek Valley northeast of the San Luis Reservoir, approximately 5.5 miles west of I-5. It would turn south to run on a diagonal path toward the San Joaquin River. On its approach to the San Joaquin River and Eastside Bypass (flood control channel), it would ascend gently to an aerial structure to cross the two watercourses. While crossing the two watercourses, the alternative would turn east near the SR 152/SR 59 interchange and then run parallel to SR 152, running on a tall embankment between the watercourses and the highway, about 85 feet north of the roadway.

West of Chowchilla, the San Jose to Merced leg of this wye would curve north and run along Road 11, then connect to the Hybrid Alternative along the UPRR/SR 99 corridor, ending at Ranch Road. The San Jose to Fresno leg would continue eastward along SR 152 (North) south of Chowchilla and across the UPRR/SR 99 corridor, then curve south along the BNSF corridor to meet the Hybrid Alternative, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 (North) and Road 11 segments of this alternative (Figure 2-12).

2.6.6 SR 152 (North) to Road 13 Wye Alternative

The SR 152 (North) to Road 13 Wye Alternative would essentially be the same as the SR 152 (North) to Road 11 Wye Alternative, except the San Jose to Merced leg would extend toward Merced along Road 13 rather than Road 11 to connect to the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 (North) and Road 13 segments of this alternative (Figure 2-12).

2.6.7 SR 152 (North) to Road 18 Wye Alternative

The SR 152 (North) to Road 18 Wye Alternative would essentially be the same as the SR 152 (North) to Road 11 Wye Alternative from its western terminus northeast of the San Luis Reservoir to the Chowchilla area. From here, however, this alternative would continue further east along SR 152 south of Chowchilla. At about Road 16, the San Jose to Merced leg of this wye would curve northward across the UPRR/SR 99 corridor and extend north along Road 18, east of Chowchilla. It then would curve west along Potters Road, cross the SR 99 and UPRR on an aerial structure, then curve northward to follow the Hybrid Alternative along the UPRR/SR 99 corridor to Ranch Road. The San Jose to Fresno leg of this wye would continue east along SR 152, cross UPRR/SR 99, then curve south to the BNSF corridor, meet the Hybrid Alternative, and end at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 18 segments of this alternative (Figure 2-12).

2.6.8 SR 152 (North) to Road 19 Wye Alternative

The SR 152 (North) to Road 19 Wye Alternative would essentially be the same as the SR 152 (North) to Road 18 Wye Alternative. However, east of Chowchilla and the UPRR/SR 99 corridor, the San Jose to Merced leg of this wye would extend along Road 19, rather than Road 18, to Potters Road. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 19 segments of this alternative (Figure 2-12).

2.6.9 SR 152 (South) to Road 18 Wye Alternative

The SR 152 (South) to Road 18 Wye Alternative would essentially be the same as the SR 152 (North) alternatives from the Romero Creek Valley northeast of the San Luis Reservoir to Elgin Road, where it would turn south and run on a diagonal path toward the San Joaquin River. On its approach to the San Joaquin River and Eastside Bypass (flood control channel), this alternative would ascend gently to an aerial structure to cross the two watercourses, then turn east to align with SR 152, running on a tall embankment between the watercourses and the highway.

This alternative would enter the SR 152 corridor by crossing the SR 152/SR 99 interchange on an aerial structure, then descend to grade, generally running from 85 to 300 feet south of SR 152. It would continue along SR 152 south of Chowchilla, where the San Jose to Merced leg of the wye would extend northward across the UPRR/SR 99 corridor and along Road 18, east of Chowchilla, then curve west along Potters Road. This alternative would rise to cross the UPRR/SR 99 corridor, curving northward to follow the Hybrid Alternative to Ranch Road. The San Jose to Fresno leg of the wye would continue east along SR 152, cross the UPRR/SR 99 corridor, then curve south along the BNSF to meet the Hybrid Alternative, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 18 segments of this alternative (Figure 2-13).

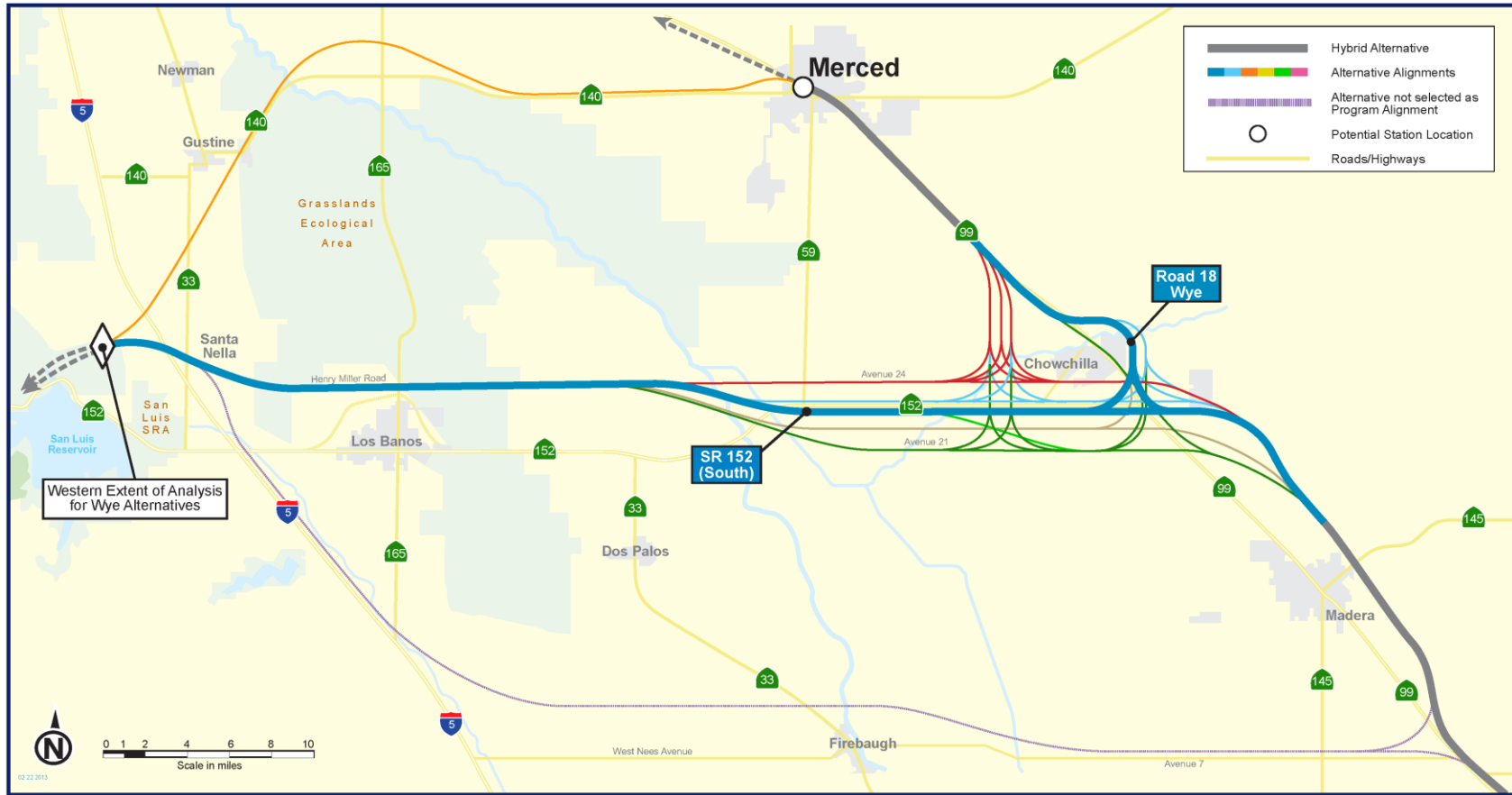


Figure 2-13
 SR 152 (South) Wye Alternative

2.6.10 SR 152 (South) to Avenue 21 to SR 99 Wye Alternative

The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative would essentially be the same as the SR 152 (South) alternatives from its western terminus northeast of the San Luis Reservoir to CA 59. From here it would be located 500 to 700 feet to the south side of SR 152. At Juniper Road, it would turn south to run diagonally to reach Avenue 21 at about Road 15, south of Chowchilla. It would follow Avenue 21 to about Road 18, where the San Jose to Merced leg of the wye would turn north, curving on an aerial structure over SR 152, UPRR, and SR 99, continue north past Chowchilla, then pass over the UPRR/SR 99 corridor again and come to grade west of SR 99. It then would follow the Hybrid Alternative along the UPRR/SR 99 corridor to Ranch Road. The San Jose to Fresno leg of the wye would continue eastward along Avenue 21, cross the UPRR/SR 99 corridor, then curve southward to meet the Hybrid Alternative and continue south, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and SR 99 segments of this alternative (Figure 2-14).

2.6.11 SR 152 (South) to Avenue 21 to Road 19 Wye Alternative

The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative would be similar to the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative. With this alternative, however, the San Jose to Merced leg would extend further east of Chowchilla, curving on an aerial structure over the UPRR/SR 99 corridor, and continue north along Road 19. Then it would curve west along Potters Road to SR 99, rise to cross the UPRR/SR 99 corridor on an aerial structure, then follow the Hybrid Alternative to Ranch Road. The San Jose to Fresno leg of the wye would continue along Avenue 21 before curving to meet the Hybrid Alternative and BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 19 segments of this alternative (Figure 2-14).

2.6.12 Avenue 22 Wye Alternative

The Avenue 22 Wye Alternative was suggested by the City of Chowchilla, the City of Madera, and the Madera County Resource Management Agency (see Figure 2-15). It leaves the Program Alignment at the east end of Henry Miller Road and turns south to cross agricultural lands. It passes the San Joaquin River and then ascends to an aerial structure to pass over SR 152 and the Eastside Bypass. It descends back to grade and curves to align with Avenue 22 through agricultural areas, with grade separations provided to carry some roads over the railway, providing access to each side. The San Jose to Merced leg of the wye curves north to cross the UPRR/SR 99 corridor on an aerial structure, then follows the Hybrid Alternative north to Ranch Road. The San Jose to Fresno leg of the wye curves south to meet the Hybrid Alternative/BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 22 and SR 99 segments of this alternative.

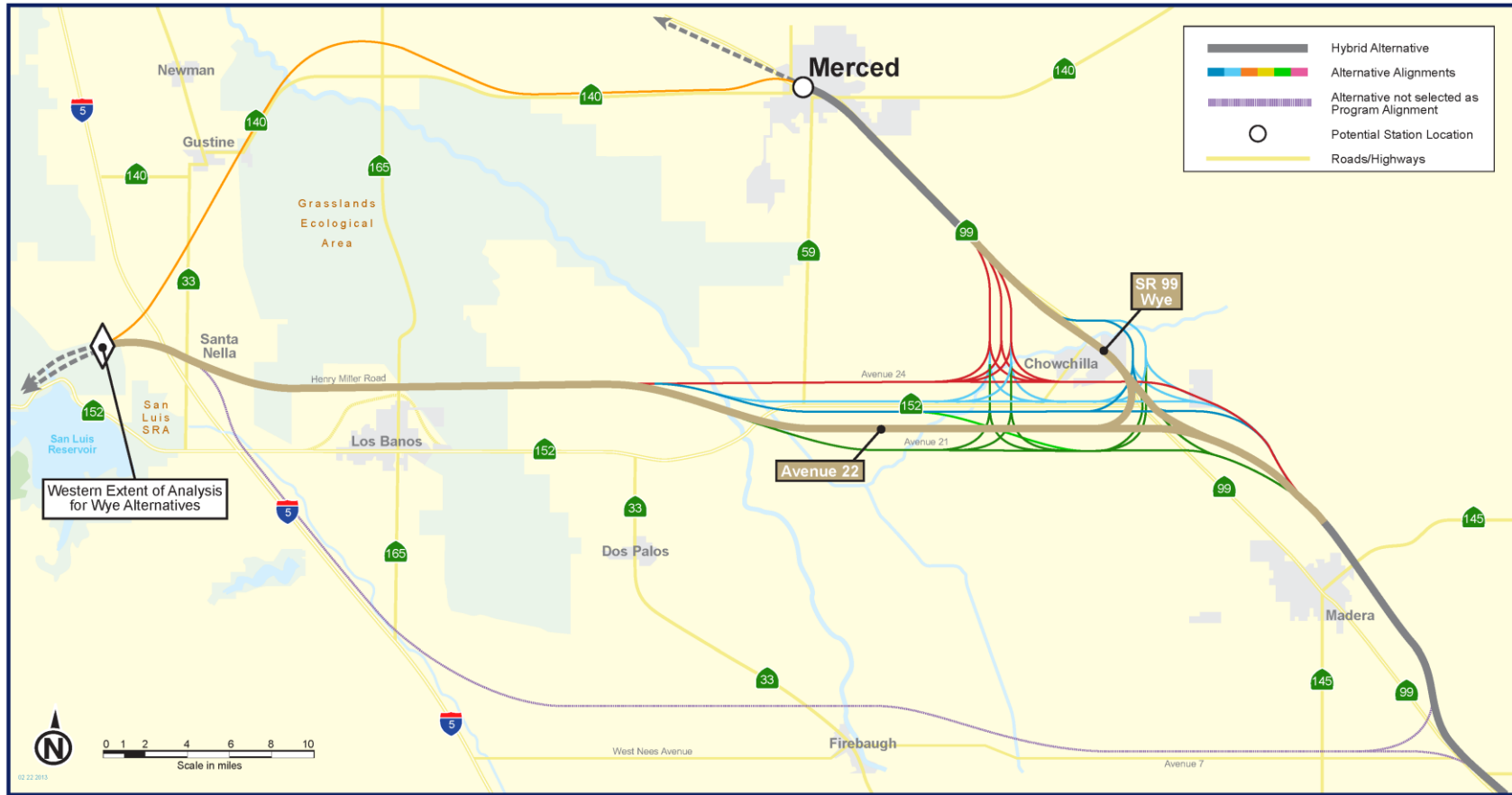


Figure 2-15
 Avenue 22 Wye Alternative

2.6.13 Avenue 21 to Road 11 Wye Alternative

The Avenue 21 to Road 11 Wye Alternative would be the same as the SR 152 alternatives from its western terminus near northeast of the San Luis Reservoir to Juniper Road. At Juniper Road, this alternative would turn south to run diagonally to Avenue 21, passing on aerial structure over the San Joaquin River and the Eastside Bypass channel. It would descend back to grade and curve to run east along the north side of Avenue 21. West of Chowchilla, at about Road 9, the San Jose to Merced leg of the wye would curve north, then follow Road 11 to the Hybrid Alternative, continuing to Ranch Road. The San Jose to Fresno leg of the wye would continue along Avenue 21, cross the UPRR/SR 99 corridor, then curve south to meet the Hybrid Alternative and BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 11 segments of this alternative (Figure 2-16).

