D R A F T

FRESNO FREIGHT RAIL REALIGNMENT STUDY

ADMINISTRATIVE DRAFT SUMMARY REPORT

January 2010

Prepared for
Council of Fresno County Governments

URS | HMM | ARUP
California High-Speed Train

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Acronyms

BNSF	BNSF Railway
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CHSRA	California High-Speed Rail Authority
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CNDDB	California Natural Diversity Database
CNPS	California Native Plan Society
Fresno COG	Council of Fresno County Governments
CPUC	California Public Utilities Commission
CTC	California Transportation Commission
DOT	Department of Transportation
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FCTA	Fresno County Transportation Authority
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GIS	Geographic Information Systems
HPP	High Priority Projects
HST	High-Speed Train
JPA	Joint Powers Authority
LWCF	Land and Water Conservation Fund
MOU	Memorandum of Understanding
mph	miles per hour
O&M	operations and maintenance
NEPA	National Environmental Protection Act
NRHP	National Register of Historic Places
PG&E	Pacific Gas and Electric Company
RTP	Regional Transportation Plan
SJV	San Joaquin Valley Railroad
SP	Southern Pacific
TE	Transportation Enhancements
TI	Transportation Improvements
TTI	Texas Transportation Institute
UP	Union Pacific Railroad
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

EXECUTIVE SUMMARY

ES.1 Project Description

This project is a study considering realignment of one or more freight railroads that currently pass directly through Fresno, California. The core of the project is the removal of freight train operations from the portion of the BNSF Railway (BNSF) alignment between the vicinity of Hammond Avenue in Fresno County and the vicinity of Avenue 9 in Madera County. The project also considers potential changes to other portions of the BNSF alignment in the vicinity of Fresno, changes to the Union Pacific Railroad (UP) alignment in Fresno, and potential new alignment alternatives that pass to the east or west of Fresno.

Fresno has long advocated realignment of the two major freight railroads (currently UP and BNSF) that traverse the city from north to south. The city is a regional hub for rail and roadway transportation of both freight and passengers, with four rail companies operating on alignments that pass through the city. These services generate a number of impacts due to train movements in the areas of Fresno through which they pass: realignment or relocation of the rights-of-way would help mitigate these impacts.

In 2006 Fresno County voters reauthorized Measure "C", creating funding expressly for freight realignment. More than $100 million is now authorized, as a local match for other funding to complete this project.

After the passage in November 2008 of California Proposition 1A, planning and design are underway for the California High-Speed Train (HST) project. The preferred alignment indentified in the program EIR/EIS for the HST system closely parallels the UP ROW through central Fresno. The UP alignment is the subject of a number of freight realignment alternatives, and this project must consider future conditions which include the HST system. Alternatives considered in this study may in fact enable HST solutions of lower complexity, impacts, and total combined costs for both projects than those that do not consider freight realignment. The HST project therefore presents both the opportunity and the imperative for Fresno to determine the means of accomplishing freight railroad realignment.

This study was originally scoped to examine options for freight rail realignment in conjunction with high speed rail alignment development. However the California High Speed Rail Authority directed that the HST alignment should be developed independently from freight realignment and the scope was revised so freight rail realignment and HST alignment alternatives would be developed separately. Thus, this report examines only the freight rail realignment options.

This study develops a set of feasible alternatives that can be further refined through design and evaluation; identifies potential environmental issues for future environmental assessment; and defines implementation and institutional considerations for accomplishing the project. Previous studies only considered consolidating the BNSF and UP through central Fresno, assuming that the two railroads would share rights-of-way and trackage rights. This study considered additional alternatives involving parallel alignments or realignments either through the city or on a bypass around the city.

This report documents the sequence of steps used to evaluate a range of feasible alternatives that attain the project's objective with the fewest environmental impacts:

- Development of project's purpose and need
- Development of a set of initial of alternatives
- Level 1 (initial) screening of alternatives

- Level 2 (comprehensive) analysis of alternatives
- Identification of final list of alternatives for further detailed analysis.

This report is an Alternatives Analysis and is meant to be a precursor to an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA), and possibly an Environmental Impact Statement (EIS) under the National Environmental Protection Act (NEPA).

Criteria and priorities for assessing freight rail realignment alternatives differ among the freight railroads themselves, the City, the Fresno COG, and other stakeholders. This study is not undertaken to improve the operation of the freight railroads, but is in the interests of Fresno residents affected by train movements, and of the Fresno COG, as custodian of funding dedicated to the project under Measure "C." However, the freight railroads are major stakeholders in this project, and have been consulted throughout the process.

ES.2 Project Purpose and Need

Freight rail realignment is needed to reduce or eliminate adverse community impacts caused by the presence of freight railroad alignments and the operation of trains through Fresno. The BNSF alignment passes through Fresno residential neighborhoods and both UP and BNSF intersect numerous local roads at-grade.

The purpose of this project is to realign freight railroad operations within Fresno to reduce impacts on the local community.

ES.2.1 Primary Project Objectives

The realignment of the BNSF and UP mainlines would eliminate many of the adverse community impacts associated with the presence of a heavily used freight line within central Fresno. The contribution of project alternatives to the achievement of the project purpose and need was the basis of the alternative screening methodology, and was based on the following primary project objectives:

- Improve pedestrian and vehicle safety;
- Reduce traffic congestion, delays, and air quality impacts; and
- Reduce or eliminate adverse community impacts such as noise, vibration and community division.

ES.2.2 Secondary Project Objectives

The project alternatives were also evaluated for their ability to meet secondary project objectives, which are not the rationale for the project, but are additional impetus for implementation:

- Potential capacity and/or operational improvements for the freight railways;
- Potential future economic development opportunities;
- Potential reuse of the BNSF corridor; and
- Potential future compatibility with high-speed train (HST).

ES.3 Evaluation Approach and Methodology

The study evaluation approach and methodology involved two primary levels of analysis as described below.

ES.3.1 Level 1 Screening

Initial (Level 1) screening focused on determining whether an alternative met the identified purpose and need. The evaluation considered each alternative in light of specific screening criteria developed from both the primary project objectives and the secondary project objectives.

Level 1 screening used a qualitative approach to assess the potential of the initial alternatives to meet the purpose and need. Alternatives that are determined to be responsive to the purpose and need are carried forward for the more detailed Level 2 analysis.

ES.3.2 Level 2 Analysis

Alternatives carried forward from the Level 1 screening were subjected to Level 2 analysis, based on a more in-depth look at technical details of the proposed project and their estimated impacts. Level 2 analysis focused on preliminary assessment and characterization based on identifying potential issues and impacts in three overall categories:

- Costs (construction and socioeconomic);
- Rail operations; and
- Environmental resources.

This analysis was a mix of quantitative and qualitative analyses. The analysis of environmental resources is based on Geographic Information Systems data that have been mapped and tabulated. These issues, along with railroad company ownership issues and implementation issues, informed the final evaluation of alternatives, with the goal of supporting future study and decision-making.

ES.4 Project Considerations

There are a number of regulatory and logistical factors affecting the potential relocation of freight service, based on both the existing service in the Fresno area and broader regional/national issues. These include:

- **Existing Rail Operations** – Fresno is a regional hub for rail and roadway transportation of both freight and passengers. Four rail companies operate on alignments that pass through the city: BNSF and UP (both Class 1 freight operations), San Joaquin Valley Railroad (SJV) (local freight), and Amtrak (passenger service).

- **Regulatory Issues** – The current rail operators must consider the preservation of service to their current customers, as well as the effects of abandoning trackage and/or relocating railroad interchange points.

- **Design Standards** – Any relocation of freight alignments must conform to the regulatory requirements of both the Federal Railroad Administration (FRA) and the California Public Utilities Commission (CPUC), as well as the internal standards of the rail operators that provide service in the Fresno area.

- **Ownership of Railroad Right of Way** – The relocation or modification of existing rights-of-way will need to take into account the rail companies' preferences regarding ownership of the rights-of-way on which they operate. This would need to be balanced against the most practical arrangements for alignment ownership via a public agency or a special-purpose authority that manages the multiple alignments.

- **Compatibility with High-Speed Train** – Any freight realignment would likely take into account the planned high-speed rail line through Fresno, with regard to potential

right-of-way conflicts, shared stations with HST and Amtrak, and maintenance facilities for freight and passenger service.

- **Yard Locations** – The existing railyards can continue to be used in some alternatives, or could be moved to new locations.

- **Potential Development Plans and Land Use Constraints** – There are existing land uses and development plans that could pose conflicts with some of the proposed realignment alternatives.

ES.5 Project Alternatives

The project alternatives were developed with local stakeholder input, using aerial-photo–based digital mapping and topographic data. Alignment geometrics were developed in accordance with standard design criteria and operating requirements for both freight rail and HST operations, and were intended to encompass a variety of potential methods of addressing the project purpose and need.

At the end of the alternatives development process, 20 initial alternatives were selected for screening, and were organized into the following six categories:

- Category 1 No realignment/no project
- Category 2 Realignment through central Fresno along existing UP alignment
- Category 3 Western bypass at freight geometry[1] for one or both of the railways
- Category 4 Western bypass at HST geometry[2] for one or both railways
- Category 5 Eastern bypass at freight geometry for one or both railways
- Category 6 Eastern bypass at HST geometry for one or both railways

ES.6 Alternatives Recommended for Further Development

Based on the Level 1 screening, 10 Alternatives were carried forward into a level 2 Screening, and based on the Level 2 Analysis; eight project alternatives were recommended to be carried forward for further study if HST is considered:

- Alternative 1A: No Project (baseline)

- Alternative 2C: BNSF and UP through central Fresno – reduced corridor width

- Alternative 3B: BNSF through central Fresno, UP on western bypass (freight geometry)

- Alternatives 3C1 and 3C2: BNSF and UP on western bypass (freight geometry)

- Alternative 4B: BNSF through central Fresno, UP on western bypass (HST geometry)

- Alternatives 4C1 and 4C2: BNSF and UP on western bypass (HST geometry)

The following project alternatives from the Level 2 analysis are also recommended if HST in not Considered:

- Alternative 2A: BNSF west of UP—due to the number of displacements and potential impacts to Roeding Park

[1] Geometry refers to the standard design requirements, particularly curve radii, for Freight operations (AREMA Class 4)
[2] For HST operations, Geometry refers to CHSRA design guidelines.

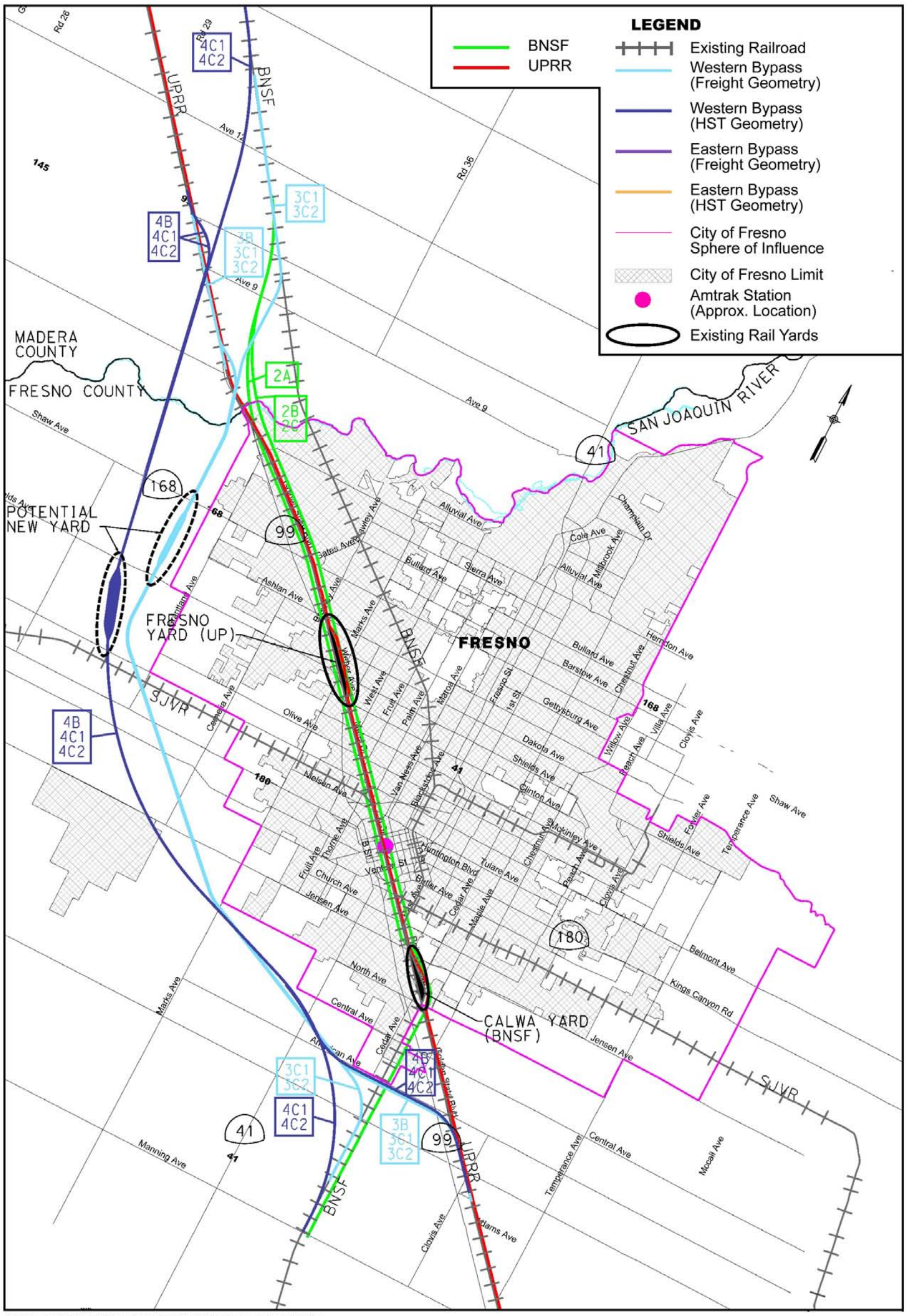
- Alternative 2B: BNSF east of UP—due to the number of displacements

These alternatives are shown graphically in Figure ES-1.

ES.7 Conclusions

The project is intended to alleviate the long-standing impacts of railroad alignment and operations through Fresno neighborhoods. It may be possible to accomplish the Freight Realignment Project at the same time as another major capital project (HST) in the same corridor. Although the criteria and priorities for this project differ from those of the High-Speed Train project EIR/EIS, this analysis has been laid out in a similar manner to allow for the merging of the two projects at a later date. Therefore, different conclusions may be drawn if the two projects are independent or if they are codependent. These are recorded below.

Figure ES-1 – Alternatives Carried Forward



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ES.7.1 Conclusions if High-Speed Train is Not Considered

Considering only the freight railroad issues, the alternatives that enable freight rail realignment within Fresno (Alternatives 2A, 2B, and 2C) appear to be less expensive to construct, and have fewer impacts on agricultural land and environmental elements, such as erodible soils, than the alternatives with a bypass. These alternatives impose more impacts on the community, however, including impacts to cultural resources and the taking of more urban land. If HST is not considered, there does not seem to be a benefit to moving the UP away from central Fresno and vacating the Fresno Yard.

The chief drawback of the alternatives that align all freight rail through central Fresno (Alternatives 2A, 2B, and 2C) is that if the freight railroads each require a separate 100-foot right-of-way as shown for Alternatives 2A and 2B, the right-of-way impact through central Fresno would increase from the current minimum 100-foot width to 200 feet, potentially requiring the removal of a number of structures. This could be mitigated by negotiation with the railroads for a narrower right-of-way in places, such as in Alternative 2C, that would still be within the CPUC clearance requirements.

If HST is not considered in the project, all of the institutional options related to railroad right-of-way ownership are open, except the involvement of the California High-Speed Rail Authority (CHSRA) as a partner in project implementation.

ES.7.2 Conclusions if High-Speed Train is Considered

The freight realignment and HST studies are both considering the same corridor through central Fresno. It is necessary to address the concurrent needs of both projects, and to seek opportunities to craft synergistic solutions that result in mutual advantages. For instance, the issue of right-of-way width noted above is more severe if HST is taken into consideration. If both freight railroads operate through central Fresno, and if HST right-of-way is added to that, the resulting railroad corridor would have a width of 330 to 335 feet. The impact of such a corridor on central Fresno could be substantial in terms of the amount of land that is now in urban use that would have to be dedicated to rail rights-of-way.

When HST alignment through central Fresno is considered, the alternatives that include a bypass for one or both freight railroads accommodate an HST right-of-way better than do the alternatives that align both railroads through central Fresno. In any of the alternatives, a secondary objective is to enable a downtown Fresno intermodal station serving both Amtrak and HST passengers. The current and long-time Amtrak contract is with BNSF, and UP has indicated that they do not intend to accommodate passenger trains on UP tracks in Fresno. Thus, either BNSF needs to be brought into the center of Fresno to augment or replace UP, or a public entity needs to acquire the right-of-way through central Fresno—potentially hosting Amtrak and/or BNSF. From this perspective, the alternatives that move the UP onto a bypass, with BNSF operating through central Fresno on the former UP right-of-way, are more desirable because they would facilitate the co-location of Amtrak and HST in the center, fulfilling a secondary purpose and need objective. In addition, BNSF has been willing to continue discussions with CHSRA and with Fresno concerning sharing their corridor with the HST system. If an agreement were to be reached, it could reduce the required footprint for combined freight and HST through the center of Fresno.

One drawback of Alternatives 3B or 4B, from BNSF's perspective, is that BNSF would acquire the UP's right-of-way, and with it the potential liability for environmental remediation on that alignment. From the railroads' perspectives, new rights-of-way on bypasses would be preferable from the point-of-view of not inheriting an environmental remediation issue.

The alternatives that move UP onto a bypass with an associated new yard (Alternatives 3B, 3C, 4B, and 4C) make available the current location of the UP Fresno Yard for reuse.

ES.7.3 Conclusions Common to Both Freight Realignment and High-Speed Train

For any of the alternatives, public agency participation is necessary to channel resources and to coordinate the project's implementation. This role could be played by an existing agency, or by an agency formed especially for this purpose. For some alternatives, such as Alternatives 2A, 2B, 2C, 3B, and 4B, the agency could be created just for project implementation, and then be dissolved after completion. For Alternatives 3C and 4C, it is assumed that the public agency would need to be permanent to retain ownership of the current UP alignment through the center of Fresno: both to facilitate Amtrak operation to a joint Amtrak/HST station in the city center, and to provide access for SJV to their various branches serving local shippers. A public agency owner of the central right-of-way may also facilitate co-location with the HST project.

Any railroads relocated to a bypass would need a new yard. Railroad operations would not be workable with mainline operations going around Fresno on a bypass and the yards remaining in their current locations, because this would require considerable backing movements and awkward logistics. Alternatives 3C and 4C include new yards for both railroads.

ES.8 Project Implementation Issues

In conjunction with the development and screening of alternatives, the study also considered issues that affect the feasibility of the overall project. These are relevant regardless of the specific alignment(s) studied, and identify issues that will need to be addressed by the Fresno COG, City, rail companies, and other stakeholders.

- **Potential Funding Sources for the Realignment Project** – Funding for the realignment project could come from a variety of sources. Freight rail projects with a strong public benefit, such as the Fresno Rail Realignment, are typically funded with a mixture of federal, state, and local funds.

- **Responsible Agency** – A responsible agency must be designated to lead the project through the environmental process, securing the project funding, and then designing and implementing the project. This is likely to be a public agency, but could also be a partnership between public and private entities. The following models for organizing the implementation of the project are reviewed, with the advantages and disadvantages of each:

    - Railroad (UP or BNSF)
    - City of Fresno
    - Fresno County
    - Fresno COG
    - Special Purpose Authority or District
    - Joint Powers Authority (JPA)
    - Inter-Agency Memorandum of Understanding
    - Caltrans (Division of Rail)

- **Environmental Process** – This report documents a feasibility analysis and preliminary environmental characterization similar to the HST Alternatives Analysis study for the Fresno-Bakersfield region and is anticipated to move forward into environmental studies under NEPA or CEQA as a stand alone project or combined with HST. The path which this project takes in the future in terms of environmental review will be determined largely by which agency is the responsible agency, and the

anticipated funding sources for project implementation. Projects of this magnitude are generally subject to the highest level of environmental review, which under NEPA is an EIS, and under CEQA is an EIR. It is highly likely that some of the funding required for this project will originate from federal sources. It is therefore prudent to anticipate the need to prepare a joint EIS/EIR document. Even if funds are not requested directly from a federal agency, because many of the funds distributed by the State through the California Transportation Commission originate as federal funds and are delegated to the State for allocation, they carry the federal requirements with them.

- **Relationship to High-Speed Train Project** – This project would realign freight railroads in a corridor that is also currently undergoing NEPA and CEQA analysis for the California HST project. In some cases, both projects are considering use of the same general alignments and rights-of-way for both the HST project and for the freight rail project through central Fresno. This raises the question of coordinating this project's environmental documentation with the High-Speed Train EIS/EIR that is now being prepared for the Fresno area as part of two sections (Fresno-Bakersfield and Merced-Fresno). The limited right-of-way width through central Fresno is a constraint which both projects need to consider. It is possible that the freight rail realignment project could facilitate the HST project by moving freight railroads out of central Fresno, making the UP alignment available for the HST system, and reducing the need to take large amounts of property.

- **Ownership Options for Railroad rights-of-way** - The simplest structure is to convey title for any replacement railroad right-of-way directly to the carrier for whom the facility is built. This approach minimizes administrative delay, is the result of a relatively straightforward negotiation, and does not require the creation of a new legal entity to own the right-of-way after the project is built. However it requires a public acceptance to fund a potentially expensive set of infrastructure improvements with public money, and then convey title to those assets to a private entity. Another option would entail a public entity owning some or all of the railroad improvements built as part of a realignment project. While a public entity could own the land under the right-of-way, the railroads would want complete control over operations and maintenance. That said, if one or both carriers are willing to consider public ownership, then several institutional options are available; Creation a Special Purpose Authority via State Legislation, Creation of a Joint Power Authority, and Execution of a memorandum of understanding.

- **Potential Reuse of BNSF Right-of-Way** – All alternatives (except "No Project") would result in discontinuing use of portions of the BNSF right-of-way. These portions could be re-used for transportation purposes or adapted for other uses.

- **Construction Phasing and Issues** – Some of the alternatives would require careful phasing, particularly with regard to existing over and underpasses and relocations of existing railroad customers. All of the surviving realignment alternatives would allow the new track and signals to be built and tested in isolation for the existing operation, before service is transferred to the new alignment.

1.0 INTRODUCTION

1.1 Description of the Project

This project is a study considering realignment of one or more freight railroads that currently pass directly through Fresno, California. The core of the project is the removal of freight train operations from the portion of the BNSF Railway (BNSF) alignment between the vicinity of Hammond in Fresno County and the vicinity of Gregg (Avenue 9) in Madera County. The project also considers potential changes to other portions of the BNSF in the vicinity of Fresno, changes to the Union Pacific Railroad (UP) alignment in Fresno, and potential new alignment alternatives that pass to the east or west of Fresno.

This study was originally scoped to examine options for freight rail realignment in conjunction with high speed rail alignment development. However the California High Speed Rail Authority directed that the HST alignment should be developed independently from freight rail realignment and the scope was revised so freight rail realignment and HST alignment alternatives would be developed separately. Thus, this report develops only freight rail realignment options.

Historically, the primary objective of this project has been to remove train traffic from the existing BNSF alignment through the northern part of the city, and consolidate it with UP traffic in a single rail corridor, thereby reducing adverse impacts to the community. The BNSF alignment currently passes through a predominantly residential area of Fresno. Increasing freight traffic volumes, longer train lengths, and high horsepower locomotives exacerbate such community impacts as noise and vibration, traffic congestion and delay, air pollution, hazards to public safety, and community division. Secondary objectives of the project relate to coordinating with high-speed rail, optimizing transportation network connectivity, and creating industrial development opportunities.

This study examined a number of alternatives to remove train traffic from the current BNSF alignment. Previous studies only considered consolidating the BNSF and UP through central Fresno, assuming that the two railroads would share rights-of-way and trackage rights. This study considered alternatives that would move the BNSF into an alignment parallel to the current UP alignment, but with a separately owned right-of-way. Additional alternatives would realign the UP away from portions of its current right-of-way through central Fresno, and replace the UP in this corridor with the BNSF, or with public-agency–owned track. This study also examines realigning one or both freight railroads on a new bypass out of central Fresno.

Corridors studied in this report are the same that are currently undergoing NEPA and CEQA analysis for the California HST system. Both projects are considering use of the same general corridors through central Fresno and there may be opportunities to accomplish the goals of both projects concurrently to minimize impacts to the local communities. Therefore this study has been conducted in a similar manner to the NEPA and CEQA Alternatives Analysis being conducted for HST.

This study develops a set of feasible alternatives that can be further refined through design and evaluation; identifies potential environmental issues for future environmental assessment; and defines implementation and institutional considerations for accomplishing the project.

Criteria and priorities for assessing freight rail realignment alternatives will differ among the freight railroads themselves, the City, the Fresno COG, and other stakeholders. This study is not undertaken to improve the operation of the freight railroads, but is in the interests of Fresno residents affected by train movements, and of the Fresno COG, as custodian of funding dedicated

to the project under Measure "C." However, the freight railroads are major stakeholders in this project, and have been consulted throughout the process.

Similar projects have been successfully accomplished in a variety of areas. Many of the alternatives defined in the report incorporate elements of these successful projects and include bypasses, grade separations, trenching, shared corridors, and yard relocations. A detailed description of each of these projects can be found in Appendix G.

1.2 Study Area

The project study area comprises the City of Fresno and the surrounding area. The study area extends as far north as Avenue 12 in Madera County, and as far south as Manning Avenue south of the City of Fowler. On the west side of Fresno, the study area extends approximately to Kerman, and on the east side to the east of Clovis. See Figure 1 for an overview of the study area and the rail network within its boundaries.

1.3 Objective of this Report

This report presents an evaluation of alternatives, opportunities, and issues associated with a potential freight rail realignment project in Fresno, California. The objectives of this report are to:

- Document the need and purpose for a realignment project;
- Develop a feasible set of realignment alternatives for more detailed future study;
- Document the opportunities and constraints related to organization and implementation of a realignment project.

This report may be a precursor to an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA), and also possibly an Environmental Impact Statement (EIS) under the National Environmental Protection Act (NEPA). As such, the report documents the background of the project; the purpose and need for the project; the development of alternatives; and the Level 1 screening to reduce the number of alternatives to those most practical and feasible. The Level 2 alternatives analysis then assesses and characterizes the alternatives based on three groups of quantitative and qualitative criteria. The Level 2 analysis has considered both standard environmental criteria and those specific to railroad operations in Fresno.

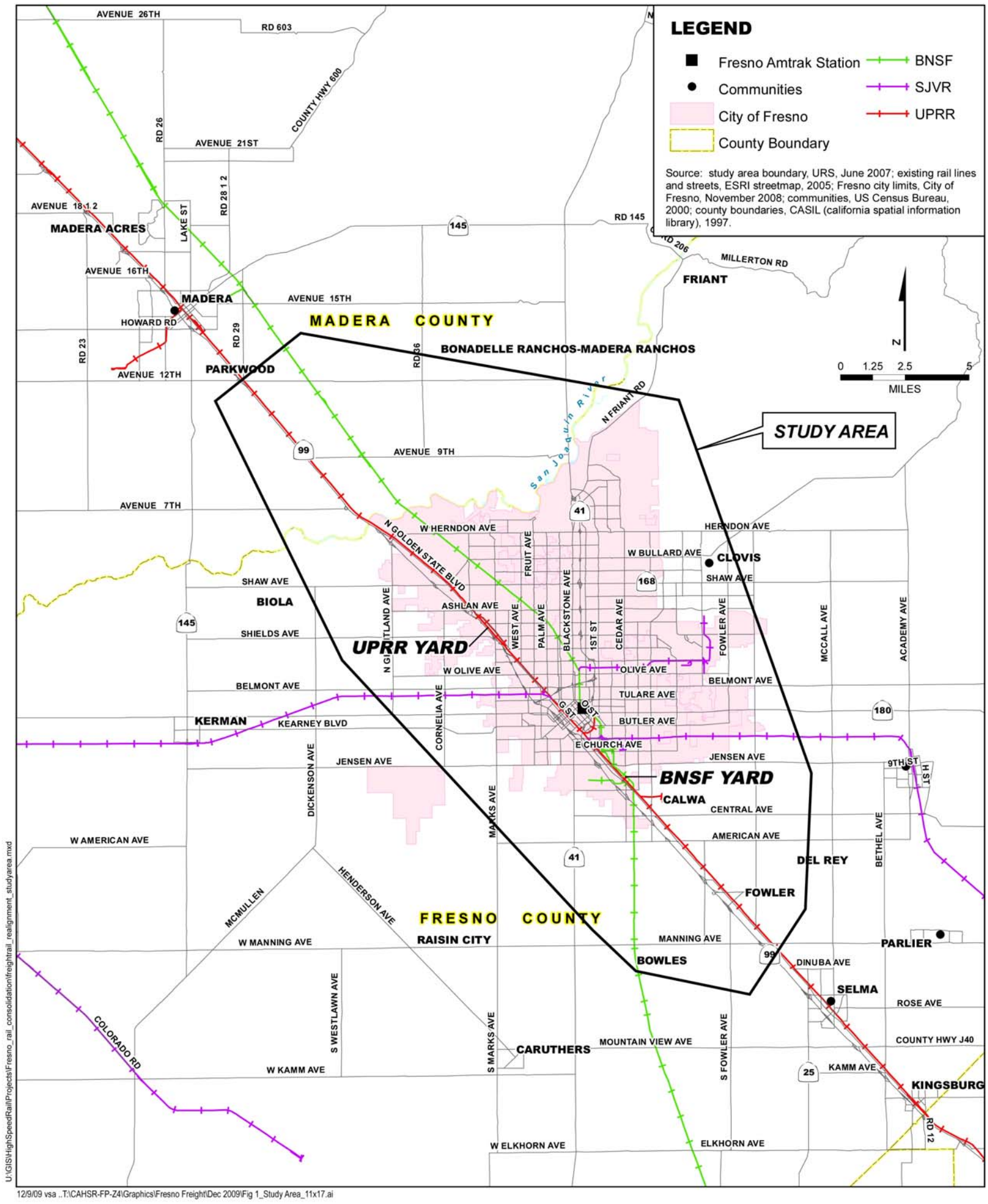
1.4 Current Rail Operations in Fresno

Fresno is a regional hub for rail and roadway transportation of both freight and passengers. Four rail operators are present in Fresno:

- BNSF – Class 1 freight operations;
- UP – Class 1 freight operations;
- San Joaquin Valley Railroad (SJV) – shortline local freight operations; and
- Amtrak – passenger service (operating on BNSF trackage).

BNSF and UP operate on roughly parallel alignments running northwest to southeast through Fresno, each with approximately 25 miles of trackage and numerous at-grade road and pedestrian crossings (BNSF: 43; UP: 25) within the study area. Both companies have yard facilities in Fresno. UP operates 25 to 30 trains per day through Fresno. BNSF operates 47 to 52

Figure 1 – Study Area



trains per day, of which 35 to 40 are freight trains, and 12 are Amtrak California's San Joaquin service intercity passenger trains.

The SJV has rail interchanges with the BNSF and UP trackage at several locations. All SJV traffic consists of local freight trains that transfer freight between the two Class 1 railroads and local branchline destinations. The frequency and size of SJV trains varies with the seasons and with customer demand.

1.5 Project Background

1.5.1 History of Rail Realignment Efforts in Fresno

Fresno has long advocated realignment of the two major freight railroads (currently UP and BNSF) that traverse the city from north to south within the existing UP alignment. This idea was first expressed as city policy in 1918, when it was incorporated into the *Fresno City Master Plan.* Several subsequent studies have further examined and refined this concept. In 1993, the Council of Fresno County Governments (Fresno COG) completed the "Fresno Rail Consolidation Review, Analysis, and Conceptual Design" study, which concluded that consolidation was feasible. These findings were updated in the 2001 *Fresno Rail Consolidation Report,* which more closely examined benefits and impacts of rail realignment and identified a possible alignment.

1.5.2 Context for Current Study

Several current issues bring to the forefront the timing of this freight rail realignment project.

A Sunset Provision for Funding

Funding is identified for Freight Rail Realignment in Fresno County Measure "C", passed by the County's voters in 1986 and reauthorized in 2006. Program Category 4 in the 2006 Reauthorization Expenditure Plan, Alternative Transportation, was created to fund the realignment of freight rail tracks through Fresno. The sales tax dedicates $102.5 million to the project over 20 years, with the intention of using those funds as local match to secure $600 to $900 million of required additional funding from federal, state or other sources. The reauthorization measure specified that if rail realignment is not programmed and construction imminent within 15 years after the measure passes (or by 2021), the funds would revert to grade separation projects that implement transit improvements and provide the greatest amount of congestion relief and air quality benefit (Council of Fresno County Governments, 2006). The sunset clause of the measure gives urgency to the project, because this is as yet the only funding dedicated to freight realignment.

B Timing of Parallel California High-Speed Train Study

After the passage in November 2008 of California Proposition 1A, planning and design are underway for the California High-Speed Train (HST) project. The preferred alignment indentified in the program EIR/EIS for the HST system closely parallels the UP Right-of-Way through central Fresno. The timing of the two projects and the overlap of their alignment alternatives creates opportunities for coordination that may benefit both projects, and that may minimize their combined cost if built together rather than separately. Both projects are considering use of the same general rights-of-way, and the limited right-of-way width through central Fresno is a fact that both projects must consider. It is possible that the freight rail realignment project could facilitate the HST project by moving freight railroads out of central Fresno, making the UP corridor available for the HST alignment and avoiding the need to take large amounts of property. At a minimum, the HST project could consider freight realignment as a reasonably

foreseeable future project, and acknowledge it in its environmental documentation. More formal and deliberate coordination of planning, design, and implementation could benefit both projects.

1.6 Agency Coordination and Outreach

A project of this scope and size requires communication with a broad spectrum of the affected community, to ensure that as many people as possible know about the project, understand its potential benefits and impacts, and have an opportunity to comment on all of its aspects.

The goal of this effort was to foster understanding and acceptance among the communities within the study area, reflective of their needs and community values.

Listed below are the agencies and groups that were contacted during this study. The team started the outreach effort by contacting local government staff involved in transportation and planning within the study area or otherwise involved in the earlier preliminary EIR/EIS for the HST system. These initial meetings led to additional contacts with these communities and the identification of other groups or agencies to contact, including agricultural and other special interest groups.

- City of Fresno
- City of Sanger
- Fresno County
- Fresno COG
- Madera County
- Caltrans
- PG&E
- UP
- BNSF
- San Joaquin Valley Rail Committee
- Fresno Area Residents For Rail Realignment
- High-Speed Rail Authority
- Fresno Business Council

Representatives from most of these agencies and groups formed the nucleus of what became known as the Fresno Freight Rail Alignment Study Technical Assessment Group (TAG).

2.0 STUDY APPROACH

The study approach involved a sequence of steps to evaluate a broad range of feasible alternatives that attain the project's objective:

- Development of project's purpose and need
- Development of a set of initial of alternatives
- Level 1 (initial) screening of alternatives
- Level 2 (comprehensive) analysis of alternatives
- Identification of final list of alternatives for further detailed analysis.

These are discussed in detail below.

2.1 Development of Project's Purpose and Need

The purpose and need statement for this project includes both primary objectives (the major problems the project is intended to solve), and secondary objectives (additional opportunities that the project may make possible). The purpose and need is described in Section 3.

2.2 Development of Initial of Alternatives

This step comprises the definition of a broad set of conceptual alternatives on the basis of their horizontal alignments and locations of such facilities as stations, yards, and maintenance facilities. A number of initial concepts were determined by preliminary evaluation to be infeasible, and were not included as initial alternatives; these are described in Section 5.4.7.

2.3 Level 1 Screening

Level 1 screening is the first phase in the process of limiting the range of solutions to those that feasibly address the project's purpose and need. A qualitative evaluation of the initial alternatives identified alternatives that do not meet the project objectives or that are technically infeasible. The initial alternatives carried forward are illustrated via the development of plan drawings for each alignment option and typical cross sections. Level 1 screening is documented in Section 6.2.

2.4 Level 2 Analysis

Level 2 analysis is a more comprehensive analysis of the remaining alternatives using selected environmental, performance, and engineering evaluation criteria. Environmental data were collected and mapped using Geographic Information Systems (GIS). Rail operations were analyzed, as well as engineering and cost data. Level 2 analyses are documented in Section 6.3.

2.5 Identification of the Final List of Alternatives for Detailed Analysis

The final list of alternatives that remain after Level 2 analysis are proposed for detailed analysis as part of future NEPA/CEQA environmental review. These are discussed in Section 6.4.

