CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report/Environmental Impact Statement

PRELIMINARY

Alternatives Analysis Report

Merced to Fresno Section High-Speed Train Project EIR/EIS

April 2010

California High-Speed Rail Authority

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PRELIMIINARY
ALTERNATIVES ANALYSIS REPORT

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Revision	Date	Description
	3/20/10	Change from Dan to Carrie B.

CALIFORNIA HIGH-SPEED TRAIN PROJECT

Merced to Fresno Section

Preliminary Alternatives Analysis Report

April 7, 2010

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
Authority	California High-Speed Rail Authority
Bay Area to Central Valley Program EIR/EIS	2008 Bay Area to Central Valley High-Speed Train Final Program Environmental Impact Report/Environmental Impact Statement
BNSF	Burlington Northern Santa Fe
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DO	Design Option
DOC	Department of Conservation
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Report
FMMP	Farmland Mapping and Monitoring Program
FRA	Federal Railroad Administration
GEA	Grasslands Ecological Area
GIS	Geographic Information System
HMF	heavy maintenance facility
HST	high-speed train
M-F	Merced to Fresno
mph	miles per hour
MOU	Memorandum of Understanding
NEPA	National Environmental Protection Act
NMFS	National Marine Fisheries Service
NOI/NOP	Notice of Intent/Notice of Preparation
Pacheco Pass	San Jose to Merced Section
ROD	Record of Decision
RTPs	regional transportation plans
SGEA	South Grasslands Ecological Area
Statewide Program EIR/EIS	2005 Final Program Environmental Impact Report/Environmental Impact Statement for the Proposed California High-Speed Train System
SR	State Route
STIP	State Transportation Implementation Program
T&E	threatened and endangered
Tier 1	program-level
TOD	transit-oriented development
UC	University of California
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

The preliminary Alternatives Analysis and its associated engineering and environmental analysis reconfirms that the alternatives that closely follow existing rail corridors, the Union Pacific Railroad UPRR and the Burlington Northern Santa Fe Railroad BNSF best serve the Project Purpose and Need while best meeting the California High Speed Rail Authority's (Authority's) project objectives.

Consistent with the Authority's project objective to maximize the use of existing transportation corridors and rights-of-way, to the extent feasible, the alternatives considered and recommended in the Authority's 2005 Statewide Final Program Environmental Impact Report/Environmental Impact Statement EIR/EIS for the Proposed California High-Speed Train System (HST) and 2008 Bay Area to Central Valley HST Final Program EIR/EIS for the "Central Valley Alignment" followed the two existing freight corridors of the UPRR and the BNSF. Much like this Preliminary Alternatives Analysis Report, these program environmental documents also considered alignment alternatives that deviate from the existing transportation corridors, notably the Western Alternative, which resembles the current Alternative A3 – Western Madera. And like the two prior Final EIR/EIS documents, the alternatives that do not closely follow existing transportation corridors (A3 and A4) are not being recommended to be carried forward into the Project Level EIR/EIS.

The reason for screening out alignment alternatives that do not closely follow existing transportation corridors is that they generally result in greater direct and indirect environmental impacts and have greater growth potential than alignment alternatives that closely follow existing transportation corridors. This is the case in the Merced to Fresno Section of the HST project, where Alternatives A3 – Western Madera and A4 – UPRR/BNSF Hybrid, which depart from existing transportation corridors.

In the Merced to Fresno Section, departing from existing transportation corridors not only directly impacts highly productive farmlands but also has the potential to reduce the viability of surrounding farmlands, giving way to other uses, such as other infrastructures such as transportation and utility systems, that may result in unwanted and unplanned growth patterns. This is particularly alarming to the counties of Merced and Madera, which rely heavily on their unique, rich soil resources for their primary industry. California's rich agricultural is slowly being diminished on the edges of urban communities. The FRA and the Authority established key project objectives to avoid and minimize the effects of the HST System on growth patterns by establishing the goal to maximize the use of existing transportation corridors to the extent possible.

The analysis demonstrated that Alternative A2 – UPRR/SR 99 meets this objective while optimizing travel time and minimizing environmental impacts, at the cost of more elevated profile and potentially more commercial property impacts than other alternatives. However, UPRR has expressed reluctance to collaborate with HST alternatives that either infringe on its right-of-way or on its access to current and future freight customers along its right-of-way throughout the Central Valley.

The only other alternative in the Merced to Fresno Section that meets the HST objective of maximizing the use of the existing transportation corridors is Alternative A1 – BNSF with the South SR152 Wye connection. This alternative, which was selected as preferred by the Authority and the FRA in the 2005 Final Statewide Program EIR/EIS, does not perform as well as Alternative A2 – UPRR/SR 99 in terms of travel time performance and impacts on the natural and residential environment. However, it does provide an alternative to the A2 – UPRR/SR99 that meets the basic project objectives.

Therefore, in order of priority, the Preliminary Alternatives Analysis Report recommends the following:

- **Carry forward Alternative A2 – UPRR/SR 99.** Alternative A2 – UPRR/SR 99 optimizes travel time and minimizes environmental impacts at the cost of more elevated profile and potentially more community impacts than other alternatives. The cities of Chowchilla and Madera expressed concerns about the impacts of the project through their central business districts, but others, such as the City and County of Merced, City of Atwater, transportation agencies, water districts, and the farming communities in both counties, have expressed support for this route compared to the BNSF and other alternatives that do not use existing transportation corridors. However, UPRR has expressed reluctance to collaborate with HST alternatives that infringe either on its right-of-way or on its access to current and future freight customers along its right-of-way throughout the Central Valley. Because areas in Merced, Madera, and Fresno are constrained portions in this corridor, UPRR's resistance may delay property access and hinder timely design solutions that would enable the HST project to meet its design objectives. The Authority Executive Staff continues to meet with UPRR on a regular basis in an effort to resolve concerns, and the project team is working to design around this limitation, which will require cooperation from UPRR. Lack of cooperation from UPRR could result in delay and make this alternative more expensive to construct.
- **Carry forward the Alternative A1 – BNSF.** Alternative A1 – BNSF provides a viable alternative to Alternative A2 – UPRR/SR 99 that meets the project purpose and need while also adhering to all the project objectives. It was selected as the Preferred Alternative over the UPRR Route in the 2005 Statewide Program EIR/EIS primarily because "the BNSF alignment avoids most of the urban areas between Modesto and Fresno and would have substantially less constructability issues, would have fewer potential noise, cultural, property, and community impacts, and is estimated to cost about $400 million less than the UPRR alignment" (California High-Speed Rail Authority 2005). Alternative A1 – BNSF is the longest route by 10 miles and still involves crossings of SR 99 and UPRR that are similar to Alternative A2 – UPRR, but it maintains the legislatively mandated travel time of 2 hours and 40 minutes between San Francisco and Los Angeles and provides a viable alternative to the UPRR corridor while remaining adjacent to existing corridors.

  The benefit of Alternative A1 – BNSF over Alternative A2, is that it may be able to take advantage of the BNSF right-of-way to avoid some residential, critical habitat and farmland impacts. Remaining adjacent to the BNSF, even if not within the BNSF right-of-way, would also minimize the amount of severance on agricultural fields. The alignment's greater distance from several community centers may allow the alternative to remain at-grade for most of its distance and have a lower level of impacts on commercial centers, compared to Alternative A2 – UPRR/SR 99. The Cities of Chowchilla and Madera, continue to echo the sentiments that the BNSF route may result in fewer community impacts compared to Alternative A2 – UPRR/SR 99. The project team is reviewing avoidance options for the community of Le Grand and Planada.
- **Carry forward the Downtown Merced Intermodal Transit Center Station.** This station best satisfies purpose and need, has the best access to the regional highway and public transit system, and has fewer residential impacts. It would be located adjacent to the UPRR right-of-way in Downtown Merced and would be served by either Alternative A2 – UPRR/SR 99 or Alternative A1 – BNSF.

Additionally, the following demonstrates why alternative alignments and station should not be carried forward into the Merced to Fresno Project EIR/EIS:

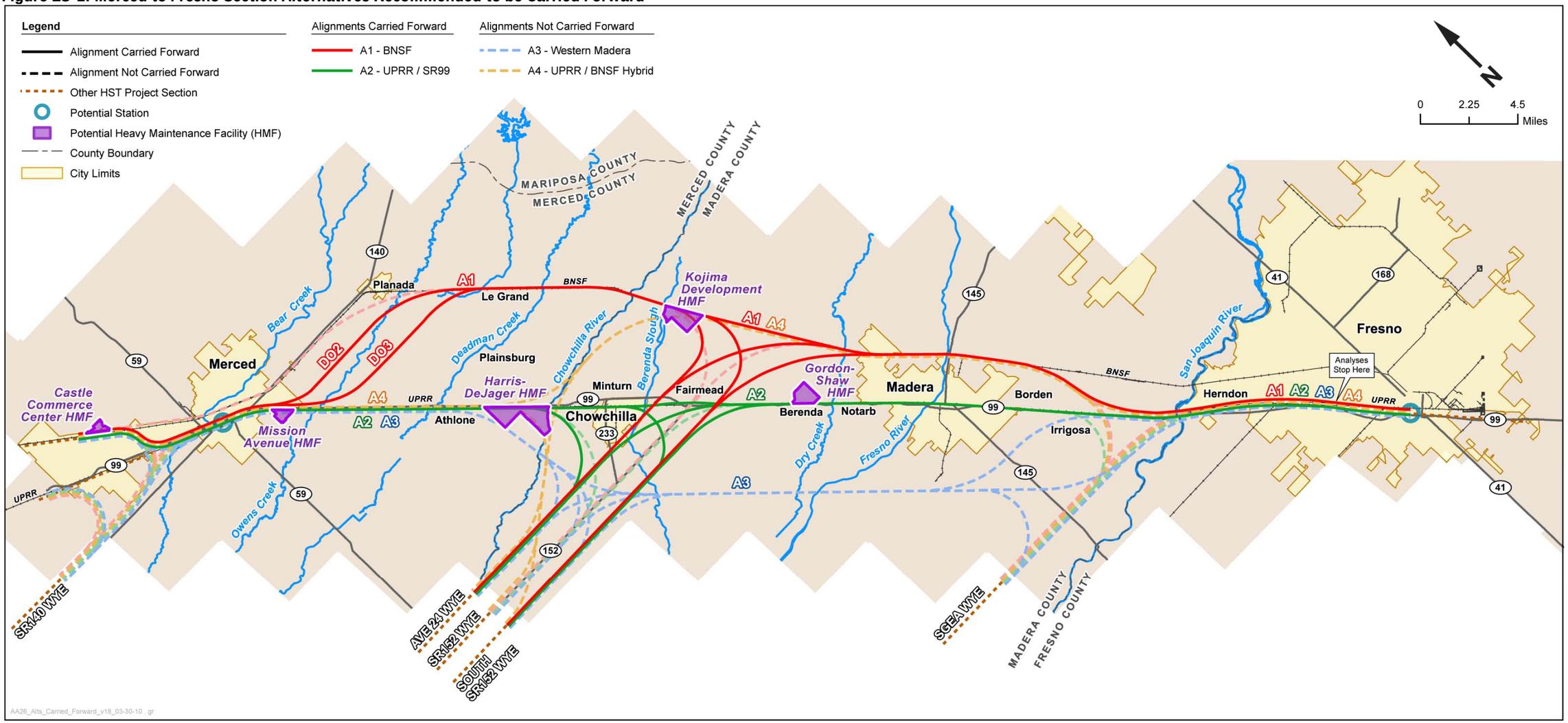
- **Do not carry forward Alternative A3 – Western Madera.** While Alternative A3 – Western Madera provides the fastest travel time between San Francisco and Los Angeles by 30 seconds, it presents considerable controversy because it is a Greenfield alternative and does not meet the Authority's key project objective to maximize the use of existing transportation corridors. Alternative A3's deviation from existing transportation corridors in Madera County would result in the high impacts on private properties, agricultural properties, and important farmlands. The high level of impacts is a result of the orientation of the HST and UPRR/SR 99 alignment in relation to the surrounding transportation network. Alternative A3 parallels the diagonal direction of the UPRR/SR 99 corridor in order to provide a more direct route between the Merced and Fresno station. Alternative A3 affects the most acres of prime, unique, and important farmlands which are oriented in the north-south alignment (555 acres), and would bifurcate farmlands, and it would potentially lead to unwanted development patterns that may erode the economic viability of these agricultural lands in Madera County. While the Authority is committed to minimizing and mitigating impacts, the bifurcation of small 40-acre farms may reduce the viability of the remnant pieces, resulting in larger impacts on the farming community and the possibility of the conversion of farmland to other uses. This impact on Madera may have a more dramatic effect than elsewhere in the state since, according to the 2008 Madera County Agricultural Crop Report, gross production value of Madera County agricultural production was $1.3 billion in 2008. The latest California Economic Development Department Labor Market information shows Madera with 42,300 total employees and 9,000 agricultural sector employees for 21.2 percent. Additionally, this alternative has received strong opposition

from the City and County of Merced and the County of Madera, and it has received strong resistance from members of the agriculture community.

- **Do not carry forward Alternative A4 – UPRR/BNSF Hybrid.** Alternative A4 – UPRR/BNSF Hybrid would not outperform the other alternatives in any criteria measure. It is the slowest alternative in the critical travel time between San Francisco and Los Angeles, taking more than a minute longer than the next slowest alternative. It would potentially result in the highest level of impacts on wetlands, and it would involve most and longest water crossings. Alternative A4 – UPRR/BNSF Hybrid was suggested as a route to modify Alternative A1 – BNSF to avoid Le Grand by traveling a greater distance along the Alternative A2 – UPRR/SR 99 alignment, then shifting eastward to avoid Chowchilla and Madera. However, like Alternative A3 – Western Madera, this alignment results in similar conflict with the Authority's key project objective to use existing transportation corridors and results in a high level of impacts on agricultural lands (436 acres for the north-south alignment) even while trying to remain adjacent to existing transportation corridors. In order to avoid Chowchilla, the alignment requires a large northward curve from Avenue 24 around Chowchilla to link up to the BNSF in a southbound direction. This is not efficient HST design and is not suited to follow existing transportation corridors through prime, unique, and important farmlands. It would result in a series of awkward parcels, reducing economic viability and possibly leading to undesirable development patterns
- **Do not carry forward the Castle Commerce Center Station.** This station is more limited in its ability to serve as a multimodal center. The Castle Commerce Center Station offers limited residential density opportunities, which would also limit the potential for the HST station as a multimodal center, and its access may be constrained due to limited arterial roadways available to the site.
- **Do not carry forward the Merced BNSF/Amtrak Station.** While this station does off a seamless connectivity with other transit services, it is located within a low-density, well-established residential community. Arterial access from SR 99 would involve travelling through the City of Merced, which would degrade the roadway system. There is no support from Merced for this station, and it would conflict with the local plans for this area.

Figure ES-1 shows the alternatives recommended to be carried to forward.

Figure ES-1. Merced to Fresno Section Alternatives Recommended to be Carried Forward



1.0 INTRODUCTION

The California High-Speed Rail Authority (the Authority) is studying alternative alignments for a high-speed train (HST) section between Merced and Fresno. This report documents the evaluation of these alternative alignments and identifies feasible and practicable alternatives to carry forward for environmental review and evaluation in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) under the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) for the Merced to Fresno Section of the California HST Project.

Additionally, the Authority and the Federal Railroad Administration (FRA) have entered into a memorandum of understanding (MOU) with the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE) to integrate the NEPA process with the Clean Water Act (CWA) Section 404 process. The Section 404 (b)(1) process includes an alternatives analysis and therefore. The objective is for the EPA and the USACE to reach concurrence with the Authority and the FRA on the alternatives to be carried forward into the EIR/EIS.

1.1 California HST Project Background

The California HST is planned to provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego (Figure 1). The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which will include contemporary safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment, with an expected express trip time between Los Angeles and San Francisco of approximately 2 hours and 40 minutes.

The California HST project will be planned, designed, constructed, and operated under the direction of the Authority, a state governing board formed in 1996. The Authority's statutory mandate is to develop a high-speed rail system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

1.2 Merced to Fresno Section EIR/EIS Background

The Merced to Fresno HST Section is a critical link connecting the Bay Area HST sections to the Fresno to Bakersfield, Bakersfield to Palmdale, and Palmdale to Los Angeles HST sections. The route development for the Merced to Fresno Section is built on the set of HST network alternatives and HST alignment alternatives that were analyzed in the 2005 Final Program EIR/EIS for the Proposed California HST System (referred to hereafter as the Statewide Program EIR/EIS) and the 2008 Bay Area to Central Valley HST Final Program EIR/EIS (referred to hereafter as the Bay Area to Central Valley Program EIR/EIS). Consistent with the Authority's project objective to maximize the use of existing transportation corridors and rights-of-way, to the extent feasible, the alternatives considered for the Central Valley alignment followed the two existing freight corridors of the UPRR and the BNSF. By sharing the existing freight railroad right-of-way in these corridors, where possible, HST impacts throughout the Central Valley could be further avoided and minimized.

The program Statewide and Bay Area to Central Valley documents resulted in selection of two different preferred alternatives for the Merced to Fresno Section. In response to the 2005 Statewide Program EIR/EIS, the Authority and the FRA selected the existing Burlington Northern Santa Fe (BNSF) rail route as the preferred alternative for the Central Valley HST between Merced and Fresno. However, in the subsequent 2008 Bay Area to Central Valley Program EIR/EIS, the Authority selected the Union Pacific Railroad (UPRR) route as the preferred alternative for the Merced to Fresno Section but also mentioned that the BNSF would continue to be carried forward for further study.[1]

Figure 1: Initial Study Corridors

[1] Based on the court ruling in Town of Atherton v. California High Speed Rail Authority, the Authority board rescinded its certification of the Final Bay Area to Central Valley HST Program EIR in December 2009 and its selection of preferred alignments and station locations for further study at the project level. The Board's action included rescinding the alignment selection for the Central Valley portion of the study area. The Authority is currently circulating revised Draft Program EIR Material and the comment period closes on April 26. The Board is expected to consider the Revised Draft Program EIR Material and a Revised Final Program EIR Material, along with the 2008 Final Bay Area to Central Valley HST Program EIR in the coming months and make a new decision on alignments to study at the project level.

Under the UPRR preferred alternative, the Bay Area to Central Valley Section would travel from the Bay Area over Pacheco Pass via Henry Miller Road, connecting to the Central Valley along the UPRR in the vicinity of Chowchilla. Figure 2 shows the routes of the BNSF and UPRR alternatives.

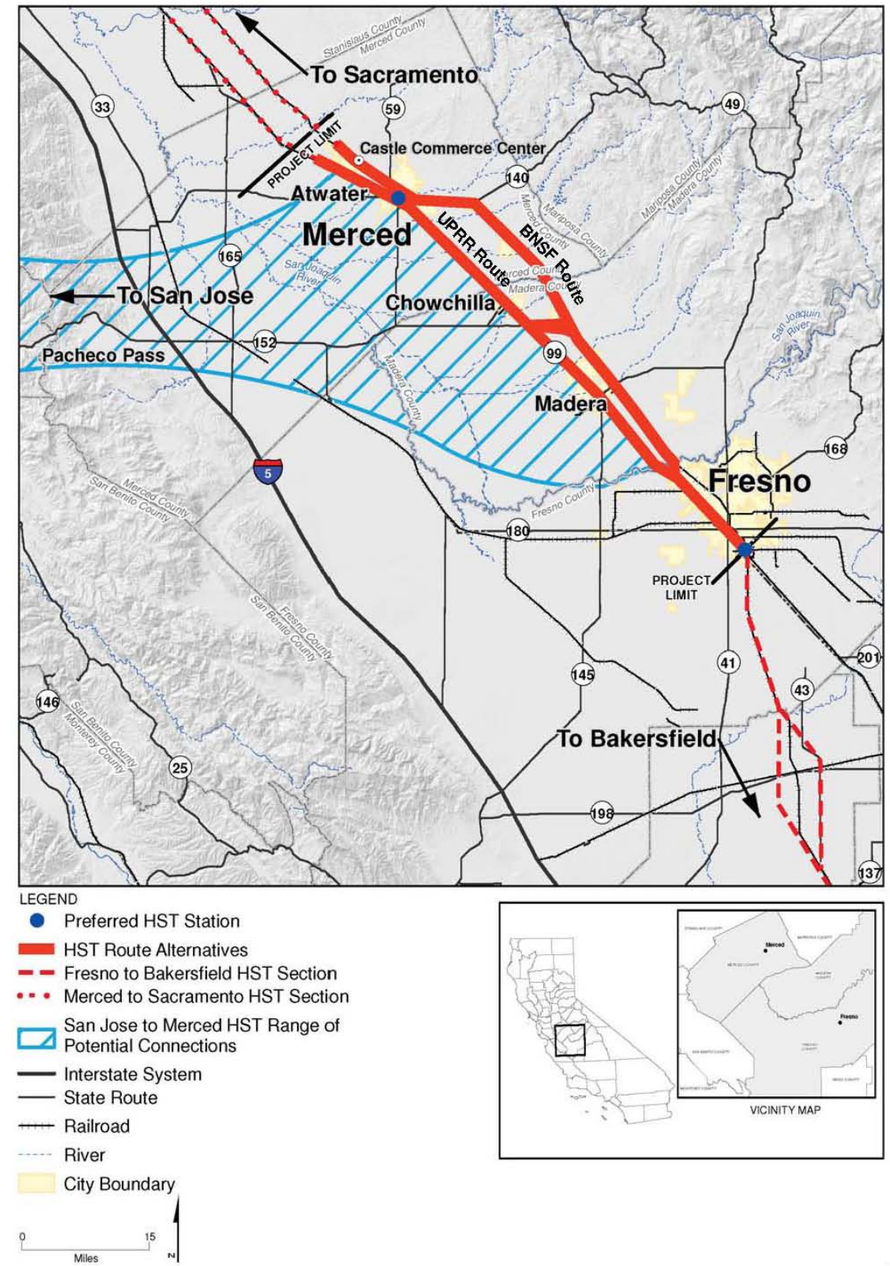
In the 2005 Statewide Program EIR/EIS, the primary reason for selecting the BNSF over the UPRR route was that the BNSF route avoided impacts associated with construction and operation in urban areas. These impacts include constructability issues, noise and impacts on culturally sensitive properties, and disturbances on the community at large. The Statewide Program EIR/EIS did acknowledge higher biological and water-related impacts, but the differences were not substantial over the entire Central Valley study area, which at the time extended from Fresno to Sacramento. In the 2008 Bay Area to Central Valley Program EIR/EIS, the study area from the Bay Area overlapped the previous Central Valley study area in Merced and Modesto. The findings showed that the UPRR route was the preferred alternative because it could better serve the downtown station destinations, which would encourage transit-oriented development (TOD) and associated infill densification rather than causing growth in undesirable locations. It was noted that at the project-level, the Authority would continue to evaluate the BNSF Alternative because of the uncertainty of negotiating with UPRR for use of some of its right-of-way and would continue investigation of alignments/linkages to a potential maintenance facility at Castle Air Force Base (California High-Speed Rail Authority 2008).

Initially, the Merced to Fresno and Fresno to Bakersfield sections were combined into a single project section known as the Merced to Bakersfield Section. The Notice of Intent / Notice of Preparation (NOI/NOP) for the combined Merced to Bakersfield Section EIR/EIS was published in the Federal Register in March 2009. Early outreach activities occurred throughout the Central Valley during autumn 2008 and winter 2009. Scoping activities were conducted between February 24 and April 10, 2009, with scoping meetings held in Merced, Madera, Visalia, Fresno, and Bakersfield. Both the general public and agencies attended these meetings. The meetings provided information about the history of the HST project to date, the two program EIR/EIS preferred alternatives, and the upcoming steps in the environmental process, including alternatives development and analysis. The meetings are summarized in the Merced to Bakersfield Section Scoping Report (June 2009).

After the scoping period ended, the initial range of alternatives for the Merced to Fresno and Fresno to Bakersfield subsections was developed. The initial review of alternatives defined the range of alternatives that would be carried forward into the alternatives analysis process. The Merced to Bakersfield Section was subsequently divided into two separate project sections: the Merced to Fresno Section and the Fresno to Bakersfield Section. The Authority, in conjunction with the FRA, determined that the environmental effects of the HST System from Merced to Bakersfield would be more appropriately assessed in two separate documents: one for Merced to Fresno and another for Fresno to Bakersfield. The project sections are of sufficient length, with logical termini allowing for an analysis of environmental matters on a broad scope, to ensure that the projects will function properly without requiring additional improvements elsewhere and without restricting consideration of alternatives for other transportation improvements.

An amended NOI/NOP was published in the Federal Register in October 2009 documenting this change. The remainder of the EIR/EIS process for the Merced to Fresno Section, including the alternatives analysis documented in this report, is therefore being conducted as a study separate from the Fresno to Bakersfield Section. The Merced to Fresno Section alternatives were evaluated to determine which would be carried forward for more detailed evaluation. The results of the preliminary evaluation were presented in July 2009 to the Technical Working Groups in Fresno, Merced, and Madera, consisting of senior staff from city and county public works, planning departments, redevelopment agencies, and economic development departments, and later the water and irrigation district managers and agricultural commissioners were included. These groups provided input on the alternatives and information about city and county land use and planning, as well as providing updates to their boards or commissions.

Figure 2: Project Study Area and Program EIR/EIS Preferred Alternatives



1.3 Study Area

The Merced to Fresno Section study area starts north of the Castle Commerce Center in Atwater (north of the city of Merced) and ends in Downtown Fresno (see Figure 2). The Merced to Fresno Section crosses the southeastern part of Merced County, Madera County, and parts of Fresno County. The Merced to Fresno Section connects to the Merced to Sacramento Section to the north, to the San Jose to Merced Section (via Pacheco Pass) to the west, and to the Fresno to Bakersfield Section to the south. While the HST sections north and south would connect with a continuous high-speed rail line, the connection to the San Jose to Merced Section (via Pacheco Pass) to the west would require a railroad wye, which is a large divergence of two rail tracks curving northbound and two rail tracks curving southbound. The location of this wye may influence the selection of the route traveling north-south between Merced and Fresno, and therefore the analysis of this wye is included in the alternatives analysis for the Merced to Fresno HST Project EIR/EIS.

1.4 Purpose of Study

This Alternatives Analysis Report uses preliminary planning, environmental, and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering design in the Merced to Fresno HST Project EIR/EIS. This report is intended to identify the range of potentially feasible alternatives to analyze in the Project Draft EIR/EIS. It documents the preliminary evaluation of alternatives, indicating how each of the alternatives meets the purpose for the HST project, how evaluation criteria were applied and used to determine which alternatives to carry forward for detailed environmental analysis, and which alternatives should not be carried forward for further analysis.

The analysis begins with the corridors selected at the conclusion of the 2005 Statewide Program EIR/EIS process and 2008 Bay Area to Central Valley Program EIR/EIS. Public and agency comments received during the Merced to Fresno Project EIR/EIS scoping period and during ongoing interagency coordination meetings, were used to identify the initial alternatives to carry forward for detailed evaluation. After initial project alternatives were identified, alignment plans, preliminary profile concepts, and cross-sections were developed and used for this detailed evaluation of the alternatives.

Section 2.0 describes the evaluation measures used for the alternatives analysis process. Each of the project alternatives is described in detail in Section 3.0. Section 4.0 evaluates the alternatives, and Section 5.0 summarizes the results of the alternatives analysis.

2.0 ALTERNATIVES DEVELOPMENT PROCESS

The process for this study involves the creation and refinement of alternatives, through a series of processes that are intended to compare alternatives. This study follows a defined alternative analysis process as described in the Technical Memo *Alternatives Analysis Methods for Project EIR/EIS, Version 2* (October 2009), and uses both qualitative and quantitative measures that reflect a mixture of applicable policy and technical considerations.

The techniques that are used to gather information and to develop and compare alternatives are described below.

Field Inspections of Corridors: Planners, engineers, and analysts with experience in railroad operations conducted field inspections of the potential alignment, right-of-way, and station locations to identify conditions and factors that may not be visible in aerial photos or on maps. Over the course of the study, field inspections became progressively more detailed as the alternatives were refined during the planning and engineering work.

Project Team Input and Review: The project team conducted team meetings to discuss alternatives and local issues that potentially affect alignments.

Qualitative Assessment: A number of the qualitative measures used to describe the alternative alignments were developed by project team members with experience in construction and operation of high-speed rail and other transportation systems. These measures included constructability, accessibility, operations, maintenance, right-of-way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts.

Engineering Assessment: Engineering assessments were provided for a number of measures that could be readily quantified at this stage of project development. The engineering assessments provided information on project length, travel time, and configuration of key features of the alignment such as the presence of existing infrastructure.

Geographic Information System (GIS) Analysis: The bulk of the assessment was performed using GIS data, which enabled depictions of the project's interactions with a variety of measurable geographic features, both natural and built. GIS data was used to assess impacts on farmland, water resources, wetlands, threatened and endangered species, cultural resources, current urban development, and infrastructure.

2.1 HST Project Purpose

The purpose of California HST Project is to implement the statewide HST System in sections along the corridors selected in program-level (Tier 1) decisions that will (1) link Southern California cities, the Central Valley, Sacramento, and Bay Area; (2) provide a new transportation option that increases mobility throughout California; (3) provide reliable HST service that delivers predictable and consistent travel times using electric-powered steel-wheel trains; and (4) provide a transportation system that is commercially viable.

The Authority's objectives and policies for the proposed HST system are as follows:

- Provide intercity travel capacity to supplement critically overused interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by present transportation systems, and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020 and generate revenues in excess of operation and maintenance costs.

2.2 Process to Identify Alternatives to be Carried Forward for EIR/EIS Analysis

The aim of this report is to document the evaluation process and to identify alternatives that should be carried forward through the environmental process and engineering design. Significant issues that would qualify an alternative to be carried forward for further consideration include the following:

- Alternative meets the purpose and need and the project objectives in providing a sustainable reduction in travel time between major urban centers.
- Alternative has no environmental or engineering issues that would make approvals infeasible.
- Alternative is feasible and practical to construct.
- Alternative reduces or avoids adverse environmental impacts.

2.3 HST Design Objectives

To determine each alternative's ability to meet the HST project purpose and need, the alternatives were evaluated using HST system performance criteria that address design differences and qualities in the alignment and station locations. These objectives and measures are summarized in Table 1.

