

# CALIFORNIA HIGH-SPEED TRAIN

## Fresno to Bakersfield Section Checkpoint B Summary Report

March 2011





# California High-Speed Train Project

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## Checkpoint B Summary Report

*Prepared by:*

URS/HMM/Arup Joint Venture

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- C Supplemental Alternatives Analysis Report, Fresno to Bakersfield. September 2010.
- D Clean Water Act Section 404 Practicability Criteria, Union Pacific Railroad Alignment Alternative. February 2011.
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**Acronyms and Abbreviations**

Authority	California High-Speed Rail Authority
BNSF	BNSF Railway Company
CAHST	California High-Speed Train
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CWA	Federal Clean Water Act
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FRA	Federal Railroad Administration
GIS	Geographic Information System
Guidelines	Clean Water Act Section 404(b)(1) Guidelines
HST	High-Speed Train
ICA	Interstate Commerce Act
ICC	Interstate Commerce Commission
LEDPA	Least Environmentally Damaging Practicable Alternative
mph	Miles per Hour
MOU	Interagency Memorandum of Understanding
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
ROD	Record of Decision
Section 14	Rivers and Harbors Act Section 14
Section 404	Federal Clean Water Act Section 404
SR	State Route
STB	Surface Transportation Board
U.S. EPA	U.S. Environmental Protection Agency
UPRR	Union Pacific Railroad

USACE            U.S. Army Corps of Engineers  
USGS            U.S. Geological Survey

# **Section 1.0**

## **Introduction**



## 1.0 Introduction

This report provides technical data and analysis for the Fresno to Bakersfield Section as required under Checkpoint B of the NEPA/404/408 Integration Process Memorandum of Understanding. Supporting documents, including planning studies and information on environmental resources and constraints, are presented as appendices.

### 1.1 Background

The California High-Speed Rail Authority (Authority) was authorized to undertake the planning and development of a proposed statewide high-speed train (HST) network in 1996. In 2005, the Authority and the Federal Railroad Administration (FRA) completed a Statewide Program EIR/EIS (Authority and FRA 2005) as the first phase of a tiered environmental review process. Subsequently, the Authority and the FRA completed the Final Program EIR/EIS for the Bay Area to Central Valley HST (Authority and FRA 2008). Subsequent to the Final Program EIR/EIS for the Bay Area to Central Valley HST, the Authority circulated a Revised Draft Program EIR in March and April 2010 in response to a suit by the Town of Atherton, and then circulated a Revised Final Program EIR in August 2010. The Authority certified the Revised Final Program EIR in September 2010, and made a new decision selecting the Pacheco Pass Network Alternative serving San Francisco via San Jose for further project-level environmental review.

The Authority and FRA are now preparing project-level environmental documents for several HST sections, including the Fresno to Bakersfield Section. These documents will tier from the Final Statewide Program EIR/EIS and the Bay Area to Central Valley HST Final Program EIR/EIS. The Authority and FRA selected the BNSF Alternative Alignment from Fresno to Bakersfield as the preferred alignment for this portion of the Central Valley in the Statewide Program EIR/EIS.

The construction of the HST project will require authorizations from several federal agencies. To facilitate compliance with the National Environmental Policy Act (NEPA), Clean Water Act (CWA) Section 404 (Section 404), and Rivers and Harbors Act (Section 14), the Authority, FRA, U.S. Environmental Protection Agency (U.S. EPA), and the U.S. Army Corps of Engineers (USACE) developed a Tier 2 Memorandum of Understanding (Tier 2 MOU) in 2010 (MOU 2010). The MOU pertains to project-level (Tier 2) actions and establishes several checkpoints at which agreement must be reached by the signatory parties.

On October 29, 2010, the Authority and FRA submitted Tier 2 MOU Checkpoint A materials to U.S. EPA and USACE. Those materials pertained to the project's Purpose and Need, and were discussed at a December 8, 2010 meeting attended by staff from the Authority, FRA, U.S. EPA, and USACE. The U.S. EPA provided its concurrence with the project's Purpose and Need on January 20, 2011, while the USACE indicated its concurrence on February 2, 2011.

This report is submitted to comply with Checkpoint B data and analysis requirements. The purpose of Checkpoint B is to identify project alternatives that will be subsequently evaluated in the Draft EIR/EIS for the Fresno to Bakersfield Section of the California HST System.

#### U.S. EPA and USACE Involvement in HST Planning

The U.S. EPA and USACE have been actively involved in HST planning activities since 2003, when they, the Authority, the FRA, the Federal Highway Administration, the U.S. Fish and Wildlife Service, and the Federal Transit Administration signed an Interagency Memorandum of Understanding (Tier 1 MOU) that established procedures to integrate agency actions relating to HST program-level (Tier 1) planning (MOU 2003). The Tier 1 MOU integration process facilitated compliance with NEPA, CWA Section 404, and Rivers and Harbors Act Section 14. In signing the

MOU, the federal agencies also agreed to be cooperating agencies during the NEPA review process.

On August 31, 2004, U.S. EPA and USACE provided written comments on the HST Statewide Program Draft EIR/EIS. These comments identified general and specific concerns that pertained to many of the HST planning sections. In the Central Valley, the U.S. EPA specifically requested that the project minimize impacts on farmland, local communities, waters of the United States, and associated biological resources by minimizing the use of bypasses and total miles of track. The USACE comments emphasized the need for avoidance and complete mitigation, requested more detailed descriptions of aquatic resources, and recommended a suite of data needs to be addressed during Tier 2, or project-level, environmental impact evaluation.

On July 22, 2005, in compliance with the Tier 1 MOU process, the U.S. EPA and USACE provided written comments to the FRA. These comments indicated concurrence that the preferred alignments and station options were most likely to contain the least environmentally damaging, practicable alternative (LEDPA). With respect to the Fresno to Bakersfield Section, the U.S. EPA letter indicated support of the decision by the Authority and FRA to "(1) identify the Burlington Northern Santa Fe (BNSF) alignment as the preferred option for high speed train service connecting Fresno to Bakersfield, and (2) fully evaluate an additional alignment, such as the UPRR alignment, in project-level environmental review *should the proposed additional planning study* (italics added) identify a feasible and practicable alignment that is likely to be less damaging to water and biological resources." The USACE similarly referenced the proposed additional planning study.

On November 18, 2005, the FRA issued its Record of Decision (ROD) on the Statewide Program Final EIR/EIS. With respect to compliance with Section 404, the ROD stated,

"The U.S. EPA and USACE have participated in the development of both the Draft and Final Program EIR/EIS and, in accordance with the MOU among Federal agencies for their environmental review, were consulted concerning the selection of the preferred corridor and route most likely to yield the least environmentally damaging practicable alternative (LEDPA) and as identified as preferred in the Final Program EIR/EIS. The U.S. EPA and USACE have concurred that the preferred HST alignment and station options are most likely to contain the LEDPA. Future project-level environmental review will include further consultation with U.S. EPA and USACE regarding the Clean Water Act leading to USACE permit application."

The Authority conducted the additional planning study referenced by the U.S. EPA and USACE NEPA/404 concurrence letters. The study assessed the potential of HST station locations to serve the vicinity of Visalia. This study, entitled the *Visalia-Tulare-Hanford Station Feasibility Study*, was initiated in early 2005 and completed in August 2007 (included in this Checkpoint B report as Appendix A). In addition to the evaluation of potential station locations in the vicinity of Visalia, along the BNSF and UPRR Corridors, the study covered a much larger scope of analysis that considered potential HST alignments between Fresno and Bakersfield, including alignments along segments of the UPRR. The study described associated potential environmental impacts, including impacts on sensitive land uses, farmland, cultural resources, communities, water resources, floodplains, wetlands, sensitive species, and 4(f) resources. The study concluded that a station east of Hanford, on the BNSF Alignment, would be capable of serving the Visalia-Tulare-Hanford area. The study also concluded that a UPRR alternative would have greater constructability issues and greater potential noise, cultural, community, and property impacts. No alternatives were identified that would be less damaging than the BNSF Alignment to biological and water resources.

On February 24, 2009, the Authority distributed a California State Notice of Preparation (NOP) on the Merced to Bakersfield Section of the HST. A Notice of Intent (NOI) for this EIR/EIS was published by the FRA in the *Federal Register* on March 16, 2009. The NOI/NOP showed the preferred alignment along the BNSF corridor. The U.S. EPA commented on the NOI/NOP on April 10, 2009; this comment letter did not include a discussion of the UPRR alignment.

In 2010, the Authority, FRA, U.S. EPA, and USACE developed a Tier 2 MOU. This MOU established a process regarding the selection of alternatives to be reviewed under NEPA, the identification of the project-level LEDPA, and the coordination of other related regulatory decisions (MOU 2010). The process includes several checkpoints, each designed to facilitate coordination and decision making on particular issues, and each with specific data and information requirements.

On May 19, 2010, Authority and FRA representatives met with U.S. EPA and USACE to discuss the progress in evaluating the BNSF and UPRR alignment alternatives. They indicated that the UPRR Alignment had been eliminated from further environmental assessment during the development of the Statewide Program Final EIR/EIS. They also referred to the results of the Visalia-Tulare-Hanford Station Feasibility Study, emphasizing that the study did not identify any alternative to the BNSF Alignment that would be less damaging to biological and water resources. The U.S. EPA informed the Authority and FRA that the UPRR Alignment could be eliminated from further evaluation if it were found to be impracticable. This guidance was supported during a subsequent meeting held November 27, 2010 between the Authority, FRA, U.S. EPA, and the USACE.

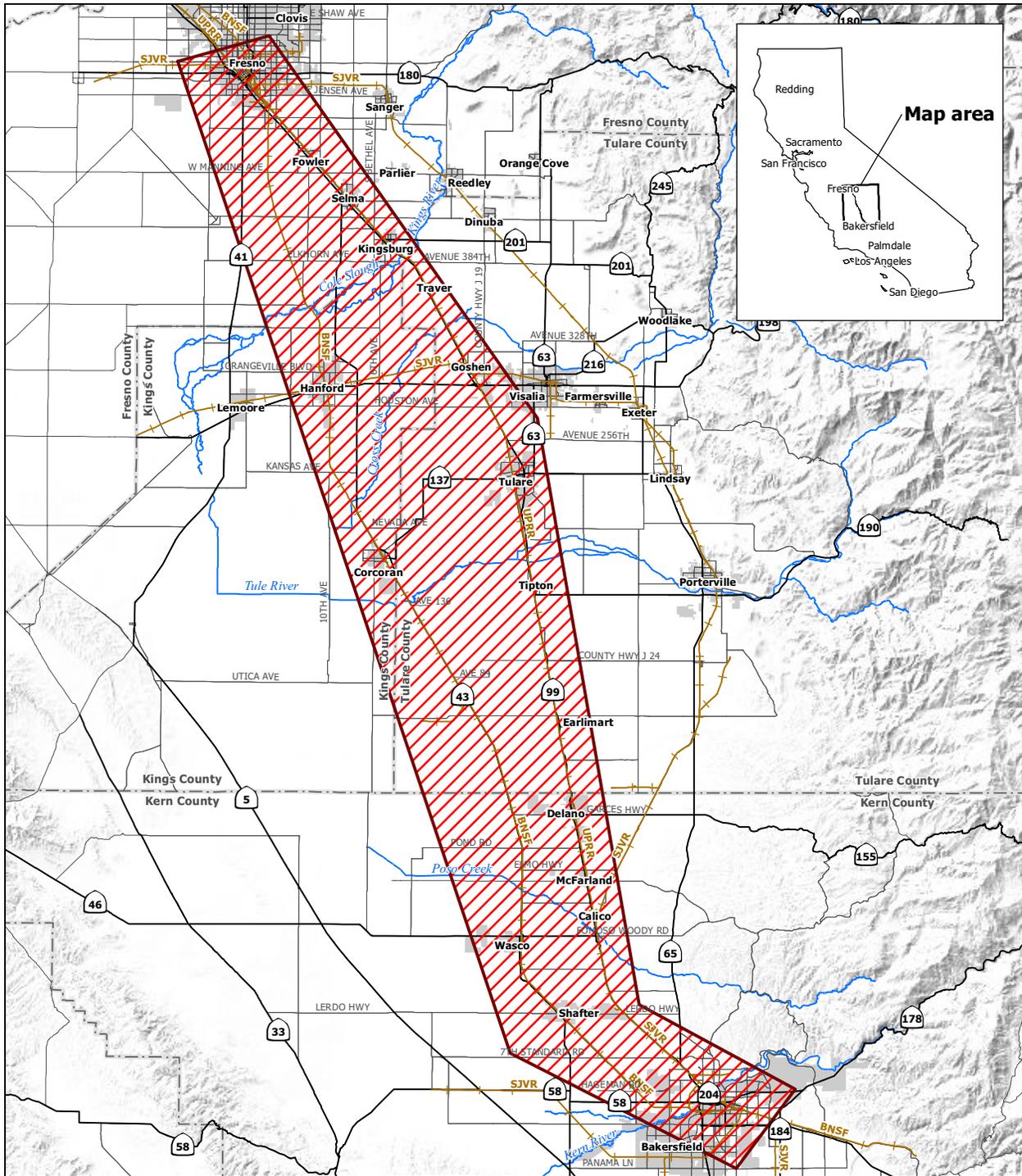
On January 28, 2011, the Authority and FRA representatives met again with U.S. EPA and USACE staff to discuss Tier 2 MOU Checkpoint B issues for the BNSF and UPRR alignments. The Authority agreed to provide additional information regarding an "avoidance" alternative along the BNSF Alignment that would further reduce potential project impacts to aquatic resources. This avoidance alternative consists primarily of alternatives that have been considered throughout the environmental studies being conducted for the Fresno to Bakersfield Section. Components of this alternative are described in this report in Section 2.0 and Section 3.1.2.E.

## 1.2 Development of Project Alternatives

The Fresno to Bakersfield Section includes urbanized areas in Fresno and Bakersfield and the more rural lands between these cities (Figure 1-1). The process to develop alternatives in this 113-mile-long corridor divided this HST section into three subsections: Fresno, Rural, and Bakersfield.

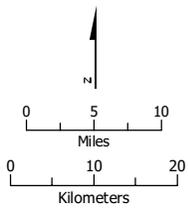
Section 2.0, Description of Project Alternatives, of this report describes the development of alternatives for the three subsections. Further details of the process are described in Appendix A (Visalia-Tulare-Hanford Station Feasibility Study), Appendix B (Fresno to Bakersfield Preliminary Alternatives Analysis Report), and Appendix C (Fresno to Bakersfield Supplemental Alternatives Analysis Report).

Section 3.0, 404(b)(1) Preliminary Alternatives Analysis, describes the process of evaluating the potential alternatives with standardized alternatives analysis criteria consistent with the 404(b)(1) Guidelines. The analysis is to inform checkpoint B decisions about whether to carry a particular alternative through the environmental review process or to drop the alternative from further consideration.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010

November 29, 2010



-  General HST Corridor
-  Existing rail line
-  Stream/River
-  Community/Urban area
-  County boundary

**Figure 1-%**  
 Fresno to Bakersfield HST Project Corridor

### 1.3 UPRR Alignment Practicability

As part of the effort to determine which alternatives to carry forward, the Authority and FRA developed information regarding the practicability of the UPRR Alternative Alignment in the rural subsection. This effort focused on the standard evaluation criteria – existing technology, cost, logistics – required for compliance with the Section 404(b)(1) Guidelines. The information substantiated earlier findings that a UPRR Alignment Alternative would present numerous technical challenges and involve extensive logistical (physical and legal) conflicts with the UPRR mainline and spurs, and conflicts with state highways, local roads, and industrial facilities. This information is presented in Appendix D (Clean Water Act Section 404 Practicability Criteria, Union Pacific Railroad Alignment Alternative).

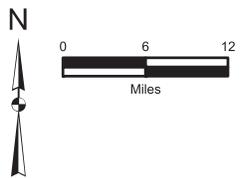
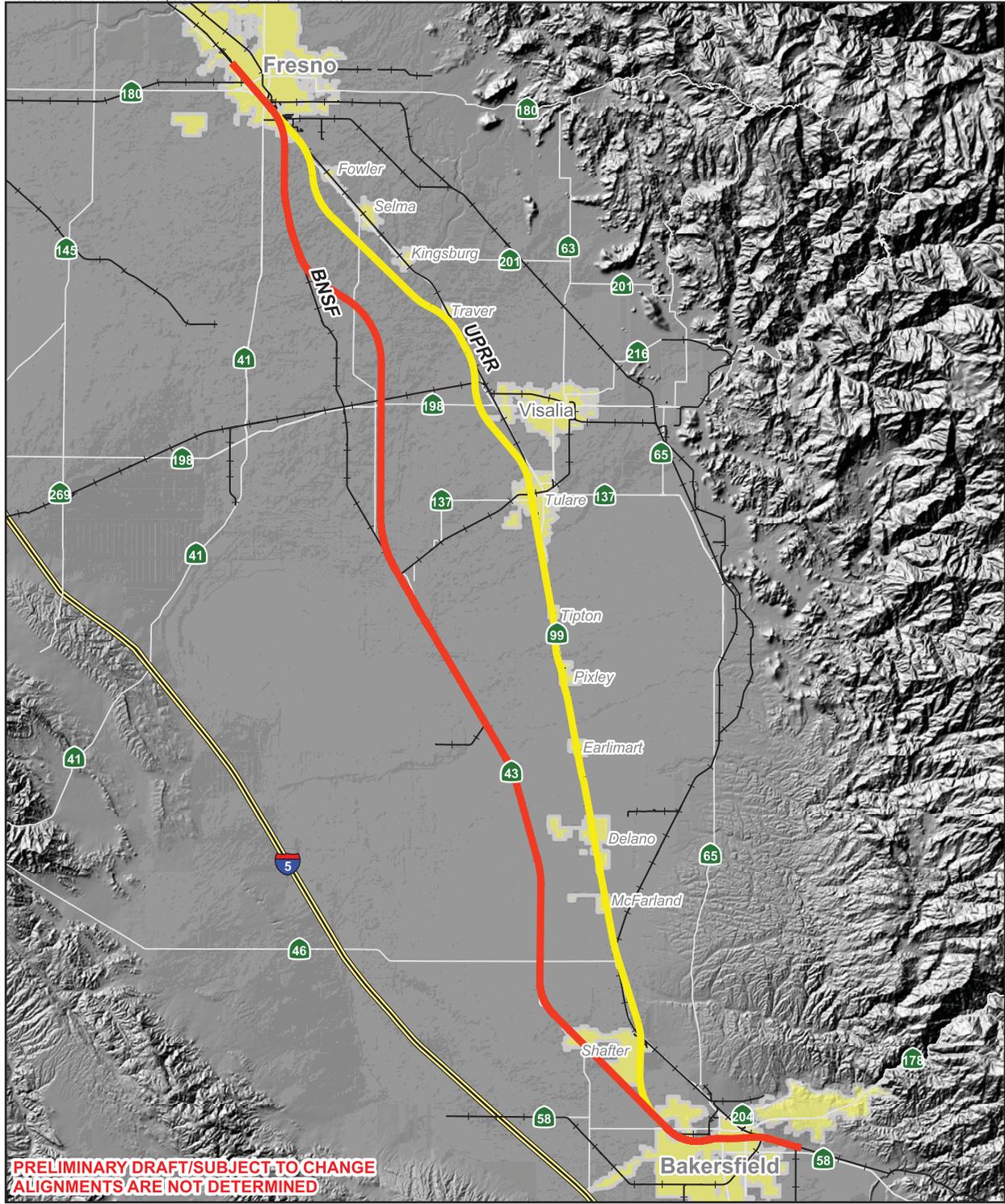
### 1.4 Environmental Resources and Constraints

A major purpose of the Tier 2 MOU Checkpoint B is to identify environmental resources and constraints that must be considered during the planning phases for the Fresno to Bakersfield Section. Of particular importance are the environmental resources within the purview of the USACE's Section 404 regulatory program. Appendix E (Summary Presentation of Environmental Resources and Constraints) provides detailed information regarding environmental resources and constraints that occur on the BNSF and UPRR alignments (see Figure 1-2), including the following:

- A delineation of potential special aquatic sites and other waters of the United States, using remote sensing imagery; associated photographs of jurisdictional features; an assessment of feature functions; and information regarding the importance of features to critical habitat, protected species, or protected open spaces (Appendix E-1).
- Maps indicating sensitive species occurrences, 100-year floodplain areas, biological reserves and preserves, wildlife crossings, and habitat conservation planning areas (Appendix E-2).
- Maps and relevant information regarding federally authorized projects.

### 1.5 Key Findings

- The Statewide Program EIR/EIS presented evaluation of a diverse array of potential HST alternatives in the Central Valley. It identified the BNSF Alignment as the preferred alignment for the Fresno to Bakersfield Section. It described elimination of the UPRR Alignment based on its greater constructability issues and increased potential for noise, cultural, community, and property impacts.
- The August 2007 Visalia-Tulare-Hanford Station Feasibility Study (Appendix A) evaluated 13 initial alignment alternatives and 8 revised alignment alternatives between Fresno and Bakersfield. These included the BNSF and UPRR alignment alternatives. It identified Alternative A-1 on the BNSF Alignment, with a station east of Hanford, as having the greatest comparative strengths and fewest weaknesses.
- The June 2010 Preliminary Alternatives Analysis Report (Appendix B) evaluated more than three dozen alternatives/station locations/design options within the Fresno, Rural, and Bakersfield project subsections. It screened each of these with eight standardized criteria, including an environmental criterion. Based on this analysis, in the report the Authority recommended the BNSF Alignment be carried forward for detailed study in the Project EIR/EIS.



- BNSF Alternative Alignment
- UPRR Corridor Alignment
- +— Existing Railroad
- 69 State Highway
- Interstate
- City

**Figure 1-&**  
BNSF Alternative Alignment and UPRR Corridor alignment comparison

- The September 2010 Supplemental Alternatives Analysis Report (Appendix C) evaluated two potential BNSF alignments through Hanford to reduce project impacts on agricultural lands. Although in the report the Authority recommended not carrying forward these options, it did recommend seeking ways to reduce losses of agricultural lands.
- Construction of a HST project on the UPRR Alignment would face numerous technical and logistical issues. Information assembled to assist in an assessment of the practicability of the UPRR Alignment Alternative (Appendix D) indicates that HST construction along the UPRR Corridor would:
  - Involve substantial logistical conflicts with existing infrastructure (in particular, the UPRR tracks, state highways and local roads, and industrial facilities).
  - Involve complex legal questions raised by UPRR with respect to being adjacent to its operations, which could delay the project extensively or indefinitely, because UPRR has consistently stated its unwillingness to share its rights-of-way with HST.
- The February 2010 Environmental Resources and Constraints Study (Appendix E) indicates the following.

### **Special Aquatic Resources**

- On the BNSF Alignment, 88 special aquatic resource features occur within a 100-foot-wide corridor. Their combined area totals 24.06 acres. Canal/ditch and vernal pool features comprise the greatest acreage. Eight features are vernal pools, and three are seasonal wetlands.
- On the UPRR Alignment, 103 special aquatic resource features occur within a 100-foot-wide corridor. Their combined area totals 21.75 acres. Canal/ditch and riverine features comprise the greatest acreage. Two features are vernal pools, and four are seasonal wetlands.
- As discussed in Section 3.1.2, the BNSF Alternative was combined with the Allensworth Bypass Alternative and a new alignment segment (Kaweah Bypass) that avoids seasonal wetlands north of Corcoran, to create an alternative termed the BNSF Avoidance Alignment. On the BNSF Avoidance Alignment, 104 special aquatic resource features occur within a 100-foot-wide corridor. Their combined area totals 30.14 acres. Canal/ditch, retention/detention basin, and riparian features comprise the greatest acreage. Two features are vernal pools, and two are seasonal wetlands.
- For the BNSF, UPRR, and BNSF Avoidance alignments, the majority (50-87%) of areal impacts would be to special aquatic features with low or low/medium functions and services values.
- Impacts to special aquatic features with the highest functions and services values would be greatest for the BNSF alignment (39%), followed by UPRR (7%); no impacts would occur to these features on the BNSF Avoidance Alignment.

### **Special-Status Species**

- Seven special-status plant species have the potential to occur on the BNSF, UPRR, and BNSF Avoidance alignments. The UPRR Alignment Alternative could affect six of these species; the BNSF and BNSF Avoidance alternatives each could affect four species.

- Twelve special-status animal species have the potential to occur on the BNSF and BNSF Avoidance Alternative alignments. Ten species have the potential to occur on the UPRR Alternative alignment.
- Federally designated critical habitat for two plant species and three animal species occurs in the wildlife study area. The UPRR Alternative Alignment crosses areas designated as critical habitat for three species. The BNSF Alternative and the BNSF Avoidance Alternative do not overlap designated critical habitat.
- The BNSF Alternative Alignment and the BNSF Avoidance Alternative Alignment infringe on four linkage and two satellite upland recovery areas. The UPRR Alternative Alignment infringes on two linkage areas and one satellite upland recovery areas.
- Other differences between the three alternative alignments with respect to special-status plant and wildlife species, their habitats, and wildlife movement corridors are not substantial.

### **Modifications to Federally Authorized Projects**

- Federally authorized project levees exist at the Kings River Complex east of the community of Layton. The BNSF Alternative and BNSF Avoidance Alternative alignments cross these levees and would require a Rivers and Harbors Act Section 208.10 encroachment permit. The placement of HST elevated structures across other, non-federal levees and floodways may require an encroachment permit from the Central Valley Flood Protection Board or other appropriate agency.
- The UPRR Alignment Alternative does not cross a federally authorized project levee; therefore, it would not require a Section 208.10 encroachment permit.

## **1.6 Alternatives to be Evaluated in the Project EIR/EIS**

Based on the studies summarized in this Checkpoint B package, the Authority and FRA propose to carry forward the following alternatives for further study in the Fresno to Bakersfield Section HST Project EIR/EIS:

- Fresno Subsection
  - UPRR West/BNSF South
- Rural Subsection
  - BNSF route, bypass east side of Hanford (Alternative Alignment A-1)
  - Kaweah Bypass Alternative
  - Kaweah-Corcoran Bypass Alternative
  - Corcoran Bypass Alternative
  - Allensworth Bypass Alternative (west of the BNSF Corridor). The Authority will also evaluate moving the existing BNSF Railway track adjacent to the Allensworth Bypass Alternative.
  - Wasco-Shafter Bypass Alternative
- Bakersfield Subsection
  - Through the BNSF yard, north of East Bakersfield, south of the UPRR
  - North of the BNSF right-of-way, along California Avenue through East Bakersfield, south of the UPRR

## **Section 2.0**

### **Description of Project Alternatives**



## 2.0 Description of Project Alternatives

### 2.1 Initial Development of Alternatives

The Fresno to Bakersfield Section includes the urbanized areas of Fresno and Bakersfield and the more rural area between the two cities, a distance of approximately 113 miles. Because urban and rural areas often have varying and different concerns, the alternatives analysis divides the corridor into three subsections:

- **Fresno** – Beginning at Clinton Avenue north of downtown Fresno and terminating in the vicinity of E. Manning Avenue south of downtown Fresno.
- **Rural** – Beginning at E. Manning Avenue in Fresno and continuing south to Hageman Road in Rosedale on the northwestern outskirts of Bakersfield.
- **Bakersfield** – Beginning at Hageman Road, continuing southeast through downtown Bakersfield and terminating at Oswell Street, southeast of downtown Bakersfield.