3.0 PROJECT PURPOSE AND NEED

3.1 Need for the Project

Freight rail realignment is needed to reduce or eliminate adverse community impacts caused by the presence of freight railroad alignments and the operation of trains through Fresno. The BNSF alignment passes through residential neighborhoods in Fresno and both UP and BNSF intersect numerous local roads at-grade.

3.2 Purpose

The purpose of this project is to realign freight railroad operations within Fresno to reduce impacts on the local community.

3.3 Primary Project Objectives

The realignment of the BNSF and UP mainlines would eliminate many of the undesirable and adverse community impacts associated with the presence of a heavily-used freight line within central Fresno. The contribution of project alternatives to the achievement of the project purpose and need is the basis of the alternative screening methodology, described further in Section 6.0, Evaluation of Alternatives. This section lists the primary project objectives, which are responding to the main need for the project.

3.3.1 Improve Pedestrian and Vehicle Safety

A primary objective of the project is to improve the safety of pedestrians and vehicles in Fresno jeopardized by numerous at-grade railroad crossings within the local arterial street network. There have been 23 at-grade crossing accidents in Fresno since the beginning of 2004. Six have been on the UP alignment and 17 have been on the BNSF alignment. Three of the accidents on the UP alignment resulted in injuries, but none resulted in fatalities. Seven of the accidents on the BNSF alignment resulted in injury, and six resulted in fatalities (FRA, 2009a). The project could address this issue by:

- Consolidating freight operations into one single corridor to eliminate conflicts at some existing crossings.
- Realigning freight rail operations away from high traffic at-grade crossings, either within Fresno or outside of Fresno, to separate freight operations away from highly traveled areas.
- Grade separating or closing current high-risk at-grade crossings to eliminate any possible conflicts with vehicles or pedestrians.

The opportunity to significantly reduce the number of these crossings is one of the more important objectives of realignment.

3.3.2 Reduce Traffic Congestion, Delays, and Air Quality Impacts

A primary objective of the project is to reduce the traffic congestion and delays associated with vehicles idling at grade crossings due to train movements. On an average weekday, more than 500,000 cars cross over at-grade crossings in Fresno,[3] resulting in an estimated 220,000 hours of delay annually, a majority of these being on the BNSF alignment.[4] This also results in an estimated 52,000,000 grams of air pollutant emissions per year due to idling automobiles.[5] The project could address this impact by:

[3] Based on average annual daily trips data from both FRA and City of Fresno sources.

[4] Based on estimated AADT and Alameda corridor methodology. wrcog.cog.ca.us/downloads/railcrossinganalysis.pdf.

[5] Based on U.S. Environmental Protection Agency emission rates for idling vehicles.

- Realigning freight rail operations from high-traffic crossings to reduce the traffic backups and reduce vehicle idling time.

- Grade separating high-traffic corridors to eliminate backups and vehicle idling due to freight operations.

3.3.3 Reduce or Eliminate Adverse Community Impacts

Another primary objective of the project is to reduce or eliminate adverse community impacts, including noise and vibration, which result from the presence of the BNSF rail alignment in a dense urban neighborhood. There are an estimated 5,500 sensitive receptors adjacent to the current alignment, and there are many residences adjacent to both alignments, with a majority of the BNSF alignment going through residential neighborhoods. The two current freight rail lines in Fresno also bisect various communities. The project could address this impact by:

- Realigning one or more of the freight lines bisecting Fresno to eliminate current community divisions.

- Realigning one or more of the freight railroads outside of Fresno to shift impacts away from more densely inhabited areas.

Figures 2 and 3 illustrate the effects of grade crossings in central Fresno along the BNSF alignment. The numerous arterial crossings of the BNSF alignment are subject to traffic backups when trains operate through this area. Figure 4 illustrates the condition in north Fresno along the BNSF alignment, in which houses are situated in close proximity to the track and are thus affected by noise and vibration caused when trains operate through the area.

Figure 2 – Amtrak Station and At-Grade Crossing on BNSF in Fresno

Figure 3 – Traffic Backup At-Grade Crossing on BNSF in Fresno

Figure 4 – BNSF Alignment in Proximity to Residences in North Fresno

3.4 Secondary Project Objectives

The project alternatives were also evaluated for their ability to meet secondary project objectives. Secondary objectives are not the rationale for the project, but are additional reasons to pursue the project. These secondary objectives include railway capacity and operational improvements, economic growth opportunities, potential reuse of the BNSF Right-of-Way, and potential synergy with future HST.

3.4.1 Potential Capacity and/or Operational Improvements for the Freight Railways

A secondary objective of this project is to improve the capacity, performance, and safety of freight railroad operations in the Fresno area.

The 2007-2008 California Department of Transportation (Caltrans) *State Rail Plan* (Caltrans, 2008) anticipates two additional round trips per day through Fresno by 2015 (for a total of eight round trips daily) for Amtrak's San Joaquin service operating on the BNSF trackage, causing additional demand for more rail capacity (Figure 5). Freight traffic on BNSF is also expected to continue to grow, which will require the addition of a second track for BNSF operations. Therefore, the project could address this secondary objective by:

Figure 5 – Amtrak on BNSF

- Increasing rail capacity by double-tracking BNSF's routing through Fresno;
- Increasing the reliability of Amtrak services by double-tracking BNSF's routing through Fresno, which could reduce delays to Amtrak caused by trains waiting for opposing trains to clear single-track segments;
- Reducing conflicts between trains and motor vehicles by consolidating rail operations on an alignment with fewer grade crossings;
- Mitigating potential safety hazards associated with freight operation through Fresno, thereby reducing railroad associated liability costs;
- Reducing at-grade crossing maintenance costs for railways and local road authorities;
- Improving freight rail performance by allowing higher train speeds through Fresno, thereby reducing costs and increasing profits, as well as providing more access time on main lines for interchange between BNSF, UP, and SJV;
- Reducing maintenance by construction of new trackage and reconfiguring interlockings to current standards; and
- Increasing operating efficiencies by providing new maintenance yards, which would be required under some build alternatives.

3.4.2 Potential Future Economic Development Opportunities

Another secondary objective of the project is to support local efforts for economic development. One aspect of future economic development opportunity could encompass reuse of the BNSF alignment, should the BNSF be relocated. A second aspect could be the community benefits that could ensue from such a move. There are also potential economic development benefits associated with the construction of the bypass alternatives for either BNSF and/or UP, in terms of improved access to potential new industrial sites. Elements of this secondary objective are:

- Eliminating the current community division associated with the freight line bisection of Fresno (Figure 6), facilitating easier and more efficient movement of people and goods through the city and enabling better linkages between local businesses and customers;
- Improving connectivity and cohesion among residential neighborhoods (see Figure 6), increasing opportunity for service integration and expansion for major Fresno landlords such as Fresno City College, Ratcliff Stadium, and Fresno Community Hospital;
- Depending on the "build" alternative, stimulating commercial and industrial growth in areas designated and/or intended by the City of Fresno to provide locations for future development; and
- Creating opportunities for economic development and revitalization associated with potential new industrial sites along new rail alignments (see Section 6.3.3).

Figure 6 – BNSF Alignment Bisecting Community

3.4.3 Potential Reuse of the BNSF Corridor

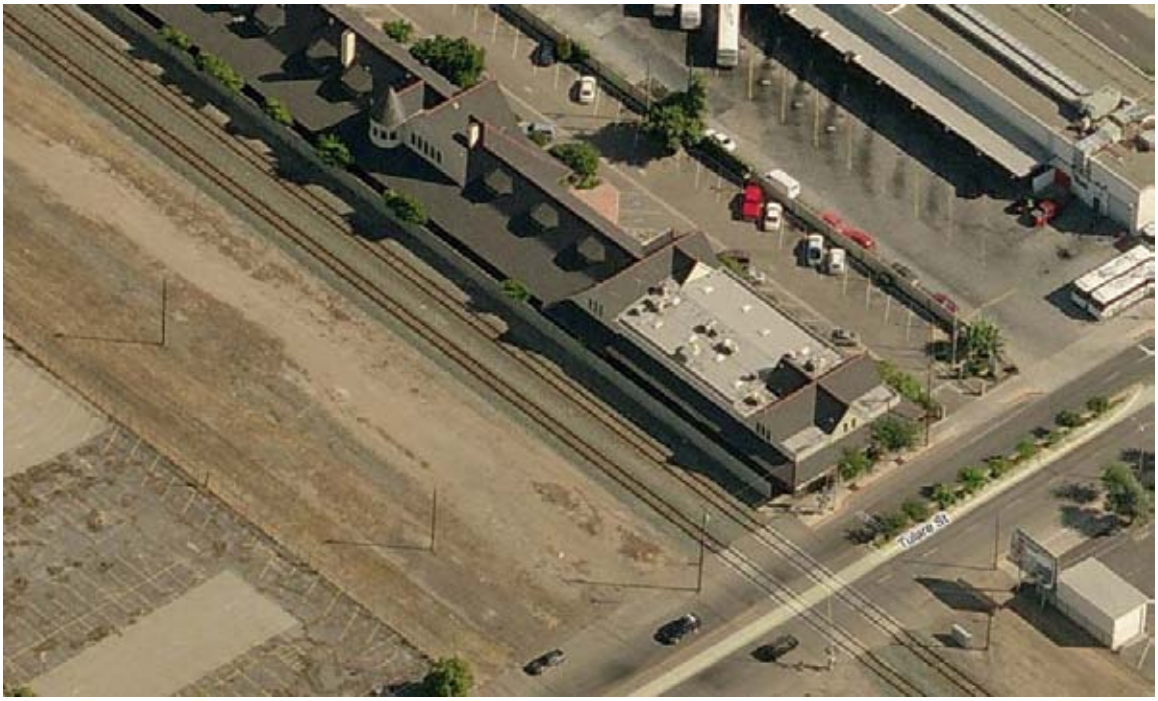
Another secondary objective is to make the BNSF corridor available for alternate uses such as recreation or modern streetcar.

3.4.4 Potential Future Compatibility with High-Speed Train

The proposed project could help accommodate construction and operation of HST through central Fresno by realigning the freight railroads in such a way that existing transportation right-of-way through central Fresno could be made available to the HST project. The California High-Speed Rail Authority (CHSRA) Program EIR/EIS Preferred Alignment shows the HST approaching Fresno from the north and south along either the BNSF or UP alignments. The HST alignments are currently assumed to parallel the UP alignment through central Fresno, but to be located outside of the UP right-of-way. The geometry and width of the current BNSF right-of-way through Fresno precludes co-location of HST within or alongside that freight railway corridor. The UP alignment is the preferred corridor for HST, because of the preferred station location in the center of Fresno within the UP alignment (see Figure 7). Elements of this secondary objective include:

- Facilitating development of freight rail alignment configured to accommodate HST through central Fresno; and
- Enabling co-location of an Amtrak and HST station at a single location in downtown Fresno.

Figure 7 – SP Station in Fresno



Source: BING Maps accessed December 8, 2009.

4.0 PROJECT CONSIDERATIONS

The alternatives developed and reviewed as part of this rail realignment study have taken into account the current status of rail operations and urban development in the study area. The existing conditions, along with other regulatory and institutional considerations, have a significant impact on whether certain alternatives are more or less feasible. This section presents a number of considerations that have informed the Level 1 screening and Level 2 analysis in this study.

4.1 Existing Rail Operations

There are two major Class 1 freight railroad operations in Fresno, UP and BNSF, both of which pass through the city in a general northwest-to-southeast direction, the BNSF located to the east of the UP. Minor branchlines connect to these two mainlines at several points. The SJV, which runs through Fresno in a north-west to south-east direction, interchanges with the BNSF and UP north of the Calwa crossing to provide local industry switching of railcars and to serve several branchlines. SJV handles deliveries of various materials between the Class 1 Railroads, local manufacturers, and distribution centers.

4.1.1 BNSF Rail Operations

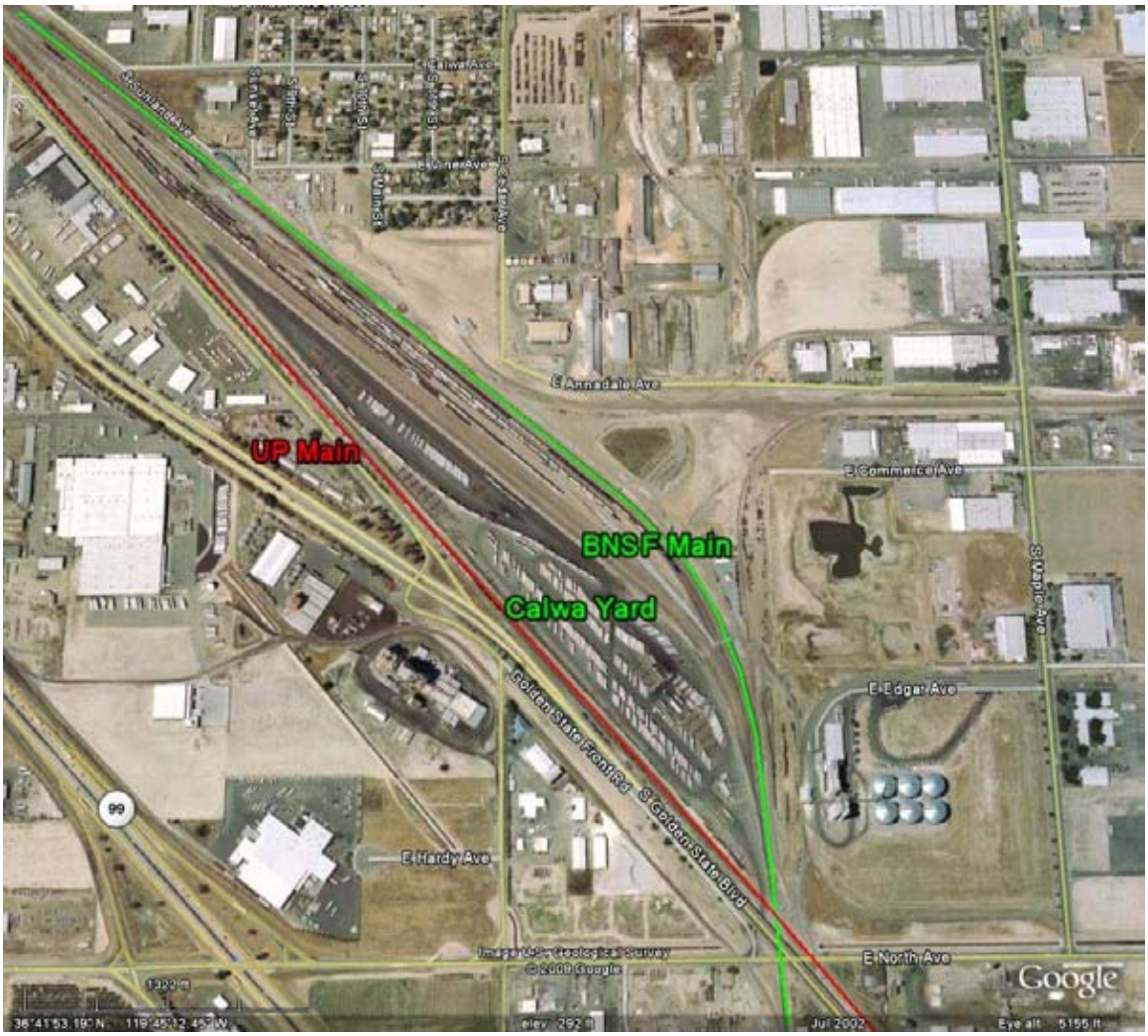
The BNSF trackage within the study area extends for 24 miles from milepost 990 at Adams Avenue, between railroad locations named Thorpe and Bowles, north to milepost 1014 at Gregg siding. Within this section, the south Fresno city limit at North Street is approximately at milepost 994.3. The north city limit is at Figarden siding, approximately milepost 1004.2, and the San Joaquin River bridge is between Figarden siding and Gregg siding, at milepost 1008.8. Milepost 990 on the south and milepost 1014 on the north represent the outer limits of the BNSF trackage included in the study area. In the City of Fresno, the BNSF system includes the following components: Calwa Yard, the connections to the SJV, and the BNSF grade crossings.

A Calwa Yard

Calwa Yard is BNSF's primary operational and maintenance facility in the Fresno area. It is located on the east side of the UP main track just north of Calwa Tower (the UP/BNSF at-grade crossing), and just north of North Avenue. Calwa Yard serves BNSF intermodal business and functions as the BNSF commercial hub for the central San Joaquin Valley. An industry track just south of the Golden State Frontage Road near milepost 994.1 provides access to numerous industries between the UP and State Route 99. (See Figure 8 for an overview and Figure 9 for an enlarged illustration of this area.)

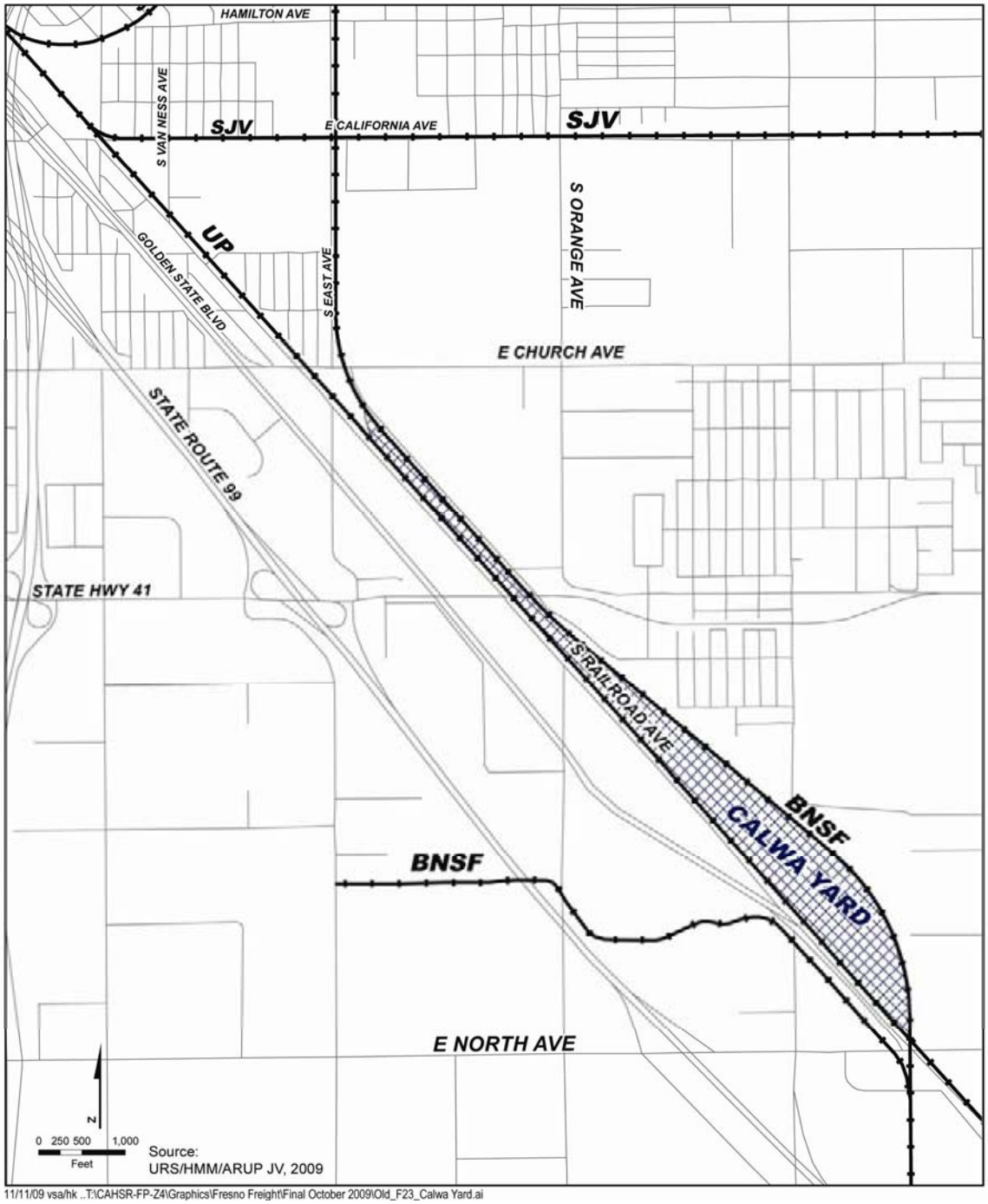
Calwa Yard supports train classification; local switching; interchange with the SJV; intermodal train loading and unloading; railcar maintenance; locomotive servicing such as fueling, lubrication, and minor mechanical repairs; and functions as a crew change point. It has 22 principal yard tracks and leads and accommodates about 35 to 40 through freight trains per day, of which 20 to 24 are intermodal trains. The yard operates continuously except on Christmas day. The yard will generally originate and terminate at least one or two intermodal trains per day to or from the east, as well as two local trains. Other through-trains stop to pick up or set out Fresno traffic.

Figure 8 – Calwa Yard



Source: Google Earth accessed September 1, 2009.

Figure 9 – Map of Calwa Yard



B Connections with the San Joaquin Valley Railroad

Connections between the BNSF and SJV are located near the cross streets shown in Table 1. SJV performs the actual interchange of rolling stock with BNSF directly at Calwa Yard.

Table 1 – BNSF and SJV Connections

Milepost	Nearest Cross Street	Direction of SJV Route	Estimated Number of Industries Served
994.4	North Avenue 0.2 mile south of turnout	East South Leg of Wye	±10 within city center, south of East Annandale Avenue
994.9	North Avenue 0.7 mile south of turnout	East North Leg of Wye	±10 within city center, north of East Annandale Avenue
996.7	California Avenue 0.05 mile south of Crossing	West to UP East to Industries	N/A, not a BNSF service connection
997.5	State Route 41	West to UP	±5
999.6	Hammond Avenue 0.1 mile south of turnout	East to Industries	±8 west of Maple Avenue

Source:

Windows Live Local Map aerial images, see http://www.bing.com/maps/default.aspx?rtp=adr.

Notes:

BNSF = BNSF Railway
N/A = Not Applicable
SJV = San Joaquin Valley Railroad
UP = Union Pacific Rail Road

The BNSF has two main tracks between Bowles (milepost 987.3) and the Amtrak station near Tulare Street (milepost 998.1). North of the Amtrak station, the BNSF is single tracked, but there are two long passing sidings; Figarden (milepost 1004.1 to milepost 1006.0) and Gregg (milepost 1010.4 to milepost 1012.2). This single-track segment has less capacity than the double-track segment and has been identified in simulation studies done jointly for BNSF and Caltrans as a constraint to both freight capacity, and to the expansion of the Amtrak intercity passenger service. Track speeds are Federal Railroad Administration (FRA) Class 4, with a maximum permitted passenger train speed of 79 miles per hour (mph) and a maximum permitted freight train speed of 70 mph, except for restrictions to lower speeds through the level railroad crossing at Calwa Tower and past Calwa Yard itself. Therefore, the existing level of utility in the physical plant available to BNSF and Amtrak is sufficient to meet the highest speeds at which they are allowed to operate under FRA regulations.

Two capacity expansion projects along the existing BNSF right-of-way have been developed as part of a joint BNSF/Caltrans Division of Rail assessment of long-term projects that would be required were the State to expand the existing conventional passenger frequencies beyond the current timetable of six daily passenger trains in each direction. One potential project would extend the second main track north from Tulare Street to Figarden siding. An alternate project would essentially double the length of Gregg siding, and install a set of crossovers in the middle, so that multiple trains could meet or pass simultaneously. These projects are not currently funded, and are not identified by BNSF/Caltrans as priority projects for funding.

C Grade Crossings

There are 43 road and/or pedestrian grade crossings in the 24 miles of BNSF track between Bowles and Gregg siding, which is an average of 1.8 crossings per mile. The crossings and the safety protection provided at each is listed in Table 2.

Table 2 – BNSF At-Grade Crossings

No.	BNSF Milepost	Street Name	Protection Equipment
1	990.23	Adams Avenue	Flashers and Gates
2	990.69	Clayton Avenue	Flashers and Gates
3	991.28	Lincoln Avenue	Flashers and Gates
4	992.28	American Avenue	Flashers and Gates
5	992.78	Malaga Avenue	Flashers and Gates
6	993.29	Central Avenue	Flashers and Gates
7	994.13	Golden State Frontage Road	Flashers and Gates
8	994.27	North Avenue	Flashers and Gates
9	995.48	Private Crossing	None Listed
10	996.32	Church Avenue	Flashers and Gates
11	996.72	California Avenue	Flashers and Gates
12	997.00	Hamilton Avenue	Flashers and Gates
13	997.23	Butler Avenue	Flashers and Gates
14	997.79	Ventura Avenue	Flashers and Gates
15	997.92	Pedestrian Crossing at Amtrak Station	None Listed
16	997.97	Pedestrian Crossing at Amtrak Station	None Listed
17	998.01	Pedestrian Crossing at Amtrak Station	None Listed
18	998.10	Tulare Avenue	Flashers and Gates
19	998.20	Pedestrian Crossing	Flashers Only
20	998.30	Fresno Street	Flashers and Gates
21	998.53	Divisadero Street	Flashers and Gates
22	998.77	McKenzie Street	Flashers Only
23	999.02	Belmont Avenue	Flashers and Gates
24	999.49	Olive Avenue	Flashers and Gates
25	999.59	Hammond Avenue	Flashers Only
26	1000.01	Blackstone Avenue	Flashers and Gates

Table 2 – BNSF At-Grade Crossings (Continued)

No.	BNSF Milepost	Street Name	Protection Equipment
27	1000.10	McKinley Avenue	Flashers and Gates
28	1000.70	Clinton Avenue	Flashers and Gates
29	1000.96	Princeton and Maroa Avenue	Flashers and Gates
30	1001.26	Shields Avenue	Flashers and Gates
31	1001.88	Palm Avenue	Flashers and Gates
32	1002.52	Fruit Avenue	Flashers and Gates
33	1002.63	Ashlan Avenue	Flashers and Gates
34	1003.17	West Avenue	Flashers and Gates
35	1006.20	Figarden Drive	Flashers and Gates
36	1009.07	Road 35	Flashers and Gates
37	1009.97	Private Crossing	None Listed
38	1010.18	Private Crossing	None Listed
39	1011.27	Private Crossing	None Listed
40	1011.48	Avenue 9	Flashers and Gates
41	1012.11	Private Crossing	None Listed
42	1012.97	Private Crossing	None Listed
43	1013.95	Avenue 11	Flashers and Gates

Source: CPUC, 2009.
Notes:
BNSF = BNSF Railway

4.1.2 Union Pacific Rail Operations

The UP trackage within the study area extends from milepost 213.8, near Clayton Avenue south of Malaga, north to milepost 191.0 at the east end of the controlled siding at Irrigosa. On the UP, the San Joaquin River Bridge and the Fresno/Madera County line is at milepost 194.6. The former SP Fresno Yard is on the east side of the main tracks, and extends for about 2 miles between Ashlan Avenue on the north and Clinton Avenue on the south. The Fresno Yard has approximately 20 significant yard tracks and leads. Figure 10 illustrates an aerial view of the UP Fresno Yard.

On a typical day, the UP main track is used by approximately 25 to 30 trains, including approximately 21 to 24 through-trains and five local trains that originate and terminate at the yard. Similar to the BNSF trackage, the UP trackage is designed and maintained to FRA Class 4 standards. The maximum train speeds allowed on the UP are generally 70 mph, and trains are restricted by carrier rule to 40 mph within the city limits.

Figure 10 – UP Fresno Yard

Source: Google Earth accessed December 8, 2009.

The UP plant through Fresno has two main tracks between Calwa Tower (UP milepost 209.1) on the south and Biola Junction (UP milepost 197.2) on the north. North of California Avenue on the east side of the UP main tracks are a set of interchange tracks where freight cars for interchange between the UP and SJV are set out by the respective carriers. Figure 11 details the area immediately adjacent to the UP/SJV interchange and shows the physical relationship of both carriers' trackage to the BNSF. UP's physical connections with the SJV are described in Table 3.

A Grade Crossings

There are 25 roadway grade crossings in the 20 miles between Malaga and the San Joaquin River, averaging 1.25 crossings per mile. The crossings and the safety protection provided at each are listed in Table 4. The UP right-of-way has fewer grade crossings than the BNSF, due to grade separations that have already been constructed for a number of the major arterials in central Fresno.

Figure 11 – SJV Connections

Table 3 – UP and SJV Connections

UP Milepost	Nearest Cross Street	Direction of SJV Route	Estimated Number of Industries Served
206.2	Between Ventura Avenue and Van Ness Avenue	East	±6
205.8	Between Mono Street and Ventura Street	East to BNSF	±5
204.2	Divisadero Street ±0.15 Mile South of Turnout	West to Oxalis South Leg of Wye	±10 Agricultural
204.05	Divisadero Street	West to Oxalis North Leg of Wye	±10 Agricultural

Notes:
BNSF = BNSF Railway
UP = Union Pacific Railroad

Table 4 – UP At-Grade Crossings

No.	UP Milepost	Street Name	Protection Equipment
1	213.75	Clayton Avenue	Flashers and Gates
2	212.50	Private Crossing	None Listed
3	211.75	American Avenue	Flashers and Gates
4	211.15	Willow Avenue	Flashers and Gates
5	210.50	Central Avenue	Flashers and Gates
6	210.40	Chestnut Avenue	Flashers and Gates
7	209.53	Private Crossing	Stop Sign
8	209.10	North Avenue	Flashers and Gates
9	209.05	UP Private Crossing	Flashers and Gates
10	207.20	Church Avenue	Flashers and Gates
11	206.85	Florence Avenue	Flashers and Gates
12	206.75	Van Ness Avenue	Flashers and Gates
13	205.90	Ventura Avenue	Flashers and Gates
14	205.85	Mono Street	Flashers and Gates
15	205.60	Kern Street	Flashers and Gates
16	205.50	Tulare Street	Flashers and Gates
17	204.40	Divisadero Street	Flashers and Gates
18	203.10	Olive Avenue	Flashers and Gates
19	202.50	McKinley Avenue	Flashers and Gates
20	201.95	Private Crossing	None Listed
21	200.05	Private Crossing	Stop Sign
22	198.50	Shaw Avenue	Flashers and Gates
23	197.80	Private Crossing	Stop Sign
24	197.20	Carnegie Avenue	Flashers and Gates
25	195.85	Herndon Avenue	Flashers and Gates

Source: CPUC, 2009.
Notes:
UP = Union Pacific Railroad

4.1.3 SJV Rail Operations

The SJV operates all or part of four former Class 1 railroad branch lines radiating from Fresno:

- The former Santa Fe Visalia branch
- The former SP Exeter branch
- Part of the former SP Clovis branch
- Part of the former SP West Side line

In addition, part of the former Santa Fe Visalia branch extends east from Fresno along East Annandale to serve local industries, but this branch is abandoned outside of Fresno. SJV interchanges traffic with BNSF at the BNSF Calwa Yard, and switches industries along East Annandale and East Commerce Streets in Fresno.

The former Exeter and Clovis branches connect to the UP near California Avenue, and between Santa Clara Street and Ventura Avenue, respectively. The Exeter branch extends east from Fresno along East California Avenue, while the connection to the remaining part of the Clovis Branch curves around from south to north and joins the existing BNSF main track through downtown near Ventura Avenue just south of the Amtrak station. The SJV trains then use the BNSF to Hammond, about 2 miles to the north, where they turn east to Hammer Field. The portion of the SP Clovis Branch between the junction with the BNSF at Ventura Avenue and Las Palmas, east of Sunnyside, was abandoned many years ago to move train operations out of Fresno. Figure 10 illustrates the main connections to the SJV from the BNSF and the UP in central Fresno.

The connection to the former West Side line is near the State Route 41 overcrossing. This part of the SJV goes west toward Kerman and Mendota. At one time, the line continued through to Tracy via Los Banos, but it is now separated into two disconnected parts, with the connecting middle segment having been abandoned.

All of the SJV service consists of local freight trains that switch industries on the branches. Frequency of service and size of trains is dictated by customer demand, and varies mostly with the growing seasons for different crops.

A Grade Crossings

The SJV trains that deliver cars to and from the UP interchange at Ventura Street, and then go to Hammer Field, use the curved connection lying southeast of Angeles Street (Figure 10). This connection has approximately ten grade crossings. The SJV trains to and from Hammer Field will then also cross the ten BNSF road and four pedestrian grade crossings that lie between Ventura Street and Hammond Avenue. There are numerous other grade crossings along the SJV as well, but none would potentially be affected by any part of the realignment alternatives considered in this report, and are not relevant to the analysis.

4.1.4 Amtrak Operations

Amtrak's San Joaquin service passenger trains operate through the entire study area on BNSF track. The San Joaquin trains operate between Oakland and Bakersfield or between Sacramento and Bakersfield. In Fresno, Amtrak trains stop at the former Santa Fe station on Tulare Street. Amtrak operates six northbound and six southbound trains per day through Fresno. These services are supported, in part, by Caltrans.

4.2 Regulatory Issues

4.2.1 Preservation of Service to Customers

Under the Interstate Commerce Act, now administered by the Surface Transportation Board, common carriers have an obligation to provide transportation to all their customers on an equitable basis, in a way that makes it possible for each customer to compete fairly, all other elements being equal. One consequence of this obligation is that railroads are not subject to eminent domain. No public body or agency, even one acting in the public interest, can force an operating railroad to give up service to its customers. That means that any project design that affects a railroad's ability to exercise its common carrier responsibilities will have to be negotiated with the carriers, and will have to meet their criteria for commercial and operating viability, as well as for maintainability. In assessing realignment alternatives, the analysis recognized that alignments that clearly did not meet railroad criteria were very likely to be fatally flawed from the beginning, and were thus discarded in the early stages of analysis.

4.2.2 Abandonment of Trackage or Service

Any discontinuation of railroad service in the United States, including relocation of railcar interchange points and the realignment of main tracks in ways that do not adversely affect shippers is subject to the Interstate Commerce Commission Termination Act and to review by the Surface Transportation Board. Carriers cannot agree to any realignment that would cut off users of carload rail service from their efficient access to the national rail system. Consequently, the alternatives analysis has discarded options that would clearly engender federal regulatory problems.

BNSF, as the contracting Class 1 carrier, has an obligation to protect Amtrak access to the stations in the original Amtrak network, and would therefore be unlikely to support an alternative that would require Amtrak to give up serving the existing former Santa Fe station unless Amtrak were also in agreement. BNSF could vacate their use of the existing right-of-way, and leave Amtrak with the option of acquiring control over, and cost responsibility for, the current route.

4.2.3 Moving Railcar Interchange Locations

The specific locations where railroads exchange freight cars with each other are specified in bilateral agreements. Generally, each carrier that is party to any such agreement tries to minimize its costs by locating the interchange conveniently. Within a terminal, the interchange location may not only be a place (a named railroad "station" location), but also a specific set of tracks, identified by number. This latter convention is often driven by agreements with the operating crafts, which are designed to ensure that employees of "foreign" railroads have only a specific and clearly defined set of tracks on the "home" railroad where they are allowed to operate. In addition, some interchange agreements specify in detail which carrier delivers cars to the other, and/or who has rights to haul cars from the interchange point back to its line. Railroads can agree amongst themselves to relocate interchange points and the specific arrangements: the parties to such agreements, however, do not have to accept any increase in costs that might be forced upon them by a public project. Consequently, the alternatives analysis weighed the potential railroad benefits directly against any negative impact on railroad costs. The negative private impact of any particular realignment alternative cannot be offset with public benefits.

4.3 Design Standards

4.3.1 Federal Railroad Administration Requirements

FRA standards apply to the design and operating capability of any railroad alignment. The particular standard to be used is left to each carrier to decide. The FRA defines the standards for which they are the responsible regulatory agency by Class of Track, and numbers each class. Higher numbers require more demanding standards. There are currently six different classes, each with its own set of requirements with respect to crossties, rail condition, elevation, and vertical or horizontal line. Each track class also comes with a specified maximum operating speed, and with the maximum speed comes the measure of Level of Utility for that class. The industry and the FRA intentionally mate the track class requirements with railroad signal requirements; the effect of the two sets of requirements together dictates that FRA Track Class 4 is the highest practical standard currently applied to freight trackage in North America. While there are Classes 5 and 6, the signal requirements to operate at those higher speeds and higher levels of utility are more demanding and expensive than can be justified in a freight-dominated environment, and so few Class 1 freight railroads design or maintain their main track to those standards. For this analysis, we have assumed that FRA Class 4 standards will have to be applied to all surviving alternatives, since only that standard yields the level of utility required by the carriers.

The FRA does not mandate railroad clearances, which are the minimum distances allowed to the side of railroad tracks, or vertically to the underside of overhead structures. These standards are left to the individual states (see Section 4.3.2). However, the FRA does require that railroads severely restrict the speed of trains on one track when passing maintenance of way work on an adjacent track, unless the track centers are at least 25 feet apart.