2.6.14 Avenue 21 to Road 13 Wye Alternative

The Avenue 21 to Road 13 Wye Alternative would be essentially the same as the Avenue 21 to Road 11 Wye Alternative except the San Jose to Merced leg of the wye would follow Road 13 toward Merced, rather than Road 11. The San Jose to Fresno leg of the wye also would be the same. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 13 segments of this alternative (Figure 2-16).

2.6.15 Avenue 21 to SR 99 Wye Alternative

The Avenue 21 to SR 99 Wye Alternative would be similar to the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative. However, this alternative would curve south directly from Juniper Road to Avenue 21 in the vicinity of the San Joaquin River (Figure 2-16).

2.6.16 Avenue 21 to Road 19 Wye Alternative

The Avenue 21 to Road 19 Wye Alternative would be essentially the same as the other Avenue 21 alternatives from its western terminus northeast of the San Luis Reservoir to south of Chowchilla. However, at about Road 15, the San Jose to Merced leg of this wye would curve northward onto an aerial structure over SR 152, UPRR, and SR 99, then return to grade along Road 19, extending north to Potters Road, then west to the Hybrid Alternative and north to Ranch Road. The San Jose to Fresno leg is the same as the other Avenue 21 alternatives as it extends to Madera Acres. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 21 and Road 19 segments of this alternative (Figure 2-16).

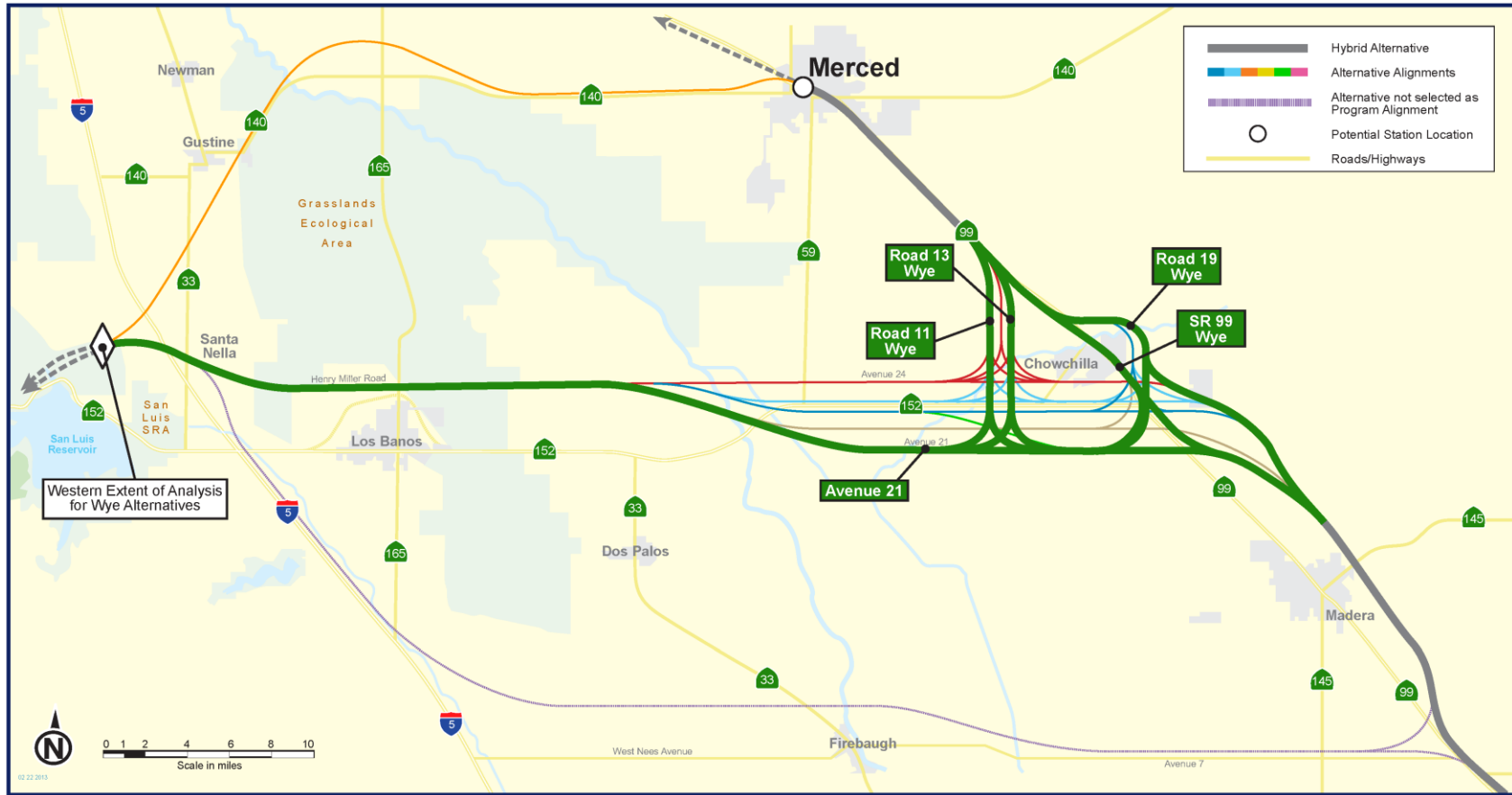


Figure 2-16
 Avenue 21 Wye Alternatives

2.6.17 South of GEA Wye Alternative

Through the *2008 Bay Area to Central Valley Program EIR/EIS* process, USACE and EPA concurred with the program-level determination that the Caltrain/Pacheco/Henry Miller Avenue and Caltrain/Pacheco/GEA North/Merced corridors most likely contain the LEDPA; these corridors do not include the South of GEA Wye Alternative. The South of GEA Wye Alternative was first identified in the Merced to Fresno PAA in 2010 as the "South Grasslands Ecological Area (SGEA)" connection. This connection, referred to in this document as the South of GEA Wye Alternative, has been included in several subsequent documents, all of which are documented in Appendix D to this report. An analysis of the South of GEA Wye Alternative is included in this Supplemental Checkpoint B Summary Report to confirm that it does not represent the LEDPA.

The South of GEA Wye Alternative would extend eastward from its western terminus northeast of the San Luis Reservoir. It would then arc south to curve along the east side of I-5 near Henry Miller Road. It would remain parallel to I-5 until SR 165, where it would begin to curve to the east. It would run south of West Courtney Avenue through agricultural areas, with grade separations provided to carry some roads over the railway, providing access to each side. For a distance, it would parallel the Delta-Mendota Canal, then ascend to cross over a UPRR branch line and SR 33. It would pass to the north of Firebaugh and cross the San Joaquin River, following the north side of Avenue 9. East of the river, it would curve to the south to run along the north side of Avenue 7. Near Road 25, a junction would provide a connection for Merced-bound trains that would arc to the north to meet the Merced to Fresno line just south of Madera. The primary leg of the alternative would continue to follow the roadway all the way to SR 99, where the line would arc south to meet the Merced to Fresno HST corridor at Herndon. The Merced to Fresno leg of the wye through Chowchilla would connect the HST along Road 7 to the Hybrid Alternative south of Madera (see Figure 2-15).

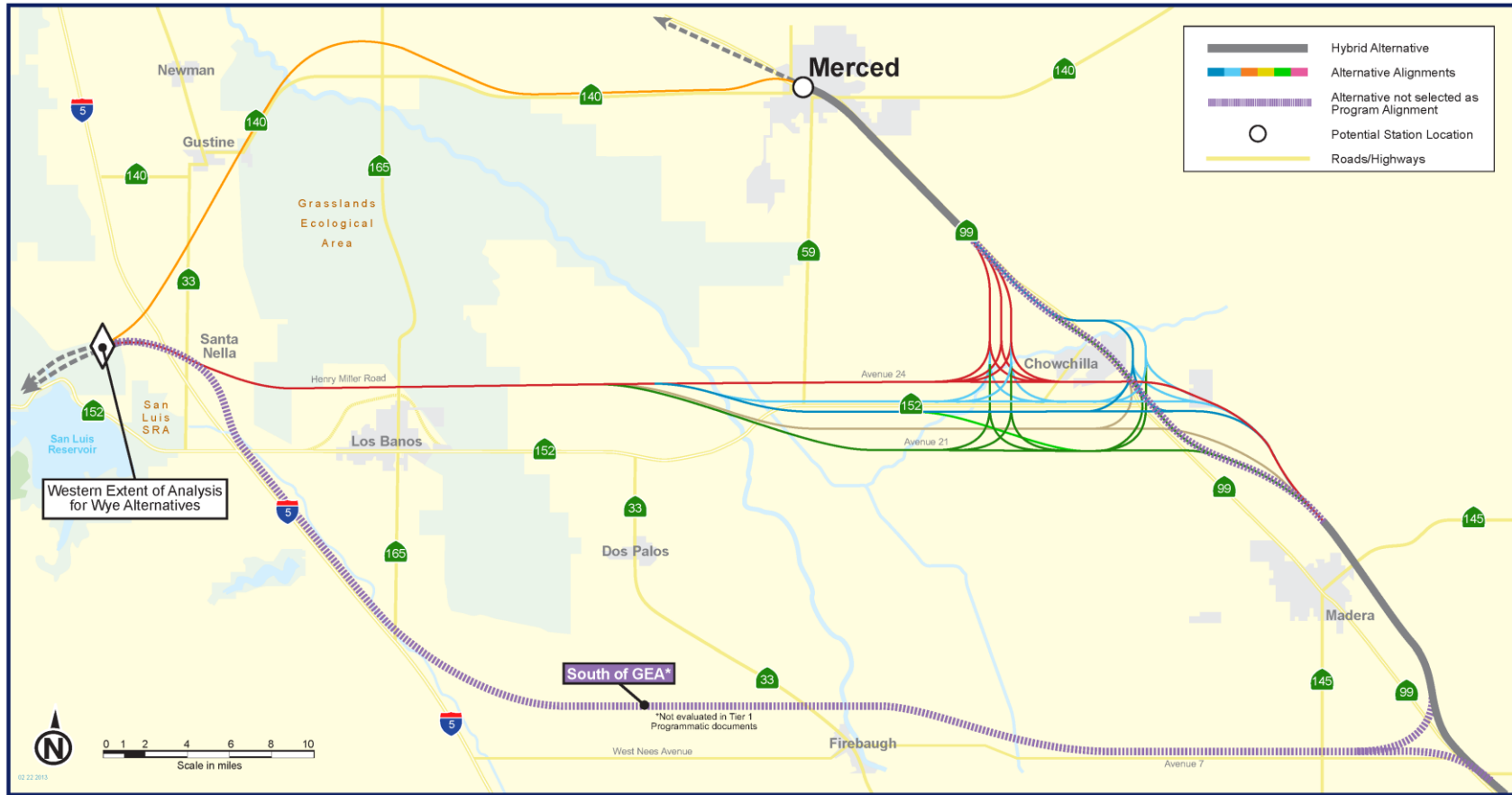


Figure 2-17
 South of GEA Wye Alternative

3.0 404(b)(1) Preliminary Alternatives Analysis

One important purpose of this Supplemental Checkpoint B Summary Report is to conduct an evaluation and comparison of the aquatic impacts associated with each alternative. This comparison of aquatic impacts will help to ensure that the alternatives with the fewest impacts on aquatic resources – the likely LEDPA – will be advanced for review in the SEIR/SEIS.

Checkpoint B documentation provides information to help determine whether any alternatives should be eliminated due to more substantial non-aquatic environmental impacts associated with the alternative, or due to the fact that the alternative is not “practicable” under CWA Section 404, in that it will not achieve the project’s purpose and need considering cost, technology, and other relevant factors. Under the regulations interpreting the requirements of CWA Section 404, “practicable” means “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes” (40 C.F.R. § 230.10(a)(2); *see also* 33 C.F.R § 320.4(b)(4) [incorporating the same by reference]). Under 404(b)(1) Guidelines, an alternative with fewer impacts on aquatic resources may be withdrawn if it is not practicable, or if it has other significant adverse environmental consequences that would justify ruling it out as the LEDPA. The comparison of aquatic and non-aquatic environmental impacts, in addition to factors of cost and logistics, may not always provide enough information to recommend the elimination of an alternative or determine the preference of one alternative over another. For example, one alternative may result in relatively low impacts to aquatic resources but involve unusually high construction costs; another alternative may have a relatively lower cost to construct but involve significantly greater impacts to aquatic resources. In these cases, further evaluation in the SEIR/SEIS may be recommended to ensure that these “trade-offs” are more fully considered.

This analysis is undertaken sequentially, focusing first on the aquatic resource impacts of each alternative in order to ensure that no alternatives with fewer impacts to significant aquatic resources are prematurely withdrawn. Second, to the extent appropriate, significant non-aquatic environmental impacts and the practicability of the project alternatives are assessed based on the environmental footprint for each wye alternative. The environmental footprints used for purposes of these comparisons and evaluations conservatively encompass all areas, for each alternative, that may be permanently and/or temporarily affected by project facilities associated with track alignment alternatives, station location options and ancillary utilities, traction power distribution facilities, traction power supply stations, switching and paralleling stations, improvements for signaling and train control elements, track structures, and track or train maintenance facilities and infrastructure, as well as HST-related roadway overcrossings and undercrossings.