Table 1: Alignment and Station Performance Objectives and Measures

Objective	Measure
Maximize ridership / revenue potential	Travel Time[a]
	Route Length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operating and maintenance costs
	Capital cost

[a] The critical travel time within the Merced to Fresno Section is the travel time between the San Jose to Merced (Pacheco Pass) alternatives and the south Merced to Fresno Section project limit. This travel time criterion is tied to the Proposition 1A requirement that HST travel between San Francisco and Los Angeles in 2 hours 40 minutes.

2.4 Comparison of Project Alternatives

In addition to the HST project objectives and evaluation measures presented in Section 2.3, there are additional measures used to evaluate and compare the project alternatives: land use, constructability, community impacts, natural resources, and environmental quality. Each of these five additional measures is discussed below.

Land Use

Alternatives and station locations were evaluated to determine whether surrounding land use supports transit use; whether the alternatives and station locations are consistent with existing adopted local, regional, and state plans; and whether they are supported by existing or future growth areas (Table 2).

Table 2: Land Use Evaluation Measures

Land Use		
Measurement	**Method**	**Source**
Development potential for TOD within walking distance of station	Identify existing and proposed land uses within 1/2-mile of station locations; identify if there are TOD districts, TOD overlay zones, mixed use designations, or if local jurisdictions have identified station areas for redevelopment or economic development	Regional and local planning documents, land use analysis, and input from local planning agencies
Consistency with other planning efforts and adopted plans	Qualitative - general analysis of applicable planning and policy documents[a]	Land use analysis and input from planning agencies[b]

[a] Alternatives were compared to local general plans, adopted future land use plan maps, and policies of local jurisdictions for consistency.
[b] Additional sources were general plans, comprehensive plans, and future land use maps.

Constructability

Alternatives were evaluated to determine whether construction of the alternative is feasible in terms of complexity of construction and right-of-way constraints (Table 3).

Table 3: Constructability Evaluation Measures

Constructability and Right of Way		
Measurement	**Method**	**Source**
Constructability, access for construction, within existing transportation right-of-way	Extent of feasible access to alignment for construction	Conceptual design plans and maps
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads[a]	Conceptual design plans and maps
Disruption to and relocation of utilities	Number of utilities crossed[b]	Conceptual design plans and maps[c]

[a] Alternatives were assessed for number of crossings of railroad right-of-way.
[b] Number of miles of alternatives located in urbanized areas were calculated.
[c] An additional source was GIS land use data.

Community Impacts

Alternatives and station locations were evaluated for their ability to minimize disruption to neighborhoods and communities. They are measured by the extent to which they minimize right-of-way acquisitions, minimize division of established communities, and minimize conflicts with community resources (Table 4).

Table 4: Community Evaluation Measures

Minimized Disruption to Neighborhoods and Communities		
Measurement	**Method**	**Source**
Displacements	If possible, identify number of properties by land use type that would be displaced, or acres of land within the right-of-way/station footprint, by type of land use: single family, multifamily, retail/commercial, industrial, etc.[a]	Identified comparing the alignment conceptual design drawings with aerial photographs, zoning maps, and General Plan maps[b]
Properties with access affected	Identify potential locations along the alignments or at station locations where access would be affected	Estimated off conceptual design plans and aerial photographs
Local traffic effects around stations	Identify potential locations where increases in traffic congestion or decreases in levels of service are expected to occur	Existing traffic levels of service from local jurisdictions[c]
Local traffic effects at grade separations	Identify potential locations at grade-separations where increases in traffic congestion or decreases in levels of service are expected to occur[d]	Existing traffic levels of service from local jurisdictions[e]

[a] Acres of land impacted, by land use type (residential, commercial, agricultural, industrial) were determined.
[b] Conceptual design drawings were compared with GIS land use data.
[c] An additional source was future station parking demand.
[d] Number of road closures were identified.
[e] Additional sources were conceptual design plans and maps.

Natural Resources

Alternatives were evaluated for their ability to minimize impacts on natural environmental resources (Table 5).

Table 5: Environmental Resources Evaluation Measures

Minimized Impact on Environmental Resources		
Measurement	**Method**	**Source**
Waterways and wetlands and natural preserves or biologically sensitive habitat areas affected	Identify new bridge crossings required; rough estimate of acres of wetlands; linear feet of crossings of waterways; acres and species of potential threatened and endangered habitat affected; acres of natural areas/critical habitat affected	Measured off conceptual design plans and GIS layers
Cultural resources	Identify locations of National Register of Historic Places- or California Historical Resources Information System-listed properties;[a] for archaeological resources, identify areas of high or moderate sensitivity based on previous studies conducted in the study area	Based on conceptual design plans and GIS layers;, Section 4(f) studies and cultural resource records search and surveys[b]
Parklands	Number and acres of parks that could be directly and indirectly affected; this would also include major trails that would be crossed	Based on conceptual design plans and GIS layers; Section 4(f) studies
Agricultural lands	Acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance	Based on conceptual design plans and GIS layers

[a] Historic parcels were also identified through field reconnaissance.
[b] An additional source of information was field reconnaissance.

Environmental Quality

Alternatives were evaluated for their ability to enhance environmental quality. They were measured by the extent to which they minimize impacts on the natural environment (Table 6).

Table 6: Natural Environment Evaluation Measures

Minimized Impact on Natural Environment		
Measurement	**Method**	**Source**
Noise and vibration effects on sensitive receivers	Identify types of land use activities that would be affected by HST pass-by noise and ground vibration[a]	Results of FRA screening level assessment; inventory of potential receivers from site survey and aerial maps[b]
Change in visual/scenic resources	Identify number of local and scenic corridors crossed and scenic/visual resources that would be affected by HST elevated structures in scenic areas and shadows on sensitive resources (parks); identify locations where residential development is in close proximity to elevated HST structures[c]	Result of general assessment; survey of alignment corridors and planning documents[d]
Maximize avoidance of areas with geological and soils constraints	Identify number of crossings of known seismic faults, acres of encroachment into areas with highly erodible soils, acres of encroachment into areas with high landslide susceptibility	U.S. Geological Survey maps and available GIS data
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints[e]	Data from previous records search conducted for other projects within study area

[a] Number of residential parcels that would be affected were identified.
[b] Additional sources were conceptual design plans and GIS right-of-way and land use data.
[c] Alternatives were assessed for number of linear miles in urban areas versus rural areas.
[d] Additional sources were conceptual design plans and GIS land use data.
[e] Number of hazardous waste sites adjacent to alternatives were identified.

3.0 PROJECT ALTERNATIVES

The evaluation of alternatives is based on the key differentiators between alternatives. This section describes the No Project Alternative, the initial range of alternatives considered, and the alternatives carried forward for detailed evaluation in the Alternatives Analysis.

3.1 No Project Alternative

The No Project Alternative is the basis for comparison of the HST build alternatives. It satisfies the statutory requirements under CEQA and NEPA for an alternative that does not include any new action or project beyond what is already committed. The No Project Alternative represents the state's transportation system (highway, air, and conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently projected in regional transportation plans (RTPs), that have identified funds for implementation, and that are expected to be in place by 2035; as well as any major planned land use changes. Annual population growth is expected to be evenly dispersed within the project area with a growth rate of approximately 3%. No major land use changes have been proposed since the University of California (UC) Merced campus was developed in Merced. The No Project Alternative addresses the geographic area that serves the major destination markets for intercity travel and that would be served by the proposed Merced to Fresno Section alternatives. This area extends generally from Merced through the Central Valley to Fresno. Figure 2 illustrates the existing intercity transportation infrastructure that currently serves these major travel markets.

The No Project Alternative includes programs and projects identified from the following sources:

- State Transportation Implementation Program (STIP)
- RTPs from Merced and Madera counties, financially constrained projects for all modes of travel
- Airport plans
- Intercity passenger rail plans

3.1.1 Highway Element

The highway system that currently serves the intercity travel market in the area that would be served by the Merced to Fresno Section includes the existing highway routes identified in Table 7.

Table 7: Existing California Intercity Highway System within Study Area

Interstate Highways	State Routes
Interstate 5	SR 41
	SR 59
	SR 99
	SR 140
	SR 145
	SR 152
	SR 180
	SR 233

The No Project Alternative includes the existing highway system identified in Table 7, as well as funded and programmed improvements on the intercity highway network based on financially constrained RTPs developed by regional transportation planning agencies. The improvements consist primarily of individual interchange improvements and roadway-widening projects on segments of the highway network, as enumerated below. These improvements in the urban areas of Merced, Madera, and Fresno are illustrated in Figure 3. These improvements do not cumulatively add much capacity to the existing highway system.

1. SR 99 – Convert to six-lane freeway between a point north of Atwater and Arena Way; remove at-grade road crossings; construct new interchange at Westside Boulevard.
2. SR 99 – Widen freeway to six lanes from Atwater through Downtown Merced; upgrade interchanges in downtown area.
3. Interchange SR 99 at SR 140 – Interchange improvements.
4. Interchange SR 99 at Mission Avenue – Construct new interchange.
5. SR 99 – Convert to six-lane freeway between McHenry Road and Buchanan Hollow Road; eliminate at-grade road crossings; construct new interchange at Arboleda Road (rural project, not illustrated in Figure 3).
6. SR 99 – Convert to six-lane freeway between Buchanan Hollow Road and Merced/Madera County line; eliminate at-grade road crossings; construct new interchange at Plainsburg Road (rural project, not illustrated in Figure 3).
7. Atwater-Merced Expressway – Construct new four-lane expressway between SR 140 and SR 59; realign SR 59; remove at-grade road crossings; construct new interchange at SR 99 and Santa Fe Avenue.
8. SR 140 – Upgrade arterial from Parsons Avenue to Tower Road.
9. Campus Parkway – Construct Campus Parkway between SR 99 and Yosemite Avenue in Madera County.
10. Interchange SR 99 at SR 233 – Reconstruct interchange (not illustrated in Figure 3).

11. SR 99 – Convert to six-lane freeway between Merced/Madera County line and SR 152; reconstruct interchange at Avenue 24.
12. Interchange SR 99 at SR 152 – Construct new interchange and rail crossing.
13. SR 99 – Widen freeway between SR 152 and south of Avenue 21.5; interchange at Avenue 22.
14. SR 99 – Convert to six-lane freeway between Avenue 17 and Ellis Street; reconstruct interchange at Avenue 17.
15. SR 99 – Convert to six-lane freeway between Ellis Street and Avenue 12; reconstruct interchange at Ellis Street.
16. Interchange SR 99 at 4th Street – Reconstruct interchange.
17. Interchange SR 99 at SR 145 – Interchange improvements.
18. Interchange SR 99 at Avenue 12 – Reconstruct interchange.
19. SR 99 – Convert to six-lane freeway between Avenue 12 and Avenue 7.
20. SR 99 – Convert to six-lane freeway between Avenue 7 and Ashlan Avenue in Fresno County.
21. SR 145 – Widen to four lanes between SR 99 and Yosemite Avenue.
22. Interchange SR 99 at proposed Veterans Boulevard – construct new interchange and rail crossings.
23. Interchange SR 99 at Grantland Avenue – interchange improvements.
24. SR 99 – Widen to 10-lane freeway (2 phases) between Clinton Avenue and Ashlan Avenue.
25. SR 41 – Southbound auxiliary lane between El Paso Avenue and Friant Road.
26. SR 41 – Northbound auxiliary lane between Bullard Avenue and Herndon Avenue.
27. Interchange SR 99 at Shaw Avenue – Interchange improvements .
28. SR 41 – Northbound auxiliary lane between Ashlan Avenue and Shaw Avenue.
29. SR 41 – Auxiliary lanes between O Street and Shaw Avenue.
30. SR 41 – Widen interchange ramps between McKinley Avenue and Shields Avenue.
31. SR 180 – Braided ramp construction between SR 41 and SR 168.
32. SR 99 – Update closed bridge structure.

3.1.2 Aviation Element

Two commercial airports serve the Merced to Fresno Section: Fresno Yosemite International Airport and Merced Municipal/Macready Field. There are also several general aviation airports in the Merced to Fresno Corridor, including two (i.e., Chowchilla Municipal and Madera Municipal) located near the proposed alternatives. Following is a summary description of these airports:

- Fresno Yosemite International Airport (FAT): The municipally owned airport is located northeast of the City of Fresno, east of SR 41. It is the major air carrier airport in the Central San Joaquin Valley. Eight certified carriers provide domestic flights to most major airports in the west and direct international flights to Guadalajara, Mexico. The airport terminal includes a recently remodeled lobby and a two-story concourse with six gates. The facility has two runways: a primary, 9,227-foot commercial runway, and a second, shorter runway for smaller aircraft. The facility provides 2,259 surface parking spaces. Parking rates are $8 long term and $12 short term. The airport also has a consolidated rental car facility (City of Fresno 2008).
- Merced Municipal/Macready Field (MCE): The Merced Municipal Airport is located southwest of Downtown Merced, south of SR 140. The 450-acre facility is owned and operated by the City of Merced. Commercial service at MCE currently includes three daily and two weekend round trips from Merced to Ontario Airport, where connections can be made to other destinations (City of Merced 2007).
- Chowchilla Municipal Airport: This general aviation facility is situated on approximately 32 acres on the southeast edge of the City of Chowchilla, just west of SR 99. The airport is owned and operated by the city. The facility is an uncontrolled airport with no onsite supervisor or tower. The airport has a 3,250-foot lighted runway (City of Chowchilla 2009).
- Madera Municipal Airport (MAE): This airport is situated 3 miles northwest of the City of Madera, west of SR 99. It is owned and operated by the city. There is a 5,544-foot, lighted primary runway (suitable for business jet service) and a secondary, 3,900-foot runway. Other facilities include an administration building, various hangers, and tie-downs and a fueling facility (City of Madera 2009).

3.1.3 Conventional Passenger Rail Element

Existing intercity passenger rail service in California is provided by Amtrak on four principal corridors covering more than 1,300 linear miles and spanning almost the entire state. The existing passenger rail network in the Merced to Fresno Section study area includes one of these corridors, the San Joaquin Route, which follows the BNSF corridor through the study area.

Amtrak's San Joaquin Route includes four trips daily in each direction from Oakland to Bakersfield and two trips daily in each direction from Sacramento to Bakersfield, for a total of six daily roundtrips serving Merced, Madera, and Fresno. The intercity route carried over 819,000 riders in 2007 with an on-time performance of 67.9%. Scheduled running time between Bakersfield and Oakland averages 6 hours 9 minutes, at an average speed of 51.3 mph. The maximum speed on the route is 79 mph (California Department of Transportation 2008).

The *California State Rail Plan 2007/8 – 2017/18* (California Department of Transportation 2008) envisions an increase in service to eight daily roundtrips by 2018, carrying 1,430,000 annual riders, with 90% on-time performance and seeks to reduce the travel time from Bakersfield to Oakland to less than 6 hours.

The San Joaquin Route shares track with the BNSF freight line in the Merced to Fresno Section study area. There are existing Amtrak stations in Merced and Madera. This corridor serves a portion of the same intercity markets as the proposed Merced to Fresno Section alternatives.

Intercity passenger rail system improvements identified in the STIP and the Caltrans California State Rail Plan for implementation before 2020 are included in the No Project Alternative and identified in Table 8. To increase levels of passenger service, the improvements consist of additional track capacity, new rolling stock, grade-crossing improvements, track and signal improvements, and expanded or upgraded passenger stations.

Table 8: Programmed Improvements in 2008 California State Rail Plan

Project Title	Route	Lead Agency	Project Description
Madera Station	San Joaquin	Caltrans	Construct new station
Merced Crossover	San Joaquin	Caltrans	Construct crossover – to increase efficiency
Merced to Le Grand	San Joaquin	Caltrans	Improvements to increase on-time performance and efficiency
Equipment	San Joaquin	Caltrans	Purchase 2 train sets (6 cars – 1 locomotive)
Source: California Department of Transportation (2008).			

Figure 3: No Project Alternative Planned Improvements in Merced, Madera, and Fresno Urban Areas

3.2 Program Alternatives

3.2.1 2005 Statewide Program EIR/EIS

Statewide Program Alternatives

The Statewide Program EIR/EIS for the California HST was completed in November 2005. The Authority and FRA selected the electric steel-wheel-on-steel-rail technology for the HST vehicles and identified potential route and station location options through the program environmental analysis. For a more detailed examination of these issues, refer to the *Final Program EIR/EIS for the Proposed California High-Speed Train System*.

The Statewide Program EIR/EIS examined three major alternatives for the statewide transportation network:

- **No Project Alternative**: The state's transportation network as it is today, along with funded projects included in regional transportation plans.
- **Modal Alternative**: Enhancements to the state's transportation network using existing modes and technologies (mainly expanded airports and highways).
- **HST Alternative**: A new HST system to connect California's major urban centers.

The HST Alternative was the selected system alternative in the Statewide Program EIR/EIS. The No Project Alternative was not able to provide the needed level of intercity mobility in the future, while the Modal Alternative provided reduced mobility compared to the HST Alternative. In addition, the Modal Alternative would have a higher cost and more substantial environmental impacts than the HST Alternative.

Merced to Fresno Section Routing and Station Alternatives

The following alignment and station options were evaluated for the Merced to Fresno Section in the Statewide Program EIS/EIR:

- Alignment Alternatives
  - BNSF Route
  - UPRR Route
  - Western Alternative (West of SR 99)
  - Eastern Bypass (East of SR 99)
- Station Locations
  - Merced – Castle Commerce Center
  - Merced – Downtown
  - Merced – Municipal Airport
  - Merced –UC Merced
  - Fresno – Downtown
  - Plainsburg

Table 9 lists each of the alternatives and station locations considered in the Statewide Program EIR/EIS and whether they were carried forward for further study or not carried forward. The BNSF Route and the Downtown Fresno Station were identified as the preferred alternative and station location.

Table 9: 2005 Statewide Program EIR/EIS Merced to Fresno Section Alternatives Considered

Alternatives / Stations	Program EIR/EIS Decision		Reasons for Elimination						Notes
	Carried Forward	Not Carried Forward	Construction	Incompatibility	Right-of-Way	Connectivity	Revenue	Severe Environ-mental Impacts	
BNSF Route	Preferred in 2005 FEIS/EIR								
UPRR Route	FEIS/EIR: carry forward to next phase of study								
Western Alternative (West of SR 99)		Eliminated during the evaluation of alternatives process				X	X	X	
Eastern Bypass (East of SR 99)		Eliminated in ROD				X	X	X	
Station Location: Castle Commerce Center	FEIS/EIR: carry forward to next phase of study								One station only, either at Castle AFB or Downtown Merced. Castle AFB is about 7 miles northwest of Merced but provides best access to developing UC Merced campus. Would require an additional two-track alignment loop to be constructed to serve Castle AFB, but would have fewer construction impacts.
Station Location: Downtown Merced	FEIS/EIR: carry forward to next phase of study								One station only, either at Castle AFB or Downtown Merced. Downtown location would be located in the transit hub at existing Amtrak Station or 16th Street transit center and would provide good access to SR 99. There would be more construction impacts associated with this station location.
Station Location: Merced Municipal Airport	FEIS/EIR: carry forward to next phase of study								Located on the ground of the existing Merced Municipal Airport complex southwest of SR 99. Would require a divergence from the BNSF to connect to UPRR. Would be located at a considerable distance from UC Merced but would be adjacent to Downtown Merced. Compatible with existing and planned development.
Station Location: Downtown Fresno	Preferred in 2005 EIS/EIR								
Station Location: UC Merced		Eliminated during the evaluation of alternatives process						X	Eliminated due to impacts on farmlands, wetlands, floodplains.
Station Location: Plainsburg		Eliminated during the evaluation of alternatives process					X	X	Eliminated due to impacts on farmlands.

Source: California High-Speed Rail Authority (2005).
Notes: AFB = Air Force Base; ROD = Record of Decision; FEIS/EIR = Final EIS/EIR

3.2.2 2008 Bay Area to Central Valley Program EIR/EIS

The subsequent Bay Area to Central Valley Program EIR/EIS for the California HST was completed in July 2008. The Authority and FRA identified potential route and station location options connecting the Bay Area to the Central Valley through this subsequent program environmental analysis. For a more detailed examination of these issues, refer to the Bay Area to Central Valley HST Final Program EIR/EIS.

The following alignment, station, and maintenance facility options were evaluated for the Merced to Fresno Section in the Bay Area Program EIR/EIS:

- Alignment Alternatives
  - UPRR Route
  - BNSF Route
  - West of SR 99 Alignment
  - East of SR 99 Alignment
- Station Locations
  - Merced – Downtown
  - Merced – Castle Commerce Center
- Maintenance Facility Locations
  - Castle Commerce Center

Table 10 lists each of the alternatives, station locations, and maintenance facility locations considered and whether they were carried forward for further study or not carried forward. The UPRR Route and the Downtown Fresno station were identified as the preferred alternative and station location.

3.2.3 Program Alternative and Station Locations

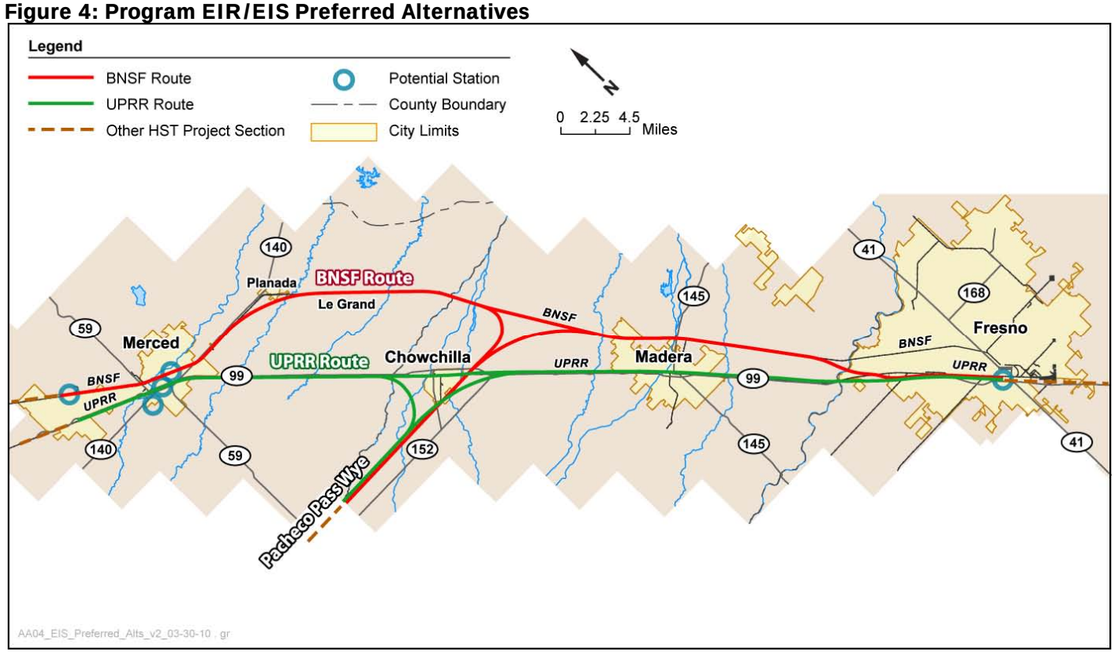
Two different preferred alternatives were selected in the 2005 and 2008 Program EIR/EIS documents. In response to the 2005 Statewide Program EIR/EIS, the Authority and the FRA selected the BNSF Route as the preferred alternative between Merced and Fresno. In the 2005 Statewide Program EIR/EIS, the primary reason for selecting the BNSF over UPRR Route was that the BNSF Route avoided impacts associated with construction and operation in urban areas. These impacts include constructability issues, noise and impacts on culturally sensitive properties, and disturbances on the community at large. The Statewide Program EIR/EIS did acknowledge higher biological and water-related impacts, but the differences were not substantial over the entire Central Valley study area, which at the time extended from Fresno to Sacramento. In the 2008 Bay Area to Central Valley Program EIR/EIS, the Authority and FRA selected the UPRR Route as the preferred alternative between Merced and Fresno. Under the Bay Area to Central Valley preferred alternative, the HST would travel from the Bay Area over Pacheco Pass via Henry Miller Road, connecting to the Central Valley along the UPRR in the vicinity of Chowchilla. The study area from the Bay Area overlapped the previous Central Valley study area in Merced and Modesto. The findings showed that the UPRR route was the preferred alternative because it could better serve the downtown station destinations, which would encourage TOD and associated infill densification rather than causing growth in undesirable locations. It was noted that at the project level, the Authority would continue to evaluate the BNSF Alternative because of the uncertainty of negotiating with UPRR for use of some of its right-of-way and would continue investigation of alignments/linkages to a potential maintenance facility at Castle Air Force Base (California High-Speed Rail Authority 2008).

Figure 4 shows the alignments and station locations for both of the preferred alternatives carried forward from the two program EIR/EIS documents, and the Pacheco Pass connection to both of the preferred alternatives, as identified in the Bay Area Program EIR/EIS.

Table 10: 2008 Bay Area to Central Valley Program EIR/EIS Merced to Fresno Section Alternatives Considered

Alternatives / Stations	Program EIR/EIS Decision		Reasons for Elimination						Notes
	Carried Forward	Not Carried Forward	Construction	Incompatibility	Right-of-Way	Connectivity	Revenue	Severe Environ-mental Impacts	
UPRR Route	Preferred in 2008 FEIS/EIR								Connects with either the Altamont Pass or Pacheco Pass alignment alternatives.
BNSF Route	FEIS/EIR: carry forward to next phase of study								Connects with either the Altamont Pass or Pacheco Pass alignment alternatives. Although the UPRR is the preferred alternative, BNSF will continue to be studied due to uncertainty of negotiations with UPRR.
West of SR 99 Alignment		Eliminated in ROD				X		X	
East of SR 99 Alignment		Eliminated in ROD				X		X	
Station Location: Downtown Merced	Preferred in 2008 FEIS/EIR								Would serve all Altamont Pass and Pacheco Pass alternatives.
Station Location: Castle Commerce Center	FEIS/EIR: carry forward to next phase of study								Would serve all Altamont Pass and Pacheco Pass alternatives.
Maintenance Facility: Castle Commerce Center	Preferred in 2008 FEIS/EIR								Designated as "Fleet Storage / Service and Inspection / Light Maintenance."
Source: California High-Speed Rail Authority (2008).									

Figure 4: Program EIR/EIS Preferred Alternatives



3.3 Initial Development of Project Alternatives

The initial range of project alternatives began with those carried forward by the Statewide Program EIR/EIS and the Bay Area to Central Valley Program EIR/EIS. Because the Merced to Fresno Section serves as a connection point for three other sections, the alternatives are influenced by input from adjoining section studies. Both the UPRR and the BNSF corridors were displayed during the project scoping process for the Merced to Fresno and the Fresno to Bakersfield sections. The initial range of alternatives for the San Jose to Merced Section carried forward the alignment on Henry Miller Road/Avenue 24, which resulted in a railroad Wye junction, with the north leg joining the Merced to Fresno Section north of Chowchilla and the south leg joining south of Chowchilla. Included as part of those alternatives were four stations: Castle Commerce Center, Downtown Merced (either on the UPRR or the BNSF/Amtrak station), Merced Airport, and the Downtown Fresno stations. Input on the stations, heavy maintenance facilities, and the Pacheco Pass Wye connects follow. A heavy maintenance facility was considered at the Castle Commerce Center.

Input on the initial development of project alternatives was collected during the public scoping periods for the Merced to Fresno Section and the San Jose to Merced Section. The initial north-south alignments expanded from two to four, and then later a fifth alternative was suggested after the scoping period ended. These five initial alternatives are summarized below.

BNSF – Adjacent to BNSF Route (Alternative A1 – BNSF)

The BNSF Alternative is consistent with the Statewide Program Preferred Alternative. This alternative generally remains west of the BNSF from Castle Commerce Center through Merced and Madera, then joins to the east side of the UPRR near the San Joaquin River. Several design options were suggested: three design options on the north end and three on the south end. On the north end, the City of Merced preferred the station to be located downtown near the UPRR and asked that the BNSF Alternative link to the UPRR corridor for the station before reconnecting to the BNSF. Therefore, the baseline Design Option 1 remains adjacent to the BNSF, and two other design options link to the station in Downtown Merced. Design Option 2 follows Mission Avenue from the UPRR to the BNSF. Due to residential impacts and constraints at the SR99/Mission Avenue interchange related to Design Option 2, Design Option 3 is located farther south to follow Mariposa Avenue to the BNSF. At the south end of the BNSF Alternative, some design options were suggested by City of Madera to remain on the BNSF as long as possible before reconnecting to the UPRR. All six design options are displayed in Figure 5.

Sierra Foothills Alternative

This option, suggested by the public during scoping, is located approximately 10 miles east of the SR 99 corridor. This is the same as the alternative studied in the Statewide Program EIR/EIS. It was not carried forward in the 2005 Statewide Program EIR/EIS because it did not meet the purpose of the project. Since there is nothing new about this suggestion, this alternative was not carried forward in this study.

UPRR/SR 99 – Adjacent to UPRR and SR 99 Route (Alternative A2 – UPRR/SR 99)

The UPRR/SR 99 Alternative is consistent with the Bay Area Program Preferred Alternative. This alternative generally remains parallel to but outside of the UPRR right-of-way, opposite SR 99, between Castle Commerce Center and the Downtown Fresno Station. There are no design options considered on this route.