4.3.2 CPUC Requirements

In California, the California Public Utilities Commission (CPUC) can act as a proxy for the FRA where inspections of railroad operating property are concerned, and the CPUC also has some jurisdiction over railroad design. For the most part, the CPUC mandates standards for railroad elements such as clearances and toepaths along the roadbed, but it also governs grade crossings. With few exceptions, the CPUC no longer grants waivers from their requirement that new rail lines be grade-separated from highways. Our analysis therefore assumes that the benefits from eliminating existing grade crossings will not need to be offset because of new crossings along any of the bypass alternatives, because there will be no grade crossings on any totally new alignment.

The CPUC requires a minimum vertical clearance of 22 feet, 6 inches above top of rail. CPUC also requires a minimum horizontal clearance of 15 feet from the centerline of one track to the centerline of an adjacent track, or from the centerline of a track to the edge of the operating right-of-way, except in cases where spurs are next to buildings for loading and unloading freight cars, or where railroad equipment such as signal control boxes or the bases of block signals are concerned.

4.3.3 Railroad Requirements

The mandated minimum clearances discussed in Sections 4.3.1 and 4.3.2 are not the practical design standards used by the railroads for actual design of a project. The railroads have their own internal standards in addition to those mandated by regulatory agencies, and the carrier-specific requirements will generally be designed to meet the more demanding of two alternate standards. For example, to meet the FRA requirement described previously concerning operation

past working maintenance crews, the railroads will require new parallel main tracks be separated on 25-foot centerlines, which exceeds CPUC requirements.

Railroad track maintenance is often performed by the railroads using off-track vehicles, which work from the side of the track rather than from on the track. This practice requires access roads for heavy equipment parallel to the main tracks.

When all the above-mentioned requirements and practices are combined, the required lateral width of a freight rail right-of-way is wider than what might be inferred from simply looking at minimum standards. In this analysis, based on experience with BNSF and UP's regular practice, we have assumed that any main line with two main tracks will require at least 100 feet clear from side to side, and that in those alternatives where both UP and BNSF would be relocated to a common bypass corridor, the total unconstrained right-of-way will need to be 200 feet wide.

4.3.4 Expandability of Freight Rail Right-of-Way

The working hypothesis throughout this analysis is that each of the two Class 1 freight railroads requires ownership of at least a 100-foot-wide right-of-way for their exclusive use. This assumption is consistent with the positions both UP and BNSF have stated, to the extent that they have been asked to address the issue. The land required for replacement yards, in those alternatives that require yards to be replaced, is in addition to the minimum right-of-way width.

Within a 100-foot-wide right-of-way, the freight railroads should be able to configure their trackage to best suit their needs for operating capacity. Within that width, they can add a third track or a siding, or extend work leads or other support track. Based on history, it is very unlikely that either BNSF or UP would ever require more than 100 feet in right-of-way width, except where yard trackage is needed.

4.4 Ownership of Railroad Right-of-Way

4.4.1 UP Position

UP's position with respect to ownership of its railroad right-of-way can be inferred from the text of the relevant portions of its letter to the CHSRA dated April 8, 2009. Among other pertinent statements, UP notes:

> "Union Pacific owns the Fresno Subdivision right-of-way in fee simple between Sacramento and Bakersfield. Union Pacific controls the operation and maintenance of this subdivision. No other carrier or government agency has the right to permit other railroads or rail operators to use any part of this right-of-way....Union Pacific does not intend voluntarily to make any part of its Fresno area right-of-way or yard available for the HST alignment. Union Pacific likewise is not interested in a consolidated rail corridor in Fresno with any other carrier."

UP has consistently articulated this position over many years. UP's desire to own its railroad is directly related to its desire to control the train dispatching and maintenance of way activities associated with the day-to-day operation of the railroad. While it is possible that an alternate ownership structure might be created in such a way that UP would have the complete control it requires, while not actually owning the right-of-way in fee, this is assumed to be unlikely. Consequently, all the surviving alternatives assume that if the UP is asked to vacate any portion of its physical plant, UP would be provided with a replacement physical plant to the same or

better level of utility, and that UP would then have the option to assume ownership in fee, as they do now.

4.4.2 BNSF Position

To the best of our knowledge, there is no written document that describes the BNSF position on ownership of its right-of-way, but discussions with BNSF make it clear that BNSF's requirements for exclusive use of and control over its own railroad right-of-way would be the same as those articulated by UP.

The simplest way to meet those requirements is through ownership in fee. BNSF has said there are other options that have proven workable in other locations and which, under the right circumstances, BNSF may be willing to consider. For example, a public agency could own the land under the right-of-way, and grant a long-term franchise (99 years, automatically renewed); or public ownership could hypothetically be coupled with a perpetual and exclusive easement, with the property reverting to the carrier if the public entity desired to dissolve its ownership responsibilities. The conservative assumption should be that any relocation of BNSF physical plant would need to protect BNSF's operation in exactly the same way as any relocation of UP plant would need to protect UP.

4.5 Compatibility with High-Speed Train

4.5.1 Width of Potential Right-of-Way in Downtown Fresno for High-Speed Train

Current planning for the High-Speed Train Project in Fresno indicates that a two-track right-of-way would be 60 feet wide, or 100 feet wide for the four-track sections on either side of the station, with additional width required at the station. This width generally does not overlap with existing railroad rights-of-way.

4.5.2 Single Downtown Station for High-Speed Train and Amtrak

A single shared station facility in Fresno, serving both HST and conventional rail services, would help fulfill the California HST project's objective of intermodal connectivity. This would require San Joaquin trains to be rerouted to serve the assumed location for the HST station, adjacent to the UP alignment near the former SP station site. Trains of the two services would have to use separate tracks. The track gauge may be the same, but the signal and train control systems used by the two types of rolling stock are incompatible. In addition, the existing FRA standards for frame strength and crash protection apply to Amtrak rolling stock because Amtrak trains operate on common tracks with freight trains.

4.6 Yard Locations

There are two existing yards in Fresno: the BNSF's Calwa Yard, located between North Avenue and Jensen Avenue; and the UP Fresno Yard, located between Belmont Avenue and Clinton Avenue. These yards are well situated for the convenience of both carriers and they have no plans to replace or rebuild either of them at this time. Factors that railroads consider when planning replacement yards are

- The required capacity is adequately replaced;
- The site chosen for the relocated yard or yards is not encumbered in some way that restricts its use (particularly at night, when switching noise can be an issue);

- The new yard site(s) are chosen so that rail connections to other carriers (such as SJV) are protected, and
- Convenient arterial connections to the state highway system are provided.

The highway connections are important because a significant amount of rail freight moves in containers or truck trailers that are drayed to the intermodal railhead in Fresno. The current location of Calwa Yard, for example, is close to Highway 99, and therefore readily accessible to shippers in the San Joaquin Valley who use intermodal rail service.

4.7 Potential Development Plans and Land Use Constraints

A review of existing development plans and land uses was completed to identify potential conflicts and constraints. The results are summarized below.

4.7.1 Development Plans

The following development plans may provide constraints for potential corridor alignments.

A El Paseo

One of the major development proposals under review by the City of Fresno is El Paseo, a master planned development that would generally bound by West Herndon Avenue on the north, North Bryan and West Bullard avenues on the east, Carnegie Avenue to the south, and State Route 99 to the west (City of Fresno, 2009a). The 238-acre project would include the Marketplace at El Paseo, a 600,000-square-foot lifestyle center/town center project with office, retail, restaurant, and entertainment uses, and featuring a hotel and a light industrial business park. Potential constraints include alternatives that run adjacent to or through El Paseo in the vicinity of Highway 99 near Herndon Avenue. Potential constraints include alternatives that run adjacent to or through El Paseo in the vicinity of Highway 99 near Herndon Avenue.

B Metro Rural Loop

The proposed Metro Rural Loop (Loop) would entail the development of a high-capacity, multi-modal transportation network linking the majority of the 30 incorporated cities in Fresno, Madera, Tulare, and Kings Counties. Based on the available maps of the conceptual Loop alternatives, the Loop would encircle the Fresno metro and outlying rural areas and include an east-west sub-loop or expressway running just north of the San Joaquin River in the vicinity of the study area. Therefore, it appears the Loop would intersect the northern limit of the alternatives within study area just north of the San Joaquin River crossing (City of Fresno, 2009b).

4.7.2 Land Use Constraints

In addition to the proposed development discussed above, there are existing land uses in the project vicinity that may also provide constraints for potential alignment alternatives. These land uses include Roeding Park, the San Joaquin River Parkway, Chinatown, and Williamson Act lands.

A Roeding Park

Roeding Park is a 159-acre regional park on Belmont Avenue next to State Route 99. It attracts 600,000 visitors annually (City of Fresno, 2009c). The park also includes the Rotary Playland and the Fresno Chaffee Zoo. Potential impacts include conflicts with the planned expansion of Chaffee Zoo in the eastern portion of the park toward Golden State Boulevard. The zoo expansion plan is currently undergoing environmental review. In addition, Roeding Park has received funding for park improvements that qualify it for protection as a Section 6(f) resource.

Any conversion of use from the Section 6(f) resource may require special approval and compensation/mitigation.

B San Joaquin River Parkway

Camp Pashayan, a natural area that is a part of the San Joaquin River Parkway, is located near Herndon Avenue and Highway 99, just to the east of the alternatives in the vicinity of the San Joaquin River crossing (San Joaquin River Parkway Conservation and Trust, 2009). The 31-acre natural area is jointly owned by the California Department of Fish and Game and the River Parkway Trust. The proposed alternatives could potentially traverse portions of Camp Pashayan as it runs south from Madera County into Fresno County.

C Chinatown

Established in 1885, Fresno's Chinatown is one of several known early ethnic neighborhoods recognized by the City of Fresno. Chinatown is bordered by Fresno Street on the north, the UP right-of-way on the east, Ventura Street on the south, and Highway 99 on the west (Downtown Association of Fresno, 2009). In 1994, Chinatown Revitalization, Inc., was created to organize revitalization efforts for the neighborhood. Fresno's Chinatown also contains an underground network of tunnels and passageways that connected various buildings within the neighborhood. Potential constraints include freight alternatives (vertical and horizontal configurations) that may conflict with the revitalization plans set forth for the neighborhood.

D Williamson Act Lands

The Williamson Act preserves agricultural lands and open space by creating arrangements whereby private land owners enter into contract agreements with counties and cities to voluntarily restrict use to agricultural and open space use. Currently, large areas are designated as Williamson Act lands west of the Fresno city limits. Potential constraints include freight alternatives, specifically for the bypass, that would require right-of-way from lands encumbered under the Williamson Act.

4.7.3 Consistency with Downtown Development Plans

Based on currently available information, the proposed projects appear to be consistent with the applicable downtown Fresno development plans. The freight realignment project has been planned for many years; the 2025 Fresno General Plan Public Facilities Element includes the following objective and policy for Transportation/Rail Systems:

- E-5. Objective: Promote continued growth of rail passenger and freight travel through a safe, efficient, and convenient rail system that is integrated with, rather than in conflict with, other modes of travel.
- Policy E-5-a: Support and advocate the relocation of the BNSF mainline operations over to the UP or other rail corridor that relocates rail operations from the center sector of the city.

5.0 PROJECT ALTERNATIVES

5.1 Overview

The project alternatives were developed with local stakeholder input, using aerial-photo–based digital mapping and topographic data. Alignment geometrics were developed in accordance with standard design criteria and operating requirements for both freight rail and HST operations, and were intended to encompass a variety of potential methods of addressing the project purpose and need.

Alternatives are depicted in plan, with typical cross sections representing all possible alignment configurations. Plans include identification of road and water crossings, major utilities (overhead electrical power lines), freight rail crossings, and land use along the corridor.

Initial alternatives (Figure 12) are organized into the following six categories:

- Category 1 No realignment/no project
- Category 2 Realignment through central Fresno adjacent to the UP Alignment
- Category 3 Western bypass at freight geometry for one or both of the railways
- Category 4 Western bypass at HST geometry for one or both railways
- Category 5 Eastern bypass at freight geometry for one or both railways
- Category 6 Eastern bypass at HST geometry for one or both railways

5.2 Alternative Development and Design Assumptions

All alternatives have been developed with the assumption that there would be independent dispatching and operation of BNSF and UP. Each railway would own its own right-of-way, and there would be no shared trackage or trackage rights agreements between BNSF and UP.

Category 1, along with a no-project alternative, defines potential improvements to the BNSF right-of-way, and includes both grade separations and a below-grade option.

All other categories (2 through 6) assume the following:

- Freight operations on the BNSF right-of-way (approximately between the BNSF junction with the SJV near Hammond Street and Avenue 9 north of the boundary of Madera and Fresno counties) would be discontinued. Under some alternatives, trackage on the current BNSF right-of-way was retained to serve Amtrak. If neither BNSF nor Amtrak required trackage north of the SJV junction, this area was assumed to be abandoned and made available for other uses.

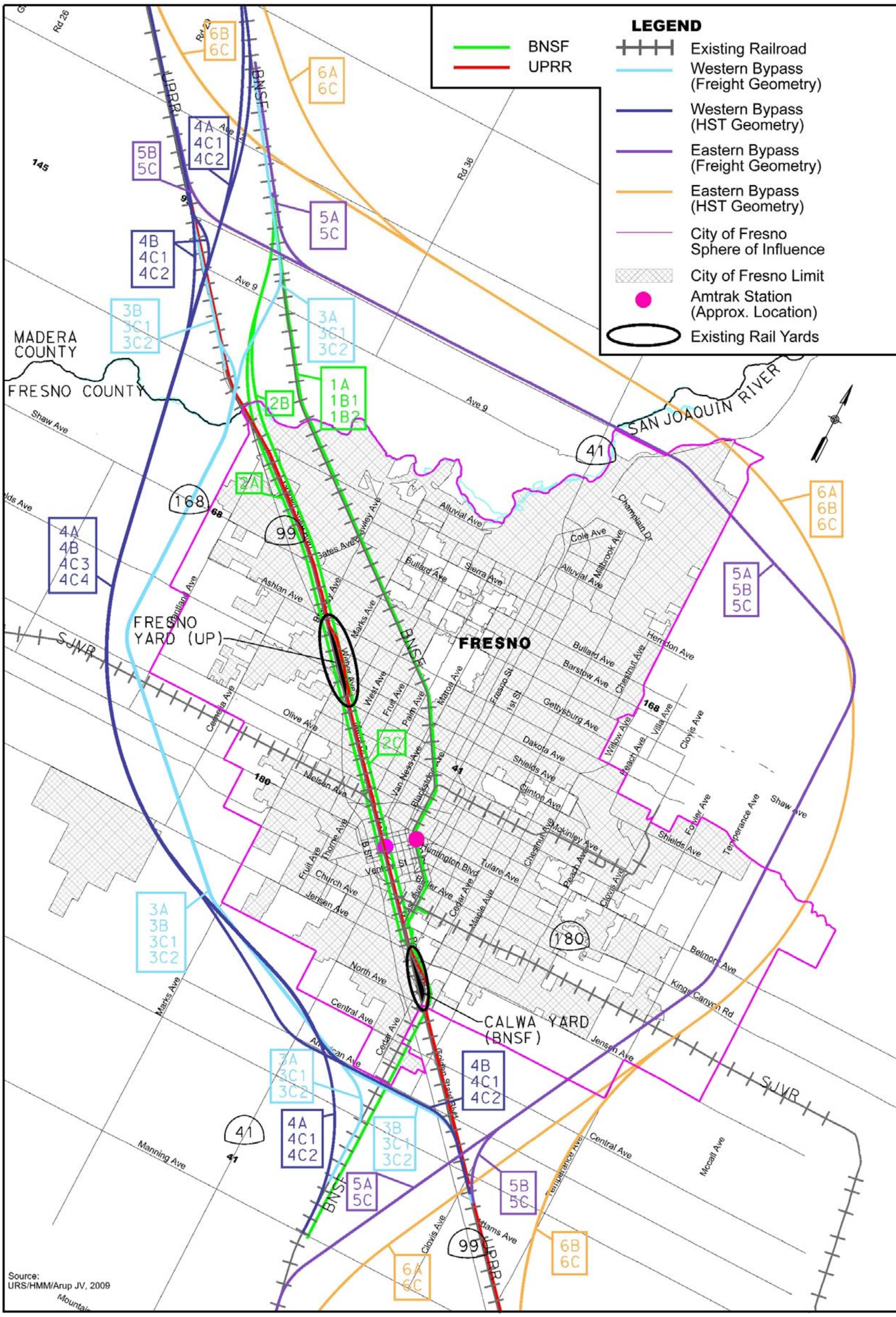
- All freight alignments, either through central Fresno or on a bypass, were assumed to be at grade, except as specified in Category 1.

- All new freight railway tracks were assumed to be built to FRA Class 4 standards for operation of freight trains at speeds up to 60 mph.[6]

- New right-of-way width requirements were based on the assumption that two tracks were provided for each railway, as well as room for additional track or sidings. This required right-of-way width was assumed to be 100 feet.

[6] Maximum allowable speed for passenger Trains under FRA Class 4 standards is 80 mph. http://www.fra.dot.gov/downloads/PubAffairs/track_standards_fact_sheet_FINAL.pdf

Figure 12 – Initial Alternatives



12/10/09 vsa ..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 12_init alts_11x17.ai

- Roadway grade separations were assumed for the bypass options at major arterials. Minor streets were assumed to be rerouted or closed. This would not result in any additional at-grade crossings for bypass options. Some alternatives would also include grade separations for alignments through central Fresno.

- It was assumed that Amtrak would continue to operate through central Fresno. If BNSF operates through Fresno, either on its current alignment or within the current UP right-of-way, Amtrak would operate on BNSF trackage. If BNSF is relocated outside of Fresno onto a bypass and UP continues to operate on its existing right-of-way within Fresno, Amtrak was assumed to operate on the existing BNSF alignment, on the bypass, or on a dedicated track in the UP alignment but outside of the current UP right-of-way.

- If either UP or BNSF are located on a bypass and access to their current yards is no longer feasible, new yards were assumed to be constructed on the bypass somewhere north of the SJV trackage and south of the San Joaquin River.

- For alternatives where both BNSF and UP are on a bypass, at least one track through central Fresno would be reserved for use by Amtrak and for access to local shippers. Ownership of this track could reside with a public agency.

5.2.1 Conceptual Engineering Assumptions

This is a planning-level study, and as such entailed no more than conceptual engineering on alignments in plan and cross sections (see Appendix A and Section 6.1.2). For freight rail-only alignments, standard AREMA Class 4 configurations were assumed, and have been referred to as "Freight Geometry". For alignments that may be shared with HST in the future, curve radii and other elements as specified by the CHSRA were assumed in order to not preclude future HST options, and have been referred to as "HST Geometry". Base mapping that was used for the HST project was used for this work, and all engineering work is compatible.

5.2.2 Assumptions Concerning High-Speed Train

Consistent with the studies currently underway for the HST system, this study has assumed initially that the HST system would be located on its own right-of-way outside of the freight railroad rights-of-way, and would be designed to the standards articulated by the CHSRA.

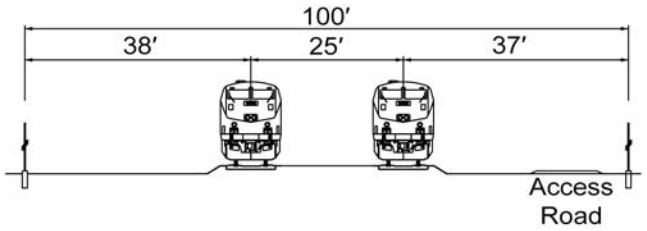
5.2.3 Conceptual Cross Sections

Each alternative can be represented by some combination of the following three cross sections:

- UP only on a 100-foot right-of-way (Figure 13);
- BNSF only on a 100-foot right-of-way (Figure 14);
- UP adjacent to BNSF, each with a 100-foot right-of-way for a total 200-foot-wide right-of-way (Figure 15); and
- UP adjacent to BNSF, minimum CPUC right-of-way requirements, 130-foot-wide total right-of-way (Figure 16).

For this study, it was assumed that each railroad required a 100-foot right-of-way, whether the railroad was on a bypass or was operating through central Fresno. Yard locations required

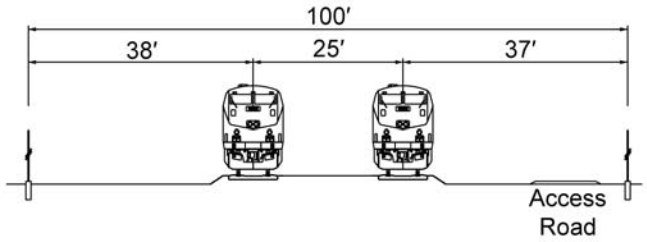
Figure 13 – UP Right-of-Way



Source:
URS/HMM/ARUP JV, 2009.

12/10/09 vsa..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 13_UP rowg.ai

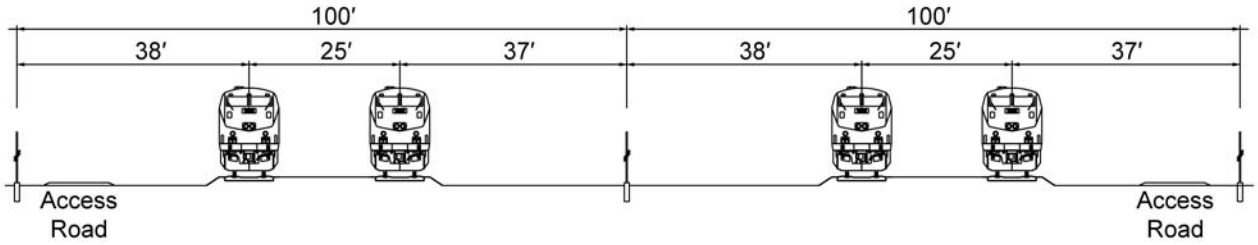
Figure 14 – BNSF Right-of-Way



Source:
URS/HMM/ARUP JV, 2009.

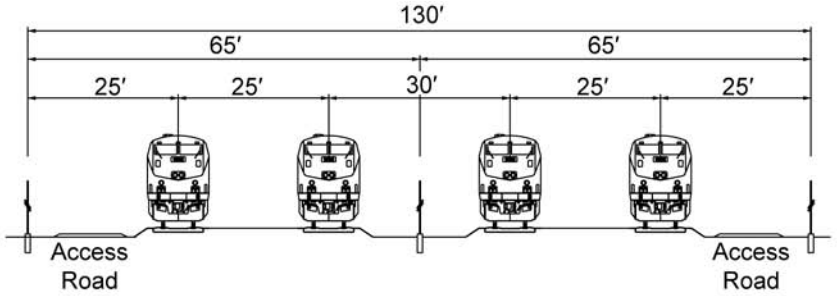
12/10/09 vsa..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 14_BNSF row.ai

Figure 15 – BNSF and UP Right-of-Way



Source:
URS/HMM/ARUP JV, 2009.
12/10/09 vsa ..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 15_UP-BNSF on bypass.ai

Figure 16 – BNSF and UP Right-of-Way – Minimum



Source:
URS/HMM/ARUP JV, 2009.
12/10/09 vsa..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 16_BNSF-UP_min.ai

a wider right-of-way, and have been included in the GIS analysis of the environmental factors in Section 6.3.5.

It may be possible in a future process to negotiate reduced right-of-way requirements in specific cases, and therefore one alternative with a smaller right-of-way requirement was analyzed. However, for the remaining alternatives the maximum right-of-way requirements as stated by the railroads have been assumed. Any reduction in right-of-way requirements would reduce impacts, and therefore the assumptions used in this study have assumed the worst-case scenario.

Figure 16 shows the potential cross-section for a condition in which the freight railroads might agree to narrower rights-of-way for each railroad, due to site constraints or to minimize impacts or costs. The separations in this cross-section meet the CPUC clearance requirements in General Order 26-D, but are not as wide as currently desired by the railroads in most situations. The narrower right-of-way could limit expandability of the railroads in the future, and does not include maintenance access roads between the two railroads.

5.3 Description of Alternatives

The alternatives are described in this section from north to south through the study area. See Figure 12.

5.3.1 Category 1: No Realignment

Under this category of alternatives, freight operations were not consolidated or realigned, and BNSF and UP continued to operate on existing rights-of-way. This category includes alternatives with improvements on the BNSF right-of-way, with BNSF being retained on its current alignment. This category includes the following alternatives.

Alternative 1A: No Project

Under this alternative, BNSF and UP would continue to operate on current alignments. There would be no alignment consolidation or changes to current operations. Amtrak would remain on the BNSF trackage, serving the existing Fresno station. This alternative would:

- Not eliminate at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

Alternative 1B1: BNSF in Retained-Cut (Trench) on Current Right-of-Way

Under this alternative, both BNSF and UP would continue to operate on current alignments. The BNSF right-of-way would be reconstructed within a trench north of the SJV, and would return to grade north of Fresno at a point to be determined. Amtrak would continue to serve Fresno on the BNSF alignment. UP would continue to operate as it does today. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

Alternative 1B2: BNSF with Grade Separations

Under this alternative, both BNSF and UP would continue to operate on current alignments, but with grade separations at major roadways (in an area located approximately between the BNSF junction with the SJV near Hammond Street and Avenue 2 north of the boundary of Madera and

Fresno counties). Amtrak would continue to serve Fresno on the BNSF alignment. UP would continue to operate as it does today. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

5.3.2 Category 2: Parallel Realignment through Central Fresno

This category of alternatives would realign BNSF adjacent to UP to the extent possible within the current UP right-of-way. These alternatives assume that both BNSF and UP would be at-grade through central Fresno, and that as a result of the increase in number of trains along the current UP right-of-way, due to both railways operating, all at-grade crossings along these alignments would need to either be grade-separated or closed to access from adjacent streets. This category includes the following alternatives:

Alternative 2A: BNSF West of UP

Under this alternative, the existing BNSF alignment would be realigned west of UP within central Fresno. The BNSF would divert from its existing alignment north of Avenue 9 and would cross over the existing UP alignment in the vicinity of the San Joaquin River. South of the San Joaquin River, the BNSF would be aligned to the west of the existing UP alignment, eventually reconnecting to the existing BNSF alignment at Calwa Yard. UP operations would be unchanged from north of Fresno to the vicinity of the Calwa Yard. When the UP alignment reaches the Calwa Yard, it would be diverted around the east side of the yard, eliminating the current conflicts associated with rail crossings at the southern end of Calwa Yard. A new Amtrak station would be built along the new BNSF trackage through central Fresno, and all existing BNSF trackage north of the SJV connection would no longer be used for rail operations. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Eliminate 16 at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

Alternative 2B: BNSF East of UP

Under this alternative, the BNSF alignment would be realigned to the east of the existing UP alignment. The BNSF would divert from its existing alignment north of Avenue 9 and would realign adjacent to the UP alignment in the vicinity of the San Joaquin River. South of the San Joaquin River, the BNSF would be aligned to the east of the existing UP alignment continuing south through Fresno. At the UP Fresno Yard, the BNSF would follow the eastern side of the yard and would return to the UP alignment south of the yard. The BNSF would continue south and would reconnect with the Calwa Yard. UP would continue to operate as it does today. A new Amtrak station would be built along the new BNSF alignment in central Fresno, and all existing BNSF trackage north of SJV would no longer be used for rail operations. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Eliminate 16 at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

Alternative 2C: UP and BNSF through the Center of Town – Minimum Right-of-Way

Under this alternative, both the UP and BNSF would be realigned adjacent to the existing UP alignment in a way that would require the minimum potential right-of-way, assumed to be

approximately 130 to 135 feet. This alternative would require extensive negotiations with the railroads to realign UP within its own right-of-way, and to sell a portion of its right-of-way to BNSF. In this alternative, BNSF would be placed onto a new right-of-way that would be partially on land formerly owned by UP, and some land that would be acquired. This alternative would meet the CPUC requirements for clearances, but may not meet the more generous widths desired by the railroads. Operationally, this alternative could function similarly to Alternatives 2A or 2B. This alternative is being evaluated in the Level 2 analysis to assess the reduced impacts of the narrower alignment footprint. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Eliminate 16 at-grade crossings on the UP alignment; and
- Not require the construction of any new rail yards.

5.3.3 Category 3: Western Bypass – Freight Geometry

This category comprises alternatives requiring the construction of a bypass to the west of Fresno where either one or both of BNSF and UP would be rerouted. These alternatives assume that the bypass would be built to FRA Class 4 standards for operation of freight trains at speeds up to 60 mph. The bypass is estimated to be approximately 28 miles in length and would require some construction in Madera County to connect UP and BNSF from their existing mainlines to their respective alignments on the bypass. This category would maintain trackage through central Fresno for local freight and Amtrak service, and includes the following alternatives:

Alternative 3A: BNSF on Western Bypass, UP through Central Fresno

Under this alternative, BNSF would be moved to the west of Fresno on a bypass. BNSF would diverge west from its current alignment north of Avenue 9 and would cross over the existing UP alignment in the vicinity of the San Joaquin River and then continue west, bypassing the city of Fresno. The BNSF would return to its existing alignment in the vicinity of Adams Avenue. This alternative would move the BNSF alignment away from Calwa Yard, and would require a new yard to be built for BNSF along the new alignment. UP would continue to operate as it does today. Amtrak would continue to serve Fresno, operating on the current BNSF trackage; however, freight operations north of the SJV on the current BNSF alignment would be discontinued. This alternative would:

- Not eliminate at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Require the construction of a new rail yard.

Alternative 3B: BNSF through Central Fresno, UP on Western Bypass

Under this alternative, UP would relocate to a bypass west of Fresno, and BNSF would relocate onto the existing UP right-of-way through central Fresno. BNSF would diverge off of its current alignment north of Avenue 9 and realign onto the existing UP alignment, in the vicinity of the San Joaquin River. BNSF would then continue south through Fresno in the existing UP alignment and would reconnect with its existing alignment at Calwa Yard. The UP would diverge off of its current alignment north of Avenue 7 and would follow a new alignment west of the city of Fresno, returning to its existing alignment in the vicinity of American Avenue. This alternative would separate the UP mainline from its current yard, and would require a new UP yard to be constructed on the western bypass. Amtrak would relocate with BNSF to the existing UP right-of-way, and would require a new station in the vicinity of downtown Fresno.

Because the BNSF operates more trains on a daily basis than UP, the number of trains using at-grade crossings on the UP alignment would increase; it is assumed that this increase is not

enough to justify any new grade separations to this alignment. All freight rail and passenger rail operations north of the SJV on the current BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of a new rail yard.

Alternative 3C1: BNSF and UP on Western Bypass, BNSF West of UP

Under this alternative, both BNSF and UP would relocate to a bypass west of Fresno. The BNSF would divert from its alignment in the vicinity of Avenue 9, and the UP would divert from its alignment near Avenue 7. Both would then align onto a new alignment west of Fresno, and would return to their existing alignments south of Fresno. BNSF would operate to the west of UP on the bypass, and both railroads would have their own exclusive right-of-way adjacent to each other. This alternative would require the construction of two new rail yards—one for BNSF and one for UP—on the bypass. Amtrak would relocate to the current UP right-of-way through Fresno, and would require a new downtown station. All freight rail and passenger rail operations north of SJV on the BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of two new rail yards.

Alternative 3C2: BNSF and UP on Western Bypass, BNSF East of UP

This alternative would be identical to Alternative 3C1, except that BNSF would operate to the east of UP.

5.3.4 Category 4: Western Bypass – High-Speed Train Geometry

This category comprises alternatives under which a bypass would be constructed to the west of Fresno. Either BNSF or UP, or both, would be rerouted onto it. This alternative category assumed that the bypass would be built to geometry for 250 mph HST operations and would be approximately 33 miles in length. While this would offer less flexibility in terms of a bypass alignment, it would allow the railways to co-locate with a potential future HST bypass, reducing future potential impacts of the project. However these alternatives would require construction in Madera County to connect UP and BNSF from their existing mainlines to their respective bypasses. This trackage construction within Madera County would be comparatively longer than the required trackage construction for bypass alignment at freight geometry. This alternative category will maintain trackage through central Fresno for local freight and Amtrak service. This category includes the following alternatives:

Alternative 4A: BNSF on Western Bypass, UP through Central Fresno

Under this alternative, BNSF would be relocated to the west of Fresno on a bypass. BNSF would diverge west from its current alignment in the vicinity of Avenue 15, cross over the existing UP alignment in the vicinity of Avenue 9, and continue west, bypassing the city of Fresno. The BNSF would return to its existing alignment in the vicinity of Manning Avenue. This alternative would move the BNSF alignment away from Calwa Yard, and would require a new yard to be built for BNSF along the new alignment. UP would continue to operate as it does today. Amtrak would continue to serve Fresno operating on the current BNSF trackage; however, freight operations north of the SJV on the current BNSF alignment would be discontinued. In both alternatives,

BNSF would converge back with its mainline in the vicinity of the Madera County line. This alternative would:

- Not eliminate at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Require the construction of a new rail yard.

Alternative 4B: BNSF through Central Fresno, UP on Western Bypass

Under this alternative, UP would relocate to a bypass west of Fresno, and the BNSF would relocate onto the existing UP right-of-way. BNSF would diverge off of its current alignment north of Avenue 9 and realign onto the existing UP alignment in the vicinity of the San Joaquin River. BNSF would then continue south through Fresno in the existing UP alignment, and would reconnect with its existing alignment at Calwa Yard. The UP would diverge off of its current alignment north of Avenue 9 and would follow a new alignment west of the city of Fresno, returning to its existing alignment in the vicinity of American Avenue.

Because the BNSF operates more trains on a daily basis than UP, the number of trains using at-grade crossings on the UP alignment would increase. However, it is assumed that this increase is not enough to justify any new grade separations to this alignment. All freight rail and passenger rail operations north of the SJV on the current BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown Amtrak passenger station; and
- Require the construction of a new rail yard.

Alternative 4C1: BNSF on Western Bypass, BNSF West of UP, UP on Western Bypass

Under this alternative, both BNSF and UP would relocate to a bypass west of Fresno. The BNSF would divert from its alignment in the vicinity of Avenue 15, and the UP would divert from its alignment near Avenue 9. Both would then align onto new alignment west of Fresno and would return to their existing alignments south of Fresno. BNSF would operate to the west of UP on the bypass, and both railroads would have their own exclusive right-of-way adjacent to each other. This alternative would require the construction of two new rail yards, one for BNSF and one for UP, on the bypass. Amtrak would relocate to the current UP right-of-way through Fresno, and would require a new downtown station. All freight rail and passenger rail operations north of SJV on the BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown Amtrak passenger station; and
- Require the construction of two new rail yards.

Alternative 4C2: BNSF and UP on Western Bypass, BNSF East of UP

This alternative would be identical to Alternative 4C1, except that BNSF would be located to the east of UP.

5.3.5 Category 5: Eastern Bypass – Freight Geometry

This category of alternatives comprises the construction of a bypass to the east of Fresno where either BNSF or UP, or both, would be rerouted. This alternative category assumes that the bypass would be built to FRA Class 4 standards for operation of freight trains at speeds up to

60 mph, and would be up to 44 miles in length. This alternative category would maintain trackage through central Fresno for local freight and Amtrak service. This category includes the following alternatives:

Alternative 5A: BNSF on Eastern Bypass, UP through Central Fresno

Under this alternative, BNSF would relocate to a bypass east of Fresno, and UP would continue to operate as it does currently. BNSF would diverge from its existing alignment in the vicinity of Avenue 12, follow an alignment to the east of Fresno, and return to its existing alignment south of Manning Avenue. This alternative separates BNSF from its Calwa Yard, and would require the construction of a new yard on the bypass. The existing BNSF right-of-way through Fresno would continue to be used for Amtrak service, but all freight operations north of the SJV spur would be discontinued. This alternative would:

- Not eliminate at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Require the construction of a new rail yard.

Alternative 5B: BNSF through Central Fresno, UP on Eastern Bypass

Under this alternative, UP would relocate to a bypass east of Fresno, and BNSF would relocate onto the existing UP right-of-way through central Fresno. BNSF would diverge off of its current alignment north of Avenue 9 and realign onto the existing UP alignment in the vicinity of the San Joaquin River. BNSF would then continue south through Fresno in the existing UP alignment and would reconnect with its existing alignment at Calwa Yard. UP would diverge from its existing alignment in the vicinity of Avenue 10, follow an alignment to the east of Fresno, and return to its existing alignment near Adam Avenue. This alternative would separate UP from its Fresno Yard and would require the construction of a replacement yard on the bypass. Amtrak would relocate with BNSF to the existing UP right-of-way, and would require a new station in the vicinity of downtown Fresno. All freight rail and passenger rail operations on the BNSF alignment through Fresno north of the SJV would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of a new rail yard.

Alternative 5C: BNSF and UP on Eastern Bypass

Under this alternative, both BNSF and UP would relocate to a bypass east of Fresno. The BNSF would divert from its alignment in the vicinity of Avenue 12, and the UP would divert from its alignment near Avenue 9. Both would then align onto a new alignment east of Fresno, and would return to their existing alignments south of Fresno. Both railroads would have their own exclusive rights-of-way adjacent to each other. This alternative would require the construction of two new rail yards—one for BNSF and one for UP—on the bypass. Amtrak would relocate to the current UP right-of-way through Fresno, and would require a new downtown station. All freight rail and passenger rail operations north of SJV on the BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of two new rail yards.