Potential direct impacts to aquatic resources that were identified in the Merced to Fresno Section Checkpoint C Summary Report (March 2012) were considered and included in this Supplemental Checkpoint B Summary Report for areas where the footprints of the San Jose to Merced Section wye alternatives merge with those of the Merced to Fresno Section wye alternatives.

After assessment and comparison of aquatic impacts, the Authority and FRA withdrew some alternatives from further analysis, additional wye alternatives that were determined to have substantial impacts to non-aquatic environmental resources or to be impracticable also were withdrawn from further analysis.

Appendix B contains the evaluation matrix providing data on alternative characteristics and community and environmental impacts associated with all carried forward and withdrawn wye alternatives. This matrix is organized with data on each alternative proposed to be carried forward or eliminated. Each wye alternative was assessed for each of the project objectives and evaluation measures. This information was then used to determine which alternatives should be carried forward into more detailed engineering

design and environmental review as part of the SEIR/SEIS. The wye alternatives were evaluated using the measures and methods described in Attachment 1.

The primary criteria used in this Supplemental Checkpoint B analysis for determining whether to eliminate or carry forward an alternative are the same criteria used for the San Jose to Merced planning process (see Section 2.2.2.2 San Jose to Merced Planning, above). These criteria are, in order of importance, as follows:

- Aquatic impacts—wetlands, vernal pools, etc.;
- Environmental impacts—non-aquatic;
- Practicability considerations;
 - Meeting the project purpose and need and design objectives.
 - Feasibility of construction, considering logistics, cost and current technology.
 - Compatibility with land use plans and local community integrity.
 - Right-of-way acquisition issues and opportunities—determined if an alternative could be constructed and at what cost in acquiring real estate.

Once the primary criteria were taken into account, other aspects of the alternatives were reviewed and taken into consideration, such as positions of agencies, stakeholders, and the public (as related to environmental impacts and practicability) and beneficial impacts of the alternatives.

Appendix C contains figures of the wye alternatives in relation to mapped environmental resources, including National Wetland Inventory (NWI), Holland vernal pool complexes, NHD hydrology, CWHR, CNDDB, FWS critical habitat, farmland resources, and parks and publicly owned lands.

As a part of the SEIR/SEIS evaluation of alternatives and the Supplemental Checkpoint C Summary Report analysis, the identification of the type and extent of wetlands and other waters affected by the alternatives carried forward will be refined. The SEIR/SEIS engineering design will refine right-of-way needs, locations of grade separations, locations of support facilities, and other alignment details. Due to limited rights of entry to properties along the various alternatives, formal delineation of wetlands will not be possible at the SEIR/SEIS stage, but the NWI, Holland Vernal Pool Complex data (Holland), and Natural History Data Base (NHDB) presented in this Supplemental Checkpoint B Summary Report will be supplemented with local data and field reconnaissance where possible. This will result in refinement of the acres of impact for each alternative from that shown on the evaluation matrix in Appendix B. With this refined design footprint and identification of the extent of wetlands and other waters, design refinements can be made to the carried forward wye alternatives to minimize impacts.

3.1 Aquatic Ecosystems

Based on the NWI, Holland, and NHDB information available at the early stage of planning, the aquatic plant communities and land cover types identified in the study area include wetland habitat, vernal pool regions, streams, creeks or canals, lakes/ponds, and swamps/marshes. Of these land cover types, wetland habitat, vernal pool regions, and swamps/marshes are considered "Wetlands," whereas streams, creeks or canals, lakes/ponds are considered "Other Waters of the United States." Corresponding aquatic resource mapping that was prepared for the Merced to Fresno Section Checkpoint C in March 2012 is included in these categories. These categories are discussed in further detail below, and acreages are provided in Table 3-1. All aquatic land cover types identified have the potential to be jurisdictional for purposes of federal or state law, pending verification from USACE and the California Department of Fish and Wildlife (CDFW).

Data collection on wetlands and other waters of the U.S. will be refined to include field observations and formal delineation (where access is granted) during preparation of the Draft SEIR/SEIS technical studies, and a more refined list of wetland types, acreages, and functions and services will be available for review and evaluation during the Supplemental Checkpoint C process. This same level of refined mapping for wetland and other waters of the U.S. mapping is not available for withdrawn wye alternatives and station location options. As a result, to equally evaluate the alternatives and select a reasonable range that is most likely to contain the LEDPA, the landscape level GIS data is the only and best available data at this stage of planning. This approach likely results in conservative (higher than actual) estimates of total acres of impacts. Although the impacts estimated in this Supplemental Checkpoint B Summary Report are likely higher than what will result from the more detailed evaluation in the Draft SEIR/SEIS, the impacts of each alternative evaluated in this Supplemental Checkpoint B Summary Report are expected to be proportional to the more detailed analysis that will be provided in the Draft SEIR/SEIS. Detailed data collection refined with field observation and formal delineation data will be included as part of the Draft SEIR/SEIS process to more accurately document anticipated impacts.

3.1.1 Wetlands

3.1.1.1 Seasonal Wetlands

Seasonal wetlands are included in the Wetland Habitat designation of Table 3-1. Seasonal wetlands are wetlands that tend to be inundated only during the wetter seasons (i.e., winter and spring). Vernal pools, a distinct type of seasonal wetland, are discussed separately below. The seasonal wetlands in the delineation area that are not vernal pools contain species such as iris-leaved rush (*Juncus xiphioides*), creeping spikerush (*Eleocharis macrostachya*), white-tipped clover (*Trifolium variegatum*), hyssop-loosestrife (*Lythrum hyssopifolium*), rabbitsfoot grass (*Polypogon monspeliensis*), Italian ryegrass (*Festuca perennis*), and Mediterranean barley (*Hordeum marinum ssp. gussoneanum*).

Seasonal wetlands are a subclass of depressional wetlands and are considered palustrine emergent seasonally flooded (PEMC) (i.e., seasonally flooded).

3.1.1.2 Riparian Habitat

Riparian habitat is included in the Wetland Habitat designation of Table 3-1. Riparian communities are generally located on the banks of natural waterways, including streams, sloughs, and rivers and, in some cases, constructed watercourses. Riparian plant communities typically consist of overstory species that are obligate (>99% probability of occurring in wetlands) or facultative (having a 67% to 99% estimated probability of occurring in wetlands) wetland species. They typically include a canopy of Fremont cottonwood (*Populus fremontii*), white alder (*Alnus rhombifolia*), and Valley oak (*Quercus lobata*), with an understory of willow's (*Salix spp.*) blackberry's (*Rubus spp.*), and wild grape (*Vitis californica*).

Riparian wetlands are considered palustrine forested wetlands.

3.1.1.3 Vernal Pool

All vernal pool types are included in the Vernal Pool Region designation of Table 3-1.

The Merced to Fresno Section crosses one main vernal pool region, the San Joaquin Valley Region as defined by the State of California in CDFGs' May 1998 *California Vernal Pool Assessment Preliminary Report*. According to this report, the San Joaquin Valley Vernal Pool Region occupies the low-lying San Joaquin Valley; no parts of the region are over 500 feet in elevation. The region stretches from central San Joaquin County to northern Kern County. It includes several well-known pool complexes: the San Luis National Wildlife Refuge in Merced County, Sandy Mush Road in Merced County (not currently an easement acquisition boundary), the Cottonwood Creek, and Pixley Vernal Pools Preserve in Tulare County. This region is the southern Great Valley analog to the Solano-Colusa Region of the Sacramento

Valley. It occupies basin margin alkaline soils and shares many plant species with the Solano-Colusa Region, including the rare San Joaquin saltbush (*Atriplex joaquiniana*) and Sacramento saltbush (*Atriplex persistens*). It contains the endemic rare species lesser saltscale (*Atriplex miniscula*) and San Joaquin Valley Orcutt's grass (*Orcuttia inaequalis*). The area may be contrasted with the Solano-Colusa Region to the north by a more extensive development of alkaline claypan pools, well-developed transition of these pools to extensive alkaline wetlands, and lower average annual precipitation. Northern Claypan is the primary pool type known from the region. Northern Claypan pools are scattered throughout the region in the lower elevations of the main San Joaquin Valley and may occur as small mima mound types or larger alkali pools. Some of these verge on other playa-like alkali wetlands and Valley Sink Scrub. Large areas of Northern Claypan pools have been lost to agriculture and urban development. The widespread development of drip irrigation in the last decade has resulted in the conversion of many acres of vernal pool habitat to vineyards and orchards.

Vernal pool wetlands are a subclass of depressional wetlands and are considered PEMC (i.e., seasonally flooded).

3.1.1.4 Freshwater Emergent Marsh

Fresh emergent marsh is included in the Swamps/Marshes designation of Table 3-1. Freshwater emergent marsh in the delineation area is generally associated with perennial drainages, sloughs, and irrigation canals. The density of freshwater emergent marsh vegetation varies from small scattered clumps to large, dense stands. The dominant vegetation in freshwater emergent marsh consists of erect, herbaceous hydrophytes (water-adapted plants) that are rooted in saturated or inundated soils, including broadleaf cattail (*Typha latifolia*), narrowleaf cattail (*T. angustifolia*), hardstem bulrush (*Schoenoplectus acutus*), and California bulrush (*Schoenoplectus californicus*). Other species that may be observed in freshwater emergent marsh are watercress (*Nasturtium officinale*), willow smartweed (*Polygonum lapathifolium*), and seep monkeyflower (*Mimulus guttatus*).

Freshwater emergent marsh wetlands are considered palustrine emergent wetlands (PEM).

3.1.2 Other Waters of the United States

3.1.2.1 Natural Watercourses

Natural watercourses are included in the Streams, Creeks or Canals designation of Table 3-1. The other waters identified in the delineation area are canals, drainages (perennial, intermittent, and ephemeral), drainage ditches, lakes, ponds, reservoirs, and sloughs. Of these waters, perennial, intermittent, and ephemeral drainages are considered natural water courses, whereas canals and drainage ditches are considered constructed water courses. All watercourses in the delineation area are considered Riverine systems (R).

Perennial drainages exhibit well-developed channels and may support wetland vegetation and/or a riparian corridor along their banks. They can have a subsystem of lower perennial or upper perennial waters (R2 and R3); the class varies with the individual water course. The named perennial drainages in the delineation area are San Joaquin River, Eastside Bypass, Chowchilla River, Ash Slough, and Berenda Slough.

Intermittent drainages convey flows seasonally (i.e., during wetter times of the year) and generally exhibit well-developed channels with a distinct bed and bank. Intermittent drainages receive water from groundwater, precipitation, and surface runoff. Intermittent drainages are considered riverine intermittent streambed (R4SB).

Ephemeral drainage features include roadside ditches constructed in uplands to drain uplands. Ephemeral drainages are typically unlined, unvegetated, and appear to contain flows only during and immediately

following periods of rainfall. Ephemeral drainages are also considered riverine intermittent streambed (R4SB).

3.1.2.2 Constructed Water Courses

Constructed water courses are included in the Streams, Creeks or Canals designation of Table 3-1. Features determined to be canals consist of constructed, concrete-lined ditches that exhibit positive indicators of wetland hydrology but lack hydrophytic vegetation and hydric soils because of the cement-lined bottom. A well-defined ordinary high water mark (OHWM) is present on both sides of the canals in the form of a clear line (i.e., a watermark) and the presence of litter and debris. Irrigation canals have the same characteristics, but they have a soil bottom and, if not maintained, emergent vegetation can persist.

Drainage and irrigation ditches in the delineation area are ditches constructed in uplands for agricultural purposes. Drainage ditches are typically unlined, unvegetated, and appear to convey flows only when water is pumped into them during periods of active irrigation. While not all irrigation ditches are jurisdictional Waters of the U.S., this analysis considers all irrigation ditches within the delineation area to be jurisdictional. Therefore, this analysis represents a conservative estimate of impacts to jurisdictional Waters of the U.S.

Constructed water courses are considered riverine unknown perennial unconsolidated bottom (R5UB), with a modifier of artificially flooded (K).

3.1.2.3 Lakes, Ponds, Reservoirs, and Sloughs

Lakes, ponds (including stock ponds), reservoirs, and sloughs are included in Lakes/Ponds of Table 3-1. Lakes, ponds, reservoirs, and sloughs hold water for prolonged periods and have an inlet and/or outlet connecting them to other waters. These features may support a wetland fringe (e.g., freshwater emergent marsh) along their shorelines. Lakes, ponds, reservoirs and sloughs are considered lacustrine systems (L).

3.1.3 Impacts to Aquatic Resources

Construction activities within and adjacent to the construction footprint could have direct impacts on aquatic communities. These impacts could include crews removing vegetation and construction vehicles and personnel in the area, thereby disturbing the vegetation (i.e., trampling and crushing). With respect to vegetation removal, it should be noted that vegetation within the HST right-of-way would be permanently removed; however, adjacent vegetation requiring removal to accommodate construction operations (i.e., access and laydown areas) would be restored after construction activities are completed.

Indirect impacts on aquatic communities could include erosion, siltation, and runoff into natural and constructed watercourses; soil and water contamination from construction equipment leaks; construction-related dust reducing photosynthetic capability (especially during flowering periods); and an increased risk of fire (e.g., construction equipment use and smoking by construction workers) in adjacent open spaces. At the conceptual-level of engineering design available for this analysis, indirect impacts were assumed to be directly proportional to direct impacts (meaning that greater direct impacts are expected to correlate to greater indirect impacts). Therefore, because potential indirect impacts are expected to be similar to direct impacts, they were not analyzed separately. A full analysis of indirect impacts will be provided in the Supplemental Checkpoint C package.

Measures to minimize and/or avoid impacts during ground-disturbing activities could include monitoring within and adjacent to jurisdictional waters, installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill. Construction of access roads, vegetation removal, and other associated activities may be conducted in such a way as to avoid or minimize their

impact on sensitive resources. Processes for verification of adherence to habitat avoidance and minimization measures (monitoring) will be addressed in the project mitigation measures, and listed as conditions in the USFWS, CDFW, Regional Water Quality Control Board (RWQCB), and USACE permit authorizations. During or post-construction, disturbed jurisdictional waters would be restored using stockpiled and segregated soils to minimize impacts. Revegetation using appropriate plants and seed mixes, and maintenance monitoring would also be conducted to minimize impacts.