Linking alternatives from each section together provides for a complete Fresno to Bakersfield Section.

To define and evaluate alternatives, the Authority and FRA used several approaches and assessments:

- **Field Inspections of Corridors** – Planners, engineers, and analysts with experience in rail construction and operations conducted field inspections of potential rights-of-way and stations to identify conditions and factors potentially not visible in aerial photos or on maps.
- **Qualitative Assessment** – Team members assessed the impacts of each alternative using criteria that included constructability, accessibility, operability, maintainability, right-of-way acquisition, public infrastructure impacts, railway infrastructure impacts, and environmental impacts.
- **Engineering Assessment** – While detailed engineering data are not available during the early alternatives screening analysis, some information yields valuable insight into the merits of the project alternatives: constructability, project length, travel time, existing infrastructure, and current land use.
- **Geographic Information System (GIS) Analysis** – GIS is an analysis tool that depicts the project's likely interactions with both natural and built geographical features. GIS data were used to assess potential impacts on farmland, water resources, wetlands, threatened and endangered species, cultural resources, urban development, and infrastructure.

The FRA and Authority developed HST system performance criteria to compare the various alternatives and their ability to meet the project's purpose and objectives. Table 2-1 summarizes these criteria.

**Table 2-1**  
 Alignment and Performance Objectives and Criteria

Objectives	Criteria
Maximize ridership/revenue potential	Travel time (minutes)
	Route length (linear distance in miles)
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Capital costs
	Operating costs
	Maintenance costs

In addition, FRA and the Authority compared and evaluated project alternatives using the following four types of measures:

- **Land Use** – Extent to which an alternative supports transit use and planned areas of existing and future growth, and the extent to which it is consistent with adopted local, regional, and state plans.
- **Constructability** – Construction feasibility measured by constructability and right-of-way constraints.
- **Community Impacts** – Measures of disruption to neighborhoods and communities, including the extent to which an alternative minimizes right-of-way acquisitions, division of an established community, and conflicts with community resources.
- **Environmental Resources** – Extent to which an alternative minimizes impacts on environmental resources (including waters, wetlands, and sensitive biological resources), agricultural land and operations, cultural resources, visual resources, and geologic conditions, and minimizes impacts from noise and vibration and hazardous waste sites.

## 2.2 Agency and Public Consultation and Scoping for Alternatives Development

### 2.2.1 Early Planning

Public and agency comments were received during preparation of the Statewide Program EIR/EIS supporting a Visalia area stop. In response, the Authority and FRA proposed to undertake an additional study of an alignment alternative between Fresno and Bakersfield to serve a potential station in the Visalia area prior to the commencement of project-level environmental review for the Fresno to Bakersfield Section (see Appendix A, the Visalia-Tulare-Hanford Station Feasibility Study).

In 2006 and 2007, FRA and the Authority conducted comprehensive outreach among communities along the alignment. The outreach consisted of three components. First, the project team contacted local government staff who were involved in transportation and planning or involved in the Statewide Program EIR/EIS. This initial contact led to follow-up communications with these communities and the identification of other groups or agencies to contact (e.g., agricultural groups). The second component of the outreach process consisted of meetings with agency staff, decision makers, and members of the public. The purpose of these meetings was to inform participants about the project, gain their knowledge of the area, and learn about stakeholders and organizations the project team should include in its outreach efforts. The third

component of the outreach process consisted of meetings with two Technical Assessment Groups (TAGs) that were organized to provide focused regional input. One TAG consisted of representatives from cities and organizations in Fresno County. The other TAG was composed of representatives from Tulare and Kings counties and representatives from Corcoran and McFarland in Kern County. Through this outreach process, the project team gained insights into the needs, background data, and history of the different communities, and into unique or important areas within each community for the HST to avoid.

### 2.2.2 Public Scoping

The Authority and FRA started the project-level HST evaluation with the section from Merced to Bakersfield. Early steps to define the alternatives carried forward in the EIR/EIS for the Merced to Bakersfield Section involved consultation with public agencies and obtaining comments from the public. On February 24, 2009, the Authority distributed a California State Notice of Preparation (NOP) on the Merced to Bakersfield Section of the HST. A Notice of Intent (NOI) for this EIR/EIS was published by the FRA in the *Federal Register* on March 16, 2009. Five public scoping meetings were held for the Merced to Bakersfield Section between March 18 and March 26, 2009, in Merced, Madera, Fresno, Visalia, and Bakersfield.

After these scoping meetings, the Authority and FRA determined that the two HST project sections and environmental effects of the HST system from Merced to Bakersfield were more appropriately assessed in two separate EIR/EIS documents: (1) Merced to Fresno Section, and (2) Fresno to Bakersfield Section. On September 29, 2009, the Authority distributed a new NOP for a Fresno to Bakersfield project EIR/EIS. The FRA published a NOI for this EIR/EIS in the *Federal Register* on October 1, 2009. In the NOP and NOI, the Authority and FRA solicited additional oral and written comments, suggestions, and requests for information and public meetings. This scoping comment period extended through October 30, 2009.

### 2.2.3 Subsequent Consultation

Following the formal scoping period, the Authority continued to host public information meetings throughout the Fresno to Bakersfield Section to keep the public apprised of project developments and to obtain public input on project alternatives. At the time of this Checkpoint B submittal, 15 public information meetings had been held in Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield.

The Authority held several types of outreach meetings for each of the three subsections. These meetings included Technical Working Group (TWG) meetings consisting of senior transportation, planning, and public works staff representing state and local agencies in the project corridor. The Authority worked with local stakeholders to form these TWGs to serve as liaisons to the HST project. In addition to these outreach efforts, the Authority met with local officials in several public meetings, and continues to meet with landowners and other interested parties.

Following the issuance of the NOI and NOP and the scoping meetings, the Authority and FRA initiated meetings with a number of federal and state resource agencies, including the California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), USACE, and U.S. EPA to obtain input on project alternatives, environmental issues of concern, and study methodologies. The FRA and the Authority has met with these agencies to discuss alternatives to be studied in this EIR/EIS.

As noted in Section 1.1.1, consultation in May and November 2010, and in January 2011, provided opportunities for the Authority, FRA, U.S. EPA and USACE to clarify concerns regarding the selection of project alternatives to be included in the Draft EIS/EIR. On January 28, 2011, the Authority and FRA representatives met with U.S. EPA and USACE and the Authority agreed to

provide additional information regarding an “avoidance” alternative along the BNSF alignment that further reduces potential project impacts to aquatic resources.

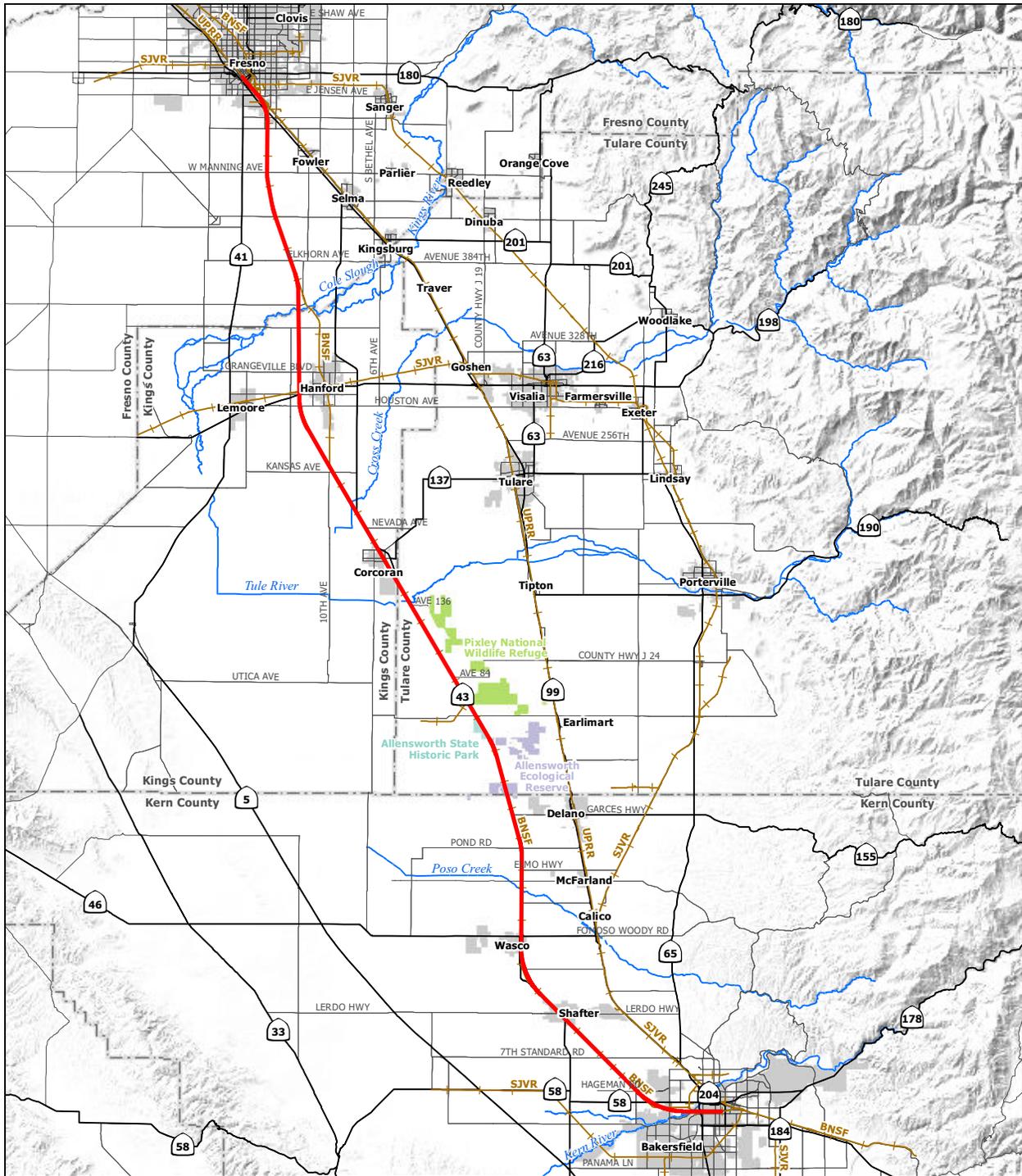
## 2.3 Formulation of Project Alternatives

The formulation of most project alternatives is described in detail in the *Visalia-Tulare-Hanford Station Feasibility Study*, *Fresno to Bakersfield Preliminary Alternatives Analysis Report*, and *Fresno to Bakersfield Supplemental Alternatives Analysis Report*, which are provided in Appendices A, B, and C, respectively. The information contained in these reports is summarized in this section.

Subsequent to the station feasibility study and alternatives analysis reports, other alternatives have been identified during the course of environmental and engineering studies conducted for the project, and in consultation with the U.S. EPA and USACE. Those alternatives are also described in this section.

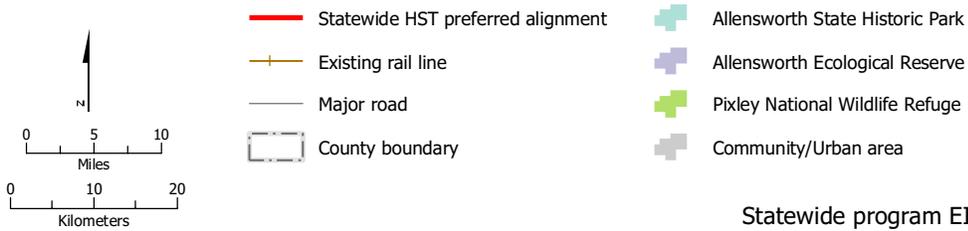
The development of potential alternatives for the Fresno to Bakersfield Section consisted of two steps. First, FRA and the Authority developed site-specific alignment and station alternatives that conformed to the preferred alternative selected in the Statewide Program EIR/EIS. The program-level preferred alignment and station locations were general in nature, since they were based on conceptual design criteria for the HST system that were further developed following the Statewide Program EIR/EIS. Figure 2-1 shows the program-level preferred alignment for the Fresno to Bakersfield Section as described in the Statewide Program EIR/EIS.

Second, the Authority decided to investigate potential alignments for a potential station location in the area near the communities of Hanford, Visalia, and Tulare. Since Visalia and Tulare are located along the UPRR Alignment, most of the potential alternatives were partially or largely located in the UPRR Corridor. However, all the alternatives had to return to the BNSF Corridor before they entered Bakersfield. With the Statewide Program EIR/EIS, the Authority and FRA selected a station location in downtown Bakersfield near the existing Amtrak station on the BNSF Railway line. Both Kern County and the City of Bakersfield adopted resolutions in 2003 supporting the downtown Bakersfield HST station. The UPRR tracks are roughly a mile north of the Bakersfield Amtrak station. To approach the Amtrak station from UPRR, the HST alignment would have to cut across the heart of downtown Bakersfield, disrupting established neighborhoods and major commercial centers, and crossing primary roadways including Golden State Avenue (SR 204) and the SR 178 freeway. By entering Bakersfield from the west along the BNSF Corridor instead of the UPRR Corridor, the HST would result in far fewer relocation impacts and would be more consistent with current and planned land uses.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010

August 13, 2010



**Figure 2-1**  
 Statewide program EIR/EIS preferred alignment

### 2.3.1 Limits of Alternative Alignment Analysis for the Fresno to Bakersfield Section

The Fresno to Bakersfield HST project section extends from the project terminus at the northern end of the Fresno station tracks, which are located along the UPRR rail line adjacent to Amador Street, south of SR 180 to the southern project terminus at the southern end of the Bakersfield station tracks at approximately Union Avenue.

The alternatives analysis presented in the *Fresno to Bakersfield Preliminary Alternatives Analysis Report* and the *Supplemental Alternatives Analysis Report*, contained in Appendix B and C, respectively, and summarized here, begins at Clinton Avenue, approximately 2.5 miles northwest of the northern terminus of the Fresno to Bakersfield Section. This is because the range of alternatives considered for the Merced to Fresno and Fresno to Bakersfield sections merge at Clinton Avenue, forming a logical point for the identification of alternatives that would cross downtown Fresno. The alternatives analysis presented here provides the reader with an understanding of how the alternative Fresno stations were developed, a process that took into account alignment development considerations for all of Metropolitan Fresno.

### 2.3.2 Design Features Common to All Alternative Alignments

The HST from Fresno to Bakersfield would be a secure grade-separated rail line dedicated to high-speed trains operating at speeds up to 220 miles per hour (mph). The rail line would consist of two separate tracks, one track predominantly for each direction. The number of tracks at stations would be increased to four to allow for local trains to stop at the station platforms and allowing nonstop express trains to pass without impediment.

Where trains travel at speeds over 150 mph, vehicles or people cannot be allowed on the tracks at any time. Therefore, the tracks would be completely grade-separated; this means that road, railroad, and other transport facility crossings would be located at different heights than the HST rails (overpasses or underpasses). Where at-grade, the rail line would be secured by 8-foot-high heavy-duty security fences or walls embedded in the ground on both sides of the right-of-way. At locations determined to be at a higher risk for unauthorized access, the fences may have to be increased in height. The rail line would be monitored on a 24-hour basis by closed-circuit television and intrusion-detection devices.

Due to the high speeds, and to achieve passenger comfort at 220 mph, changes in horizontal or vertical alignment must be made over relatively long distances. The maximum local grade of the rail would be 2.5%, with a maximum sustained grade of 1.25% over approximately 1 mile. The minimum curve radius varies from approximately 4 to 6.5 miles, thus taking several miles to make a change in direction. As a result, compared to other types of linear projects (e.g., highways, freight trains, transmission lines, and pipelines), designs for the HST track alignment are less flexible with regard to changes in elevation or to curving, crossing, or wiggling around or through the surrounding lands and associated resources.

The HST track would be of a stronger design than track normally found on a conventional railway. The rails would be continuously welded so that smooth continuous tracks are provided. Where the rail line would be at-grade, the rail would be fixed by means of specially developed high-strength clips to pre-stressed concrete cross ties that would be embedded in either crushed rock ballast or a continuous concrete slab (Figure 2-2). On at-grade portions of the 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. This would typically make the rails 6 to 10 feet above existing ground. A 3-foot-wide drainage area would be on either side of the rail line. These drainage areas would be intercepted at regular intervals by culverts and open structures that would carry runoff to existing natural drainage or appropriate municipal drainage systems. Ducts

would also be laid alongside the HST tracks to carry low-voltage power cables to power the trackside signaling and communications apparatus and fiber-optic cables that enable continuous communications with the HST on-board computers and train controls. The duct covers would also serve as safety walkways for detrainning passengers in the event of an emergency train stop. The overall width of the right-of-way would be approximately 100 feet where it is at-grade. In at-grade areas where the alignment width is restricted, the right-of-way would be approximately 60 feet wide. The right-of-way would not require maintenance roads. Maintenance would be accomplished from the track.

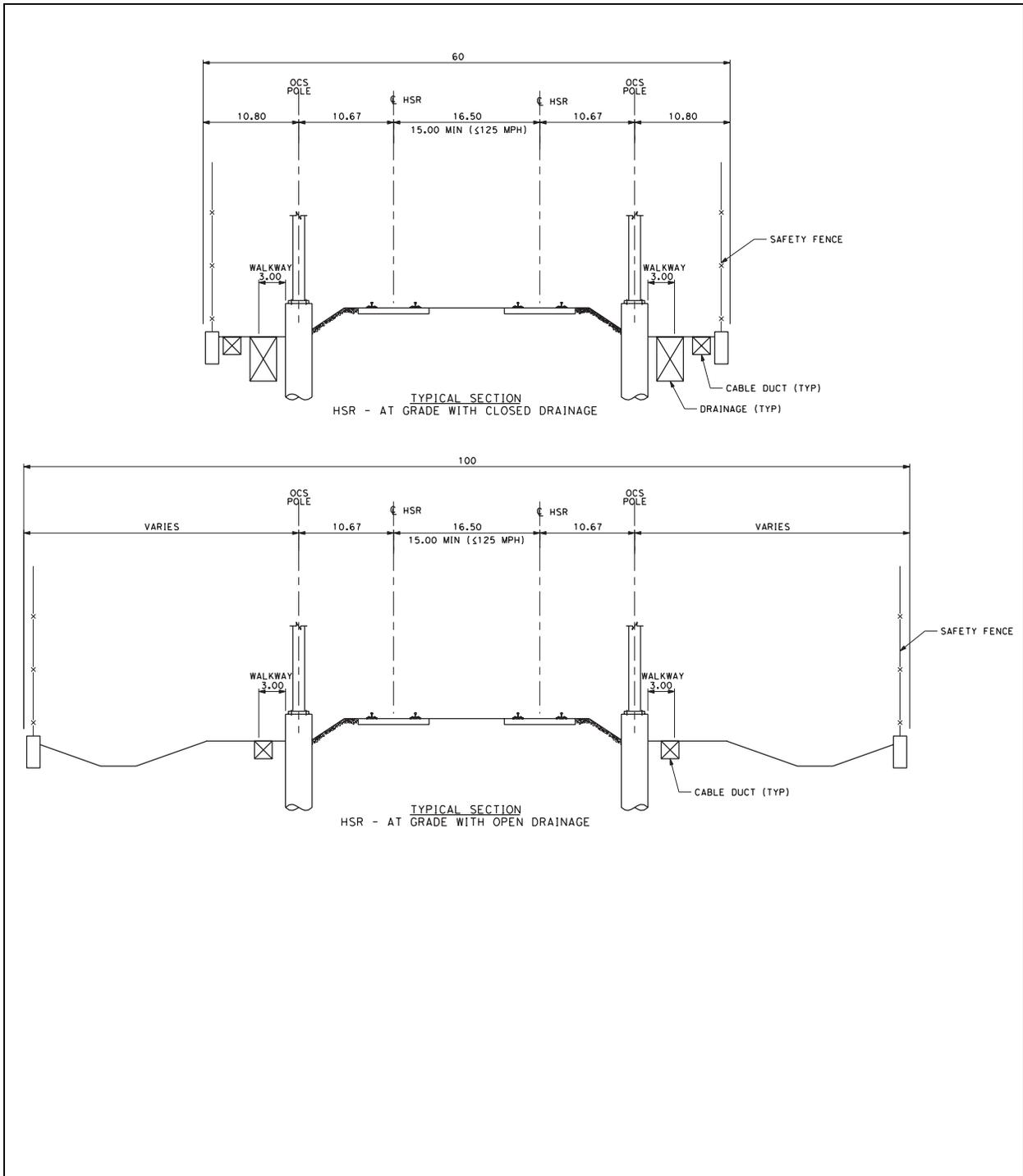
Where the HST would be above-grade, the tracks would be on an aerial structure consisting primarily of concrete box girders supported by piers (Figure 2-3). The aerial structures, often referred to as viaducts, would be used over water, in steep terrain, in congested urban areas, and to cross over existing freight railroad lines and highways. The final design of the aerial structures, including the potential limited use of steel box or truss sections, would be determined in response to specific conditions along the alignment. Likewise, the final design of the foundations of the aerial structures would be determined in response to specific ground conditions along the alignment, and would likely include spread footing or pile-supported foundations. The spans between piers for viaducts would generally be on the order of 100 to 130 feet. In addition to the track structure, the viaduct would also support the power system, cable ducts for low-voltage power cables and fiber-optic cables, a service walkway running the length of the structure, a low parapet wall to protect the walkway and prohibit access, and any necessary noise barriers. The permanent right-of-way required to support the system would be 60 feet wide for elevated structures.

There would be four tracks at each station, two for local trains that would stop at the station, and two for express trains passing through. Station tracks would be 6,000 feet long, with the station at the center.

Long viaducts would include staircases to the ground at intervals. These stairs would provide access to the guideway for HST staff to undertake routine inspection and maintenance, usually during the nighttime when normal HST service is suspended. They would also provide an emergency evacuation route for passengers.

### **2.3.3 Alternatives Formulated for the Fresno Subsection**

With the Statewide Program EIR/EIS, the Authority and FRA selected the BNSF Alignment as the preferred alternative between Merced and Fresno. The Statewide Program EIR/EIS alignment follows BNSF from the north and crosses over to parallel the UPRR rail alignment just south of Herndon Avenue in Fresno (Figure 2-4). Through central Fresno, within the Fresno subsection, the preferred alignment from the Statewide Program EIR/EIS parallels and is adjacent to the UPRR route. South of Fresno, the preferred alignment transitions back from the UPRR right-of-way to the BNSF right-of-way between American and Jensen avenues.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

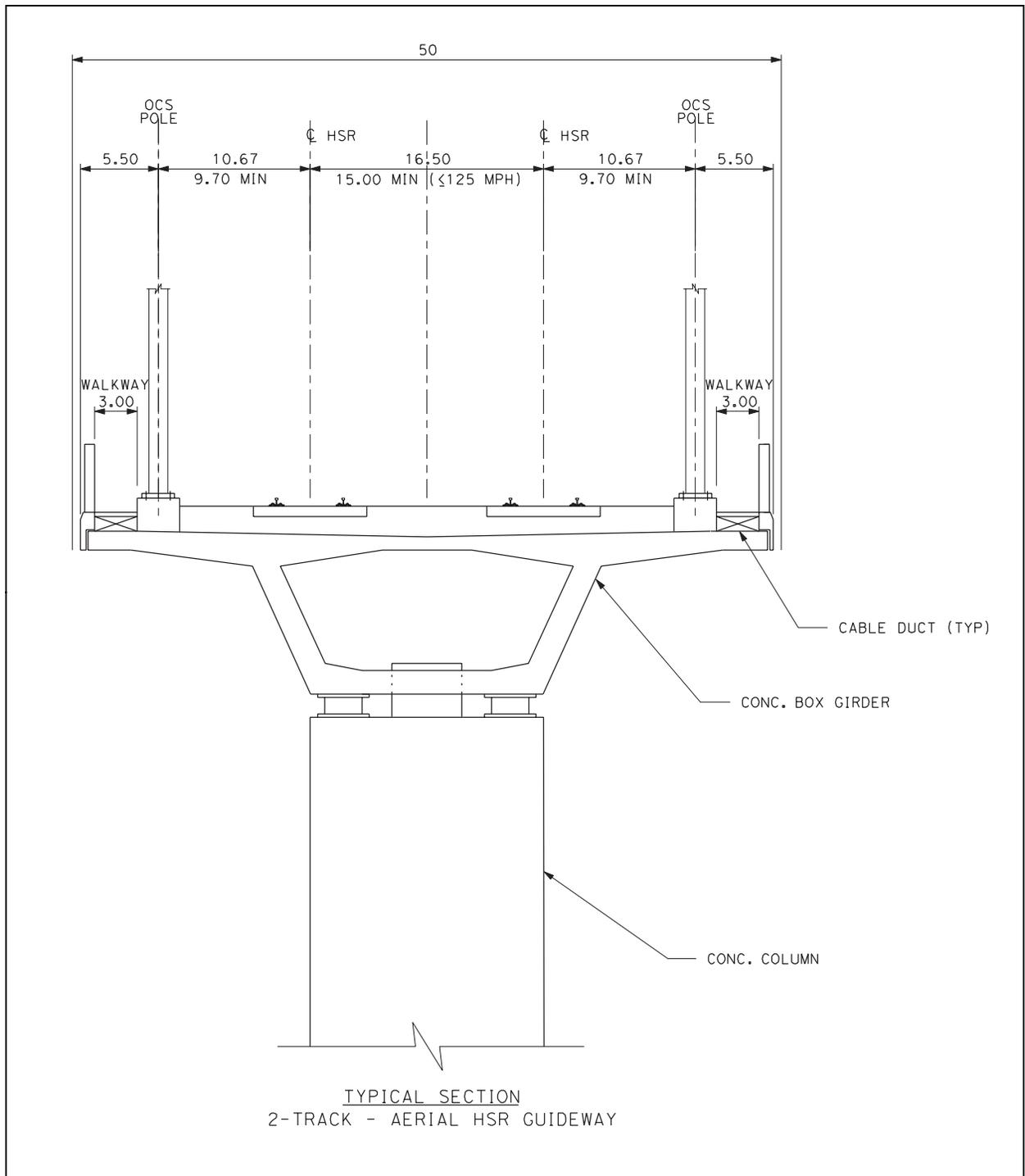
March 30, 2010

**NOTES:**

1. TRACK, OCS POLES AND FOUNDATIONS, CABLE DUCTS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
2. RIGHT-OF-WAY REQUIRED FOR THE HIGH-SPEED RAIL GUIDEWAY WILL DEPEND UPON CONDITIONS ALONG THE ALIGNMENT INCLUDING TERRAIN, WHERE CUT/FILL, SLOPES, RETAINING STRUCTURES, AND ACCESS ARE REQUIRED.