5.3.6 Category 6: Eastern Bypass – High-Speed Train Geometry

This category of alternatives comprises the construction of a bypass to the east of Fresno, where either BNSF or UP, or both, would be rerouted. This alternative category assumes that the bypass would be built to geometry for 250 mph HST operations and would be approximately 59 miles in length. While this would offer less flexibility in terms of a bypass alignment, it would allow co-location of freight and HST alignments, reducing future potential impacts and costs of the project. This alternative category would maintain trackage through central Fresno for local freight and Amtrak service. This category includes the following alternatives:

Alternative 6A: BNSF on Eastern Bypass, UP through Central Fresno

Under this alternative, BNSF would relocate to a bypass east of Fresno, and UP would continue to operate as it does currently. BNSF would diverge from its existing alignment north of Avenue 15, follow an alignment to the east of Fresno, and would return to its existing alignment far south of Manning Avenue. This alternative separates BNSF from its Calwa Yard, and would require the construction of a new yard on the bypass. The existing BNSF right-of-way through Fresno would continue to be used for Amtrak service, but all freight operations north of the SJV spur would be discontinued. This alternative would:

- Not eliminate at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment; and
- Require the construction of a new rail yard.

Alternative 6B: BNSF through Central Fresno, UP on Eastern Bypass

Under this alternative, UP would relocate to a bypass east of Fresno, and BNSF would relocate onto the existing UP rights-of-way through central Fresno. BNSF would diverge off of its current alignment north of Avenue 9 and realign onto the existing UP alignment in the vicinity of the San Joaquin River. BNSF would then continue south through Fresno in the existing UP alignment and would reconnect with its existing alignment at Calwa Yard. UP would diverge from its existing alignment in the vicinity of Avenue 15, follow an alignment to the east of Fresno, and return to its existing alignment near Manning Avenue. This alternative would separate UP from its Fresno Yard, and would require the construction of a replacement yard on the bypass. Amtrak would relocate with BNSF to the existing UP right-of-way, and would require a new station in the vicinity of downtown Fresno. All freight rail and passenger rail operations on the BNSF alignment through Fresno north of the SJV would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of a new rail yard

Alternative 6C– BNSF and UP on Eastern Bypass

Under this alternative, both BNSF and UP would relocate to a bypass east of Fresno. The BNSF would divert from its alignment north of Avenue 15 and the UP would divert from its alignment near Avenue 15. Both would then align onto a new alignment east of Fresno, and would return to their existing alignments south of Fresno. Both railroads would have their own exclusive rights-of-way adjacent to each other. This alternative would require the construction of two new rail yards, one for BNSF and one for UP, on the bypass. Amtrak would relocate to the current UP right-of-way through Fresno and would require a new downtown station. All freight rail and passenger rail operations north of SJV on the BNSF alignment would be discontinued. This alternative would:

- Eliminate 16 at-grade crossings on the BNSF right-of-way;
- Not eliminate at-grade crossings on the UP alignment;
- Require construction of a new downtown passenger station; and
- Require the construction of two new rail yards.

5.3.7 Alternatives Considered and Rejected

As part of the development of initial alternatives, a number of alignments were considered but rejected because they would be likely to result in substantial community impacts but did not offer any greater contribution to the achievement of the purpose and need when compared to other alternatives. These are described below:

Stacked Configuration (HST above Freight), through Central Fresno

This alignment would have some combination of BNSF and UP at-grade or below grade, on an alignment paralleling the current UP corridor. HST could then potentially be elevated above both railroads on a large structure which straddles the corridor. However, both at-grade or below grade alignments would require costly and complex construction, which may have impacts no less severe than those incurred by Through Central Fresno Alternatives (2A, 2B, and 2C).

Short Western Bypass (HST Geometry), Connecting North of Calwa Yard

This alignment would include some combination of BNSF and UP on a short western bypass at HST geometry, running north-south through central Fresno, west of the existing UP alignment, starting north of the Calwa Yard to past the San Joaquin River.

Short Western Bypass (Freight Geometry), Connecting North of Calwa Yard

This alignment would include some combination of BNSF and UP on a short western bypass at freight geometry, running north-south through central Fresno, west of the existing UP alignment, starting north of the Calwa Yard to past the San Joaquin River.

Short Eastern Bypass (HST Geometry), Connecting North of Calwa Yard

This alignment would include some combination of BNSF and UP on a short eastern bypass at HST geometry, running north-south through central Fresno, east of the existing BNSF alignment, starting north of the Calwa Yard to past the San Joaquin River.

Short Eastern Bypass (Freight Geometry), Connecting South of Calwa Yard

This alignment would include some combination of BNSF and UP on a short eastern bypass at freight geometry, running north-south through central Fresno, east of the existing BNSF alignment, starting north of the Calwa Yard to past the San Joaquin River.

Under these alternatives, it was assumed that the BNSF and UP tracks could be situated either east or west of the other railway. All of the short western and eastern bypass alternatives would require the construction of several miles of new bypass within existing commercial and residential areas in the City of Fresno. This would necessitate considerable property acquisition and demolition, with associated community impacts during both construction and operation. These impacts would include community disruption associated with traffic; noise and vibration during construction; and socioeconomic impacts associated with acquisition of property and construction of a major new rail alignment within an existing urban area. In addition, the short bypass alternatives do not offer any substantial achievement of the purpose and need over and above that offered by other less impacting alternatives. For these reasons, the short bypass alternatives were rejected and alternatives were not advanced into the Initial Screening analysis.

6.0 EVALUATION OF ALTERNATIVES

6.1 Methodology

6.1.1 Level 1 Screening

Initial screening focused on determining whether an alternative met the purpose and need, as described in Section 3.0. The evaluation considered both the primary project objectives and the secondary project objectives for each alternative.

Initial screening used a qualitative approach to assess the potential of the initial alternatives to meet the purpose and need. Alternatives that were determined to be responsive to the purpose and need were carried forward into the more detailed Level 2 Analysis.

The project primary and secondary objectives were used to develop initial screening criteria, which are presented in Table 5.

Alternatives were evaluated based on how each alternative performed against each of the screening criteria using the following qualitative approach:

- **Positive (+2).** Alternative fully supports the purpose and need or additional project benefit being evaluated;
- **Partial Positive (+1).** Alternative primarily partially contributes to the purpose and need or additional project benefit being evaluated, but has some detracting secondary features;
- **Neutral (0).** Alternative does not support or detract from the purpose and need or additional project benefit being evaluated;
- **Partial Negative (-1).** Alternative primarily partially detracts from the purpose and need or additional project benefit being evaluated, but has some positive secondary features; and
- **Negative (-2).** Alternative fully detracts from the purpose and need or additional project benefit being evaluated.

Although the approach was based on the assignment of numbers to allow scoring of each alternative against the criteria, no ranking was implied, nor should ranking be inferred, from the Initial Screening. The methodology did allow the project's primary purpose and need objectives (see Section 3.3) to be given greater significance than the project's secondary purpose and need objectives (see Section 3.4) in the evaluation of project alternatives. An alternative that did not make any contribution to the primary purpose and need objectives therefore received a partially (-1) or fully (-2) negative score. With respect to a project's secondary objectives, which can be seen as an additional reason for the project but which is not the primary motivator for the project, an alternative that did not make any contribution to the secondary project objectives received a neutral score (0). An alternative only received a partially or fully negative score (-1 or -2) if it worsened the current conditions.

The rationales used to assess each alternative against the criteria are presented in Table 6.

Table 5 – Initial Screening Criteria

Criteria	Elements Considered
Purpose and Need – Primary Objectives	
Results in the improvement of pedestrian and vehicle safety	• Elimination of grade crossings • Reduction in freight train operations through central Fresno • Reduced delays to emergency vehicles at grade crossings
Results in substantial reduction in traffic, congestion, and delay	• Reduction of vehicle delay time at-grade crossings • Reduction of air quality and public health impacts due to the exhaust *from idling vehicular traffic at-grade crossings*.
Reduces or eliminates adverse community impacts	• Reduction of noise in residential neighborhoods • Reductions in ground-borne vibrations in residential neighborhoods • Reduction of air quality and public health impacts due to the exhaust from diesel electric locomotives operating through residential neighborhoods. • Reduction of residential community divisions caused by presence of railway alignment.
Purpose and Need – Secondary Objectives	
Results in substantial improvements in railway operational capacity and/or performance	• Potential increase in number of tracks available for through railway operations • Effect on the number of level railway-to-railway crossings • Effect on track grades • Effect on all needed connections to shortlines and shippers • Effect on rail miles • No net increase in railway operating, maintenance or ownership costs.
Supports potential future economic development in areas designated/ intended for industrial/commercial growth	• Creation of economic development opportunities in designated/intended locations
Allows for reuse/redevelopment of BNSF ROW	• Provision of opportunities for community uses and/or redevelopment of the BNSF ROW
Accommodates and optimizes future HST implementation.	• Creation of space in central Fresno for future HST alignment • Enable a downtown Fresno intermodal station (HST, Amtrak, transit, etc.)
Notes: BNSF = BNSF Railway HST = High-Speed Train	

Table 6 – Level 1 Screening Rationale

Score	Meets Project Purpose and Need Primary Objectives			Meets Project Purpose and Need Secondary Objectives			
	Results in the Improvement of Pedestrian and Vehicle Safety	**Results in Substantial Reduction in Traffic Congestion and Delay**	**Reduces or Eliminates Adverse Community Impacts**	**Results in Substantial Improvements in Railway Operational Capacity and/or Performance**	**Supports Potential Future Economic Development in Areas Designated and/or Intended for Industrial/Commercial Growth by the City of Fresno**	**Allows for Reuse of Abandoned Railway ROW**	**Enables Future Accommodation of High-Speed Rail**
Elements Considered	• Elimination of grade crossings. • Reduction in train operations through central Fresno on at-grade crossings.	• Reduction of vehicle delay time at-grade crossings. • Improvement in air quality through reduction of vehicular traffic delayed at crossings. • Reduced delays to emergency vehicles at grade crossings.	• Reduction of noise in residential neighborhoods. • Reductions in ground-borne vibrations in residential neighborhoods. • Presence of railway in residential area. • Reduction of residential community divisions caused by presence of railway alignment. • Avoids creating additional impacts to existing residential neighborhoods.	• Increase in main track capacity. • No increase in the number of level railway-to-railway crossings. • No increase in track grades. • Maintains all needed connections to shortlines and shippers. • No net increase in railway operating, maintenance, or ownership costs	• Creation of economic development opportunities in designated commercial/industrial growth areas.	• BNSF ROW is abandoned north of SJV and available for redevelopment and/or community use.	• Creates space in central Fresno for HST. • Allows Amtrak to serve central Fresno HST station location. • Clears ROW through Fresno for HST from San Joaquin River to Calwa. • Geometry of bypass.
Positive (2)	• Elimination of all at-grade crossings except where track must remain to serve local industry switching. Applies if BNSF and UP on bypass, or UP on bypass and BNSF through Fresno on UP right-of-way with all UP grade crossings eliminated.	• Elimination of delay times and air quality impacts due to grade crossings, except as required for local switching. Applies if BNSF and UP on bypass, or UP on bypass and BNSF through Fresno on UP right-of-way, or UP and BNSF on UP right-of-way with all UP grade crossings eliminated.	• Eliminates all adverse community impacts and does not create new additional community impacts. Maximum score assumes BNSF and UP on western bypass south of Calwa and all adverse community impacts in central Fresno are eliminated.	• Significant increase in capacity, operating flexibility and performance. Applies to all bypass options, and if UP is on a bypass and BNSF occupies the UP right-of-way. Requires replacement yard(s) for any carrier on a bypass.	• Likely to induce industrial/commercial growth in areas designated/intended for development.	N/A	• Provides space for four-track HST alignment in central Fresno and allows Amtrak to serve same station location.
Partial Positive (1)	• Significant reduction in the number of at-grade crossings not needed to support local switching and significant reduction in freight traffic and Amtrak using existing at-grade crossings. Applies if BNSF on bypass; UP on current right-of-way.	• Significant reduction in delay times and air quality impacts due to grade crossings, except as required for local switching. Applies if BNSF on bypass; UP on current right-of-way.	• Significant reduction in adverse community impacts and does not create new additional community impacts.	• Modest to minimal increase in capacity, operating flexibility and performance. Applies if BNSF and UP both occupy UP ROW, and if yards remain where they are now.	• May induce industrial/commercial growth in areas designated/intended for development.	• BNSF ROW is available for alternate/ community uses.	• Provides space for two-track HST alignment in central Fresno and allows Amtrak to serve same station location. Compatible with HST bypass options.
Neutral (0)	• Reduction in the number of grade crossings and some reduction in freight traffic and Amtrak using existing at-grade crossings. Applies if BNSF and UP both occupy UP alignment and UP grade crossings remain.	• Reduction in delay times and air quality impacts due to grade crossings, except as required for local switching and some through freight traffic using existing crossings. Applies if BNSF and UP both occupy UP corridor and UP grade crossings remain.	• Significant reduction of existing community impacts, but may create minor additional new impacts in new areas.	• No net change to capacity, flexibility and performance. Applies to no-project alternatives	• No influence on growth.	• BNSF ROW is not available for alternate/community uses.	• Provides space for two-track HST alignment in central Fresno and allows Amtrak to serve same station location. Bypass not compatible with HST options. Assume two BNSF tracks, UP on bypass at freight geometry.
Partial Negative (-1)	• No reduction in the number of grade crossings, some reduction in freight traffic using existing at-grade crossings. Applies if BNSF freight trains move, Amtrak does not, and UP remains as it is.	• Slight reduction in delay times and air quality impacts due to grade crossings, except as required for local switching, some through freight traffic and Amtrak using existing crossings. Applies if BNSF on bypass, Amtrak remains on BNSF, and UP remains as it is.	• Reduction in some existing community impacts, but creates additional major impacts in new areas.	• Minimal reduction in capacity, operating flexibility and performance. Applies to any alternative that is slower, longer, and/or single track.	• May induce industrial/commercial growth in areas not designated/intended for development, including residential areas.	N/A	• Creates obstacles for HST serving central Fresno, but does allow Amtrak to serve same station location. Minor incompatibilities with HST bypass options. Assume two BNSF and two UP tracks.
Negative (-2)	• No reduction in the number of grade crossings and no reduction in freight traffic and Amtrak using existing at-grade crossings. Applies to no-project alternative.	• No reduction in delay times and air quality impacts due to grade crossings. Applies to no-project alternative.	• No reduction of community impacts, and/or creates substantial new impacts from major construction of route in urban area.	• Notable to substantial reduction in capacity, operating flexibility or performance e.g., substantially increased journey time. Applies to any alternative that is slower, longer, single track, or that cuts either carrier off from their existing yard.	• Likely to induce industrial/commercial growth in areas not designated/intended for development, including residential areas.	N/A	• Creates significant obstacles for HST serving central Fresno, and does not allow Amtrak to serve same station location. Incompatible with HST bypass options.

Notes:
BNSF = BNSF Railway
HST = High-Speed Train
N/A = Not Applicable
SJV = San Joaquin Valley Railroad
USFWS = U.S. Fish and Wildlife Service

6.1.2 Level 2 Analysis

Alternatives carried forward from the initial screening process (Level 1 screening) were subjected to Level 2 analysis, based on a more in-depth look at technical details of the proposed project and their estimated impacts. Level 2 analysis focused on preliminary assessment and characterization based on identifying potential issues and impacts. The analysis has been grouped into three overall categories:

- Costs (construction and socioeconomic);
- Rail operations; and
- Environmental resources.

This analysis was a mix of quantitative and qualitative analyses. The analysis of environmental resources was based on GIS data that has been mapped and tabulated.

These issues, along with railroad company ownership issues and implementation issues, informed the final evaluation of alternatives. The Level 2 analysis was not intended to score and recommend any one alternative in particular, but to characterize each alternative in enough detail to inform future study and decision-making.

The Level 2 analysis conducted in this report is described in detail in Section 6.3.2 (Capital Costs), Section 6.3.3 (Socioeconomics), Section 6.3.4 (Rail and Operations), and Section 6.3.5 (Environmental Considerations).

In the Level 2 analysis, an assumption was made in one area that differs slightly from the Level 1 screening. In Level 1, the assumption with respect to grade crossings in central Fresno was that if any change was made central Fresno, then all existing grade crossings would be grade-separated. This assumption has been modified in Level 2. In Level 2, all existing grade crossings in the UP alignment were assumed to be grade-separated if a railroad is added to the alignment, but not if BNSF was simply substituted for the UP, with UP moved to a new alignment.

6.2 Level 1 Screening Results

The results of Initial Screening are presented in Table 7.

Alternative 1A: No Project

This is the no-project or baseline alternative, and was carried forward for analysis as a control for comparison with any of the build alternatives. This alternative does not make any contribution to the project's purpose and need.

Alternative 1B.1: BNSF in Retained Cut (Trench) on Current Right-of-Way

This alternative made some contribution to the purpose and need primary objectives when compared to the no-project alternative, because the location of BNSF in a trench for part of its length would have beneficial effects on pedestrian and vehicle safety, traffic congestion, and community impacts in the northern parts of Fresno. However, this alternative would still require surface operation in the downtown area because of existing junctions and therefore would not fully address the purpose and need in these locations. This alternative would introduce varying grades onto the BNSF line as a result of elevation changes at each end of the trench, adversely impacting railway operations. This alternative also does not contribute to the purpose and need secondary project objectives for economic development, because it would not allow for redevelopment of the BNSF Right-of-Way, and would not allow for future accommodation of HST. Amtrak would continue to serve Fresno on the BNSF alignment.

This alternative was not carried forward to Level 2 analysis.

Alternative 1B.2: BNSF on Existing Right-of-Way with Grade Separations

This alternative made some contribution to the purpose and need objectives when compared to the no-project alternative, because grade-separating all roadways crossing BNSF would reduce some impacts in the northern parts of Fresno. However, this alternative still requires surface operation in the downtown area because of existing junctions and therefore would not fully address the purpose and need in these locations. Although this alternative would address vehicle and pedestrian safety and traffic congestion, the adverse community effects associated with the operation of freight trains in central Fresno, including diesel emissions and noise and vibration, would still be present. This alternative does not contribute to the purpose and need secondary project objectives, such as facilitating potential economic development and allowing for redevelopment of the BNSF Right-of-Way or potential future accommodation of HST. Amtrak would continue to serve Fresno on the BNSF alignment.

This alternative was not carried forward to Level 2 analysis.

Alternative 2A: BNSF Moved Adjacent to Existing UP Alignment West of UP, UP Remains in Existing Alignment

This alternative contributed to the achievement of two of the purpose and need objectives; reducing traffic congestion, and improving vehicle and pedestrian safety. This was dependent on the assumption that when BNSF is realigned adjacent to the UP alignment, all remaining grade crossings in the UP alignment would be grade-separated. This alternative would increase freight train operation through central Fresno, but would transfer it to a primarily industrial corridor, which would eliminate many of the adverse existing impacts associated with existing BNSF operations in residential areas. This alternative would also improve rail capacity by increasing the number of BNSF tracks through Fresno and would allow for redevelopment of the BNSF ROW. This alternative does not contribute to the purpose and need secondary project objectives, such as facilitating potential economic development or allowing for potential future accommodation of HST. This alternative would allow for Amtrak to continue serving downtown Fresno, but would require a new station somewhere along the new BNSF alignment.

This alternative was carried forward to Level 2 analysis.

Alternative 2B: BNSF Moved Adjacent to Existing UP Alignment East of UP, UP Remains in Existing Alignment

Results of the evaluation of this alternative are identical to those for Alternative 2A.

This alternative was carried forward to Level 2 analysis.

Alternative 2C: BNSF Moved Adjacent to Existing UP Alignment East of UP, UP Remains in Existing Alignment, both BNSF and UP realigned into a minimum ROW configuration

Results of the evaluation of this alternative were similar to those for Alternative 2A, except this alternative would better facilitate the use of HST through Fresno.

This alternative was carried forward to Level 2 analysis.

Table 7 – Level 1 Screening Results

		No Realignment			Realignment through Fresno			Western Bypass Freight Geometry			Western Bypass HST Geometry			Eastern Bypass Freight Geometry			Eastern Bypass HST Geometry		
		1A	1B1	1B2	2A	2B	2C	3A	3B	3C1, 2	4A	4B	4C1, 2	5A	5B	5C	6A	6B	6C
Screening Criteria		No Project	BNSF on Existing Right-of-Way in Trench	BNSF on Existing Right-of-Way with Grade Separations	BNSF West of UP, UP as Is	BNSF East of UP, UP as Is	BNSF East of UP, minimum ROW	BNSF on Bypass, UP in Central Fresno	BNSF in Central Fresno, UP on Bypass	BNSF and UP on Bypass	BNSF on Bypass, UP through Town	BNSF in Central Fresno, UP on Bypass	BNSF and UP on Bypass	BNSF on Bypass, UP in Central Fresno	BNSF in Central Fresno, UP on Bypass	BNSF and UP on Bypass	BNSF on Bypass, UP in Central Fresno	BNSF in Central Fresno, UP on Bypass	BNSF and UP on Bypass
Primary Purpose and Need Objectives	**Results in the improvement of pedestrian and vehicle safety**	Negative (-2)	Partial Positive (+1)	Partial Positive (+1)	Positive (+2)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)
	Results in substantial reduction in traffic congestion and delay	Negative (-2)	Partial Positive (+1)	Partial Positive (+1)	Positive (+2)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)	Partial Negative (-1)	Positive (+2)	Positive (+2)
	Reduces and or/eliminates adverse community impacts	Negative (-2)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)	Positive (+2)	Partial Positive (+1)	Partial Positive (+1)	Positive (+2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)
Secondary Purpose and Needs Objectives	**Results in substantial improvements in railway operational capacity and/or performance**	Neutral (0)	Partial Negative (-1)	Partial Negative (-1)	Partial Positive (+1)	Partial Positive (+1)	Partial Positive (+1)	Positive (+2)	Positive (+2)	Positive (+2)	Positive (+2)	Positive (+2)	Positive (+2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)
	Supports potential future economic development	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Positive (+2)	Positive (+2)	Positive (+2)	Positive (+2)	Positive (+2)	Partial Positive (+1)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)	Negative (-2)
	Enables future accommodation of HST	Negative (-2)	Negative (-2)	Negative (-2)	Partial Negative (-1)	Partial Negative (-1)	Partial Positive (+1)	Negative (-2)	Neutral (0)	Positive (+2)	Negative (-2)	Partial Positive (+1)	Positive (+2)	Negative (-2)	Negative (-2)	Positive (+2)	Negative (-2)	Negative (-2)	Positive (+2)
	Allows for reuse of BNSF ROW	Neutral (0)	Neutral (0)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)	Partial Positive (+1)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)	Neutral (0)	Partial Positive (+1)	Partial Positive (+1)
LEVEL 1 SCREENING RESULTS		**-8**	**-1**	**-1**	**5**	**5**	**7**	**1**	**10**	**13**	**1**	**11**	**12**	**-10**	**-3**	**1**	**-10**	**-3**	**1**
Alternative Advances to Level 2 Screening (Score 2 or Higher)		Carry forward as baseline	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No

Alternative 3A: BNSF on Western Bypass (Freight Geometry), UP Remains in Existing Alignment

This alternative partly contributed to the purpose and need objectives because it included the relocation of BNSF freight traffic to a bypass, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment in residential areas. However, Amtrak operation would continue on the BNSF alignment, and so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. This alternative did contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity and supporting potential economic development, but does not allow for reuse of the BNSF Right-of-Way. It also would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 3B: BNSF Moved to Existing UP Alignment through Central Fresno, UP on Western Bypass (Freight Geometry)

This alternative contributes to the purpose and need objectives by moving BNSF freight traffic to the UP alignment, and moving UP onto a bypass, and includes full grade separation of the UP alignment. This would eliminate all of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. This alternative contributes to the purpose and need secondary project objectives in terms of enhancing rail capacity, supporting potential economic development, and allowing for redevelopment of the BNSF Right-of-Way. This alternative also accommodates potential future HST.

This alternative was carried forward to Level 2 analysis.

Alternative 3C1 and 3C2: BNSF and UP on Western Bypass (Freight Geometry)

These alternatives contribute to the purpose and need objectives by moving BNSF and UP freight traffic onto a bypass. This would eliminate all of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. These alternatives also contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity, supporting potential economic development, and allowing for redevelopment of the BNSF Right-of-Way. However, Amtrak operation would relocate onto the UP alignment, and so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. These alternatives also accommodate potential future HST.

These alternatives were carried forward to Level 2 analysis.

Alternative 4A: BNSF on Western Bypass (HST Geometry), UP Remains in Existing Alignment

This alternative does partly contribute to the purpose and need objectives because it includes the relocation of BNSF freight traffic to a bypass, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, Amtrak operation would continue on the BNSF alignment, and so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. This alternative does contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity and supporting potential economic development, but does not allow for reuse of the BNSF Right-of-Way. It also would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 4B: BNSF Moved to Existing UP Alignment through Central Fresno, UP on Western Bypass (HST Geometry)

This alternative contributes to the purpose and need objectives by moving BNSF freight traffic to the UP alignment and moving UP onto a bypass, and would include full grade separation of both alignments. This would eliminate all of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. This alternative does contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity, supporting potential economic development, and allowing for redevelopment of the BNSF Right-of-Way. This alternative also accommodates potential future HST.

This alternative was carried forward to Level 2 analysis.

Alternative 4C1, 2: BNSF and UP on Western Bypass (HST Geometry)

These alternatives contribute to the purpose and need objectives by moving BNSF and UP freight traffic to a bypass. This would eliminate all of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. These alternatives also contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity, supporting potential economic development, and allowing for redevelopment of the BNSF Right-of-Way. However, Amtrak operation would relocate onto the UP alignment, and so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. These alternatives also accommodate potential future HST.

These alternatives were carried forward to Level 2 analysis.

Alternative 5A: BNSF on Eastern Bypass (Freight Geometry), UP Remains in Existing Alignment

This alternative partly contributes to the purpose and need objectives because it includes the relocation of BNSF freight traffic to a bypass, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, Amtrak operation would continue on the BNSF alignment, and so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. In addition, there would be substantial community impacts associated with the construction and operation of a new alignment within existing and planned residential areas on the east side of Fresno.

This alternative does contribute to the purpose and need secondary project objectives in terms of enhancing rail capacity, but would adversely affect railway operations because of substantially increased travel time. It does not support potential economic development or allow for reuse of the BNSF ROW. It also would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 5B: BNSF Moved to Existing UP Alignment through Central Fresno, UP on Eastern Bypass (Freight Geometry)

This alternative partly contributes to the purpose and need objectives, because it includes the relocation of UP freight traffic to a bypass and BNSF traffic to the UP alignment, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, there would be substantial community impacts associated with the construction and operation of a new alignment within existing and planned residential areas on the east side of Fresno.

This alternative contributes to the purpose and need secondary project objectives in terms of enhancing rail capacity, but would adversely affect railway operations because of substantially increased travel time. It does not support potential economic development, but would allow for reuse of the BNSF Right-of-Way. It would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 5C: BNSF and UP on Eastern Bypass (Freight Geometry)

This alternative partially contributes to the purpose and need objectives, because it includes the relocation of both BNSF and UP to a bypass, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, Amtrak operation would relocate onto the UP alignment, and some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. In addition, there would be substantial community impacts associated with the construction and operation of a new alignment within existing and planned residential areas on the east side of Fresno.

This alternative contributes to the purpose and need secondary project objectives in terms of enhancing rail capacity, but would adversely affect railway operations because of substantially increased travel time. It does not support potential economic development or allow for reuse of the BNSF Right-of-Way. It would allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 6A: BNSF on Eastern Bypass (HST Geometry), UP Remains in Existing Alignment

This alternative partly contributes to the purpose and need objectives, because it includes the relocation of BNSF freight traffic to a bypass, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, Amtrak operation would continue on the BNSF alignment, and some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. In addition, there would be substantial community impacts associated with the construction and operation of a new alignment within existing and planned residential areas on the east side of Fresno.

This alternative contributes to the purpose and need secondary project objectives in terms of enhancing rail capacity, but would adversely affect railway operations because of substantially increased travel time. It does not support potential economic development or allow for reuse of the BNSF Right-of-Way. It would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 6B: BNSF Moved to Existing UP Alignment through Central Fresno, UP on Eastern Bypass (HST Geometry)

This alternative contributes to the purpose and need objectives because it includes the relocation of UP freight traffic to a bypass and BNSF traffic to the UP alignment, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, there would be substantial community impacts associated with the construction and operation of a new alignment within existing and planned residential areas on the east side of Fresno.

This alternative contributes to the purpose and need secondary project objectives in terms of enhancing rail capacity, but would adversely affect railway operations because of substantially increased travel time. It does not support potential economic development but does allow for reuse of the BNSF Right-of-Way. It would not allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

Alternative 6C– BNSF and UP on Eastern Bypass (HST Geometry)

This alternative contributes to the purpose and need objectives because it would remove freight operations from Fresno, resulting in the elimination of the adverse effects on safety, congestion, and the community that are currently caused by freight traffic on the BNSF alignment. However, Amtrak operation would relocate onto the UP alignment, so some adverse effects associated with the presence of grade crossings in central Fresno would not be alleviated. Additionally, it would also have substantial community impacts because it would require the construction of a new alignment within existing and planned residential areas on the east side of Fresno.

In terms of the purpose and need secondary project objectives, this alternative would adversely affect railway operations as a result of substantially increased freight travel time and would not support economic development, but does allow for reuse of the BNSF Right-of-Way. It would allow for potential future accommodation of HST.

This alternative was not carried forward to Level 2 analysis.

6.2.1 Alternatives Carried Forward for Level 2 Analysis

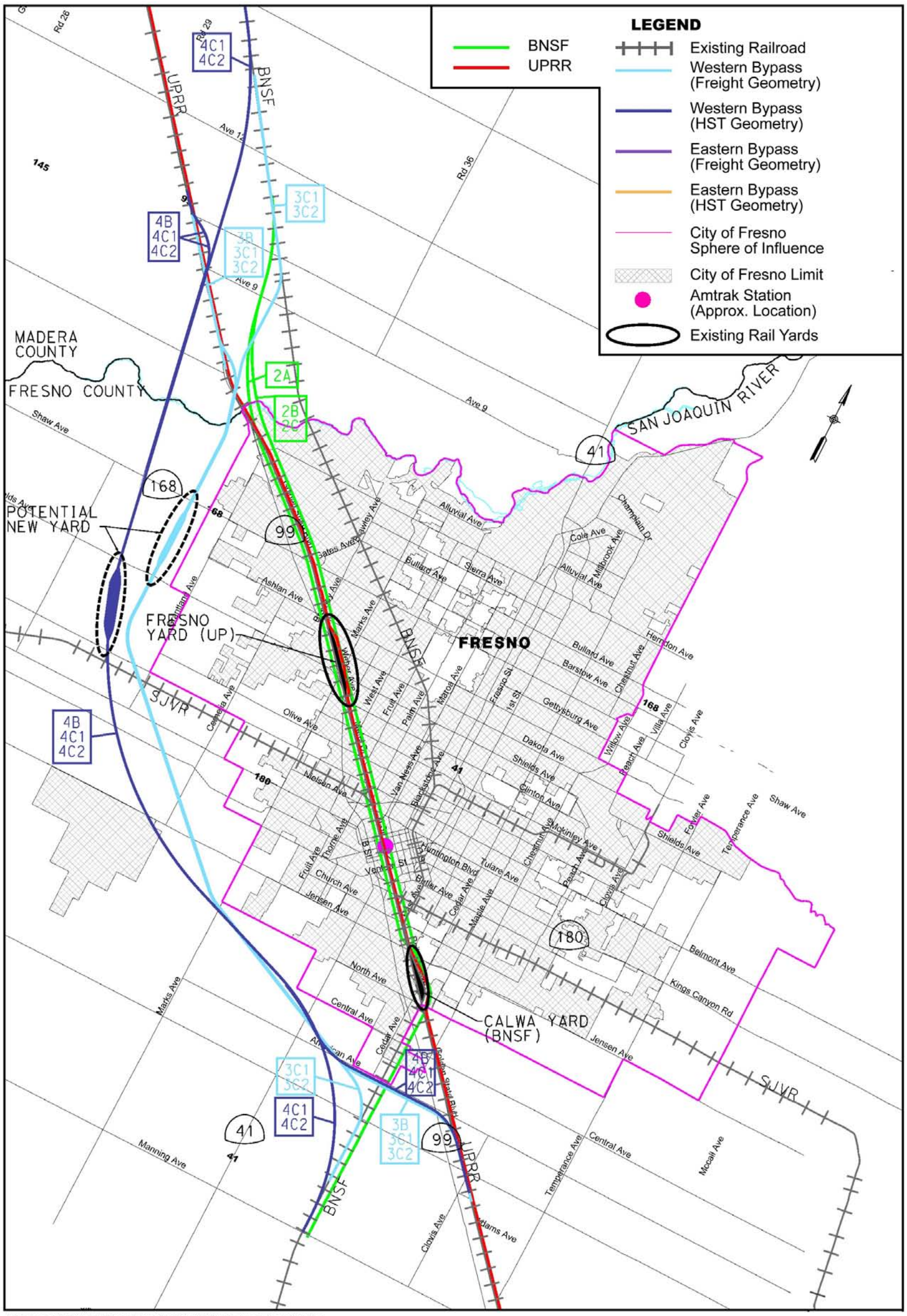
In summary, as a result of Initial Screening the following nine alternatives are advanced for Level 2 analysis, plus the No Project Alternative. They are presented in Figure 17.

- Alternative 1A: No Project (baseline)
- Alternative 2A: BNSF west of UP
- Alternative 2B: BNSF east of UP
- Alternative 2C: BNSF and UP through Central Fresno – minimum right-of-way
- Alternative 3B: BNSF through Central Fresno, UP on western bypass (freight geometry)
- Alternative 3C1, 2: BNSF and UP on western bypass (freight geometry)
- Alternative 4B: BNSF through central Fresno, UP on western bypass (HST geometry)
- Alternative 4C1, 2: BNSF and UP on western bypass (HST geometry)

6.3 Level 2 Analysis Results

Level 2 analysis encompassed a wide range of analysis and characterization of each of the alternatives. Measures related to the project's purpose and need were quantified, and capital costs were developed for each alternative. The effect on rail operations was analyzed for each alternative, and then environmental data were developed using GIS to characterize each of the alternatives. Explanations of the information contained in the table are presented in the following sections.

Figure 17 – Alternatives Carried Forward



12/10/09 vsa ..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 17_alts carried forward_11x17.ai

6.3.1 Purpose and Need

Several measures related to the project's purpose and need were quantified. These measures quantified the number of new grade separations required, and the number of road crossings that would be closed. These measures also quantified the amount of vehicle delay that would be reduced if the number of grade crossings were reduced, the reduction in vehicle emissions from the reduction in cars idling at grade crossings, and the reduction in accidents from removal of the grade crossings. Below is a summary of the methodology used to quantify economic benefits for each alternative, but a more detailed documentation of assumptions, unit prices, quantities, and other methodology is included in Appendix D.

- New grade separations: It was assumed that all major arterials intersecting new railroad construction would be grade-separated, using a spacing of approximately one per mile. In alternatives where one railroad is added side-by-side with another railroad, similar new grade separations were assumed.

- Road crossing closures: It was assumed that all minor roads intersecting new railroad construction that would not be grade-separated would need to be rerouted or closed. In alternatives where one railroad is added side-by-side with another railroad, roads not grade separated were assumed to be closed or rerouted.

- Reduced at-grade crossing waiting time: An annual delay associated with vehicles waiting for trains to clear at-grade crossings was developed using one of many recognized approaches that accounts for street configuration, train lengths, train travel speed, average annual daily traffic, and other factors.

- Reduced automobile emissions at grade crossings: Annual emissions for idling vehicles were estimated using the figures developed in the at-grade crossing waiting time. Total tons per year were estimated for Volatile Organic Chemicals, nitrous oxide, and carbon monoxide.

- Reduction of at-grade crossing incidents: Closure of at-grade crossings would reduce the risk of incidents between trains and vehicles or pedestrians. The FRA maintains a database of all reported accidents for each at-grade crossing and assigns a probability that an incident may occur at each crossing in the FRA records. The risks associated with all at-grade crossings to be closed under each alternative were summed

Alternatives 2A and 2B

Alternatives 2A and 2B have the fewest new grade separations required or road crossings affected, because of the limited corridor width that is affected by these alternatives and because it is already largely urban, with a significant number of existing grade separations. These alternatives have a substantial reduction in hours of delay and pollutants emitted when compared with the no-build baseline (Alternative 1A), and also in accident rate.