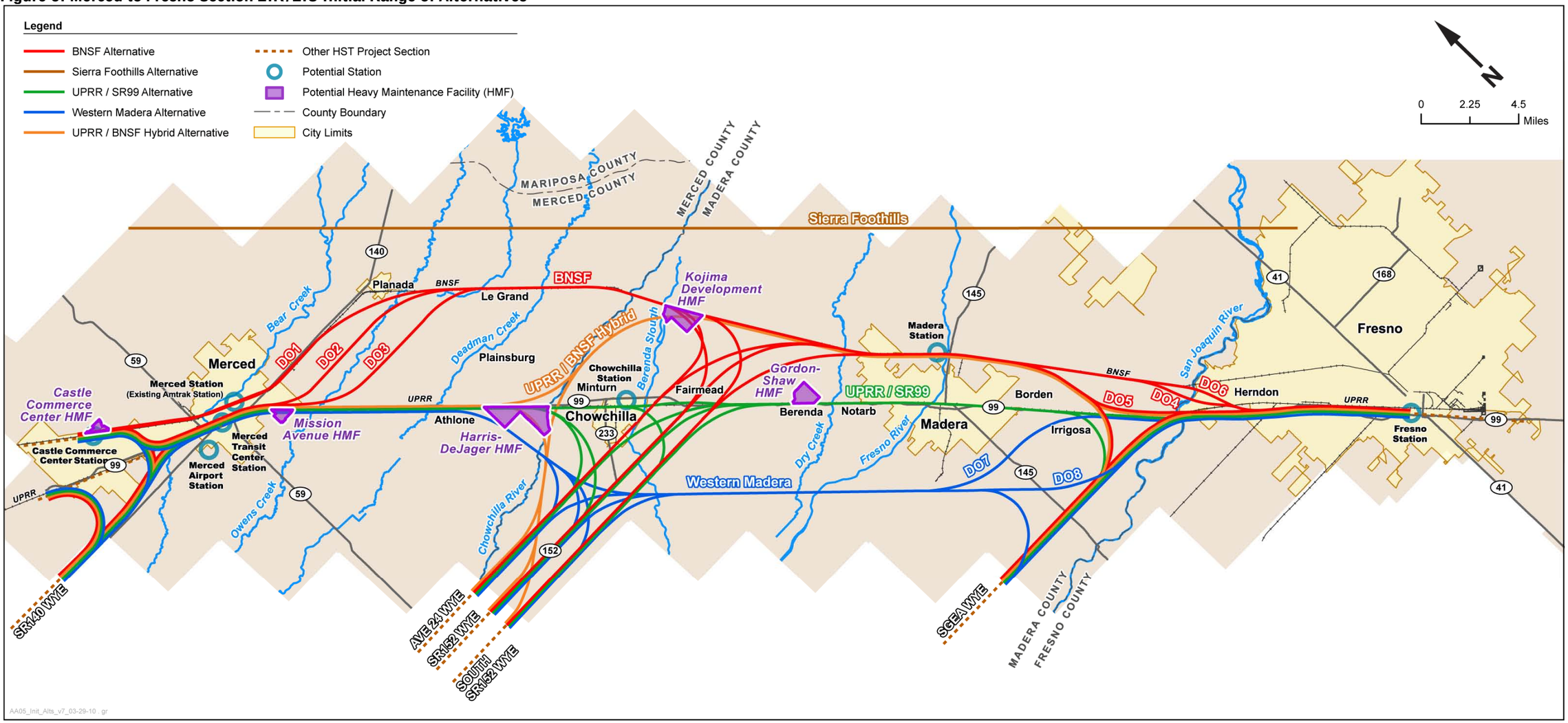
Western Madera Alternative (Alternative A3 – Western Madera)

This alternative follows the UPRR/SR 99 route from Castle Commerce Center southward but deviates to the west before reaching Chowchilla. It moves west to a location approximately 3.75 miles west of and parallel to the UPRR, then returns to be adjacent to SR 99 and UPRR south of Madera. This alternative has two design options south of Madera.

UPRR/BNSF Hybrid (Alternative A4 – UPRR/BNSF Hybrid)

After the scoping period, the City of Chowchilla suggested an alternative that also follows the UPRR/SR 99 route and, like the Western Madera Alternative, deviates from the UPRR before Chowchilla, but which moves east to connect with the BNSF route. The alternative follows the BNSF and then connects back to the UPRR south of Madera. There are no design options suggested on this route.

Figure 5: Merced to Fresno Section EIR/EIS Initial Range of Alternatives



Station Locations Considered in Initial Alternatives Review

The initial station locations were defined by the Program EIR/EIS documents and Proposition 1A. Additional station suggestions from the scoping process were also evaluated. In order for the HST to reach its destinations in a timely manner that maintains high ridership expectation, the train must limit the number of stops and attract riders from a broad area. During the Program EIS/EIR, the Authority conducted several ridership studies and determined the number of station locations that would be needed in order to reach this balance of speed and ridership. The EIR/EIS noted that a station would be possible in Fresno from the Bay Area going south, and that from Fresno or the Bay Area going north, a station in Merced would be appropriate. Many cities would like a station, but this would compromise the performance and purpose of the HST system. Station locations considered included the following stations, displayed in the context of the alternative alignments shown in Figure 5 and individual images shown in Figures 6 through 11. The dashed circle indicates a quarter-mile walking distance, which is the ideal walking distance between destinations, and the solid circle indicates a half-mile walking distance.

Figure 6: Castle Commerce Center Station

Castle Commerce Center Station

Castle Commerce Center occupies a large portion of land along the northeast side of Santa Fe Drive and the UPRR corridor in Atwater, north of Merced. A station located here would likely be in the vicinity of or on the grounds of the Castle Airport. The station would be compatible with all alternatives.

Figure 7: Merced Intermodal Transit Center

Merced Intermodal Transit Center

This station would be located at the existing Merced Intermodal Transit Center, which is currently bounded on the north and south by West 16th Street and West 15th Street and to the east and west by M Street and O Street. The future station would occupy a much larger area, possibly extending to SR 59 to the west and Canal Street to the east. The station would be compatible with all alternatives.

Figure 8: Merced Amtrak Depot Station

Merced Amtrak Depot Station

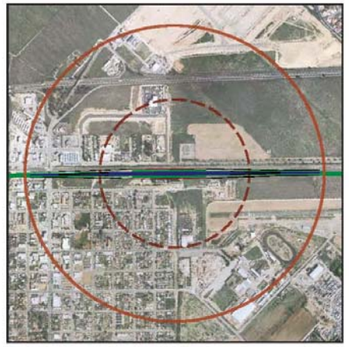
This station would be located at the existing Amtrak Depot in Merced, which is currently bounded on the north and south by West 24th Street and West 25th Street and to the east and west by K Street and G Street. The future HST station would occupy a much larger area, possibly extending to M Street to the west and 5th Avenue to the east. The station would only be compatible with Alternative A1 – BNSF.

Figure 9: Merced Municipal Airport Station

Merced Municipal Airport Station

The Merced Municipal Airport is located to the southwest of central Merced and approximately 1.5 to 2 miles southwest of Alternative A2 – UPRR/SR99. A station here would be in the general vicinity of the airport, bounded by Thornton Road running north-south and West Dickenson Perry Road running east-west. This station location would not be adjacent to any of the proposed alternatives.

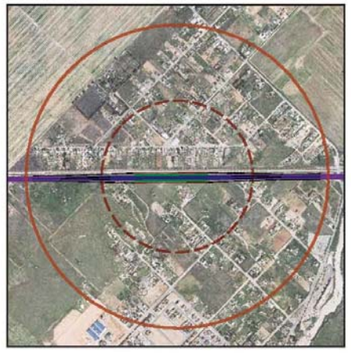
Figure 10: Chowchilla Station



Chowchilla Station

This station would be located on the UPRR between Downtown Chowchilla and the Chowchilla Municipal Airport. The station would be compatible only with Alternative A2 – UPRR/SR 99.

Figure 11: Madera Station



Madera Station

This station would be located on the BNSF rail line immediately west of the City of Madera. The location would be within a rural residential area outside of the Madera city limits. The station would be compatible only with Alternative A1 – BNSF.

Pacheco Connection and Wye Connections Considered

The initial ranges of alternatives for the Merced to Fresno and San Jose to Merced HST sections were concurrently developed and reviewed. After completing the initial reviews, the two project teams studied additional connections between the ranges of alternatives. The wye connections discussed below were developed in response to the range of alternatives studied for the San Jose to Merced Section, shown in Figure 12. Figure 12 demonstrates that all wyes connect to a common point at the San Luis Reservoir. Travel time was measured from the San Luis Reservoir to each of the eastern end points in the study area: Fresno and Merced. Figure 12 also illustrates how alternative connections were designed to minimize impacts on the Grasslands Ecological Area (GEA) by selecting northern or southern routes, or traveling along existing transportation corridors, such as Henry Miller Road and SR 152.

SR 140 / NGEA Wye Connection

This wye would connect to the San Jose to Merced SR 140 Alternative located north of the GEA Nature Refuge, which lies west of the Merced to Fresno Section study area. The alignment would approach the Merced to Fresno Section following SR 140 from the west, and would align with the Merced to Fresno Section alternatives near the City of Atwater.

Henry Miller / Ave 24 Wye Connection

The wye would connect to the San Jose to Merced Henry Miller-Avenue 24 Alternative, which is the closest to the Preferred Alternative from the 2008 Bay Area to Central Valley Program EIR/EIS. The alignment would follow Avenue 24, north of SR 152, and would align with the Merced to Fresno Section alternatives near Chowchilla.

SR152 Wye Connection

This wye would connect to the San Jose to Merced Henry Miller-SR 152 Alternative, located in the median of SR 152, and would align with the Merced to Fresno Section alternatives near Chowchilla.

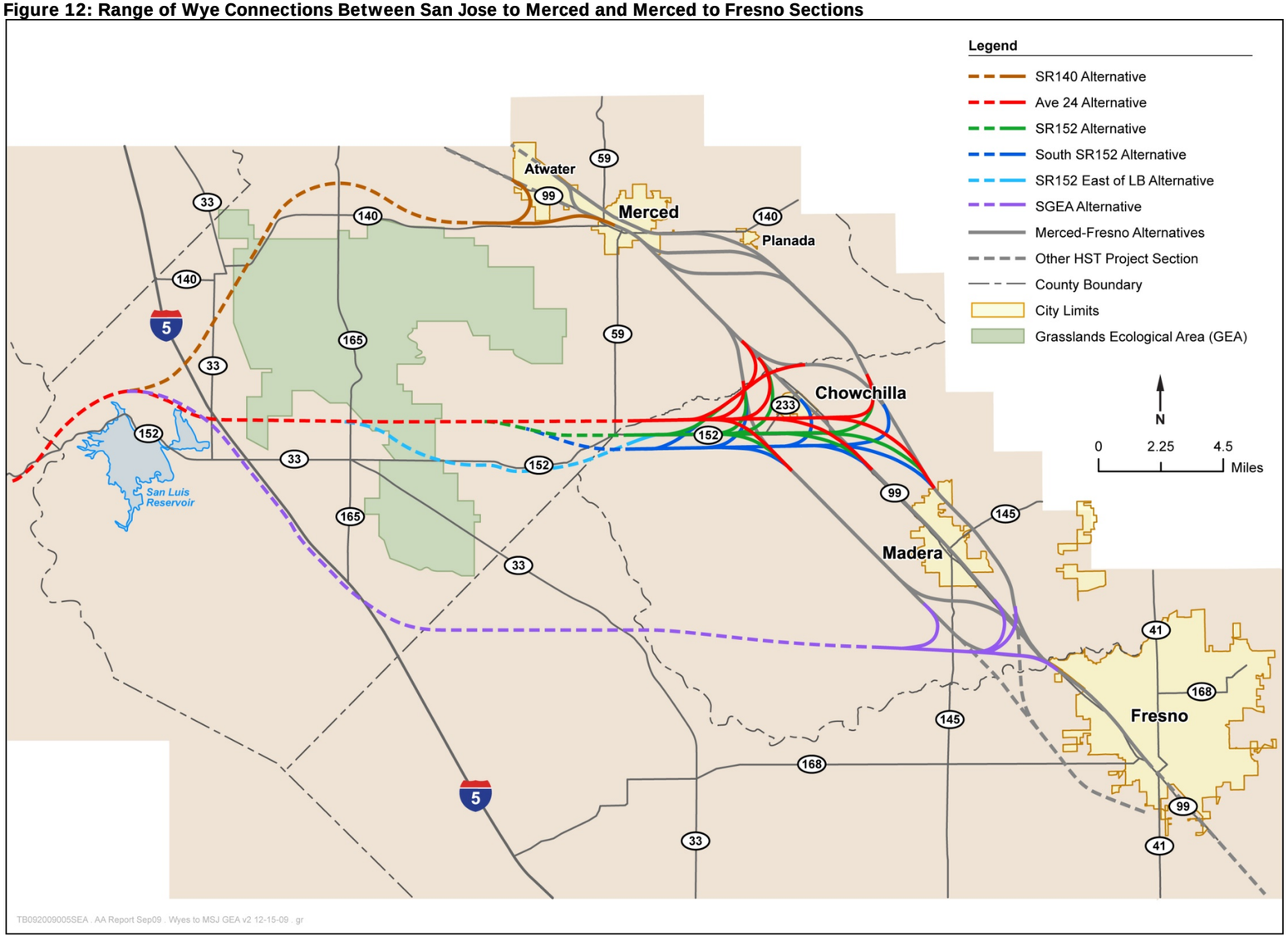
South SR152 Wye Connection

This wye is the equivalent of the San Jose to Merced Henry Miller-S152 wye connection initially studied. The wye would connect to the South SR 152 Alternative, which approximately follows Avenue 22 or Avenue 21 south of SR 152. Both the north and south wye legs would converge with the Merced to Fresno Section alternatives south of Chowchilla.

SGEA Wye Connection

This wye would connect to the San Jose to Merced SGEA Alternative, which nearly avoids the GEA Nature Refuge by traveling farther south than the other San Jose to Merced Section alternatives. The east-west approach to the Merced to Fresno Section is Avenue 10, which is between Madera and Fresno and generally north of and parallel to the Madera/Fresno county line and the San Joaquin River. Both legs of the wye would converge with the Merced to Fresno Section alternatives south of Madera and north of the Madera/Fresno county line.

Figure 12: Range of Wye Connections Between San Jose to Merced and Merced to Fresno Sections



Maintenance Facility Locations Considered

While maintenance centers will be required throughout the state, a heavy maintenance facility is expected to be situated in the Central Valley because of its central location at the heart of the system. Eight maintenance facility locations were initially identified in the Bay Area to Central Valley Program EIR/EIS and during the scoping period for the Merced to Fresno Section. These preliminary sites included Castle Commerce Center, North of SR 152, East of Fairmead, South of Fairmead, Rural Madera County near Berenda Slough, Rural Madera County near Dry Creek, Eastern Madera, and Southern Madera. These site suggestions were made prior to the establishment of HST requirements for heavy maintenance facility site selection. Therefore, these sites were rejected and in winter 2009, the California High-Speed Rail Authority Board issued a Request for Expressions of Interest (RFEI) with additional information about site requirements. The RFEI requested that proposers identify potential locations for heavy maintenance facilities (HMFs) along the planned HST route between Merced and Bakersfield.

The Authority sought proposals from local governments, public transportation agencies, private companies, and others for both heavy and other maintenance facilities that could meet the Authority's requirements, minimize environmental impacts, and offer the financial incentives and other economic benefits to the state and local communities. The entities that made these suggestions during the scoping process refined their locations and provided information on the sites through their applications. The RFEI attracted some private proposals as well. Within the Merced to Fresno Section of the HST System, the applications resulted in five potential sites, as illustrated and described in Figures 13 through 17. These potential HMF sites are located along the Merced to Fresno Section alternatives as shown in Figure 5.

3.3.1 Initial Review of Alternatives

The north-south Merced to Fresno alternatives, and their associated design options, stations, and wye connections to the San Jose to Merced Section were subjected to an initial review to determine if they met the project purpose and need, resulted in impacts on community resources, conflicted with approved future development in the study area, or deviated from desired design performance criteria as defined in the *Alternatives Analysis Methods for Project EIR/EIS Technical Memorandum Version 2* (October 2009). These alternatives were then evaluated for their ability to maximize design standards, minimize disruption to neighborhoods and communities, and minimize impacts on environmental resources. This initial review found that, among the north-south alternatives, only the Sierra Foothills Alternative did not meet the HST purpose and need, because it would not provide connectivity to the Merced and Fresno urban centers and would result in high environmental impacts.

Initial Review of Station Locations

Among the six station locations initially reviewed, the Castle Commerce Center site, Merced Amtrak Depot site, and Merced Intermodal Transit Center site fulfilled the most station location criteria and were carried forward for further consideration.

- The Castle Commerce Center site would minimize neighborhood and natural resource impacts and is supported by local plans and policies, but it is not currently an intercity destination.
- The Merced Amtrak Depot site is located in a predominantly residential community and would negatively affect the surrounding neighborhoods. Access would require traveling through neighborhoods. This station would provide connectivity with Amtrak passenger service.
- The Downtown Merced Intermodal Transit Center site would fulfill all of the criteria, because it is centrally located near intercity destinations, has high potential for multimodal connectivity and transit-oriented development/redevelopment, would minimize neighborhood and natural resource impacts, and is supported by local plans and policies.

The Merced Airport Station, Chowchilla Station, and Madera Station sites were removed from consideration because they fulfill few of the station location criteria.

- The Merced Airport station site is not adjacent to any of the proposed alternatives; development potential is limited by airport contours; and the station location is not supported by planning efforts in Merced.
- Land uses surrounding the Chowchilla station site do not support transit; redevelopment sites are limited and development potential is further limited by airport contours. Chowchilla is not a regional urban destination. Access would be available via SR 99.
- Land uses surrounding the Madera station site also do not support transit; the site is 2 miles from Downtown Madera. It would offer connectivity with Amtrak passenger service.

Initial Review of Design Options

Alternative A1 – BNSF, Design Options 1, 2, and 3

- Design Option 1 – Alignments follows the BNSF corridor through Merced, affecting a cohesive residential area. It would also create the most road closures. Carrying this design option forward would depend on whether the BNSF-Amtrak station is carried forward for further evaluation.
- Design Option 2 – Mission Avenue may affect a residential community northeast of the Mission Avenue interchange and require modifications to the Mission Avenue interchange. To minimize these impacts, the design speed may have to be lowered.
- Design Option 3 – Mariposa Avenue would have the most linear miles of elevated track and curves, the most linear miles of deviation from existing corridors, and the most impacts on private property, wetlands, and known cultural sites. However, the differences between Design Options 2 and 3 may be reduced as design develops further.

Alternative A1 – BNSF, Design Options 4, 5, and 6

The Madera/Fresno vicinity design options have similar operations but different levels of impacts.

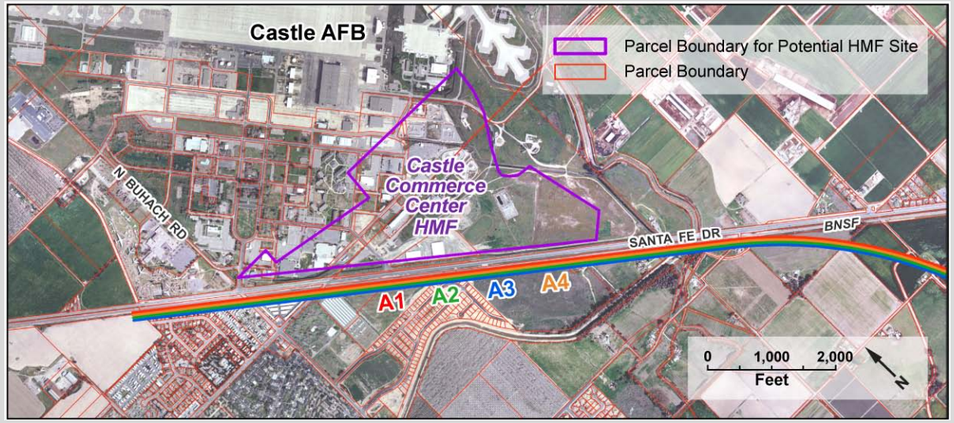
- Design Option 5 would have operations similar to Design Option 4 and Design Option 6; however, Design Option 5 would create much less community disruption because it would avoid the developed residential areas north of Fresno. Fresno communicated its lack of support of Design Options 4 and 6.

Alternative A3 – Western Madera, Design Options 7 and 8

The initial review of the two Alternative A3 – Western Madera design options did not reveal a clear advantage for either option.

- Design Option 7 would have almost 1.5 more linear miles of elevated track than Design Option 8.
- Design Option 8 would have more acres of wetlands impacts, more acres of impacts on important farmlands, and more road closures.

Figure 13: Castle Commerce Center HMF



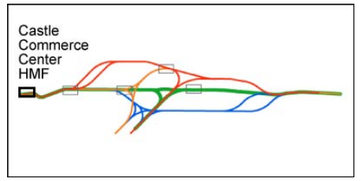
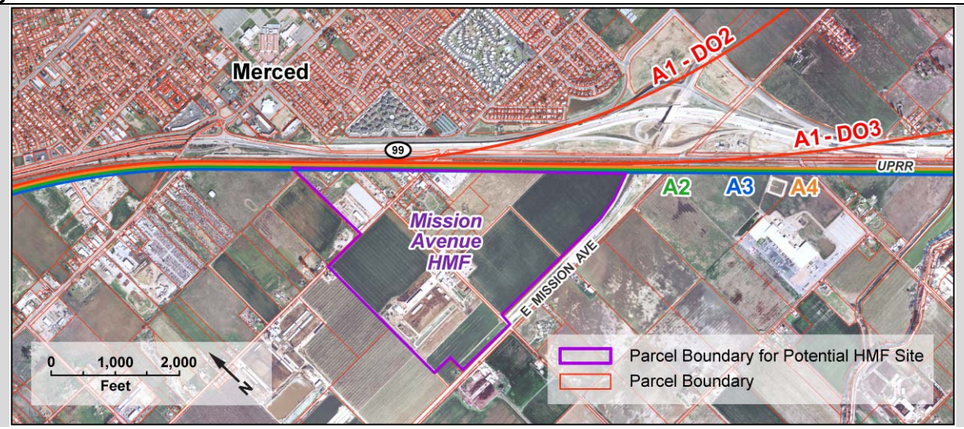
Location / Description	Property Characteristics	Proposer
• 164 acres • 6 miles northwest of Merced, at the former Castle Air Force Base in northern unincorporated Merced County. Adjacent to and on the east side of the BNSF mainline, 1.75 miles south of the UPRR mainline, off of Santa Fe Drive and Shuttle Road, 2.75 miles from existing SR 99 interchange. • Adjacent to all alternatives under consideration: A1-BNSF A2-UPRR, as well as A3 - Western Madera and A4 - UPRR/BNSF Hybrid.  	• Economic incentives: long-term lease for $1/year, low-cost power, Enterprise Zone, Redevelopment Project Area. Recovery Zone financing potentially available. Foreign Trade Zone, Defense Base Realignment and Closure (BRAC) funding opportunities. • Mostly consistent with General Plan and zoning: Commercial, Industrial, Agriculture. • Outside of floodplain • Direct highway access • Utilities readily available • Hazardous materials cleanup underway • 1 business, 1 agriculture use displaced • Intermittent stream on site • Cultural resource on site	Greater Merced High-Speed Rail Committee, Inc.

Figure 14: Mission Avenue HMF



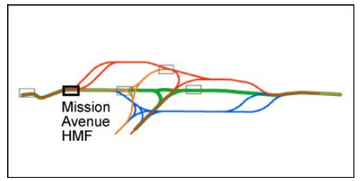
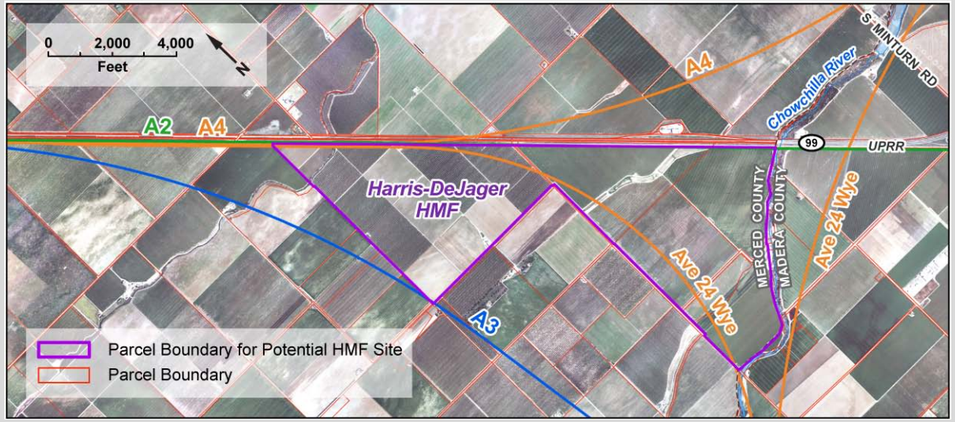
Location / Description	Property Characteristics	Proposer
• 222 acres • Southeast Merced, adjacent to and west of the UPRR A2 alignment, 3 miles southeast of proposed Merced station, 2.75 miles from SR 99 interchange along E Mission Avenue. • Adjacent to all alternatives under consideration: A1-BNSF A2-UPRR, as well as A3 - Western Madera and A4 - UPRR/BNSF Hybrid.  	• Economic incentives: low-cost power, Enterprise Zone, Redevelopment Project Area, Gateway Redevelopment plan incentives, expedited entitlement processing. • Mostly consistent with General Plan and zoning: Public/General Use; Commercial, Manufacturing/Industrial; Low Density Residential. • Entirely within 100-year floodplain • Special flood hazard area (AO) • 5 potential hazardous materials sites • 1 agriculture, church, 1 multi-family, 7 single family, and 9 business displacements • Perennial stream and canal on site	Greater Merced High-Speed Rail Committee, Inc.

Figure 15: Harris-DeJager HMF



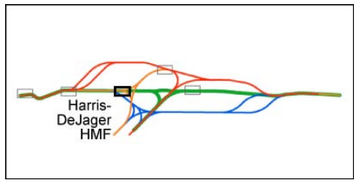
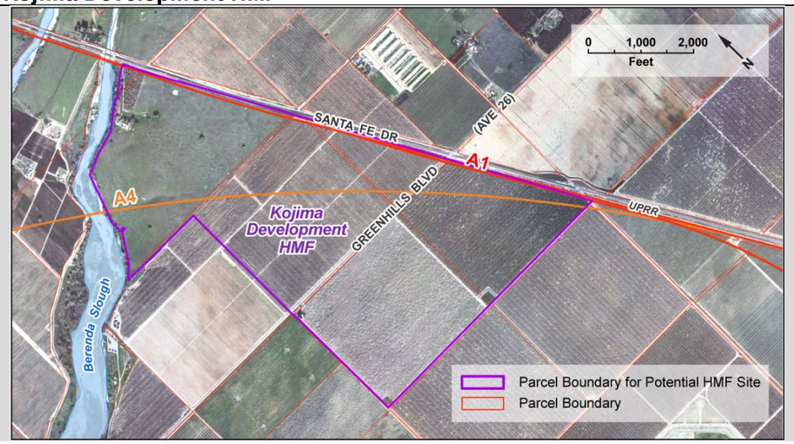
Location / Description	Property Characteristics	Proposer
• 155 acres • North of Chowchilla adjacent to and on west side of the UPRR corridor, along S Vista Road, near SR 99 interchange under construction. • Adjacent to Alternatives A2, UPRR, as well as A3 - Western Madera and A4 - UPRR/BNSF Hybrid.  	• Conditionally offered at no cost to the Authority • Joint Powers Authority would provide financing for site and off-site improvements. • No floodplain • Agricultural zoning, agricultural use displacement • Williamson Act land • Wildlife corridor at northern boundary	City of Chowchilla, and property owners (Harris, DeJager)

Figure 16: Kojima Development HMF



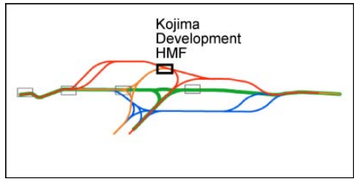
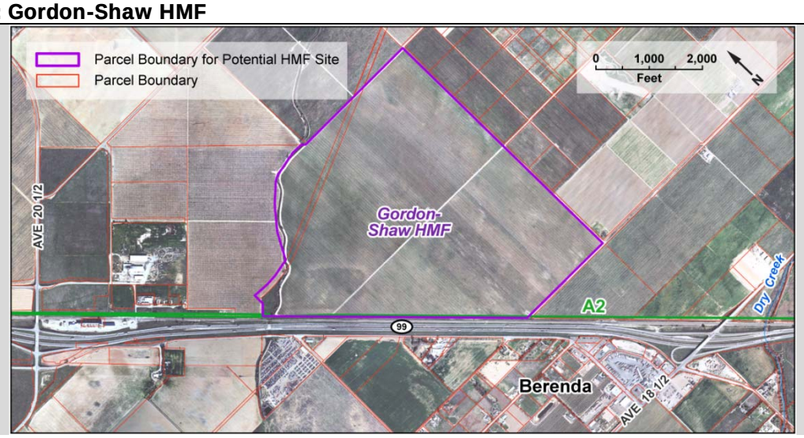
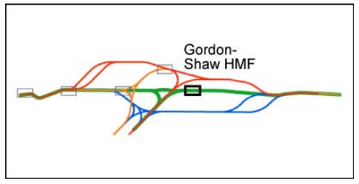
Location / Description	Property Characteristics	Proposer
• 400 acres • On BNSF route alignment east of Chowchilla, along Santa Fe Drive and Robertson Boulevard (Avenue 26). • Adjacent to Alternatives A1– BNSF and A4 – UPRR/BNSF Hybrid.  	• Conditionally offered at no cost to the Authority • Plan to create a self-contained community allowing for a work/live environment. • Developer will offer financial incentives such as favorable financing (0% down) for HMF employees. • All dam failure inundation area • Agriculture zoning, agriculture use displacement • Williamson Act land	Madera County, City of Chowchilla, and property owner (Kojima Development)

Figure 17: Gordon-Shaw HMF



Location / Description	Property Characteristics	Proposer
• 451 acres • Adjacent to and on east side of the UPRR corridor from north of Berenda Boulevard to Avenue 19. • Adjacent to Alternative A2 - UPRR.  	• Joint Powers Authority to assist in property acquisition and financing for infrastructure improvements. • California Annual Grassland, stream channel with mixed riparian forest • Agriculture zoning, agriculture use displacement • Partially in 100-year floodplain	Madera County Resource Management Agency

Initial Review of Pacheco Pass Wye Connections

Both the Merced to Fresno and the San Jose to Merced sections evaluations included the east-west Pacheco Wye connections. Both evaluations resulted in similar recommendations to carry forward only the Henry Miller/Avenue 24 Wye and the South SR152 Wyes for all alternatives in the Merced to Fresno Section. A summary of the findings follows:

- The NGEA/SR 140 wye connection would be the least effective alternative at meeting the purpose and need of the project due to its comparatively poor travel time. It would be nearly 7 minutes slower than the best-performing wye connections in the route between San Francisco and Los Angeles. Also, the SR 140 Wye connection would have the greatest potential impact on wetlands. The connection would result in high community impacts in Atwater and high impact on habitat lands that support threatened and endangered species.
- The SGEA alignment and wye connection would provide the best travel time between San Francisco and Los Angeles, and few disruptions to neighborhoods and communities. However, this alternative would likely result in higher overall project costs due to the need to construct approximately 22 miles of additional track to the immediate west of the study area. The additional length of track would cross habitat lands that are known to support threatened and endangered species.
- The Ave 24 Wye connection would provide efficient travel time and comparative cost depending on the north-south alignment it connects with because some alternatives may require more or less elevated structure, which would reduce road closures. This alternative does have fewer impacts on farmlands, but otherwise it is comparable with South SR152 wye and SR152 wye connections.
- The SR152 Wye would have the second-highest cost, estimated to be twice as expensive as the SR 140, South SR 152, and SGEA wyes. The high cost is due to the need to reconstruct portions of SR 99 and crossings over SR 99 and the UPRR rail line. However, this connection would have fewer impacts and lower cost if combined with Alternative A3 – Western Madera.
- The South SR152 Wye connection is a similar concept to the Ave 24 Wye connection, running parallel to SR 152, but with fewer environmental impacts, more farmland impacts, lower cost, and comparable travel time to the Ave 24 Wye.