**Figure 2-2**  
HSR Two Track at Grade



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

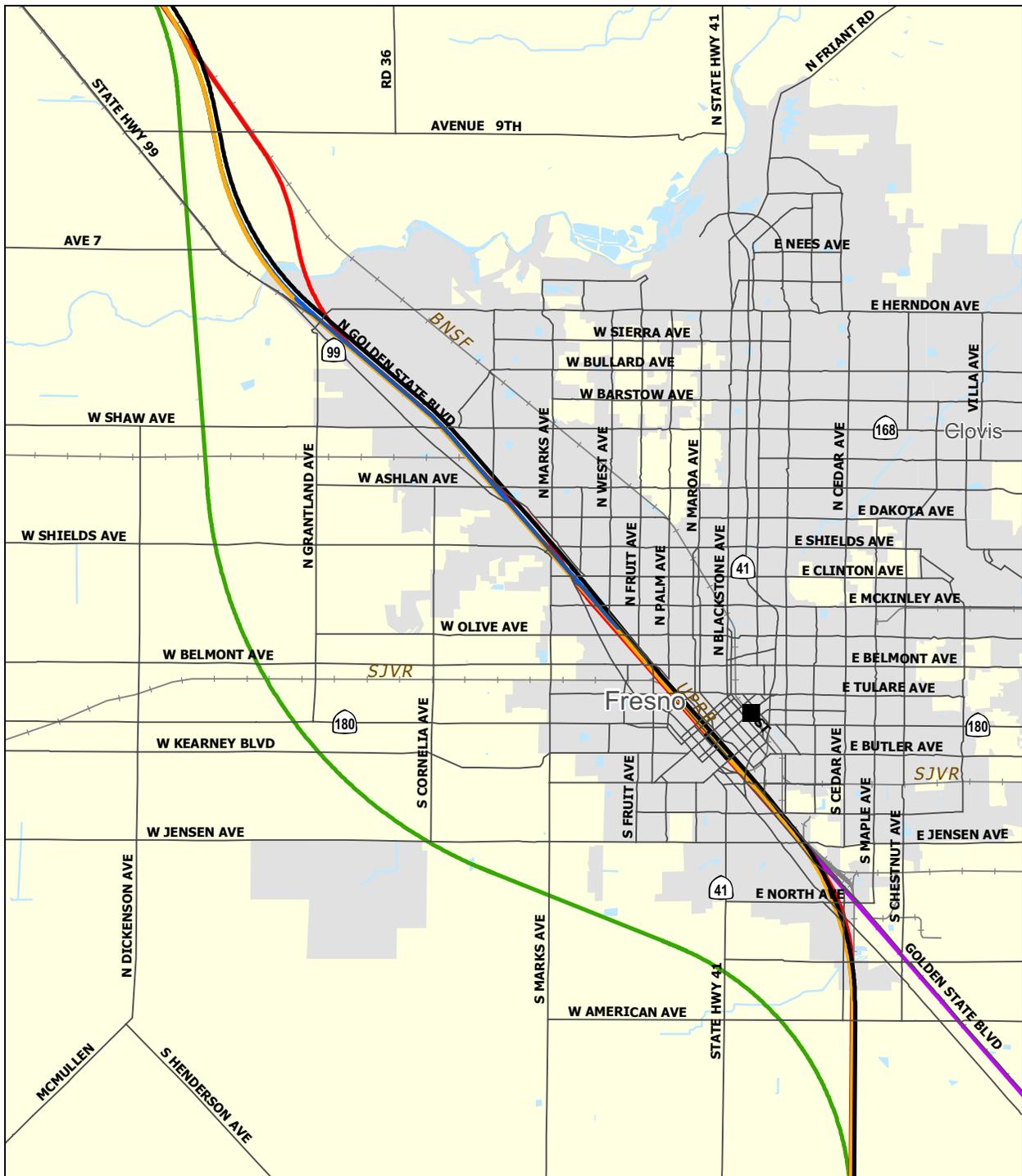
March 30, 2010

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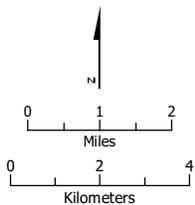


**Figure 2-3**  
HSR Two Track Aerial Guideway



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

August 13, 2010



- UPRR East
- UPRR West
- Western Bypass
- Statewide program EIR/EIS preferred alignment
- State Route 99 Alternative
- Golden State Boulevard Alternative
- Fresno Amtrak station
- Major road
- Potential station area
- Community/Urban area

**Figure 2-4**  
 Fresno subsection alternatives

The initial alternative alignments identified for Fresno were based largely on the Statewide Program EIR/EIS preferred alignment. With input from the Fresno TWG and other local stakeholders, five initial alternative alignments were identified for study. An alternative was also identified that would route trains not stopping in Fresno around the city center to the west. All of these alternative alignments are shown in Figure 2-4 and described below..

#### **A. HST WEST OF UPRR RIGHT-OF-WAY (UPRR WEST ALTERNATIVE)**

For this alternative, the HST alignment would be adjacent to the western boundary of the UPRR right-of-way within the existing Golden State Boulevard footprint from Clinton Avenue south to Belmont Avenue. North of the station, the UPRR West Alternative would run along the eastern edge of Roeding Park (Figure 2-5). The four-track station section would be located between Stanislaus and Ventura streets. South of the station, the alignment would continue to parallel the UPRR right-of-way until reaching East Florence Avenue just north of East Jensen Avenue, where it would curve westerly toward the existing BNSF Railway route south of Fresno.

#### **B. HST EAST OF UPRR RIGHT-OF-WAY (UPRR EAST ALTERNATIVE)**

The UPRR East Alternative track alignment would begin on the western side of the existing UPRR right-of-way at Clinton Avenue and then cross over to the eastern side of the UPRR Corridor at West Olive Avenue. From there to the southern end of Metropolitan Fresno, the HST alignment would be immediately adjacent to the eastern side of UPRR's right-of-way.

South of Belmont Avenue, the HST alignment would transition to four tracks (two mainline and two station tracks) for the station approach; the station would be located between Stanislaus and Ventura streets. Between Fresno Street and Tulare Street, the UPRR East Alternative would affect the Southern Pacific Depot, which is on the National Register of Historic Places (Figure 2-6). The transition back to two tracks would occur north of the SR 41 and SR 99 interchange near Santa Clara Street.

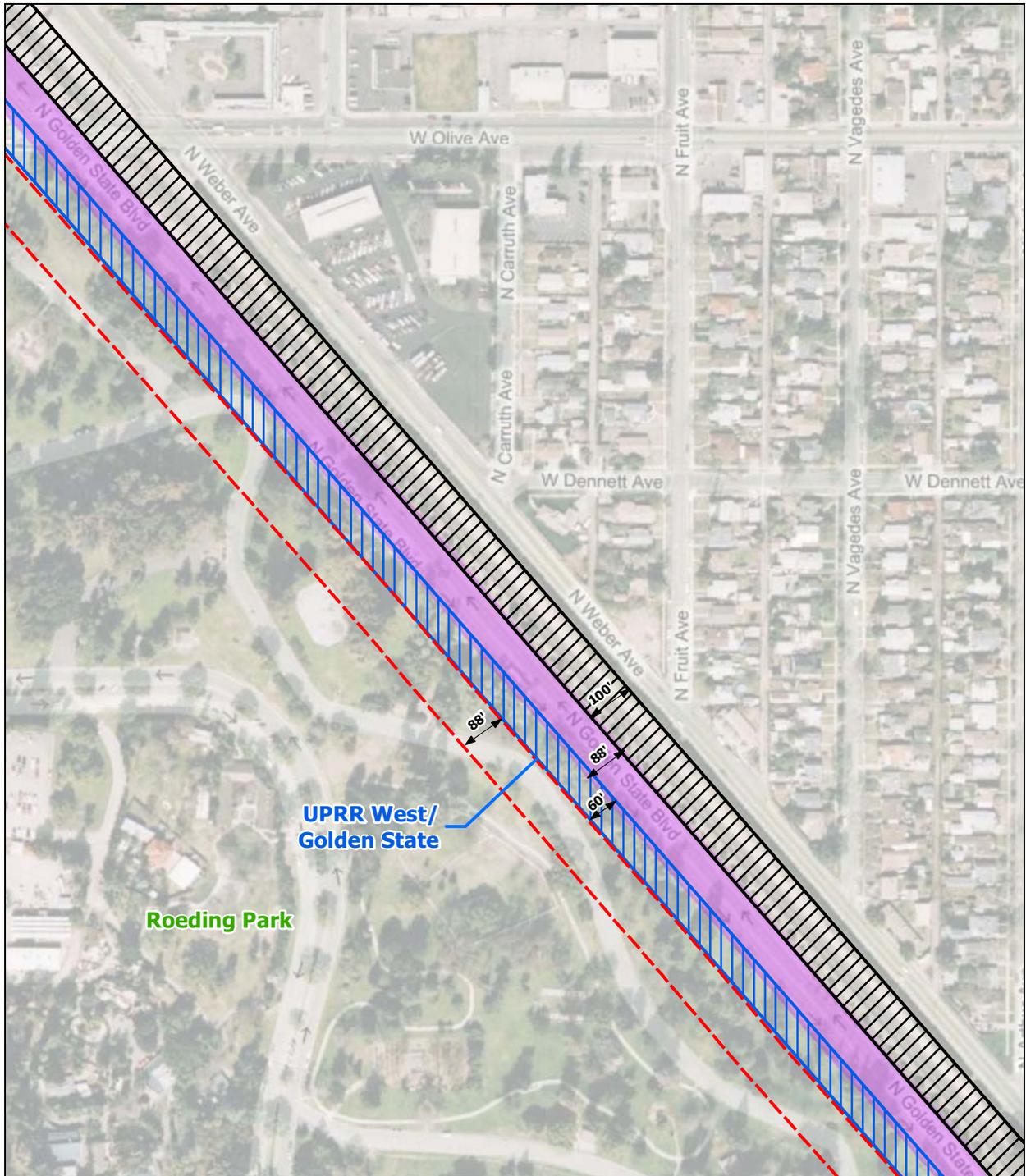
North of Jensen Avenue, the HST alignment would again cross the UPRR tracks and continue parallel to the UPRR right-of-way until reaching East Florence Avenue, where the alignment would then curve westerly toward the existing BNSF Railway route south of Fresno.

#### **C. GOLDEN STATE BOULEVARD**

This alternative would follow the current alignment of Golden State Boulevard (Figure 2-4). From north to south, the HST alignment would enter the Fresno subsection via the Golden State Boulevard right-of-way. It would then proceed south past the eastern edge of Roeding Park (Figure 2-5) and through Fresno's Chinatown District, which is bordered by SR 99 on the west, the UPRR on the east, Fresno Street on the north, and Ventura Street on the south. The alignment would continue south and depart the Golden State Boulevard right-of-way at about Church Avenue and proceed south adjacent to the BNSF Railway route in the vicinity of Cedar Avenue.

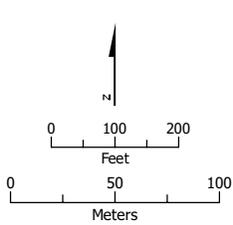
#### **D. STATE ROUTE 99**

From north to south through the Fresno subsection, the State Route 99 Alternative would follow the alignment of SR 99 until the point where SR 99 swings west to bypass Roeding Park. It would then stay elevated along the western edge of Roeding Park before proceeding south in the SR 99 right-of-way. Before leaving the Fresno subsection, it would transition to the BNSF Railway route in the vicinity of Cedar Avenue (Figure 2-4).



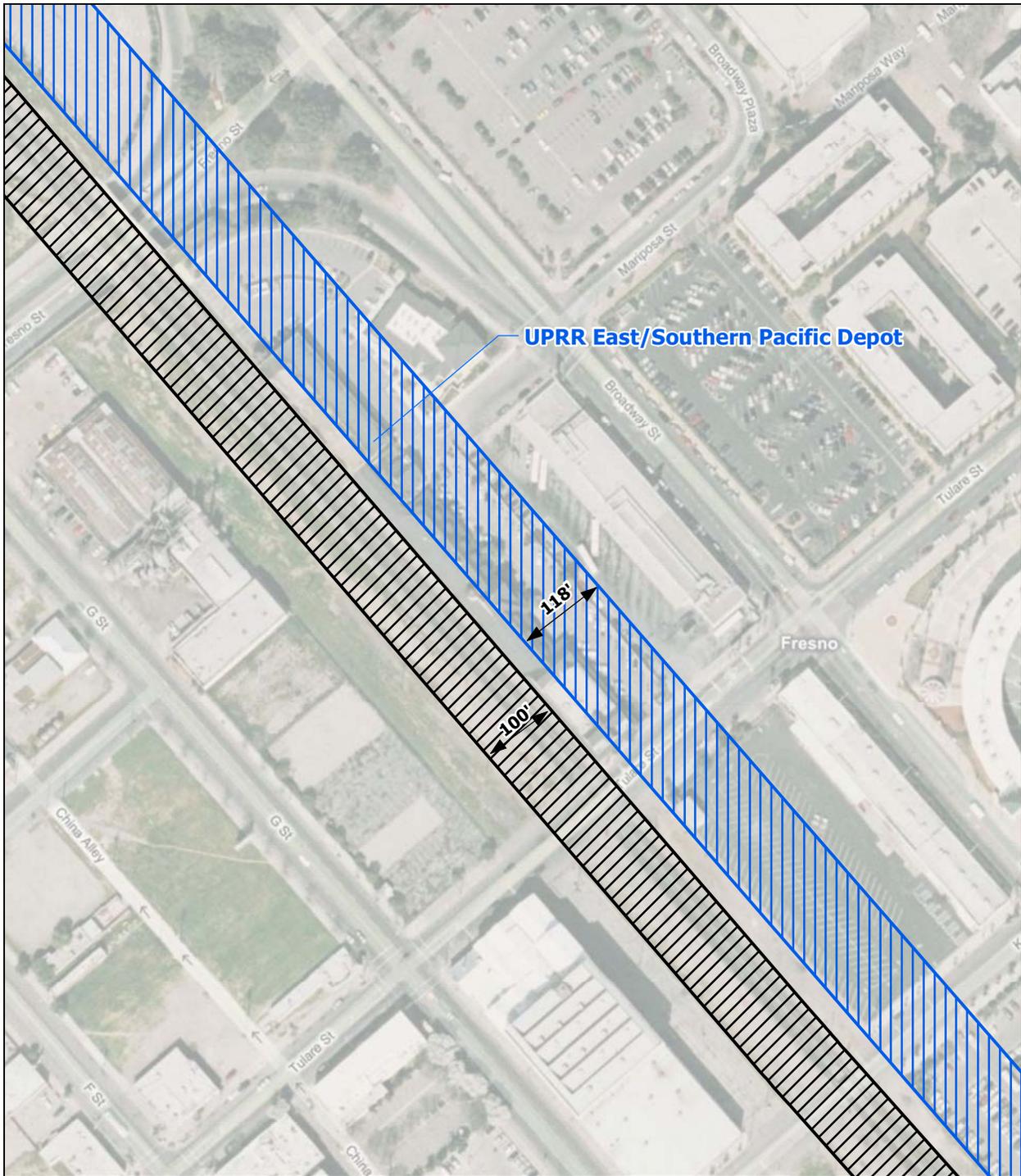
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

August 13, 2010



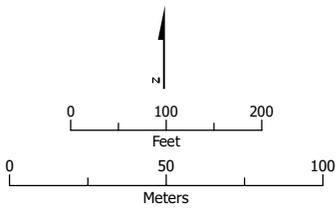
-  At-grade HST right-of-way
-  UPRR right-of-way
-  Relocated Golden State Boulevard right-of-way
-  Existing Golden State Boulevard right-of-way

**Figure 2-5**  
 UPRR West elevated section  
 potential impacts to Roeding Park



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

August 13, 2010



-  At-grade HST right-of-way
-  UPRR right-of-way

**Figure 2-6**  
 UPRR East elevated section potential impacts  
 to the Southern Pacific Depot

## **E. WESTERN BYPASS ALIGNMENT**

Due to farmland impacts and failure to meet objectives for the HST System, rail alignments that would bypass Fresno were not fully studied in the Statewide Program EIR/EIS. However, for project-level analysis a western bypass alternative was evaluated for two reasons. First, the City of Fresno, the County of Fresno, and the Council of Fresno County Governments encouraged the Authority and FRA to evaluate the concept of separating express and local HST tracks through the Fresno area. Second, the Merced to Fresno Section to the north considered a Western Madera Alternative that would have aligned with the western edge of the Fresno Metropolitan Area.

The Western Bypass Alternative would route two HST tracks around Fresno at-grade via a bypass to accommodate through (express) trains (Figure 2-4). This would establish a narrower, lower-speed, HST right-of-way for station tracks to be aligned through central Fresno adjacent to the UPRR right-of-way. This concept could also be coupled with realignment of the UPRR and/or BNSF Railway tracks to create additional flexibility for management of freight and passenger service through the Fresno area.

## **F. VERTICAL ALIGNMENT OPTIONS**

Through Fresno, the HST could be built at-grade, below-grade, or on an elevated structure. Another option is to stack the HST tracks with HST through tracks at-grade and station tracks elevated above them.

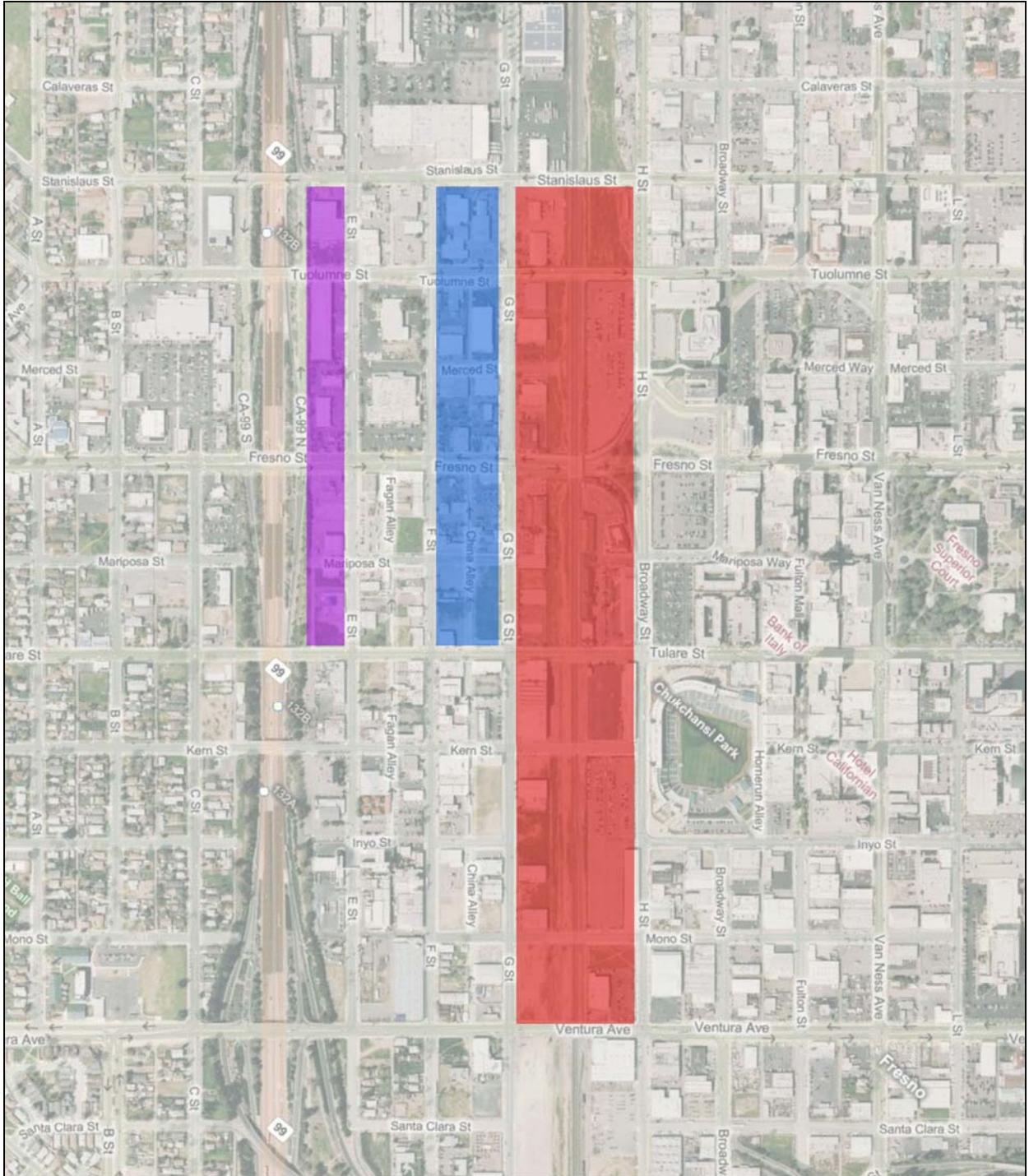
The Authority and FRA judged that placement of the HST entirely below-grade would be impracticable. The alternative alignments pass through a densely developed area of Fresno with many underground utilities, all of which would have to be relocated if the HST were placed in a trench or a cut-and-cover tunnel. Construction of a trench or cut-and-cover tunnel would also result in a lengthy disruption of traffic patterns because each road crossed by the HST would need to be closed and then rebuilt after the HST infrastructure was built. Construction of a below-grade HST would be much more expensive than any of the other vertical alignment options. For these reasons, a completely below-grade alignment in Fresno was not carried forward for further consideration.

A stacked set of HST tracks would reduce the amount of property that would need to be acquired over the 6,000-foot length of the station tracks, but it would not reduce the other impacts of an at-grade or elevated set of tracks. Therefore, a stacked configuration was not carried forward for further consideration.

## **G. FRESNO STATION ALTERNATIVES**

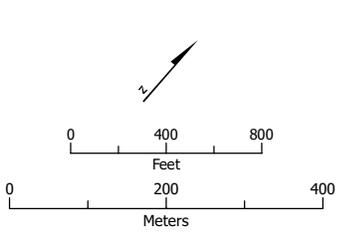
Initial investigations and discussions with representatives of the City of Fresno indicated a preference for a station oriented toward the downtown. The City staff's preference was for a station located at Mariposa Street on the east side of the UPRR right-of-way that would orient it toward Fresno's "front door."

All the alternative alignments considered for the Fresno subsection assumed a downtown station in the area generally bounded by Stanislaus Street on the north, Ventura Street on the south, H Street on the east, and SR 99 on the west (Figure 2-7). Because all of the alternative alignments provided the opportunity for a long stretch of straight track through this area, they afforded considerable flexibility for the location of the station platforms. Alternative stations were



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

August 13, 2010



**Downtown Fresno station investigation areas**

- Golden State Boulevard Alternative
- State Route 99 Alternative
- UPRR Alternatives

**Figure 2-7**  
 Fresno area:  
 Downtown Fresno station investigation areas

evaluated on the UPRR East and UPRR West alternative alignments between Stanislaus, H, Inyo, and G streets. Alternative stations on the Golden State Boulevard Alternative Alignment were evaluated between Stanislaus, G, Tulare, and F streets. For the SR 99 Alternative Alignment, stations were evaluated between Stanislaus, E, and Tulare streets, and SR 99.

### 2.3.4 Alternatives Formulated for the Rural Subsection

The initial alternatives for the rural subsection originated from a variety of sources. First, the preferred alignment identified in the Statewide Program EIR/EIS was included as part of this analysis (Figure 2-1). Second, responding to the commitment made in the Statewide Program EIR/EIS to investigate alternatives that specify a potential station in the Visalia-Tulare-Hanford area, the Visalia-Tulare-Hanford Station Feasibility Study (Appendix A) identified several alternative alignments. Third, initial alternatives were developed in response to input from local, state, and federal agency officials and stakeholders during the scoping process.

The initial alternatives reflected combinations of the following three factors:

- **Primary Route** – All of the initial alternatives followed the existing BNSF Railway or UPRR routes, in accordance with the project objective to use existing transportation corridors to the maximum extent possible.
- **Traversing Communities** – Many of the communities in the south San Joaquin Valley have grown up around the BNSF and UPRR rights-of-way. Initial alternatives were identified that either passed through these communities adjacent to the existing railroad rights-of-way or bypassed the communities.
- **Visalia-Tulare-Hanford Area Station** – A number of initial alternatives were driven by the possible locations for a potential Kings/Tulare Regional Station to serve the Visalia-Tulare-Hanford area.

#### A. TRANSITION FROM UPRR CORRIDOR TO BNSF CORRIDOR

Because Visalia and Tulare are located on the UPRR Corridor, some of the initial alternatives for a Kings/Tulare Regional Station were in the UPRR Corridor. However, all of the alternatives had to return to the BNSF Corridor before entering Bakersfield as described above.