Alternative 2C

Alternative 2C is identical to Alternatives 2A and 2B in all measures related to purpose and need.

Alternative 3B

Alternative 3B experiences a reduction of approximately 60 percent in hours of delay and pollutants emitted when compared with the no-build baseline (Alternative 1A). Accidents are similarly reduced by approximately 50 percent. More grade separations and road closures are required than in Alternatives 2A, 2B, and 2C.

Alternatives 3C1 and 3C2

Alternatives 3C1 and 3C2 require the same number of grade separations and road closures as Alternative 3B, but hours of vehicle delay and pollutants emitted due to idling vehicles at grade crossings is reduced to negligible amounts, because all major freight train activity is moved onto grade-separated bypasses.

Alternative 4B

Alternative 4B is identical to Alternative 3b in all measures related to purpose and need.

Alternatives 4C1 and 4C2

Alternative 4C1 and 4C2 are identical to Alternatives 3C1 and 3C2 in all measures related to purpose and need, except that four additional road closures are required.

Summary

Alternatives 3C1, 3C2, 4C1, and 4C2 perform the best against the Level 2 analysis measures related to the project's purpose and need criteria. Alternatives 2A, 2B, and 2C offer substantial benefits as well when compared to the existing condition. Table 8 summarizes the major findings of the Level 2 analysis.

Table 8 – Summary Comparison of Alternatives

	No Realignment	Realignment through Fresno			Western Bypass Freight Geometry		Western Bypass HST Geometry	
	1A	2A	2B	2C	3B	3C1 and 3C2	4B	4C1 and 4C2
Analysis Criteria	**No Project**	**BNSF West of UP, UP as Is**	**BNSF East of UP, UP as Is**	**UP and BNSF through the Center of Town – Minimum Right-of-Way**	**BNSF in Central Fresno, UP on Western Bypass**	**BNSF and UP on Western Bypass**	**BNSF in Central Fresno, UP on Western Bypass**	**BNSF and UP on Western Bypass**
Purpose and Need Objectives	• Does not achieve any of the purpose and need objectives of the project	• Alignment creates less space in Central Fresno for HST alignment than Alternatives 2C, 3B, 3C1, 3C2, 4B, 4C1, and 4C2 • This alignment eliminates less community impacts than any bypass alternative.	• Alignment creates less space in Central Fresno for HST alignment than Alternatives 2C, 3B, 3C1, 3C2, 4B, 4C1, and 4C2 • This alignment eliminates less community impacts than any bypass alternative.	• Alignment creates less space in Central Fresno for HST alignment than Alternatives 3B, 3C1, 3C2, 4B, 4C1, and 4C2, but more space than Alternatives 2A and 2B • This alignment eliminates less community impacts than any bypass alternative.	• Alignment creates less space in Central Fresno for HST alignment than Alternatives 3C1, 3C2, 4C1, and 4C2, but more space than Alternatives 2A, 2B, and 2C • This alignment eliminates some but does not eliminate the same level of impacts as Alternatives 3C1, 3C2, 4C1, 4C2.	• Alignment creates more space in Central Fresno for HST alignment than Alternatives 1A, 2A, 2B, 2C, 3B, and 4B • These alignments, along with 4C1 and 4C2, eliminate the greatest amount of community impacts	• Alignment creates less space in Central Fresno for HST alignment than Alternatives 3C1, 3C2, 4C1, and 4C2, but more space than Alternatives 2A, 2B, and 2C • This alignment eliminates some but does not eliminate the same level of impacts as Alternatives 3C1, 3C2, 4C1, 4C2.	• Alignment creates more space in Central Fresno for HST alignment than Alternatives 1A, 2A, 2B, 2C, 3B, and 4B • These alignments, along with 3C1 and 3C2, eliminate the greatest amount of community impacts
Costs and Socioeconomic Factors	• Base case – no costs	• Displaces the second greatest number of residences and businesses • No increase to railroad O&M costs • Nine assumed new grade separations • Seven assumed road crossing closures	• Displaces the greatest number of residences and businesses • No increase to railroad O&M costs • Nine assumed new grade separations • Seven assumed road crossing closures	• Lowest estimated cost for build alternatives • Displaces the smallest number of residences and businesses for through town alternatives, but more than bypass alternatives • No increase to railroad O&M costs • Nine assumed new grade separations • Seven assumed road crossing closures	• Fourteen assumed new grade separations • Thirty-two assumed road crossing closures • Lower estimated economic benefits than Alternatives 2A, 2B, 2C, 3C1, 3C2, 4C1, and 4C2	• Fourteen assumed new grade separations • Thirty-two assumed road crossing closures	• Fourteen assumed new grade separations • Thirty-six assumed road crossing closures • Lower estimated economic benefits than Alternatives 2A, 2B, 2C, 3C1, 3C2, 4C1, and 4C2	• Highest estimated total cost • Highest estimated economic benefits • Displaces the smallest number of residences and businesses • Fourteen assumed new grade separations • Thirty-eight assumed road crossing closures • Highest operating costs
Rail Operations	• No change to existing UP and BNSF operations • No changes to Amtrak operations	• No change to existing UP operations • Amtrak operations on BNSF through Fresno • No change in route lengths for either railroad	• No change to existing UP operations • Amtrak operations on BNSF through Fresno • No change in route lengths for either railroad	• Amtrak operations on BNSF through Fresno • No change in route lengths for either railroad	• Amtrak operations on BNSF through Central Fresno • UP route length increases by 2.3 miles, no increase to BNSF • One additional interlocking required • Requires the replacement of one rail yard	• Amtrak operations on western bypass or public right-of-way though Fresno • UP route length increases by 2.3 miles, BNSF increases by 1.3 miles • Two additional interlockings required • Requires the replacement of two rail yards	• Amtrak operations on BNSF through Central Fresno • UP route length increases by 2.8 miles, no increase to BNSF • One additional interlocking required • Requires the replacement of one rail yard	• Amtrak operations on western bypass or public right-of-way though Fresno • UP route length increases by 2.8 miles, BNSF increases by 0.6 mile • Two additional interlockings required • Requires the replacement of two rail yards
Environmental Considerations	• Highest noise and vibration impacts,	• Fewer impacts to agricultural land than Alternatives 3B, 3C1, 3C2, 4B, 4C1, and 4C2 • Probable impacts to Roeding Park	• Fewer impacts to agricultural land than Alternatives 3B, 3C1, 3C2, 4B, 4C1, and 4C2 • More noise and vibration impacts than Alternatives 2A, 3B, 3C1, 3C2, 4B, 4C1, and 4C2	• Highest acreage of new alignment within 100-year flood plain • Fewer impacts to agricultural land than Alternatives 3B, 3C1, 3C2, 4B, 4C1, and 4C2 • More noise and vibration impacts than Alternatives 2A, 3B, 3C1, 3C2, 4B, 4C1, and 4C2	• Fewest impacts to previously recorded historic properties and archeological sites and cultural resources	• Smallest number of new alignment within 100-year flood plain • Fewest impacts to parks and recreation areas • Fewest impacts to Section 4(f) properties	• Most impacts to parks and recreation areas	• Highest impact to wetlands and special aquatic resources • Largest alignment footprint within areas of highly erodible soils • Most impacts to agricultural land

Notes:

BNSF = BNSF Railway
HST = High-Speed Train
O&M = operations and maintenance
UP = Union Pacific Rail Road

6.3.2 Capital Costs

Capital costs were estimated for the alternatives in the Level 2 analysis. The capital costs estimated include right-of-way acquisition, utility relocation, construction, and hazardous materials/contamination remediation costs. The quantification of costs is based on preliminary alignment information and has not been developed with or reviewed by local agencies for consistency with their assumptions.

A Capital Cost Estimating Methodology

Below is a summary of the methodology used to estimate costs associated with the project. Table 9 summarizes the property acquisitions required. Table 10 summarizes the estimated economic cost and benefits for each alternative. Detailed cost estimates for each scenario are presented in Appendix D.

Direct Costs: The order of magnitude of direct costs was estimated for four categories:

- Right-of-Way Acquisition: The land needed to provide a 100-foot-wide corridor and new yards, as required, was developed using the centerline of the track alignment. The City of Fresno land use GIS database was scanned along the alignment and a distance between boundaries of land uses (residential, agricultural, industrial, etc.) was reported. The acreage under each of the "parcels" of land use type was calculated for each alternative. An assumed purchase price was assigned to each parcel needed to provide the linear transportation corridor, and a total acquisition amount was generated. See Appendix D for a summary of parcels, land use types, subtotals by county, and project total by acres. Maps showing the conceptual routes and areas of right-of-way acquisition for each alternative are included in Appendix B and more detailed property acquisition tables can be found in Appendix C.

- Utility Relocation: Using limited utility information from the GIS database, the number and type of utility crossings were counted. Public utilities included in the database were public utility water pipes, sanitary sewer pipes, and storm drain pipes. Pacific Gas and Electric Company (PG&E) electrical and gas transmission lines were also included, but PG&E distribution lines were not. Unit costs for replacement or protection of utilities are based on recent bids for similar new utilities and are assumed to be incidental to a major construction project. Such a project typically results in reasonable costs because the utility relocations and protection are not a stand-alone or case-by-case effort.

- New Construction: The following major costs associated with construction of the possible project were evaluated:

    - Demolition and site preparation of acquired property
    - Railroad track construction
    - Railroad bridges and culverts
    - New San Joaquin River bridges
    - Roadway and traffic signals
    - Incidental reconstruction costs for the Union Corridor
    - Freight and intermodal yard replacement
    - New Amtrak station construction
    - Grade separations

Unit costs for these items are based on recent bids for similar work. Costs were increased from a basic amount when an alternative would result in a higher unit price to incorporate additional work, such as increasing the span of a grade separation (bridge) to cross two railroads instead of just one.

Table 9 – Real Estate Acquisitions

Alternative	2A	2B	2C	3B	3C1	3C2	4B	4C1	4C2
Number of Parcels Affected	30	125	17	4	9	6	4	0	0
Acreage	227	227	108	383	751	751	424	893	893

Table 10 – Capital Costs

	Realignment through Fresno		Western Bypass Freight Geometry		Western Bypass HST Geometry	
Alternative	**2A and 2B**	**2C**	**3B**	**3C1 and 3C2**	**4B**	**4C1 and 4C2**
Description	BNSF West of UP; BNSF East of UP	BNSF and UP through central Fresno – minimum ROW	BNSF in Central Fresno, UP on Western Bypass	BNSF and UP on Western Bypass	BNSF in Central Fresno, UP on Western Bypass	BNSF and UP on Western Bypass
Total Cost	$ 809,000,000	$ 803,000,000	$ 830,000,000	$ 1,265,000,000	$ 849,000,000	$ 1,380,000,000

Notes:

BNSF = BNSF Railway
UP = Union Pacific Rail Road

- Removal of Hazardous Materials and Contamination. Railroad corridors are known to be almost universally encumbered with contamination such as diesel, oils, and other materials deposited by routine train operations. Estimated costs to remove a surface layer of material were included in the construction cost estimates. This cost assumption provides a placeholder for some level of minimal activity to make land relinquished from BNSF at least nominally useable. The level of effort and cost assumed is similar to the removal efforts of soils, with aerially deposited lead being removed from highway rights-of-way during widening construction.

B Analysis of Real Estate Acquisitions

One of the major impacts of any transportation project is the impact of the land acquisitions required to build the project. Acquiring land causes displacements, and ultimately determines where the impacts from the project will be experienced. All of the alternatives considered, except for the No Project Alternative, entailed some level of property acquisition, as shown in Table 9. The scale and locations of the acquisitions differs by alternative, however.

Alternatives 2A and 2B

Alternatives 2A and 2B have a relatively low requirement for the amount of acreage to be acquired. The locations of the acquisitions are primarily on the north end of the study area to connect the BNSF to the UP alignment, and along the UP alignment through central Fresno because of the increased width of 200 feet in all places to accommodate both railroads. Alternatives 2A and 2B are estimated to each require acquisition of approximately 226.50 acres of land, distributed between varieties of land uses. These two alternatives require the most industrial and residential land because of the widened urban corridor through central Fresno. However, these alternatives do not require taking any agricultural land in Fresno County, though some is required in Madera County.

Alternative 2C

Alternative 2C would require the least acreage acquisition—lower than Alternatives 2A and 2B—because it would use a narrower corridor through central Fresno. In general, property requirements for each type of land use would be lower for this alternative than Alternatives 2A and 2B in Fresno County, but the total acreage required in Madera County would be the same. A total of 107.9 acres would need to be acquired for this alternative.

Alternative 3B

Alternative 3B requires taking slightly more acreage than Alternatives 2A and 2B—a total of 383.2 acres. This increase is primarily due to the construction of a bypass, and would require agricultural land in both Fresno and Madera Counties. However, the acreage of industrial and residential required through central Fresno is reduced significantly.

Alternatives 3C1 and 3C2

Alternatives 3C1 and 3C2 require slightly less than double the amount of acquisition required for Alternative 3B, because this alternative has two railroads on the bypass instead of one. This doubles the width of the corridor needed, and means that an additional yard is also needed. These alternatives require an estimated 750.9 acres of acquisition, primarily agricultural, in both Fresno and Madera Counties.

Alternative 4B

Alternative 4B is similar to Alternative 3B, but requires slightly more acquisition—a total of 424.3 acres. The increase is primarily due to the slightly longer bypass, because it is constructed to high-speed geometry rather than freight geometry. The mix of land uses is similar to Alternative 3B, with most acquisitions being agricultural land.

Alternatives 4C1 and 4C2

Alternatives 4C1 and 4C2 are similar to Alternatives 3C1 and 3C2, but require more acquisition—a total of 892.9 acres. The increase is primarily due to the slightly longer bypass, which is constructed to high-speed geometry rather than freight geometry. The mix of land uses is similar to Alternatives 3C1 and 3C2, with most acquisitions being agricultural land.

Summary

Alternatives 2A and 2B are the alternatives with the lowest total required land acquisitions, but with the most urban acquisitions, industrial and residential, required. All other alternatives primarily require acquisitions of agricultural land, with small amounts of acreage of all other land uses.

C Analysis of Capital Costs

The ranking of costs follows very closely to the ranking of property acquisitions required. The primary driver of cost is the construction required, whether it is within an existing right-of-way or in a new right-of-way. In examining the costs, property acquisition tended to be between 5 and 10 percent of the total cost of the alternative. Construction, on the other hand, tended to be approximately 90 to 91 percent of the total cost of the alternative.

Alternatives 2A and 2B

Alternatives 2A and 2B cost approximately $809 million.

Alternative 2C

Alternative 2C is the least expensive alternative to implement with a cost of $803 million. This is primarily due to a smaller corridor width within Fresno, resulting in slightly lower right-of-way acquisition costs than Alternatives 2A and 2B.

Alternative 3B

Alternative 3B is slightly more expensive to implement, with a cost of $837 million, or approximately 3 percent more than Alternatives 2A and 2B. This alternative does not require any new right-of-way in central Fresno, but does require right-of-way acquisition for a bypass.

Alternatives 3C1 and 3C2

Alternatives 3C1 and 3C2 are more expensive to implement, with a total cost of approximately $1.275 billion, or an increase of 58 percent over Alternatives 2A and 2B. This is primarily due to the cost of building the bypass for two railroads and building two new yards. The operating cost increase to the railroads over 20 years is approximately $10.16 million, or $510,000 annually. The benefit-to-cost ratio is approximately 11 percent.

Alternative 4B

Alternative 4B is slightly more expensive to implement than Alternative 3B, due to the slightly longer bypass, which is built to high-speed geometry. The cost to implement this alternative is approximately $857 million, or a 6 percent increase over Alternatives 2A and 2B, and a 2 percent increase over Alternative 3B. Alternative 3B does have an operating cost increase to the railroads over 20 years of approximately $8.1 million, or $405,000 annually. The benefit-to-cost ratio is approximately 14 percent.

Alternatives 4C1 and 4C2

Alternatives 4C1 and 4C2 are the most expensive to implement than Alternatives 3C1 and 3C2, due to the slightly longer bypass, which is built to high-speed geometry. The total cost of these alternatives is approximately $1.39 billion, or an increase of 72 percent over Alternatives 2A and 2B. This is primarily due to the cost of building the bypass for two railroads at high-speed geometry, and building two new yards. The operating cost increase to the railroads over 20 years is approximately $11.34 million, or $570,000 annually. The benefit-to-cost ratio is approximately 10 percent.

Summary

Alternatives 2A and 2B are the least expensive to implement, with Alternatives 3B and 4B close in price. Alternatives 3C1, 3C2, 4C1, and 4C2 are substantially more expensive to implement because of the costs of building bypasses for two railroads and two yards.

6.3.3 Socioeconomic Costs and Benefits

The cost estimates in Section 6.3.2 did not take into account some of the socioeconomic costs and benefits of the alternatives, because the alternatives have not yet been evaluated in sufficient detail to allow the generation of reliable traffic, public health, or other data for use in monetizing socioeconomic costs and benefits. These are areas that will be important to the residents and policymakers in the area, and should be the subject of additional study once direction is established with respect to the alternatives to be pursued. For example, in addition to right-of-way costs, residential and community displacements could cause socioeconomic impacts to the community. Residential relocations, especially when contiguous, can change the characteristics of a neighborhood. Commercial relocations, especially when exacerbated by traffic disruptions during construction and permanent alterations to traffic patterns related to street closures, can result in the loss of businesses, commercial neighborhoods, and jobs. Based on development density, the alignments that occur in downtown Fresno would require more displacements than the bypass alternatives. If federal funding or approvals are required, analysis of socioeconomic impacts from displacement would be required, specifically to ensure that impacts would not adversely and disproportionately impact low income or minority populations.

Road closures could also result in socioeconomic impacts associated with access issues, required out-of-direction travel, increased response times for social and emergency services (school buses, police, and ambulance service), and potential economic losses if traffic is rerouted from commercial areas. Secondary impacts to commercial businesses would be more pronounced for alternatives that would require road closures in downtown Fresno. However, in rural areas along the bypass alternatives, road closures could result in longer delays for social and emergency services, because alternative routes may not be readily available. Additionally, road closures could render some agricultural parcels unusable, if access to portions of a farm is altered in a way that requires extensive drive times for farm equipment.

In a future detailed economic cost-benefit analysis with more data developed regarding likely traffic impacts, etc., several of the measures discussed above could be monetized and a dollar value to the benefit could be derived:

- Reduced at-grade crossing waiting time: A value per hour of time associated with vehicle delay could be developed and assigned.
- Reduced automobile emissions at grade crossings: A value per ton could be applied to each material using offset credits purchased by various parties as reported by the California Air Resources Board to monetize this measure.
- Reduction of at-grade crossing incidents: To monetize this measure, the risks associated with all at-grade crossings to be closed under each alternative could be summed and an annual cost per accident could be multiplied by the reduced risk of accidents. Should the project be investigated in further detail, the at-grade crossing safety improvements should be determined using the FRA "Safety Calculator" to estimate a more detailed rate and value for at-grade crossing closure, realignment, and construction of new grade separations.

In addition, the public health benefits of removing a rail operation and the accompanying diesel emissions from a dense urban neighborhood could also be monetized.

A detailed real estate evaluation of the alternatives could generate data on the expected change in value for properties located next to any current railroad properties that would experience a drop in rail traffic if one of the alternatives were implemented. The value of the linear railroad corridor could also be established, though the current BNSF right-of-way may be more valuable as a transportation corridor, recreation facility, or other community use than it would be if sold for development or sold to the adjoining property owners. Similar rail corridors have been converted to other linear uses throughout the country, such as light rail or bike or walking trails, at tremendous benefit.

6.3.4 Railroad Operations

Rail impacts are not as easily quantified as the capital costs above, and have been based on the effects each alternative will have on each railroad in Fresno (BNSF, UP, and SJV). These impacts have been generally defined as dispositions of the current right-of-way, changes in route length, and changes in number of railroad interlockings. Impacts to Amtrak operations have also been assessed as part of the evaluation of BNSF realignment alternatives.

A Evaluation of BNSF Realignment Alternatives

Alternative 1A: No Project (Baseline)

This alternative would leave the BNSF main track where it is now, and railroad operations would continue as they are today, with continued impacts to the city street grade crossings as rail traffic grows. BNSF expects to operate two or three additional through freight trains daily in the near future, and the State is negotiating with the railway for rights to add a seventh passenger schedule each way daily in return for added public investment in the railroad physical plant, all of which would be added to the current level or traffic on this alignment. No Changes would be needed to Calwa Yard or any interchange locations.

Alternative 2A: BNSF West of UP

Alternative 2A would move the BNSF to a route through central Fresno adjacent to the existing UP alignment, but on separate tracks to the west of the UP. This alternative would leave Calwa

Yard intact at its current location. Alternative 2A would require that the UP main track, which now lies to the west of Calwa Yard, be shifted to the east immediately south of the current Calwa Tower, so that it would cross the SJV Visalia Branch rather than the BNSF main track, then swing around the east side of Calwa Yard to the east of the BNSF main tracks. From approximately Jensen Avenue north, both the relocated BNSF and UP main tracks would shift westward into the UP alignment, with the UP occupying its present right-of-way and the BNSF would be located on a new and parallel right-of-way to the west of the UP. The UP would then remain on the east side of the BNSF until a point (to be determined) north of railroad location Biola Junction (near the north city limit), where the BNSF would have to cross the UP at-grade in order to reconnect to the existing BNSF alignment near Gregg. This railroad crossing would replace the existing one at Calwa Tower, and this alternative is therefore neutral with respect to adverse railroad impacts.

If the UP were not moved to the east of Calwa Yard under Alternative 2A and remained exactly where it is now, the BNSF would cross the UP at Calwa Tower, as it does now, then cross the UP north of Calwa Yard (to get to the west side of the UP right-of-way to avoid UP's Fresno Yard), and cross back yet again to the east north of Biola Junction. That would require three level railroad crossings in 24 miles, where there is now one. Both UP and BNSF would likely object to such a configuration, which could not be forced upon them without their consent. As it is likely to prove an institutionally unacceptable alternative, it has therefore not been carried forward for further development and evaluation. Grade-separating the two railroads by having one fly over the other has also not been proposed, because this solution either requires excessively long aerial structures to keep the ruling grade low enough, or shorter structures with steeper approach grades. Because the San Joaquin Valley is flat, both BNSF and UP can operate heavy trains the length of the Valley with minimal locomotive consists. If the railroad grade separation has grades, it would require that additional locomotive units be entrained across the entire district, just to supply the horsepower for the bridge approaches at Fresno. This is also an unacceptable consequence, and so it has also been ruled out.

In this alternative, with the BNSF located on the west side of the UP north of Jensen Avenue, Amtrak would only be able to access the former SP station location via a pedestrian footbridge or subway, because the UP main tracks would lie between the BNSF tracks and the station building, and passengers would not be allowed to walk across the UP main tracks at-grade.

Alternative 2B: BNSF East of UP

Alternative 2B would also move the BNSF adjacent to the UP alignment, but to the east of the UP main tracks. This alternative is more practical for railroad operations than Alternative 2A, because it does not require moving the UP tracks within the corridor. However, this alternative requires threading the BNSF around the east side of the UP's Fresno Yard, which would cut off the UP yard from its road access to the east unless a road grade separation was built across the BNSF. The BNSF east side alignment also requires taking land, especially east of the existing UP yard, with attendant negative community impacts. Alternative 2B does have the advantage of allowing Amtrak trains to stop directly at the former SP station without the need for a pedestrian footbridge or subway.

In other respects, Alternative 2B has railroad impacts identical to those described for Alternative 2A. The one level railroad crossing remains at Calwa Tower where it is now.

Alternative 2C

Alternative 2C would function similarly to Alternatives 2A and 2B, assuming that the more workable position of the railroads relative to each other (described in Alternative 2B) would be used. The BNSF would be to the east of the UP, and would have to go around the east side of UP's yard. The primary difference between Alternatives 2A and 2B is that the total right-of-way

needed would be narrower for a short portion of the alternatives through central Fresno, assuming that the railroads would agree to this through negotiation. The chief drawback is that the narrower right-of-way would allow no space between the two railroads for a maintenance road. There would be maintenance roads on the outside of the two railroads, and the track center-spacing would meet or exceed the 25-foot spacing required by both railroads.

Alternative 3B: BNSF through Central Fresno, UP on Western Bypass (Freight Geometry)

Alternative 3B would divert the UP to a western bypass (for the UP impacts of this alternative, refer to Section 6.3.4.B), and move the BNSF to the current UP alignment through central Fresno. With this alternative, there would be no need to relocate either railroad around the outside edge of the other railroad's yard. The UP yard is no longer required, can be retired, and the land sold. Amtrak would operate on the new BNSF alignment through central Fresno, with access to the SP station.

Alternative 3B leaves Calwa Yard where it is, but retires the BNSF right-of-way entirely between Hammond Avenue and the siding at Gregg. This would eliminate more than 20 grade crossings in the north part of the city, and reduces the train frequency across about 20 others immediately south of Hammond Avenue to the one local train each way each day that goes to Hammer Field.

Alternatives 3C1 and 3C2: BNSF and UP on Western Bypass (Freight Geometry)

Alternatives 3C1 and 3C2 would divert the BNSF as well as the UP to a western bypass. The BNSF main track would transition to the bypass alignment at a point south of Calwa Yard, and would remain on the bypass north to approximately the San Joaquin River, where the line would reconnect to the existing alignment near Gregg. The BNSF bypass would be approximately 23 miles long in total. Alternative 3C1 would place the BNSF on the west side of a corridor shared with the UP, and on an entirely separate set of main tracks. Alternative 3C2 would place BNSF on the east side of the common corridor, again on an entirely separate set of main tracks.

Either version of this alternative would require that Calwa Yard would need to be replaced with a new yard of approximately the same size, and with approximately the same capacity. This would require a parcel approximately 2 miles long and 86 acres in size, on land located west of the existing yard at a suitable point along the bypass alignment. In Alternative 3C1, the new Calwa Yard would lie on the west side of the rail corridor; in Alternative 3C2, it would lie to the east side of the corridor. In Alternative 3C1, the level crossing between the BNSF and the UP would move from its present location at Calwa Tower north to a point in the vicinity of the San Joaquin River crossing; in Alternative 3C2, the Calwa Tower crossing would be replaced by a new crossing a south of the existing crossing.

Either version of Alternative 3C would provide BNSF with two main tracks between Bowles and Gregg. That would be an increase in capacity and a substantial benefit to BNSF, and would eliminate the need for future state investment in BNSF capacity between Tulare Street and Figarden, or at the existing Gregg Siding.

Under terms of the existing contract between BNSF and Amtrak, the Amtrak service would operate over BNSF tracks on the new bypass alignment unless specific arrangements were made for an alternative. Several alternatives exist for Amtrak. The Amtrak service could hypothetically remain on the current BNSF route, but if that were done, the existing BNSF right-of-way between Hammond and Gregg could not be abandoned, and the reduction in grade crossing impacts would not be as complete as if all trains were eliminated from this alignment. The Amtrak service could also move to an alignment through central Fresno on a track that could be owned by a public agency, to retain Amtrak service in the center and maintain local freight service.

However, if UP retained ownership of the track through central Fresno and did not sell it to a public agency, UP would have to agree specifically to accommodate Amtrak service on the existing UP tracks. UP is not obligated to accept Amtrak as a tenant, and UP has largely not been favorable to expansion of Amtrak services where prior rights do not exist. UP's agreement to allowing passenger service on its tracks is unlikely, and this has not been considered a realistic possibility in screening alternatives for this report.

Both Alternatives 3C1 and 3C2 would eliminate approximately 20 of the BNSF grade crossings entirely (unless Amtrak stays on the current route) and eliminate through freight and passenger traffic across all but two of the 43 BNSF grade crossings. The net reduction in grade crossings assumes that the bypass would be fully grade-separated. It is likely that the bypass would be required to be fully grade-separated. Eliminating grade crossings is a stated objective of the CPUC and it is unlikely that they would approve a bypass that includes any grade crossings in the design. Grade separations could be constructed in phases, but those roads where separations are not constructed initially would not be allowed to have temporary grade crossings until the separation is built; they would have to be closed in the interim. The reduction in grade crossings is a major benefit of the bypass alternatives, but it comes at a high capital cost, due to the requirement that Calwa Yard be replaced.

Alternative 4B: BNSF through Central Fresno, UP on Western Bypass (HST Geometry)

Alternative 4B is similar to Alternative 3B except that the bypass is designed to HST geometry. In Alternative 4B, only the UP occupies the freight bypass, and the impacts on UP are discussed in the following section. The impacts on BNSF operations under Alternative 4B are identical to those described previously under Alternative 3B.

Alternatives 4C1 and 4C2: BNSF and UP on Western Bypass (HST Geometry)

Alternatives 4C1 and 4C2 differ from Alternatives 3C1 and 3C2 only with respect to the alignment geometry of the western bypass trackage. In Alternatives 4C1 and 4C2, the bypass is designed to HST geometry, and is therefore longer than it would be if freight geometry is used: the BNSF bypass under Alternatives 4C1 or 4C2 is about 31 miles long instead of 23. That means eight additional miles of new, grade-separated double-main track would need to be constructed were the BNSF bypass laid out along an HST-compatible alignment, as opposed to the new construction required if freight geometry were used. The total route length of the HST-aligned BNSF bypass is, however, only about a half-mile longer than BNSF's existing route, so—after the additional capital investment in the longer bypass—the long-term effects on BNSF operating and maintenance costs would be negligible. As noted previously, constructing a freight bypass to HST alignment standards has no incremental benefit to the freight carriers, or to Amtrak; they cannot operate faster, nor can they operate more trains in a given period of time, on an HST-compatible alignment than they can on one engineered to support FRA Class 4 freight geometry.

All the other impacts to BNSF operations discussed under Alternatives 3C1 and 3C2 above, including the requirement that BNSF would need a replacement for Calwa Yard, would be identical under Alternatives 4C1 and 4C2.

B Evaluation of UP Realignment Alternatives

Alternative 1A: No Project (Baseline)

This alternative would leave both the UP main track and the UP yard where they are now. It is neutral with respect to the UP train operation. Both the capacity and level of utility that UP obtains from their current trackage through Fresno are adequate to support their current and planned operations.

Alternative 2A: BNSF West of UP

Alternative 2A, where the BNSF is relocated to the west side of the UP right-of-way between Jensen Avenue and the San Joaquin River, has some effect on the UP operation. This alternative requires that the UP main track be rerouted around the east side of Calwa Yard to avoid two new level railroad crossings that would otherwise be required to transition the BNSF from east side to west side, then back again to the east side at some point near the north city limit. Otherwise, Alternative 2A would leave UP with its current main tracks and yard. The level crossing with BNSF would move from Calwa Tower to some point north of Biola Junction, but the new crossing would simply replace the existing one.

Alternative 2B: BNSF East of UP

Alternative 2B is neutral as to impacts on UP's operation, so long as highway access is provided over the relocated BNSF main tracks, and into the east side of the UP's Fresno Yard. This alternative could provide benefits directly related to the number of UP alignment grade crossings that would be eliminated by either grade-separating the roadway or closing the street. In this alternative the level crossing between UP and BNSF remains where it is now, at Calwa Tower; and is operationally neutral from the UP's perspective.

Alternative 2C

Alternative 2C would function similarly to Alternatives 2A and 2B, assuming that the more workable position of the railroads relative to each other (described in Alternative 2B) would be used. The BNSF would be to the east of the UP, and would have to go around the east side of UP's yard. The primary difference between Alternatives 2A and 2B is that the total right-of-way needed would be narrower for a short portion of the alternatives through central Fresno, assuming that the railroads would agree to this through negotiation. The chief drawback is that the narrower right-of-way would allow no space between the two railroads for a maintenance road. There would be maintenance roads on the outside of the two railroads, and the track center-spacing would meet or exceed the 25-foot spacing required by both railroads.

Alternative 3B: BNSF through Central Fresno, UP on Western Bypass (Freight Geometry)

This alternative proposes to move UP out of central Fresno entirely and on to a western bypass. It requires that UP's Fresno Yard be replaced with a new yard somewhere along the bypass. Replacing the UP yard with a new one would be a less complicated project than replacing the BNSF yard at Calwa. The existing UP Fresno Yard occupies a greater area than is strictly required by the operations it supports, and it could probably be replaced with a yard with a smaller footprint. In addition, the land occupied by the existing UP Fresno Yard could become available for other uses.

UP would receive a new 22-mile-long double track main line between Calwa and Irrigosa (with no 40-mph restriction) which would replace the 12 miles of existing double track between Calwa and Biola Junction, as well as 8 miles of existing single track. Twenty-three of the 25 grade crossings would no longer be required, and the current UP land holdings could be sold, with a cash benefit and reduced taxes on operating property. While the bypass is 2 miles longer than the existing route, the new trackage would offer UP higher speeds, more capacity, and greater safety, all of which are benefits that would offset the negative impact of the longer distance.

Alternatives 3C1 and 3C2: BNSF and UP on Western Bypass (Freight Geometry)

Alternatives 3C1 and 3C2 have the same requirements, and offer the same type of benefits for UP as those alignments do for BNSF: UP would receive a new yard, a new double track, FRA

Class 4 main line, and elimination of virtually all grade crossings in the 20-mile segment. The bypass would be constructed to freight rail geometry, and there is no incremental benefit to the UP if the bypass is engineered to HST geometry. In all other respects, the impacts to UP of Alternatives 3C1 and 3C2 are identical to those described under Alternative 3B. Under Alternative 3C1, where BNSF is to the west of the UP, the level crossing between the two carriers would have to be relocated to a point near the north city limit or the San Joaquin River. Under Alternative 3C2, the UP remains on the west side of the corridor, and the level railroad crossing would move to a new location south of the current crossing at Calwa Tower.

All the options with UP on the western bypass require the UP/SJV interchange to be moved from the current location at Ventura Street. One solution to that issue would involve creating a new set of interchange tracks at the point where the new UP bypass would cross the current SJV (former SP) line to Kerman. This part of the SJV runs west of Fresno parallel to Belmont Avenue. A new interchange would have the benefit of being outside of the city. Rail carriers can mutually agree to move an interchange if it is their interest to agree. The effect on the UP is otherwise negligible. The effects on the SJV are more significant, and are discussed in the next section.

Alternative 4B: BNSF through Central Fresno, UP on Western Bypass (HST Geometry); and Alternatives 4C1 and 4C2: BNSF and UP on Western Bypass (HST Geometry)

Impacts to UP from adopting HST geometry standards for a western bypass are almost identical to those impacts on BNSF. There is no benefit to the UP freight operation simply from operating on an HST compatible alignment, because UP cannot run faster, nor can more trains be run.

If the bypass were engineered to HST-compatible alignment standards, UP's route would have to be approximately 3 miles longer than the current route, and approximately 3 miles longer than the freight geometry alternative, with the consequent impact on construction cost.

C Evaluation of SJV Realignment Alternatives

Current SJV operations would be affected by many of the realignment alternatives. All bypass alternatives (Alternatives 3B, 3C1, 3C2, 4B, 4C1, and 4C2) would displace the existing SJV interchange locations and the associated current operating routines. Any relocation of the BNSF Calwa Yard would require that SJV be provided an independent connection to the former Visalia Branch. Any relocation of the UP main track would require either relocating the Ventura Avenue interchange to some point near the crossing of a UP bypass and the line to Kerman, or continuing access to the current interchange tracks at Ventura Avenue.

Maintaining the interchange is a significant part of any realignment project. By agreement between the carriers, and by Interstate Commerce law, this interchange facility must be preserved. Consequently, any operating impacts on this interchange associated with any of the alternatives would have to be offset, either by leaving the interchange where it is and preserving enough track in the UP alignment to support the interchange, or by replacing it in kind at an alternate location. To the extent that realignment alternatives provide an improved UP/SJV interchange, the improvement is a benefit. To the extent that the interchange becomes more cumbersome or costly, it becomes a disbenefit.

If the BNSF were to inherit the existing UP right-of-way (as in Alternatives 3B and 4B), the BNSF/SJV interchange would not be affected. With the BNSF in the UP right-of-way, however, SJV's current access across the UP between the junction to the line to Kerman and Ventura and California avenues would have to be preserved, and the obligation to provide that access would shift to BNSF. If both BNSF and UP were moved to a western bypass, the SJV may be forced to move the point at which it receives traffic. This interchange could move to the south side of the city (a new junction where the Class 1 railroads could set out the traffic), from which point SJV

would need to retain trackage along the UP right-of-way at least to Ventura Avenue to access the Clovis and Exeter branches. A second alternative would allow connection with both Class 1 railroads at the bypass crossing with the line to Kerman, from which point SJV would need to retain trackage east to the existing junction with the UP at Irrigation Bay, then along the UP to Ventura and California avenues.

Any of these solutions is operationally feasible. Moving the interchange to a junction west of the city, along the line to Kerman, might increase SJV's haulage distance and so increase its costs. Because SJV receives a flat rate per car handled, any such cost increase is very relevant to SJV, and a potential drawback to the bypass alternatives. The interchange problem is the major impact on SJV, and while it is an issue, it is unlikely to prove a significant obstacle to any of the surviving alternatives.