The following provides a general description of aquatic resources and potential impacts to these resources within the wye alternatives of the Merced to Fresno Section of the HST and describes how impacts to aquatic resources were considered in evaluating the alternatives. Table 3-1 summarizes the acreage of potential impact on wetland habitat; vernal pool regions; streams, creeks or canals; lakes and ponds; and swamps/marshes for each wye alternative withdrawn and carried forward.

Vernal pools and other seasonal wetlands are present within and adjacent to California annual grassland along the wye alternatives southwest of SR 99 between South Arboleda Drive and South Athlone Road south of Deadman Creek. Because of the large amount of agriculture in the San Joaquin Valley, the majority of features in this subsection are irrigation canals, sloughs, or creeks that are diverted for irrigation. Great Valley mixed riparian forest and other riparian vegetation are present along Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, and Dry Creek; the vegetation is fragmented, with varying degrees of quality depending on the extent of development. Coastal and valley freshwater marsh occurs along the fringes of several of these rivers, creeks, and sloughs. Direct and indirect impacts to vernal pools and Great Valley mixed riparian forest would occur during construction.

Riverine habitat with associated riparian corridors and wetlands is common along the wye alternatives. The riparian areas along the alternatives include: Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, Berenda Creek, Fresno River, and the San Joaquin River. Great Valley mixed riparian forest and other riparian vegetation are present along Deadman Creek, Chowchilla River, Ash Slough, Berenda Slough, and Berenda Creek, but are fragmented, with varying degrees of quality depending on the extent of development. Direct and indirect impacts to these riparian areas would occur during construction under all proposed wye alternatives.

The three alternatives with the least amount of impacts to aquatic resources include the SR 152 (North) to Road 13 Wye Alternative, the SR 152 (South) to Road 18 Wye Alternative, and the Avenue 21 to Road 13 Wye Alternative. All three of these alternatives are recommended to be carried forward for further analysis.

The three alternatives with the highest impacts to aquatic resources, specifically to high-quality vernal pool complexes, (South of GEA Wye Alternative, Avenue 22 Wye Alternative, and SR 140 Wye Alternative) will not be carried forward for further evaluation. The South of GEA Wye Alternative would have greater impacts to aquatic resources over the Henry Miller Road wye alternatives and SR 140 Wye Alternative because it would pass through disconnected remnant wetlands associated with the former San Joaquin floodplain, which now have vernal pool characteristics. The SR 140 Wye Alternative would have greater impacts to aquatic resources than the Henry Miller Road wye alternatives because it would pass through wetlands that are in and contiguous to the Kesterson Unit of the GEA, which is a collection of four National Wildlife Refuge Units and associated adjoining conservation easements.

Aquatic impacts also contributed to several other wye alternatives being withdrawn from further analysis, as other similarly aligned alternatives would have fewer impacts to aquatic resources and were thus carried forward. The withdrawn wye alternatives are:

- Avenue 24 to Road 11 Wye Alternative, Avenue 24 to East of Road 12 Wye Alternative, and Avenue 24 to Road 13 Wye Alternative are being withdrawn because they would impact

approximately 9 to 20 more acres of aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis.

- SR 152 (North) to Road 11 Wye Alternative is being withdrawn because it would result in more impacts to aquatic resources (147.2 acres) than the similarly aligned SR 152 (North) to Road 13 Wye Alternative (138.1 acres), which is being carried forward for further analysis.
- SR 152 (North) to Road 19 Wye Alternative and SR 152 (South) to Avenue 21 to Road 19 Wye Alternative have been withdrawn as they would impact approximately 2 to 14 more acres of aquatic resources than the similarly aligned SR 152 (North) to Road 18 Wye Alternative, which is being carried forward for further analysis. Other reasons for withdrawing these alternatives are summarized in Section 4.2.
- SR 152 (South) to Avenue 21 to SR 99 Wye Alternative, the Avenue 21 to SR 99 Wye Alternative, and the Avenue 21 to Road 19 Wye Alternative have been withdrawn, as they would each impact up to 6 acres more of aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which would have among the fewest impacts to aquatic resources among the wye alternatives and is being carried forward for further analysis. Other reasons for withdrawing these alternatives are summarized in Section 4.2.
- Avenue 21 to Road 11 Wye Alternative is being withdrawn because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis.

Table 3-1
 Wetlands and Other Waters Potentially Affected

Wye Alternatives	Carried Forward or Withdrawn	Wetland Habitat* (acres)	Vernal Pool Complex** (acres)	Streams, Creeks or Canals*** (miles)	Lakes/Ponds*** (acres)	Reservoir/Constructed Basin/Constructed Watercourse*** (acres)	Swamps/Marshes*** (acres)
SR 140 Wye	W	33.5	125.0	8.1	5.3	6.7	2.6
Avenue 24 to Road 11 Wye	W	54.4	48.2	21.2	8.9	11.9	3.9
Avenue 24 to East of Road 12 Wye	W	58.1	48.6	26.1	10.7	17.2	3.9
Avenue 24 to Road 13 Wye	W	56.7	49.9	23.2	7.8	14.7	3.9
SR 152 (North) to Road 11 Wye	W	62.1	40.4	24.4	8.0	8.4	3.9
SR 152 (North) to Road 13 Wye	C	56.3	41.0	20.0	7.0	9.9	3.9
SR 152 (North) to Road 18 Wye	C	63.5	41.1	24.9	7.5	5.6	3.9
SR 152 (North) to Road 19 Wye	W	56.9	42.5	20.3	7.7	25.0	3.9
SR 152 (South) to Road 18 Wye	C	61.2	41.1	21.6	7.0	5.5	3.9
SR 152 (South) to Avenue 21 to SR 99 Wye	W	53.8	40.7	25.2	8.3	18.1	3.9
SR 152 (South) to Avenue 21 to Road 19 Wye	W	53.8	43.2	22.1	7.6	14.5	4.0
Avenue 22 Wye	W	50.5	101.7	22.9	8.4	16.0	4.5
Avenue 21 to Road 11 Wye	W	55.9	40.5	23.2	11.6	16.3	3.9
Avenue 21 to Road 13 Wye	C	52.3	41.1	22.3	6.2	15.6	3.9
Avenue 21 to SR 99 Wye	W	53.1	40.7	27.3	6.7	21.4	3.9
Avenue 21 to Road 19 Wye	W	53.1	43.2	23.7	6.4	16.9	4.0
South of GEA Wye	W	35.7	197.5	20.4	4.7	7.5	0.04
Notes: *National Wetland Inventory (2012); Merced to Fresno Section Checkpoint C (2012) ** Department of Fish and Game - Holland Vernal Pools, complexes (2009); Merced to Fresno Section Checkpoint C (2012) *** National Hydrography Dataset (2009); Merced to Fresno Section Checkpoint C (2012)							

3.2 Practicability

As part of its effort to determine which alternatives to carry forward, FRA and the Authority analyzed the practicability of the HST track alignments. The term “practicable” means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. This analysis was conducted using evaluation criteria established pursuant to the Section 404(b)(1) Guidelines.

3.2.1 Journey Time

The HST System must meet California’s need for reliable, high-speed, lower emissions transit in a manner that is consistent with provisions of Proposition 1A, the Safe, Reliable, High-Speed Passenger Train Bond Act, adopted by California voters in November 2008 (Streets & Highways Code § 2704, et seq.). That initiative states:

[m]aximum express service travel times for each corridor that shall not exceed the following:

- (1) San Francisco-Los Angeles Union Station: 2 hours, 42 minutes.
 - (2) Oakland-Los Angeles Union Station: 2 hours, 42 minutes.
 - (3) San Francisco-San Jose: 31 minutes.
 - (4) San Jose-Los Angeles: 2 hours, 14 minutes.
 - (5) San Diego-Los Angeles: 1 hour.
 - (6) Inland Empire-Los Angeles: 29 minutes.
 - (7) Sacramento-Los Angeles: 2 hours, 22 minutes.
 - (8) Sacramento-San Jose: 1 hour, 12 minutes.
- (Streets & Highways Code § 2704.09[b]).

Additional journey time contributed to three of the wye alternatives being withdrawn from further analysis: SR 140 Wye Alternative, SR 152 (South) to Avenue 21 to Road 19 Wye Alternative, and Avenue 21 to Road 19 Wye Alternative. Each of these wye alternatives would add from approximately 1.5 to 4 minutes of travel time to Merced relative to other wye alternatives with the next longest journey times, which contributed to these wye alternatives being withdrawn from further analysis.

3.2.2 Relative Construction Costs

The HST System must meet California’s need for reliable, high-speed, lower emissions transit in a manner that is consistent with provisions of Proposition 1A, the Safe, Reliable, High-Speed Passenger Train Bond Act, adopted by California voters in November 2008 (Streets & Highways Code § 2704, et seq.). That initiative states, in relevant part: “[i]n order to reduce impacts on communities and the environment, the alignment for the HST system shall follow existing transportation or utility corridors to the extent feasible and shall be financially viable, as determined by the authority” (Streets & Highways Code § 2704.09[g]).

As shown in Table 3-2, the Avenue 21 to SR 99 Wye Alternative has a capital cost of more than \$7.3 billion, the highest estimated capital cost of all the wye alternatives and approximately \$1.5 to \$1.8 billion (approximately 26% to 33%) more than the other Avenue 21 wye alternatives. The Avenue 21 to Road 13 Wye Alternative would impact fewer aquatic resources than the Avenue 21 to SR 99 Wye Alternative and has a capital cost of approximately \$5.8 billion. The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative would cost approximately \$7.2 billion (approximately \$1.4 to \$1.7 billion more than the other SR 152 [South] wye alternatives). The expenditure of an additional \$1.4 to \$1.8 billion for these alternatives would not yield a justifiably significant environmental benefit relative to the other wye alternatives under consideration. For example, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative would have an impact on 145.2 acres of aquatic resources, and the Avenue 21 to SR 99 Wye Alternative would have an impact on 153.1 acres of aquatic resources. Neither of these impacts would

represent a substantially lower impact on aquatic resources than other alignment alternatives: two of the wye alternatives would have a smaller impact than the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative, and nine alignment alternatives would have a smaller impact than the Avenue 21 to SR 99 Wye Alternative. Therefore, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative and the Avenue 21 to SR 99 Wye Alternative have been withdrawn from further evaluation because they are not “financially viable” relative to the other feasible wye alternatives being carried forward. Additional reasons for withdrawing these wye alternatives are summarized in Section 4.2.

The South of GEA Wye Alternative was not carried forward in one of the program-level corridors evaluated as part of the 2008 Bay Area to Central Valley Program EIR/EIS and is being considered here to confirm that one of the program-level corridors contains the LEDPA (Caltrain/Pacheco/Henry Miller Avenue and Caltrain/Pacheco/GEA North/Merced). The South of GEA Wye Alternative has a cost that is 35% higher, or approximately \$1.9 billion more, than the SR 140 Wye Alternative; this is associated with the additional approximately 30 miles that would be constructed for the South of GEA Wye Alternative compared to the SR 140 Wye Alternative. The expenditure of an additional \$1.9 billion for this alternative would not yield a justifiably significant environmental benefit relative to the other wye alternatives under consideration. For example, the 265.8 acres of aquatic impacts would be the highest of any of the wye alternatives. Therefore, this wye alternative is also considered to not be “financially viable” and has been withdrawn. Other reasons for withdrawal are discussed above and in later sections, and summarized in Section 4.2.

Table 3-2
 Cost Estimates

Wye Alternatives	Carried Forward or Withdrawn	Capital Cost (\$ Millions)
SR 140 Wye	W	\$5,276
Avenue 24 to Road 11 Wye	W	\$5,830
Avenue 24 to East of Road 12 Wye	W	\$5,456
Avenue 24 to Road 13 Wye	W	\$5,233
SR 152 (North) to Road 11 Wye	W	\$6,170
SR 152 (North) to Road 13 Wye	C	\$6,250
SR 152 (North) to Road 18 Wye	C	\$6,723
SR 152 (North) to Road 19 Wye	W	\$6,705
SR 152 (South) to Road 18 Wye	C	\$6,840
SR 152 (South) to Avenue 21 to SR 99 Wye	W	\$7,193
SR 152 (South) to Avenue 21 to Road 19 Wye	W	\$6,570
Avenue 22 Wye	W	\$5,935
Avenue 21 to Road 11 Wye	W	\$5,530
Avenue 21 to Road 13 Wye	C	\$5,836
Avenue 21 to SR 99 Wye	W	\$7,338
Avenue 21 to Road 19 Wye	W	\$5,646
South of GEA Wye	W	\$7,103

⁴ Capital costs are the total costs to construct the HST System for the wye alternatives are comprised of certain basic cost categories: track structures and track; site work, right-of-way, land, and existing improvements; communications and signaling; and electric traction.

3.2.3 Logistics of Implementation/Constructability

None of the wye alternatives was withdrawn from further consideration due to constructability or implementation issues.

3.2.4 Displacement Impacts

As shown in Table 3-3, the wye alternatives with the highest number of potential displacements are the SR 152 (North) wye alternatives. Each of these wye alternatives would result in over 130 residential displacements; however, this range of displacements is comparable to similarly aligned wye alternatives along Avenue 24 and Avenue 21. None of the wye alternatives was withdrawn due to displacement impacts.