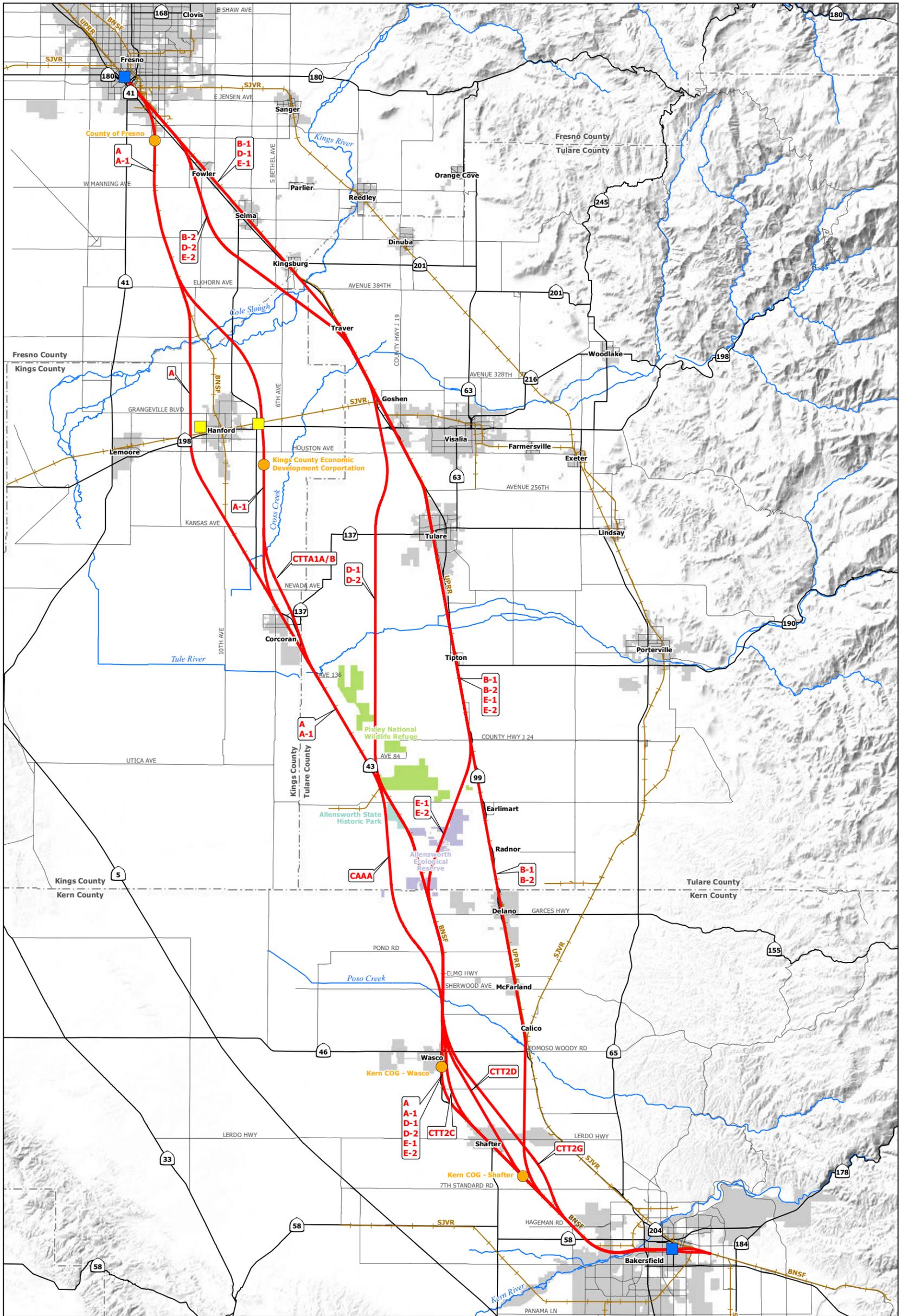
Table 2-2 lists the initial alternatives identified for the rural subsection. The horizontal alignments for these alternatives are shown in Figure 2-8. All of these horizontal alternative alignments are summarized in the discussion below. Appendix B, which includes Volume III of the *Fresno to Bakersfield Preliminary Alternatives Analysis Report*, contains more detailed plans for these alternatives.

Over the course of engineering and environmental studies for the initial alternatives, alignments were refined to improve design efficiency and reduce potential environmental impacts. In addition, consultation with the U.S. EPA and USACE identified an alternative in the BNSF Corridor north of Corcoran that would avoid impacts to seasonal wetlands (Figure 2-9).

**Table 2-2**  
 Rural Subsection Initial Alternatives

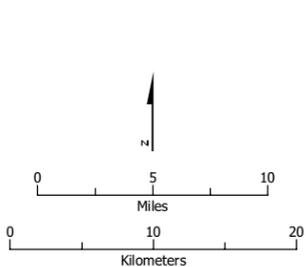
Alternative	Route	Station
A (PEIR/EIS Preferred)	BNSF Hanford West Bypass	None
A-1	BNSF Hanford East Bypass	198 West <sup>a</sup>
CTTA1A/B	BNSF Corcoran Bypass	NA
CAAA	BNSF Allensworth Bypass	NA
CTT2C	Wasco Bypass	NA
CTT2D	BNSF Wasco-Shafter Bypass	NA
CTT2G	BNSF Wasco-Shafter--7 <sup>th</sup> Standard Road Bypass	NA
B-1	UPRR Through Fowler-Selma-Kingsburg	99 North <sup>c</sup>
B-2	UPRR Bypass Fowler-Selma-Kingsburg	99 North <sup>c</sup>
D-1	UPRR to BNSF Railway Northern Transition Through Fowler-Selma-Kingsburg	198 East, <sup>b</sup> 99 Center <sup>d</sup>
D-2	UPRR to BNSF Railway Northern Transition Bypass Fowler-Selma-Kingsburg	198 East, <sup>b</sup> 99 Center <sup>d</sup>
E-1	UPRR to BNSF Railway Southern Transition Through Fowler-Selma-Kingsburg	99 North <sup>c</sup>
E-2	UPRR to BNSF Railway Southern Transition Bypass Fowler-Selma-Kingsburg	99 North <sup>c</sup>
3-B	BNSF-Straight South of Corcoran West	198 West <sup>a</sup>
3-C	BNSF-Straight South of Corcoran East	198 West <sup>a</sup>
Notes: <sup>a</sup> 198 West Station, approximately 3 miles east of Hanford <sup>b</sup> 198 East Station, approximately 1 to 1½ miles southwest of SR 198/SR 99 <sup>c</sup> 99 North Station, near Goshen Junction <sup>d</sup> 99 Center Station, approximately 4½ miles west of Visalia  Acronyms: BNSF = BNSF Railway CAAA = Clean Air Act Amendments PEIR/EIS – Program Environmental Impact Report/Environmental Impact Statement UPRR = Union Pacific Railroad		

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PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010

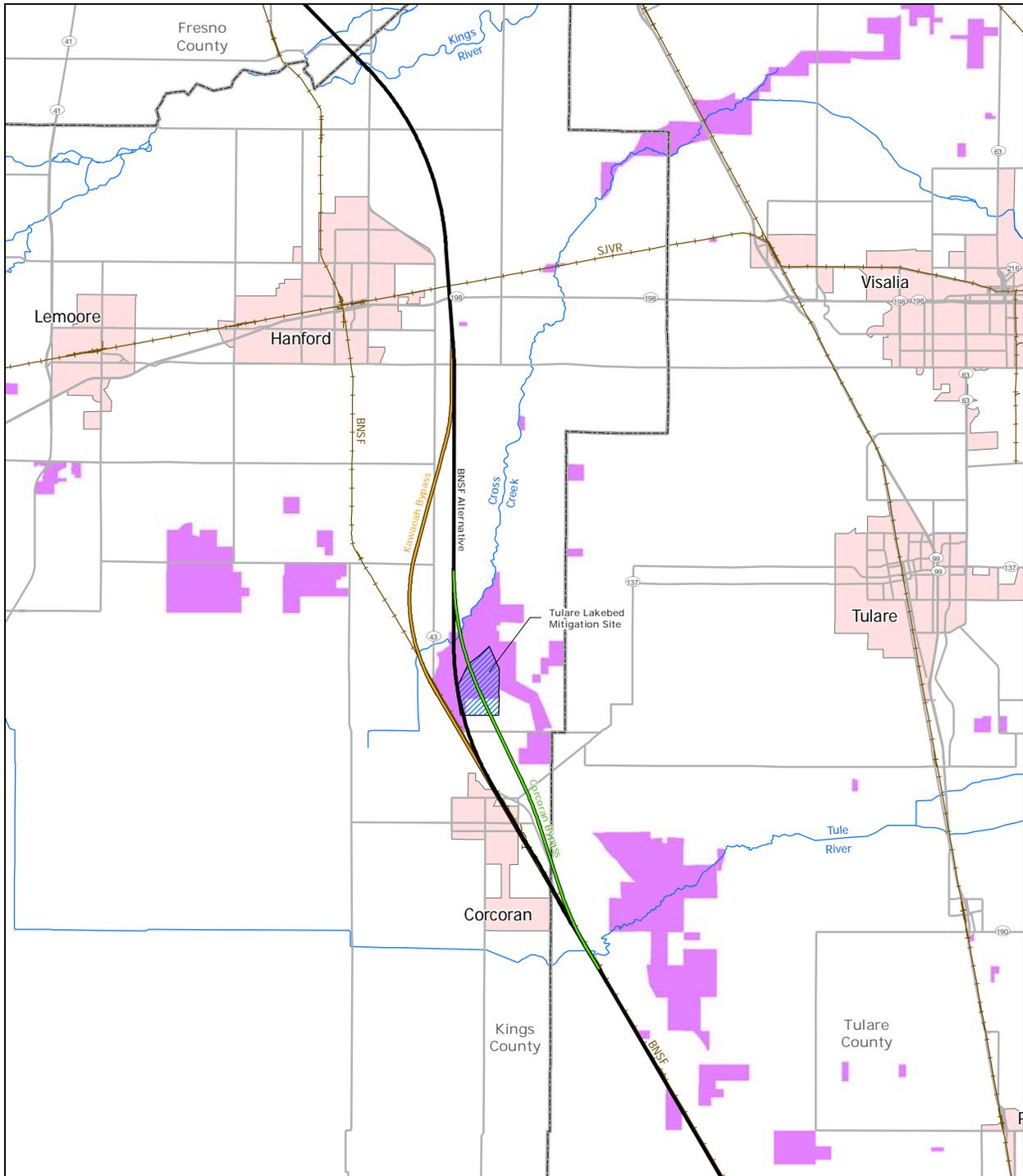
August 13, 2010



- Alternative alignments
- Existing rail line
- Major road
- Hydrographic feature
- County boundary
- Proposed HST Heavy Maintenance Facility site
- Proposed station site
- Potential Kings/Tulare regional station site
- Allensworth State Historic Park
- Allensworth Ecological Reserve
- Pixley National Wildlife Refuge
- Community/Urban area

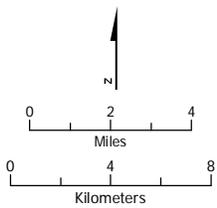
**Figure 2-8**  
 Rural subsection alternatives

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PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Vernal pool source: Holland, 2009

February 11, 2011



- BNSF Alternative
- Corcoran Bypass
- Kaweah Bypass
- Tulare Lakebed Mitigation Site
- County boundary
- River
- Major roads
- Urban area
- Vernal pool area

**Figure 2-9**  
 BNSF avoidance alternative alignment  
 near Hanford/Corcoran

## **B. BNSF ALTERNATIVE ALIGNMENT (ALTERNATIVE A)**

Except in the vicinity of Hanford, the alignment of this alternative (similar to the Statewide Program EIR/EIS preferred alignment) follows the BNSF Railway route from E. Manning Avenue in Fresno south to Hageman Road in the community of Rosedale on the northwestern outskirts of Bakersfield. In the Hanford area, the alignment diverges south from the BNSF Railway route north of the community of Laton near Elkhorn Avenue and bypasses Hanford on the west, rejoining the BNSF Railway route north of Corcoran (Figure 2-1 and Figure 2-8). This deviation from the BNSF Railway was done to reduce travel times between the San Francisco Bay Area and southern California.

The Alternative A alignment would be located on the western side of the BNSF right-of-way from Fresno to Corcoran, and on the eastern side of the BNSF right-of-way south of Wasco. Between Corcoran and Shafter, alignments were evaluated on both the eastern and western sides of the BNSF Railway.

Potential sharing the BNSF right-of-way to the maximum extent possible would further minimize agricultural and biological impacts. However, negotiations have not been concluded with the BNSF Railway on the use of their right-of-way. For the purpose of evaluating potential project impacts, it has been assumed that the HST right-of-way would abut the BNSF Railway right-of-way to the maximum extent possible, but would not encroach upon it.

## **C. HANFORD EAST BYPASS (ALTERNATIVE A-1)**

This alternative would bypass Hanford to the east, diverging from Alternative Alignment A at approximately Elkhorn Avenue, crossing the Kings River, and then swinging south to rejoin Alternative Alignment A in the vicinity of Nevada Avenue north of Corcoran. A potential Kings/Tulare Regional Station could be located in the vicinity of SR 43 and SR 198 on this alternative alignment (Figure 2-8). This alternative would be at-grade except where it crosses the Kings River.

## **D. KAWEAH BYPASS**

This alternative would avoid impacts to wetlands that occur along the east side of the BNSF Corridor north of Corcoran. This alternative would diverge from the A-1 Alternative Alignment just south of the Kings/Tulare Regional Station and swing to the west (Figure 2-9). At Cross Creek it would merge with the existing BNSF track corridor and re-join the A-1 Alternative Alignment just north of Corcoran. The total length of the Kaweah Bypass would be 21.5 miles. This bypass would avoid special aquatic resources in the Cross Creek Complex.

## **E. KAWEAH-CORCORAN BYPASS**

This alternative would be similar to the Kaweah Bypass in the section immediately south of the Kings/Tulare Regional Station. However, rather than joining the existing BNSF Corridor at Cross Creek, it would continue to the west side of the BNSF tracks, cross back over the A-1 Alternative Alignment just north of Corcoran, and then bypass Corcoran to the east. It would rejoin the BNSF Corridor at the same location as would the Corcoran Bypass. This bypass would avoid special aquatic resources at Cross Creek and bypass Corcoran.

## **F. CORCORAN BYPASS (ALTERNATIVE CTTA1A/B)**

This alternative would bypass Corcoran to the east. It would diverge from Alternative Alignment A-1 at approximately Kansas Avenue and rejoin Alternative Alignment A-1 at Avenue 136 (Figure 2-8).

### **G. ALLENSWORTH BYPASS (ALTERNATIVE CAAA)**

Portions of the Pixley National Wildlife Refuge and the Allensworth Ecological Reserve managed by the CDFG are located adjacent to the eastern side of the BNSF right-of-way in the Allensworth area between Corcoran and Wasco (Figure 2-8). In addition, Allensworth State Historic Park is adjacent to the western side of the BNSF right-of-way in this area. To avoid affecting these resources, a bypass west of the BNSF Railway route was developed between Avenue 84 and the Elmo Highway. The alignment for this bypass was developed using information from biological field surveys and wetland delineation to minimize impacts on wetlands in the region, and to minimize impacts on existing agricultural operations.

The FRA and Authority will also evaluate the possibility of moving the BNSF Railway tracks adjacent to the HST Allensworth Bypass. In this case, the BNSF would abandon its existing right-of-way between Avenue 84 and the Elmo Highway and occupy a new right-of-way adjacent to the HST right-of-way along the Allensworth Bypass alignment.

### **H. WASCO BYPASS (ALTERNATIVE CTT2C)**

This alternative would bypass Wasco to the east. It would diverge from Alternative Alignments A or A-1 at approximately Sherwood Avenue and rejoin Alternative Alignment A at approximately Fresno Avenue north of Shafter (Figure 2-8).

### **I. WASCO-SHAFTER BYPASS (ALTERNATIVE CTT2D)**

This alternative would bypass Wasco and Shafter to the east. It would diverge from Alternative Alignments A or A-1 at approximately Sherwood Avenue and rejoin Alternative Alignment A at 7<sup>th</sup> Standard Road (Figure 2-8).

### **J. WASCO-SHAFTER-7TH STANDARD ROAD BYPASS (ALTERNATIVE CTT2G)**

This alternative would bypass Wasco and Shafter farther to the east than the Wasco-Shafter Bypass Alternative Alignment in order to minimize impacts on planned industrial development south of Shafter and to reduce the amount of elevated construction required. The alternative would diverge from Alternative Alignments A or A-1 at approximately Sherwood Avenue, and rejoin Alternative Alignment A at Hageman Road (Figure 2-8).

### **K. UPRR TO 7TH STANDARD ROAD (ALTERNATIVE B-1)**

This alternative, as well as the other alternatives along the UPRR Corridor, described below, were developed to provide a potential Kings/Tulare Regional Station that would serve the communities of Visalia, Tulare, and Hanford. Alternative B-1 would begin at the Fresno subsection alternative alignments that parallel the UPRR on the southern end of the Fresno Metropolitan Area, and proceed south as close to the UPRR route as HST design standards allow. This alternative alignment would diverge from the UPRR in the vicinity of SR 46 south of McFarland, and continue south to connect with Alternative Alignment A at 7<sup>th</sup> Standard Road (Figure 2-8). The alternative would pass through the cities of Selma, Fowler, Kingsburg, Tulare, Delano, and McFarland, as well as the communities of Tipton, Pixley, and Earlimart. This alternative would have a potential Kings/Tulare Regional Station in Goshen in the vicinity of the UPRR and SJVR junction, which could be accessed from SR 99.

### **L. UPRR TO 7TH STANDARD ROAD BYPASSING SELMA, FOWLER, AND KINGSBURG (ALTERNATIVE B-2)**

This alternative is the same as Alternative B-1, except it would bypass the cities of Selma, Fowler, and Kingsburg to the east (Figure 2-8). The bypass would diverge from Alternative Alignment B-1 at approximately East American Avenue, and it would rejoin Alternative Alignment B-1 just north

of Cross Creek. This alternative would also have a potential Kings/Tulare Regional Station in Goshen in the vicinity of the UPRR and SJVR junction, which could be accessed from SR 99.

**M. UPRR NORTHERN TRANSITION TO BNSF RAILWAY (ALTERNATIVE D-1)**

This alternative follows the same alignment as Alternative B-1 south to Visalia, where it diverges from the UPRR route at Visalia and travels south to rejoin Alternative Alignment A on the BNSF Railway route at Avenue 84. There are two possible stations on this alternative alignment in the Visalia area. One station site is located on SR 198 to the west of Visalia on city-owned land (198 East), and the other is located adjacent to the Visalia Municipal Airport (99 Center), as shown in Figure 2-8.

**N. UPRR NORTHERN TRANSITION TO BNSF RAILWAY BYPASSING SELMA, FOWLER, AND KINGSBURG (ALTERNATIVE D-2)**

This alternative is the same as Alternative D-1, except it bypasses the cities of Selma, Fowler, and Kingsburg on the same alignment as the bypass described for Alternative B-2 (Figure 2-8).

**O. UPRR SOUTHERN TRANSITION TO BNSF RAILWAY (ALTERNATIVE E-1)**

This alternative follows the same alignment as Alternative B-1 south to approximately Pixley, where it diverges from the UPRR route and travels south to rejoin Alternative Alignment A on the BNSF Railway route at about the Tulare/Kern county border. This alternative would have a potential Kings/Tulare Regional Station at the same location as Alternatives B-1 and B-2 (Figure 2-8).

**P. UPRR SOUTHERN TRANSITION TO BNSF RAILWAY BYPASSING SELMA, FOWLER, AND KINGSBURG (ALTERNATIVE E-2)**

This alternative is the same as Alternative E-1 except it bypasses the cities of Selma, Fowler, and Kingsburg on the same alignment as the bypass described for Alternative B-2 (Figure 2-8).

**2.3.5 Alternatives Formulated for the Bakersfield Subsection**

The Bakersfield subsection begins at Hageman Road in Rosedale, northwest of Bakersfield, where it meets the rural subsection. It continues through downtown Bakersfield and terminates near Union Avenue, where it meets the Bakersfield to Palmdale HST Section.

The preliminary alternatives for the Bakersfield subsection were variations of the Statewide Program EIR/EIS preferred alternative alignment and were developed in coordination with city staff, local stakeholders, and the Bakersfield TAG. The initial alternatives were based on the factors described below:

- **Truxtun Station** – The Statewide Program EIR/EIS process identified a preferred station near Truxtun Avenue in the vicinity of the existing Amtrak station. This location ties into the local transit system and is most compatible with Bakersfield land use plans. A Truxtun station was endorsed by the City of Bakersfield, the County of Kern, and the Kern Council of Governments in 2003.
- **Operating Speed** – The geometry of all the alternative alignments needed to be straight enough to maintain operating speeds of 220 mph through Bakersfield in order to meet travel time goals for the system.
- **Minimize Impacts on Cultural and Civic Resources** – To reach a station site in the vicinity of Truxtun Avenue, the alignment must pass through a densely developed downtown.

Initial alternatives were developed to minimize impacts on county and city civic buildings, schools, hospitals, and other important resources.

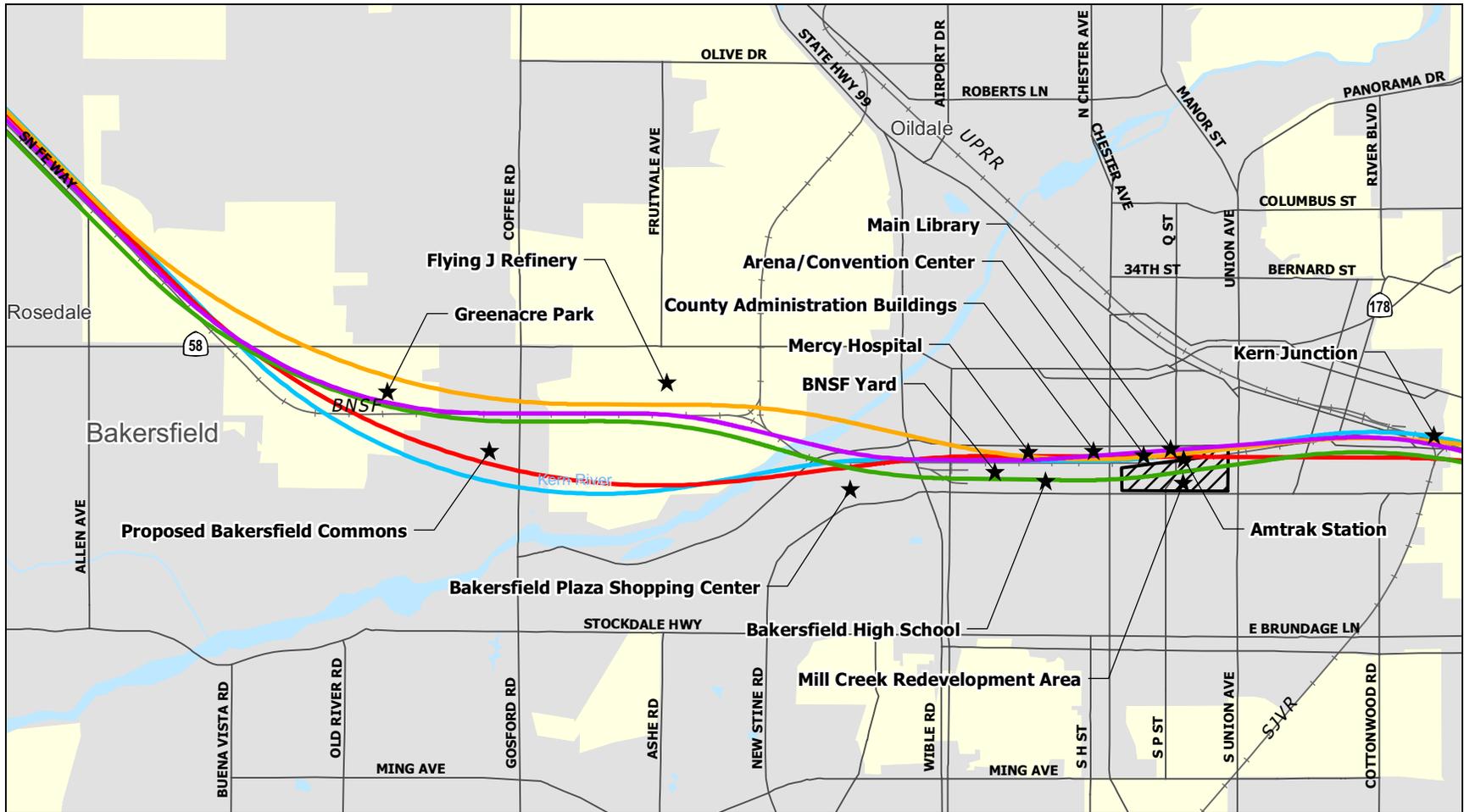
- **Refinery** – The BNSF Alignment passes through the “Flying-J” refinery (purchased by Alon USA Energy, Inc. in 2010) in northwestern Bakersfield. Initial alternatives were developed to avoid this facility.

The initial alternatives developed for the Bakersfield subsection are shown in Figure 2-10 and summarized below.

#### **A. STATEWIDE PROGRAM EIR/EIS PREFERRED ALTERNATIVE**

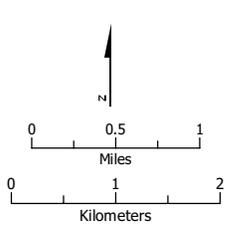
This alternative follows the BNSF right-of-way at-grade from Hageman Road into Bakersfield from the north. It diverts from the BNSF Railway route east of Allen Road, and traverses a residential area to the north of the BNSF Railway route before rejoining the BNSF Railway route through the Flying-J Refinery. At this point, the alignment where it expands to four tracks that cross the Kern River on their own structure close to the BNSF Railway bridge, crossing over SR 99 and through the downtown. As it traverses Downtown Bakersfield, the alignment displaces several civic buildings, including Superior Court, the Convention Center, and the Library (all located south of Truxtun Avenue) before entering the HST station on Truxtun. The four-track alignment parallels the BNSF Railway.

The geometry of this alignment generally provides a maximum operating speed of 190 mph that can be maintained throughout Bakersfield. In some locations, the geometry allows an operating speed of 220 mph to be achieved.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

August 13, 2010



- Option 1A
- Option 1D
- Option 2A
- Option 2C
- Programmatic EIR/EIS preferred alignment
- ★ Significant land-use site
- Existing rail line
- ▨ Potential station area
- Community/Urban area

**Figure 2-16**  
 Bakersfield subsection alternatives

## **B. ALTERNATIVE 1**

Alternative 1 is a family of optional alignments developed to avoid the Flying-J Refinery by swinging well south of the BNSF Railway in the Rosedale area and paralleling the Westside Parkway Corridor into Bakersfield. Three of the options, Options 1B, 1C, and 1E, were not carried forward for further consideration early in the planning process because they did not satisfy one or more of the important factors for development of alternatives in the Bakersfield subsection. Options 1B and 1C avoided the Flying-J Refinery on such a tight curve radius that train speeds would drop to less than 120 mph. These two options would also result in a substantial number of residential and commercial displacements. Option 1E maintained the design speed throughout its alignment, curving south of the refinery and then east along California Avenue, but it did not provide access to a downtown station near Truxtun Avenue.

Two options for Alternative 1, Options 1A and 1D, were carried forward in the alternatives development process.