Initial Review of North-South Alignment Alternatives

The Sierra Foothills Alternative was not carried forward for further analysis because it did not meet the purpose and need to provide high-speed intercity connectivity. The results of the initial review of the remaining north-south alignment alternatives are as follows:

- **Alternative A1 – BNSF:** The BNSF alternative will meet the 2 hour and 40 minute travel time between San Francisco and Los Angeles. However, because the train needs to travel farther east before turning south travel is less efficient than other alternatives. This alternative consistently met the project purpose and need and the criteria of maximizing the use of existing transportation corridors; therefore, this alternative was carried into the alternatives analysis process. Design Options 4 and 6 in conjunction with Alternative A1 – BNSF should be removed from further consideration because of the potential for high impacts on new residential developments in the Herndon area and a crossing over the environmentally sensitive areas of the San Joaquin River, including Camp Pashayan.
- **Alternative A2 – UPRR/SR 99:** There were no changes resulting from discussions on Alternative A2 – UPRR/SR 99. This alternative remains adjacent to the existing corridors, but as identified during the Bay Area to Central Valley Program EIR/EIS, remaining adjacent to the UPRR may result in delays.
- **Alternative A3 – Western Madera:** This alternative offers some travel time savings when considering the San Francisco to Los Angeles travel path. While Alternative A3 – Western Madera deviates from existing transportation corridor, and therefore does not follow the Authority's objective to maximize use of existing transportation corridors, it also would avoid impacts on downtown communities of Chowchilla and Madera. This alternative is a "Greenfield" alternative, meaning that it does not follow existing transportation corridors for much of the alignment and therefore represents a new transportation corridor across areas otherwise reserved for agricultural uses. This alternative would result in more acres of impacts on prime, unique, and important farmland than the other alternatives. Perhaps more importantly, it would result in bisecting some farmland properties. The preliminary design of Design Option 8 would result in higher wetland impacts than Design Option 7. However, both design options were carried forward into the next phase of analysis, and Design Option 8 underwent design refinement to avoid wetland impacts where possible.
- **Alternative A4 – BNSF/UPRR Hybrid:** This alternative was suggested when the initial analysis was being conducted. It minimizes impacts that Alternative A1 – BNSF would have on Le Grand and that the UPRR Alternative would have on Chowchilla and Madera. However, the hybrid alternative would also have impacts from both the BNSF and UPRR alternatives because it uses portions of both corridors.

Heavy Maintenance Facilities

The initial review of the five maintenance facility locations found that each site would be accessible by one or more of the alternatives under consideration and also found no critical issues that would impede the sites from further consideration. As the alternatives develop further, some of the proposed sites may prove to be more practical than other sites.

3.3.2 Agency Coordination and Public Outreach

Coordination with agencies and the public is a key component of the alternatives development and evaluation process. Early outreach and scoping activities and a series of Technical Working Group meetings informed the development of the initial range of alternatives. Public and agency input on issues to be studied, city and county land use and planning information, and input on the range of alternatives provided valuable information to assist in evaluating the alternatives. After the initial review of these alternatives, a series of Technical Working Group meetings led to the identification of alternatives to carry forward for detailed evaluation. Another element of the outreach has been to provide updates and presentations to clubs, organizations, farm bureaus, and business owners, as well as the City and County of Merced and Madera, to facilitate an inclusive and transparent process. Additional coordination with the San Jose to Merced HST Section led to a review of additional wye connections to that section's alternatives. Each of these agency coordination and public outreach activities is described below.

Early Outreach and Scoping

Early outreach activities occurred throughout the study area during autumn 2008 and winter 2009/2010. Scoping activities were conducted between February 24 and April 10, 2009, with scoping meetings held in Merced and Madera. Both the general public and agencies attended these meetings. The meetings provided information about the history of the HST project to date, the two Program EIR/EIS preferred alternatives, and the upcoming steps in the environmental process, including alternatives development and analysis.

The cities of Chowchilla and Madera voiced concern over Alternative A2 – UPRR/SR 99 because of potential impacts to their communities. Their issues included how the Pacheco Pass wye may connect to Alternative A2 – UPRR/SR 99 and place Chowchilla in a triangle of HST track. The north leg of the wye connection would travel north of Chowchilla, the south leg would travel south of Chowchilla, and the Alternative A2 – UPRR/SR 99 north-south alignment would travel east of Chowchilla. In response to these concerns, Chowchilla representatives suggested a new wye connection farther south, called the South SR152 Wye, which would connect both wye legs south of the city. Because Alternative A2 – UPRR/SR 99 would parallel the UPRR through Madera, the city of Madera felt that the alternative would divide the community and cause substantial impacts on commercial and residential areas surrounding the proposed alignment. The scoping meetings also led to the suggestion of Alternative A3 – Western Madera and the Sierra Foothills Alternative, and the design options associated with Alternative A1 – BNSF and A3 – Western Madera. The meetings are summarized in the *Merced to Fresno Section Scoping Report* (January 2010).

Technical Working Groups – First Series

After the scoping period ended, the initial range of alternatives was developed. In June 2009, the Merced to Fresno Section alternatives were presented to the Technical Working Groups in Fresno, Merced, and Madera. These groups consist of senior staff from county and city public works and planning departments, redevelopment agencies, and the economic development commission. The purpose of the groups is to facilitate the exchange of information and ideas during the course of the study. The Technical Working Groups provided input on the alternatives and information about city and county land use and planning, as well as providing updates to their boards or councils. These meetings are summarized in meeting minutes found in Appendix A.

Review of Initial Alternatives

The Sierra Foothills Alternative was not carried forward for further analysis because it did not meet the purpose and need to provide high-speed intercity connectivity. Two Alternative A1 – BNSF design options (Design Option 4 and Design Option 6) that affected the northern Fresno community of Herndon were also removed from further consideration based on input from the City of Fresno. Three station locations—the Merced Airport Station, Chowchilla Station, and Madera Station—were not carried forward because they do not adequately fulfill the station location criteria. The remaining alternatives were carried forward into detailed alternatives analysis. Fresno completed a Rail Consolidation Study that reviewed moving UPRR and possibly BNSF west of Fresno. The result of the study was inconclusive and the Fresno Technical Working Group and the Authority agreed to work with existing conditions and remain adjacent to the UPRR without encroaching on UPRR's right-of-way. The focus after the initial alternatives analysis was to look more closely at the profile of the alternative to minimize costs and avoid Roeding Park, located north of Downtown Fresno along Golden State Boulevard.

Technical Working Groups – Second Series

Following the initial review of alternatives, the project team met with the Technical Working Groups in Merced and Madera to review the initial range of alternatives and receive more detailed information about transportation and land use development patterns that could be affected by the alternatives. The meeting included additional representatives from the Madera Irrigation District and Chowchilla Water District. These meetings are summarized in meeting minutes found in Appendix A. The Merced group did not support the Merced Amtrak Station site because it is not compatible with existing surrounding residential land uses; they preferred the Downtown Transit Center site over the others. At the Madera Technical Working Group meeting, representatives from Chowchilla continued to voice objections to Alternative A2 – UPRR/SR 99 with the Ave 24 Wye, because it would place Chowchilla in a triangle of HST track; however, they were less concerned about the Alternative A2 – UPRR/SR 99 alignment with the South SR152 Wye. They were concerned about noise impacts in the city resulting from Alternative A2 – UPRR/SR 99, and they were concerned about the amount of agricultural land disturbed by the Alternative A3 – Western Madera alignment.

Technical Working Group members also offered insights about important community features, proposed and future infrastructure plans, and existing utilities. This resulted in adjustments in the position of the alignments and profile of the alternatives to avoid and minimize impacts on community resources. This increased the length of elevated profile for the Ave 24 Wye connection in the area west and north of Chowchilla. Another wye centered on SR 152, discussed below, was also refined to increase the length of elevated profile in this area. The input also resulted in repositioning Alternative A3 – Western Madera slightly farther west.

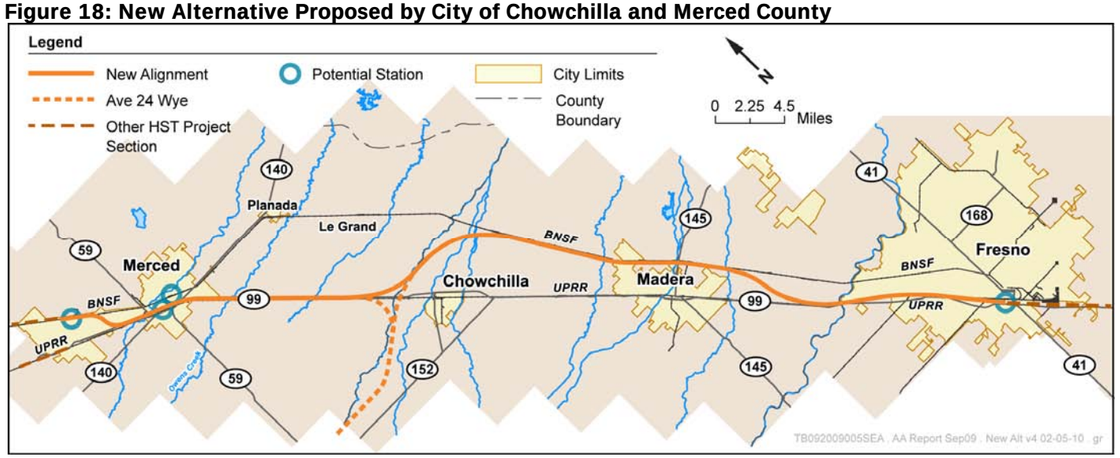
As a result of these meetings, the City of Chowchilla requested that another alternative be considered, shown in Figure 18. This alternative would travel south along the Alternative A2 – UPRR/SR 99 alignment from the City of Merced and would leave the Alternative A2 – UPRR/SR 99 alignment heading east north of the City of Chowchilla. This new alternative would join the BNSF alignment south of Le Grand and continue along Alternative A1 – BNSF to the Fresno Station. This new alternative would be similar to Alternative A3 – Western Madera in that it would travel along UPRR and SR 99 and then diverge to avoid Chowchilla and central Madera. In reviewing this alternative, the project team modified the connections to the San Jose to Merced Section alternatives that center around SR 152 to curve north to minimize the impacts on Chowchilla. This alternative is referred to as the UPRR/BNSF Hybrid Alternative (A4).

In Fresno, the Technical Working Group discussion centered on the placement of the Downtown Fresno Station. The City of Fresno would prefer the station to be located east of UPRR and near Fresno and Tulare streets, close by the Chukchansi Park Stadium. Due to all the infrastructure constraints and presence of the Historic Southern Pacific Station, the station would be more easily placed on the western side of the UPRR. The analysis resulted in three design options between the Fresno UPRR freight yard and the Fresno Station: an eastern, a western, and a hybrid design option. The hybrid option avoids Roeding Park and the Southern Pacific Station by crossing over UPRR twice, whereas the others only avoid one or the other resource. Other discussions continued regarding the alignments south of town and outside the study area of the Merced to Fresno Section.

Technical Working Groups – Third Series

Once the preliminary alternatives analysis findings were available, but before publication of the report, the results and findings were communicated to the Technical Working Groups, the public, and the California High-Speed Rail Authority Board members, in December 2009. This discussion and summary appears in Section 4.6, Detailed Alternatives Evaluation Meetings, to help summarize the results of the analysis and the input that required additional evaluation.

Figure 18: New Alternative Proposed by City of Chowchilla and Merced County



Regulatory Agency Meeting

The project team met with regulatory agencies on September 23, 2009, and presented the range of alternatives undergoing evaluation and potential resource impacts. The U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), EPA, and local water boards attended the meeting. The agencies provided input on the alternatives development and evaluation process as it relates to natural resource impacts. Several agency representatives voiced strong support of Alternative A2 – UPRR/SR 99 because it follows an existing developed urban transportation corridor and would result in fewer impacts to natural resources.

Department of Conservation

The state of California has protected agricultural resources by enacting the Williamson Act, which requires that notification be offered when an alternative affects lands that are protected by the Act. The Authority met with the Department of Conservation (DOC) to review the alternatives in the Central Valley and to gain understanding of when property notification procedures would be required. The DOC staff mentioned that the process was complex and that they may be able to help guide appropriate agricultural mitigation. The DOC cautioned about underestimating the importance of preserving prime, unique, and farms of local and statewide importance. Also, the DOC mentioned that farmlands of statewide importance are considered equal to the federal designation of prime farmlands.

EPA and USACE Coordination

FRA has entered into an MOU with the EPA and USACE to merge NEPA and the Clean Water Act (CWA) Section 404 processes. As part of that MOU, the project teams have agreed to implement the Program EIR/EIS decisions of the Authority and FRA. The team has consulted with EPA and USACE regarding CWA to support the 404(b)(1) Alternatives Analysis decision-making process as part of the USACE permit applications.

The NEPA/404 MOU includes three checkpoints that require concurrence from signatories of the MOU. These checkpoints include the following:

1. Purpose and need
2. Identification of the range of alternatives to be studied in the Draft EIS
3. The preliminary least environmentally damaging practicable alternative (LEDPA) determination and conceptual mitigation plan.

Preliminary assessments were shared with the EPA on March 11, 2010, and the USACE on March 17, 2010. Representatives of EPA generally supported the full range of alternatives presented. EPA was interested in the reasons behind the new alternatives that were not originally in the Statewide or Bay Area to Central Valley Program EIR/EIS documents. The project team provided an overview of the alternatives. All the alternatives are consistent with the project purpose, and they are feasible and constructible and thus practicable. However, with regard to Alternatives A3 – Western Madera and A4 – UPRR/BNSF Hybrid, the development of a new transportation corridor in prime, unique, and important farmlands is inconsistent with local plans and thus may fail the land use compatibility criteria.

Caltrans

The following Caltrans coordination meetings were held with Merced to Fresno Section project team:

- October 14, 2009 – Caltrans District 10 office/Stockton (led by Grace Magsayo)
- October 23, 2009 – Caltrans District 6 office/Fresno (led by Garth Fernandez)
- December 8, 2009 – Caltrans District 6 office/ Fresno (led by Garth Fernandez)

Caltrans reviewed the alternative alignments in regard to how they might impact state routes and facilities. Potential impacts were referenced by state highway postmile to identify locations of state highway facilities relative to the proposed HST alignment alternatives. The postmile listings identify where the HST project would affect an existing highway structure undercrossings and overcrossings on the state highway system.

Caltrans provided additional information from the SR 99 Business Plan for District 6 and the SR 99 Corridor System Management Plan for the San Joaquin area (District 10), as well as regarding future plans for improvements to the state highway system in the HST project vicinity. As a result of this coordination effort and exchange of data, both Caltrans and the HST project team improved their understanding of existing and upcoming projects and of their potential impacts.

Potential impact of some of the HST alignments on several state highway crossings and interchanges in Madera and Fresno counties have been identified and reported to Caltrans. An overall Project Initiation Document discussing the list of identified impacts associated with the Alternative A2 – UPRR/SR 99 alignment (directly adjacent to SR 99) has been developed to be presented to Caltrans (March 30, 2010). HST alignments face difficult constraints south of the San Joaquin River and adjacent to the Fresno UPRR rail yard and SR 99 in the northern region of the City of Fresno. Collaborative engineering efforts have focused on identifying design solutions, including a potential option to realign SR 99 to make room for the HST in a congested region adjacent to the UPRR rail yard.

3.3.3 Conclusions of Initial Review of Alternatives: Alternatives Carried Forward and Not Carried Forward into Detailed Evaluation

Based on the initial review of alternatives and subsequent input from the Technical Working Groups, the project team proceeded with the analysis of alternatives and options as follows.

Alternatives and Design Elements That Were Not Carried Forward

Alignment Alternatives and Design Options not carried forward:
- Sierra Foothills Alternative – Sierra Foothills
- Design Option 4 (Alternative A1 – BNSF)
- Design Option 6 (Alternative A1 – BNSF)

Stations not carried forward:
- Merced Airport Station
- Chowchilla Station
- Madera Station

Pacheco Pass wye connections not carried forward:
- NGEA/SR 140 Wye Connection
- SR152 Wye Connection
- SGEA Wye Connection

Alternatives and Design Elements That Were Carried Forward

- Alternatives:
  - o A1 – BNSF
    - Design Option 1
    - Design Option 2
    - Design Option 3
  - o A2 – UPRR/SR99
  - o A3 – Western Madera
    - Design Option 7
    - Design Option 8
  - o UPRR/BNSF Hybrid

- Station locations:
  - o Castle Commerce Center
  - o Merced Amtrak Depot
  - o Downtown Merced Intermodal Transit Center

- Pacheco Pass wye connections:
  - o Ave 24 Wye connection
  - o SR152 Wye connection
  - o South SR152 Wye connection
  - o SGEA Wye connection

- All proposed heavy maintenance facility sites:
  - o Castle Commerce Center
  - o Mission Avenue
  - o Harris-DeJager
  - o Gordon-Shaw
  - o Kojima Development

Tables 15 through 19 list the reasons alternatives and their associated design elements were carried forward or not carried forward for detailed evaluation.

Table 15: Summary of Initial Review of North-South Alignment Alternatives

Alternative	Carry Forward?	Reason
A1 – BNSF	Yes	▪ Meets project purpose and need ▪ Follows existing transportation corridors ▪ Longest alternative and travel time, but needs further evaluation
Sierra Foothills	No	▪ Provides no connectivity to urban centers ▪ Does not meet project purpose and need ▪ Does not fulfill criteria for paralleling existing transportation corridors
A2 – UPRR/SR99	Yes	▪ Meets project purpose and need ▪ Shortest route from Merced to Fresno ▪ Closely follows transportation corridors ▪ Fewest farmland impacts
A3 – Western Madera	Yes	▪ Meets project purpose and need, although it does not follow the Authority's objective to maximize use of existing transportation corridors when traveling west of Chowchilla and Madera ▪ Best travel time from Pacheco Pass to Fresno ▪ Avoids most community impacts, but impacts more farmlands than other alternatives
A4 – UPRR/BNSF Hybrid	Yes	▪ Meets project purpose and need, but deviates from existing transportation corridors to travel back and forth between UPRR and BNSF ▪ Second longest alternative and travel time, but needs further evaluation

Table 16: Summary of Initial Review of Alternative A1 – BNSF Design Options

Design Option	Carry Forward?	Reason
DO1	Yes	▪ Retained until the Merced station location is determined
DO2	Yes	▪ Retained until the Merced station location is determined
DO3	Yes	▪ Retained until the Merced station location is determined
DO4	No	▪ Undesirable community impacts north of Fresno with no other operational advantages
DO5	Yes	▪ Fewer community impacts north of Fresno with comparable operations
DO6	No	▪ Undesirable community impacts north of Fresno with no other operational advantages

Table 17: Summary of Initial Review of Alternative A3 – Western Madera Design Options

Design Option	Carry Forward?	Reason
DO7	Yes, becomes DO4	▪ Operations and impacts comparable to DO8; retained for further evaluation
DO8	Yes, becomes DO5	▪ Operations and impacts comparable to DO7; retained for further evaluation

Table 18: Summary of Initial Review of Station Locations

Station	Carry Forward?	Reason
Castle Commerce Center	Yes	▪ Generally fulfills station location criteria and is supported by local plans and policies
Merced Amtrak Depot	Yes	▪ Does not fulfill all station location criteria, but retained for further evaluation
Downtown Merced Intermodal Transit Center	Yes	▪ Fulfills all location criteria and is supported by local plans and policies
Merced Airport	No	▪ Does not fulfill station location criteria for TOD and land use considerations
Chowchilla Station	No	▪ Does not fulfill station location criteria for TOD and land use considerations
Madera Station	No	▪ Does not fulfill station location criteria for TOD and land use considerations

Table 19: Summary of Initial Review of Wye Connections to Alternative A1 – BNSF

Wye Connection	Carry Forward?	Reason
NGEA/SR 140	No	▪ Does not meet project purpose and need criterion for travel speed ▪ High community impacts in Atwater ▪ Results in high environmental impacts on habitat that supports threatened and endangered species
Ave 24	Yes	▪ High community impacts on Chowchilla with Alternative A1 – BNSF and A2 – UPRR/SR99; some constructability challenges ▪ Lower cost, fewer community impacts and constructability challenges when combined with Alternative A3 – Western Madera because it would avoid Chowchilla boundaries
SR152	No	▪ Second-highest cost; community impacts on Chowchilla Highest constructability and infrastructure impacts Lower cost, fewer community impacts and constructability challenges when combined with Alternative A3 – Western Madera because it would avoid Chowchilla
South SR152	Yes	▪ Competitive travel time and low capital cost
SGEA	No	▪ Competitive travel time between San Francisco and Los Angeles ▪ Results in statewide construction of additional 22 miles of track associated with SGEA Alternative resulting in high impacts on habitat that supports threatened and endangered species

Alternatives Carried into Detailed Alternatives Evaluation

Table 20 presents the north-south alignment alternatives and their associated design options, station locations, and wye connections that were carried forward for detailed alternatives evaluation, which is described in Section 4.0. The alternatives are illustrated in Figure 19. In order to simplify the naming conventions, Alternatives A1 – BNSF, A2 – UPRR/SR 99, A3 – Western Madera, and A4 – UPRR/BNSF Hybrid were added as shown in Table 20. Because some of the design options were not carried forward, Design Option 7 and Design Option 8 of Alternative A3 – Western Madera were renamed Design Option 4 and Design Option 5, respectively.

Engineering plan sheets for each alternative are located in Appendix B.

Table 20: Alternatives Carried Forward to Detailed Alternatives Evaluation

North-South Alternatives				Wye Connection Alternatives
Name	Alignment	Design Options	Station Locations	
A1	BNSF	DOs 1, 2, and 3	Castle Commerce Center, Merced Amtrak Depot, Downtown Merced Intermodal Transit Center	Ave 24, and South SR152
A2	UPRR/SR 99	No DO	Castle Commerce Center, Downtown Merced Intermodal Transit Center	Ave 24, and South SR152
A3	Western Madera	DOs 4 and 5	Castle Commerce Center, Downtown Merced Intermodal Transit Center	Ave 24, and South SR152
A4	UPRR/BNSF Hybrid	No DO	Castle Commerce Center, Downtown Merced Intermodal Transit Center	Modified Ave 24, and South SR152

Map Illustrations of Alternatives

Figures 20 through 26 on the following pages illustrate each of the station locations and alignment alternatives carried into detailed evaluation, along with the design options and wye connections that work with each alternative.

Castle Commerce Center Station map: Figure 20, page 24

Downtown Merced Intermodal Transit Center Station map: Figure 21, page 25

Merced Amtrak Depot Station map: Figure 22, page 25

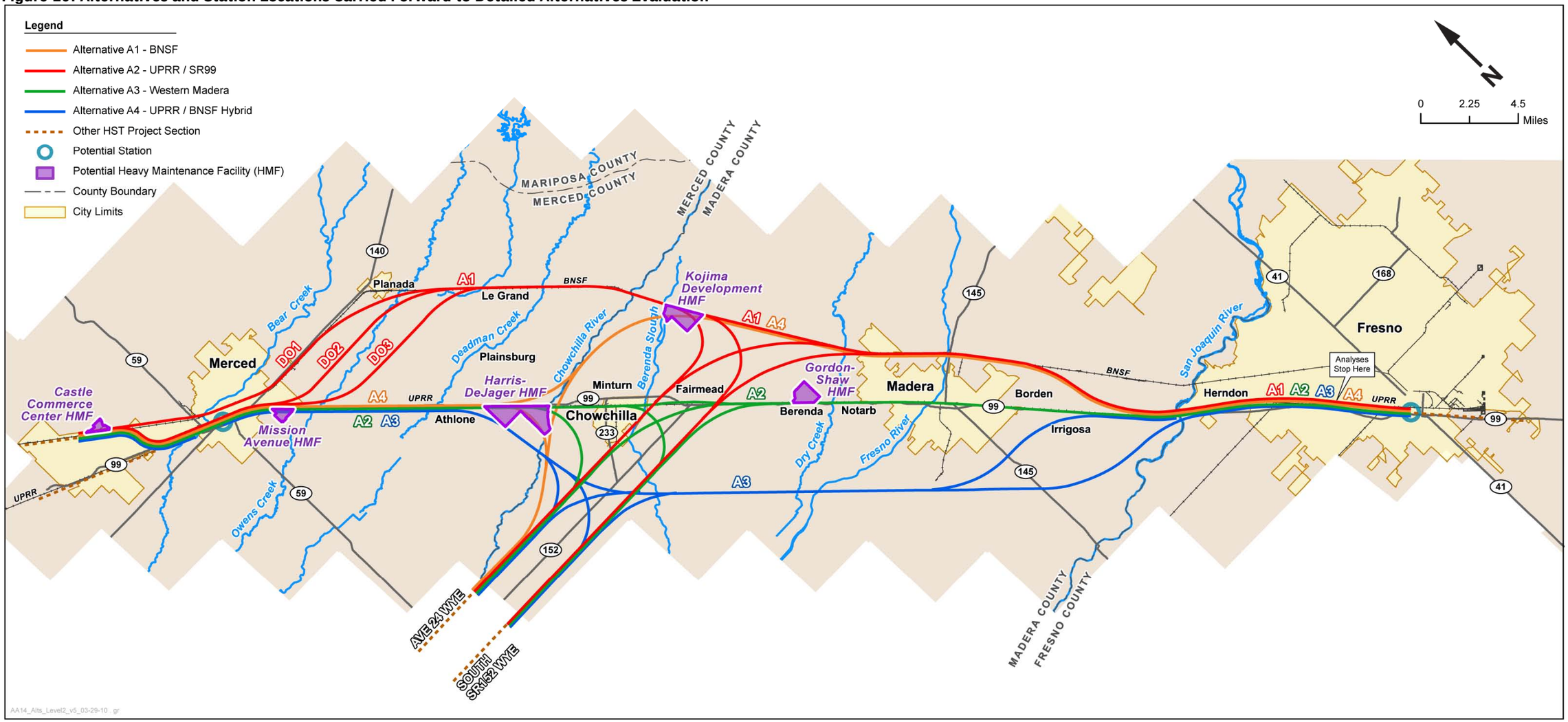
Alternative A1 – BNSF map: Figure 23, pages 26 and 27

Alternative A2 – UPRR/SR99 map: Figure 24, pages 28 and 29

Alternative A3 – Western Madera map: Figure 25, pages 30 and 31

Alternative A4 – UPRR/BNSF Hybrid map: Figure 26, pages 32 and 33

Figure 19: Alternatives and Station Locations Carried Forward to Detailed Alternatives Evaluation



Station Locations

Initial evaluation of station locations (Section 3.3.1) resulted in three station locations carried forward for detailed evaluation. Descriptions of each station location are provided below.

Castle Commerce Center Station

The Castle Airport and Commerce Center is located in the City of Atwater, north of the busy four-lane Santa Fe Road; the Castle Commerce Center HST Station is proposed to be located south of Santa Fe Road and the BNSF corridor. The proposed quarter-mile station area site is located on a largely greenfield development area within the Castle Commerce Center on the northeast and on a greenfield site straddling Merced County and the City of Atwater in the southwest area.

The station area is immediately surrounded by future development areas in Atwater and agricultural land in Merced County. New streets built as the result of a new low-density residential subdivision near the Atwater city limits currently provide the only access to the proposed station location. Bellevue Road, approximately a half mile away from the proposed station location, is the only road connecting the northeast and southwest station areas. An existing drainage canal, following the City of Atwater limits, also runs through the proposed station area site and feeds into Canal Creek a half mile east of the proposed site.

The Castle Commerce Center Station would be served by all alternatives. It would be designed as an at-grade, four-track and platform system.

Downtown Merced – Merced Intermodal Transit Center

This station would be located at the existing Merced Intermodal Transit Center on 16th Street and N Street, on the UPRR. The transit center lies in the core area of Downtown Merced and is the central hub of transit activity for the city and the surrounding communities in Merced County. Specifically, the transit center is an existing transportation hub for the city's local, regional, and national bus service. It is located in the city's Project Area 2 Redevelopment Area, which is currently bounded on the north and south by West 16th Street and West 15th Street and to the east and west by M Street and O Street. The future HST station would occupy a much larger area, possibly extending to SR 59 to the west and Canal Street to the east. The station would be compatible with all alternatives.

The transit center provides local and regional connections from Downtown to the Merced Airport, Merced College, UC Merced, the Amtrak Station, Castle Commerce Center, Merced Mall, and other shopping center destinations in the city. The bus transit system also provides services to the surrounding cities and areas in Merced County, including the communities of Atwater, Livingston, Delhi, Turlock, Hilmar, Le Grand, Planada, Dos Palos, and Los Banos.

The Downtown Transportation Center HST Station could be served by all alternatives except Design Option 1 associated with Alternative A1 – BNSF. The station and surrounding track would need to be designed as an elevated four-track and platform system, located south of the UPRR.

Downtown Merced – Existing Amtrak Depot Station

This station would be located at the existing Amtrak Depot in Merced, which sits on 24th Street between K Street and Martin Luther King Jr. Way. The depot is a passenger station on the BNSF railroad line. It is served by the Amtrak San Joaquin line, providing passenger service from Oakland and Stockton to Bakersfield. Amtrak also provides connecting motor coach service from the station to the Monterey and Salinas area and Yosemite National Park. Feeder bus routes are also provided to Sacramento and Los Angeles.

The future HST station would occupy a much larger area than the existing Amtrak station, possibly extending to M Street to the west and 5th Avenue to the east. It would be designed as an elevated four-track and platform system, located south of the existing Amtrak railroad line. The station would only be compatible with Design Option 1 associated with Alternative A1 – BNSF.