Table 3-3
 Potential Displacements

Wye Alternatives	Carried Forward or Withdrawn	Residential Displacements	Business Displacements
SR 140 Wye	W	83-98	18-20
Avenue 24 to Road 11 Wye	W	131-143	1-3
Avenue 24 to East of Road 12 Wye	W	111-122	4-5
Avenue 24 to Road 13 Wye	W	129-143	2-5
SR 152 (North) to Road 11 Wye	W	133-158	9-13
SR 152 (North) to Road 13 Wye	C	142-163	5-10
SR 152 (North) to Road 18 Wye	C	137-160	7-15
SR 152 (North) to Road 19 Wye	W	136-153	5-8
SR 152 (South) to Road 18 Wye	C	132-155	9-16
SR 152 (South) to Avenue 21 to SR 99 Wye	W	130-146	6-9
SR 152 (South) to Avenue 21 to Road 19 Wye	W	137-153	3-6
Avenue 22 Wye	W	102-111	4-6
Avenue 21 to Road 11 Wye	W	128-144	2-3
Avenue 21 to Road 13 Wye	C	128-142	2-3
Avenue 21 to SR 99 Wye	W	126-137	5-6
Avenue 21 to Road 19 Wye	W	133-144	2-3
South of GEA Wye	W	77-86	9-10

3.3 Other Significant Adverse Environmental Consequences

3.3.1 Biological Impacts

The plant communities and special status species habitats occurring along each of the wye alternatives were identified by reviewing existing Geographic Information System (GIS) databases. Comprehensive field-level reconnaissance surveys have not been conducted for all wye alternatives to verify the presence or absence of these resources. At this conceptual-level of engineering and analysis, and based on the GIS resources consulted, it is assumed, solely for the limited purposes of this Supplemental Checkpoint B Summary Report, that there is suitable habitat and an increased likelihood of presence of each listed special status species. The Authority and FRA believe this to be suitable for use as a conservative (high) estimate to determine the potential impact to each of the biological resources assumed to be present.

The CNDDDB includes a number of highly sensitive species (such as the giant kangaroo rat), including one presumed to be extinct (Hoover's cryptantha), within the vicinity of the wye alternatives. The South of GEA Wye Alternative would potentially impact an area in which the giant kangaroo rat has been observed based on this CNDDDB record; potentially significant delays to the project could occur in the event that pre-construction surveys determine presence of this species. All wye alternatives along Avenue 24, SR 152 (North), SR 152 (South), and Avenue 22 are within the vicinity of prior observed occurrences of Hoover's cryptantha, now presumed extinct. In the event that pre-construction surveys determine presence of this species, the CDFW would not be able to issue a take permit, resulting in significant delays in construction to identify an avoidance strategy.

The following conclusions are summarized from Table 3-4:

The South of GEA Wye Alternative, which was not identified as the Program Alignment in the *2008 Bay Area to Central Valley Program EIR/EIS*, would have among the greatest potential impacts to sensitive species and species habitats (including vernal pool complex impacts previously mentioned) of all wye alternatives and does not represent the LEDPA.

Similar to the South of GEA Wye Alternative, the SR 140 Wye Alternative would potentially impact many species identified on the CNDDDB that would not be impacted by any other wye alternative. Additionally, the SR 140 Wye Alternative would impact less acreage of habitat occupied by moestan blister beetle and giant garter snake, but almost twice as many acres of CNDDDB-listed longhorn fairy shrimp as any other wye alternative. In addition, the SR 140 Wye Alternative would be the only wye alternative to impact the North Grasslands Wildlife Area.

The SR 152 (North) wye alternatives and the SR 152 (South) to Road 18 Wye Alternative would impact nearly 200 more acres of recurved larkspur and Hoover's cryptantha than the other wye alternatives.

The two SR 152 (South) to Avenue 21 wye alternatives, four Avenue 21 wye alternatives, and one Avenue 22 wye alternative would impact over 100 more acres of lesser saltscale and heartscale than the other wye alternatives.

All other wye alternatives not listed above would impact a similar number of acres of biological resources.

Table 3-4
 Direct Biological Impacts

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye	
California Wildlife Habitat Relationships (CWHR) Range Data																	
California Red-Legged Frog (acres)	95	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	94
San Joaquin Kit Fox (acres)	1,219	1,755	1,722	1,693	1,708	1,561	1,696	1,567	1,648	1,578	1,580	1,642	1,603	1,505	1,569	1,547	2,024
California Tiger Salamander (acres)	2,168	3,476	3,453	3,618	3,998	3,647	4,158	4,027	4,150	3,300	3,663	3,517	3,753	3,631	3,374	3,778	2,870
Critical Habitat																	
Vernal pool tadpole shrimp (acres)	<0.1	2.8	0	0	2.8	0	0	1.5	0	0	0.1	0	2.8	0	0	1.5	0
Vernal pool fairy shrimp (acres)	<0.1	2.8	0	0	2.8	0	0	0	0	0	0	0	2.8	0	0	0	0
San Joaquin Orcutt Grass (acres)	0	0	0	0	0	0	0	1.5	0	0	0.1	0	0	0	0	1.5	0
Colusa grass (acres)	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hoover's spurge (acres)	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye	
Vernal pool tadpole shrimp (acres)	<0.1	2.8	0	0	2.8	0	0	1.5	0	0	0.1	0	2.8	0	0	1.5	0
Vernal pool fairy shrimp (acres)	<0.1	2.8	0	0	2.8	0	0	0	0	0	0	0	2.8	0	0	0	0
Conservancy fairy shrimp (acres)	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Natural Diversity Database (CNDDB)																	
moestan blister beetle (acres)	62	127	116	161	124	129	125	202	125	110	289	169	161	161	110	289	62
California Tiger Salamander (acres)	0.2	0	0	0	0	0	0	0.01	0	0	0.01	0	0	0	0	0.01	0
giant garter snake (acres)	14	442	442	442	437	422	452	422	445	402	437	371	420	420	409	420	8.0
western pond turtle (acres)	5.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	0
hispid bird's beak (acres)	0	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	0
recurved larkspur (acres)	0	15	18	9.6	229	194	174	181	231	39	40	21	0	0	0	0	0

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye	
lesser saltscale (acres)	0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	158	106	126	100	201	139	90	0.1
Hoover's cryptantha (acres)	0	15	18	9.6	229	194	174	181	231	39	40	21	0	0	0	0	0
American badger (acres)	0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	0
northern harrier (acres)	0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	0
Wright's tricho- coronis (acres)	0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	0
Swainson's hawk (acres)	13	12	16	17	7.6	17	17	17	17	17	17	16	11	18	16	17	16
San Joaquin Kit Fox (acres)	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
Cismontane Alkali Marsh (acres)	3.7	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	0
heartscale (acres)	0	35	35	35	35	35	35	35	35	167	137	157	131	232	147	121	1.8
Sanford's arrowhead (acres)	18	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	0

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye	
longhorn fairy shrimp (acres)	553	285	285	285	285	285	285	285	261	261	285	240	285	285	261	285	0
Yuma myotis (acres)	1.7	0	0	0.6	0	0	0	1.0	1.5	4.7	1.0	1.7	0	0	4.7	1.0	1.7
subtle orache (acres)	0	0	0	0	21	0	21	0	0	20	22	74	4.5	85	0.7	0.7	0
succulent owl's clover (acres)	7.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.1
forked hare- leaf (acres)	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California linderiella (acres)	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
western spadefoot (acres)	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
western mastiff bat (acres)	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
delta button- celery (acres)	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
round-leaved filaree (acres)	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye	
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye		
tricolored blackbird (acres)	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
burrowing owl (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6
Nelson's antelope squirrel (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
blunt nosed- leopard lizard (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
California horned lark (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6
San Joaquin whipsnake (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.1
giant kangaroo rat (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.0
prairie falcon (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Valley Sacaton Grassland (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125

Species/ Habitat	SR 140 Wye	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 22	Avenue 21				South of GEA Wye
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye		Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye	
Vernal Pool Tadpole Shrimp (acres)	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildlife Refuges/Conservation Areas																	
Grasslands Ecological Area (acres)	90	268	268	268	268	268	268	268	243	243	244	244	268	268	243	268	0
North Grasslands Wildlife Area (acres)	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.3.2 Agricultural Impacts

The agricultural resources occurring along each of the wye alternatives were identified by reviewing the existing Farmland Mapping and Monitoring Program (FMMP) and Williamson Act GIS databases.

As seen in Table 3-5, all of the wye alternatives would impact hundreds of acres of important agricultural resources and Williamson Act lands. There also would be substantial agricultural parcel severance issues related to the following alternatives along SR 152 (South): SR 152 (South) to Road 18 Wye Alternative, SR 152 (South) to Avenue 21 to SR 99 Wye Alternative, and SR 152 (South) to Avenue 21 to Road 19 Wye Alternative.

Agricultural resource impacts would be roughly equivalent and equally significant among most wye alternatives. However, high agricultural impacts contributed to the decision to withdraw the following alternatives: SR 152 (North) to Road 19 Wye Alternative, SR 152 (South) to Avenue 21 to SR 99 Wye Alternative, and SR 152 (South) to Avenue 21 to Road 19 Wye Alternative.

Table 3-5
 Direct Agricultural Resource Impacts

Wye Alternatives	Carried Forward or Withdrawn	Farmland of Local Importance (ac)	Prime Farmland (ac)	Unique Farmland (ac)	Farmland of Statewide Importance (ac)	Williamson Act Farmland (ac)
SR 140	W	139	607	536	466	760
Avenue 24 to Road 11 Wye	W	197	934	791	680	1,148
Avenue 24 to East of Road 12 Wye	W	189	971	771	682	1,070
Avenue 24 to Road 13 Wye	W	225	1,032	746	677	1,073
SR 152 (North) to Road 11 Wye	W	186	1,133	736	778	1,191
SR 152 (North) to Road 13 Wye	C	182	908	737	687	1,024
SR 152 (North) to Road 18 Wye	C	211	1,147	899	577	1,123
SR 152 (North) to Road 19 Wye	W	194	1,023	1,017	609	1,353
SR 152 (South) to Road 18 Wye	C	200	1,244	1,014	773	1,286
SR 152 (South) to Avenue 21 to SR 99 Wye	W	187	1,024	746	689	1,147
SR 152 (South) to Avenue 21 to Road 19 Wye	W	233	1,155	960	672	1,492
Avenue 22 Wye	W	200	967	912	588	1,217
Avenue 21 to Road 11 Wye	W	256	1,074	876	748	1,303

Wye Alternatives	Carried Forward or Withdrawn	Farmland of Local Importance (ac)	Prime Farmland (ac)	Unique Farmland (ac)	Farmland of Statewide Importance (ac)	Williamson Act Farmland (ac)
Avenue 21 to Road 13 Wye	C	257	1,058	748	760	1,192
Avenue 21 to SR 99 Wye	W	187	961	830	539	1,030
Avenue 21 to Road 19 Wye	W	232	1,092	1,085	517	1,399
South of GEA	W	241	790	672	967	1,512

3.3.3 Consistency with Local Plans

Each wye alternative was checked for consistency with the Merced County General Plan, the Madera County General Plan, the San Joaquin Valley Blueprint Planning Process, the Madera County 2011 Regional Transportation Plan, the 2011 Regional Transportation Plan for Merced County, and the City of Chowchilla 2040 General Plan. There was no difference between wye alternatives in regard to consistency with local plans. Therefore, none of the wye alternatives was withdrawn due to inconsistencies with local plans.

3.3.4 Cultural Resources

The wye alternatives are located in an area that is highly sensitive for archaeological deposits and contains National Register Historic Properties (NRHP) and known archaeological sites. The impacted NRHP-eligible resources are long linear resources (water conveyance features and a 12-mile tree row) that would be bisected by the wye alternatives at several points of the alignment alternatives. Since all of the wye alternatives would impact from six to twelve NRHP-eligible or listed properties, and because the resources are linear in nature and are bisected by the alignment alternatives, these impacts are considered unavoidable; none of the wye alternatives was withdrawn from further analysis based on potential impacts to cultural resources.

3.3.5 Section 4(f) Resources

The Section 4(f) resources that exist in each of the wye alternatives were identified by taking an inventory of all public parks, recreation areas, NRHP-listed or potentially eligible historic properties, and wildlife/waterfowl refuges within 1,000 feet of any of the wye alternatives. Only under certain circumstances, school playfields may also qualify for Section 4(f) protection. For this reason, school district resources are not listed in the Section 4(f) discussion and, instead, follow in Section 3.3.6. Consultation with a majority of the agencies with jurisdiction over 4(f) resources in the study area was initiated in 2010 and is on-going.

Each of the wye alternatives would have the same potential for use of one recreational Section 4(f) resource, the Los Banos Wildlife Management Area. Furthermore, one school facility (Fairmead Elementary School) would be directly affected by the SR 152 (South) to Road 18 Wye Alternative. Presently, it is unknown if this facility qualifies for Section 4(f) protection. Otherwise, there is no potential for use under Section 4(f) of any parks, recreation, or wildlife/waterfowl refuge resources. However, each of the wye alternatives would potentially result in direct impacts to between six and twelve protected historic properties. No wye alternative was withdrawn from further analysis based on potential Section 4(f) use.

3.3.6 School Impacts

As part of its effort to determine which alternatives to carry forward, FRA and the Authority analyzed potential impacts to local schools and school districts. Using GIS, schools within 1,500 feet of the alternatives were identified. The number of schools identified does not necessarily represent an actual impact to the school, as impacts will either be avoided to the extent feasible with refinements to the design, or minimized through appropriate mitigation measures.

As shown in Table 3-7, up to two schools are located within 1,500 feet of the wye alternatives with one school, Fairmead Elementary school being directly affected by the SR 152 (South) to Road 18 wye alternative. It is unknown if this facility qualifies for Section 4(f) protection at this time. Further design refinement may result in being able to avoid any impact to schools for most of the wye alternatives. None of the wye alternatives was withdrawn from further analysis based on potential impacts to schools.

Table 3-6
 Schools within 1,500 Feet of the Wye Alternatives

Wye Alternatives	Carried Forward or Withdrawn	Number of Schools within 1,500 feet*
SR 140 Wye	W	2
Avenue 24 to Road 11 Wye	W	0
Avenue 24 to East of Road 12 Wye	W	0
Avenue 24 to Road 13 Wye	W	0
SR 152 (North) to Road 11 Wye	W	1
SR 152 (North) to Road 13 Wye	C	1
SR 152 (North) to Road 18 Wye	C	1
SR 152 (North) to Road 19 Wye	W	1
SR 152 (South) to Road 18 Wye	C	1
SR 152 (South) to Avenue 21 to SR 99 Wye	W	1
SR 152 (South) to Avenue 21 to Road 19 Wye	W	0
Avenue 22 Wye	W	2
Avenue 21 to Road 11 Wye	W	0
Avenue 21 to Road 13 Wye	C	1
Avenue 21 to SR 99 Wye	W	1
Avenue 21 to Road 19 Wye	W	0
South of GEA Wye	W	0

Notes: *The number of schools within 1,500 feet of the alignment does not represent actual impacts to schools. Impacts to schools will be avoided to the extent feasible.