### **Alternative 1, Option 1A (Blue Line or North Bakersfield).**

This alternative diverges to the south of the BNSF right-of-way near Palm Avenue, and passes through residential and industrial areas, including the site of the proposed Bakersfield Commons development. The alignment traverses residential neighborhoods south of the BNSF Railway before entering the Westside Parkway right-of-way immediately south of the Flying-J Refinery. After crossing the Kern River near the Mohawk Street Extension, the alignment transitions to a four-track horizontal alignment as it skirts the northern edge of the Bakersfield Plaza shopping center. Passing over SR 99 and the BNSF Railway yard, and paralleling the BNSF Railway on the south, the alignment then passes through the Bakersfield High School property, before entering the HST station, which is located south of the BNSF Railway near the Amtrak station. The alignment continues to parallel the BNSF Railway to the end of the station tracks near Union Avenue.

### **Alternative 1, Option 1D (Red Line or Bakersfield South)**

At its western end, this alternative is similar to Alternative 1, Option 1A, in that it diverges to the south of the BNSF right-of-way, but it does not curve as far south as Option 1A. This alternative traverses a residential neighborhood north of the BNSF Railway and east of Cactus Drive before crossing over the BNSF Railway in a southeasterly direction at Calloway Drive. The alignment continues in a southeasterly direction, entering the Westside Parkway right-of-way so as to bypass the Flying-J Refinery on the south. The alignment crosses the Kern River near the Mohawk Street Extension, and transitions to a four-track alignment as it skirts the northern edge of the Bakersfield Plaza shopping center. The alignment then passes over SR 99 and follows the BNSF Railway entering the HST station on the southern side of the BNSF Railway mainline track west of Union Avenue. The alignment continues directly east to the end of the station tracks near Union Avenue.

## **C. ALTERNATIVE 2**

Alternative 2 is a family of alignment options that most closely parallels the Statewide Program EIR/EIS preferred alignment in western Bakersfield. This family of alignment options traverses the Flying-J Refinery. Option 2B was not carried forward for further consideration early in the planning process because it did not meet the design speed requirement through Bakersfield. Options 2A and 2C were carried forward in the alternatives development process.

### **Alternative 2, Option 2A**

This alternative is similar to the Statewide Program EIR/EIS preferred alignment. The alternative diverges from the BNSF right-of-way east of Allen Road through a residential neighborhood immediately north of the BNSF right-of-way. The alignment rejoins the BNSF right-of-way west of Coffee Road, transitioning from two tracks to four tracks as it traverses the Flying-J Refinery. The alignment again diverges from the BNSF Railway to cross over the Kern River, continuing over SR 99 and entering the downtown area through the BNSF Railway yard and parcels along the southern side of the BNSF right-of-way. The four-track alignment enters the HST station area on the southern side of the BNSF Railway across from the Amtrak station and continues east to the end of the station tracks.

### **Alternative 2, Option 2C**

This alternative is similar to the Statewide Program EIR/EIS preferred alignment except it crosses the Kern River farther to the north. The alternative diverges from the BNSF right-of-way near Allen Road through a residential neighborhood immediately to the north of the BNSF Railway. The alignment rejoins the BNSF Railway route at Coffee Road, transitioning from two tracks to four tracks as it traverses the Flying-J Refinery. From that point, the alignment curves to the southeast as it diverges from the BNSF Railway route to cross the Kern River and SR 99 before crossing to the southern side of the BNSF Railway at F Street. The alignment traverses the downtown area on the southern side of the BNSF right-of-way, entering the HST station area on four tracks spanning Union Avenue.

## **2.3.6 Alternative Sites for the Heavy-Maintenance Facility**

A HMF for HST rolling stock would be located in the Central Valley between Merced and Bakersfield. This facility would support the assembly, testing, commissioning, and acceptance of high-speed rolling stock prior to the start up of operations. After initial operations have begun, the HMF would assume maintenance and repair functions to sustain the regular operation of the system and would be responsible for activation of new rolling stock as it is delivered. The HMF would require approximately 154 acres, including buildings, outdoor service areas, storage, roadways, and parking.

In November 2009, the Authority and FRA issued a solicitation for Expressions of Interest (EOI) from private landowners and public agencies to provide proposals on where the HMF could be located between Merced and Bakersfield. For the Fresno to Bakersfield Section, eight proposals were received. Each proposal is described below.

### **A. FRESNO WORKS**

The City of Fresno proposed the Fresno Works – Fresno HMF site, which is on the western side of the BNSF Railway alignment between SR 99 and Adams Avenue, south of Fresno. The 696-acre site is located in an Enterprise Zone. It is adjacent to all HST alternative alignments under consideration.

### **B. KINGS COUNTY HANFORD**

The Kings County Economic Development Corporation proposed the Kings County – Hanford HMF site, which is southeast of Hanford, adjacent to and east of SR 43, between Houston Avenue and Idaho Avenue. The 880-acre site is adjacent to the Kings County Enterprise Zone and accessible to all HST alternative alignments under consideration.

### **C. ANGIOLA**

Schuil & Associates proposed the Angiola HMF site, which is 9 miles south of Corcoran on the west side of the BNSF Railway at Avenue 112 and Tulare County Highway J33. The 29-acre site is accessible to all HST alternative alignments under consideration.

### **D. ALLENSWORTH**

The City of Allensworth Development Group LLC proposed the Allensworth HMF site. The 279-acre site is on the west side of the BNSF Railway alignment approximately 1 mile south of Allensworth State Historic Park. It is accessible to the BNSF Alternative Alignment, but not to the Allensworth Bypass Alternative Alignment.

### **E. MCFARLAND**

Watson Touchstone Commercial Development proposed the McFarland HMF site, which is on the eastern side of the UPRR alignment in McFarland, 25 miles north of Bakersfield. The site covers 630 acres. A 6.5-mile spur would be required to access the site from any HST alternative alignment.

### **F. WASCO**

The Kern Council of Governments, Kern County, and the City of Wasco proposed the Kern Council of Governments – Wasco HMF site. It is directly east of Wasco between SR 46 and Filburn Street. The 421-acre site is accessible to all HST alternative alignments under consideration.

### **G. SHAFTER**

The Kern Council of Governments, Kern County, and the City of Shafter proposed the Kern Council of Governments – Shafter HMF site. It is east of the BNSF Railway alignment between Burbank Street and 7th Standard Road. The site covers 640 acres. While it is potentially accessible to the BNSF Alternative Alignment and the Wasco-Shafter Bypass Alternative Alignment, access is complicated by the location of existing BNSF Railway facilities. In addition, the site is not suitable for yard track turnouts from the Wasco-Shafter Bypass Alternative Alignment.

### **H. BAKERSFIELD**

Muse LLC proposed the Bakersfield site. It is near Bakersfield's Meadows Field Airport, approximately 5 miles from Downtown Bakersfield. The site covers 52 acres. A 6-mile spur would be required to access the site from any HST alternative alignment.

## **2.3.7 Modification of Alternatives Based on Value Engineering Study**

A value engineering study was conducted in January 2011 to identify possible measures to reduce project costs. Large cost reductions were identified that would come from constructing the HST at-grade to the maximum extent possible. Where alternative alignments were initially planned to be on elevated structures through Fresno, Corcoran, and Shafter, and at the Kings/Tulare Regional Station, mostly at-grade solutions were developed. The City of Fresno has expressed its interest in having the HST at-grade through the community. The elevated structure to carry the HST over the Kern River in Bakersfield would also begin as far south as possible, thus reducing its length. A reduction in the length of aerial structures needed to crossing the Kings River is also being evaluated.

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**Section 3.0**  
**404(b)(1) Preliminary Alternatives**  
**Analysis**



### 3.0 404(b)(1) Preliminary Alternatives Analysis

The alternatives identified for the project, and described in Section 2.0, were evaluated using environmental information obtained from existing publications and GIS databases, and assuming a 100-foot-wide right-of-way for at-grade sections of the alignment and a 50-foot-wide right-of-way for sections on elevated structures. Wetland and vernal pool acreage was identified based on data from the National Wetlands Inventory (NWI) (USFWS 2009) and Holland Vernal Pool Inventory (Holland 2009). A cultural resource analysis was based on information provided by the South San Joaquin Valley Information Center, California State University, Bakersfield, in December 2009. Parcel data were obtained from the counties crossed by the project alternatives. Farmland information was obtained from the California Department of Conservation Farmland Mapping and Monitoring Program. Finally, information on parks and national wildlife refuges was obtained from existing GIS databases. The following criteria were used in determining whether to carry an alternative through the environmental review process.

- The alternative is consistent with the purpose and need and/or the project objectives.
- The alternative can be permitted.
- The alternative is practicable to build.
- The alternative has fewer adverse environmental impacts than those of other viable alternatives.

### 3.1 Alternative Alignments not Carried Forward in the Fresno to Bakersfield Section EIR/EIS

The alternative alignments listed in Section 2.0 that did not meet the screening criteria and therefore will not be carried forward in the Fresno to Bakersfield Section EIR/EIS are discussed below by subsection.

#### 3.1.1 Fresno Subsection

##### A. GOLDEN STATE BOULEVARD

The Golden State Boulevard Alternative would have greater community impacts on Chinatown, which is a locally important cultural area, than either the UPRR East or UPRR West alternatives. The station for the Golden State Boulevard Alternative would be south of G Street (Figure 2-7). This site is inconsistent with the City of Fresno's redevelopment vision for the downtown area, and places the HST station far away from the city's "gateway" at Mariposa Street. This makes the alternative inconsistent with the project purpose and need to link the HST with the existing transit and transportation networks in the region.

North of the Fresno to Bakersfield Section, the Golden State Boulevard Alternative would have the same adverse impacts on Roeding Park, downtown circulation, and displacements as the UPRR East and UPRR West alternatives. The Golden State Boulevard Alternative was not carried forward for further study because it was inconsistent with the project purpose and need. It was also inconsistent with the City of Fresno's redevelopment vision, does not provide a station with a strong land use linkage with downtown, and has greater environmental impacts than either the UPRR East or UPRR West alternatives.

##### B. STATE ROUTE 99

The SR 99 Alternative would cross through Roeding Park north of the Fresno to Bakersfield Section, while the UPRR West and Golden State Boulevard alternatives would run along one edge of Roeding Park. For this reason, the SR 99 Alternative would take more property from Roeding

Park than the UPRR West and Golden State Boulevard alternatives. Within the limits of the Fresno to Bakersfield Section, the SR 99 Alternative would be located farthest from Fresno's central business district (approximately 0.25 mile), making it even less consistent with the City's downtown redevelopment vision than the Golden State Boulevard Alternative and therefore inconsistent with the project purpose and need. This alternative was not carried forward for further study because it was not consistent with the project purpose and need and because it had greater environmental impacts than either the UPRR East or UPRR West alternatives.

**C. FRESNO EAST**

The Fresno East Alternative would result in the demolition or relocation of the Southern Pacific Railroad Depot. The depot is on the National Register of Historic Places and therefore qualifies for protection under Section 4(f) of the U.S. Department of Transportation Act. Section 4(f) does not allow the U.S. Department of Transportation to use protected properties unless there is no feasible and prudent alternative to that use. The Fresno West Alternative is a feasible and prudent alternative; therefore, the Fresno East Alternative was not carried forward for further consideration.

**D. FRESNO BYPASS**

The Fresno Bypass Alternative was not carried forward for further consideration for the following reasons:

- This alternative is not consistent with the project objective to use existing transportation corridors to the maximum extent possible.
- The two-track bypass would impact 177 agricultural parcels, resulting in substantial impacts on agricultural land.
- The City and County of Fresno submitted a letter to the Authority jointly opposing the alternative.
- The split-track scenario adds design and construction complexity and duplication, including overpasses of SR 41 and SR 99, as well as uncertainties associated with construction staging.
- The alternative would require acquisition of substantially more right-of-way than an alternative that only goes through Fresno.

**3.1.2 Rural Subsection**

**A. BNSF HANFORD WEST BYPASS**

Table 3-1 lists the environmental impacts associated with the alignment alternatives in the rural subsection based on the existing information described above. As shown in the table, the BNSF Hanford West Bypass (Alternative Alignment A) would have very similar impacts on aquatic resources, special-status species habitat, and agricultural land as the BNSF Hanford East Bypass. On the other hand, the BNSF Hanford West Bypass would have greater impacts on local land use plans than the BNSF Hanford East Bypass. The Hanford West Bypass is located between the cities of Hanford and Lemoore. Local plans seek to guide future development in this infill area between the two cities. HST construction on the Hanford West Bypass would discourage this development. About 26% more residential parcels (146 versus 107) would also be affected by the Hanford West Bypass than the Hanford East Bypass.

The Hanford West Bypass does not provide an opportunity for a regional station in the Visalia/Tulare/Hanford area that can conveniently serve the residents of Visalia, Tulare, and Hanford. None of these three communities supports a station along this alignment.

The Hanford West Bypass was not carried forward for further consideration because it would not substantially reduce impacts on aquatic resources, special-status species habitat, and agricultural land relative to the Hanford East Bypass, but would result in more substantial residential relocation impacts and land use impacts. In addition, the Hanford West Bypass does not provide a satisfactory location for a potential Kings/Tulare Regional Station because it would not serve Visalia and Tulare as well as it serves Hanford.

## **B. WASCO BYPASS**

Wasco and Shafter are approximately 5 miles apart on SR 43. It would not be logical to bypass Wasco to minimize impacts on that community and not bypass Shafter for the same reason. Therefore, this alternative was not carried forward for further consideration.

## **C. WASCO-SHAFTER-7TH STANDARD ROAD BYPASS**

The Wasco-Shafter-7<sup>th</sup> Standard Road Bypass would require acquisition of 25 more acres of farmland than the Wasco-Shafter Bypass Alternative Alignment. In addition, the Wasco-Shafter-7<sup>th</sup> Standard Road Bypass would physically divide a planned 2,600-acre housing development, and is not supported by the City of Bakersfield. For these reasons, it was not carried forward for further consideration.

## **D. UPRR CORRIDOR ALTERNATIVES**

HST alignments in the UPRR Corridor were evaluated in the Statewide Program EIR/EIS, but they were not selected as the preferred alignment for the rural subsection for several reasons:

- An HST alignment along the UPRR route would have greater community impacts (i.e., on Fowler, Selma, and Kingsburg) than along the BNSF Railway route.
- The BNSF and UPRR Corridors would have similar biological and wetland impacts, and thus the UPRR Alignment offers no environmental advantages.
- The UPRR Alignment would require acquisition of more right-of-way, primarily greenfield and agricultural lands.
- The UPRR Alignment is not practicable to construct due to conflicts with existing transportation infrastructure, such as SR 99.

As indicated in Section 2.2.4, the Statewide Program EIR/EIS committed the Authority and FRA to undertake an additional study of potential locations for a station in an existing and/or planned urbanized area near Visalia prior to the commencement of the project-level environmental review for the Fresno to Bakersfield Section. To fulfill that commitment, the Authority conducted a study of potential regional station sites in the Hanford, Visalia, and Tulare region. That study is reported in the *Visalia-Tulare-Hanford Station Feasibility Study* prepared in 2007, and is provided in Appendix A.

**Table 3-1**  
 Preliminary Impact Analysis of Alternative Alignments, Rural Subsection

Alternative Alignment	Impacts on Aquatic Resources					Environmental Impacts				
	Streams/ Creeks/ Canals (miles)	Lakes/ Ponds/ Swamp/ Reservoirs (acres)	Wetlands/ Vernal Pools (acres)	Special- Status Wildlife Habitat (acres)	National Wildlife Refuge (acres)	Residential Displacements (parcels)	Commercial/ Industrial Displacements (parcels)	Cultural Resources (No. of records)	Park land (acres )	Farm- land (acres)
<b>Alignment A:</b> BNSF Hanford West Bypass	2	6	30	238	0	146	87	0	17	875
<b>Alignment A-1:</b> BNSF Hanford East bypass	2	4	28	223	0	107	90	0	17	890
<b>Alignment B-1:</b> UPRR to 7 <sup>th</sup> Standard Road	3	9	15	291	0	141	53	0	2	664
<b>Alignment B-2:</b> UPRR to 7 <sup>th</sup> Standard Road, Fowler/Selma/ Kingsburg bypass	3	8	15	315	0	141	63	0	2	799
<b>Alternative D-1:</b> UPRR Northern Transition to BNSF Railway	4	10	42	220	11	155	58	0	27	830

**Table 3-1**  
 Preliminary Impact Analysis of Alternative Alignments, Rural Subsection

Alternative Alignment	Impacts on Aquatic Resources					Environmental Impacts				
	Streams/ Creeks/ Canals (miles)	Lakes/ Ponds/ Swamp/ Reservoirs (acres)	Wetlands/ Vernal Pools (acres)	Special- Status Wildlife Habitat (acres)	National Wildlife Refuge (acres)	Residential Displacements (parcels)	Commercial/ Industrial Displacements (parcels)	Cultural Resources (No. of records)	Park land (acres )	Farm- land (acres)
<b>Alternative D-2:</b> UPRR Northern Transition to BNSF Railway Bypassing Selma, Fowler, and Kingsburg	3	9	42	244	11	155	68	0	27	966
<b>Alternative E-1:</b> UPRR Southern Transition to BNSF Railway	3	8	93	268	0	145	72	0	44	699
<b>Alternative E-2:</b> UPRR Southern Transition to BNSF Railway Bypassing Selma, Fowler, and Kingsburg	3	8	93	292	0	145	50	0	17	835

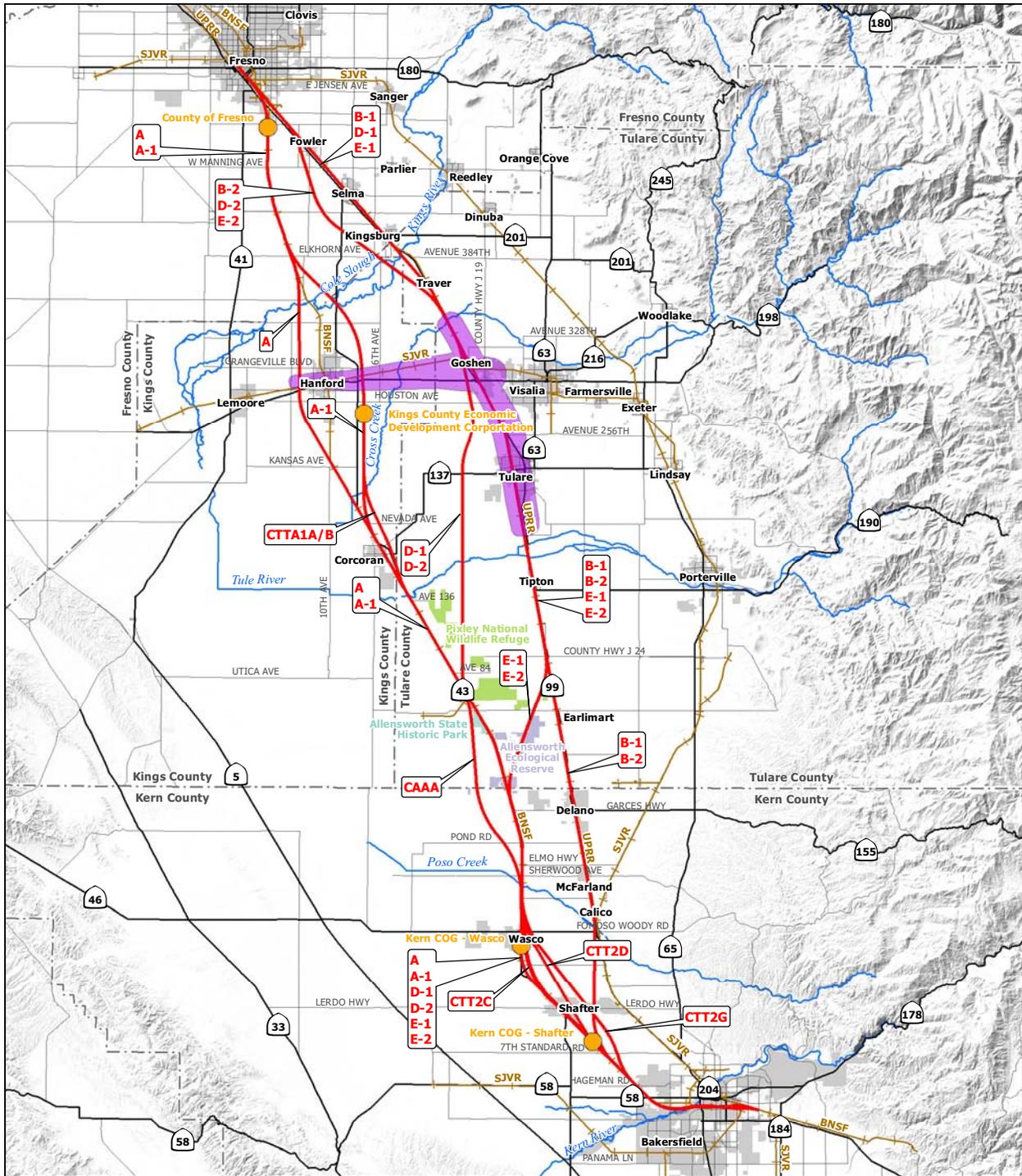
Because Visalia and Tulare are located on the UPRR, evaluation of potential stations had to consider alternative HST alignments along the UPRR Corridor. Potential station sites were evaluated in a zone extending along SR 99, from north of Visalia to south of Tulare, and along SR 198 and the SJVR corridor from Visalia to the western side of Hanford (Figure 3-1). Four potential sites were identified:

- **99 North** – This site is located in Goshen, adjacent to SR 99 in the vicinity of the UPRR and CVR junction.
- **198 East** – This site is located on SR 198 to the west of Visalia.
- **99 Center** – This site is adjacent to SR 99 and the Visalia Municipal Airport.
- **198 West** – This site is east of Hanford near the interchange of SR 198 and SR 43.

Site 198 West would be served by the Hanford East Bypass in the BNSF Corridor. The remaining sites would be served by alignments in the UPRR Corridor. The *Visalia-Tulare-Hanford Station Feasibility Study* indicated that any of these station sites would provide good service to the region because of their connectivity to the local transportation network and proximity to population centers.

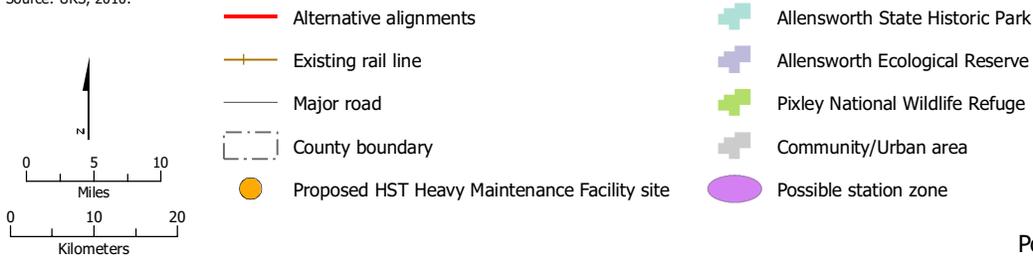
As described in Section 2.3.2.3 of the *Visalia-Tulare-Hanford Station Feasibility Study*, six alternatives were evaluated within the UPRR Corridor to serve the potential station sites in the Visalia area. These six alternatives can be described as three basic alignments with alternative routing in the vicinity of Fowler, Selma, and Kingsburg. The UPRR route passes through these three cities. All three cities and Fresno County are strongly opposed to an HST passing through them. Therefore, in addition to evaluating an HST alignment adjacent to the UPRR, an alternative was considered that would bypass the three cities to the west (Figure 3-1). In relation to an alignment adjacent to the UPRR right-of-way, the bypass would increase impacts on special-status species habitat (24 more acres) and impacts on farmland (135 more acres), and would also increase encroachment on commercial parcels (10 more parcels). On the other hand, the bypass would encroach on approximately the same number of residential parcels as an alignment adjacent to the UPRR Corridor.

South of Visalia, the three pairs of UPRR alternative alignments follow different routes to reconnect with the BNSF Railway north of Bakersfield. To minimize out-of-direction travel and maintain the travel-time goal, UPRR Alternative Alignments D-1 and D-2 travel almost due south from Visalia and reconnect with the BNSF Railway corridor in the Allensworth area. UPRR Alternative Alignments E-1 and E-2 continue to follow the UPRR Corridor south from Visalia to Pixley where they diverge to the southwest, rejoining the BNSF Railway route at the Tulare/Kern county border. UPRR Alternative Alignments B-1 and B-2 continue on the UPRR Corridor south from Visalia all the way to SR 46 south of McFarland, where they then travel due south to rejoin the BNSF Railway at approximately 7<sup>th</sup> Standard Road (Figure 3-1).



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 Source: URS, 2010.

August 13, 2010



**Figure 3-1**  
Possible station zones

South of the Tule River, Alternative Alignments D-1/D-2 and E-1/E-2 cross through extensive wetland habitat. Alternative Alignments D-1/D-2 cross the Pixley National Wildlife Refuge and Alternatives E-1/E-2 cross the Allensworth Ecological Reserve. As shown in Table 3-1, alternatives D-1/D-2 and E-1/E-2 would impact 43 and 93 acres of wetlands, respectively, most of which occurs in the area south of the Tule River. This is substantially more wetland impacts than those resulting from alternatives in the BNSF Corridor or from UPRR alternatives B-1/B-2.

Alternatives D-1/D-2 and E-1/E-2 were not carried forward for further consideration primarily because they would cause substantially more wetland impacts than UPRR alternatives B-1/B-2 or alternatives on the BNSF corridor and they would cross a national wildlife refuge and a state ecological reserve. In addition, alternatives D-1/D-2 and E-1/E-2 would have about 45 and 30 miles, respectively, of alignment outside of an existing transportation corridor, which is inconsistent with the project objectives.

As shown in Table 3-1, existing environmental information indicates that UPRR alternatives B-1 and B-2 and alternatives on the BNSF corridor would have approximately the same level of impact on aquatic resources. UPRR alternatives B-1 and B-2 would affect 24 and 23 acres, respectively, of aquatic resources consisting of wetlands, lakes, and ponds. This is less than the 32 acres of aquatic resources that would be affected by BNSF Alternative Alignment A-1, which follows the BNSF route except for bypassing Hanford to the east. On the other hand, Alternatives B-1 and B-2 would affect 291 and 315 acres, respectively, of special-status species habitat, whereas Alternative Alignment A-1 would affect 223 acres of this habitat type. In sharing the BNSF right-of-way to the maximum extent possible, the Authority and FRA could further minimize these biological impacts.

## **E. ADDITIONAL EVALUATION OF BNSF AND UPRR ALTERNATIVES**

FRA and the Authority recently conducted two additional studies of potential project alignments in the BNSF and UPRR corridors. The first study presented information regarding the practicability of the UPRR Alignment Alternative. It was undertaken to identify practicability issues as defined by the Clean Water Act Section 404(b)(1) Guidelines. The second study involved a detailed assessment of potential project impacts on aquatic resources and special-status species along each of the corridors. This section presents the results of these studies, and the complete study documents are included as appendices.