Figure 20: Castle Commerce Center Station Location

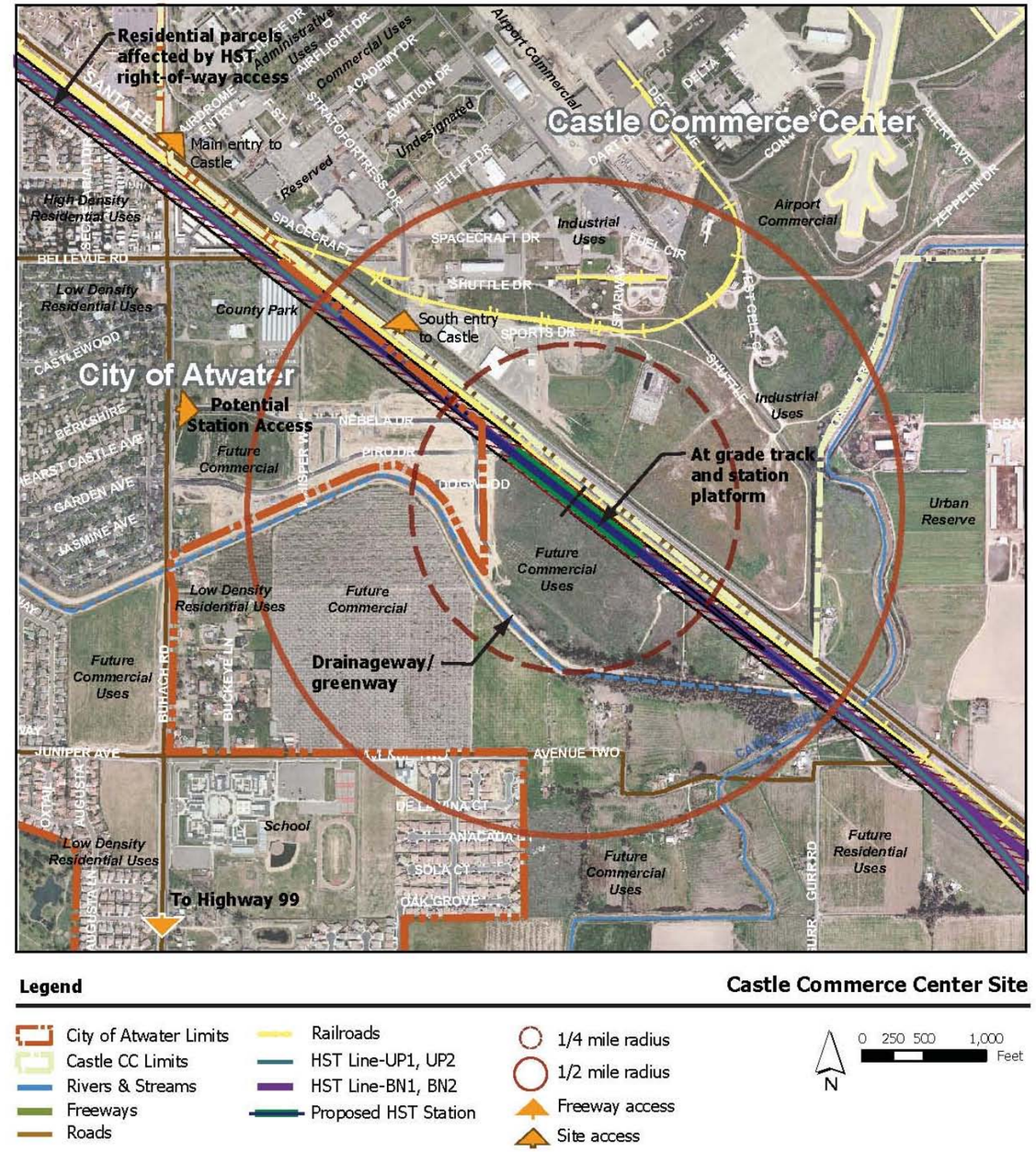
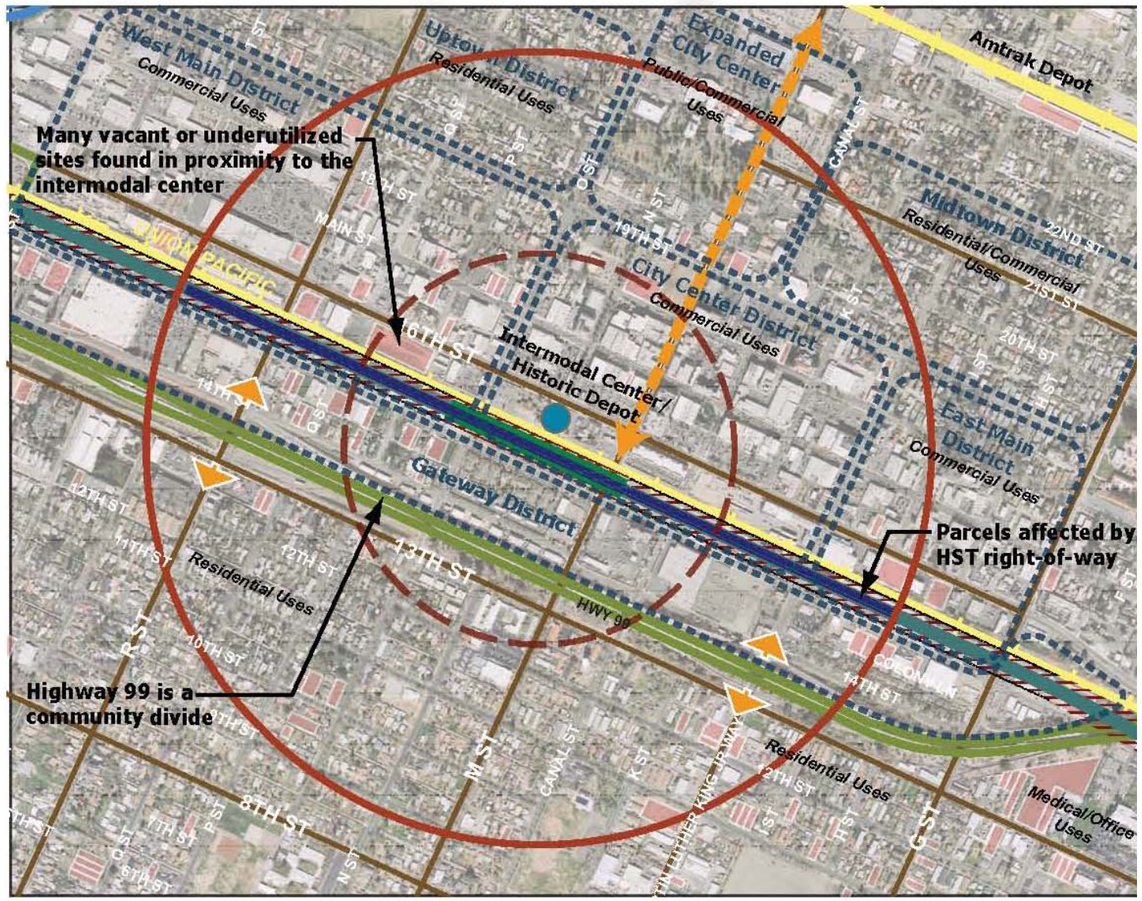


Figure 21: Downtown Merced Intermodal Transit Center

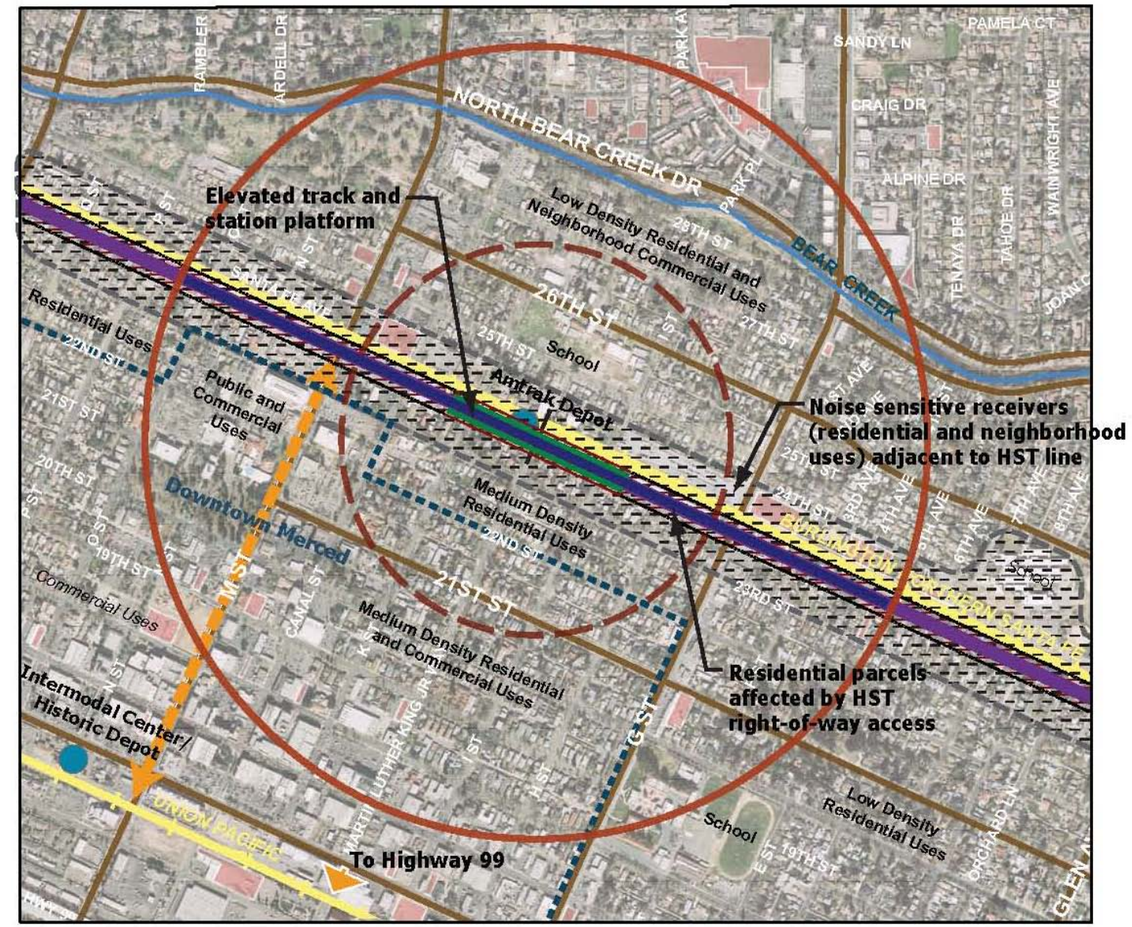


Legend — **Downtown Intermodal Center Site**

- Railroads
- Rivers & Streams
- Major Roads
- HST Line-BN1-DO1
- HST Line-UP1, UP2, BN1-DO2 and DO3
- Proposed HST Station
- Existing Transit Stations
- 1/4 mile radius
- 1/2 mile radius
- Downtown Districts
- Site Freeway Access
- Transit Street
- Affected Parcels/ HST right-of-way
- Vacant Parcels

N — 0 250 500 1,000 Fee

Figure 22: Merced Amtrak Depot Station Location

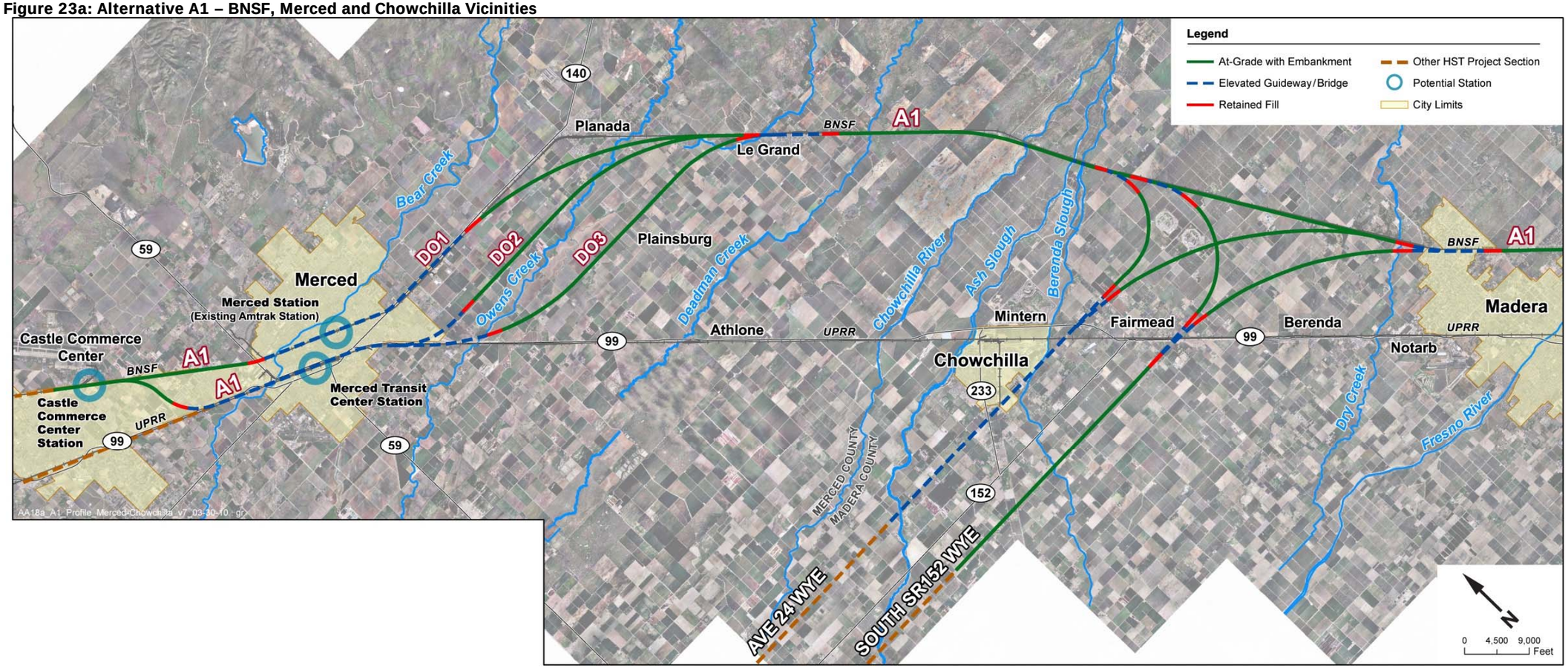


Legend — **Amtrak Depot Site**

- Railroads
- Rivers & Streams
- Major Roads
- HST Line-BN1-DO1
- HST Line-UP1, UP2, BN1-DO2 and DO3
- Proposed HST Station
- Existing Transit Stations
- 1/4 mile radius
- 1/2 mile radius
- Downtown District Boundary
- Affected Parcels/ HST right-of-way
- Site Freeway Access
- Transit Street
- Vacant Parcels

N — 0 250 500 1,000 Feet

Figure 23a: Alternative A1 – BNSF, Merced and Chowchilla Vicinities



Alternative A1 – BNSF

Alternative A1 – BNSF generally would follow the southwest side of the BNSF route from Merced to just northwest of Fresno, at which point it would enter Fresno parallel to the UPRR route. From Merced, the proposed route would follow one of three design options before reaching the community of Le Grand. Under Design Option 1, the route would follow the BNSF route through Merced, then enlarge its curve radius and deviate from the BNSF corridor to avoid the community of Planada, remaining south of the developed limits of the town. Under Design Options 2 and 3, the route would follow the UPRR corridor through Merced and then begin curving toward the BNSF route at the south edge of the city. The route would join the BNSF corridor near the community of Le Grand.

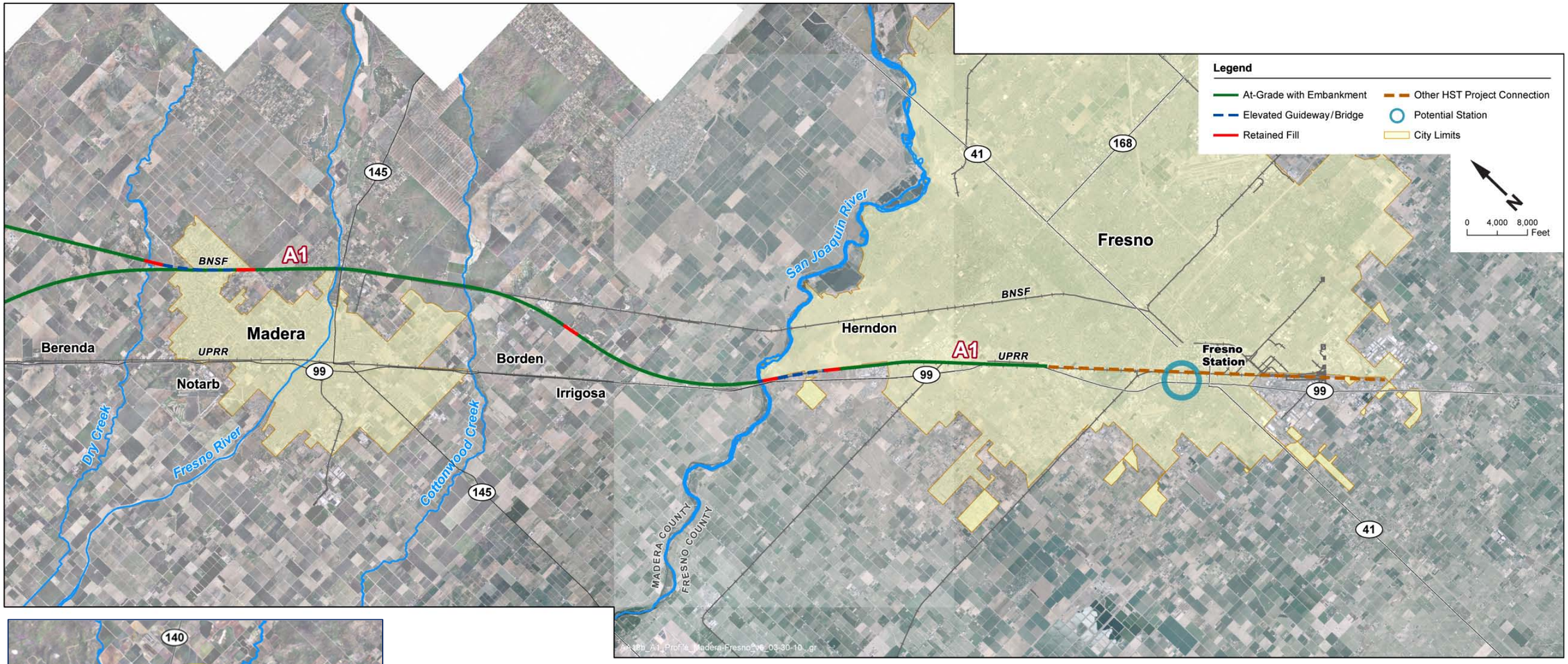
The alternative then would travel southeast along the BNSF corridor through Le Grand and through suburban residential portions of Madera. It would then move in a more southerly direction and transition toward the UPRR after Madera and travel on the east side of the UPRR. After crossing the San Joaquin River, Alternative A1 would cross to the west side of the UPRR right of way before entering the Downtown Fresno Station.

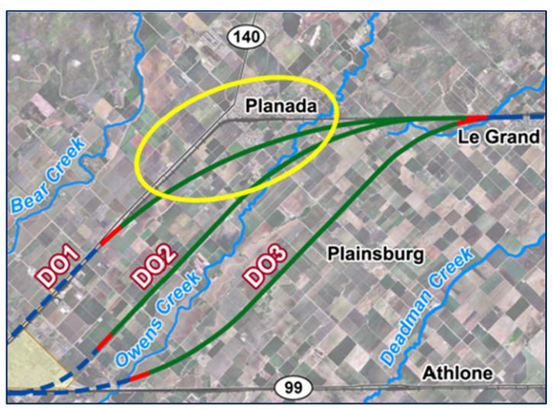
Alternative A1 – BNSFwould shift away from the BNSF corridor in areas where maintaining the BNSF alignment would compromise the design speeds of the HST. Elevated roadway profiles would be necessary in Merced, Le Grand, and through Fresno in order to remain grade-separated and avoid conflicts with the local roadway network. Typical cross sections of at-grade and elevated track sections are shown on page 31, adjacent to Alternative A3 – Western Madera.

Three design options were considered in the Merced vicinity to explore access to different station locations in Downtown Merced and avoidance of residential areas and river crossings south of downtown. The Downtown Merced Station would be located either on the BNSF corridor at the existing Amtrak Depot (under Design Option 1) or on the UPRR near the existing Intermodal Transit Center (under Design Options 2 and 3).

Two wye connections to the San Jose to Merced Section were considered as feasible connections: the Ave 24 Wye connection and the South SR152 Wye connection. The Ave 24 connection would be located along the south border of Chowchilla. Both wye legs would connect with the BNSF alignment east of Chowchilla. The South SR152 Wye would follow either Avenue 22 or 21 south of SR 152 and Chowchilla city boundaries; the south leg would join the alternative just north of the Madera Acres residential area, but may enter a portion of the residential area.

Figure 23b: Alternative A1 – BNSF, Madera and Fresno Vicinities

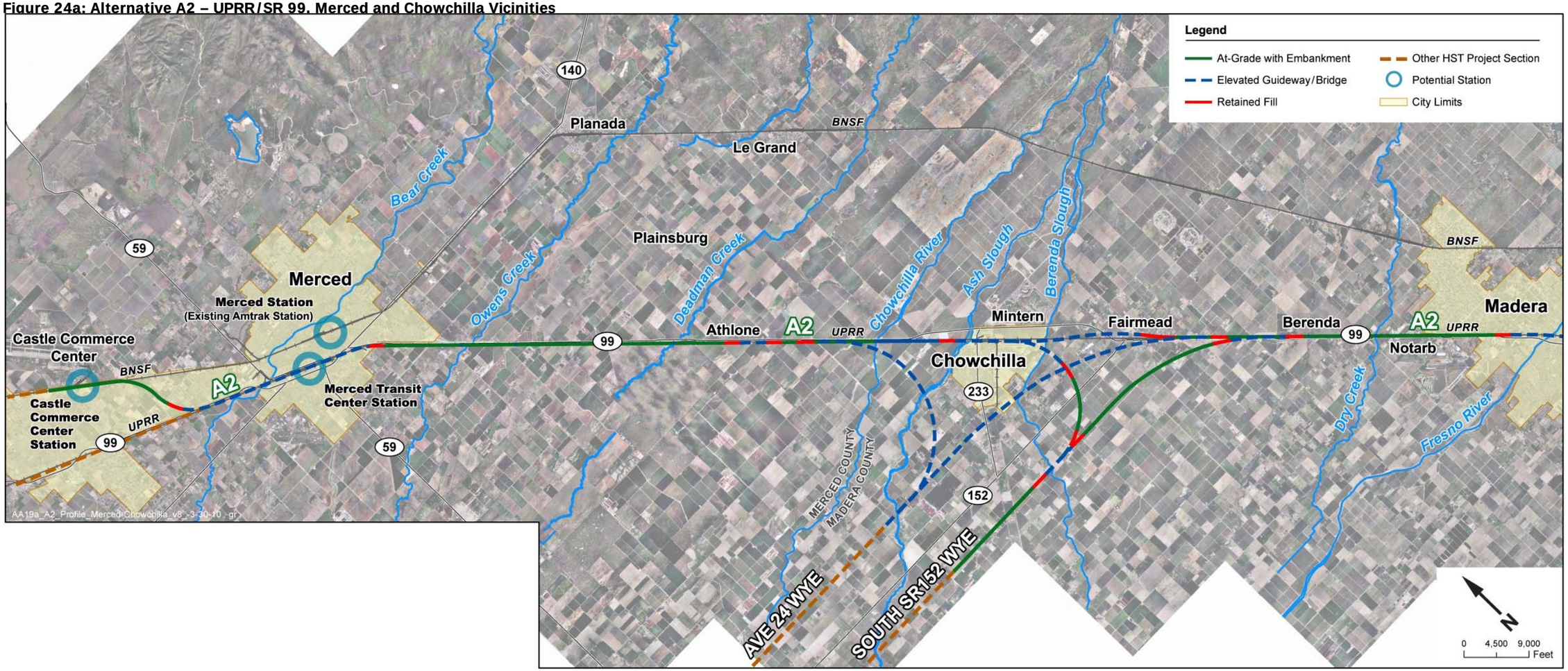




Design options avoid the community of Planada and may avoid Le Grand.

Design Option 1 would travel through residential neighborhood surrounding the existing Amtrak Depot.

Figure 24a: Alternative A2 – UPRR/SR 99, Merced and Chowchilla Vicinities



Alternative A2 – UPRR/SR 99

Starting from the Castle Commerce Center, along the west side of the BNSF corridor, Alternative A2 – UPRR/SR 99 would traverse to the west side of the UPRR to access the station in Downtown Merced near the existing Intermodal Transit Center. The proposed alternative would run parallel to the west side of the UPRR from Merced to just north of the City of Chowchilla. The HST would cross over both the UPRR and SR 99 just south of Chowchilla. The illustrations on the following page show how the HST crossing of UPRR and SR 99 could look using straddle bents, but segmental construction can be used as also shown.

The alignment would be straight, generally at-grade, with portions on retained fill to avoid 100-year floodplain issues. Elevated roadway profiles would be necessary in Merced, Chowchilla, Madera, and Fresno in order to remain grade-separated and avoid conflicts with the local roadway network. Typical cross sections of at-grade and elevated track sections are shown on page 31, adjacent to Alternative A3 – Western Madera.

There were no design options proposed for this alternative. Two wye connections to the San Jose to Merced Section were considered as feasible connections: the Ave 24 Wye and the South SR152 Wye connection. The north leg of the Ave 24 Wye would curve north around Chowchilla boundaries and the southbound leg would curve around the south Chowchilla boundary. Both the legs of the South SR152 Wye would join Alternative A2 – UPRR/SR 99 south of the city limits of Chowchilla. The legs avoid the existing Chowchilla airport as well as the Fairmead landfill and nearby paleontological museum.

Figure 24b: Alternative A2 – UPRR/SR 99, Madera and Fresno Vicinities

Example of segmental construction of a bridge over existing infrastructure and water features.

HST could cross over SR 99 using straddle bents, similar to this example located north of Merced.

Figure 25a: Alternative A3 – Western Madera, Merced and Chowchilla Vicinities

Alternative A3 – Western Madera

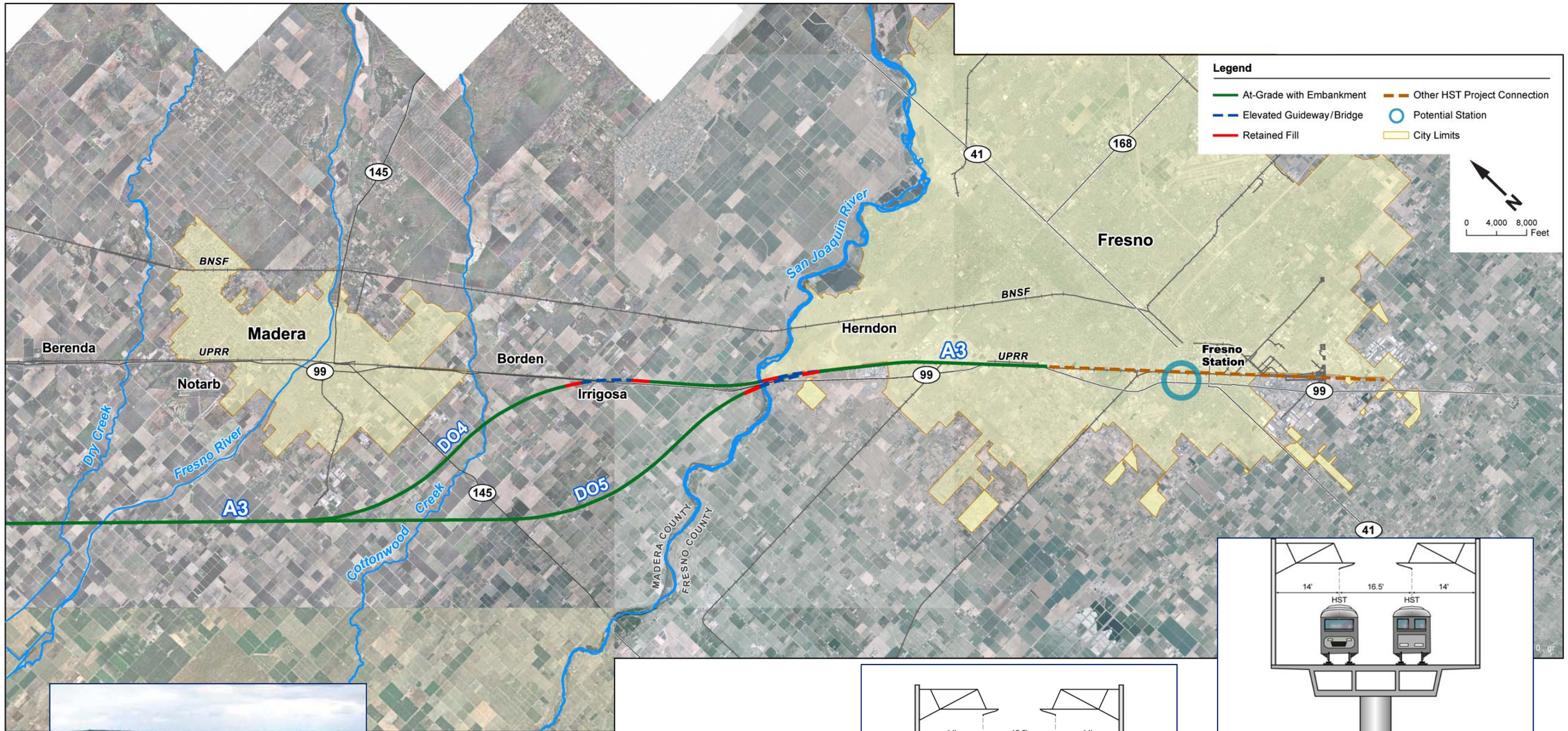
Alternative A3 – Western Madera would follow the same alignment as Alternative A2 – UPRR/SR 99 from the northern project limit through Merced. South of Merced, at Buchanan Hollow Road near the Town of Athlone, the alternative would transition southwest via reverse curves (with design speeds of 250 mph) to follow a path parallel to Alternative A2 – UPRR/SR 99, but approximately 3.75 miles to the west. The alternative would traverse mainly agricultural areas and avoid the urban limits of Chowchilla and Madera. The alternative then would begin a transition back to the Alternative A2 – UPRR/SR 99 alignment south of Madera.