3.3.7 Aesthetic/Visual Resources

All of the wye alternatives would have similar impacts to visual resources, except the SR 140 Wye Alternative, which would be the only wye alternative to impact the North Grasslands Wildlife Area and result in high visual intrusiveness by adding a train river crossing within a state park. Aesthetic/visual resource impacts contributed to the withdrawal of the SR 140 Wye Alternative from further consideration.

4.0 No-Fill Alternative

To assure a robust evaluation of alternatives pursuant to the 404(b)(1) process, a no-fill alternative is evaluated to determine whether the project can be practicably implemented (i.e., constructed) without the discharge of fill into Waters of the United States. If there is a practicable no-fill alternative, it would then serve as the LEDPA.

Throughout the project development process, the Authority and FRA have sought to balance the regulatory need to minimize and avoid impacts to jurisdictional areas (e.g., by shifting the alignment and/or maximizing the use of elevated structures), taking into account the project's purpose and need, along with design, engineering, cost, and environmental criteria. Despite adherence to a rigorous alternatives screening and evaluation process, the Authority and FRA are unable to identify a practicable "no-fill alternative." In addition, a no-fill alternative would have other significant adverse environmental effects as described below.

4.1 No Practicable No-Fill Alternative

The 404(b)(1) Guidelines state that an alternative is *practicable* "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes." 40 CFR § 230.10(a)(2). The purpose of the statewide HST System is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of the state, and that delivers predictable and consistent travel times. The purpose of this project is to implement the Merced to Fresno Section: Wye Alternatives of the California HST System to provide the public with high-speed electric-powered rail service as an alternative to vehicular and other types of travel that generate higher emissions of pollutants, while providing predictable and consistent travel times between major urban centers, and connectivity to airports, mass transit systems, and the highway network through the San Joaquin Valley. The project would implement the critical segment of the HST System that connects the Bay Area to the Central Valley HST sections.

Specifically, the Merced to Fresno HST Project section would connect a Merced station and a Fresno station via a portion of the already adopted Hybrid Alternative. The planned HST line west of the Merced to Fresno Section is through the Pacheco Pass, and will connect the San Francisco to San Jose HST Project to the Central Valley and the rest of the HST System. North of the Merced Station, the HST line is planned to continue to Sacramento. South of the Downtown Fresno Station, the HST line is planned to continue to Los Angeles through Bakersfield and Palmdale.

The HST System must meet California's need for reliable, high-speed, lower emissions transit in a manner that is consistent with provisions of Proposition 1A, the Safe, Reliable, High-Speed Passenger Train Bond Act, adopted by California voters in November 2008 (Streets & Highways Code § 2704, et seq.). That initiative states: "[i]n order to reduce impacts on communities and the environment, the alignment for the HST system shall follow existing transportation or utility corridors to the extent feasible and shall be financially viable, as determined by the authority" (Streets & Highways Code § 2704.09(g)). In addition, the project must be designed to "[p]reserv[e] wildlife corridors and mitigating impacts to wildlife movement, where feasible as determined by the authority, in order to limit the extent to which the system may present an additional barrier to wildlife's natural movement." *Id.* § 2704.09(j).

- **Financial Considerations** – Taking into account that tax revenues and public monies are the source of funding for the HST System, which includes the proposed project, and consistent with the legal requirement that the HST project must be "financially viable," the Authority and FRA have emphasized the need to maximize the use of at-grade construction. However, in locations where impacts to aquatic features are unavoidable, or where system design dictates (e.g., in

order to meet public safety requirements), it would be appropriate to investigate whether an elevated structure would be a feasible and cost effective alternative to an at-grade design.

4.1.1 Construction of a No-Fill Alternative Would Be Cost Prohibitive

There is no practicable HST alignment for the Merced to Fresno Section: Wye Alternatives that would follow existing transportation or utility corridors to the maximum extent feasible without crossing waters of the United States. To design a no-fill alternative, portions of the Merced to Fresno Section that cross jurisdictional waters would need to be built on elevated structure regardless of historical fills, the size of the jurisdictional water to be crossed, or the quality of those waters. Subject to cost variations related to the location and design demands for a particular segment of track, a 1-mile trackway built on an elevated structure costs approximately \$48 million, compared to costs for construction of an at-grade section, which typically are \$2.2 million. While typical construction costs for an elevated track segment is about 22 times more expensive than its at-grade counterpart, some aerial structures could cost considerably more than 22 times the cost of an at-grade structure.

In addition to the generally incomparable costs of construction for an elevated versus at-grade HST System, the engineering design criteria require track alignments that are mostly straight (tangent alignment) and, when required, use a large curve radius of up to 5 miles to safely achieve high speeds of up to 220 mph. This engineering requirement results in a rigid system (i.e., the design of the track alignments cannot easily and frequently accommodate vertical or horizontal deviations to avoid specific resources), while meeting the design criteria. A change in the track alignment to avoid one location can result in a shift in track alignment over a distance of 2 to 4 miles and, therefore, has the potential to affect other resources and facilities. Any attempt to avoid all jurisdictional waters would not be feasible due to the numerous occurrences and crossings of jurisdictional waters throughout the Merced to Fresno Section: Wye Alternatives HST study area. Thus, a no-fill alternative is not practicable from a cost standpoint in light of the purpose of the HST System and the legal requirements imposed on the HST System by Streets & Highways Code § 2704.09(g).

- **Logistics** – Design of a no-fill alternative to avoid all jurisdictional waters would add additional logistical complexity to project construction. An alternative design for any particular limited track segment of an HST System may not be prohibitive in terms of technological limitations; however, due to the linear nature of the project, the logistics of creating a more circuitous alignment that would result in additional road closures as it diagonally traverses farmlands or county roads to avoid the use of fill material for project construction would, at a minimum, result in cumbersome overcrossings, ineffective circulation, and inefficient use of adjacent lands. In addition, such a route would add significant distance and travel times and would therefore be inconsistent with the project's purpose.

If the alternative were designed as a primarily elevated structure, it would offer no efficiency advantages over other alternatives that avoid a greater amount of non-aquatic environmental resources. Therefore, it would not be practicable from a cost perspective.

- **Technical Considerations** – Construction of a no-fill alternative between Merced and Fresno is possible given existing technology, but is cost prohibitive.
- **Operational Impacts** – The no-fill alternative would require the addition of miles of track to the alignment, resulting in a longer journey. To avoid resources, the no-fill alternative also would require the addition of numerous curves that would require the HST to operate at reduced speed. These features would combine to result in the addition of substantial distance and longer travel times compared to other alternatives.

4.1.2 A No-Fill Alternative Would Have Greater Non-Aquatic Environmental Impacts

The 404(b)(1) Guidelines require the USACE to determine whether each project alternative, including a no-fill alternative, would cause other significant adverse environmental impacts compared to the carried forward alternatives (40 CFR § 230.10[a]). Compared to the carried forward alternatives, a no-fill alternative would result in more significant adverse impacts to several types of environmental resources, including the following:

- **Aesthetic Impacts** – With some variances related to height and location, the use of a primarily elevated structure that diagonally traverses the Merced to Fresno Section to avoid aquatic features would trigger additional visual and aesthetic impacts, both during project construction and during system operation. Significant impacts, and impacts with substantial intensity that cannot be mitigated, would result from extensive use of vertical elements of the aerial structure that would block views of natural resources and change the landscape character, or from the use of these structures in less developed areas.
- **Traffic Impacts** – As described above under Logistics, a no-fill alternative could introduce additional traffic impacts due to road closures designed as a result of creating a more circuitous alignment to avoid aquatic resources. The rerouting of traffic could also cause out-of-direction travel for individuals, adding time and distance to local roadway trips.
- **Noise Impacts** – In general, noise and vibration impacts would occur during project construction and system operation, whether the alternative is built at-grade or on elevated structure. However, train noise can be heard from a greater distance on an elevated structure than when operating at ground level. In addition, to the extent that the no-fill route must be longer and more circuitous to accommodate avoidance of all jurisdictional waters, both adverse construction and operational noise impacts would affect more receptors than the proposed project. While noise mitigation measures can be used to reduce impacts to local residents, businesses, and sensitive receptors (e.g., schools), the impact to be mitigated would be substantially greater and affect more receptors, and depending on the ability to deploy and the efficacy of mitigation, may remain significant following mitigation.
- **Air Quality Impacts (including greenhouse gas [GHG] emissions)** – In general, a no-fill alternative that involves constructing more structures or results in a longer, more circuitous alignment to avoid aquatic impacts, would result in greater construction-related air quality impacts.
- **Energy Generation or Consumption Impacts** - A no-fill alternative that results in a longer, more circuitous alignment to avoid aquatic impacts would result in a negligible increase in energy consumption needed to power the train.
- **Cultural Resources Impacts** – Due to the necessity of a longer, more circuitous route, a no-fill alternative on a primarily elevated structure requires definition of a larger area of potential project effect (APE) for both architectural and archaeological resources. A larger APE will likely result in the identification of additional cultural and historical resources considered “unique” under CEQA and/or eligible for national register status under the National Historic Preservation Act. In addition, the need for additional aerial structures and supporting straddle bents would result in the disturbance and destruction of additional subsurface resources. This is because bent structures require a greater depth of surface disruption when compared to at-grade alignment construction activities, which typically require a much less intrusive level of grading and disturbance. Consequently, both construction and operational adverse impacts to cultural and historical resources can be anticipated to be greater with the no-fill alternative.
- **Section 4(f) Resources Impacts** - Due to the necessity of a longer, more circuitous route, a no-fill alternative on a primarily elevated structure would likely result in the identification of

additional parks, refuges and historical sites subject to protection under Section 4(f) under the Department of Transportation Act of 1966 that would be subject to both construction and operational adverse impacts. For the HST Project, the FRA may not approve the use of a Section 4(f) property unless it determines there is no feasible or prudent alternative to avoid use of the property and all measures have been taken to minimize harm. If the no-fill alternative results in the use of Section 4(f) properties, it would create a regulatory conflict between the no-fill alternative and Section 4(f). Should the no-fill alternative pose a potential impact to parks, refuges or historical resources located adjacent to its longer, more circuitous alignment, it could result in the alternative being impracticable if it cannot be built to avoid those resources as a matter of sound engineering judgment under FRA's *Procedures for Considering Environmental Impacts* (64 FR 25445, May 26, 1999) and under 49 U.S.C. § 303.

- **Property Acquisition** – Due to the necessity of a longer, more circuitous route, a no-fill alternative on elevated structure would likely require the need to acquire additional property to avoid aquatic resources. Depending on location and the distance the alignment would need to be re-routed, this could result in greater environmental impacts to local resources and receptors and greater right-of-way acquisition costs for the project substantially.
- **Agriculture Impact** – Due to the necessity of a longer, more circuitous route that diagonally traverses farmlands, impacts to farmland and Williamson Act land may be greater with the no-fill alternative.

4.2 Summary of Grounds for Elimination of Alternatives

The following subsections and referenced materials provide preliminary explanation and justification for elimination of wye alternatives within the Merced to Fresno Section of the HST.

As shown in Table 4-1, FRA and the Authority have determined that 13 wye alternatives should be eliminated from further environmental review.

The reason for elimination for each of the wye alternatives is shown in Table 4-1, and the rationale for elimination is provided in further detail below. A detailed description and figures of these wye alternatives is provided in Section 2.6. Table 4-1 also provides the page number in the 2013 SAA (see Attachment 4) where additional discussion of the reasons for elimination is provided for 10 of the wye alternatives.

Table 4-1
 Reasons for Elimination

Wye Alternatives – 13 Withdrawn Alternatives	Purpose and Need	Impacts to Aquatic Resources	Impacts to Environment*	Relative Construction Costs	Logistics of Implementation/ Constructability	Incompatible with land use	Public/Agency Input	April 2013 Supplemental Alternatives Analysis (Attachment 4) Page Number	Comparison Matrix
SR 140 Wye	S	P	P			S		N/A**	Appendix B
Avenue 24 to Road 11 Wye		P						Page 20	Appendix B
Avenue 24 to East of Road 12 Wye		P						Page 21	Appendix B
Avenue 24 to Road 13 Wye		P						Page 21	Appendix B
SR 152 (North) to Road 11 Wye		P						Page 21	Appendix B
SR 152 (North) to Road 19 Wye		P	P					Page 21	Appendix B
SR 152 (South) to Avenue 21 to SR 99 Wye		P	P	P				Page 21	Appendix B
SR 152 (South) to Avenue 21 to Road 19 Wye		P	P					Page 21	Appendix B
Avenue 22 Wye		P						N/A**	Appendix B
Avenue 21 to Road 11 Wye		P						Page 22	Appendix B
Avenue 21 to SR 99 Wye	P			P				Page 22	Appendix B
Avenue 21 to Road 19 Wye	S	P	P					Page 22	Appendix B
South of GEA Wye		P	P	P				N/A**	Appendix B6

Wye Alternatives – 13 Withdrawn Alternatives	Purpose and Need	Impacts to Aquatic Resources	Impacts to Environment*	Relative Construction Costs	Logistics of Implementation/ Constructability	Incompatible with land use	Public/Agency Input	April 2013 Supplemental Alternatives Analysis (Attachment 4) Page Number	Comparison Matrix
<p>Notes: P = Primary reason; S = Secondary reason</p> <p>*"Impacts to Environment" refers to all impacts to the human and natural environment (except for aquatic resource impacts which are reported separately), including: biological resources, agricultural resources, cultural resources, parklands, noise and vibration impacts, visual/aesthetic, and displacements.</p> <p>** The SR 140 Wye Alternative, Avenue 22 Wye Alternative, and South of GEA Wye Alternative were evaluated in the San Jose to Merced PAA (June 2010) (see Section 2.2.2 and Appendix D).</p>									

Thirteen wye alternatives have been withdrawn from further analysis, and four are being carried forward. The wye alternatives carried forward are discussed in Section 4.3, and a summary of the rationale for the eliminated wye alternatives is provided below. Each of the wye alternatives being carried forward shares the same route along Henry Miller Road in the vicinity of Los Banos and was included in the program-corridor in the *2008 Bay Area to Central Valley Program EIR/EIS*. The other alternatives either had significantly greater aquatic resource impacts (such as the SR 140 Wye Alternative and South of GEA Wye Alternative) or potential agricultural impacts (such as the SR 152 East of Los Banos alternative). In addition to greater agricultural resource impacts, the SR 152 East of Los Banos Alternative would result in a longer alignment, with associated longer travel times, increased environmental impacts and increased costs (see Section 2.5.2). As a result, the wye alternatives following Henry Miller Road in the vicinity of Los Banos are far superior compared to the other options. The analysis in this Supplemental Checkpoint B Summary Report further confirms that the Caltrain/Pacheco/Henry Miller Avenue corridor evaluated in the *2008 Bay Area to Central Valley Program EIR/EIS* is most likely to contain the LEDPA.