6.3.5 Environmental Considerations

This section provides an overview of environmental considerations that may be present within the footprint of each of the considered alternatives. Information on the natural, cultural, and build environment was collected based on existing information available from resource agencies, planning documents, and a "windshield survey" of the study area; resource specific surveys were not completed (e.g., pedestrian archaeological surveys or species-specific protocol surveys).

In general, quantification of potential resources was based on a projected alignment footprint. However, some resources required analysis of an additional buffer to account for indirect impacts (Section 4[f] park properties, cultural resources), the nature of the resource (visual resources), or agency screening requirements (FRA buffer thresholds for noise and vibration). With the exception of Alternative 1A, the No Project Alternative, each projected alignment footprint was determined by mapping the areas of new right-of-way or new impacts, including possible yard locations. Data for Alternative 1A were based on the existing railroad rights-of-way. Under this alternative, new impacts would not be expected to occur; however, data were quantified for comparison purposes. Detailed results for all alternatives are presented in Appendix E.

A Natural Resources

For the purposes of this overview, the natural environment is comprised of biological, water, and geological resources. The natural resources overview is discussed below.

Biological Resources

Information from the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game, the California Natural Diversity Database (CNDDB), and local and regional land use and land planning documents was queried to identify potential biological resources within the alignment footprints. No USFWS-designated critical habitat is located within any of the proposed alignments.

The CNDDB database provides a summary of reported species occurrences[7] within a specific geographic boundary. It should be noted that the lack of species information cannot be assumed as an indication of the absence of a species in the area, but merely reflects that specific data has not been reported in the system. Reported incidents within each alignment footprint range from 0 to 10, and include flora and/or fauna listed as threatened, endangered, or as species of concern (Table 11). Because most instances have been recorded as a result of past or ongoing projects, these reports are concentrated in areas of existing development. This is reflected in the large number of incidents reported for those alternatives that use existing infrastructure in central Fresno (Alternatives 1A [10],

[7] One occurrence represents a visual sighting of one or many species (it could be one sighting of one bird or one sighting of 50 birds).

2A [8], 2B [8], 3B [8], and 4B [8]), and the absence of reported data for the alternatives that are exclusively outside the central Fresno area (Alternatives 3C1, 3C2, 4C1, and 4C2). As is to be expected, Alternative 2C, which follows existing infrastructure but contains a smaller corridor, had fewer reported incidents (3) than those alternatives with a wider corridor.

Table 11 – CNDDB Species Occurrences

Species		Status [a]	Alternatives
Common Name	Scientific Name		
Antioch efferian robberfly	*Antioch Efferian Robberfly*	—	1A, 2A, 2B, 3B, 4B
California jewel-flower	*Caulanthus californicus*	F-E; S-E; CNPS-1B.1	1A, 2A, 2B, 3B, 4B
California satintail	*Imperata brevifolia*	CNPS-2.1	1A, 2A, 2B, 3B, 4B
California tiger salamander	*Ambystoma californiense*	F-T; S-PC/SC	1A, 2A, 2B, 3B, 4B
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*	CNPS-1B.1	1A, 2A, 2B, 3B, 4B
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	F-E; S-E	1A, 2A, 2B, 3B, 4B
Hurd's metapogon robberfly	*Metapogon hurdi*	—	1A, 2A, 2B, 3B, 4B
Molestan blister beetle	*Lytta molesta*	—	1A, 2A, 2B, 3B, 4B
Sanford's arrowhead	*Sagittaria sanfordii*	CNPS-1B.2	1A
Western mastiff bat	*Eumops perotis*	—	1A

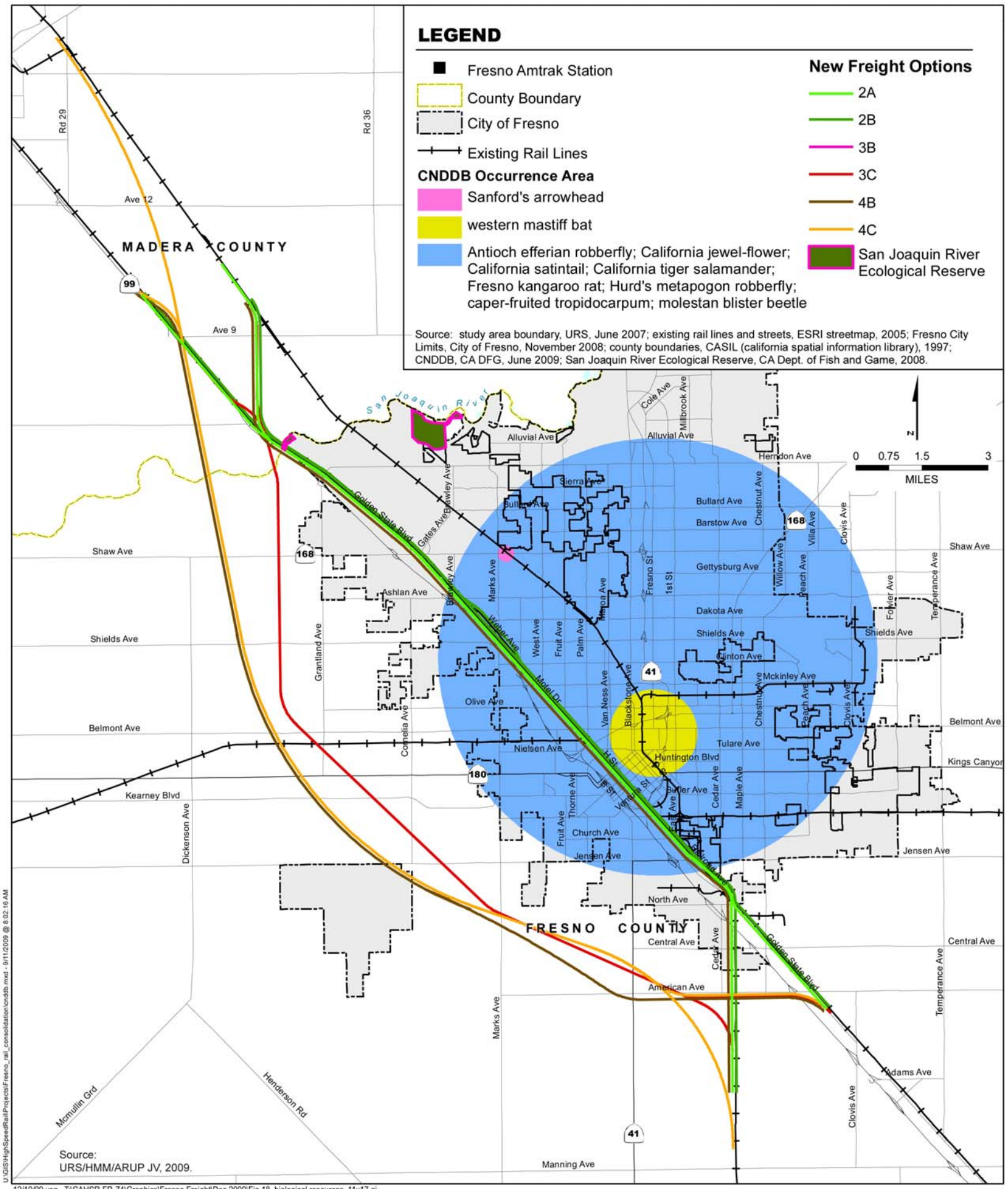
Notes:
CNDDB = California Natural Diversity Database
[a] F-E: Federally listed as Endangered; S-E: State listed as Endangered; CNPS-1B.1: California Native Plan Society [CNPS] Rare, Threatened, or Endangered in California (CA) and Elsewhere, Seriously Threatened in CA; CNPS-2.1: Rare, Threatened, or Endangered in CA, Seriously Threatened in CA; F-T: Federally listed as Threatened; S-PC/SC: State listed as Proposed Candidate Species/Species of Concern; CNPS-1B.2: Rare, Threatened, or Endangered in CA and Elsewhere, Fairly Threatened in CA; —: No status data available.

One wildlife preserve, the San Joaquin Ecological Preserve, is located along the San Joaquin River (Figure 18). Large circles and not more specific boundaries were used for the purpose of either: confidentiality to not provide exact location of a species that they may want to keep confidential (like with cultural resources), or the exact location is not known, but they have knowledge of the general area. Alternatives 2A, 2C, 3B, and 4B could impact the preserve. Alternative 2C would have the greatest impact (1.7 acre); Alternative 2A would have the second greatest impact (1.0 acre) Alternatives 3B and 4B would both impact approximately 0.6 acre of the preserve.

Water Resources

Water resources data collected for this overview include information on wetlands and special aquatic resources, 100-year floodplains, and the location of natural waterways within the proposed alignment footprints. This information provides an indication of potential compliance

Figure 18 – Biological Resources



issues related to Section 404 of the Clean Water Act, Executive Order 11988 Floodplain Management, and Executive Order 11990 Protection of Wetlands, as well as areas of potentially high sensitivity for biological resources. Data were collected from the USFWS National Wetlands Inventory, GIS Holland vernal pool complex data, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) floodplain data, U.S. Geological Survey (USGS) mapping, and aerial photography, and is presented in Figure 19. No vernal pools are present within the study area. However, each of the proposed alternatives would impact wetlands. Alternatives that consolidate the rail lines through Fresno would potentially impact the least area of wetlands (Alternatives 2A, 2B, and 2C), while alternatives that would place both the BNSF and UP lines on a western bypass would impact the most area (Alternatives 3C1, 3C2, 4C1, and 4C2).

FEMA data documents that areas of designated 100-year floodplain occur predominantly in Madera County, along the San Joaquin River, and through central Fresno; however, areas are also intermittently present throughout the study area. Those alternatives that would keep facilities in the central Fresno area would impact the greatest acreage of 100-year floodplain; Alternative 2C would impact 67 acres, and Alternatives 2B, 3B, and 4B would each impact more than 40 acres of the floodplain; however, these would each encompass more than 25 *fewer* acres than are contained within the existing rights-of-way (Alternative 1A, No Project). Alternatives 3C1 and 3C2 would impact approximately 28 acres of designated 100-year floodplain, the least amount of all considered alternatives.

Each alternative would require a crossing of the San Joaquin River, which forms the boundary of Madera and Fresno counties. Alternatives 2A, 2B, and 2C would bisect the westernmost portion of the proposed San Joaquin River Parkway, an area that extends east of State Route 99. The Parkway and associated *San Joaquin River Parkway Master Plan* was delineated with the goal of preserving, protecting, and restoring the natural resources of the corridor and to provide for resource-sensitive public use of the river. Each alternative crosses the San Joaquin River. Alternatives 4C1 and 4C2 also cross two other waterways: Cottonwood Creek and Little Dry Creek.

Geological Resources

Geologic data were obtained from the U.S. Department of Agriculture Natural Resources Conservation Service, Soil Survey, land use planning documents, and a desktop review by a geologist. The Safety Element of the *2025 Fresno General Plan* states "Fresno is in one of the more geologically stable areas of California..." No known seismic faults that cross any of the alternative corridors. A geologist reviewed the study area, and determined there was a low likelihood for soils with high landslide potential to be present in any of the corridor alignments. However, areas of highly erodible soils were identified, and are primarily concentrated southeast of the project vicinity (Figure 20). A small area (less than 5 acres) is located north of the San Joaquin River, within the footprint of Alternatives 4B, 4C1, and 4C2.

B Cultural Resources

Cultural resources include historic and prehistoric resources and can be buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. Cultural resources that have determined to be worthy of preservation are listed on the National Register of Historic Places (NRHP). For the purposes of this overview, cultural resources include historic resources (standing structures, buildings, or objects, generally more than 45 years old) and archaeological sites within 0.25 mile of an alignment footprint. An expanded buffer zone was used to identify cultural resources that may be both directly (within the alignment footprint) or indirectly (impacts to setting) impacted by an alternative.

Figure 19 – Water Resources

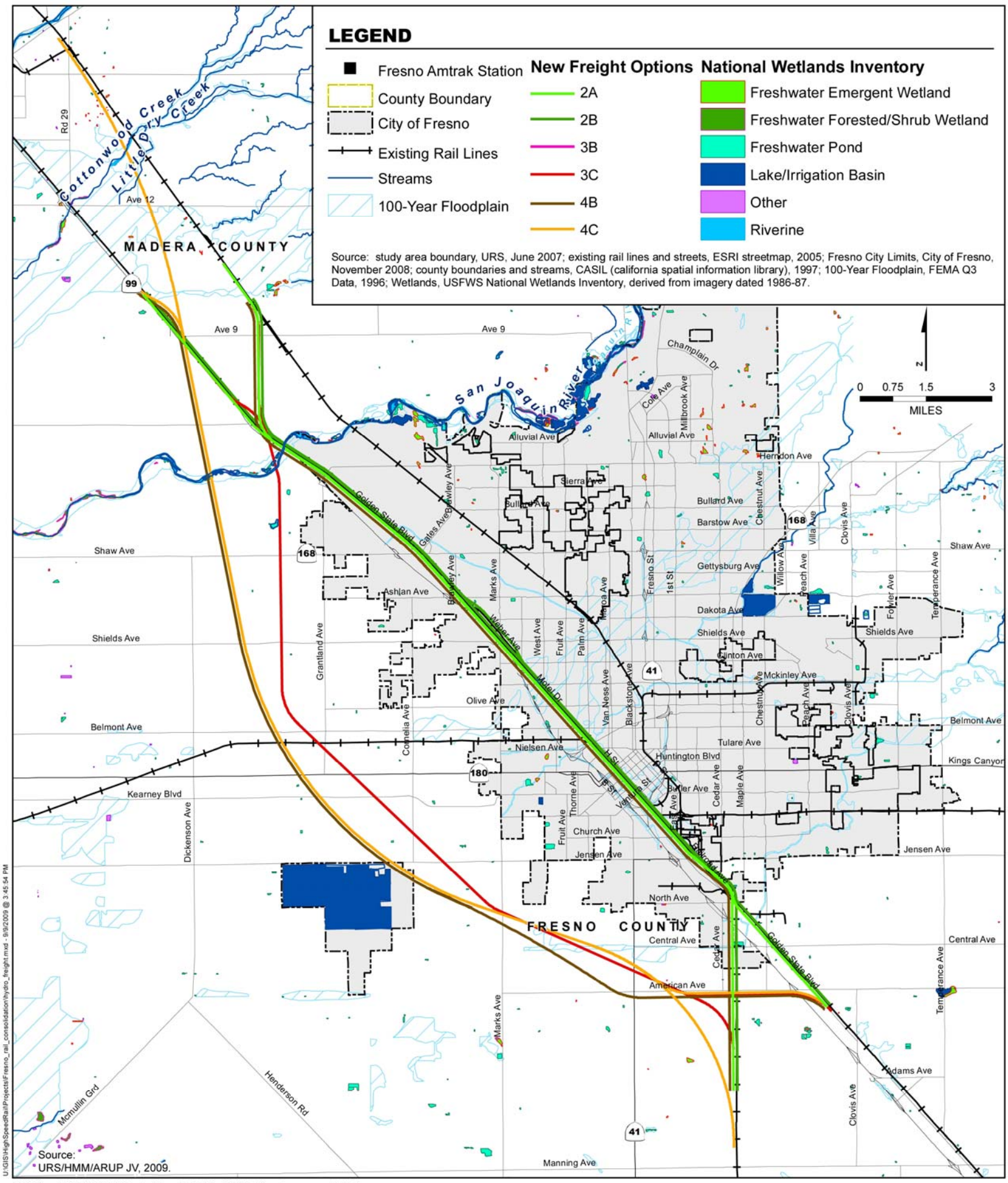
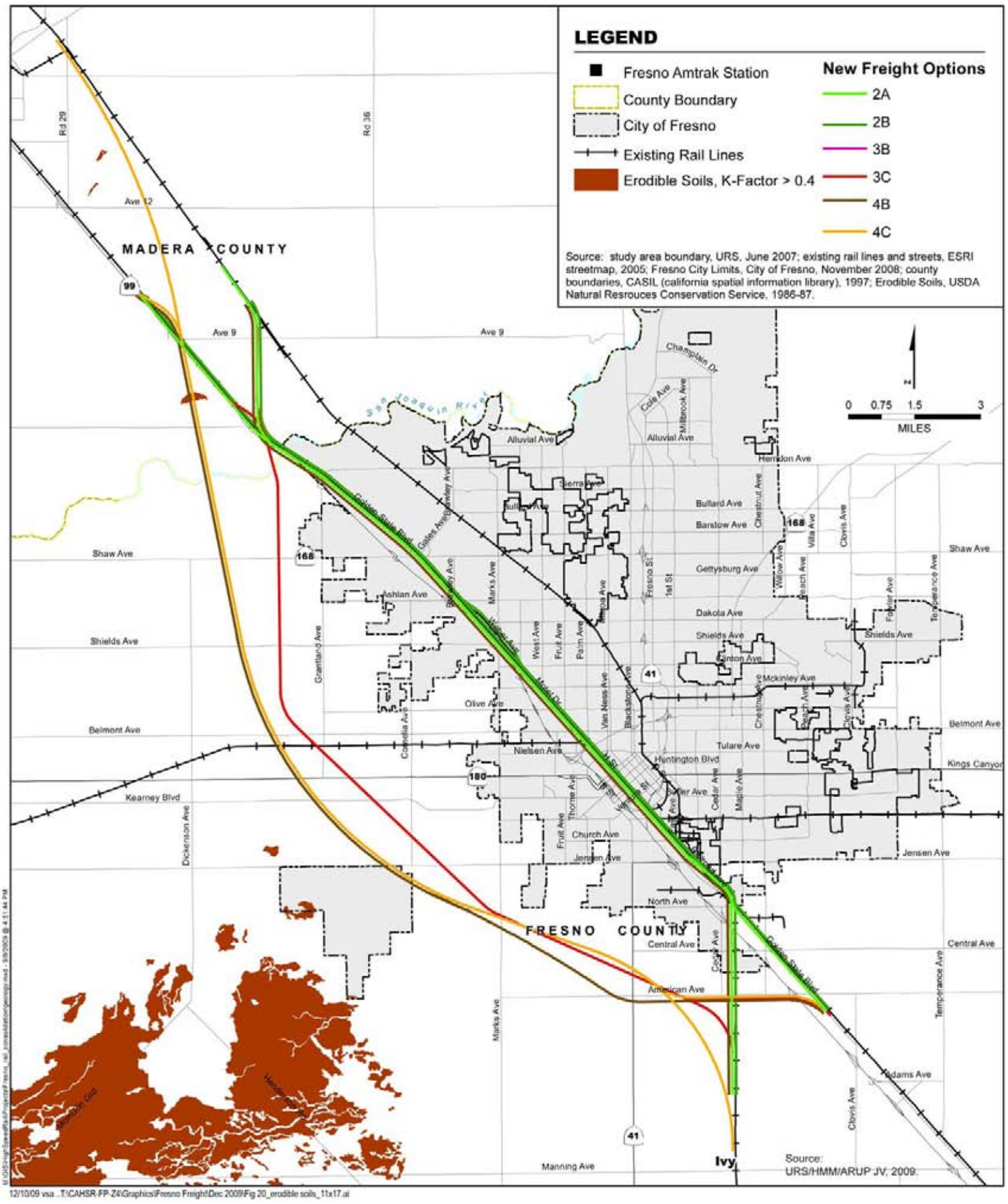


Figure 20 – Erodible Soils



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Data were compiled from the NRHP; the California Historical Resources Information System (CHRIS), specifically site files on record at the Southern San Joaquin Valley Information Center; and from the City of Fresno's Historic Places GIS data. Historic property and archaeological site records provide an inventory of previously identified cultural resources. However, these data may not be indicative of the actual number of cultural resources that may be present in an alignment corridor, because some areas may not have been previously surveyed and/or survey information may be dated or obsolete. Cultural resources data are summarized below.

Previous Investigations

Information on previous cultural resources investigations was obtained through the CHRIS. Preliminary data were used to identify the approximate number of linear miles of survey that have been conducted within an alignment corridor. No specific information relative to the date or adequacy of these previous investigations was obtained. This information is presented to provide a comparative quantification of previous investigations, primarily to inform the discussion of previously identified cultural resources, as discussed below. Specifically, for those alignment alternatives that have undergone a large number of previous investigations, such as Alternative 1A (48 linear miles) data on the number of reported historic properties may reflective of actual resources in the corridor. Correspondingly, alternatives that have not been previously surveyed would reflect an increased uncertainty in regard to quantification of actual historic properties in a given corridor (Alternatives 4C1 and 4C2 [2 linear miles]).

Historic Properties

Seventeen NRHP-listed properties were identified within the study area; two of the properties are railroad depots (the Santa Fe Passenger Depot and the SP Passenger Depot). An additional 53 historic properties were identified from the City of Fresno Historic Places GIS data and the CHRIS. Historic properties are overwhelmingly located in central Fresno; only six properties (the NRHP-listed Kearny M. Theo Park and Mansion, the Forestiere Underground Gardens, and canals and buildings) are located outside the downtown area (Figure 21). One segment of an existing railroad alignment has also been recorded.

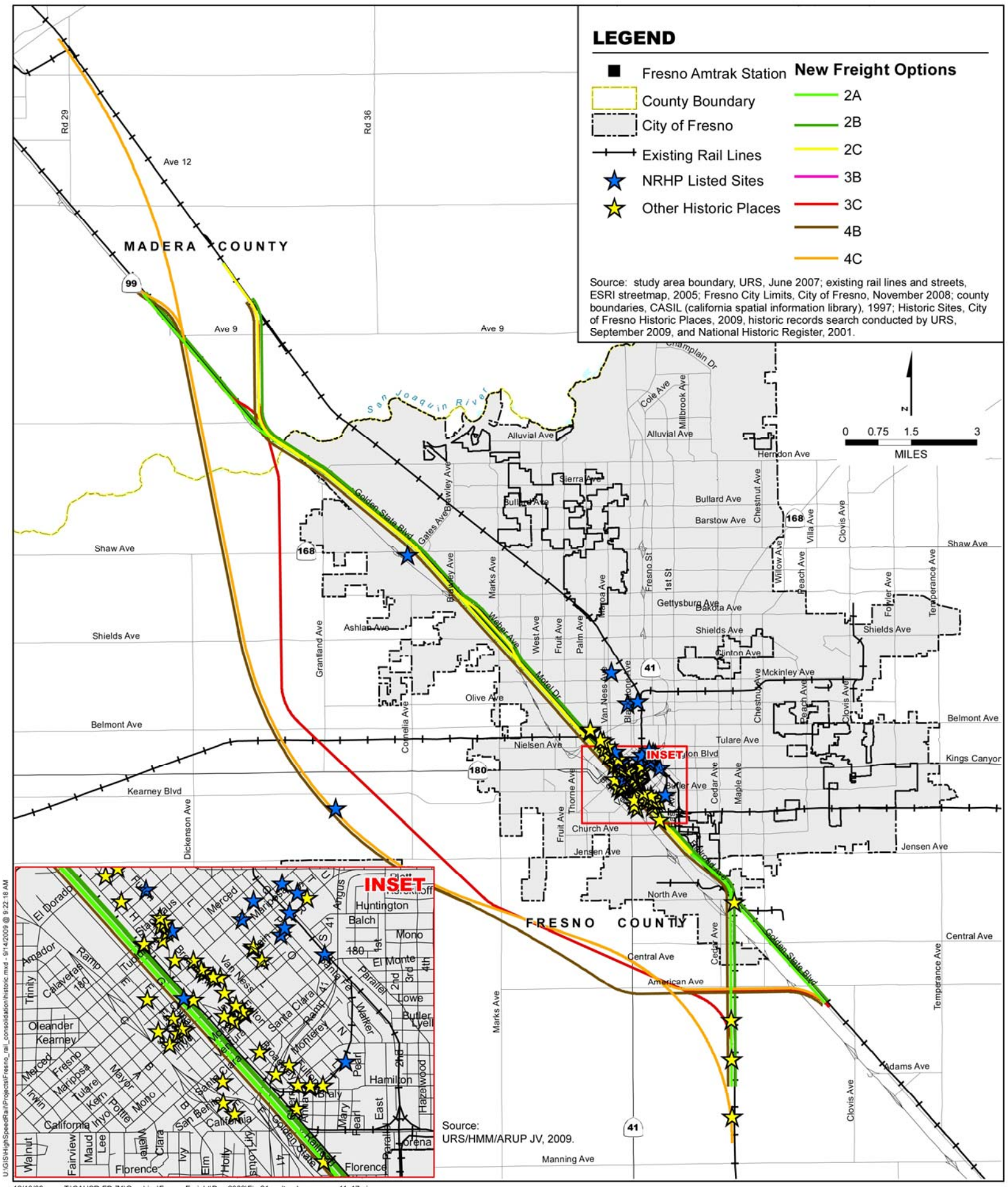
Because the previously identified cultural resources are concentrated in the Fresno city core, those build alternatives that maintain rail service through Fresno could potentially impact most of the historic properties. Alternative 2B could impact 52 properties, including five that are NRHP-listed. Alternative 4B may impact 52 properties, including five that are NRHP-listed). Alternatives 2A and 2C would also impact a commensurate number of properties (50, including four that are listed on the NRHP). In contrast, Alternatives 4C1 and 4C2 would only impact two known historic properties, one of which is listed on the NRHP. Only one historic property was identified within 0.25 mile of Alternatives 3C1 and 3C2. However, as discussed above, alternative alignments that have not been previously surveyed for cultural resources may include numerous additional resources that have not yet been recorded.

Alternative 1A, the No Project Alternative, is the only alignment within 0.25 mile of a designated historic district. However, Alternatives 2A, 2B, 3B, and 4B are all located within 0.25 mile of three areas proposed as historic districts (City of Fresno, 2007).

C Built Environment

For the purposes of this overview, the built environment comprises protected agricultural land (prime or unique farmland; farmland of statewide or local significance; farmland committed to agricultural under the Williamson Act), sensitive receptors for noise and vibration; hazardous materials sites; Section 4(f) and Section 6(f) properties; and visual resources. These considerations are discussed below.

Figure 21 – Cultural Resources



12/10/09 vsa ..T:\CAHSR-FP-Z4\Graphics\Fresno Freight\Dec 2009\Fig 21_cultural resources_11x17.ai

Agricultural Land

For the purposes of this overview, agricultural land was considered protected if it met the criteria of the Farmland Protection Policy Act and the California Land Conservation Act of 1965 (commonly referred to as the Williamson Act). The amount (in acres) of potentially protected farmland in each alignment footprint was calculated based on the California Department of Conservation Farmlands Mapping and Monitoring Program, and the California Department of Conservation Division of and Resource Protection.

The Farmland Protection Policy Act applies to federal programs, funding, actions, and assistance; this act was intended to minimize the impact that federal actions have on unnecessary and irreversible conversion of farmland to nonagricultural use. The act specifically applies to prime farmland, unique farmland, and farmland of statewide or local importance. The Williamson Act preserves agricultural lands and open space by creating arrangements whereby private land owners enter into contract agreements with counties and cities to voluntarily restrict use to agricultural and open space use.

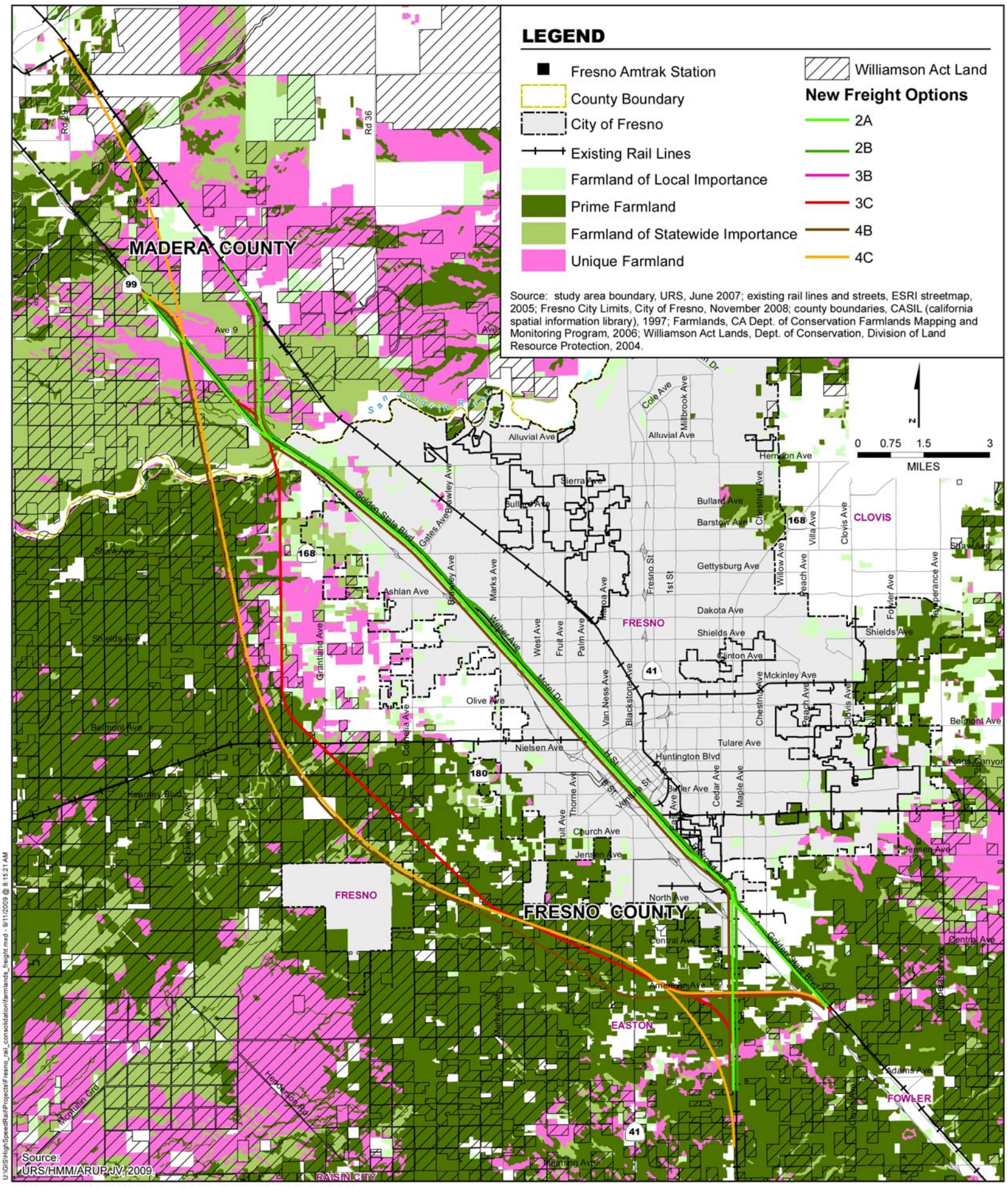
Protected agricultural land is concentrated outside the Fresno city limits (Figure 22). As such, alternatives that maintain service within the city limits have substantially less potential impact to these agricultural lands than do the alternatives that include a bypass. For example, Alternatives 2A and 2B, which consolidate rail service through Fresno, could impact up to approximately 46 acres of prime and unique farmland and farmland of statewide or local significance, and require the conversion of up to 14 acres of land under existing Williamson Act contracts. By contrast, Alternatives 4C1 and 4C2, which would use a western bypass and include HST geometry, could require the conversion of approximately 840 acres of protected farmland, and up to 603 acres of land under Williamson Act contracts.

Noise and Vibration

The potential for each alignment alternative to result in noise and vibration impacts was quantified based on the number of known sensitive receptors in proximity to each corridor. Sensitive receptors were estimated from existing land use data and USGS information. The inventory was also based on Federal Transit Administration land use categories (per FRA guidance), as shown in Table 12; and FRA analysis buffers for sensitive noise receivers (700-foot buffer in urban areas and 1,300-foot buffer in rural areas) and sensitive vibration receivers (275-foot buffer urban and rural areas).

As would be expected based on existing development, those alignment alternatives that would maintain freight service within the Fresno City limits would have the potential to result in noise and vibration impacts to greater number of receivers than would the alignments that bypass the city center. Alternative 2B, which would place the BNSF east of the UP, could potentially impact the most receivers (1,076 [noise] and 348 [vibration])—more than 200 more noise or vibration receivers than if the BNSF were placed west of the UP. Realignment of the rails would substantially reduce the total number of sensitive noise and vibration receivers affected by rail operations, when compared with the No Project Alternative (5,500 [noise] and 1,562 [vibration]). However, those receivers that would be impacted by a consolidated line may experience increases in noise and vibration impacts. Alternatives 4C1 and 4C2, which would consolidate BNSF and UP on the westernmost bypass, could impact the least number of noise-sensitive receivers (34), and impact no vibration-sensitive receivers, reflecting the sparse and intermittent development west of the city limits.

Figure 22 – Important Farmlands



Hazardous Materials

Known hazardous materials within the alignment footprints were obtained from U.S. Environmental Protection Agency (i.e., Comprehensive Environmental Response, Compensation, and Liability Information System and Resource Conservation and Recovery Act data), California Environmental Protection Agency (i.e., Department of Toxic Substances Control's contaminated sites), the California State Water Resources Control Board (Underground Storage Tanks-Cleanup Sites), and the National Response Center's databases. The data search was limited to the proposed alignment footprint, and did not conform to American Society for Testing and Materials search radii. A formal Phase I site assessment was not completed.

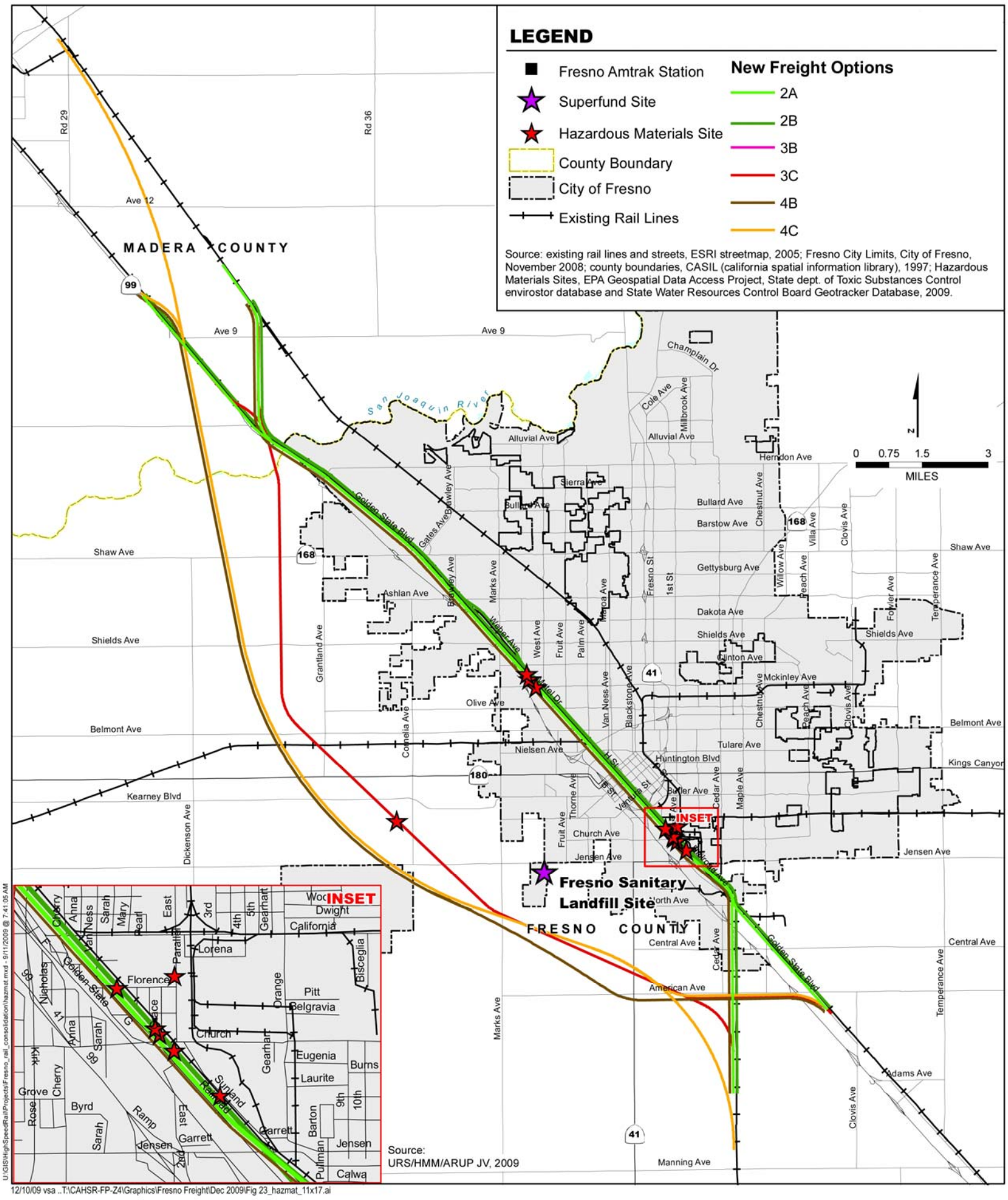
Table 12 – Noise and Vibration Analysis Use Categories

Noise Analysis Categories	
Category 1	Land where quiet is an essential element of intended purpose. Includes lands set aside for serenity and quiet, and land uses such as outdoor amphitheaters and concert pavilions, as well as national historic landmarks with significant outdoor use. Also included are recording studios and concert halls.
Category 2	Residences and buildings where people normally sleep. Includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
Category 3	Institutional land uses with primarily daytime and evening use. Includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.
Vibration Analysis Categories	
Special Buildings	Buildings that can be very sensitive to vibration and noise but do not fit into the other three categories and warrant special attention (e.g., concert halls, television and recording studios, and theaters).
Category 1	Buildings where vibration would interfere with interior operations (e.g., research and manufacturing; hospitals with vibration-sensitive equipment; university research operations).
Category 2	Residences and buildings where people normally sleep (e.g., hospitals, hotels, residences).
Category 3	Institutional land uses with primarily daytime use (e.g., places of worship, schools, offices). Excludes buildings primarily for industrial use.
Notes: [a] Sensitive noise receptors do not apply to most commercial or industrial uses, but do apply to business uses which depend on quit as an important part of operations.	