Two design options were considered south of Madera to explore different locations for reconnecting to the UPRR corridor between Madera and Fresno. Design Option 4 would reconnect the alternative to the east side of the UPRR via a crossover just south of the Madera city limits. The alignment would then cross back to the west side of the UPRR as it enters Downtown Fresno. Design Option 5 would reconnect the alternative to the west side of the UPRR alignment south of the San Joaquin River. This design option would need to cross SR 99 but would avoid a crossover of the UPRR.

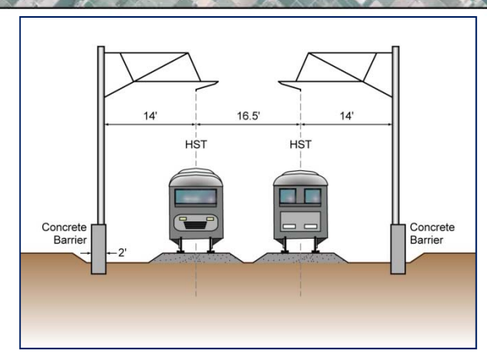
Both the Ave 24 and the South SR152 wye connections from the San Jose to Merced Section would join the alternative in the vicinity of SR 152 west of Chowchilla.

Most of the alignment would be at-grade, although mitigation for impacts may consider elevated profile. Elevated roadway profiles would be necessary in Merced and Fresno in order to remain grade-separated and avoid conflicts with the local roadway network. Typical cross sections of at-grade and elevated track sections are shown on page 31.

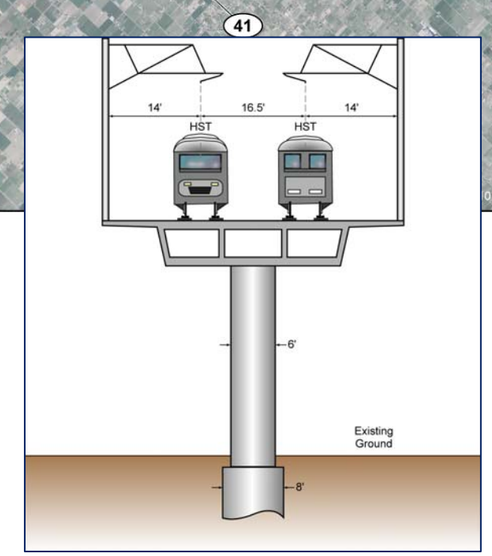
Figure 25b: Alternative A3 – Western Madera, Madera and Fresno Vicinities



Example of HST traveling across farmlands in France, much like Alternative A3 – Western Madera.



At-grade track typical 100-foot right-of-way section



Elevated track typical 50-foot right-of-way section

Figure 26a: Alternative A4 – UPRR/BNSF Hybrid, Merced and Chowchilla Vicinities

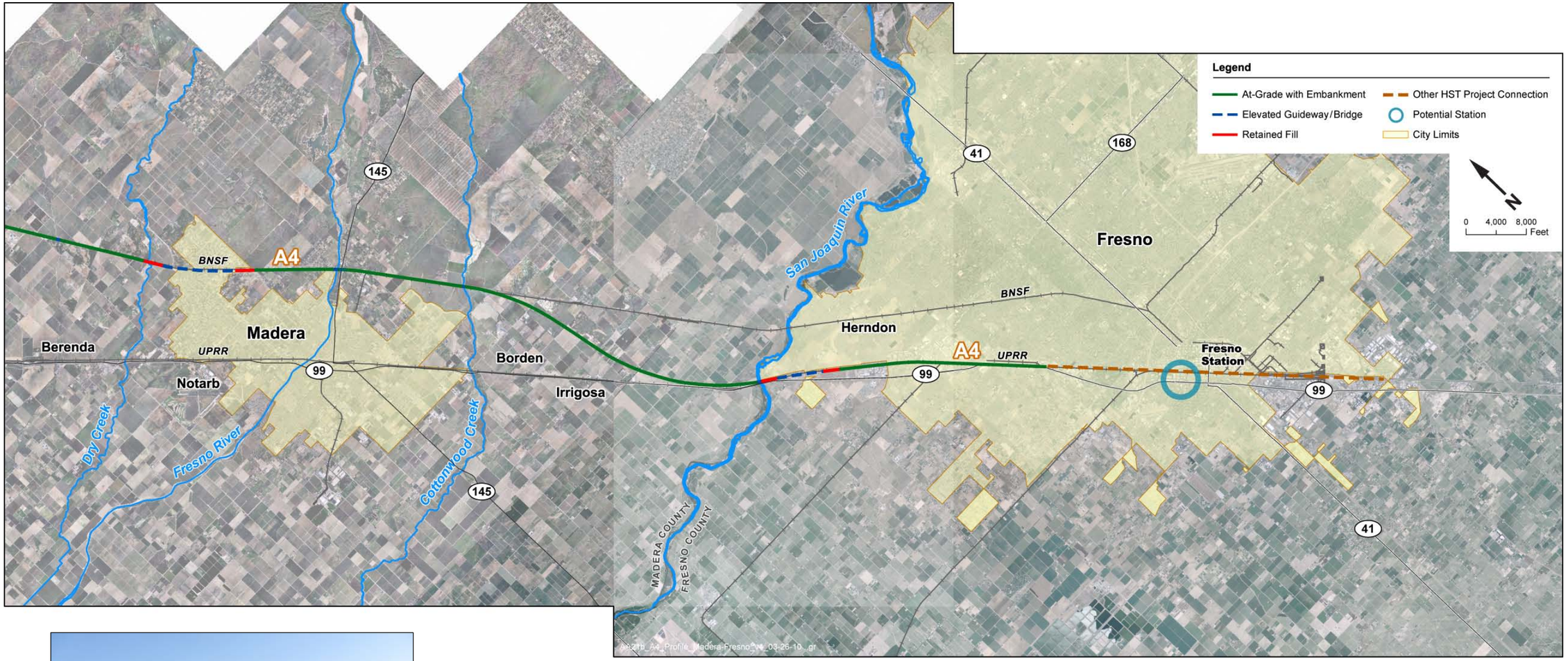
Alternative A4 – UPRR/BNSF Hybrid

Alternative A4 – UPRR/BNSF Hybrid would follow the UPRR along the same alignment as Alternative A2 – UPRR/SR 99 from the northern project limit through Merced and the Town of Athlone. North of Chowchilla, the alignment would curve southeast and transition toward the BNSF corridor. The alternative would join the west side of the BNSF corridor east of Chowchilla. Alternative A4 – UPRR/BNSF Hybrid would then follow the same alignment as Alternative A1 – BNSF south to Downtown Fresno. The alignment would follow the BNSF south past Chowchilla and Madera then transition toward the UPRR south of Madera and travel on the east side of the UPRR. After crossing the San Joaquin River, Alternative A4 – UPRR/BNSF Hybrid would cross to the west side of the UPRR right-of-way before entering the Downtown Fresno Station.

Most of the alignment would be at-grade. Elevated roadway profiles would be necessary in Merced and Fresno in order to remain grade-separated and avoid conflicts with the local roadway network. Typical cross sections of at-grade and elevated track sections are shown on page 31, adjacent to Alternative A3 – Western Madera.

There were no design options proposed for this alternative. Two wye connections to the San Jose to Merced Section were considered as feasible connections: modified Ave 24 and South SR152 wye connections. The modified wye connections would veer north from Avenue 24 to joinAlternative A4 – UPRR/BNSF Hybrid north of Chowchilla, near the area where the alternative veers from the UPRR corridor toward the BNSF corridor. The wye connection would avoid the Chowchilla City limits. The wye connection and the main alignment would be elevated in this area, as shown in Figure 25a above. The South SR152 Wye would require a longer northbound radial track to connect to the east-west link along Avenue 21 or 22.

Figure 26b: Alternative A4 – UPRR/BNSF Hybrid, Madera and Fresno Vicinities



Alternative A4 – UPRR/BNSF Hybrid would result in multiple crossings of the Chowchilla River, pictured at right looking upstream at SR 99. Inset photo shows the river with high flow.

Located within the footprint of Alternative A4 – UPRR/BNSF Hybrid, vernal pools provide habitat for threatened and endangered species.

4.0 EVALUATION OF ALTERNATIVES

The alternatives and potential stations carried forward into the detailed evaluation of alternatives (as shown in Figure 19) were assessed for each of the project objectives and evaluation measures. This information was then used to select the alternatives to carry forward into preliminary engineering and environmental review as part of the EIR/EIS. The alternatives, wyes, design options, and stations that were selected for continued evaluation—along with the refinements and additions that resulted from the initial review and stakeholder input—were evaluated using the objectives and measures described in Chapter 2.0 and summarized in Tables 1 through 6. These performance objectives and evaluation measures are categorized as follows:

- Design objectives (including measures such as route length, travel time, cost, and adherence to design standards)
- Land use (including measures such as consistency with land use and general plans)
- Constructability (including measures such as track type construction and access to the corridor)
- Community impacts (including measures such as amount of land acquisition)
- Natural resources (including measures such as impacts to wetlands, potential threatened and endangered species habitat, and important farmlands)
- Environmental quality (including measures such as noise-sensitive land use types and hazardous materials sites)

This section provides a summary of the performance of the alternatives and station locations against each category of evaluation measure. The data for each evaluation category are presented in comparison tables (Table 21 through 29). The written analysis focuses on the measures that most distinguish the alternatives from one another; three primary sets of measures differentiate the alternatives: design objectives, natural resource impacts, and community impacts. Design objectives provide a measure of how well an alternative would meet the project purpose and need. Meeting design objectives must be balanced against environmental and community impacts, along with the support of regulatory agencies and the public. These three primary sets of evaluation measures are discussed below at each step of the detailed alternatives analysis process to support the selection of alternatives to carry forward.

The detailed alternatives evaluation process involved identification of the best design options and connecting wyes for each north-south alternative. These design options and wyes were used to develop optimally performing alternatives that were compared against one another. The comparison of these optimally performing alternatives (or refined alternatives) was used to identify the alternatives to be carried forward for further evaluation in the EIR/EIS. The Merced Station compatibility and potential for TOD could influence a portion of the alignment decision without eliminating the viability of an entire alternative. Therefore, the study starts with the station evaluation. For comparing the alternatives, the evaluation process begins with reviewing differences in the design options on the north-south portion of the alternative, then the best-performing wye connections from the San Jose to Merced Section alternatives are incorporated, and, finally, the best versions of each alternative in composite are compared.

In Phase 1 of the project, the primary function of the HST will be to travel between San Francisco and Los Angeles. The Merced to Fresno Section is the HST system nexus connecting San Francisco, to the west, with the north-south alignment between Los Angeles and Sacramento. The San Jose to Merced Section (also referred to as the HST connection via the Pacheco Pass) provides the east-west connection from the Bay Area to the Merced to Fresno Section, which, in turn, connects the north-south route to Los Angeles. The connection between the San Jose to Merced Section and Merced to Fresno Section is a critical portion of the route between San Francisco and Los Angeles and can influence whether a Merced to Fresno alternative performs well or poorly. To fully evaluate the performance of the Merced to Fresno Section alternatives, travel time, route length, and construction costs were evaluated by combining the Pacheco Pass wye connection with the north-south alignment in order to understand how the alternative would perform relative to the statewide project purpose of traveling most efficiently between San Francisco and Los Angeles.

Because farmland impacts are an area of great interest to communities in the Central Valley, it is important to note that impacts on farmlands have been evaluated using two different methods in the tables presented below. Impacts on lands designated by county assessor records as agricultural land use were estimated. These impacts do not consider the type of farmland that exists on those lands (for example, whether the land is designated as prime farmland or as grazing land). The impacts on agricultural land use are presented under the category of Disruption to Communities in the tables below. Impacts on prime, unique, and statewide and locally important farmlands, as designated by the Farmland Mapping and Monitoring Program (FMMP), were also estimated. FMMP data use a different method to determine agricultural land use than assessor data, and thus do not match the assessor data exactly. The impacts on prime, unique, and statewide and locally important farmlands are presented under the category of Environmental Resources in the tables below. Additionally, the source years of the land use data from the county assessor records and the FMMP data differ. County assessor records were generated in 2009, and FMMP data were generated in 2006. The acreages of estimated impact on agricultural land use, as defined by county assessor records, and on prime, unique, and statewide and locally important farmland, as defined by FMMP data, differ because they measure two different sets of data with different source years.

4.1 Evaluation of Station Locations

The purpose of the California HST System is to provide intercity high-speed rail service in California. Potential station locations are one of the most important considerations in the design of alternatives. The location of the Fresno station was selected as part of the Fresno to Bakersfield Alternatives Analysis process. The Merced station site influences the location of the alternative alignments in Merced; therefore, the station analysis is discussed before the alignment portion of the alternatives in this chapter.

The stations (see Figure 19) were evaluated using the measures described in Chapter 2.0. Three of the categories of evaluation measures were applicable to the station evaluation:

- Alignment and station performance (i.e., design objectives)
- Land use
- Community impacts

The evaluation compared the potential station locations to determine how they performed against the evaluation criteria and ultimately to determine which location(s) should be carried forward for analysis in the project EIR/EIS. The Castle Commerce Center and Downtown Merced Transit Center stations would be accessible by all Merced to Fresno Section alternatives studied in this analysis. The Merced Amtrak Depot would be accessible only by Design Option 1 of Alternative A1 – BNSF, which follows the BNSF route through Merced. Table 21 shows the performance of each of the station locations against the four evaluation criteria applicable to the station analysis.

The Downtown Merced Intermodal Transit Center station was the best-performing location. The Castle Commerce Center station performed adequately, while the Merced Amtrak Depot station performed the poorest of the three locations. Local traffic impacts in the area surrounding all three station sites would be minimal, as traffic operations would continue to maintain acceptable LOS on surrounding arterials. However, traffic would increase from current flow in residential areas with the Amtrak station.

Local planning policy supports the opportunity for TOD around the Downtown Merced Transit Center station. The station would be in the center of the Downtown Merced commercial zone, surrounded by zoning supportive of substantial TOD, and within a designated economic development zone with two major access points from SR 99 within a half mile of the station. The site would also be supported by intermodal connections, as the existing Intermodal Transit Center serves county, regional, and intercity bus routes. The City and County of Merced expressed the highest level of support for the Downtown Merced Transit Center station.

While local planning policy supports the opportunity for TOD around the Castle Commerce Center station, it is more supportive of the Downtown Transit Center site. Limited high-density residential potential exists around the Castle Commerce Center Station site, and the location is currently surrounded by vacant land rather than transit-supportive mixed uses. The site would be supported by intermodal connections to the county bus system and a regional multiuse trail. Merced County supported the Castle Commerce Center station but preferred the Downtown Merced station.

Planning policy and surrounding land use do not support the Merced Amtrak Depot station, which would be surrounded by existing low-density residential areas, and planning policies do not identify a desire for land use change in these areas. The site would be supported by intermodal connections to the county bus system and intercity Amtrak rail service.

Table 21: Summary Comparison of Station Locations

Evaluation Category	Evaluation Criteria	Castle Commerce Center	Downtown Merced	Amtrak
Design Objectives	Intermodal connections	Neutral Several Merced County Transit (The Bus) routes serve site, also multiuse regional path is near site.	Supportive “Merced Transpo” is central hub for Merced County Transit (The Bus), also major regional and intercity bus hub.	Supportive Transit hub served by multiple Merced County Transit (The Bus) routes, depot for Amtrak intercity rail service.
Land Use	Potential for TOD	Neutral Atwater and Castle Commerce Center current plans support moderate commercial but only limited high-density residential in station area.	Supportive Planning and zoning in station area supportive of substantial TOD, proximity of downtown commercial zone is additional benefit.	Not supportive Area around station primarily zoned low-density residential, and no changes proposed in future plans.
	Consistency with other planning efforts	Neutral Although Atwater and Castle Commerce Center current plans support commercial and residential in station area, City of Merced prefers downtown Merced site.	Supportive City of Merced favor station at Downtown Intermodal Center, areas around station are designated economic development zones.	Not supportive City of Merced are opposed to station along BNSF corridor in downtown.
Disruption to Communities	Local traffic effects around stations (number of roads with decreased levels of service).	10 links analyzed; 1 link (10% of total links) changes from LOS B to C.	12 links analyzed; 2 links change from LOS B to C, 1 link changes from LOS C to D (25% of total links affected).	14 links analyzed; 4 links change from LOS B to C, 1 link changes from LOS C to D (35% of total links affected) .

4.2 Evaluation of Design Options

Alternative A1 – BNSF had three alignment design options, and Alternative A3 – Western Madera had two. Alternatives A2 – UPRR/SR 99 and A4 – UPRR/BNSF Hybrid had no design options.

Alternative A1 – BNSF Design Options

Figure 27 illustrates the three design options associated with Alternative A1 – BNSF. The intent of these design options was to avoid and minimize impacts on community and natural resources in the cities of Merced and Planada. The options explored access to different station locations in Downtown Merced and avoidance of residential areas and river crossings south of downtown. The Downtown Merced Station would be located either on the BNSF corridor at the existing Amtrak Station (Design Option 1) or on the UPRR near the existing transit center (Design Option 2 or Design Option 3). Design Option 1 most closely follows the BNSF. Design Option 2 follows Mission Avenue, and Design Option 3 follows Mariposa Avenue so that agricultural fields are no bifurcated, to the extent possible.

Table 22 summarizes the cost, travel times, and impacts of the north-south and the alignment design options.

Figure 27: Alternative A1 – BNSF, Design Options 1, 2, and 3

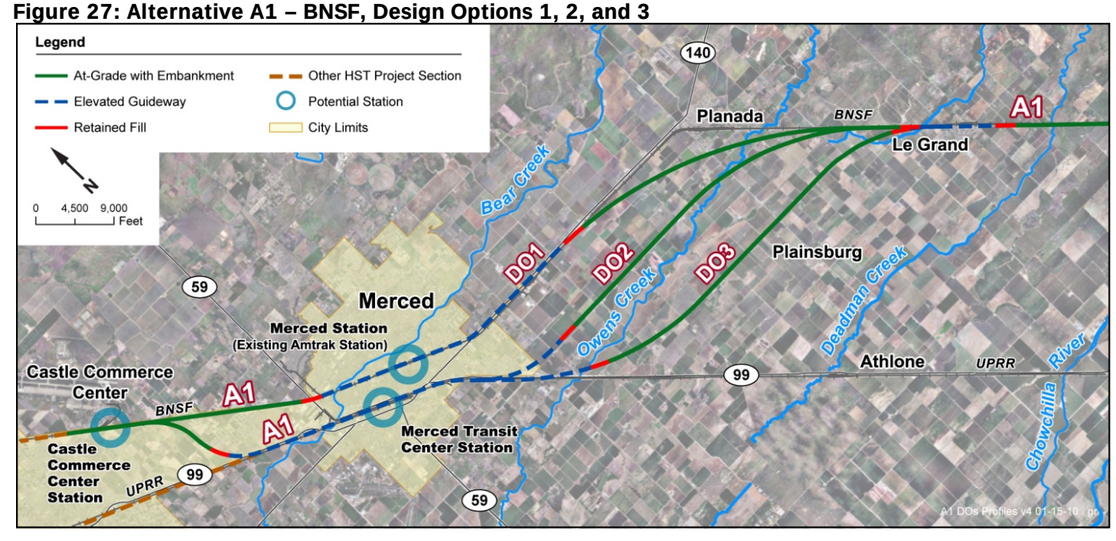


Table 22: Comparison of Design Options for Alternative A1 – BNSF

Category	Measurement[a]	Alternative A1 + DO1	Alternative A1 + DO2	Alternative A1 + DO3
Design Objectives	Journey time (minutes) - Merced to Fresno	20.43	21.07	20.97
	Route length (miles)	60.9	61.6	61.5
	at-grade/ embankment	46.1	45.6	44.9
	retained fill	4.3	3.4	3.8
	elevated	10.5	12.6	12.8
	miles of curvature	21.7	22.7	24.0
	Intermodal connections	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Operating & Maintenance Costs	Medium	High	High
	Capital Cost Factor	1.00	1.03	1.05
Land Use	Potential for TOD	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Consistency with other planning efforts	Not supportive – conflicts with land use plans and policies in Merced	Neutral – land use plans and policies do not support or conflict with design option	Neutral – land use plans and policies do not support or conflict with design option
Constructability	Constructability (complexity of construction)	high	high	high
	Disruption to existing railroads (number of crossings of railroad right-of-way)	1	2	2
	Disruption to and relocation of utilities (miles of alternative in urban areas)	23	21	19
	Number of crossings of UPRR/ BNSF/ SR 99	1	7	7
	# SR 99 crossings	0	4	4
	# UPRR crossings	1	3	3
	# BNSF crossings	0	0	0
Disruption to Communities	Total property within right-of-way (acres)	745	738	735
	Agricultural (acres)[b]	464	489	502
	Commercial (acres)	10	12	12
	Industrial (acres)	11	8	8
	Residential (acres)	90	70	66
	Other (acres)	170	158	147
	Properties with access affected (number of road closures)	28	24	24
	Local traffic effects around stations (number of roads with decreased levels of service)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Local traffic effects at grade separations (number of grade separations)	28	22	22
Environmental Resources	Biological Resources - number of new bridge crossings	17	18	19
	Biological resources - acres of wetlands	8.8	8.9	11.8
	Biological resources - linear feet of waterways crossed	4,160	4,370	4,330
	Biological resources - acres of potential T&E habitat	321	260	281
	Cultural Resources (number of sites)	66	37	38
	Parklands (number of parks)	1 Park/1 acre	0	0
	Agricultural lands (acres of prime, unique, and important farmland)[b]	454	465	459
Natural Environment	Noise and Vibration	High amount of residential land use	Medium amount of residential land use	Medium amount of residential land use
	Visual/scenic resources (miles of alternative in urban areas)	10	10	8
	Geotechnical constraints	Not applicable	Not applicable	Not applicable
	Hazardous Materials (number of sites)	21	48	49

[a] Totals may not equal sum of subtotals due to rounding differences.
[b] The differences between affected acres of agricultural land use(City/County data) and prime, unique, and important farmland (California Department of Conservation) is due to the difference in the source and how they define agricultural land use.
T&E = threatened and endangered

Despite the small advantages of Design Option 1 over Design Option 2 and Design Option 3 in cost, travel time, and constructability, as indicated in Table 22, the existing land uses around Design Option 1 and associated with the Amtrak Station are incompatible with HST operations and the associated station development that is desirable for HST to be successful. Also, Design Option 1 affects notably more residential land uses, park, and cultural sites than the other two. As summarized in Section 4.1, Evaluation of Station Locations, planning policy and surrounding land use do not support the Merced Amtrak Depot station on Design Option 1. The station and design option would be surrounded by low- to medium-density residential land uses, and planning policies do not identify a desire for land use change in these areas. Therefore, Design Option 1 was not recommended to be carried forward for further evaluation.

Design Option 2 and Design Option 3 would have very similar costs and travel times, with only a 1% cost difference and less than 10 seconds difference in travel time between Merced and Fresno. They would have the same number of crossings of UPRR and SR 99 in Merced, and maintenance costs and complexity of construction would be comparable. Design Option 2 and 3 both have areas where meeting design speed standards may be compromised. Design option 2 may require lower speeds at the Mission Avenue interchange where the curvature may affect residential lots. Design Option 3 may have to lower speeds where it joins the BNSF corridor before Le Grand; the curve in this location would be too tight for a 250-mph design speed. This curvature was proposed to minimize impacts on Le Grand, but further design refinements may be able to maintain speeds in this area. Other avoidance designs would only increase impacts on environmental resources and increase total acres of impacts without improving operational performance. Community and environmental impacts would be fairly comparable as well. Design Option 2 is recommended to be carried forward as a part of Alternative A1 – BNSF for the analysis comparison with the other three alternatives because it includes the preferred station location in Downtown Merced and it would meet design objectives without adding environmental impacts. It has one fewer river crossing, fewer wetlands impacts, and fewer residential impacts than Design option 3. However, at this level of design, the differences in the two design options and their resulting impacts were not great enough to dramatically affect the feasibility of Alternative A1 – BNSF over any of the three other alternatives. The difference between Design Option 3 and Design Option 2 is not great enough to eliminate either design option at this time.

Alternative A3 – Western Madera Design Options

Figure 28 shows the two design options for Alternative A3 – Western Madera. The intent of these design options was to study differences in the alternative's connection back to the UPRR alignment. Design Option 5 was refined after the initial development of alternatives in order to minimize wetland impacts.

Table 23 summarizes the cost, travel times, and impacts of the north-south and the alignment design option.

Figure 28: Alternative A3 – Western Madera, Design Options 4 and 5

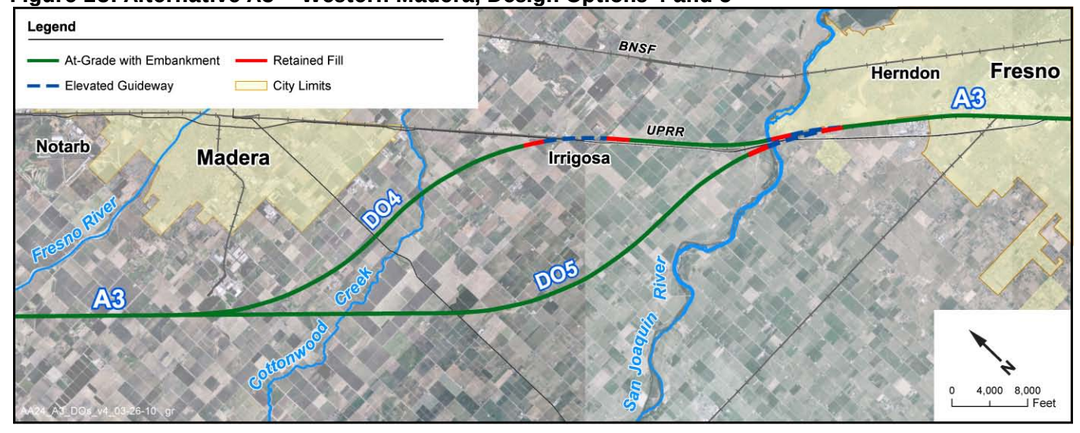


Table 23: Comparison of Design Options for Alternative A3 – Western Madera

Category	Measurement[a]	Alternative A3 + Design Option 4	Alternative A3 + Design Option 5
Design Objectives	Journey time (minutes) - Merced to Fresno	20.16	20.18
	Route length (miles)	60.9	60.6
	at-grade/ embankment	50.5	52.2
	retained fill	2.9	1.7
	elevated	7.4	6.7
	miles of curvature	30.9	27.3
	Intermodal connections	Not applicable (station measure only)	Not applicable (station measure only)
	Operating & Maintenance Costs	medium	low
	Capital Cost Factor	1.03	1.00
Land Use	Potential for TOD	Not applicable (station measure only)	Not applicable (station measure only)
	Consistency with other planning efforts	Not supportive – conflicts with land use plans and policies in Madera County.	Not supportive – conflicts with land use plans and policies in Madera County.
Constructability	Constructability (complexity of construction)	low	low
	Disruption to existing railroads (number of crossings of railroad right-of-way)	3	1
	Disruption to and relocation of utilities (miles of alternative in urban areas)	13	13
	Number of crossings of UPRR/ BNSF/ SR 99	7	5
	# SR 99 crossings	4	4
	# UPRR crossings	3	1
	# BNSF crossings	0	0
Disruption to Communities	Total property within right-of-way (acres)	693	704
	Agricultural (acres)[b]	512	539
	Commercial (acres)	11	11
	Industrial (acres)	9	9
	Residential (acres)	33	28
	Other (acres)	129	117
	Properties with access affected (number of road closures)	35	39
	Local traffic effects around stations (number of roads with decreased LOS)	Not applicable (station measure only)	Not applicable (station measure only)
	Local traffic effects at grade separations (number of grade separations)	37	41
Environmental Resources	Biological Resources - number of new bridge crossings	18	17
	Biological resources - acres of wetlands	9.2	8.3
	Biological resources - linear feet of waterways crossed	4,550	4,390
	Biological resources - acres of potential T&E habitat	125	201
	Cultural Resources (number of sites)	36	34
	Parklands (number of parks)	0	0
	Agricultural lands (acres of prime, unique, and important farmland)[b]	516	555
Natural Environment	Noise and Vibration	Low amount of residential land use	Low amount of residential land use
	Visual/scenic resources (miles of alternative in urban areas)	6	6
	Geotechnical constraints	Not applicable	Not applicable
	Hazardous Materials (number of sites)	41	40

[a] Totals may not equal sum of subtotals due to rounding differences.
[b] The differences between affected acres of agricultural land use(City/County data) and prime, unique, and important farmland (California Department of Conservation) is due to the difference in the source and how they define agricultural land use.

In general, Design Option 5 would perform better with respect to meeting design objectives than Design Option 4 would. It would have a longer at-grade profile, less linear distance of curved trackway, and fewer crossings of UPRR and SR99, which would result in lower capital, operating and maintenance costs. Design Option 5 would cost the least because it would have fewer miles of elevated track; however, the cost difference is only 3%. The travel time from Merced to Fresno would be the same for both design options.

Community and environmental impacts would be comparable, as well. Design Option 4 would have slightly lower impact than Design Option 5 on potential critical habitat and important agricultural land; while Design Option 5 would have fewer impacts than Design Option 4 on residential land uses and wetlands. Due to the comparable community and environmental impacts and slightly lower cost, Design Option 5 is recommended to be carried forward as a part of Alternative A3 – Western Madera for comparison to the other three alternatives. The differences in the two design options and their resulting impacts are not great enough to dramatically affect the feasibility of Alternative A3 – Western Madera over any of the three other alternatives, and Design Option 4 remains a feasible design option.

4.3 Evaluation of Refined Merced to Fresno North-South Alignments

As a result of the design option evaluation, four refined north-south alternative alignments between Merced and Fresno were identified for comparison against the evaluation measures. Design Option 2 was carried forward with Alternative A1 – BNSF for simplification although both Design Options 2 and 3 are feasible. Design Option 5 was carried forward with Alternative A3 – Western Madera , although Design Option 4 also remains a feasible design option. The project team then evaluated the refined north-south connection alignments between Merced and Fresno, without yet considering the wye connections west to the San Jose to Merced Section.