SR 140 Wye Alternative: This wye alternative was withdrawn because the potential impacts to aquatic resources, particularly impacts on vernal pool complexes (125 acres), would be third highest of all of the wye alternatives. Also, this alternative would be the only wye alternative to impact the North Grasslands Wildlife Area, with 22 acres of impact. This wye alternative would result in high visual intrusiveness by adding a train river crossing within a state park. Further, this alternative would add 4 minutes of travel time between San Francisco and Los Angeles, which would likely make it inconsistent with the maximum travel time requirements of Proposition 1A of 2 hours and 40 minutes between Los Angeles Union Station and the Transbay Terminal in San Francisco. Therefore, this wye alternative is withdrawn from further analysis because of high aquatic impacts and because it was inconsistent with Proposition 1A and, therefore, does not meet the project's purpose and need (see Sections 3.1.3, 3.2.1, 3.3.1, 3.3.7 and Table 4-1 of this Supplemental Checkpoint B Summary Report).

Avenue 24 to Road 11 Wye Alternative: The Avenue 24 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 20]).

Avenue 24 to East of Road 12 Wye Alternative: The Avenue 24 to East of Road 12 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

Avenue 24 to Road 13 Wye Alternative: The Avenue 24 to Road 13 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

SR 152 (North) to Road 11 Wye Alternative: The SR 152 (North) to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

SR 152 (North) to Road 19 Wye Alternative: The SR 152 (North) to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more acreage of impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 18 Wye Alternative, which is being carried forward. This

alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that result in one of the highest impacts to agricultural resources among the wye alternatives. Additionally, this alternative would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, and this could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA). (see Sections 3.1.3, 3.2.1, 3.3.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

SR 152 (South) to Avenue 21 to SR 99 Wye Alternative: The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that resulted in one of the highest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 1.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA). Further, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative has a capital cost of more than \$7.2 billion, approximately \$1.4 to \$1.7 billion more than the other SR 152 (South) wye alternatives. The high cost of this wye alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives. The expenditure of an additional \$1.4 to \$1.7 billion for this wye alternative would not yield a significant amount of environmental benefit compared to the other wye alternatives under consideration, and would have the effect of making an already expensive project that much more expensive for taxpayers. As such, it is not "financially viable" relative to the other feasible wye alternatives being carried forward (see Sections 3.1.3, 3.2.1, 3.2.2, 3.3.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

SR 152 (South) to Avenue 21 to Road 19 Wye Alternative: The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that result in one of the highest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA) (see Sections 3.1.3, 3.2.1, 3.3.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

Avenue 22 Wye Alternative: This wye alternative is withdrawn from further analysis because it would result in the second highest acreage of impacts to aquatic resources among all wye alternatives (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report).

Avenue 21 to Road 11 Wye Alternative: The Avenue 21 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis (see Section 3.1.3 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).

Avenue 21 to SR 99 Wye Alternative: The Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it has a capital cost of more than \$7.3 billion, which is the highest estimated capital cost of all the wye alternatives. Further, this is approximately \$1.5 to \$1.8 billion more than the other Avenue 21 wye alternatives. Specifically, the Avenue 21 to Road 13 Wye Alternative would impact fewer aquatic resources than the Avenue 21 to SR 99 Wye Alternative and has a capital cost of approximately \$5.8 billion. The additional cost of the Avenue 21 to SR 99 Wye Alternative is due to this alignment requiring a

greater amount of aerial structure than the other wye alternatives. The expenditure of an additional \$1.5 to \$1.8 billion for this wye alternative would not yield a significant amount of environmental benefit compared to the other wye alternatives under consideration, and would have the effect of making an already expensive project that much more expensive for taxpayers. As such, it is not “financially viable” relative to the other feasible wye alternatives being carried forward (see Sections 3.1.3, 3.2.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).

Avenue 21 to Road 19 Wye Alternative: The Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis. This alternative is also withdrawn because it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA) (see Section 3.1.3, 3.2.1 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).

South of GEA Wye Alternative: The South of GEA Wye Alternative was not included in any of the program-level corridors, and this analysis confirms it does not represent the LEDPA. This wye alternative was withdrawn from further analysis because it would have the greatest impact to aquatic resources and has high cost and logistical issues due to its extensive environmental impacts and additional 30 miles of alignment compared to the SR 140 Wye Alternative. Additionally, the South of GEA Wye Alternative would have the greatest potential of all wye alternatives to adversely affect aquatic resources, with impacts to vernal pool complexes of 197.5 acres. Therefore, this alternative is withdrawn from further analysis (see Sections 3.1.3, 3.2.2, 3.3.1 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).

4.3 Carried Forward Wye Alternatives—Rationale and Description

As shown in Table 4-2, four wye alternatives are being carried forward for further analysis based on the criteria discussed in Section 3.0. These wye alternatives have been determined to be potentially practicable and fulfill the project purpose and need.

The four wye alternatives that are carried forward are shown in Figures 4-1 through 4-3 and summarized in Table 4-2. A description of these wye alternatives and the rationale for carrying them forward follows.

SR 152 (North) to Road 13 Wye Alternative: The SR 152 (North) to Road 13 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it would have the least aquatic impacts among all wye alternatives (see Section 3.1.3 of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 22]).

SR 152 (North) to Road 18 Wye Alternative: The SR 152 (North) to Road 18 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it would result in the second fewest aquatic impacts among the SR 152 (North) wye alternatives and the fourth fewest aquatic impacts among all wye alternatives. Further, an SR 152 (North) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies (see Section 3.1.3 and Appendix A of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 22]).

SR 152 (South) to Road 18 Wye Alternative: The SR 152 (South) to Road 18 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it has the second fewest aquatic impacts among all wye alternatives. Further, a SR 152 (South) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies (see Section 3.1.3 and Appendix A of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 23]).

Avenue 21 to Road 13 Wye Alternative: The Avenue 21 to Road 13 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it has the third fewest impacts to aquatic resources among all wye alternatives (see Section 3.1.3 of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 23]).

Table 4-2
 Wye Alternatives Carried Forward

Wye Alternatives—4 Carried Forward Alternatives	Rationale for Carrying Forward						April 2013 Supplemental Alternatives Analysis (Attachment 4) Page Number	Comparison Matrix
	Purpose and Need	Low Impacts to Aquatic Resources	Low Impacts to Environment*	Relative Construction Costs	Compatible with Land Use	Public/Agency Input		
SR 152 (North) to Road 13 Wye	P	P	P	-	S	S	Page 22	Appendix B
SR 152 (North) to Road 18 Wye	P	P	P	-	-	S	Page 22	Appendix B
SR 152 (South) to Rd 18 Wye	P	P	P	-	S	S	Page 23	Appendix B
Avenue 21 to Road 13 Wye	P	P	P	S	-	-	Page 23	Appendix B

Notes: P = Primary reason; S = Secondary reason
 *"Impacts to Environment" refers to all impacts to the human and natural environment (except for aquatic resource impacts which are reported separately), including: biological resources, agricultural resources, cultural resources, parklands, noise and vibration impacts, visual/aesthetic, and displacements.