Ten locations with reported hazardous materials were identified (Figure 23). Six of these sites are located in downtown Fresno, three are located in north-central Fresno, and one is located west of the Fresno city boundaries. The Alternative alignments that would cross downtown Fresno could impact the greatest number of reported hazardous materials sites (Alternatives 2A, 2B, and 2C), while the alternatives furthest removed from the city core would not cross any reported hazardous materials sites.

A search of the National Response Center's database reported approximately 142 railroad incidents occurring in or near Fresno. Specific location information was not available; therefore, these incidents could not be plotted. However, data associated with the incidents reveals that at least 26 of these reports occurred on Amtrak, BNSF, or UP lines or facilities, four of which were in

Figure 23 – Hazardous Materials



rail yards. However, 18 of these were nonreleases and were related to accidents or other incidents of bodily harm. The remaining eight incidents included releases of diesel and sodium hydroxide spills.

No Superfund sites or landfills are reported within the alignment footprints. However, although it is mapped outside of the analysis corridor, it should be noted that the Fresno Sanitary Landfill Superfund site is within 1.25 miles of Alternatives 3C1, 3C2, 4C1, and 4C2. The 145-acre site is located 3 miles west of State Route 99, south of Jensen Avenue. The landfill was owned and operated by the City of Fresno from 1935 to 1989. Methane gas, vinyl chloride, and contaminated groundwater had migrated from the landfill to the surrounding areas.

Railroad facilities could include facilities and features that may be considered contaminated with hazardous materials. Chemical or creosote treatment of railroad ties; contamination associated with regular maintenance activities (e.g., weed control); leaks from equipment, material transfers, and accidents; and discarded materials from adjacent industries may result in hazardous materials in the soil and on the surface of rail corridors.

Section 4(f)/Section 6(f) Properties

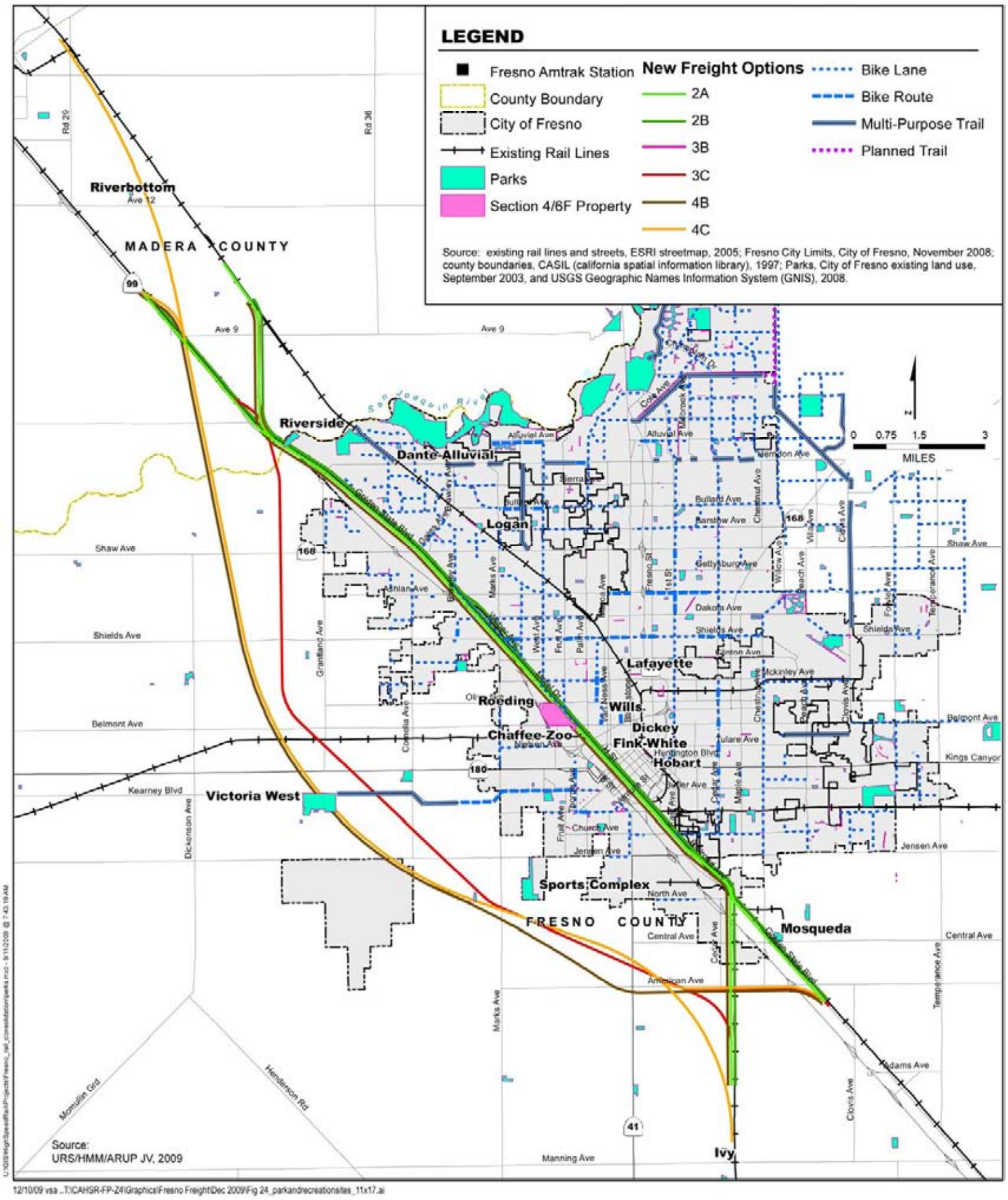
Section 4(f) of the Department of Transportation (DOT) Act of 1966 stipulated that DOT agencies in the United States cannot approve the use of land from publicly-owned parks, recreational areas, wildlife and waterfowl refuges, or historical sites unless the following conditions apply: (1) there is no feasible and prudent alternative to the use of land; and (2) the action includes all possible planning to minimize harm to the property resulting from use. "Use" as defined in Section 4(f) can include the conversion of land into a transportation use, or indirect impacts that impair the characteristics of a resource that qualify it for protection under Section 4(f).

Therefore, for the purposes of this overview, information on possible parks, recreation areas, wildlife and waterfowl refuges, and historic sites was gathered within a 0.25-mile buffer of each alignment footprint. Information on parks and recreation areas (including bike paths and trails) was obtained from City of Fresno existing land use data and USGS databases. For the purposes of this analysis, the San Joaquin River Ecological Preserve was considered a possible wildlife/ waterfowl refuge. Although the City of Fresno maintains information on many historic resources, only those listed on the NRHP were included in tabulation for historic properties that qualify for Section 4(f) protection. Potential Section 4(f) properties are presented in Figure 24.

In general, park/recreation areas and NRHP-listed properties are concentrated in the city of Fresno. Therefore, alternatives that maintain freight service through the city have the potential to impact more Section 4(f) properties than those alternatives that shift service outside of the city limits. Of the build alternatives, Alternative 2C could potentially impact the greatest number of known Section 4(f) properties (22)—almost half of which are bike trails. Alternatives 2B and 4B could potentially impact the next greatest number of known Section 4(f) sites (12). Alternatives 3C1 and 3C2 would impact the least; only two Section 4(f) properties (the Victoria West Community Park and a multi-use trail) are within 0.25 mile of these alignment footprints.

Section 6(f)(3) of the Land and Water Conservation Fund (LWCF) contains provisions to protect certain park and recreational facilities (Section 6[f] properties). The law discourages conversion of park and recreation facilities by ensuring that proposed changes or conversions will not be approved without a finding that the proposed project is in compliance with the existing comprehensive statewide outdoor recreation plan. Furthermore, conversion from a park or recreational use also requires substitution of other recreation properties. One Section 6(f)

Figure 24 – Parks and Recreation Sites



property is located within the study area: Roeding Regional Park. The park encompasses 159 acres, and has received LWCF funds for development and rehabilitation of picnic areas, development of sports and play fields and courts, landscaping, irrigation, lighting, pathways, and fencing. Alternative 2A may require the conversion of Roeding Regional Park Land. Alternatives 2A, 2B, 3B, and 4B could all increase noise and other effects on Roeding Regional Park. No other Section 6(f) properties are located in the study area.

Visual Resources

To obtain information about existing visual management objectives, sensitive viewpoints, or key observation points, data were queried from land management agencies, land use and planning documents, and the California Scenic Highway Mapping System. No federal lands with visual management classifications or objectives are located within 0.25 mile of the proposed corridors. No state- or federally-designated or eligible scenic highways are located within 0.25 mile of any of the proposed alternatives. Local scenic corridors/boulevards were identified by review of Policy E-4-b of the Public Facilities Element of the *2025 Fresno General Plan.* Three locally-designated scenic corridors/boulevards are within the study area: Van Ness/Fulton Couplet, and portions of Kearny Boulevard and Van Ness Boulevard. Current facilities (Alternative 1A, No Project) are within 0.25 mile of two of these scenic corridors/boulevards. Of the build alternatives, Alternative 3B would be within 0.25 mile of the most corridors (two), Alternative 2C crosses one scenic corridor, while Alternatives 4C1 and 4C2 would not be in proximity to any scenic corridors. All other build alternatives would be within 0.25 mile of one of the scenic corridors.

Potential visual impacts from new grade-separated structures were also assessed through an inventory of grade/separated structures located within 0.25 mile of residential areas (Figure 25). Alternatives that maintain rail service through the Fresno city core have substantially higher number of grade-separated structures that could result in impacts to nearby residents. Alternatives 2A and 2B would result in the most (eight) grade-separated structures in close proximity to residential areas, while all other build alternatives would only result in one (Alternatives 3B, 3C1, 3C2, 4C1, and 4C2) or two (Alternative 4B).

D Evaluation of Realignment Alternatives – Environmental Considerations

Alternative 1A

The No Project Alternative would continue to have impacts to the greatest number of noise and vibration sensitive receptors, 5,500 and 1,562, respectively.

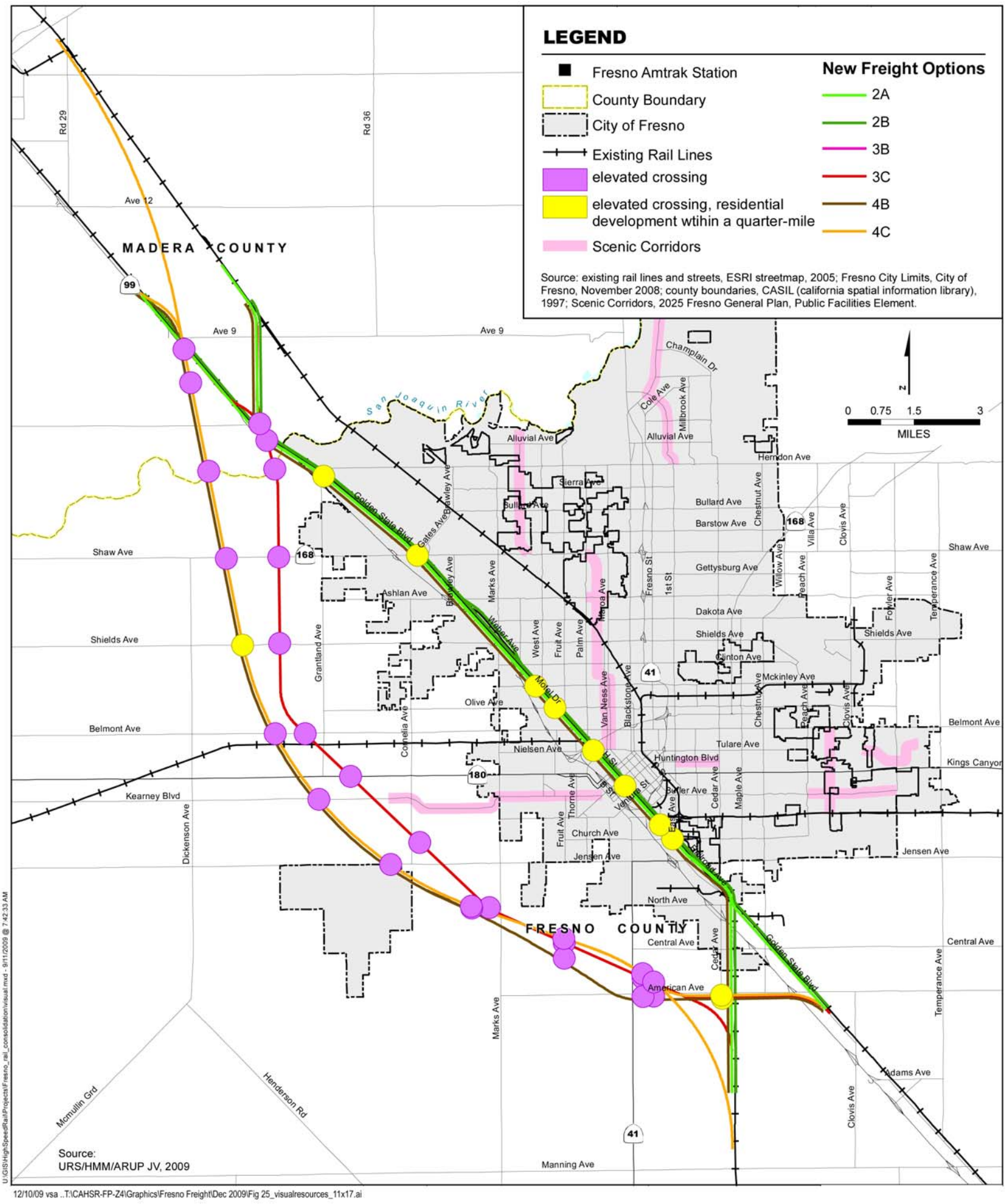
Alternative 2A

This alternative would impact the smallest area of wetlands/special aquatic resources, 2.9 acres less than Alternatives 4C1 and 4C2. As would be expected, the alternatives that consolidate freight service through Fresno would impact the least amount of farmland; Alternative 2A would impact the least amount of state- and locally-important farmland.

Alternative 2B

This alternative, as with the other alternatives that consolidate or maintain service within downtown Fresno, would have potential impacts to the greatest numbers of historic properties and districts; of those alternatives, Alternative 2B could impact the most known cultural resources/districts. As would be expected, the alternatives that consolidate freight service through Fresno would impact the smallest amount of farmland; Alternative 2B would impact the smallest amount of unique farmland or Williamson Act lands. This alternative, as with the other

Figure 25 – Visual Resources



alternatives that consolidate or maintain service within downtown Fresno, would have potential impacts to the greatest numbers of sensitive noise and vibration receptors. Alternative 2B could impact the most new noise and vibration receptors of the build alternatives (1,076 and 348).

Alternative 2C

This alternative's narrower corridor results in crossing areas that have five fewer reported sensitive species than the other realignment alternatives that maintain rail service through Fresno (i.e., Alternatives 2A, 2B, 3B, and 4B). However, this alternative would require reconstruction of segments of the existing railroads and therefore, would have a greater impact on certain resources. For instance, Alternative 2C would cross the largest amount of designated wildlife/waterfowl refuge or preserve (1.7 acres), the largest amount of area designated as within a 100-year floodplain, and would have potential impacts to the most Section 4(f) properties (22). This alternative would also impact the greatest number of hazardous materials sites.

Alternative 3B

As would be expected, the alternatives that consolidate or move freight service on a bypass would impact the greatest amount of farmland; however, of these, Alternative 3B would impact the least amount of prime, unique, or state-important farmland and Williamson Act lands.

Alternative 3C1

As with the other full bypass alternatives, this alternative would not impact designated wildlife/waterfowl refuge or preserve, or cross areas of reported sensitive species. However, it is important to note that the absence of reported species likely reflects the lack of previous work in the area, not poor-quality habitat or the absence of sensitive species. Alternative 3C1, along with Alternative 3C2, would potentially impact the smallest number of known cultural resources. As would be expected, the alternatives that consolidate move freight service on a bypass would impact the most amount of farmland; of these, Alternative 3C1 would impact the most farmland of statewide importance.

Alternative 3C2

As with the other full bypass alternatives, this alternative would not impact designated wildlife/ waterfowl refuge or preserve, or cross areas of reported sensitive species. However, as with Alternative 3C1, the absence of reported species may reflect the lack of previous work it the area, not poor quality habitat or the absence of sensitive species. Alternative 3C2, along with Alternative 3C1, would potentially impact the smallest number of known cultural resources; these bypass alternatives are the only alternatives not within 0.25 mile of a NRHP-listed property. As would be expected, the alternatives that consolidate or move freight service on a bypass would impact the greatest amount of farmland; of these, Alternative 3C2 would impact the most farmland of local importance.

Alternative 4B

The western bypass HST geometry alternatives are the only alternatives that cross areas of highly erodible soils. Of these, this alternative impacts the least (2 acres), 3 fewer acres than Alternatives 4C1 and 4C2. These bypass alternatives are the only alternatives not within 0.25 mile of a NRHP-listed property

Alternatives 4C1 and 4C2

As with the other full bypass alternatives, these alternatives would not impact designated wildlife/waterfowl refuge or preserve, or cross areas of reported sensitive species. These

alternatives would impact more wetlands/special aquatic resources than any other alternative. The western bypass HST geometry alternatives are the only alternatives that cross areas of highly erodible soils; these alternatives impact 5 acres of such soil. As would be expected, the alternatives that consolidate or move freight service on a bypass would impact the greatest amount of farmland; of these, Alternative 4C1 would impact the most prime farmland and Williamson Act lands and Alternative 4C2 would impact the most unique farmland. Alternatives 4C1 and 4C2 could result in impacts to the fewest noise and vibration receptors of the build alternatives (34 and 0, respectively), and also have the fewest visual resources impacts.

6.4 Alternatives Recommended for Further Development

The following project alternatives are recommended to be carried forward for further study if HST is considered. Those alternatives are:

- Alternative 1A: No Project (baseline)
- Alternative 2C: BNSF and UP through town – minimum right-of-way
- Alternative 3B: BNSF through central Fresno, UP on western bypass (freight geometry)
- Alternative 3C1 and 3C2: BNSF and UP on western bypass (freight geometry)
- Alternative 4B: BNSF through central Fresno, UP on western bypass (HST geometry)
- Alternative 4C1 and 4C2: BNSF and UP on western bypass (HST geometry)

The following project alternatives are also recommended if HST if not considered:

- Alternative 2A: BNSF west of UP—due to the number of displacements and potential impacts to Roeding Park
- Alternative 2B: BNSF east of UP—due to the number of displacements

7.0 CONCLUSIONS

Fresno has long sought to improve the quality of life in portions of the city by consolidating the two railroads that serve Fresno on a single alignment. This has been city policy for nearly 100 years, and is similar to the reasons for realignment projects that have been accomplished in other cities around the United States, each driven by local concerns, and usually pursued by local governmental entities as the prime mover of the projects.

This study has developed a set of feasible alternatives that can be refined through further design and evaluation, and identified potential environmental issues for further study in subsequent processes.

Criteria and priorities for assessing freight rail realignment alternatives will differ among the freight railroads, the City, the Fresno COG, and other stakeholders. This study is not undertaken to improve the operation of the freight railroads, but is in the interests of Fresno residents affected by train movements, and of the Fresno COG, as custodian of funding dedicated to the project under Measure "C." The project is intended to alleviate the long-standing impacts of railroad alignment and operations through Fresno neighborhoods, and is motivated by the opportunity to accomplish its objectives at the same time as another major capital project (HST) in the same corridor. Other opportunities may be availed by the project, such as minimizing some of the impacts of the HST project, and creating economic opportunity for the city and the region.

Different conclusions may be drawn if it is assumed that there are shared interests between the freight rail realignment and HST projects, or if it is assumed that the two projects are totally unrelated.

7.1 Conclusions if High-Speed Train is Not Considered

Considering only the freight railroad issues, the alternatives that enable freight rail realignment within Fresno (Alternatives 2A, 2B, and 2C) appear to be cheaper to construct, and have fewer impacts on agricultural land and environmental elements, such as erodible soils, than the alternatives with a bypass. These alternatives impose more impacts on the community, however, including impacts to cultural resources and the taking of more urban land. Alternative 2C would have fewer urban impacts than Alternatives 2A and 2B, but with compromises required of the railroads in terms of right-of-way width. From the railroads' perspectives, Alternative 2C would probably be less desirable than all of the other alternatives because of the narrower right-of-way width. From the railroads' perspectives, Alternatives 3C or 4C would likely be the most desirable, giving both of the railroads new alignments and yards. If HST is not a factor, there does not seem to be a benefit to moving the UP away from central Fresno and vacating the Fresno Yard.

The chief drawback of the alternatives that align all freight rail through the city center (Alternatives 2A, 2B, and 2C) is that if the freight railroads each require a separate 100-foot right-of-way as shown for Alternatives 2A and 2B, the right-of-way impact through central Fresno would increase from the current minimum 100-foot width to 200 feet, potentially requiring the removal of a number of structures. This could be mitigated by negotiation with the railroads for a narrower right-of-way in places, which would still be within the CPUC clearance requirements. This is shown in Alternative 2C.

Institutionally, if HST is not a factor in the project, all of the institutional options related to railroad right of way ownership are open except the involvement of the CHSRA as a partner in project implementation.

7.2 Conclusions if High-Speed Train is Considered

The freight realignment and HST studies are both considering the same corridor through central Fresno. It is necessary to address the concurrent needs of both projects, and to seek opportunities to craft synergistic solutions that result in mutual advantages. All recommended alternatives are feasible when considering the perspective from the CHSRA, but some alternatives, better accommodate HST than others. For instance, the issue of right-of-way width noted above is more severe if HST is taken into consideration. If both freight railroads operate through central Fresno, as in Alternatives 2A and 2B, the unmitigated combined right-of-way requirements are for 200 feet for the freight railroads, or 100 feet more than the existing UP right-of-way. If HST right-of-way is added to that, approximately 130 to 135 feet of additional width are required for the four-track HST station section, resulting in a total railroad corridor width of 330 to 335 feet. .Alternative 2C could enable this width to be reduced by 60 to 65 feet, but it is still considerably wider than the current right-of-way. The impact of any of these widths on central Fresno could be substantial in terms of the amount of land that is now in urban use that would have to be dedicated to rail rights-of-way. Alternatives that include a bypass for one or both freight railroads accommodate HST right-of-way better than do the alternatives that align both railroads through central Fresno. If only taking into account corridor width and impacts to central Fresno, alternatives which realign both BNSF and UP to a bypass would require the least amount of right-of-way and would best facilitate HST.

Figure 26 - HST Cross section - Preferred width

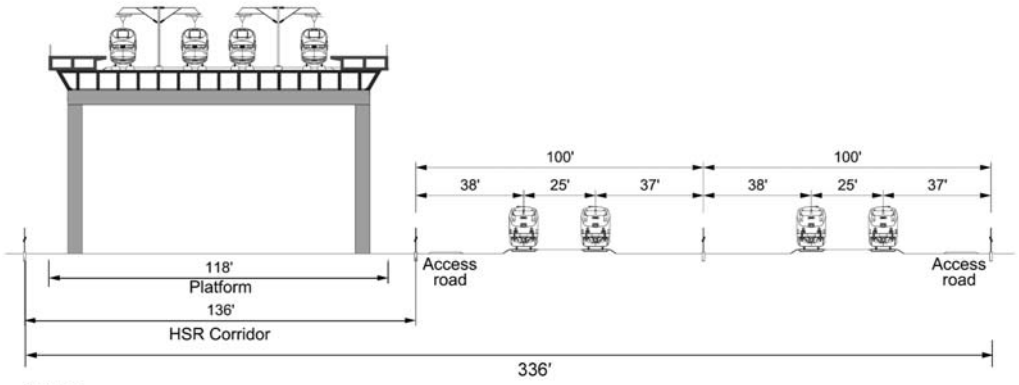


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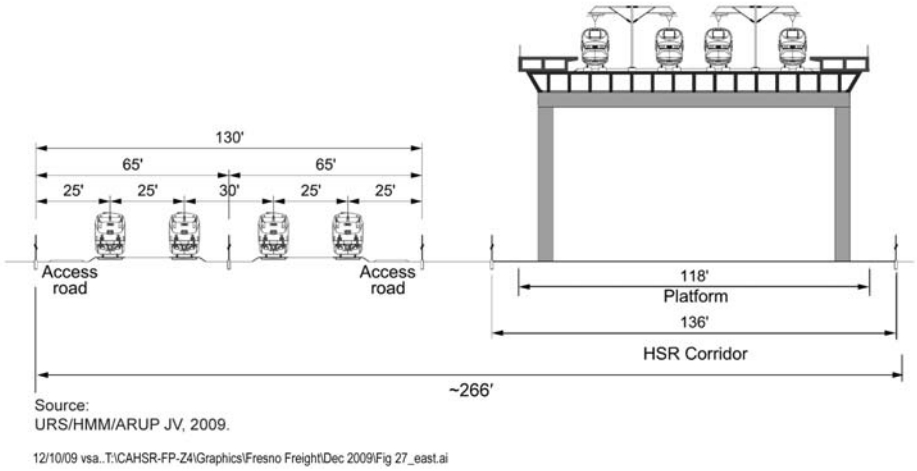
Figure 27 - HST Cross Section - Minimum CPUC requirements



In all alternatives, a secondary objective is to enable a downtown Fresno intermodal station serving both Amtrak and HST passengers. The current and long-time Amtrak contract is with the BNSF, and UP has indicated that they do not intend to accommodate passenger trains on UP tracks in Fresno. Thus, either BNSF needs to be brought into the center of Fresno to augment or replace UP, or a public entity needs to acquire the right-of-way through central Fresno—potentially hosting Amtrak and/or BNSF. From this perspective, the alternatives that move the UP onto a bypass, with BNSF operating through central Fresno on the former UP right-of-way, are more desirable because they would facilitate the co-location of Amtrak and HST in the center, fulfilling a secondary purpose and need objective. In addition, BNSF has been willing to continue discussions with CHSRA and with Fresno concerning sharing its corridor with the HST system. If an agreement were to be reached, it could reduce the required footprint for combined freight and HST through the center of Fresno.

One drawback of Alternatives 3B or 4B, from BNSF's perspective, is that BNSF would acquire the UP's right-of-way, and with it the potential liability for environmental remediation on that alignment. From the railroads' perspectives, new rights-of-way on bypasses would be preferable from the point-of-view of not inheriting an environmental remediation issue.

The alternatives that move the UP onto a bypass with an associated new yard (Alternatives 3B, 3C, 4B, and 4C), make available the current location of the UP Fresno Yard for reuse. If the entire UP right-of-way were vacated, and the UP yard replaced with a new facility on a western bypass, the land under the existing UP yard would presumably be available for sale along with the right-of-way itself.

If the BNSF and UP are relocated to a western bypass and the existing UP right-of-way is not required for Amtrak, portions of the UP can be retired and the UP right-of-way used to support the HST system. Additionally, If Amtrak operates via the UP right-of-way under one of the scenarios where both UP and BNSF are relocated to a bypass, but Amtrak and HST operate through downtown Fresno, then at least one conventional at-grade track will need to be retained throughout the UP alignment. The southern end of this track can be shared between Amtrak and SJV.

The HST system requires anywhere from 60 feet of right-of-way width to well over 100 feet where stations and other additional adjoining tracks are planned. If a potential freight realignment project frees up some or all of the existing UP right-of-way, about 100 feet would be available to the CHSRA, depending on whether some width is reserved for Amtrak and/or SJV,

and excluding any consideration of yard or maintenance facilities. It would therefore appear that the HST infrastructure could be expanded within this right-of-way if future conditions so required.

7.3 Conclusions Common to Both Freight Realignment and High-Speed Train

For any of the alternatives, public agency participation is necessary to channel resources and to coordinate the project's implementation. This role could be played by an existing agency, or by an agency formed especially for this purpose. For some alternatives, such as Alternatives 2A, 2B, 2C, 3B, and 4B, the agency could be created just for project implementation, and then be dissolved after completion. For Alternatives 3C and 4C, it is assumed that the public agency would need to be permanent to retain ownership of the current UP alignment through the center of Fresno, both to facilitate Amtrak operation to a joint Amtrak/HST station in the city center, and to provide access for SJV to their various branches serving local shippers. A public agency owner of the central right-of-way may also facilitate co-location with the HST project.

Any railroads relocated to a bypass would need a new yard. Railroad operations would not be workable with mainline operations going around Fresno on a bypass and the yards remaining in their current locations, because this would require considerable backing movements and awkward logistics. Alternatives 3C and 4C include new yards for both railroads.

7.4 Next Steps

The next steps recommended for this study are:

1. Fresno COG will review this Administrative Draft Summary Report and provide comments to the consultant.

2. The consultant will revise the Report.

3. The revised Report will be presented to the Fresno Freight Rail Realignment Study TAG, Fresno City Council, and Fresno County Board of Supervisors.

7.5 Potential Follow-Up Actions

4. Discussions could be initiated by local stakeholders with the CHSRA about potential coordination of this study with the EIR/EIS process currently underway for the HST project in the Central Valley.

5. After discussions with the Authority, discussions could be initiated with potential federal lead agencies.

6. Discussions could be initiated with state and federal representatives about use of potential funding sources.

8.0 PROJECT IMPLEMENTATION ISSUES

Regardless of which realignment alternative, if any, is selected for development, there are a number of high-level issues that will affect both the planning and implementation of the project. While these considerations do not necessarily affect the feasibility of one alternative over another, brief summaries are presented here for consideration by the project stakeholders.

8.1 Potential Funding Sources for the Realignment Project

Funding for the realignment project could come from a variety of sources. Freight rail projects with a strong public benefit, such as the Fresno Rail Realignment, are typically funded with a mixture of public funds.

8.1.1 Planning Documents

This project is listed in two relevant planning documents that are crucial to any effort to program funds for project implementation.

A Fresno COG 2007 Regional Transportation Plan

The Regional Transportation Plan (RTP) is the primary document for committing public funds within a region to a project. The RTP for the Fresno area is produced by the Fresno COG. The 2007 update of the RTP lists the Rail Consolidation Project as a candidate project under "Other RTP Candidate Projects," with the Fresno Area Residents for Rail Consolidation listed as the sponsoring agency and the project cost as $300 million (Fresno COG, 2007). The RTP is not a source of funds, but rather is a planning document that enumerates the funds planned, programmed or allocated for various projects. Projects receiving public funds must generally be listed in the RTP and must have a funding plan that demonstrates full funding to be included in the financially-constrained portion of the plan. The RTP is used as a primary input for the State in developing funding commitments for state funds.

B State Rail Plan

The *California State Rail Plan 2007-08 to 2017-18* is the primary planning document in the state for prioritizing passenger rail improvements on the mainline railroad network. The document also expresses state policy with regard to maintaining and improving freight rail operations throughout the state. The plan is used as the primary vehicle for recommending funding for both passenger and freight rail projects in the state. The Fresno Rail Realignment Project is listed in the document on page 233 (Caltrans, 2008).

8.1.2 Current Sources with Potential for Funding the Realignment Project

Several fund sources already exist that could potentially be used to fund portions of the project.

A Federal

Federal Railroad Administration – Rail Line Relocation and Improvement Program

The reauthorization of the federal transportation bill as SAFETEA-LU in 2005 included a provision for rail relocation funding of up to $350 million per year, targeted at locations where the rail lines were creating traffic safety issues, community disruptions, or affecting community economic development. Grants would be made for the purposes of relocating railroads, either vertically or horizontally. Subsequent appropriation action by Congress has not made the full $350 million

available annually. In Fiscal Year 2008, Congress appropriated approximately $20 million for the program.

Federal Highway Administration – Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds projects that reduce transportation related emissions in air quality nonattainment and maintenance areas. CMAQ is jointly administered by Federal Highway Administration (FHWA) and Federal Transit Administration and was reauthorized in 2005 under SAFETEA-LU. Eligible project types include public transit projects and projects that reduce emissions. CMAQ funds have been used in the past for mainline rail projects, such as the Cross Valley Rail Project, that contribute to reductions in truck traffic and the resulting emissions reductions. The Cross Valley project used approximately $3.4 million in CMAQ funds to rehabilitate that line as part of the $14 million funding package for the project, because the project was anticipated to remove trucks from parallel roadways (Caltrans, 2002). The Fresno Freight Rail Realignment Project could be eligible for CMAQ funds if similar benefits could be anticipated in emissions reductions, either through reduction in through truck traffic or due to reductions in truck traffic due to reconfigured yard access. Approximately $15 million annually is available to the Fresno region in this program (Fresno COG, 2007).

Transportation Enhancements Program

The Transportation Enhancements (TE) program is a competitive grant program to fund environmental and alternative transportation projects that enhance the transportation system. Public agencies submit TE project applications to the Fresno COG for scoring and regional prioritization based on a bid target determined by the California Transportation Commission (CTC). Of the overall TE funding made available to the State of California by the Federal Government, 75 percent goes to the regions, to be administered through the State Transportation Improvement Program; the remaining 25 percent of the enhancement funds go to the State for programming. Projects must have a direct relationship to the intermodal transportation system by function, proximity, or impact. Also, projects must be over and above required project environmental mitigation and fall within the established categories for project eligibility. Eligible project types include preservation of abandoned railway corridors (including conversion and use as pedestrian or bicycle trails), which could be used for portions of the project dealing with reuse of portions of the BNSF Right-of-Way. Approximately $1.6 million a year is available to the Fresno area in this program (Fresno COG, 2007).

Federal Railroad Administration – American Recovery and Reinvestment Act of 2009

This program was enacted to assist in economic recovery in 2009, and all funds are anticipated to be awarded prior to the Fresno Freight Realignment Project attaining a state of readiness to qualify for the funds in the current appropriation. However, eligible project types include the repair, rehabilitation, or upgrade of railroad assets or infrastructure, and for capital projects that expand passenger rail capacity (FRA, 2009b). Portions of this project that are concerned with Amtrak services could be eligible in the future, should this program continue to be authorized.

Congressional Earmarks

Project funding can come in the form of a congressional earmark, when a direct act of Congress bypasses the competitive allocation process by identifying a specific recipient of funds (such as a location, project, or institution). Earmarked funds must come from an existing program, and are typically specified in program authorization bills (such as the upcoming reauthorization of SAFETEA-LU in 2009) and in annual appropriation bills.

Obtaining an earmark involves gaining the support of congressional representatives who would then introduce a specific budget line item for the project, to be included in a future appropriation or authorization bill.

Earmarks in SAFETEA-LU are specified principally in three programs under the act: Major Transit Capital Investment (New Starts/§5309), High Priority Projects (HPP) Program (HPP/§1101 and 1701-1703), and the Transportation Improvements (TI) Program (TI/§1934). The New Starts Program would not be likely to apply to this project. Brief descriptions of the other two programs follow. Earmarks require the local match required for the specific fund source earmarked.

High Priority Projects Program

The HPP Program is an FHWA-administered program that designates funds to SAFETEA-LU identified projects. Each of the 5,091 projects has been identified and allocated with a specified amount of funding over the 5-year period. The project could potentially be added to the list of eligible HPP recipients when SAFETEA-LU is reauthorized in 2009. A match of 20 percent is required for this fund source.

Transportation Improvements Program

The TI program is authorized under SAFETEA-LU and administered by FHWA. A total of 466 transportation improvements projects have been identified, each with a specified amount of funding for every year of SAFETEA-LU. While the current program does not include this project, there is potential for the project to be included in the renewal/reauthorization of SAFETEA-LU in 2009.