The travel times reported below represent the time it would take the train to travel from Merced to Fresno only.

Table 24 shows the performance of each of the refined Merced to Fresno Section alternatives.

Table 24: Comparison of Merced to Fresno North-South Alignments with the Best-Performing Design Options

Category	Measurement[a]	Alternative A1 + DO2	Alternative A2	Alternative A3 + DO5	Alternative A4
Design Objectives	Journey time (minutes) - Merced to Fresno	21.07	18.12	20.18	20.71
	Route length (miles)	61.6	58.6	60.6	60.6
	at-grade/ embankment	45.6	38.3	52.2	46.3
	retained fill	3.4	4.7	1.7	2.5
	elevated	12.6	15.7	6.7	11.8
	miles of curvature	22.7	11.5	27.3	24.4
	Intermodal connections	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Operating & Maintenance Costs	medium	low	low	high
	Capital Cost Factor	1.16	1.32	1.00	1.23
Land Use	Potential for TOD	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Consistency with other planning efforts	Neutral – land use plans and policies do not support or conflict with alternative	Not supportive – conflicts with land use plans and policies in Chowchilla and Madera	Not supportive – conflicts with land use plans and policies in Merced and Madera County.	Neutral – land use plans and policies do not support or conflict with alternative
Construct-ability	Constructability (complexity of construction)	Medium, urban constraints in Merced and Fresno and possible movement/ crossings of BNSF	Medium- high, multiple complex infrastructure crossings throughout corridor	Low – medium, same urban constraints in Merced and Fresno	High, due to number of river and infrastructure crossings
	Disruption to existing railroads (number of crossings of railroad right of way)	3	4	1	3
	Disruption to and relocation of utilities (miles of alternative in urban areas)	21	21	13	16
	Number of crossings of UPRR/ BNSF/ SR 99	7	7	5	7
	# SR 99 crossings	4	4	4	4
	# UPRR crossings	3	3	1	3
	# BNSF crossings	0	0	0	0
Disruption to Communities	Total property acquisition (acres)	738	637	704	671
	Agricultural (acres)[b]	489	373	539	461
	Commercial (acres)	12	11	11	13
	Industrial (acres)	8	20	9	9
	Residential (acres)	70	36	28	52
	Other (acres)	158	197	117	137
	Properties with access affected (number of road closures)	24	42	39	26
	Local traffic effects around stations (number of roads with decreased levels of service)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Local traffic effects at grade separations (number of grade separations)	22	18	41	22
Environ-mental Resources	Biological Resources - number of new bridge crossings	18	18	17	19
	Biological resources - acres of wetlands	8.9	8.6	8.3	11.3
	Biological resources - linear feet of waterways crossed	4,370	4,000	4,390	5,680
	Biological resources - acres of potential T&E habitat	260	126	201	169
	Cultural Resources (number of sites)	37	48	34	38
	Parklands (number of parks)	0	0	0	0
	Agricultural lands (acres of prime, unique, and important farmland)	465	284	555	436
Natural Environment	Noise and Vibration (affected land use types)	High amount of residential land use	Medium amount of residential land use	Low amount of residential land use	Medium amount of residential land use
	Visual/scenic resources (miles of alternative in urban areas)	10	11	6	7
	Geotechnical constraints	Not applicable	Not applicable	Not applicable	Not applicable
	Hazardous Materials (number of sites)	48	129	40	48

[a] Totals may not equal sum of subtotals due to rounding differences.

[b] The differences between affected acres of agricultural land use(City/County data) and prime, unique, and important farmland (California Department of Conservation) is due to the difference in the source and how they define agricultural land use.

From Merced to Fresno, the maximum difference in the length of the alternatives is 3 miles. Differences in costs were largely dependent on the number of crossings of SR 99 and UPRR and the amount of elevated track required. However, the alignment designs are preliminary and therefore the amount of elevated and at-grade track is not fully determined for these alternatives. Additionally, this section of the HST Project is relatively inexpensive compared to other areas of the statewide project, so costs were not considered to be a distinguishing factor among the alternatives. Environmental impacts depend primarily on trade-offs between community impacts in urban areas and natural resource impacts in rural areas. Public and agency input were also considered in the analysis.

4.3.1 Alternative A1 – BNSF

Alternative A1 – BNSF, the preferred alternative from the Statewide Program EIR/EIS, is the longest of the four alternatives, but it is only 1 mile longer than Alternatives A3 – Western Madera and A4 – UPRR/BNSF Hybrid. It follows existing transportation corridors to the extent possible and may be able to realize other benefits in cooperation with BNSF in the further development of this route, including minimizing impacts. Comparatively, it provides the slowest travel time from Merced to Fresno ranging between 30 seconds and 3 minutes longer than the other alternatives, but it still meets the legislative mandate to travel between San Francisco and Los Angeles in 2 hours and 40 minutes. In a few locations, the design may negotiate with the BNSF to adjust the right-of-way to support HST design criteria. While this alternative would result in the highest impacts to private property, residential land uses, and habitats that may support threatened and endangered species and important farmlands, further negotiations with BNSF for use of a portion of their right-of-way may considerably reduce these impacts. Also, locating both railways together would minimize bifurcation of farmlands and consolidate grade crossings.

Alternative A1 – BNSF is designed to be predominantly at-grade because its alignment has fewer conflicts with major roadways. This is because there is less development along the BNSF than the UPRR corridor. Elevated track is proposed in a number of locations: to reach the station locations in Merced and Fresno, the route must cross over the UPRR and SR 99 seven times (which is common with all alternatives except A3 – Western Madera). Being adjacent to the BNSF right-of-way reduces the amount of severance to land use and may provide an additional barrier against further indirect impacts on critical habitat impacts. Early in the project, Merced County expressed concerns about Alternative A1 – BNSF and possible community impacts near Planada and Le Grand. Design options avoid Planada and can also avoid Le Grand. This alternative has been preferred by the cities of Chowchilla and Madera over Alternative A2 – UPRR/SR 99 because it avoids traveling through their central business districts. Regulatory agency representatives expressed concerns over possible impacts on critical habitat and the possibility of affecting important conservation areas.

4.3.2 Alternative A2 – UPRR/SR 99

Alternative A2 – UPRR/SR 99 is the shortest of the four alternatives and would provide the best travel time from Merced to Fresno. It was the preferred alternative from the Bay Area to Central Valley EIR/EIS and is designed to stay adjacent to the UPRR/SR 99 transportation corridor, to the extent possible, using current design criteria. This corridor provides the straightest route between Merced and Fresno. Several crossings over UPRR and SR99 are necessary in order to remain adjacent to the UPRR, because UPRR and SR 99 cross each other several times. Alternative A2 – UPRR/SR 99 would have the most elevated track in order to provide grade separation from the numerous urban roadway and railway crossings as it travels through all four cities in the corridor. HST track is typically elevated in urban areas in order to minimize disruption to the existing street network. This alternative is adjacent to UPRR. UPRR has expressed strong concerns about reducing its accessibility to rail spurs and future clients. UPRR prefers the Authority to look into other alternatives

Alternative A2 – UPRR/SR 99 offers strong environmental advantages over the other three alternatives. Because of its proximity to the existing UPRR/SR 99 corridor and shortest length between Merced and Fresno, the Alternative would have the fewest impacts of all alternatives to private property acquisition, potential threatened and endangered species habitat, and prime and important farmlands. Alternative A2 – UPRR/SR 99 has strong support from all the cities in Merced, the County of Merced, Regional Transportation Agencies, Merced and Madera water districts, Merced and Madera farm bureaus, as well Mariposa and Fresno County However, it has not been well supported by the city of Chowchilla. (The City of Madera is neutral.) Some regulatory agencies expressed support for this route because SR 99 and UPRR already serve as a barrier between various sensitive biological resources.

4.3.3 Alternative A3 – Western Madera

The Alternative A3 – Western Madera north-south portion of the route would be 2 minutes slower between Merced and Fresno than Alternative A2 – UPRR/SR 99. Alternative A3 – Western Madera does not follow the California HST objective to follow existing transportation corridors, and the potential to attract additional disruptions, such as roadways, utilities and eventually land use development, to this corridor are substantial concerns.

Of the four north-south alignment alternatives, Alternative A3 – Western Madera's deviation from existing transportation corridors in Madera County would result in the second highest impacts to private properties, and the highest impacts to agricultural properties and important farmlands. The UPRR/SR 99 corridor runs at an angle through the Central Valley, while the surrounding state and county highway network is oriented on a north-south grid. This alternative parallels the diagonal direction of the UPRR/SR 99 corridor to provide a more direct route between the Merced and Fresno stations, which would sever farmlands into awkward triangles that are difficult to farm. This would result in bifurcation of many farm properties, primarily in Madera County, which are set up on a north-south grid, in a prime agricultural area of the Central Valley. Dividing up smaller farms may erode the economic viability and reduce the economic incentives to continue farming. The farming community does not support the alternative because of impacts to farm properties and operations.

Alternative A3 – Western Madera would avoid the impacts in Chowchilla and Madera that the other alternatives would cause. For these reasons, it was initially supported by the cities of Chowchilla and Madera. Despite the alternative's deviation from existing transportation corridors in Madera County, its impacts to aquatic resources and sensitive habitat would not be substantially higher than those of the other alternatives. The City of Merced, and counties of Merced and Madera oppose this alignment because it is off of existing transportation corridors and because of its impacts on agricultural land. Most of the farmland impacts would occur in Madera County. In 2008, agriculture was the largest industry in Madera County, accounting for 23.8% of those employed in 2008 (California Employment Development Department 2010).

4.3.4 Alternative A4 – UPRR/BNSF Hybrid

Alternative A4 – UPRR/BNSF Hybrid was suggested during the initial review of alternatives to avoid the impacts of Alternative A1 – BNSF on Planada and Le Grand, and to avoid the impacts of Alternative A2 – UPRR/SR 99 on Chowchilla and Madera. However, the alternative provides the second slowest travel time. While the alternative appears to take advantage of both UPRR and BNSF rights-of-way, the alternative would deviate from existing transportation corridors to cross back and forth from the UPRR corridor to the BNSF, adding length and travel time to the project. Additionally, this alternative blends the disadvantages of both alternatives—resistance from UPRR and possible impacts on critical habitats and residential areas. Alternative A4 – UPRR/BNSF Hybrid would have as many crossings of the UPRR and SR 99 as Alternatives A1 – BNSF and A2 – UPRR/SR 99 and as a result would involve nearly as much costly elevated guideway and high construction complexity.

Alternative A4 – UPRR/BNSF Hybrid has community support from Chowchilla and Madera because, unlike Alternative A2 – UPRR/SR 99, it would travel through their central business district area. It would continue to affect residential portions of Madera Acres and critical habitat areas, just as A1 – BNSF would. Alternative A4 – UPRR/BNSF Hybrid would result in more water crossings and higher wetland impacts than all the other alternatives.

4.4 Evaluation of North-South Alignments and Wye Connections

The final step in the evaluation analyzed the best combinations of north-south alternatives in combination with the South SR152 Wye for Alternatives A1 – BNSF, A2 – UPRR/SR 99, and A3 – Western Madera and the Ave 24 Wye for Alternative A4 – BNSF/UPRR Hybrid, although both wyes are considered feasible. To demonstrate that the differences are slight, the data for the alternatives and design options with the second wye connection is also included in parentheses in Table 25. The travel times discussed in this section prioritize the travel time from the San Jose to Merced Section to the Fresno Station, via the wye connections, because it is tied to the legislated travel-time requirement of 2 hours 40 minutes between San Francisco and Los Angeles. Travel time was also measured between the San Luis Reservoir and the Downtown Merced Station to capture travel time for trips going north from the wye connection, and between Merced and Fresno to capture travel time for the entire north-south direction between the

Sacramento and Los Angeles termini. Table 25 shows the performance of each of the alternatives against all of the evaluation criteria.

Table 25: Comparison of North-South Alternatives with Best-Performing Design Options and Wye Connections (Alternate Wye Connection Shown in Parentheses)

Category	Measurement[a]	Alternative A1 + DO2 + South SR152 (Ave 24 Wye)	Alternative A2 +South SR152 (Ave 24 Wye)	Alternative A3 + DO5 + South SR152[b] (Ave 24 Wye)	Alternative A4 + Ave 24 (South SR152 Wye)
Design Objectives	Journey time (minutes) - San Luis Reservoir to Fresno Station	24.26 (24.5)	23.89 (24.02)	23.66 (23.82)	25.40 (25.68)
	Journey time (minutes) - Merced to Fresno	21.07 (same)	18.12 (same)	20.18 (same)	20.71 (same)
	Journey time (minutes) - San Luis Reservoir to Merced Station	22.67 (22.3)	19.48 (18.15)	17.85 (16.84)	17.84 (19.22)
	Route length (miles)	93.1 (95.1)	83.2 (83.9)	81.1 (79.4)	81.1 (81.8)
	at-grade/ embankment	71.2 (58.1)	56.1 (38.7)	67.0 (60.1)	48.5 (51.3)
	retained fill	6.3 (5.3)	7.1 (5.2)	4.6 (same)	3.4 (3.7)
	Elevated	15.6 (31.8)	20.1 (40.1)	9.6 (14.8)	29.3 (26.7)
	miles of curvature	34.0 (35.8)	20.8 (24.5)	37.0 (36.1)	35.6 (same)
	Intermodal connections	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Operating & Maintenance Costs	Medium (same)	Low (Medium)	Low (same)	Medium (same)
	Capital Cost Factor	1.23 (1.52)	1.31 (1.69)	1.00 (1.03)	1.50 (same)
Land Use	Potential for TOD	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Consistency with other planning efforts	Neutral – land use plans and policies do not support or conflict with alternative (same)	Supported by City and County of Merced with Ave 24 Not supportive – conflicts with land use plans and policies in Chowchilla and Madera (same)	Not supportive – conflicts with land use plans and policies in Merced and Madera County (same)	Supported by Chowchilla and City of Madera Neutral – land use plans and policies do not support or conflict with alternative (same)
Constructability	Constructability	High (same)	Medium (High)	Low (same)	Medium (same)
	Disruption to existing railroads (number of crossings of railroad right-of-way)	5 (same)	4 (same)	1 (same)	4 (same)
	Disruption to & relocation of utilities (miles of alternative in urban areas)	23 (24)	23 (22)	13 (same)	17 (same)
	Number of crossings of UPRR/ BNSF/ SR 99	11 (same)	9 (same)	5 (same)	9 (same)
	# SR 99 crossings	6 (same)	5 (same)	4 (same)	5 (same)
	# UPRR crossings	5 (same)	4 (same)	1 (same)	4 (same)
	# BNSF crossings	0 (same)	0 (same)	0 (same)	0 (same)
Disruption to Communities	Total property acquisition (acres)	1042 (993)	847 (774)	876 (860)	805 (837)
	Agricultural (acres)[c]	779 (732)	565 (503)	707 (693)	594 (625)
	Commercial (acres)	12 (14)	17 (11)	11 (same)	13 (same)
	Industrial (acres)	8 (14)	20 (same)	9 (same)	9 (same)
	Residential (acres)	83 (70)	36 (same)	30 (28)	52 (same)
	Other (acres)	160 (162)	209 (204)	119 (118)	138 (same)
	Properties with access affected (number of road closures)	39 (31)	55 (42)	44 (same)	26 (same)
	Local traffic effects around stations (number of roads with decreased levels of service)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)	Not applicable (station measure only)
	Local traffic effects at grade separations (number of grade separations)	37 (32)	31 (18)	57 (52)	22 (24)
Environmental Resources	Biological Resources - number of new bridge crossings	22 (same)	23 (same)	21 (22)	21 (same)
	Biological resources - acres of wetlands (vernal pool)	10 (3)/(10 (3))	9 (0)/(9 (0))	9 (0)/(9 (0))	12 (2)/(13 (2))
	Biological resources - linear feet of waterways crossed	5050 (7040)	5,200 (5,900)	5,090 (5,590)	6,280 (same)
	Biological resources - acres of potential T&E habitat	298 (260)	126 (131)	201 (same)	169 (same)
	Cultural Resources (number of sites)	41(42)	64 (53)	34 (same)	44 (43)
	Parklands (number of parks)	0 (same)	0 (0)	0 (same)	0 (0)
	Agricultural lands (acres of prime, unique, and important farmland)[c]	725 (665)	450 (395)	719 (700)	567 (599)
Natural Environment	Noise and Vibration	High amount of residential land use (same)	High amount of residential land use (same)	Low amount of residential land use (same)	Medium amount of residential land use (same)
	Visual/scenic resources (miles of alternative in urban areas)	10 (11)	13 (11)	6 (same)	7 (same)
	Geotechnical constraints	Not applicable	Not applicable	Not applicable	Not applicable
	Hazardous Materials (number of sites)	49 (51)	144 (134)	40 (same)	49 (50)

[a] Totals may not equal sum of subtotals due to rounding differences.
[b] The performance of Alternative A3 with the Ave 24 Wye is similar to the performance of the alternative with the South SR152 Wye.
[c] The differences between affected acres of agricultural land use(City/County data) and prime, unique, and important farmland (California Department of Conservation) is due to the difference in the source and how they define agricultural land use.

While there are several notable differences among the alternatives (namely travel time, operation and maintenance costs, and environmental impacts), a resounding theme voiced by the technical working group members and concerned community members was the value of maximizing the use of existing transportation corridors to the extent possible. Alternatives A1 – BNSF and A2 – UPRR/SR 99 best meet this objective, even when considering the best wye connections. Alternatives A3 – Western Madera and A4 – BNSF/UPRR Hybrid require substantial deviation from existing corridors to reach the same destinations as Alternatives A1 – BNSF and A2 – UPRR/SR 99. The following sections review the differences in performance against the evaluation measures for all the alternatives, including the best performing design options and Pacheco Wye Connection.

Measures of track length include the total HST track required for both the north-south main alignment as well as the wye connection. Construction complexity considers a range of design elements, including crossings of UPRR and SR 99 rights-of-way and access to the alignment for construction. Environmental impacts depend primarily on trade-offs between community impacts in urban areas and natural resource impacts in rural areas. Public and agency input also played a significant role in the analysis.

4.4.1 Alternative A1 – BNSF with South SR152 Wye

Alternative A1 – BNSF was the preferred alternative from the Statewide Program EIR/EIS. Alternative A1 – BNSF with the South SR152 Wye connection avoids the commercial centers of Chowchilla and Madera. The Ave 24 Wye may impact the south boundary of Chowchilla. BNSF is a cooperative partner in planning and use of possible shared right-of-way and corridor planning. This alternative is only 30 seconds slower than the fastest alternative between the San Luis Reservoir and Fresno Station. The alternative may require small adjustments to shift the BNSF right-of-way in some locations to maintain design speeds. Alternative A1 – BNSF may be able to be predominantly at-grade due to relatively low amount of development and existing infrastructure. Like all the alternatives, the BNSF alternative and wye connection would involve crossing over UPRR and SR 99, 11 times.

While this alternative closely follows existing transportation corridors to avoid bifurcating farmlands and community resources, Alternative A1 – BNSF would result in the high impacts to private property, residential land uses, potential threatened and endangered species habitat, and important farmlands. Alternative A1 – BNSF would include avoidance alignments for community impacts near Planada and Le Grand. Some regulatory agencies have voiced concerns that Alternative A1 – BNSF may affect sensitive vernal pool resources that support threatened and endangered species, along with some important conservation areas. However, the presence of the HST Project may create a barrier to avoid future indirect impacts on these lands.

4.4.2 Alternative A2 – UPRR/SR 99 with South SR152 Wye

Alternative A2 – UPRR/SR 99 is the preferred alternative from the Bay Area to Central Valley EIR/EIS and is designed to stay adjacent to the UPRR/SR 99 transportation corridor. The South SR 152 Wye is designed to locate both its north and south legs south of Chowchilla. The Ave 24 Wye would place Chowchilla in a triangle of track requiring longer length of track and affecting more farmlands in this wye area. As stated earlier, Alternative A2 – UPRR/SR 99 offers strong travel time performance and environmental advantages over the other three alternatives. It would provide comparably top travel time between the San Luis Reservoir and Fresno Station and it would provide the best travel time between Merced and Fresno by 3 minutes. Because the UPRR corridor travels through four primary cities in the corridor, it would be elevated to avoid conflicts with existing infrastructure. The amount of elevated track and crossings may increase the level of complexity during construction and involve UPRR negotiations. Alternative A2 – UPRR/SR 99 has the least length of curvature, thus maintenance costs may remain low.

Because of its proximity to the existing UPRR/SR 99 corridor, Alternative A2 – UPRR/SR 99 would have the lowest impacts of all alternatives related to private property acquisition, potential threatened and endangered species habitat, and important farmlands. As a result, Madera County, communities in Merced County, the farming community, and regulatory agencies support the alternative. Regulatory agency support was high because SR 99 and UPRR already serve as a barrier between various sensitive biological resources. However, the City of Chowchilla does not support the alternative, and the City of Madera remains neutral. The alternative would affect 17 acres of commercial property, but its residential impacts would be much lower than those of Alternatives A1 – BNSF and A4 – BNSF/UPRR Hybrid because it would travel through fewer residential neighborhoods.

4.4.3 Alternative A3 – Western Madera with South SR152 Wye

Alternative A3 – Western Madera is one of the shortest alternatives when adding the wye connection, and it is comparable with the UPRR travel time between the San Luis Reservoir and Fresno Station. There are very few differences in the wye connections because the wyes meet outside the urban development limits and connect in a curve, which reduces the length of track for the wyes. Because Alternative A3 – Western Madera is removed from the existing transportation network, it has only 5 crossings of the UPRR and SR 99. This in turn keeps maintenance costs low and makes construction less complex. However, because there are no existing barriers blocking roadways, this alternative and wye connection also results in the highest number of potential road closures, if remaining at-grade. The deviation away from UPRR and SR 99 results in 37 miles of curved track. This alternative does not follow the commitment in the 2008 Programmatic EIR/EIS Record of Decision for the California HST to follow existing transportation corridors.

Alternative A3 – Western Madera's deviation from existing transportation corridors in Madera County would result in the high impacts on private properties, agricultural properties, and important farmlands. The high level of impacts is a result of the orientation of the HST and UPRR/SR 99 alignment in relation to the surrounding transportation network. The UPRR/SR 99 corridor runs at an angle through the Central Valley, while the surrounding state and county highway network is oriented on a north-south grid. The alternative parallels the diagonal direction of the UPRR/SR 99 corridor in order to provide a more direct route between the Merced and Fresno station; however, this would bifurcate many farm properties—which like the state and county highways are set up on a north-south grid—in a prime agricultural area of the Central Valley. While the Authority is committed to minimizing and mitigating impacts, the bifurcation of small 40-acre farms may reduce the viability of the remnant pieces, resulting in larger impacts on the farming community and the possibility of the conversion of farmland to other uses. This may be quite important to Madera County because, according to the 2008 Madera County Agricultural Crop Report, gross production value of Madera County agricultural production was $1.3 billion in 2008 (Madera County Department of Agriculture 2008). The latest CA EDD Labor Market information shows Madera with 42,300 total employees and 9,000 agricultural sector employees for 21.2%. Conversely, Alternative A3 – Western Madera would avoid the urban and commercial impacts in Chowchilla and Madera that the other alternatives would cause, and for these reasons, it is supported by the City of Chowchilla, although they prefer Alternative A1 – BNSF or Alternative A4 – UPRR/BNSF Hybrid.

4.4.4 Alternative A4 – UPRR/BNSF Hybrid with Ave 24 Wye

Alternative A4 – UPRR/BNSF Hybrid was suggested by the City of Chowchilla to avoid the impacts of Alternative A1 – BNSF on Planada and Le Grand and to avoid the impacts of Alternative A2 – UPRR/SR 99 on Chowchilla and Madera. The alternative, in combination with the Ave 24 or the South SR152 wye connection provides the slowest travel time of all the alternatives considered.

Despite its slow travel time, Alternative A4 – UPRR/BNSF Hybrid with the wye is one of the shortest alternatives due to its wye configuration, which would have much shorter north and south legs than the wyes connecting to the other alternatives. While the alternative appears to take advantage of both UPRR and BNSF rights-of-way, Alternative A4 – UPRR/BNSF Hybrid would deviate from existing transportation corridors to cross from the UPRR corridor to the BNSF and back, and it would join with the Ave 24 Wye by going north around Chowchilla before returning southbound. This would result in 35.6 miles of curvilinear track, the second highest length of curved trackway of the four alternatives. Curved track is more costly to maintain than straight track. Alternative A4 – UPRR/BNSF Hybrid would also have the most elevated track (28.1 miles), primarily needed in the vicinity of Chowchilla. Both of the Wye connections would be elevated to accommodate the existing and planned transportation network near Chowchilla. The amount of elevated track and curved trackway creates a higher level of complexity and construction. Because the alternative would require the train to travel north before proceeding southeast, it would provide the slowest travel time on the

critical route between San Francisco and Los Angeles, taking up to 2 minutes longer than the fastest alternative and would provide the second slowest travel time between Merced and Fresno.

Alternative A4 – UPRR/BNSF Hybrid would have fewer impacts on private property and important farmlands than Alternatives A1 – BNSF and A3 – Western Madera, but it would have the second highest impacts on residential land use. Alternative A4 – UPRR/BNSF Hybrid has community support from Chowchilla and Madera. However, it would continue to affect residential portions of eastern Madera. Regulatory agencies have expressed concern over the possibility of affecting sensitive vernal pool resources, possibly highest impacts on other wetlands, and longer crossings of waterways than other alternatives would have. Noise from construction may affect many residents along the BNSF corridor.

4.5 Detailed Alternatives Evaluation Meetings

Initially, Alternatives A2 – UPRR/SR 99 and A3 – Western Madera were proposed to be carried forward for analysis. Alternatives A1 – BNSF and A4 – UPRR/BNSF Hybrid were proposed to not be carried forward because of their high costs, slower relative travel times, and community and environmental impacts. The Downtown Merced Transit Center station was proposed to be carried forward for analysis, and the Castle Commerce Center or Merced Amtrak stations were not.

The recommendation of wye connections was not completed until the San Jose to Merced Section evaluation was complete. The results of the San Jose to Merced Section analysis proved consistent with this Merced to Fresno Section analysis, in that the east-west alternative alignments along SR140/NGEA, SR 152, and South GEA were imprudent based on extra miles of track or high costs associated with infrastructure obstacles along SR 152 as well as high environmental impacts. Therefore the only remaining alternative connections follow the Henry Miller/Avenue 24 and South SR 152 alignments.

On December 3, 2009, an update of the alternatives analysis was presented to the California High-Speed Rail Authority Board. A number of representatives of the agricultural community in the study area expressed concerns about Alternative A3 – Western Madera affecting prime agricultural lands in the Central Valley. Representatives expressed surprise that these alternatives, which were not part of the Proposition 1A, voted on November 4, 2008, were now being considered. They stated that Alternative A3 – Western Madera did not meet the criteria of maximizing existing transportation corridors. The Board also acknowledged that Alternative A2 – UPRR/SR 99 may have undesirable community impacts in developed areas of Chowchilla and Madera. As a result, the Board expressed a need for further economic analysis of Alternative A2, A3, and A4, in order to better understand the impacts of each alternative. An economic impact study focused on farmland and real estate values was conducted for the alignment alternatives that have been under consideration in the Merced to Fresno Section. The preliminary results can be summarized as follows:

- Real estate costs are substantially proportional to the length of the alternative. The real estate costs added approximately 6% for Alternative A1 – BNSF, 11% Alternative A2 – UPRR/SR 99, 7% for Alternative A3 – Western Madera, and 6% for Alternative A4 – UPRR/BNSF Hybrid to the capital costs.
- The study indicates that Alternative A3 – Western Madera results in the largest annual loss of economic output, largely due to the direct conversion of productive farmland to construct the rail alignment and additional adverse impacts on the productivity of adjacent farmland. Other alternatives resulted in less annual loss of farmland revenues, but more impacts on residential, commercial and industrial properties.
- The construction budget for the portions of the Merced to Fresno alternatives will exceed $2 billion, and funding will come almost entirely from state, federal, and possibly private sources. The overall employment from the Merced to Fresno HST Project due to this level of construction over a 6-year period is estimated to be between 2,000 and 7,000 new jobs.

The economics study did not result in directly changing the relative cost comparison of the alternatives; however, the analysis did underscore the concern for initiating a “green-field alternative” among prime farmlands. The report has been revised for consideration of the potential growth inducement and associated indirect long-term impacts that would create a new transportation corridor through prime farmlands.

On December 14 and 17, 2009, the results of the alternatives analysis, including the continued evaluation of Alternative A4– UPRR/BNSF Hybrid and the Ave 24 Wye and Design Option 4 associated with Alternative A3 – Western Madera, were presented to the Merced and Madera Technical Working Groups and to the public at meetings in Merced and Madera. The project team received strong feedback from the farming community against Alternative A3 – Western Madera, and to a lesser extent Alternative A4 – UPRR/BNSF Hybrid. The concerns centered on the impacts on their farming operations and infrastructure due to its diagonal direction through Madera County. They also felt that the analysis underestimated the amount of farmland acquisition that would occur as a result of the diagonal orientation of the alignment, and they felt that these alternatives would continue to contribute to the loss of prime agricultural lands in the Central Valley. The farming community strongly advocated that the HST alignment adhere to the California High-Speed Rail objective to follow existing transportation corridors.