### **Development of a BNSF Avoidance Alternative**

As noted in Section 1.1.1, on January 28, 2011, the Authority and FRA representatives met with U.S. EPA and USACE to discuss Tier 2 MOU Checkpoint B issues for the BNSF and UPRR alignments. The Authority agreed to provide additional information regarding a potential "avoidance" alternative along the BNSF alignment that further reduces potential project impacts to special aquatic resources.

This alternative is the same as Alternative Alignment A-1 except it includes the Allensworth Bypass and the Kaweah Bypass described above in Section 2.3.4. All of these alternatives were identified during initial alternatives studies except for the Kaweah Bypass Alternative which was developed in response to the January 28, 2011 meeting with the U.S. EPA and USACE. The combination of these alternatives, termed the BNSF Avoidance Alternative for this report, would avoid the most valuable special aquatic resources – vernal pools – along the BNSF Corridor. These resources occur north of Corcoran in the vicinity of Cross Creek and at the Allensworth State Historic Park and Allensworth Ecological Reserve. The BNSF Avoidance Alternative includes the following features, starting from its northern end:

- From Fresno, it would follow the A-1 Alternative Alignment to the Kings/Tulare Regional Station. Just south of the station, it would diverge from the A-1 Alternative Alignment and

swing to the west onto the Kaweah Bypass (Figure 2-9). At Cross Creek, the Kaweah Bypass would merge onto the existing BNSF track alignment, continue southward, and rejoin the A-1 Alignment at Corcoran.

- South of Corcoran, it would follow the A-1 Alignment (Figure 2-8).
- Near Allensworth, it would diverge from the A-1 Alignment and follow the Allensworth Bypass (Figure 2-8).
- South of the Allensworth Bypass it would follow the A-1 Alternative Alignment through Wasco and Shafter into Bakersfield and the terminus of the project (Figure 2-8).

The potential project impacts of this avoidance alternative on special aquatic resources and special-status species are described below and more fully in Appendix E.

### **UPRR Alignment Alternative Practicability Issues**

The CWA Guidelines specify that the USACE may authorize a proposed project only if it is determined to be the least environmentally damaging practicable alternative. For an alternative to be “practicable,” it must be available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose.

Since the completion of the Statewide Program EIR/EIS in 2005, the Authority has maintained that the construction of an HST project along the UPRR Corridor between Fresno and Bakersfield would present extensive technical and logistical challenges. To substantiate this position, FRA and the Authority assembled information regarding project practicability. This information is included as Appendix D (Clean Water Act Section 404 Practicability Criteria, Union Pacific Railroad Alignment Alternative) and is summarized in this section.

Appendix D describes the requirements of the CWA Guidelines, defines the Fresno to Bakersfield project purpose and alignment, and evaluates the UPRR B-2 alternative with respect to existing technology, logistics, and cost. Key findings of the analysis indicate that HST construction along the UPRR Corridor would:

- Present substantial technical challenges.
- Present numerous logistical conflicts with existing infrastructure, in particular, UPRR railroad tracks, state highways and local roads, and airport and industrial facilities.
- Potentially require the resolution of complex legal issues raised by UPRR and other parties, which could delay the onset of project construction by several years.

The major logistical impediment to the construction of an HST project along the UPRR Corridor is UPRR’s position that it is not in its best interest for the HST project to be placed on its right-of-way. UPRR has stated its position in correspondence with the Authority on many occasions. These letters also identify UPRR’s concerns with having the HST project placed adjacent to its right-of-way, and they emphasize UPRR’s concern that the HST project being constructed on or immediately adjacent to its right-of-way could have adverse business/economic consequences to UPRR itself, its customers, and local, regional, and the state economies. According to UPRR, placement of the HST alignment immediately adjacent to its Fresno Subdivision line would cause serious economic losses by interrupting service to many existing shippers.

UPRR also notes that it has a common carrier obligation to provide service to its customers along its railroad lines and cannot be forced to abandon or discontinue freight service over its main or branch lines without authority from the Surface Transportation Board. UPRR has also identified safety concerns associated with placement of the HST in proximity to its freight operations. Finally, UPRR noted the environmental consequences of having HST limit or constrain its freight operations: industries that cannot in the future be served by freight rail due to proximity to the HST project would have to rely on truck service on local roads to move their goods.

The UPRR is more adverse to the HST being located adjacent to its right-of-way in this section of the proposed HST system than in other sections. At approximately 113 miles in length, the Fresno to Bakersfield Section crosses the entire southern San Joaquin Valley, the most productive agricultural region in California, and among the most productive agricultural regions in the world. State Route (SR) 99 already blocks off the UPRR from serving potential customers on one side of its Fresno Subdivision line in the southern San Joaquin Valley. Locating the HST adjacent to the UPRR right-of-way would block off the other side of its line in many areas. In letters to the Authority contained in Appendix D, the UPRR has characterized the location of the HST adjacent to its Fresno Subdivision line as creating a “railroad dessert” through a region where railroad service is important to the efficient movement of agricultural products. In some other sections of the proposed HST system, there are locations where there are no good alternatives to locating the HST alignment adjacent to the UPRR. In the south San Joaquin Valley, the BNSF Corridor does provide a viable alternative to the UPRR Corridor.

### **Potential Project Impacts on Special Aquatic Resources**

The initial analysis of potential project impacts on special aquatic resources (SAR) presented in Section 3.1.2 was based primarily on two data sources: the National Wetlands Inventory (NWI) and the Holland Vernal Pool Inventory (Holland 2009). Given the constraints of the data, the analysis presented only a general assessment of the extent of potential project impacts on SAR. To develop a more robust estimate of potential project impacts on SAR, as required by Checkpoint B, the Authority and FRA recently undertook an additional analysis. This analysis is included herein as Appendix E (Summary Presentation of Environmental Resources and Constraints, Preliminary, for the BNSF and UPRR Alternative Alignments).

The more detailed analysis estimated and compared potential project impacts on SAR along the BNSF and UPRR corridors. It analyzed the A-1 Alignment on the BNSF Corridor, the BNSF Avoidance Alternative Alignment, and the B-2 Alignment on the UPRR Corridor (this UPRR alignment was selected as it includes a bypass of Fowler, Selma, and Kingsburg, a feature strongly requested by those municipalities and by Fresno County).

The analysis utilized aerial photography from the U.S. Department of Agriculture’s National Agricultural Imagery Program (NAIP) taken in June 2005. Using semi-automated digital image processing techniques to extract SAR features from color-infrared imagery, it identified SAR features in a corridor along the A-1 and B-2 alignments, and the BNSF Avoidance Alternative Alignment. Where the HST tracks would be at-grade, this corridor was 100 feet wide; where tracks would be elevated, it was 50 feet wide.

Four types of SAR features were extracted from the imagery: canal/ditch, retention/detention basin, riverine, and riparian. Additional data sources – NWI, Holland, and the USGS National Hydrography Dataset (USGS 2009) – were used to identify two other SAR features: seasonal wetlands and vernal pools. The analysis was conducted using GIS tools and available data. It did not involve any ground-truth data.

The analysis also assessed several major functions and services provided by the SAR features; this involved rating hydrology, water quality, and habitat integrity. This assessment indicated that

vernal pools and riparian areas had the highest overall function and service ratings; seasonal wetlands and riparian features had medium ratings; and canals/ditches and retention/detention basins had the lowest overall ratings.

Table 3-2 summarizes the results of the analysis. The data and other information in Appendix E can be summarized as follows:

- 88 SAR features occur on the BNSF Alignment, 103 SAR features occur on the UPRR Alignment, and 104 SAR features occur on the BNSF Avoidance Alignment.
- The total area of SAR features on the BNSF and UPRR alignments is quite similar, with 24.06 acres on the BNSF Alignment and 21.75 acres on the UPRR alignment. There are 30.14 acres of SAR features on the BNSF Avoidance Alternative Alignment.
- Vernal pool and canal/ditch are the predominant SAR features on the BNSF Alignment, while canal/ditch and retention basin features predominate on the UPRR and BNSF Avoidance Alternative alignments. Riparian features are present with all alternatives.
- Vernal pool and riparian features have the highest average overall function and service ratings (combining hydrology, water quality, and habitat integrity), while canal/ditch and retention/detention basin have the lowest ratings.
- The largest areas of vernal pool acreage on the BNSF Alignment are located north of Corcoran in the Cross Creek drainage and in the Allensworth area. The construction of the BNSF Avoidance Alternative would avoid project impacts to these wetland areas.

**Table 3-2**  
 Special Aquatic Resources Within the BNSF, UPRR, and BNSF Avoidance Alternative Alignments Differentiated by  
 Functions and Services Value

		Number of Features		
Functions and Services Value	Feature Type	BNSF Alternative Alignment	UPRR Alternative Alignment	BNSF Avoidance Alternative Alignment
<b>Low</b>	Canal/Ditch	50	58	65
	Retention/Detention Basins	7	16	10
	Riparian	1	1	3
	Riverine	3	5	4
	<b>Total features/acreage:</b>	<b>61 / 11.83 acres</b>	<b>80 / 18.61 acres</b>	<b>82 / 19.88 acres</b>
<b>Low/Med</b>	Retention/Detention Basins	0	0	1
	Riparian	1	1	0
	Riverine	2	2	2
	<b>Total features/acreage:</b>	<b>3 / 0.30 acres</b>	<b>3 / 0.38 acres</b>	<b>3 / 1.22 acres</b>
<b>Med</b>	Retention/Detention Basins	0	0	2
	Riparian	10	8	10
	Riverine	3	4	3
	Seasonal Wetland	3	4	2
	Vernal Pool Habitat	2	0	2
	<b>Total features/acreage:</b>	<b>18 / 2.63 acres</b>	<b>16 / 1.2 acres</b>	<b>19 / 9.04 acres</b>

**Table 3-2**  
 Special Aquatic Resources Within the BNSF, UPRR, and BNSF Avoidance Alternative Alignments Differentiated by  
 Functions and Services Value

		Number of Features		
Functions and Services Value	Feature Type	BNSF Alternative Alignment	UPRR Alternative Alignment	BNSF Avoidance Alternative Alignment
Med/High		0	0	0
	<b>Total features/acreage:</b>	<b>0 / 0 acre</b>	<b>0 / 0 acre</b>	<b>0 / 0 acre</b>
High	Vernal Pool Habitat	6	2	0
	Riparian	0	2	0
	<b>Total features/acreage:</b>	<b>6 / 9.30 acres</b>	<b>4 / 1.56 acres</b>	<b>0 / 0 acres</b>
<b>Total features:</b>		<b>88</b>	<b>103</b>	<b>104</b>
<b>Total acres:</b>		<b>24.06</b>	<b>21.75</b>	<b>30.14</b>

**Potential Project Impacts on Sensitive Species and Associated Habitats**

The Authority and FRA conducted an analysis of potential project impacts on special-status species and habitats to provide information for Checkpoint B. The results of this analysis are included as Appendix E. The analysis identified special-status plant and animal species, critical habitat, recovery plan areas, and wildlife movement corridors along the BNSF and UPRR alignments. Table 3-3 summarizes the results of this analysis. The data support several conclusions:

- The UPRR Alternative Alignment would have impacts on two more plant species than the BNSF Alternative Alignment or the BNSF Avoidance Alternative Alignment.
- The BNSF Alternative Alignment and BNSF Avoidance Alternative Alignment would have impacts on two more wildlife species than the UPRR Alternative Alignment.
- The BNSF Alternative Alignment and the BNSF Alternative Alignment would affect more natural lands that provide potential habitat for both plant and wildlife special-status species.
- The UPRR Alignment would result in greater impacts on designated critical habitat, both in terms of number of species and acreage of impacts. The BNSF Alternative Alignment or the BNSF Avoidance Alternative Alignment would not affect designated critical habitat.
- The BNSF Alternative Alignment or the BNSF Avoidance Alternative Alignment would result in impacts on twice as many linkage and satellite recovery areas identified in federal recovery plans.
- The UPRR Alignment would result in greater impacts on core recovery areas identified in federal recovery plans. Neither the BNSF Alternative Alignment nor the BNSF Avoidance Alternative Alignment would affect core recovery areas.
- Other differences between the three alternative alignments with respect to special-status plant and wildlife species, their habitats, and wildlife movement corridors are not substantial.

**Table 3-3**  
 Summary of Special-Status Resource Impacts

Special-Status Resource	Resource Type	Potential Habitat in the Project Footprint			
		Resource Description	BNSF	UPRR	BNSF Avoidance
Wildlife Habitat Types	Natural Lands	Alkali desert scrub, Annual grassland, Perennial grassland, Natural Areas	148.97 ac	43.74 ac	161.02
	Agricultural	Irrigated field, Orchard/vineyard, Vineyard, Cropland	823.20 ac	956.10 ac	880.12 ac
	Aquatic	Lacustrine, Valley riparian, Riverine	14.57 ac	17.78 ac	6.73 ac
	Urban	Urban	83.82 ac	114.43 ac	87.83 ac

**Table 3-3**  
 Summary of Special-Status Resource Impacts

Special-Status Resource	Resource Type	Potential Habitat in the Project Footprint			
		Resource Description	BNSF	UPRR	BNSF Avoidance
Special-Status Species	Plants	Species Likely to Occur	4 species	6 species	4 species
		Potential Impacts (terrestrial)	<148.96 ac	<43.74 ac	161.01 ac
		Potential Impacts (seasonal wetlands)	--	<1.24 ac	--
	Wildlife	Species Likely to Occur	12 species	10 species	12 species
	Wildlife	Maximum Potential Impacts (terrestrial)	<1,058.13 ac	<1,127.99 ac	<1,131.65 ac
	Wildlife	Potential Impacts (aquatic)	<2.68 ac	<1.24 ac	--
Critical Habitat	Designated Critical Habitat	Vernal Pool Fairy Shrimp (acres)	--	17.67 ac	--
		Vernal Pool Tadpole Shrimp (acres)	--	17.67 ac	--
		California Tiger Salamander (acres)	--	7.63 ac	--
Recovery Areas	San Joaquin Upland Species	Linkage Areas (quantity)	4 linkages	2 linkages	4 linkages
		Satellite Areas (quantity)	2 areas	1 areas	2 areas
	San Joaquin Valley Vernal Pool Regions	Core Areas (quantity)	--	1	--
		Core Areas (acres)	--	17.67 ac	--
Wildlife Movement Corridors	General Wildlife Linkages	Linkages (quantity)	6	6	6
Acronym: ac = acre					

**Results of Additional Evaluations**

The results of the additional evaluation of the rural sections of the BNSF, UPRR, and BNSF Avoidance Alternative alignments may be summarized as follows:

- The UPRR Alternative is burdened by substantial logistical challenges that involve conflicts with UPRR tracks and spurs, state highways, local roads, and airport and industrial facilities.

Pursuing an HST project on this alignment could require the resolution of complex legal issues raised by UPRR and other parties, which could delay the onset of project construction by several years.

- The total acreage of aquatic resources of all values is fairly similar for the BNSF and UPRR alternative alignments: 24.06 acres on the BNSF Alignment, compared to 21.75 acres on the UPRR Alignment. The BNSF Avoidance Alternative Alignment supports 30.14 acres of special aquatic features.
- Aquatic resources with the greatest overall functions and services values include riparian areas and vernal pools. Those with the lowest overall functions include canal/ditch and retention/detention basin.
- The majority of special aquatic features on all three alignments exhibit low-to-low/medium functions and services values.
- The BNSF Avoidance Alternative would result in minimal project impacts to medium-value vernal pool features and no impacts to high-value riparian and vernal pool features. The BNSF and UPRR alternatives would have lesser impacts to medium-value vernal pool and riparian features than the BNSF Avoidance Alternative, but the BNSF and UPRR alternatives would also impact high-value vernal pool and/or riparian features.
- The UPRR Alternative would affect two more special-status plant species and cause greater impacts on designated critical than the BNSF or BNSF Avoidance alternatives.
- The BNSF and BNSF Avoidance alternatives would affect two more special-status wildlife species, more potential habitat for both special-status plant and wildlife species, and a greater acreage of natural lands than the UPRR Alignment.
- The BNSF Avoidance Alternative stands out as vastly superior regarding potential impacts on high-value special aquatic resources and aquatic wildlife habitats.

### 3.1.3 Bakersfield Subsection

The Statewide Program EIR/EIS preferred alignment for the Bakersfield subsection, as well as Alternative 2, Options A and C, would pass directly through the Flying-J Refinery along the BNSF Railway right-of-way. The freight rail right-of-way is narrow in this area and would not allow HST tracks to share the constrained right-of-way. In addition, gas pipelines parallel and pass under the right-of-way, posing obstacles for construction and the possibility of encountering fuel leaks and contaminated soil. A risk assessment was done of HST operation through an active refinery, and concluded that the proximity of the trains to refinery facilities could release toxic gases or cause other catastrophic events that could not be adequately mitigated to minimize risk to the passing trains and their riders. The risk assessment also cautioned that sparking from the trains' overhead power lines could ignite a gas release, causing an explosion. For these reasons, these alternatives were not carried forward for further consideration.

### 3.1.4 Heavy Maintenance Facility

Four of the eight potential HMF sites were not carried forward for further consideration; Table 3-4 summarizes the reasons.

**Table 3-4**  
 HMF Sites Not Carried Forward: Basis for Recommendations

HMF Location	Findings and Basis for Recommendations
Angiola	Site is too small for HMF use (29 acres). No convenient roadway access to the site. Soils have high expansive potential and high likelihood of liquefaction under seismic loadings. Would displace 28 acres of farmland of statewide importance (97% of the site).
Allensworth	Site is remote, with poor access to skilled labor, utilities, and surface transportation. Site is near sensitive cultural and environmental resources. Soils have high expansive potential and high likelihood of liquefaction under seismic loadings. Allensworth Bypass alignment has no direct access to the site.
McFarland	Site is 6.5 miles from nearest alternative alignment. Located in a floodplain (431 acres, or 68% of the site). No convenient roadway access to the site. Site is 2.2 miles from nearest 230 kV transmission lines. Wetlands on the site (0.3 acre, or 1% of the site).
Bakersfield	Site is 6 miles from the nearest HST alternative alignment. Configuration of the site does not meet the estimated spatial requirements of the heavy-maintenance facility. Site contains crude oil line pipeline. Inconsistent with the Airport Land Use Commission Plan. Aviation easement would be required and height limits would be in effect. Inconsistent with planned freeway construction. Bakersfield General Plan Update Map shows a future freeway through the site.

## 3.2 Alternatives to be Evaluated in the Project EIR/EIS

### 3.2.1 Alignment and Station Alternatives

#### A. ALTERNATIVE A-1 (BNSF ALTERNATIVE)

Alternative Alignment A-1, also termed the BNSF Alternative, would extend from Fresno to Bakersfield and would lie adjacent to the BNSF to the extent feasible (Figures 3-2 through 3-5 and Appendix B-1). A more detailed description of this alternative is presented below.

The BNSF Alternative would begin at the north end of the Fresno station tracks adjacent to the western side of the UPRR right-of-way in the vicinity of Amador Street. The Fresno station components would be located between Tulare Street on the north, Santa Clara Street on the south, H Street on the east, and G Street on the west. The actual station would be located either on Tulare Street (Figure 3-6) or Kern Street (Figure 3-7).

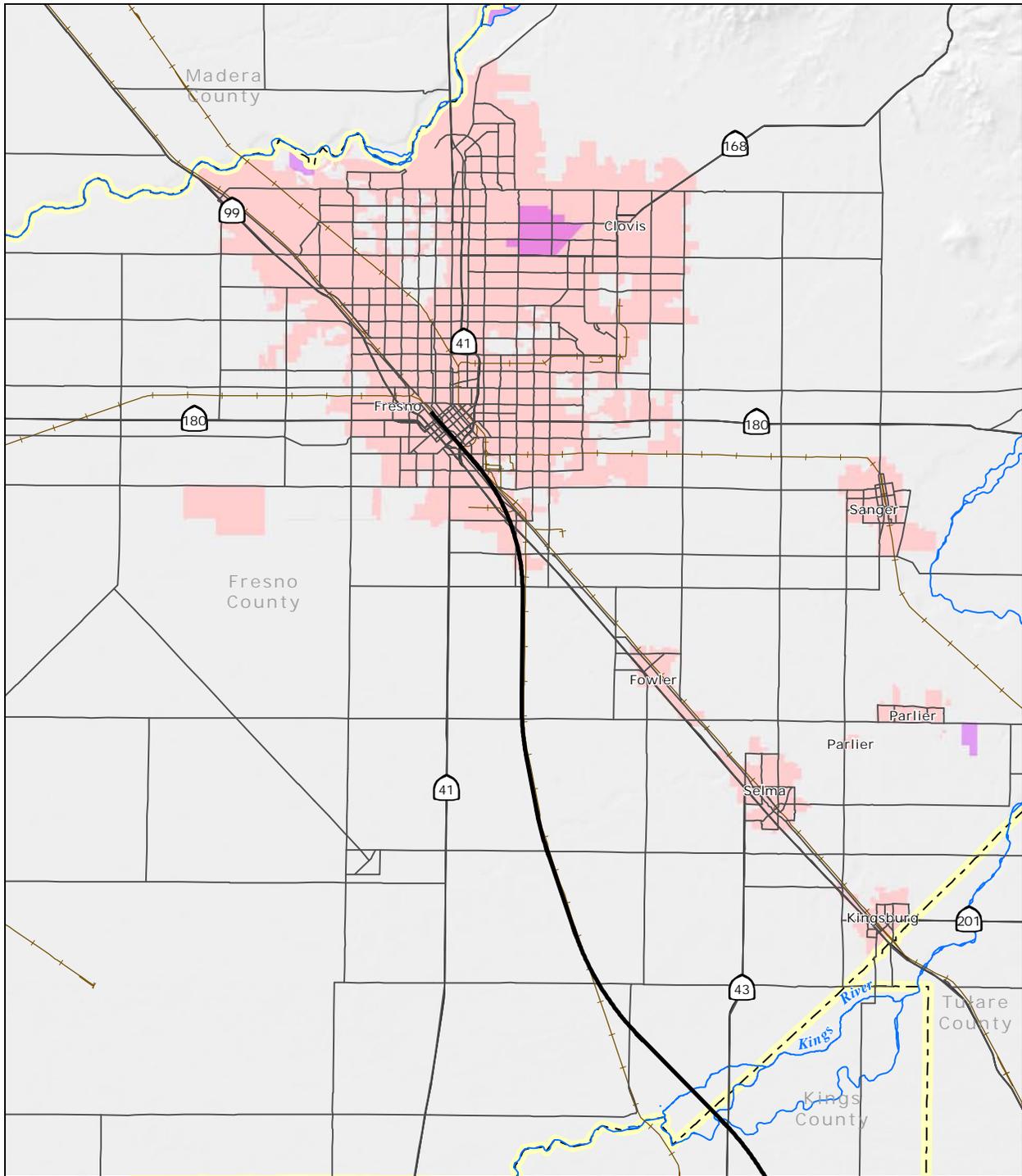
The alignment would run southeast through Fresno on the western side of the UPRR to East Jensen where it would curve westerly toward the existing BNSF alignment south of Fresno. The BNSF Alternative would continue through Fresno County along the BNSF right-of-way until about Elkhorn Avenue where it would diverge from the BNSF in a southeasterly direction until it crossed into Kings County at the Kings River.

Approximately 40 miles of the BNSF Alternative would be in Kings County. The alignment would follow south along State Highway (SR 43), rejoining the BNSF Railway at about Nevada Avenue north of the City of Corcoran. It would pass through Corcoran adjacent to the BNSF and into Tulare County.

The BNSF Alternative would follow the BNSF Railway through Tulare and Kern counties, crossing through the cities of Wasco, Shafter, and Bakersfield, terminating at approximately Union Avenue in Bakersfield. The Tulare County portion of the BNSF Alternative is about 28 miles long. The Kern County portion of the alternative is about 54 miles long.

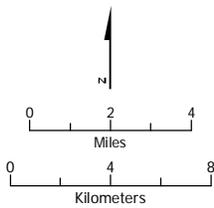
The segment of the alignment from approximately Avenue 84 in Tulare County to the Elmo Highway in Kern County passes adjacent to the Allensworth Ecological Reserve and the Pixley Wildlife Refuge. This region contains important habitat for a wide variety of species, including special-status species such as the San Joaquin kit fox. Therefore, it is important that wildlife can pass across the HST alignment. For this reason, wildlife crossing structures would be provided in the railroad embankment at intervals of approximately 0.3 mile over this segment. The structures would essentially be small bridges spanning openings in the elevated embankment that would support the HST tracks. The bridge deck would be approximately 50 feet wide and would span a distance of approximately 63 feet from toe-to-toe (Figure 3-8). The bridge deck would be supported by three rows of three 2-foot-diameter, 5-foot-high vertical columns (Figure 3-9). Each dedicated wildlife crossing structure would provide five 15-to-16-foot-wide openings; each opening would provide 5 feet of vertical clearance for wildlife approaching these structures.

The Bakersfield station would be located between Truxtun Avenue on the north, Union Avenue on the east, California Avenue on the south, and S Street on the west (Figure 3-10). It would be accessed from Truxtun Avenue, Union Avenue, and S Street.