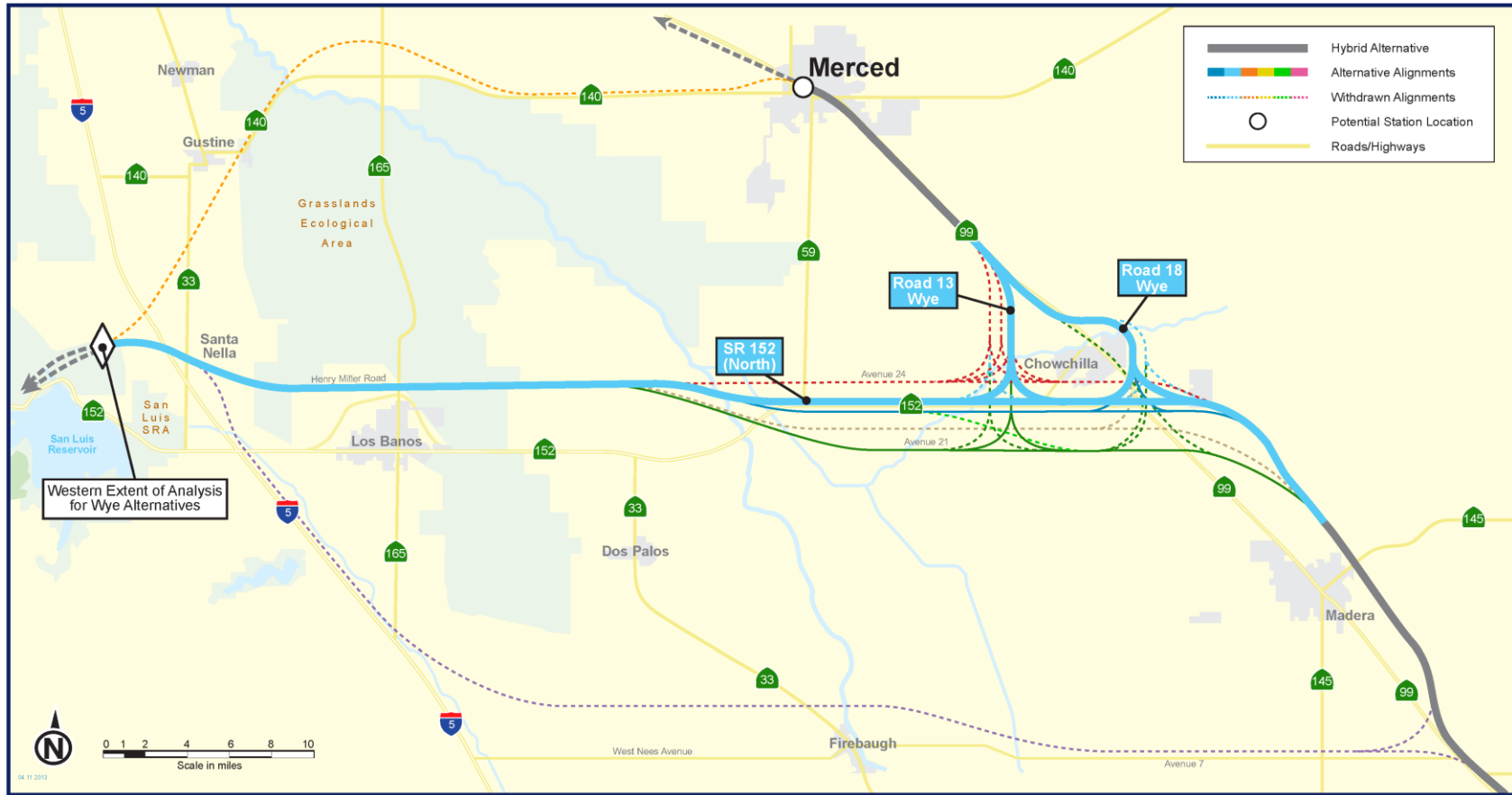


Figure 4-1
 Carried Forward SR 152 (North) Wye Alternatives

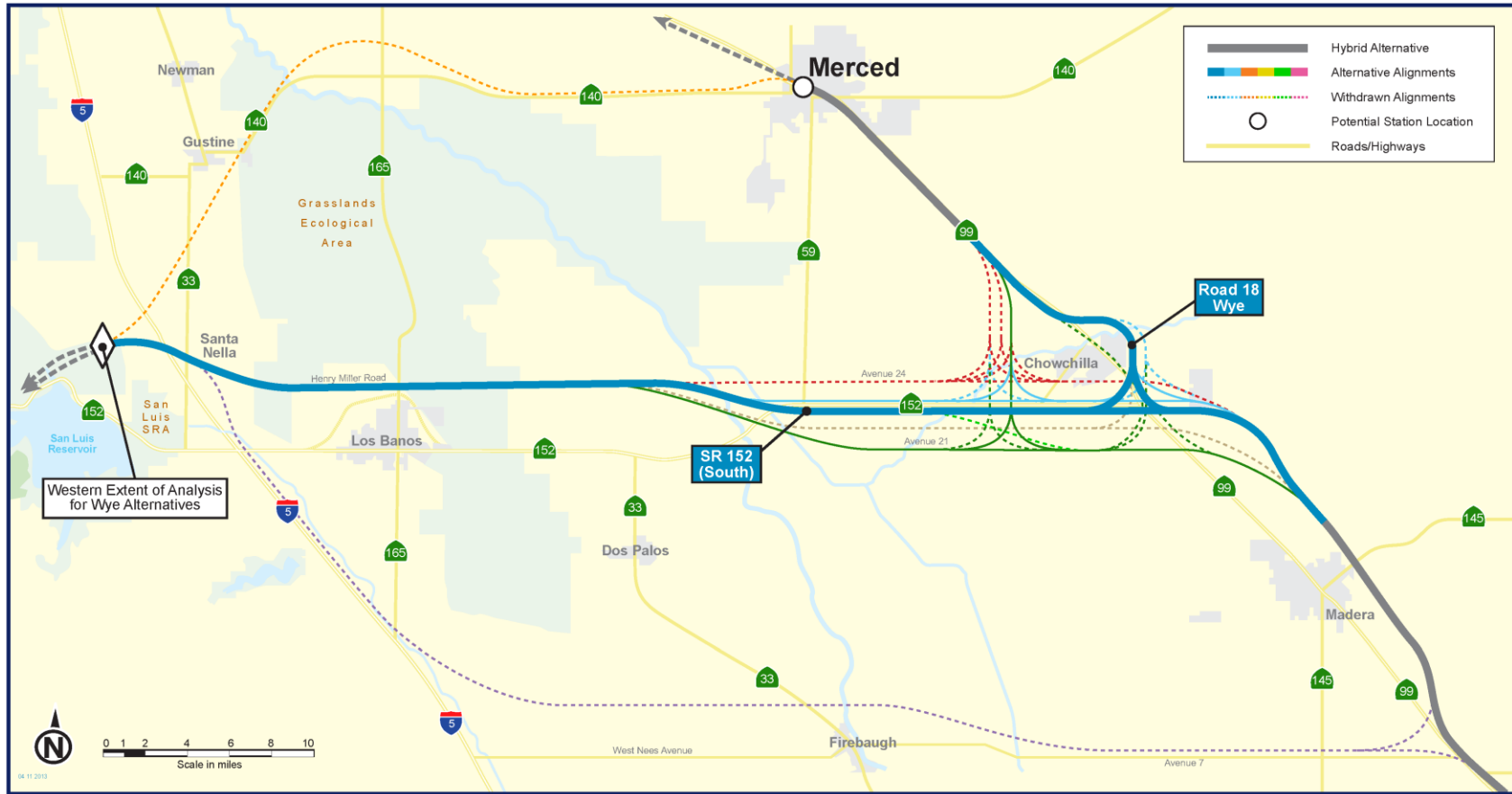


Figure 4-2
 Carried Forward SR 152 (South) Wye Alternatives

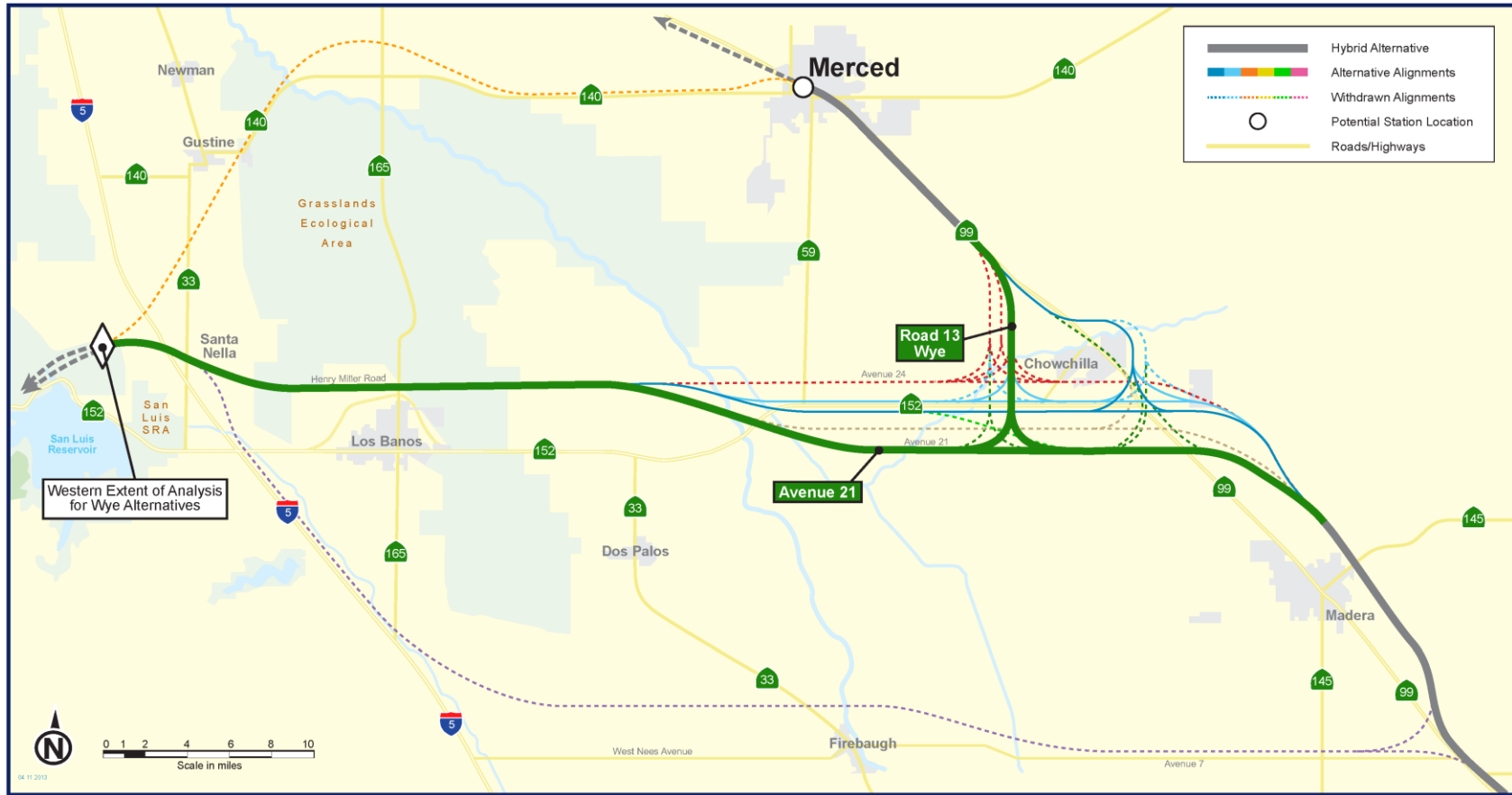


Figure 4-3
 Carried Forward Avenue 21 Wye Alternatives

4.4 Summary of Conclusions

After considering all of the information in this Supplemental Checkpoint B package, the Authority and FRA recommend the conclusions summarized below for the Merced to Fresno Section: Wye Alternatives. These conclusions are based on the information available prior to the more detailed analysis that will be conducted to produce the Draft SEIR/SEIS:

4.4.1 *Alignment Alternatives Withdrawn Prior to the Checkpoint B Alternatives Analysis*

- The Merced Southern Alignment Alternative (Central Valley portion) was eliminated from further investigation in the San Jose to Merced Section from the *2005 Statewide Program EIR/EIS* because the alignment would pass through sensitive wetlands, floodplains, farmlands of statewide importance, and sensitive habitats.
- The Direct Tunnel Alignment Alternative was eliminated from further investigation in the *2005 Statewide Program EIR/EIS* because it would cross three active or potentially active fault areas, including the Ortigalita fault, the southern extension of the Greenville fault trend, and the Calaveras fault zone. This alternative would likely cost at least \$3 billion more than the other alignment alternatives, which would be due largely to the long tunnel and the high unit cost per mile associated with tunnels that exceed 6 miles in length. The direct tunnel concept would involve construction of a tunnel that would be among the longest in the world (31 miles) through mixed soil and geology types. The results of the Authority's technical tunnel conference indicated that, while not impossible, a tunnel of this length in California would be extremely expensive to construct, operate and maintain, and would therefore be impracticable.
- The Diablo Range Direct Alignment (Northern Alignment and alignments through Henry Coe State Park) Alternative was eliminated from further investigation in the *2005 Statewide Program EIR/EIS* because it would have greater potential environmental impacts (including impacts to high value aquatic resources, visual, noise and habitat fragmentation impacts) and greater constructability concerns than alignment alternatives that would avoid Henry Coe State Park.
- The SR 152 East of Los Banos Alignment Alternative was considered within the San Joaquin Valley Crossing Subsection (San Jose to Merced PAA and SAA), but eliminated from further investigation prior to the PAA because it would have additional environmental effects on the GEA as it would introduce an additional corridor with the new crossing to SR 152. It also was not supported by local officials in the City of Los Banos due to possible impacts to existing and proposed City facilities.

4.4.2 *Wye Alternatives Reviewed in the Supplemental Checkpoint B Summary Report*

- The SR 140 Wye Alternative is withdrawn from further analysis because the potential impacts to aquatic resources associated with the alternative would be third highest of all of the wye alternatives, and it would be the only wye alternative to impact the North Grasslands Wildlife Area. This wye alternative would also result in high visual intrusiveness by adding a train river crossing within a state park. Further, this alternative would add 4 minutes of travel time between San Francisco and Los Angeles, which would likely make it inconsistent with the maximum travel time requirements of Proposition 1A of 2 hours and 40 minutes between Los Angeles Union Station and the Transbay Terminal in San Francisco. Therefore, this wye alternative is withdrawn from further analysis because it was inconsistent with Proposition 1A and, therefore, does not meet the project's purpose and need (see Sections 3.1.3, 3.2.1, 3.3.1, 3.3.7, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report).

- The Avenue 24 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 20]).
- The Avenue 24 to East of Road 12 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).
- The Avenue 24 to Road 13 Wye Alternative is withdrawn from further analysis because it would have greater impacts to aquatic resources than the similarly aligned Avenue 24 to Road 13 Wye Alternative, which is being carried forward for further analysis (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).
- The SR 152 (North) to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).
- The SR 152 (North) to Road 13 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it would have the least aquatic impacts among all wye alternatives (see Sections 3.1.3, 4.3 and Table 4-2 of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 22]).
- The SR 152 (North) to Road 18 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it would result in the second fewest aquatic impacts among the SR 152 (North) wye alternatives. Further, an SR 152 (North) to Road 18 Wye Alternative has support from many stakeholders and agencies (see Sections 3.1.3, 4.3, Table 4-2 and Appendix A of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 22]).
- The SR 152 (North) to Road 19 Wye Alternative is withdrawn from further analysis because it would have greater acreage of impacts to aquatic resources than the similarly aligned SR 152 (North) to Road 18 Wye Alternative, which is being carried forward for further analysis. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that would result in one of the highest impacts to agricultural resources among the wye alternatives. Additionally, this alternative would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA) (see Sections 3.1.3, 3.2.1, 3.3.2, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).
- The SR 152 (South) to Road 18 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need, and it has among the fewest aquatic impacts of all wye alternatives. Further, an SR 152 (South) to Road 18 Wye Alternative has support from many stakeholders and agencies (see Sections 3.1.3, 4.3, Table 4-2 and Appendix A of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 23]).
- The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than carried forward alternatives along SR 152 (North) and Avenue 21. This alternative is also withdrawn because it does not

follow transportation corridors, leading to diagonal crossings that resulted in one of the highest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA). Further, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative has a capital cost of more than \$7.2 billion, approximately \$1.4 to \$1.7 billion more than the other SR 152 (South) wye alternatives. The additional cost of this wye alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives. The expenditure of an additional \$1.4 to \$1.7 billion for this alternative would not yield a justifiably significant environmental benefit relative to the other wye alternatives under consideration and would have the effect of making an already expensive project that much more expensive for taxpayers. As such, it is not "financially viable" relative to the other feasible wye alternatives being carried forward (see Sections 3.1.3, 3.2.1, 3.2.2, 3.3.2, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).

- The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than carried forward alternatives along SR 152 (North) and Avenue 21. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that resulted in among the highest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA) (see Sections 3.1.3, 3.2.1, 3.3.2, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 21]).
- The Avenue 22 Wye Alternative is withdrawn from further analysis because it would result in the second highest acreage of impacts to aquatic resources among all wye alternatives (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report).
- The Avenue 21 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis (see Sections 3.1.3, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).
- The Avenue 21 to Road 13 Wye Alternative is potentially practicable and is carried forward for further analysis because it meets the project's purpose and need and has the third fewest impacts to aquatic resources among all wye alternatives (see Sections 3.1.3, 4.3 and Table 4-2 of this Supplemental Checkpoint B Summary Report and Section 3.4 of Attachment 4 [page 23]).
- The Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it has a capital cost of more than \$7.3 billion, which is the highest estimated capital cost of all the wye alternatives. Further, this is approximately \$1.5 to \$1.8 billion more than the other Avenue 21 wye alternatives. Specifically, the Avenue 21 to Road 13 Wye Alternative would impact fewer aquatic resources than the Avenue 21 to SR 99 Wye Alternative and has a capital cost of approximately \$5.8 billion. The additional cost of the Avenue 21 to SR 99 Wye Alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives. The expenditure of an additional \$1.5 to \$1.8 billion for this alternative would not yield a justifiably significant environmental benefit relative to the other wye alternatives under consideration and would have the effect of making an already expensive project that much more expensive for taxpayers. As such, it is not "financially viable" relative to the other feasible wye alternatives being carried forward (see Sections 3.1.3, 3.2.2, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).

- The Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis. This alternative is also withdrawn because it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA) (see Sections 3.1.3, 3.2.1, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report and Section 3.3 of Attachment 4 [page 22]).
- The South of GEA Wye Alternative was not included in one of the program-level corridors, and this analysis confirms it does not represent the LEDPA. This wye alternative was withdrawn from further analysis because it would have the greatest impact to aquatic resources and has high cost and logistical issues due to its extensive environmental impacts and additional 30 miles of alignment compared to the SR 140 Wye Alternative (see Sections 3.1.3, 3.2.2, 3.3.1, 4.2 and Table 4-1 of this Supplemental Checkpoint B Summary Report).

5.0 References

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- CirclePoint. 2010. Draft Alternatives Analysis Public Participation Report for the San Jose to Merced High Speed Train Project EIR/EIS: October 2009 – May 2010. San Francisco, CA. Prepared for California High Speed Rail Authority and U.S. Department of Transportation, Federal Railroad Administration.
- MOU 2003. Memorandum of Understanding. Integration Process for the California High-Speed Train Program. Signed by California High-Speed Rail Authority, Federal Highway Administration, Federal Railroad Administration, Federal Transit Administration, U.S. Environmental Protection Agency, and U.S. Army Corps of Engineers. April.
- MOU 2006. Memorandum of Understanding. The Bay Area to Central Valley High-Speed Train Program Environmental Impact Report/Environmental Impact Statement. Signed by Federal Railroad Administration and U.S. Environmental Protection Agency. July.
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