B State

Regional Choice Program

The Regional Choice Program represents approximately 75 percent of the funds available in the State Highway Account. The funds are programmed by the regional transportation planning agencies in their Regional Transportation Improvement Programs for inclusion in the State Transportation Improvement Program. Pursuant to Senate Bill 45, allocations of Regional Choice funds are known as 'County Shares" and replace the previous "County Minimums." Eligible projects include grade-separation projects and intermodal facility projects, which could fund portions of the rail realignment project, including grade separations in the existing UP alignment and an intermodal facility for Amtrak if the station is moved to the UP alignment. Approximately $24 million is available annually to the Fresno region in this program (Fresno COG, 2007).

Interregional Improvement Program

International Improvement Program funds represent 25 percent of available State Highway Account funding. The funds are programmed by Caltrans on a statewide priority basis, for use primarily on the state highway system (outside urbanized areas). Regional agencies may also nominate projects that generate economic development (which may be inside metropolitan areas). Regional agencies may nominate projects if they can show better cost-effective use of funds. Eligible project types include intercity rail projects, which could fund portions of the rail realignment project dealing with realignment of the Amtrak services through Fresno. Approximately $10 million is available annually through this program for the Fresno region (Fresno COG, 2007).

CPUC Grade Separation Fund

The CPUC manages the Section 190 Grade Separation Fund Program, which provides funds to public agencies to grade-separate existing at-grade crossings, eliminate existing at-grade crossings, or improve existing grade-separated crossings. The funds are allocated based on a prioritized list of nominated projects developed through a formal proceeding by the CPUC. The CTC and the Caltrans use the Priority List to allocate funds of $15 million made available to the program annually to assist local governments in financing construction and reconstruction of grade-separation projects. The Priority List, which is created every 2 years, establishes the relative priorities for funding qualified projects to eliminate or grade-separate railroad crossings. Funds from this program could potentially fund portions of the project dealing with constructing new grade separations at existing grade crossings through Fresno in the UP alignment or modifying existing crossings in the UP alignment to accommodate the BNSF operation in this corridor (CPUC, 2009).

High-Speed Train Bonds

In November 2008, California voters approved the issuance of $9.95 billion in state bonds for the purposes of building the statewide HST system. This bond issuance was expected to fund a portion of the cost for the system (total cost estimated at $40 billion), which is also anticipated to receive federal, local and private funding (CHSRA, 2009). To the extent that facilitation of the HST system may require realignment of one or more of the freight railroads serving Fresno, including the Amtrak services on the BNSF, bond funds may be available for a portion of the project.

C Local

Fresno County Measure C Transportation Sales Tax

In 1986, Fresno County voters passed Measure "C", which is a ½-cent sales tax for transportation, with a sunset in 2007. The sales tax was reauthorized in 2006 with a new expenditure plan, which contained an updated list of projects to be pursued in the county. The reauthorization period extends for a 20-year period from July 1, 2007 through 2027. Program Category 4 in the 2006 Reauthorization Expenditure Plan, Alternative Transportation, was created to fund the realignment of freight rail tracks through Fresno. The sales tax provides $102.5 million in funding for the project over the 20 years, with the intention of using those funds as local match to secure an additional $600 to $900 million in required additional funding from federal, state, or other sources. The reauthorization measure specified that the intent of the funding in the measure would be used for the rail realignment project, including associated new under- or over-passes that would be required to separate vehicular and rail traffic. The measure also specified that if the rail realignment is not programmed with construction imminent within 15 years after the measure passes, the funds would revert to grade-separation projects that coordinate with transit improvements and provide the greatest amount of congestion relief and air quality benefit. The program is administered by the Fresno County Transportation Authority (FCTA, 2009).

D Potential Future Sources

Federal Revenue Sources

There are no known new or anticipated federal revenue sources or financing mechanisms at this time. New approaches may emerge as part of the reauthorization of SAFETEA-LU. As of early September 2009, the SAFETEA-LU reauthorization was not proceeding quickly, and it appears likely that extensions of SAFETEA-LU will be sought. The proposed reauthorization bill introduced

into the House by Representative James Oberstar (D-Minn) continues the Rail Relocation Program noted above.

State Revenue Sources

There are no known new or anticipated state revenue sources or financing mechanisms at this time.

Regional/Local Revenue Sources

Local Sales Tax

An additional local transportation sales tax could be enacted, either to fund this project alone or in combination with other projects.

Local Bond Measure

The project could be funded through a local bond measure if a local bond measure were to be developed and a revenue source for repayment identified. For the project to be eligible for local bonds, a two-thirds approval of the electorate would be required.

Local Assessment District

Assessment districts are special districts formed by local government agencies to finance the construction, reconstruction, or acquisition of designated capital facilities or infrastructure, and/or to finance public services by levying an assessment, which is included on the property tax bill of the parcels receiving direct benefit.

E Financing Mechanisms

In addition to the funding sources noted above, several financing mechanisms exist that could make funding available for the project on an accelerated time schedule. These mechanisms require that a repayment source be identified, but they allow project implementation to occur in the near-term, even if repayment revenues will be realized over a longer period.

FRA – Railroad Rehabilitation and Improvement Financing

The Railroad Rehabilitation and Improvement Financing Program provides direct federal loans and loan guarantees to finance development of railroad infrastructure. Under this program, the FRA Administrator is authorized to provide direct loans and loan guarantees up to $35.0 billion. Up to $7.0 billion is reserved for projects benefiting freight railroads other than Class 1 carriers.

The funding may be used to:

- Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings, and shops;
- Refinance outstanding debt incurred for the purposes listed above; and
- Develop or establish new intermodal or railroad facilities.

Direct loans can fund up to 100 percent of a railroad project, with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government. Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers who intend to construct a new rail connection (FRA, 2009b).

FHWA – Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act of 1998 established a federal credit program for eligible transportation projects of national or regional significance under which the U.S. DOT may provide three forms of credit assistance—secured (direct) loans, loan guarantees, and standby lines of credit. The program's fundamental goal is to leverage federal funds by attracting substantial private and other nonfederal co-investment in critical improvements to the nation's surface transportation system. The U.S. DOT awards credit assistance to eligible applicants, which include state DOTs, transit operators, special authorities, local governments, and private entities (FHWA, 2009).

F Funding Other Rail Realignment Projects

Examples of other rail realignment projects were presented in Appendix G. This section describes in more detail the funding used to implement these projects. Funding for other rail realignment projects has traditionally been from a mix of sources, with participation from both the public and private sectors. The four examples below are projects that are similar to the Fresno project, either having a similar type of realignment, or in several cases involving the same railroads.

Marysville, Kansas

This project relocated a high-volume UP mainline and yard that formerly bisected the downtown of Marysville, Kansas, to a bypass alignment around the west side of the town. The project also included several grade separations and flood control work. The total project cost was $76 million, which was shared between three partners. Kansas DOT funded $39 million, UP funded $36 million, and the City of Marysville contributed $1 million. The relocation project was opened in 2006, (TTI, 2007).

Reno, Nevada

The Reno Transportation Access Corridor project, which opened in 2005, constructed a trench for the UP line through Reno to alleviate downtown impacts. The project cost approximately $282 million, with 71 percent paid for by local taxes (a combination of a 1 percent hotel tax levied by the City of Reno, and an additional local 1/8th cent sales tax increase). UP contributed $58 million, this included land, lease revenue, air rights, and construction material. For the remainder of the project costs, Reno issued $113.2 million in municipal revenue bonds and paid $2 million directly in cash. Reno's Downtown Benefit Assessment District also contributed $18 million (TTI, 2007).

Lafayette, Indiana

The Lafayette project consolidated four lines of two railways into one triple-track corridor. with relatively close track centers, but no shared trackage. Norfolk Southern and CSX mainlines were relocated away from the center of the city and onto a new shared alignment along a riverfront. This was a $186 million project, paid for primarily with federal funds from four sources—Federal Aid Highway Program, Surface Transportation and Urban Relocation Act of 1987 Section 149, ISTEA Section 1108, and TEA-21 Section 161—contributing 83 percent of the project funding. The remainder came from state (4 percent) and local funds (13 percent), primarily from income tax and a tax on economic development projects (TTI, 2007).

Los Angeles, California

The Alameda Corridor project constructed a 20-mile-long trench bypass of congested surface lines on a UP alignment for consolidated rail access to the ports of Los Angeles and Long Beach for BNSF and UP. The $2.4 billion project was funded through a blend of public and private

sources, and a mix of grants, bonds, and loans. The bonds and loans are being repaid through revenues from user fees paid by the railroads for each freight car hauled through the corridor. The funding used was 49 percent bond funds, 16 percent loans from the federal government through the Surface Transportation and Uniform Relocation Assistance Act of 1987, 16 percent from the ports, 14 percent in grants from the Los Angeles Metropolitan Transportation Authority, and 5 percent other funds (Agarwal et al., 2004).

Elko, Nevada

This project moved two mainlines onto a bypass around the downtown area; one for the UP (former Western Pacific) and one for the SP, in the town of Elko, Nevada. The relocation cost $43.5 million, and was undertaken to reduce impacts created by multiple grade crossings in the downtown. Trains moved slowly through the downtown, and often blocked access across the downtown for extended periods. The two parallel mainlines were relocated south of the downtown, near the Humboldt River. The project was funded 95 percent by federal sources, largely through funds made available in the Federal Aid Highway Act of 1975. The remainder was split three ways between the two railroads and local agencies (Myrick, 2007).

8.2 Implementing Agency

A responsible agency must be designated to lead the project through the environmental process, securing the project funding, and then designing and implementing the project. This is likely to be a public agency, but could also be a partnership between public and private entities. A number of models for organizing the ownership of the project are discussed in Section 8.5. This section will review the issues with different project management arrangements.

- **Railroad (UP or BNSF)** – One or both of the railroads involved could manage the project implementation. This would have the benefit of ensuring that the operating requirements of the railroads were met, but it could limit access to public funds for the project. Also, in a project of this scope, this arrangement could limit public input and oversight unacceptably.

- **City of Fresno –** The City could manage the project implementation. This could have the benefit of streamlining processes within the City, but could lead to disagreements in locations where the project touches other governmental entities. The City by itself is unlikely to have significant experience with a prior rail project.

- **Fresno County** – The County could manage project implementation, with many of the same issues that the City would have.

- **Fresno COG** – The Fresno COG could manage project implementation, with many of the same issues that the City would have.

- **Special Purpose Authority or District –** A special purpose authority or district could take the lead on the project, and would have the benefit of being focused solely on project implementation for this one project. An authority would be similar in structure to a state-created transit authority such as Bay Area Rapid Transit or Los Angeles County Metropolitan Transportation Authority. A drawback for managing implementation is that none of the affected local agencies would be represented on the board, and neither would the railroads.

- **Joint Powers Authority** – JPAs are the most common method in California for organizing rail project implementation on the mainline rail system. The Alameda Corridor project was built and is owned by a four-party public agency JPA, though

the day-to-day operation is managed by a committee that includes the freight railroads that operate in the corridor. Other rail services in the state that are managed as JPAs are the Caltrain service, the Capitol Corridor service, and Metrolink. JPAs have the advantage that they can be formed relatively quickly.

- **Memorandum of Understanding** – Of all the options for joint management of the project by more than one entity, the Memorandum of Understanding (MOU) has the advantage of allowing both the public sector agencies and the privately-owned railroads to participate in the management of the project as parties to the MOU.

8.3 Environmental Process

This project is currently undergoing Alternatives Analysis, as a step to anticipate further environmental studies under NEPA or CEQA. The path that this project takes in the future in terms of environmental review will be largely determined by which agency is the responsible agency, and where the anticipated funding would come from for project implementation.

Projects of this magnitude are generally subject to the highest level of environmental review, which under NEPA is an EIS, and under CEQA is an EIR. If no federal decisions are needed and if no federal funds are anticipated to be used on this project, preparation of only an EIR would likely be required. If federal decisions or if federal funds are anticipated to be used on the project, then an EIS will also be required. It is fairly common, on projects of this size, to produce a joint EIS/EIR document that satisfies the requirements of both programs, and the additional review required is minimal, as many of the requirements are similar.

It is highly likely that some of the funding required for this project will originate from federal sources. It is therefore prudent to anticipate the need to prepare a joint EIS/EIR document. Even if funds are not requested directly from a federal agency, because many of the funds distributed by the State through the CTC originate as federal funds and are delegated to the State for allocation, they carry the federal requirements with them.

8.4 Relationship to High-Speed Train Project

This project would realign freight railroads in a corridor that is also currently undergoing NEPA and CEQA analysis for the California HST project. In some cases, both projects are considering use of the same general alignments and rights-of-way through central Fresno. This raises the question of coordinating this project's environmental documentation with the High-Speed Train EIS/EIR that is now being prepared for the Fresno area. As discussed throughout this document, the limited right-of-way width through central Fresno is a fact that both projects need to consider. It is possible that the freight rail realignment project could facilitate the HST project by moving freight railroads out of central Fresno, making the UP Right-of-way available for the HST system and avoiding the need to take large amounts of property. At a minimum, the HST project could consider freight realignment as a reasonably foreseeable future project, and acknowledge it in its environmental documentation. More formal and deliberate coordination of planning, design, and implementation could benefit both projects, however, and should be considered.

8.5 Ownership Options for Railroad Rights-of-Way

8.5.1 Railroad Ownership

The simplest structure, and therefore the one with the fewest complications from the railroad perspective, is to convey title for any replacement railroad right-of-way directly to the carrier for whom the facility is built. If, for example, BNSF and UP were to be co-located along the current UP right-of-way (Alternatives 2A or 2B), it is clear that each carrier would require its own,

distinct, 100-foot-wide right-of-way. Most of the UP track would remain exactly where it is now, with the exception (under Alternative 2A) of the realignment to the east, which would take the UP around the east side of Calwa Yard. The BNSF would then acquire sole title to the new and parallel right-of-way constructed adjacent to the UP. UP would require new title only to the new trackage around Calwa Yard, and then only if Alternative 2A were the alternative selected. If any of the bypass alternatives were ultimately chosen, either or both of the railroads would receive title to their new line, as dictated by the alternative.

This approach minimizes administrative delay, is the result of a relatively straightforward negotiation, and does not require the creation of a new legal entity to own the right-of-way after the project is built. What it does require is a public acceptance to fund a set of infrastructure improvements with public money, and then convey title to those assets to a private entity. If the trade-off, as measured by the perceived public benefits, is great enough, this type of transaction is likely to prove workable.

It is possible, but by no means guaranteed, that in negotiating with either or both carriers for an acceptable relocation plan, the City could establish a value for the railroad operating property being vacated, and obtain agreement from the owning carrier to treat some or all of that value as an offset against the capital cost of building the new rail line or lines. The methods for valuation of railroad property are not the same as for valuing industrial, commercial, or residential property and a lengthy discussion of these methods is beyond the scope of this report. But any vacated railroad property clearly has some value, and that value can be recognized in the transaction. For one thing, the vacated property comes off the tax roll, even as the replacement rail line (if owned in fee) goes on the tax roll.

8.5.2 Public Agency Ownership

In theory, a public entity could own some or all of the railroad improvements built as part of a realignment project. While a public entity could own the land under the right-of-way, the railroads would want complete control over operations and maintenance. That said, if one or both carriers are willing to consider public ownership, then several institutional options are available. They each have their own advantages and disadvantages. This report will discuss three options.

A Create a Special Purpose Authority via State Legislation

The City could request the creation of a statutory agency specifically dedicated to the construction of the selected realignment alternative. The state Legislature and Governor would have to act to create such an entity. The agency could be governed by either an elected board (elected at large, or by jurisdictions within the territory of the statutory agency), or an appointed board. Either option would be appropriate for a special purpose agency, subject to limitations stated in the legislation or in the bylaws of the agency. The drafters can have broad discretion in fixing the terms, conditions, rights, and obligations of the statutory agency directors.

The advantage of a legislated agency is that the participants, especially at the initial stage, are able to define the powers of the new agency according to their needs and objectives. For example, unlike other institutional options, the new, legislated agency could have authority beyond those of the participants, individually or collectively.

Statutory agencies customarily can employ staff, enter into contracts and other agreements with other public agencies and with private entities, sue and be sued, and generally exercise any other powers of public agencies. Statutory agencies may be formed for a special purpose (such as implementing the realignment project), or as more generic structures under which subordinate agencies may be formed for specific purposes in accordance with the conditions of the statute.

A statutory agency would probably be structured so that it could raise funds via taxes or fees to pay the capital costs of the railroad improvements, and manage or dispose of any vacated railroad property it acquires. At the very least, such an agency would have to be able to finance the construction costs, and be able to borrow money against an identified revenue stream.

While the enabling legislation might not define all the terms and conditions to which the agency might be subjected, the statute would probably set critical terms, such as the representative, voting and quorum features of the agency. Amending these provisions would require further legislative action, which would require greater effort, with a less predictable outcome, than processes for amending the charters of other types of organization.

Establishing a new agency through legislation has the disadvantage that it would be uncertain whether the legislation would become law. The legislation can be drafted and a sponsor obtained, but there is less assurance that the bill can be navigated through the Legislature and obtain the signature of the Governor. If creation of such an agency is likely to provoke strong opposition (perhaps because there is opposition to the project itself), then considerable time and effort will be required to refine the legislation and to position it among the many measures introduced each session. Furthermore, such legislation can be amended in committee, resulting in wording that does not reflect the original intent. It is therefore sometimes not clear whether, after successfully negotiating the legislative process, the final product will be like the original draft, or anything resembling it.

Once enabling legislation becomes effective, organizing a new entity may take considerable time and effort. While certain actions can be taken in anticipation of an effective date, it may be several months after enactment of the legislation before the work of the agency could begin.

B Create a Joint Powers Authority

The State of California is among several states that recognize the legal standing of JPAs, authorities constituted for a specific purpose via the mutual assent and joint authority of two or more existing government entities, although JPAs can also be created specifically through legislation, just as special-purpose agencies are. JPAs are applied to a broad range of purposes, including transportation projects, public utilities, waste management, water quality control, and fairs and expositions. The principal requirement of a JPA, as the name implies, is that multiple existing agencies must participate: the City of Fresno, by itself, could not create a JPA.

A JPA can efficiently manage decision-making and administration: it is an intergovernmental venture with implementing agreements that help ensure that conflicts are resolved expeditiously in the shared interests of the parties. However, creating a new JPA can be both time- and resource-consuming. Existing agencies may have overlapping or conflicting agendas, which can make rational policy-making more difficult.

In California, there are no requirements for legislative or local electoral approval for the creation of a JPA, and the structure can be put in place as quickly as the parties can agree on the terms and conditions to be included in the agreement. That is a big advantage relative to the creation of a statutory agency. A new JPA must file articles of its incorporation with the State, and demonstrate compliance with state corporation law, but there are otherwise relatively few administrative complications involved in the process.

A joint powers agreement generally defines the powers and limitations of the particular JPA, such as the agency's funding arrangements. As a consequence, each of the participating public agencies needs to review its powers before establishment of the JPA as the preferred governance structure. The parties need to negotiate carefully the details of the agency's governance because the powers of the JPA will be limited to those held by the weakest party to the agreement. JPAs

seem to work best when they are alliances among relative equals, i.e., equals with respect to administrative power, and equals with respect to financial strength.

Once established, each of the participants becomes a member of a new authority that can exercise existing powers shared in common by the participating agencies. For example, the participating public agencies can authorize the agency to make and enter contracts; to employ agents and employees; to acquire, construct, manage, maintain, or operate any building, works, or improvements; to acquire, hold, or dispose of property; or to incur debts, liabilities, or obligations.

While the powers of a JPA are limited to those held in common by the participating agencies, the manner in which they may be exercised is not as limited. For instance, while the power to procure goods and services must be commonly held by all the participants in a JPA for the JPA to exercise the power, the manner in which such goods and services may be procured is limited only by the abilities of any one of the participants. Accordingly, if one agency has less stringent procurement policies, or permits work to be performed by agency staff, the policies of that agency may be adopted by the JPA.

Often, the JPA will select one of its members to administer the project or service that the JPA has been created to build or operate. For example, in a multi-county agency, one county may handle all the administrative work for the JPA. Alternatively, the JPA can create a commission or board to execute or administer its functions, or hire a person, firm, or corporation, including a nonprofit corporation, designated in the agreement, to carry out its wishes. The JPA agreement may provide for mutual exchange of services without payment. Similar to a statutory agency, a JPA has the power to enter into contracts with other public entities and private parties, to sue and be sued, and to manage its affairs. The governing body is subject to appointment and with voting/ quorum and other rights determined by the agreement.

If a JPA has not established a separate board or commission, the agreement is in effect a contract among the primary parties to the authority, and the rights, obligations, powers, and duties of the individual parties would be directly subject to the terms of the agreement. Under this alternative, the parties can then designate a third party, or even a private entity, as the managing agency with the responsibility for the day-to-day affairs of the JPA. That entity would then enter into contracts on its own and could sue or be sued in its own name.

The terms and conditions regarding liabilities, exemptions, relief, disability, workers' compensation, and other benefits that apply to the personnel of an agency participating in a JPA also apply while they are engaged in the performance of any of their work in behalf of the JPA.

A JPA has flexible financing powers, and may issue revenue bonds in its own name for the purpose of acquisition or construction. The bonds do not constitute a debt, liability, or obligation of any of the public agencies that are members of the JPA. Moreover, a JPA can obtain funds for a short period of time to meet operational expenses, until expected revenues are available, either by accepting funds advanced by the parties to the agreement, or by borrowing from private sources. A JPA's ability to borrow is, of course, a function of its credit rating, and that is in turn a dependent function of its revenue stream.

The parties to the JPA may provide means by which the agreement may be amended, rescinded, or terminated, and for parties to join or withdraw from the JPA. In negotiating the termination provision, the participants should take into account such issues as the maturity date of any bonds issued by the agency, payment due dates for other forms debt, the disposition of claims, and the distribution of JPA assets. In this case, if a JPA constructed and held title to a railroad line, it is likely that asset would automatically convey to the operating railroad upon dissolution of the JPA.

On the whole, a JPA can be a more flexible structure than a statutory agency. Board membership and voting rights are generally established in the agreement, subject to modification by action of the participants; the participating public agencies have the flexibility to specify in the agreement the types of common powers allocated to the agency, and the method of exercising such powers.

If amendments to the agreement are needed, the process does not require legislative or voter action. Generally, because the agreement is a contract, material changes would require the unanimous consent of the parties; however, agreements frequently contain provisions that permit amendment and modification to certain terms of the agreement by less than unanimous consent. There are a significant number of existing JPAs in California specifically related to railroads. The Cross Valley Rail Corridor JPA formed by Lemoore, Huron, and Visalia is one example; the Southern California Regional Rail Authority, which runs Metrolink; the Peninsula Joint Powers Board, which runs Caltrain; and the Capitol Corridor JPA, which oversees the San Jose/Auburn intercity service are other examples of regional rail systems governed by JPAs. One final advantage of the JPA as a structure is that BNSF, UP, and SJV are all already familiar with such agencies in California.

C Execute a Memorandum of Understanding

There is also a nonlegislative statutory approach to government ownership of railroad assets. The parties to the transaction can enter into local agreements or MOU. Such an arrangement implies a joint exercise of power not unlike the joint exercise of power in a JPA. The powers exercisable under the contract would be limited to those held by, or implicit in, the powers retained by the parties to the agreement. In contrast with a JPA, however, all actions and risks, including those related to operations, fundraising, and payments, have to be assumed by the individual parties to the MOU; and the railroad(s) would likely be a direct party to the agreement.

This approach would offer a number of advantages in comparison to a JPA, without the legal, political, and administrative complexity of that structure. For example, it does not require multiple governmental agencies. Most, if not all of the principles embodied in the creation of a JPA could be addressed in the simpler MOU format, such as the type of fees, projects to be funded, priorities and scheduling, and mechanisms for dispute resolution. As with the JPA, administration of an MOU could be undertaken by one of the signatory parties, or another entity satisfactory to all parties.

The MOU structure has limitations. Policy changes cannot be enforced without complete, voluntary concurrence by all parties, and no identifiable entity is visible to the public and stakeholders. If either of the Class 1 railroads were party to the agreement, policy changes that would benefit the City but which might not benefit the railroads, or which might increase their risk, would be difficult to secure. The MOU approach, therefore, requires the public to accept more risk to the project from unresolved disagreements. Many complex undertakings are successfully completed through an MOU structure, however, and as with JPAs, problems can be avoided through effective leadership, coupled with a strong set of arbitration or mediation provisions.

The execution of a contract between the City and one or both railroads would not result in the creation of a separate entity or governing body, but the delegation of functions to one or more of the contracting parties. The contract could provide for the creation of committees, boards, or other governance mechanisms for the purpose of implementing the contract, and the contract would determine the respective powers of the parties under the agreement.

The problem, if there is one, is that the private railroads might not particularly like being tied to governing boards or committees. Among themselves, inter-carrier agreements that govern the

joint use of tracks or yards are called joint facility agreements. There is an established process, as well as a clear set of industry precedents, that governs these agreements. The industry is familiar with this history, but no carrier is especially anxious to enter into new joint facility agreements because they can be contentious. To a major railroad, executing a capital project of this size under an MOU would look a lot like a joint facility agreement—only with a public agency, not another railroad.

Subject to the limitations described before, there are few restrictions on the terms and conditions to which the parties can agree. Because there are no governmental review or approval requirements, the structure can be put in place as soon as the parties can reach an agreement. There is no separate entity, and no governing body; however, there is no reason the parties cannot agree to establish mechanisms with substantially the same functions, duties, responsibilities, and powers. The most likely complication inherent in such an approach is negotiating the allocation of risk and the indemnification measures.

8.6 Potential Reuse of BNSF Right-of-Way

With the exception of the No Project Alternative, all alternatives would result in the discontinuation of use of portions of the BNSF right-of-way; these segments would no longer be needed for freight purposes. BNSF could suspend services, "rail-bank," or abandon these portions of the line. The existing right-of-way could be re-used for transportation purposes, as a recreational facility, or revert to original land owners or be sold to new land owners for uses consistent with applicable planning documents.

Because existing rail access to local customers must be protected, some rights-of-way that could be vacated by the through freight operations of one or both carriers will not be completely retired, and their grade crossings will not be eliminated, no matter which realignment alternative is ultimately chosen. For example, to retain connections to local customers, the existing BNSF trackage between Jensen Avenue and Hammond and UP trackage between Divisadero and North Avenue must remain. Existing tracks south of Calwa to Malaga on the UP, and to a connection with BNSF at the point where a BNSF bypass would diverge to the west, might also need to remain, depending on the alternative selected.

8.6.1 Transportation

The portion of the BNSF line that would no longer be used for freight service currently also provides passenger rail service, operated by Amtrak. Assuming that Amtrak services would be shifted either to a new BNSF alignment through central Fresno within the UP alignment or a publicly-owned alignment in this same corridor, this segment would be available for other transportation uses. Possible transportation uses of the existing BNSF right-of-way could include transit uses (light rail, commuter bus, or transit), telecommunications service (fiber optic lines), or other transportation functions (roadway, bicycle path, walking path). If used for another transportation use, BNSF would abandon service on the line and transfer the line to another entity (e.g., City of Fresno, Fresno County) for use as a transportation corridor. BNSF would convey the right-of-way and all existing facilities to the purchasing entity. Reuse of the BNSF rail line that would be abandoned as part of the project could provide critical transportation right-of-way for these types of mass public transportation.

The Council of Fresno County Governments' *2007 Regional Transportation Plan: The Long-Range Transportation Vision for the Fresno County Region for the Years 2007 to 2030* (2007 RTP) noted that "Although earlier studies indicate there is not currently sufficient ridership for a light rail, commuter rail, or some other fixed guideway rail transit system, it is prudent from the standpoint of long-range planning to identify and preserve rail corridors that may be needed in the future, given our growth potential" (Council of Fresno County Government 2007). The 2007 RTP also

included a goal to recognize and integrate the bicycle as a valid transportation mode in transportation planning activities. To meet this goal, this plan included a policy to "work with … railroads, and other owner of linear rights-of-way that have the potential to accommodate bicycle facilities, the development of which would strengthen the Countywide bicycle transportation system."

The Rail Right-of-Way and Abandoned Corridors Study Final Report (Caltrans, 2005) identified the segment of the BNSF that would be discontinued under the build alternatives as a line segment with high potential (high demand and high feasibility) for nonmotorized transportation (e.g., bicycle and walking/hiking) and use as a transit link. The study documented that this segment of rail line has such demand characteristics as being located within 0.5 mile of existing bus and rail transit, and such feasibility characteristic as accident predictions and clearance adequacy.

8.6.2 Recreational Use

The segment of the BNSF rail line that would have discontinued service could also be reused as a recreational corridor. In 1983, the National Trails System Act of 1968 was amended to provide interested parties an opportunity to negotiate agreements with railroads to use rail rights-of-way for trails (U.S. General Accounting Office, 1999). The amendment provided for "rail banking," which preserves the right-of-way for future rail use, but allows the land to be used as a trail in the interim. A trail sponsor, who would assume interim responsibility of the right-of-way, must agree to assume all managerial, financial, and legal responsibility, including all liability arising out its use as a trail. Rail banking would preclude the trail sponsor from taking any action that would impede the restoration of trail service. Construction of trails within rail-banked rights-of-way are eligible for federal funding though programs such as TE grants, the Surface Transportation Program, CMAQ, and the Recreational Trails Program (U.S. General Accounting Office, 1999).

The May 2007 *Fresno/Clovis Bikeways Map* designates a multi-purpose trail immediately east of a small segment of the BNSF line north of Herndon that may be discontinued as part of the proposed project. The map also documents numerous bike lanes on streets that intersect this portion of the BNSF line, which could provide opportunities for recreation and nonmotorized transportation connections.

Furthermore, *Implementing Guidelines: Alternative Transportation Program of the Final 2006 Measure "C" Extension Expenditure Plan Appendix E*(Council of Fresno County Governments, 2006) includes the following implementation guidelines for the Rail Realignment Program: "Should rail realignment occur, the land along the BNSF tracks will revert back to the City and County of Fresno for trails, bikeways, and pedestrian facilities" (A-8).

8.6.3 Abandonment

If the discontinued segment were abandoned and not sold intact to a public entity, BNSF would be required to remove existing improvements (e.g., ties, rails), and the right-of-way would revert to landowners with previous rights (or easement) to the land. In cases where the underlying land is not encumbered, the title to the land would remain with BNSF; disposal of such parcels would be at BNSF's discretion. Future uses of such lands would be dependent on the property owner, and local land use requirements. State law requires that local jurisdictions have a right to review proposed abandonments and have the right of first refusal of the right-of-way (Council of Fresno County Governments, 2007).

The Council of Fresno County Governments' *2007 Regional Transportation Plan: The Long-Range Transportation Vision for the Fresno County Region for the Years 2007 to 2030* notes that:

> "Abandonment of railroad branch lines within Fresno County is detrimental to users relying solely on rail freight service and results in the loss of potential light or commuter rail corridors that would be almost impossible, or at least very difficult, to replace."

8.7 Construction Phasing and Issues

When freight railroads or Amtrak make major infrastructure changes, they construct the new track and signals separately from the existing operation, to the maximum extent possible. When the new plant is ready for use (tested, inspected, and certified), the railroad "cuts over" or "cuts in" the new infrastructure all at once, usually with a carefully planned and relatively short suspension of normal service. The railroad improvements specifically called for in connection with all of the surviving realignment alternatives can all be built separately from the current operating rail lines, and then cut in this manner. The bypass alternatives, for example, could be built on their new alignments and readied for service right to the limits of their respective northern and southern connections; the replacement yards likewise; and all the new infrastructure made accessible from the current tracks via temporary switches until tested for service. When relevant new infrastructure is ready for regular revenue service, a day, time, and duration is picked, and everything is placed in service at that time.

The project component most likely to require careful phasing is the reconstruction of existing grade separations along the UP right-of-way if either Alternative 2A or Alternative 2B is chosen. The existing over and underpasses will need to be partially demolished and rebuilt to clear 200 feet of railroad right-of-way. Each rebuild project will likely require that the street involved be closed for some period of time, while traffic is diverted to adjacent streets that remain open.

New grade separations do not pose this problem to the same extent. Like new railroad infrastructure, they can be built separately from the existing roadway, and then cut in when finished. If both UP and BNSF occupy adjacent rights-of-way along the UP alignment, it is very likely that the CPUC will require the entire alignment to be grade-separated, and it might be possible to construct the required new over- or undercrossings before beginning the rebuilds of the existing ones.

One additional issue that will probably require phasing of some activities well in advance of new construction is the relocation of any industries or businesses whose land is required by the project. Affected companies will be subject to disruption of their commercial activity if the relocation is not planned carefully and well in advance, and that is an exposure to liability that the project will have to bear.

9.0 REFERENCES

Agarwal, Ajay, Genevieve Giuliano, and Christian Redfearn, 2004. The Alameda Corridor, a White Paper. University of Southern California School of Planning and Development. June.

Caltrans (California Department of Transportation), 2002. Traffic Congestion Relief Program Amendment Request to California Transportation Commission, Resolution #TAA-02-05. Meeting. May 9.

Caltrans (California Department of Transportation), 2005. *The Rail Right-of-Way and Abandoned Corridors Study*. Final Report.

Caltrans (California Department of Transportation), 2008. Division of Rail, Caltrans, *California State Rail Plan 2007-08 to 2017-18*. March.

CHSRA (California High-Speed Rail Authority), 2009. CHSRA web site: http://www.cahighspeedrail.ca.gov/news/FUNDING_lr.pdf. Accessed September 7.

City of Fresno, 1918. *Fresno City Master Plan*.

City of Fresno, 2002. *2025 Fresno General Plan*. City of Fresno Planning and Development Department. February 1.

City of Fresno, 2007. GIS Data provided by City of Fresno to URS Corporation.

City of Fresno, 2009a. Major Proposals Under Review. Web site: http://www.fresno.gov/Government/DepartmentDirectory/PlanningandDevelopment/Planning/MajorProjectsunderReview.htm. Accessed September 8.

City of Fresno, 2009b. Metro Rural Loop Multi-Jurisdictional Workshop. Web site: http://www.fresno.gov/NR/rdonlyres/78504CAC-EEC2-4C25-825D-DDAF24DC89C4/8836/MRLWorkshopSynopsisBrochure4408.pdf. February 29.

City of Fresno, 2009c. Roeding Park web site: http://www.fresno.gov/Government/DepartmentDirectory/ParksandRecreation/ParksandFacilities/Regional+Parks/RoedingParks.htm. Accessed on September 8.

Council of Fresno County Governments, 2006. *Final 2006 Measure "C" Extension Expenditure Plan*. June 27. FCTA web site: http://www.measurec.com/admin/docs/2006MeasureCExpenditurePlan.pdf. Accessed September 7, 2009.

Council of Fresno County Governments, 2007. *2007 Regional Transportation Plan: The Long-Range Transportation Vision for the Fresno County Region for the Years 2007 to 2030.*

Council of Fresno County Governments, 1993. *Fresno Rail Realignment Review, Analysis, and Conceptual Design Study*.

Council of Fresno County Governments, 2001. *Fresno Rail Realignment Report*.

Council of Fresno County Governments 2007. *2007 Regional Transportation Plan*.

CPUC (California Public Utilities Commission), 2009. CPUC web site: http://www.cpuc.ca.gov/PUC/transportation/crossings/rrcrossingfundingprg.htm. Accessed September 7.

Downtown Association of Fresno, 2009. Chinatown. Web site: http://www.downtown fresno.org/chinatown.html. Accessed September 8.

FCTA (Fresno County Transportation Authority), 2009. FTCA web site: http://www.mearurec. com/admin/docs/2006MeasureCExpenditure Plan. pdf. Accessed September 7.

FHWA (Federal Highway Administration), 2009. FHWA TIFIA web site: http://tifia.fhwa.dot.gov/. Accessed September 9.

FRA (Federal Railroad Administration), 2009a. Office of Safety Analysis. Accident Data 2004-2009.

FRA (Federal Railway Administration), 2009b. FRA web site: http://www.fra.dot.gov/us/content/ 2166. Accessed September 9.

Google Earth, 2009. Images accessed September 1.

Myrick, David F., 2007. *Railroads of Nevada and Eastern California*, Volume 3. University of Nevada Press.

San Joaquin River Parkway Conservation and Trust, 2009. Camp Pashayan. Web site: http:// www.riverparkway.org/aboutParkwayParks.asp. Accessed September 8.

San Joaquin River Conservancy Governing Board, 2000. *San Joaquin River Parkway Master Plan*. Adopted July 20.

TTI (Texas Transportation Institute), 2007. Rail Relocation Projects in the U.S.: Case Studies and Lessons for Texas Rail Planning. March.

U.S. General Accounting Office, 1999. Report to the Honorable Sam Brownback, U.S. Senate: Surface Transportation Issues Related to Preserving Inactive Rail Lines as Trails. General Accounting Office, Washington, D.C.

Windows Live Local Map, 2009. Aerial images. http://www.bing.com/maps/default.aspx?rtp =adr.