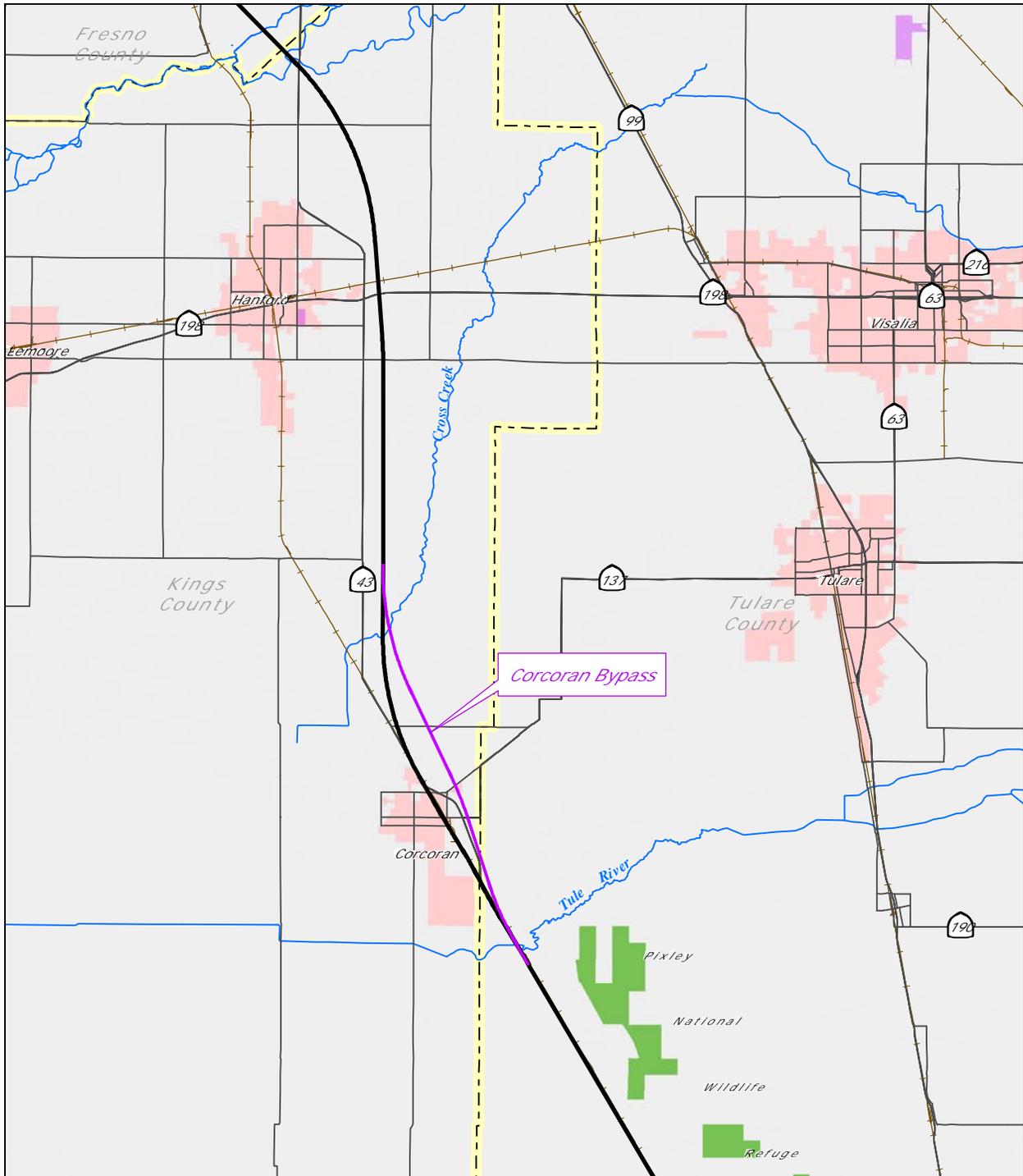
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 Source: URS, 2010.

July 13, 2010



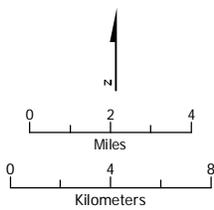
- BNSF Alternative (Bypasses labeled)
- Allensworth State Historic Park
- Allensworth Ecological Reserve
- Pixley National Wildlife Refuge
- Other Public Lands
- County boundary

Figure 3-2  
 Fresno County  
 HST alternatives



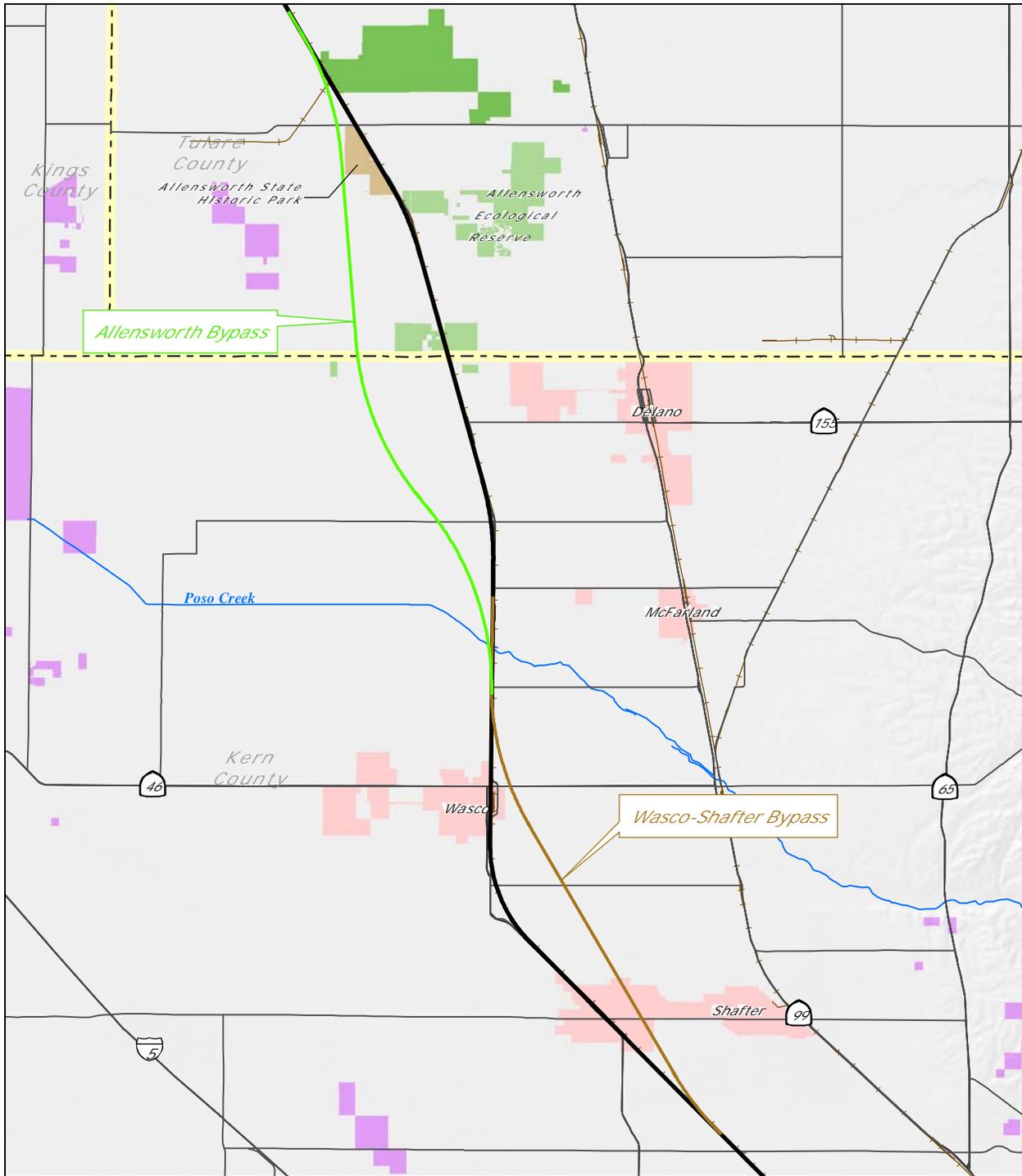
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 Source: URS, 2010.

July 13, 2010



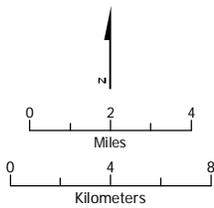
- BNSF Alternative (Bypasses labeled)
- Allensworth State Historic Park
- Allensworth Ecological Reserve
- Pixley National Wildlife Refuge
- Other Public Lands
- County boundary

*Figure 3-3*  
 Kings County  
 HST alternatives



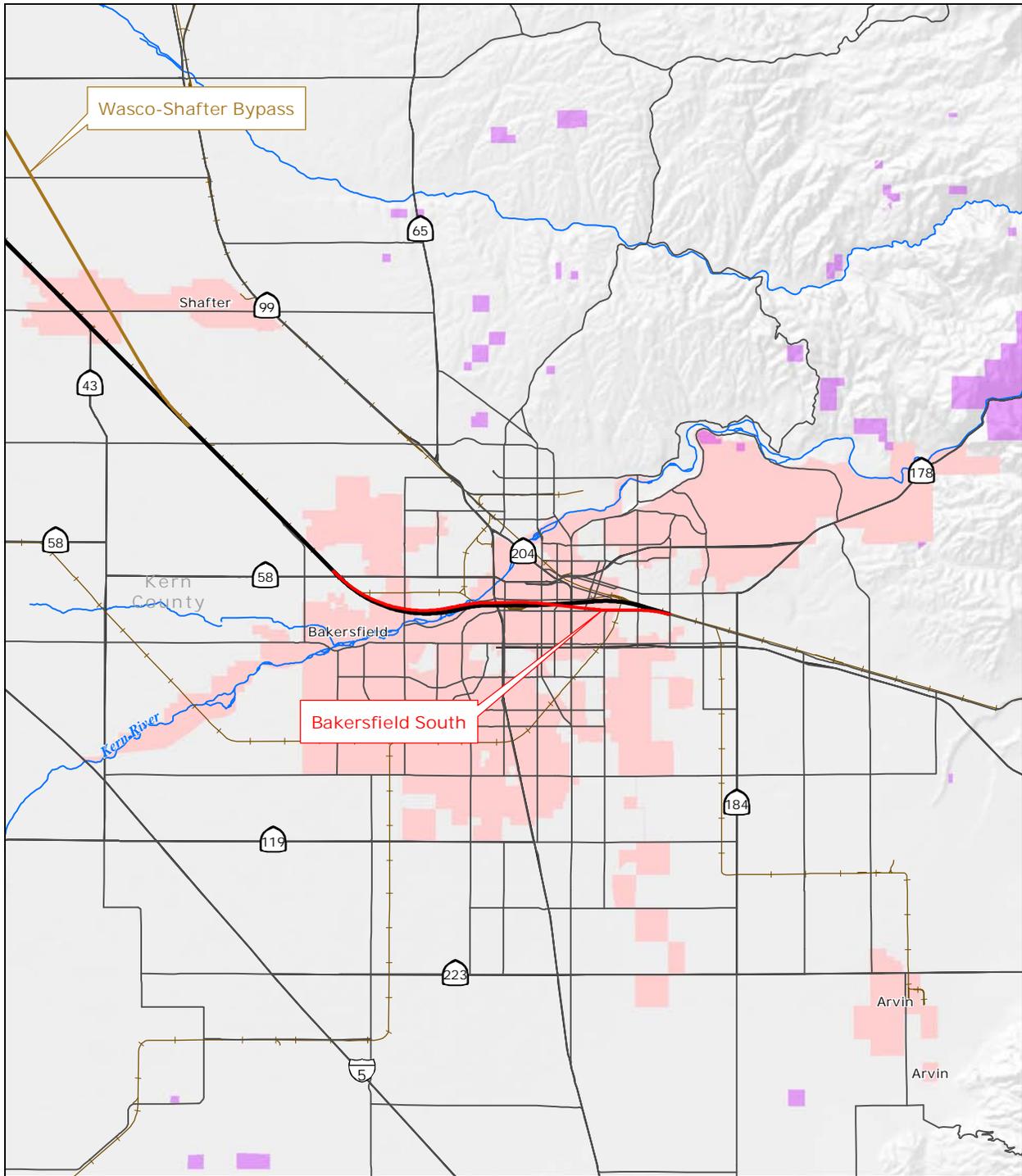
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

July 13, 2010



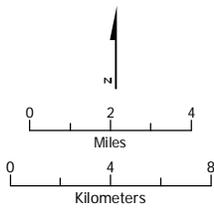
- BNSF Alternative (Bypasses labeled)
- Allensworth State Historic Park
- Allensworth Ecological Reserve
- Pixley National Wildlife Refuge
- Other Public Lands
- County boundary

*Figure 3-4*  
 Tulare County  
 HST alternatives



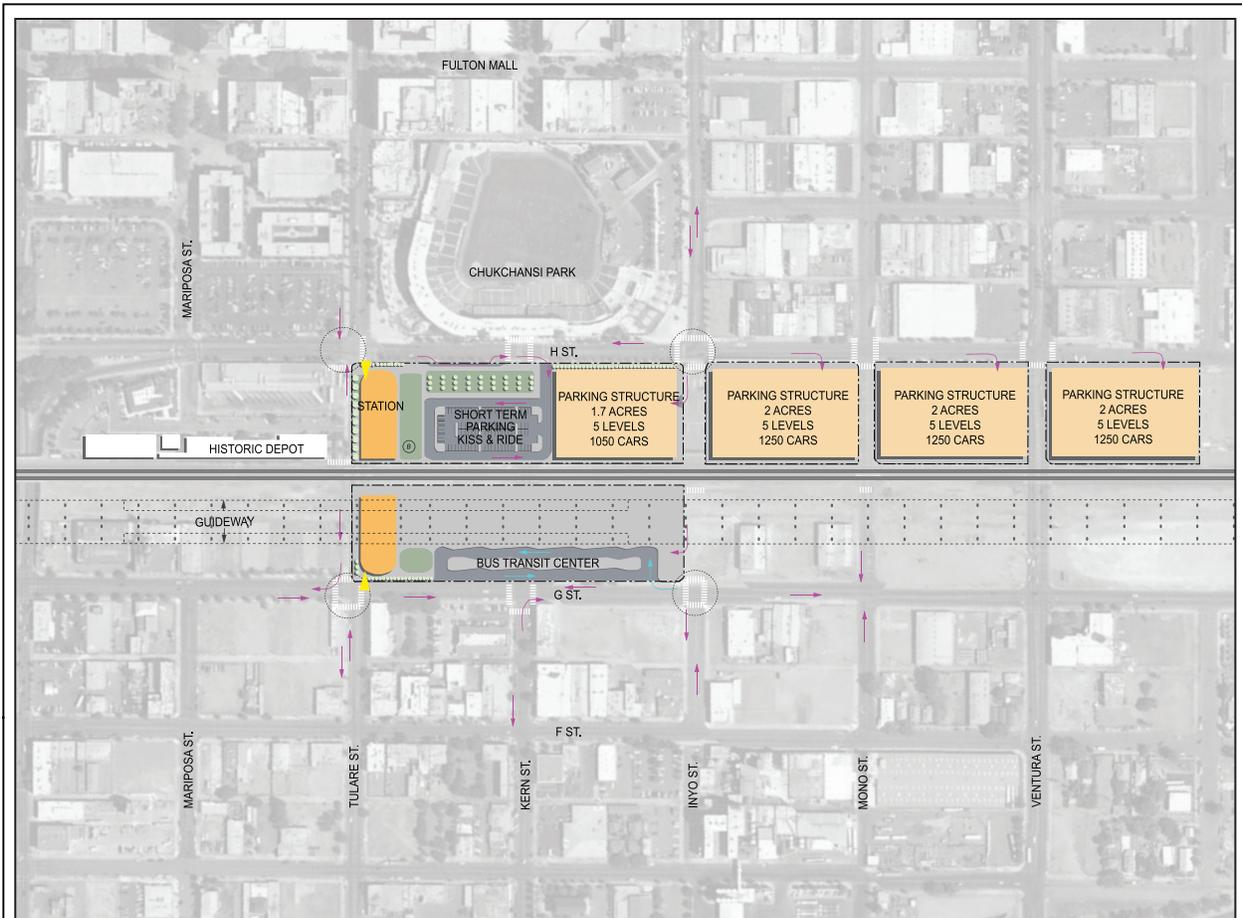
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: URS, 2010.

July 13, 2010



- BNSF Alternative (Bypasses labeled)
- Allensworth State Historic Park
- Allensworth Ecological Reserve
- Pixley National Wildlife Refuge
- Other Public Lands
- County boundary

Figure 3-5  
 Kern County  
 HST alternatives

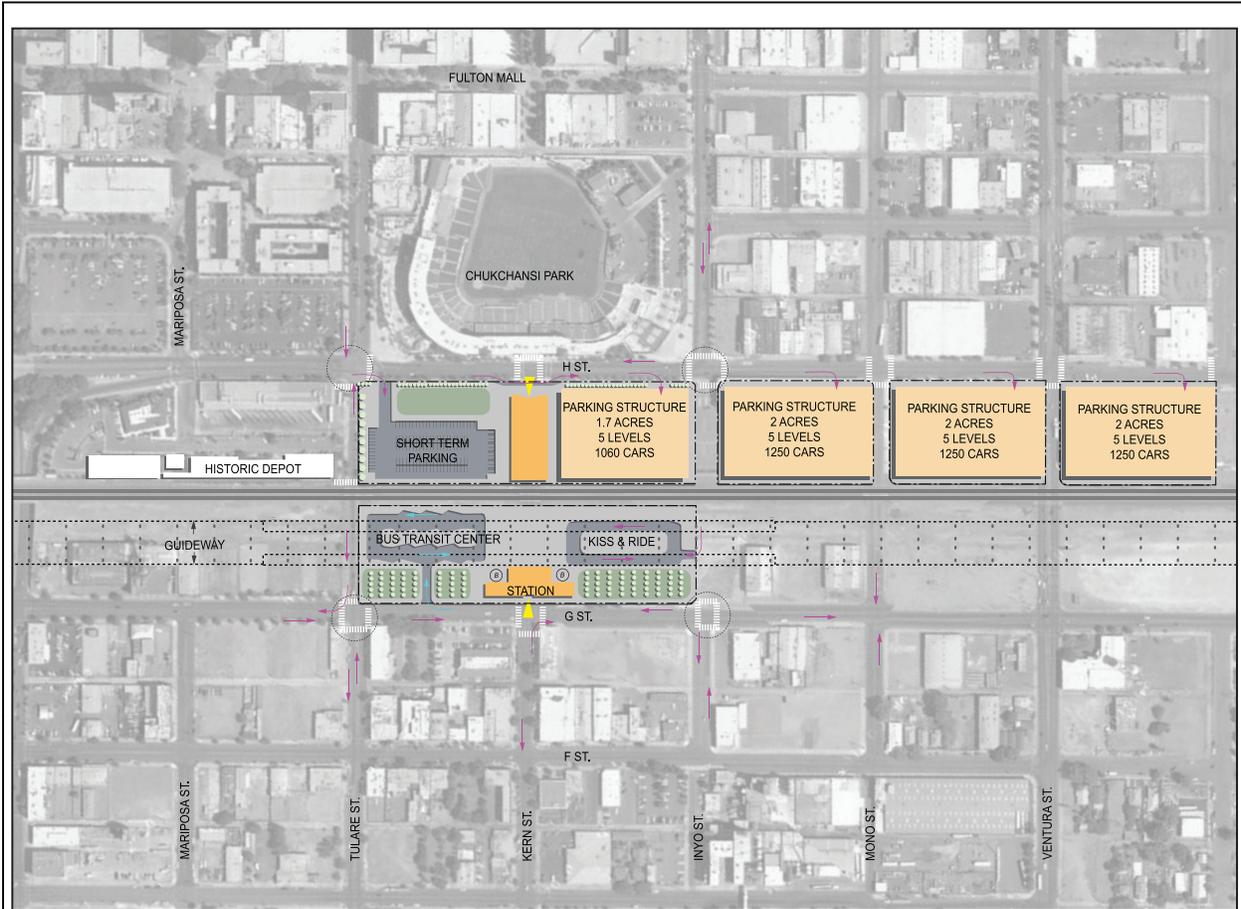


PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 30, 2010



**Figure 3-6**  
Fresno West Station—Tulare Alternative

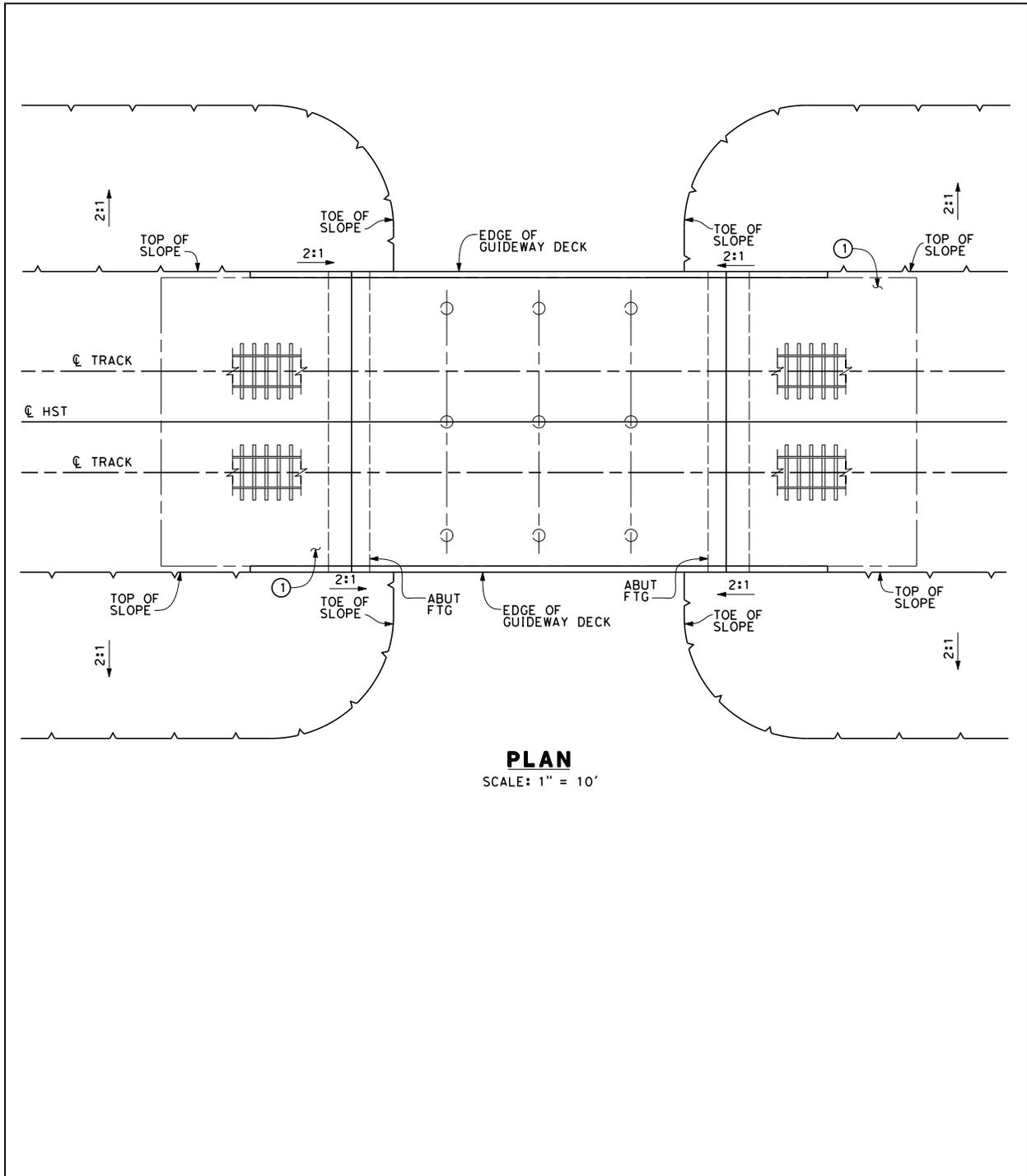


PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 30, 2010



**Figure 3-7**  
Fresno West—Kern Station Alternative

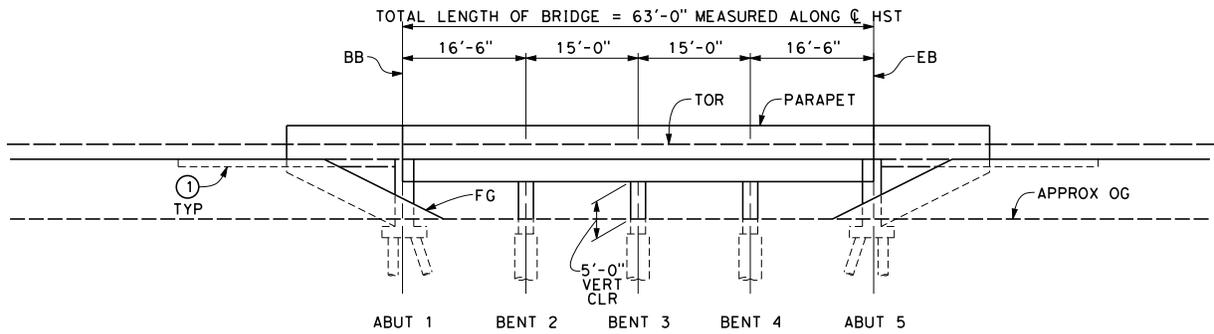


PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

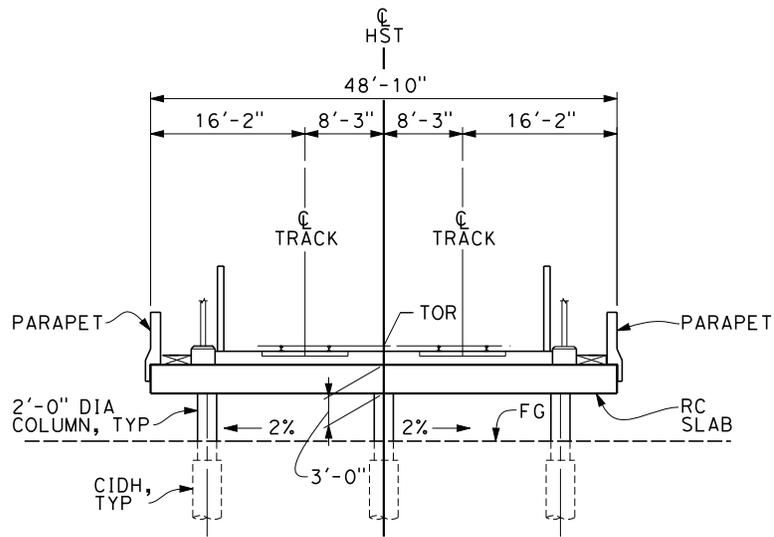
March 30, 2010

- LEGEND:
- ① STRUCTURE APPROACH SLAB
  - ▨ INDICATES RR TRACK

**Figure 3-8**  
Wildlife Crossing Plan



**ELEVATION**



**TYPICAL SECTION**

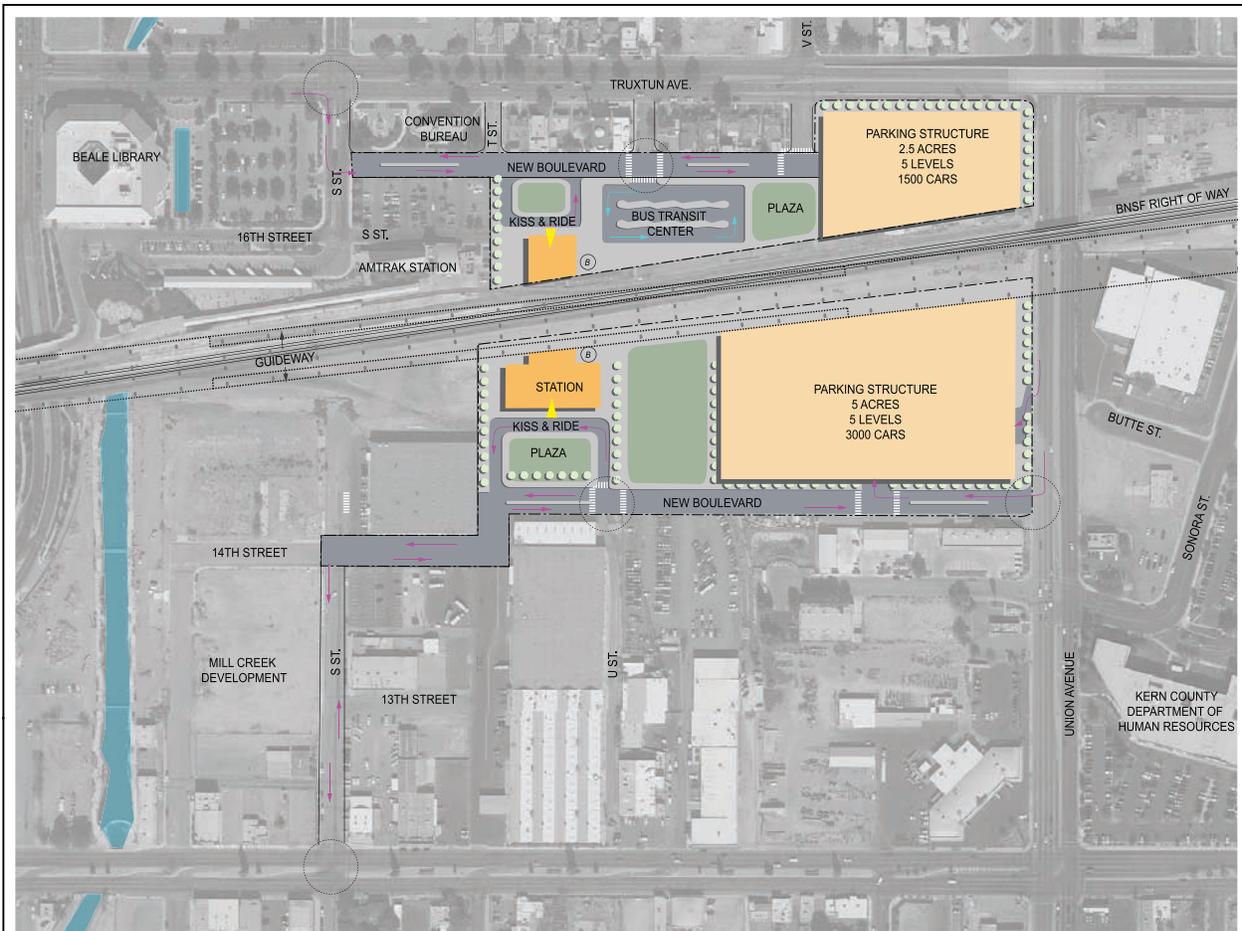
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 30, 2010

LEGEND:

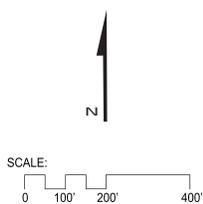
- ① STRUCTURE APPROACH SLAB

**Figure 3-9**  
Wildlife Crossing Elevation and Cross Section



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 30, 2010



- STATION ENTRANCE
- BUS CIRCULATION
- VEHICLE ACCESS
- KEY PEDESTRIAN LINKAGE
- BIKE PARKING
- KEY ACCESS INTERSECTIONS SIGNALIZED
- LANDSCAPING
- ELEVATORS
- BOUNDARY OF CAMPUS PARCELS
- EXISTING PROPERTY LINES

**Figure 3-10**  
Bakersfield Station—North Alternative

The BNSF Alternative would cross the following major water features by means of elevated structures:

- Cole Slough
- Dutch John Cut
- Kings River
- Cross Creek
- Corcoran Reservoir/Ponds
- Tule River
- Deer Creek
- Rag Gulch
- Dyer Creek
- Poso Creek
- Kern River

Other water features, such as ditches and canals, would be crossed using culverts or bridges, depending on the size of the water course.

#### **B. KAWEAH BYPASS**

This alternative would diverge from the A-1 Alternative alignment just south of the Kings-Tulare Station and swing to the west (Figure 2-9). At Cross Creek it would merge with the existing BNSF track corridor and re-join the A-1 Alternative Alignment just north of Corcoran. The total length of the Kaweah Bypass would be 21.5 miles. This bypass would avoid special aquatic resources in the Cross Creek Complex.

#### **C. KAWEAH-CORCORAN BYPASS**

This alternative would be similar to the Kaweah Bypass in the section immediately south of the Kings-Tulare Station. However, rather than joining the existing BNSF Corridor at Cross Creek, it would continue to the west side of the BNSF tracks, cross back over the A-1 Alternative Alignment just north of Corcoran, and then bypass Corcoran to the east. It would rejoin the A-1 Alternative Alignment at the same location as would the Corcoran Bypass. This bypass would avoid special aquatic resources at Cross Creek and bypass Corcoran.

#### **D. CORCORAN BYPASS ALTERNATIVE**

The Corcoran Bypass Alternative would diverge from the A-1 Alternative Alignment at approximately Kansas Avenue and swing east of Corcoran, rejoining the BNSF route at Avenue 136 (Figure 3-3 and Appendix B-1). The total length of the Corcoran Bypass Alternative would be approximately 12.6 miles.

#### **E. ALLENSWORTH BYPASS ALTERNATIVE**

This alignment passes west of the A-1 Alternative Alignment, avoiding the Allensworth Ecological Reserve and Allensworth State Historic Park (Figure 3-4 and Appendix B-1). The total length of the Allensworth Bypass Alternative would be approximately 18.9 miles, from its beginning at Avenue 84 to where it rejoins the A-1 Alternative Alignment at Elmo Highway. The Allensworth Bypass Alternative would be constructed on an elevated structure where the alignment crosses the Alpaugh railroad spur. The majority of the alignment would pass through Tulare County at-grade. The wildlife crossing structures described for the Allensworth area of the BNSF Alternative would also be used for the Allensworth Bypass Alternative.

#### **F. WASCO-SHAFTER BYPASS ALTERNATIVE**

This alignment would diverge from the A-1 Alternative Alignment between Sherwood Avenue and Fresno Avenue, bypassing Wasco and Shafter to the east (Figure 3-4, Figure 3-5, and Appendix B-1). The total length of the alternative would be 15.5 miles, and the alignment would be at-grade.

#### **G. BAKERSFIELD SOUTH ALTERNATIVE**

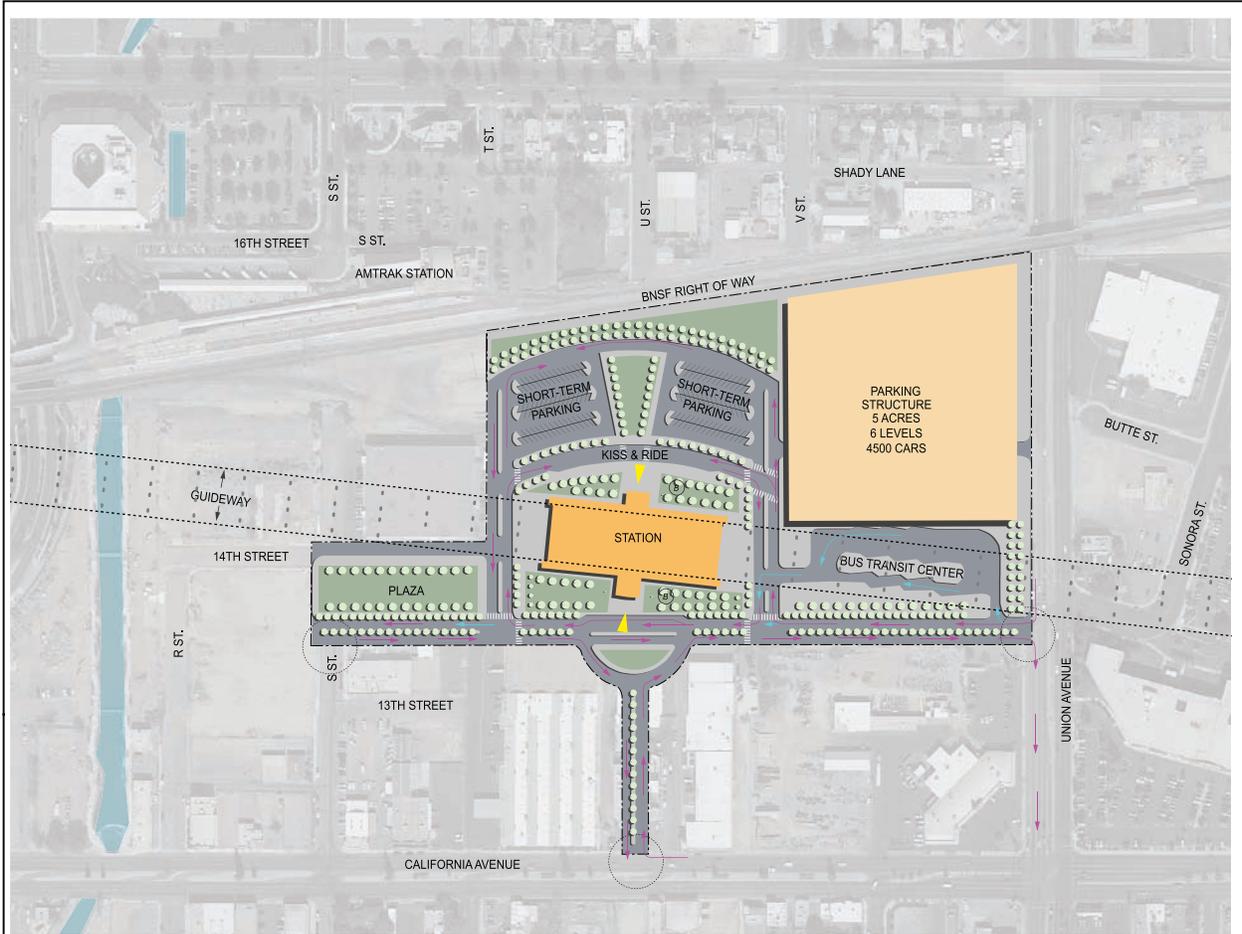
From the Rosedale Highway (SR 58) in Bakersfield, the Bakersfield South Alternative parallels the BNSF Alternative approximately 250 feet to the north (Figure 3-5 and Appendix B-1). At Chester Avenue, the Bakersfield South Alternative curves south and parallels California Avenue.

The Bakersfield South station would be located between the BNSF Railway on the north, Union Avenue on the east, California Avenue on the south, and S Street on the west (Figure 3-11). The station would be accessed by a new roadway from California Avenue.

### **3.2.2 Heavy Maintenance Facility Alternatives**

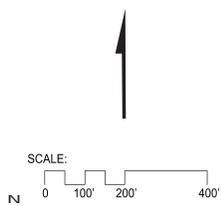
#### **A. FRESNO WORKS – FRESNO**

The Fresno Works – Fresno HMF site encompasses 696 acres and is in the southern limits of the City of Fresno and County of Fresno next to the BNSF right-of-way (Figure 3-12). The Fresno Works site would be immediately accessible from the HST tracks and large enough and suitably shaped to support the HMF. It is also located 0.8 mile from 230 kV power transmission lines.



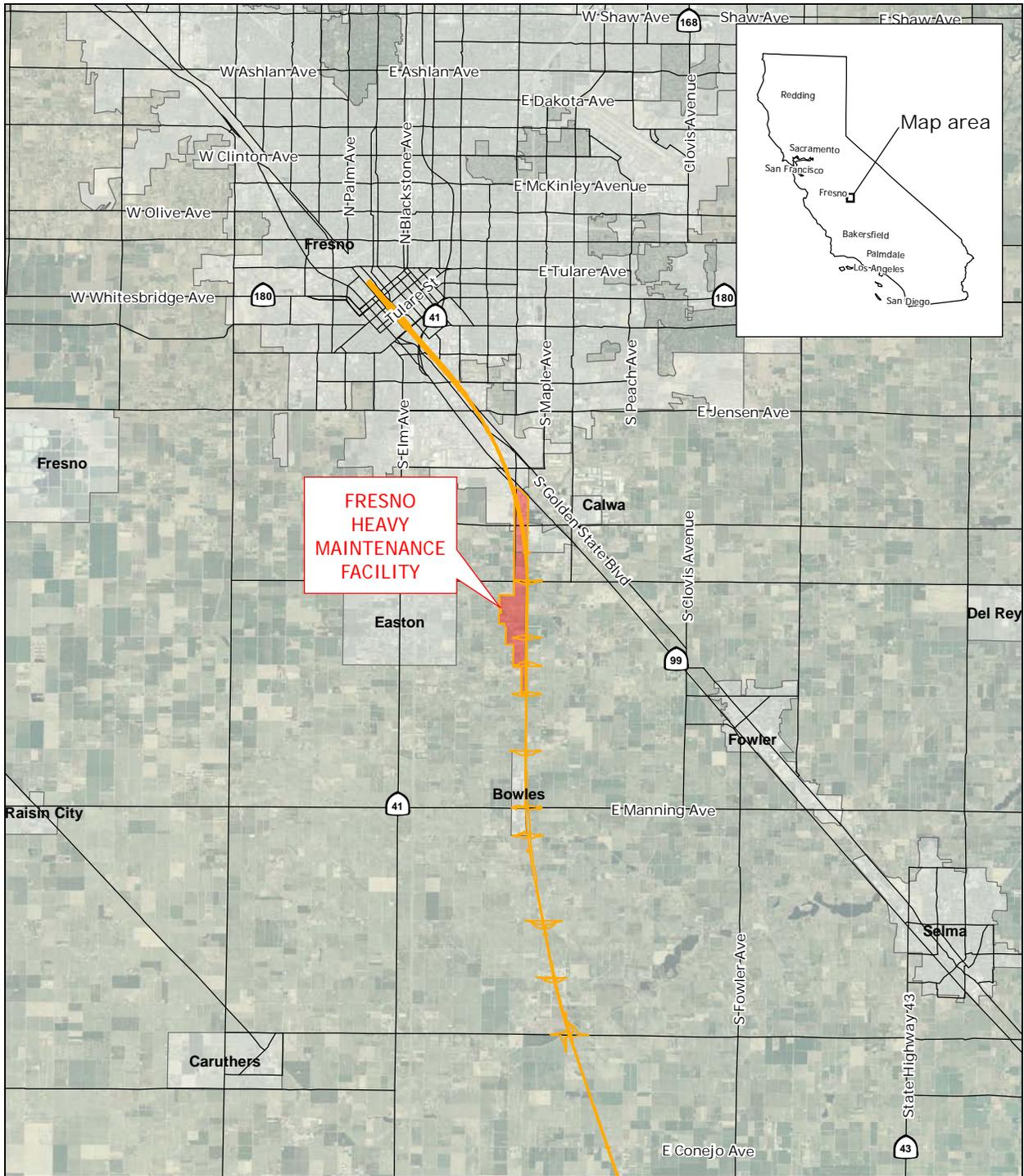
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED

March 30, 2010



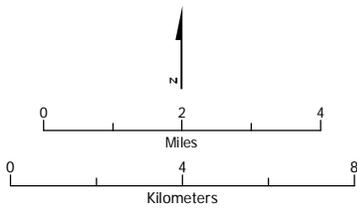
-  STATION ENTRANCE
-  BUS CIRCULATION
-  VEHICLE ACCESS
-  KEY PEDESTRIAN LINKAGE
-  BIKE PARKING
-  KEY ACCESS INTERSECTIONS SIGNALIZED
-  LANDSCAPING
-  ELEVATORS
-  BOUNDARY OF CAMPUS PARCELS
-  EXISTING PROPERTY LINES

**Figure 3-11**  
Bakersfield Station—South Alternative



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: National Agriculture Imagery Program, 2005; URS 2010

June 10, 2010



- Heavy maintenance facility
- Impact footprint
- Road

Figure 3-12  
 Fresno heavy maintenance facility

**B. KINGS COUNTY – HANFORD**

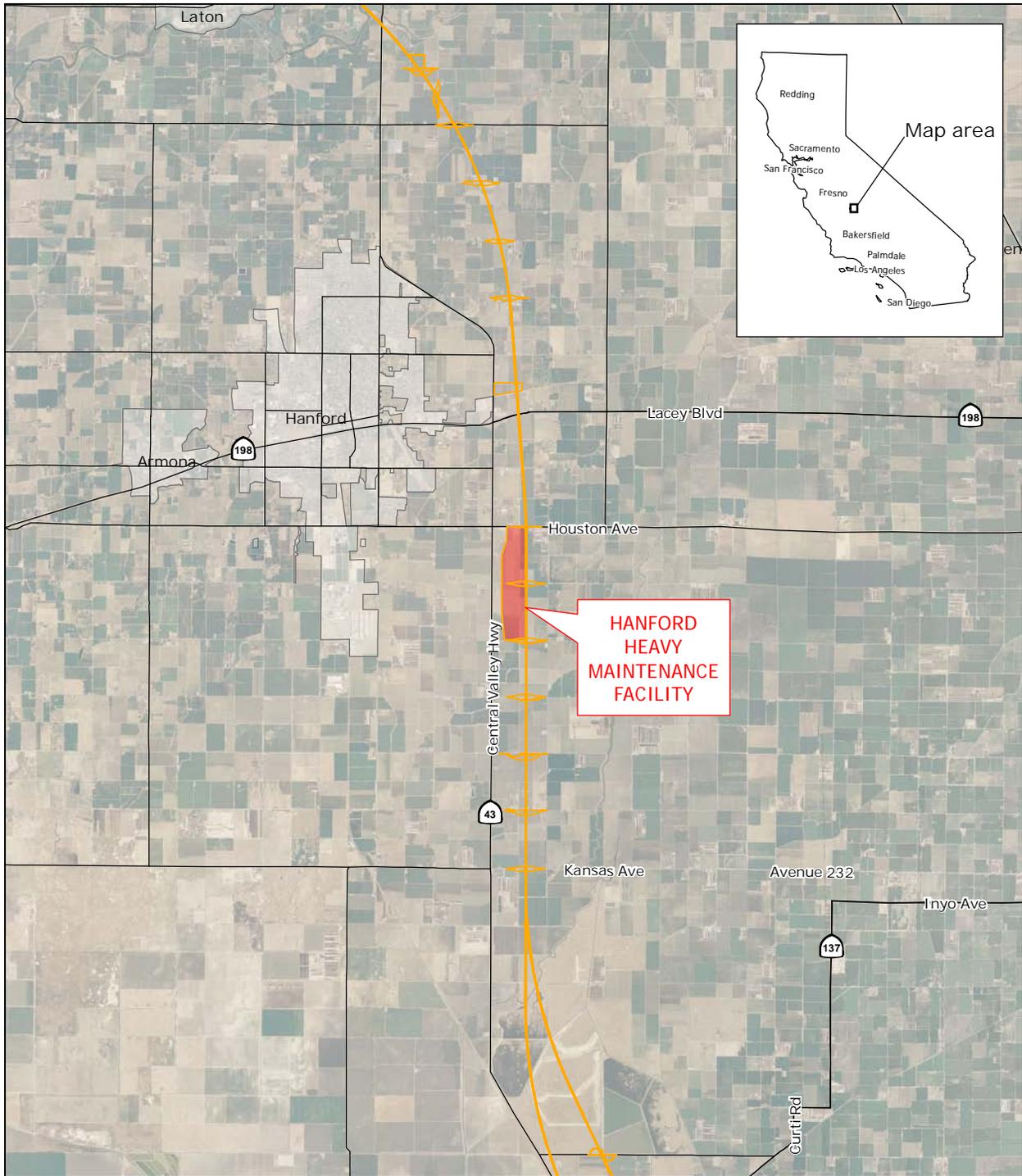
The Kings County – Hanford HMF site includes a total of 880 acres and is southeast of the City of Hanford (Figure 3-13). This site is immediately accessible from the HST tracks, is in proximity to 230 kV power transmission lines, and has convenient roadway access.

**C. KERN COUNCIL OF GOVERNMENTS – WASCO**

The Kern Council of Governments – Wasco HMF site is directly east of Wasco between SR 46 and Filburn Street. The 421-acre site is accessible to all the HST alignment alternatives under consideration (Figure 3-14).

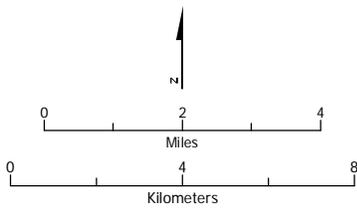
**D. KERN COUNCIL OF GOVERNMENTS – SHAFTER**

The Kern Council of Governments – Shafter HMF site is in the City of Shafter next to the BNSF Alternative and the Wasco-Shafter Bypass Alternative (Figure 3-15). It includes a total of 421 acres, and is accessible to all the HST alignment alternatives under consideration.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: National Agriculture Imagery Program, 2005; URS 2010

June 10, 2010



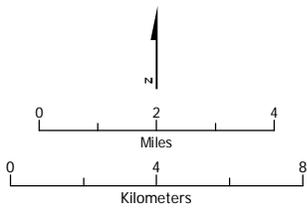
- Heavy maintenance facility
- Impact footprint
- Road

Figure 3-13  
 Hanford heavy maintenance facility



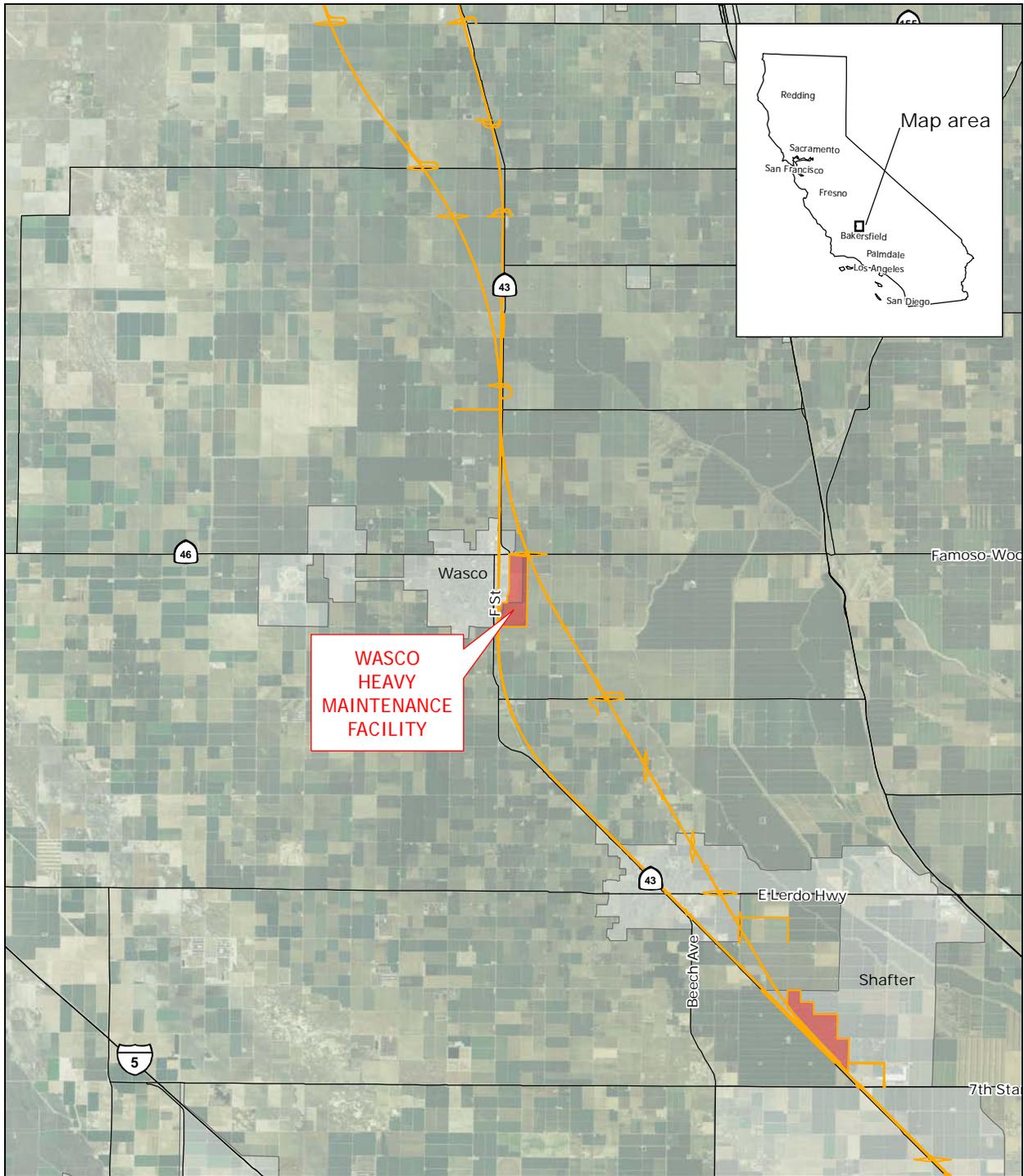
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: National Agriculture Imagery Program, 2005; URS 2010

June 10, 2010



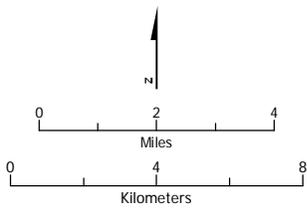
- Heavy maintenance facility
- Impact footprint
- Road

Figure 3-15  
 Shafter heavy maintenance facility



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HST ALIGNMENT IS NOT DETERMINED  
 Source: National Agriculture Imagery Program, 2005; URS 2010

June 10, 2010



- Heavy maintenance facility
- Impact footprint
- Road

Figure 3-14  
 Wasco heavy maintenance facility



## **Section 4.0**

### **References**



## 4.0 References

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MOU 2010. Memorandum of Understanding. Integration Process for the California High-Speed Train Program. Signed by Federal Railroad Administration, California High-Speed Rail Authority, Environmental Protection Agency, and U.S. Army Corps of Engineers. December.

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**Appendix A**  
**Visalia-Tulare-Hanford Station Feasibility**  
**Study**





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**Appendix B**  
**Preliminary Alternatives Analysis Report,**  
**Volume 1**





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**Appendix C**  
**Supplemental Alternatives Analysis Report**





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**Appendix D**  
**Clean Water Act Section 404 Practicability**  
**Criteria, Union Pacific Railroad Alignment**  
**Alternative**





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**Appendix E**  
**Summary Presentation of Environmental**  
**Resources and Constraints for the BNSF**  
**and UPRR Alternative Alignments**





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