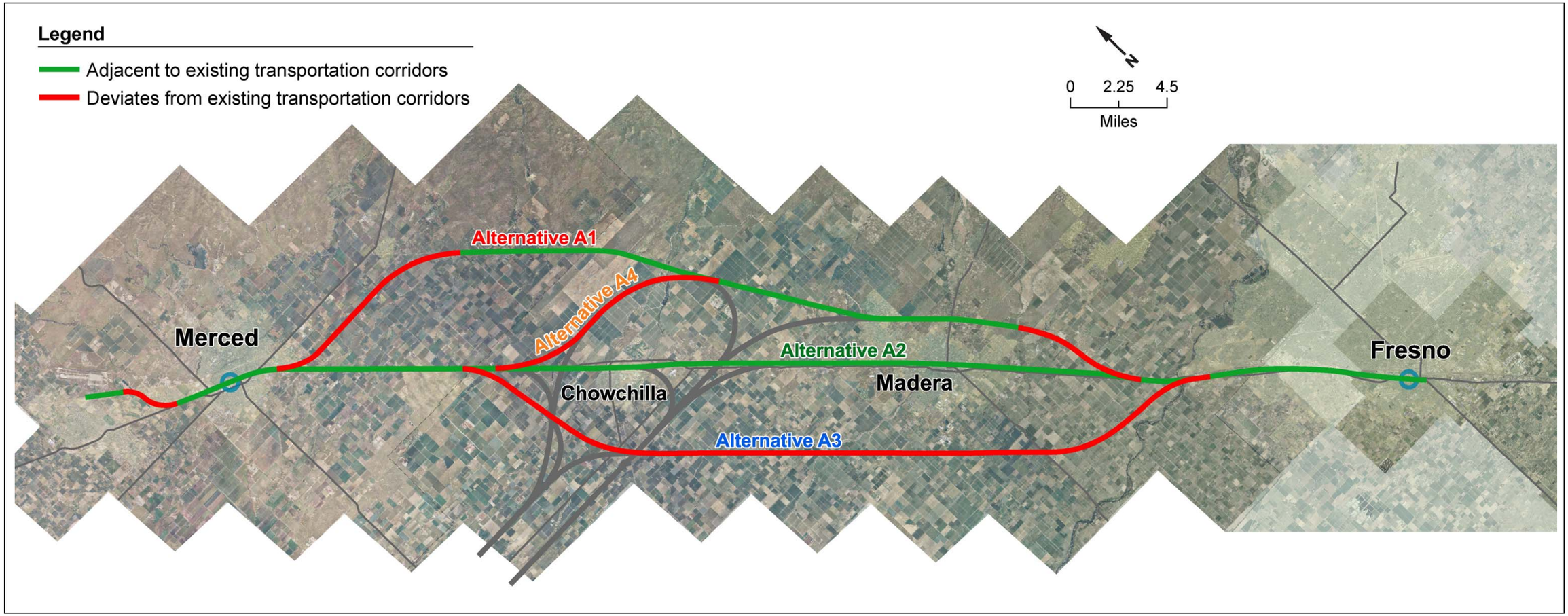
The City and County of Merced and the Merced County Association of Governments have passed resolutions supporting the Alternative A2 – UPRR/SR 99 alignment. Several community stakeholders, including the County of Madera and Farm Bureaus in Merced and Madera have stated that Alternative A2 – UPRR/SR 99 is more consistent with the California High-Speed Rail objective to follow existing transportation corridors. In response, the project team analyzed the number of miles where each north-south alignment alternative deviates from existing BNSF and UPRR corridors (see Figure 29 and Table 26). Figure 29 illustrates the areas where Alternatives A1 – BNSF, A2 – UPRR/SR 99, A3 – Western Madera, and A4 – UPRR/BNSF Hybrid are adjacent to existing BNSF and UPRR corridors (in green) and the areas where they deviate from existing corridors (in red). The table only reports the number of miles for adjacency and deviation for the north-south alignment, but the design team has also emphasized that the east-west connection would be placed adjacent to existing roadways, minimizing impacts of property acquisition on bifurcating farms and other known resources. The two curved legs of the wyes have limited ability to be adjacent to existing roadways because of the need to maintain high train speeds and join to the north-south corridor that travels nearly perpendicular to the east-west alignments. The portion of Alternative A1 – BNSF that travels between Downtown Merced and the BNSF was not included in north-south measurements because the project team only measured adjacency within 1/8- mile of the railroads. However, this link does follow Mission Avenue and therefore still meets the criteria of following existing transportation corridors to minimize impacts. Although Alternative A4 – UPRR/BNSF Hybrid follows both the UPRR and the BNSF corridors, the connections between the rail corridors and the Ave 24 Wye travel in a wide radius north to avoid Chowchilla, which is not conducive to following existing transportation corridors. Therefore, unlike Alternative A1 – BNSF where the deviation areas can still follow a roadway, the Alternative A4 – UPRR/BNSF Hybrid connection between UPRR and BNSF would not be able to follow a roadway; therefore Alternative A4 – UPRR/BNSF Hybrid still performs worse than Alternative A1 - BNSF.

As shown in Table 26, Alternatives A1 – BNSF and A2 – UPRR/SR 99 best meet the criteria of adjacency to existing transportation corridors.

Table 26: Adjacency to Existing Transportation Corridors: North-South Alignment Alternatives

Proximity to Existing Transportation Corridor	Alternative A1 – BNSF	Alternative A2 – UPRR/SR 99	Alternative A3 – Western Madera	Alternative A4 – UPRR/BNSF Hybrid
Adjacent (miles of alternative within 1/8 mile of SR 99, UPRR, or BNSF)	47.5 miles	55.9 miles	19.0 miles	42.8 miles
Deviating (miles of alternative more than 1/8 mile away from SR 99, UPRR, or BNSF)	14.1 miles	2.7 miles	41.9 miles	17.8 miles

Figure 29: Adjacency to Existing Transportation Corridors: Alternatives A1 – BNSF, A2 – UPRR/SR 99, A3 – Western Madera, and A4 – UPRR/BNSF Hybrid North-South Alignments



5.0 DRAFT ANALYSIS SUMMARY AND CONCLUSIONS

Consistent with the Authority's project objective to maximize the use of existing transportation corridors and rights-of-way, to the extent feasible, the alternatives considered and recommended in the Authority's prior 2005 Final EIR/EIS for the Proposed California HST System and 2008 Bay Area to Central Valley HST Final Program EIR/EIS for the *Central Valley Alignment* followed the two existing freight corridors of the UPRR and the BNSF. These program environmental documents also considered, much like this Preliminary Alternatives Analysis Report, alignment alternatives that deviated from the existing transportation corridors, notably the Western Alternative which resembles the current Alternative A3 – Western Madera. And like those prior environmental documents, the alternatives that do not closely follow existing transportation corridors (A3 – Western Madera and A4 – UPRR/BNSF Hybrid) are not being recommended to be carried forward in this Preliminary Alternatives Analysis Report.

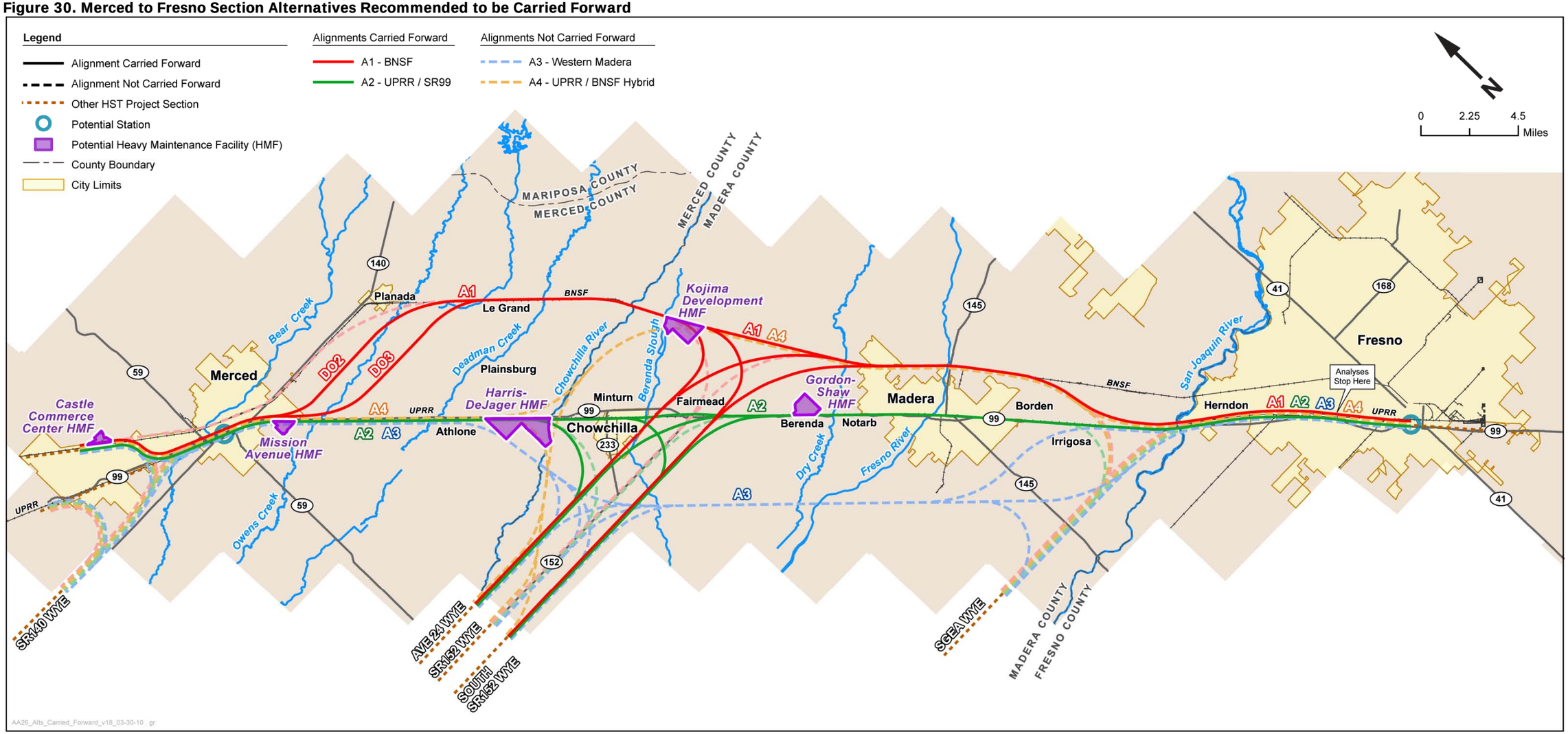
The basis for screening out alternatives that do not closely follow existing transportation corridors is that they generally result in greater direct and indirect environmental impacts and have greater growth potential than alignment alternatives that closely follow existing transportation corridors. This is the case in the Merced to Fresno Section of the HST project, where the two alignment alternatives that depart from existing transportation corridors (A3 – Western Madera and A4 – UPRR/BNSF Hybrid) may have lasting impacts on the landscape. In the Merced to Fresno Section, departing from existing transportation corridors not only directly impacts highly productive farmlands but also has the potential to reduce the viability of surrounding farmlands, giving way to other uses that may result in unwanted and unplanned growth patterns. This is particularly alarming to Merced and Madera Counties, which rely heavily on their unique, rich soil resources for their primary industry. California's rich agricultural heritage is slowly being diminished on the edges of urban communities. The FRA and the Authority established key project objectives to avoid and minimize the effects of the HST System on growth patterns, by establishing the goal to maximize the use of existing transportation corridors to the extent possible.

Subject to EPA and USACE's concurrence as part of the Clean Water Act § 404 (b)(1)/NEPA integration process, and considering the extensive community, stakeholder, and agency input received, Authority staff recommend that the following alignment and station alternatives be carried forward, as illustrated in Figure 30:

- **Carry forward Alternative A2 – UPRR/SR 99.** Alternative A2 – UPRR/SR 99 optimizes travel time and minimizes environmental impacts, including having the least amount of impacts on wetlands, vernal pools, endangered species and farmland, and it is adjacent to an existing transportation corridor. Additionally, it has low levels of impacts on residential properties. The cities of Chowchilla and Madera expressed concerns about the impacts of the project through their central business districts, but others, such as the City and County of Merced, City of Atwater, transportation agencies, water districts, and the farming communities in both counties, have expressed support for this route compared to Alternative A1 – BNSF and other alternatives that do not use existing transportation corridors. However, UPRR has expressed reluctance to collaborate with HST alternatives that either infringe on its right-of-way or on its access to current and future freight customers along its right-of-way throughout the Central Valley. Because areas in Merced, Madera, and Fresno are constrained portions in this corridor, UPRR's resistance may delay property access and hinder timely design solutions that would enable the HST project to meet its design objectives. The Authority Executive staff continues to meet with UPRR on a regular basis in an effort to resolve concerns, and the project team is working to design around this limitation, which will require cooperation from UPRR.
- **Carry forward the Alternative A1 – BNSF.** The only other alternative in the Merced to Fresno Section that meets the HST objective of maximizing the use of the existing transportation corridors is Alternative A1 – BNSF. This alternative, which was selected as preferred by the Authority and the FRA in the 2005 Final Statewide Program EIR/EIS, does not perform as well as Alternative A2 – UPRR/SR 99 in terms of travel time performance and impacts on the natural and built environment. However, it does provide an alternative to Alternative A2 – UPRR/SR 99 that meets the project purpose and need while also adhering to all the project objectives. It was selected as the Preferred Alternative over the UPRR route in the 2005 Statewide Program EIR/EIS primarily because "the BNSF alignment avoids most of the urban areas between Modesto and Fresno and would have substantially less constructability issues, would have fewer potential noise, cultural, property, and community impacts, and is estimated to cost about $400 million less than the UPRR alignment" (California High-Speed Rail Authority 2005). Alternative A1 – BNSF is the longest route by 10 miles and still involves many crossings of SR 99 and UPRR that are similar to Alternative A2 - UPRR, but it maintains the legislatively mandated travel time of 2 hours and 40 minutes between San Francisco and Los Angeles and provides a viable alternative to the UPRR corridor while remaining adjacent to existing transportation corridors. Alternative A1 – BNSF results in the most acres of impacts on residential areas and sensitive habitat areas that may support threatened and endangered species. While the alignment would result in greater agricultural land impacts (465 acres for the north-south alignment) than Alternative A2 – UPRR/SR 99, Alternative A1 – BNSF may be able to take advantage of the BNSF right-of-way to avoid some of these and other impacts. Remaining adjacent to the BNSF, even if not within the BNSF right-of-way, will also minimize amount of severance on agricultural fields. The alignment's greater distance from several community centers may allow this alternative to remain at-grade for most of its distance and have a lower level of impacts on commercial centers, compared to Alternative A2 – UPRR/SR 99. The alignment's more distant location from several community centers may allow the alternative to remain at-grade for most of its distance and have a lower level of impact on commercial centers compared to Alternative A2 – UPRR/SR 99. The project team is reviewing avoidance options for the community of Le Grand.
- **Carry forward the Downtown Merced Intermodal Transit Center Station.** This station best satisfies purpose and need, has the best access to the regional highway and public transit system, and has fewer residential impacts. It would be located on the UPRR right-of-way in Downtown Merced and be served by either Alternative A1 – BNSF or Alternative A2 – UPRR/SR 99.
- **Do not carry forward Alternative A3 – Western Madera.** While Alternative A3 – Western Madera provides the fastest travel time between San Francisco and Los Angeles by 30 seconds, it presents considerable controversy because it is a Greenfield alternative and does not meet the Authority's key project objective to maximize the use of existing transportation corridors. Alternative A3 – Western Madera affects the most acres of prime, unique, and important farmlands in the north-south alignment (555 acres) and would bifurcate farmlands; it would potentially lead to unwanted development patterns that may erode the economic viability of these agricultural lands in Madera County. This alternative would diagonally divide already small farms and possibly reduce economic incentives to continue farming. This alternative has received strong opposition from the City and County of Merced and the County of Madera, and it has received strong resistance from members of the agriculture community. This impact on Madera may have a more dramatic effect than elsewhere in the state because agriculture is the largest industry in Madera County, accounting for 29.9% of the employment. The total value of agricultural commodities produced exceeds $1 billion annually in Madera County (California Employment Development Department. 2010). According to the 2008 Madera County Agricultural Crop Report, gross production value of Madera County agricultural production was $1.3 billion in 2008. The latest CA EDD Labor Market information shows Madera with 42,300 total employees and 9,000 agricultural sector employees for 21.2%.
- **Do not carry forward Alternative A4 – UPRR/BNSF Hybrid.** Alternative A4 – UPRR/BNSF Hybrid would not outperform the other alternatives in any criteria measure. It is the slowest alternative in the critical travel time between San Francisco to Los Angeles, taking more than a minute longer than the next slowest alternative. It would potentially result in the highest level of impacts on wetlands and would involve the most and longest water crossings. Alternative A4 – UPRR/BNSF was suggested as a route to modify Alternative A1 – BNSF to avoid Le Grand by traveling along the Alternative A2 – UPRR/SR 99 alignment longer but shifted eastward to avoid Chowchilla and Madera. However, like Alternative A3 – Western Madera, this alignment results in similar conflict with the Authority's key project objective to use existing transportation corridors and results in a high level of impacts on agricultural lands (436 acres for the north-south alignment portion) even while trying to remain adjacent to existing transportation corridors. In order to avoid Chowchilla, the alignment requires a large northward curve from Avenue 24 around Chowchilla to link up to the BNSF in a southbound direction. This is not efficient HST design and is not suited to follow existing transportation corridors through prime, unique, and important farmlands. It would result in a series of awkward parcels, reducing economic viability and possibly leading to undesirable development patterns.

- **Do not carry forward the Castle Commerce Center Station.** This station is more limited in its ability to serve as a multimodal center than the Downtown Merced Station. The center proposes limited residential density opportunities, which would also limit the potential for HST station as a multimodal center, and access may be constrained due to limited arterial roadways available to the site.
- **Do not carry forward the Merced BNSF/Amtrak Station.** While this station does offer a seamless connectivity with other transit services, it is located within a low-density, well-established residential community. Arterial access from SR 99 would involve traveling through the City of Merced, which would degrade the roadway system. There is no support from Merced for this station, and it would conflict with the local plans for this area.

Figure 30. Merced to Fresno Section Alternatives Recommended to be Carried Forward



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APPENDICES

Appendix A: Meeting Minutes

Appendix B: Engineering Drawings

APPENDIX A: MEETING MINUTES

Merced County Technical Working Group
June 4, 2009
Meeting Summary

Introductions

John Clerici (CirclePoint) welcomed the TWG Members and then asked for self introductions. He then invited Ken Sislak (AECOM and Merced to Fresno EIR/EIS PM) to introduce the technical team. John provided an overview of the meeting goals, the agenda and the anticipated schedule. He added that primary purpose of the TWG is to exchange information on the environmental process, stations and alternatives under consideration.

In reviewing the proposed schedule John pointed out that at the beginning of the process it is likely that meetings may be held every six to eight weeks. Once some of the initial items are taken care of meetings will be held ever three months or so. Attendance at each meeting may vary by topic or issue. We want to make sure that the right people are in the room and that we don't take up everyone's time unnecessarily.

He emphasized that while the team is here to provide information it is critically important that the TWG members provide relevant feedback to the team. It is anticipated that we will all use our professional discretion in distributing materials that we receive in both directions. The environmental team also requests that any questions or concerns be directed to the outreach team (Beverly Mason – AECOM and John).

California High-Speed Train Overview

Ken Sislak provided an overview of the statewide high-speed train system, the project's purpose and need, benefits of the project, and an update on the other 8 sections of the project (slides 7-13). He emphasized that while the Caltrain corridor in the Bay area and the Metro Link in the Los Angeles area are getting a great deal of attention, the valley will not be overlooked. He pointed out that before any high speed trains can be used they must first be assembled and tested somewhere in the Central Valley. The Central Valley section of the high speed train is the is critical to the system since the heavy maintenance facility and the test track will occur in the Valley. The Valley is also the only place in the HST system will reach their maximum operating speed. Three stations are slated for this section, Merced, Fresno, and Bakersfield. There is a possibility of a station in the Tulare, Visalia or Hanford area as well. There will be running service shops at strategic locations along the system, but the heavy maintenance depot will be in this vicinity. The heavy maintenance facility will require high tech/ computer related jobs as well as skilled labor such as metal bending, welding, fiberglass repair, and upholsterers.

Scoping Summary

Lauren Swift (CH2M Hill) provided an overview of the March Scoping meetings including a summary of the comments that were received from local, state and federal agencies as well as the public. Lauren discussed the purpose of the scoping meetings, how the public was notified, meeting set up and displays, meeting attendance, how comments were submitted and the types of comments that were received. Major comment themes included: strong support for the project and an interest in "fast tracking", Castel AFB as maintenance station and a few alternative alignments (see slides 14 – 29).

Alternatives

Kwong Chang (CH2M Hill) provided an overview of the alternatives that were developed as a result of the scoping comments. He began the presentation by highlighting the key operating and design criteria for HST (See slides 31-32). Kwong shared two maps with the TWG. The first showed the alternatives developed in the Program EIS/EIR. The second showed the Alternatives that were added as a result of the scoping process. He provided a list of the station and maintenance facility locations that were developed through scoping (slide 35) and provided a map of those alternatives (slide 36).

Kwong discussed the different types of structures that would be used along the alignment in order to accommodate HST (slide 37). He provided a detailed explanation of each of the alignment alternatives broken down into four areas, the Merced Vicinity, Chowchilla Vicinity, Madera Vicinity and Fresno Vicinity (slides 38 – 50). Following the overview of the alternatives Chang highlighted a few of the site specific adaptations that were used during the conceptual development of the alternatives from scoping. The adaptations discussed included

- The overcrossing in South Merced where one design options is favored in terms of construction but another options reduces impacts to water ways.
- Relocation of the BNSF in order to make a curve that would allow the train to operate at high speeds
- Potentially very high overcrossing needed to go over a highway 99 overpass.
- The need to use an elevated track through a congested city center in order to avoid at grade crossings.

Slides 51-58 contain the complete list of adaptations discussed in the meeting.

Stations

Rick Phillips (HNTB) spoke to the group about the HST station. He discussed the role of the station, station design principles, a typical station "footprint", typical station design elements, the scale of the station and a typical station cross section (Slides 59 – 65).

Rick also discussed the station location alternatives being considered in Merced (slides 66-67). He explained that the dotted/dashed circle around each station indicates a half-mile radius that would be the primary area influenced by the station. Within that circle, everything is within easy walking distance of the station. The solid circle is a mile radius around the station and indicates the second tier area that would be influenced by the station.

Alternatives Analysis

Jodi Ketelson (CH2M Hill) described the alternatives analysis process the team is currently engaged in and how the alternatives will be finalized. She explained that we are in the initial screening process that involves looking back at what the Programmatic EIS/EIR looked and ruled out or included for further study. The team is making sure that alternatives meet the project purpose and need, and that there are fatal flaws or excessive impacts to the environment. Once the initial screening process is completed the team will delve into detailed study of each of the remaining alternatives (slides 78-79).

Wrap Up and Next Meeting

John Clerici helped wrap up the meeting with a commitment on the part of the technical team to send agendas, information requests, and other materials to the TWG ahead of time so that you can react and bring any pertinent information to the meeting. He added that a secure ftp site will be set up to share information since many of maps we want to share are too large of files to send via email. John added that the team also wants to get suggestions from the TWG for agenda and discussion items as well.

The next TWG meeting is expected to be held in about 6-8 weeks (mid July). The schedule on slide 78 provides a good overview of what you can expect from the project over the next few months and years.

Questions and Answers

Q: What is the anticipated criteria for the maintenance station?

A: We are working at the criteria right now. Generally we are looking for a place with access to mainline railroads, access to water, sewer, highway electricity. The Authority is putting requirements together and once those go out, that will sort of be an invitation to bid.

Q: How many people will the facility employ?

A: The French high-speed train maintenance facility employs about 1,000 people. Right now there is no way to tell exactly how many people will be employed by this facility but it is likely to be on the same scale as the French facility and will employ a lot of people. The smaller facilities along the route will employ about 150-200 people.

Q: How big is the area needed for the facility, roughly?

A: 100-150 acres or so.

Q: When we will have the maintenance facility criteria?

A: End of June or early July is the current time frame.

Q: Who leads the southern team (Fresno to Palmdale)?

A: Bob Shavitz and Eric Vonberg (URS) are the local people on the southern team (Fresno to Bakersfield). Bryn Forhan is the regional outreach manager and Beverly Mason is also a contact for the entire area.

Q: In regards to some of the design adaptations needed to cross over SR 99, instead of assuming the built environment is a constant, would it be easier to reconstruct 99 to fit the train rather than fit the train to the current 99 route?

A: The team is operating under the assumption that the built environment is a constant, but if the city or county has plans to modify or improve roadways it is important for this team to know what those plans are. For example, if the county knows that what is currently a 2 lane road will eventually be expanded into a 4 or 6 lane road, this team needs to know that and we will build the train to accommodate those planned improvements. Once the train is built, there's no changing it so we need to be able to plan ahead.

Meeting Attendees

Oksana Newman, County of Merced
Bill Cahill, City of Merced
Kim Espinosa, City of Merced
Angelo Lamas, County of Merced
John Bramble, City of Merced
Jesse Brown, MCAG
Scott McBride, City of Atwater
Charlie Woods, City of Atwater
Bobby Lewis, County of Merced
Ken Sislak, AECOM
Beverly Mason, AECOM
Allan Boone, AECOM
Jodi Ketelson, CH2M Hill
Lauren Swift, CH2M Hill
Kwong Chang, CH2M Hill
Rick Phillips, HNTB
Mike Lynch, Mike Lynch Consulting
John Clerici, CirclePoint
Shay Humphrey, CirclePoint

DRAFT

Madera County Technical Working Group
June 4, 2009
Meeting Summary

Introductions

John Clerici (CirclePoint) welcomed the TWG Members and then asked for self introductions. He then invited Ken Sislak (AECOM and Merced to Fresno EIR/EIS PM) to introduce the technical team. John provided an overview of the meeting goals, the agenda and the anticipated schedule. He added that primary purpose of the TWG is to exchange information on the environmental process, stations and alternatives under consideration.

In reviewing the proposed schedule John pointed out that at the beginning of the process it is likely that meetings may be held every six to eight weeks. Once some of the initial items are taken care of meetings will be held ever three months or so. Attendance at each meeting may vary by topic or issue. We want to make sure that the right people are in the room and that we don't take up everyone's time unnecessarily.

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Rick also discussed the station location alternatives being considered in Merced (slides 66-67). He explained that the dotted/dashed circle around each station indicates a half-mile radius that would be the primary area influenced by the station. Within that circle, everything is within easy walking distance of the station. The solid circle is a mile radius around the station and indicates the second tier area that would be influenced by the station.

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The next TWG meeting is expected to be held in about 6-8 weeks (mid July). The schedule on slide 78 provides a good overview of what you can expect from the project over the next few months and years.

Questions and Answers

Q: Are there other TWG groups? And if so, who do they involve?
A: Yes, there are other Technical Working Groups for Fresno to Bakersfield section as well as a TWG for Merced County. The members of those groups hold the same types of positions as the people in this group for those jurisdictions. City and County planning, develop, engineering, transpiration, etc.

Q: Who is responsible for the “Y” (connection to the SJ to Merced Section)?
A: This team is responsible for the connection at Chowchilla.

Q: Additional stations are there for Madera because of Scoping, correct?
A: Yes. Those station alternatives are likely to be ruled out before we get any further along in the process (Programmatic EIR/EIS).

Q: What about the UP2? Is it just a line on a page?
A: No, the UP2 alternative is legitimate and has gained the interest of the Authority.

Q: When we will be getting the requirements for the maintenance facility?
A: End of July or early August its the most likely timeframe.

Q: For things like future road crossings, how do you plan to deal with local road improvements and highway widening?
A: We are going to coordinate with those agencies that have specific knowledge. If we know that there are plans for a road widening we will build to accommodate that improvement. The TWG is important to this and we want to make sure we don’t impact the things your community is planning to do.

Meeting Attendees

John Weiser, Madera County
Richard Poythress, Madera County
Dave Merchen, City of Madera
Leona James, City of Chowchilla
Waseem Ahmed, City of Chowchilla
Tom Skinner, City of Chowchilla
Matt Treber, Madera County
Roy Price, City of Chowchilla
Glenna Jarvis, Madera County
Harry Turner, City of Chowchilla
Steve Greer, City of Madera
Keith Helmuth, City of Madera
Dave Randall, City of Madera
Mike Waiczis, URS
Ken Sislak, AECOM
Beverly Mason, AECOM
Allan Boone, AECOM
Jodi Ketelson, CH2M Hill
Lauren Swift, CH2M Hill
Kwong Chang, CH2M Hill
Rick Phillips, HNTB
Mike Lynch, Mike Lynch Consulting
John Clerici, CirclePoint
Shay Humphrey, CirclePoint

DRAFT

Merced County Technical Working Group
July 15, 2009
Meeting Summary

Introductions

John Clerici (CirclePoint) welcomed the TWG Members and then asked for self introductions. He then introduced the technical team. John provided an overview of the meeting goals and agenda.

Jodi Ketelsen (CH2M HILL) provided more detail on the purpose of the meeting and the planning process to date. She noted that the primary purpose of the meeting was to obtain input from city and county staff regarding the proposed alignments and planning constraints within their cities/counties. The initial portion of meeting would be an explanation of current alignments and station areas, and process to date; the second portion of the meeting would consist of breakout groups focused on alignments and station areas.

Overview of Planning Process Since Last TWG Meeting

Jodi provided an overview of the Federal Railroad Authority presentation on June 23, 2009 and walked the group through the 11x17 booklet that was used during that presentation. The booklet provided a quick overview of the alternatives currently under consideration. Jodi noted that the BN2 (A4) alignment was eliminated because it doesn't meet the project purpose and need. She also noted that the nomenclature for the alternatives is changing in order to be consistent with the Fresno to Bakersfield section of this project segment. Jodi briefly walked the group through the Alternatives Analysis Methods Technical Memorandum and noted that, although many of the evaluation criteria can be measured in GIS, there are others that can only be understood through local knowledge and input, which was the purpose of the July 15 TWG meeting.

Rick Phillips (HNTB) explained the station analysis to date. He noted that the project team is recommending that only the three Merced and Fresno station options be advanced to the EIR/EIS. The other stations proposed at Castle Commerce Center, Chowchilla, and Madera will be eliminated because they either do not meet the purpose and need of the project or they reduce travel time in the corridor.

Maintenance Facility Status

Carrie Bauen (HRA) explained the status of the maintenance facility planning process. She described some of the criteria the Authority is looking for in a maintenance facility site; she noted that the Authority will have the final criteria developed by the end of the week to distribute to communities. Because the maintenance facility planning is not currently following the same schedule as the alignment and station planning, an additional public process will be held in the

Merced to Bakersfield section to address the maintenance facility. Carrie noted that the Authority is unsure if the facility will be part of this EIS/EIR because the its planning process is not running concurrently with the remainder of the process; she planned to discuss this with the FRA the following week.

Workshop Groups

The meeting then dispersed into a workshop format, with one group of attendees focusing on the different alignments and another focusing on the two different station locations in Merced.

Input received from Stations Group

- City staff were concerned about the Amtrak Station site because the HST track would pass through a residential neighborhood. The neighborhoods near the Amtrak station would object to HST along the BNSF line through their neighborhoods.
- City staff prefer to see all alignments, including the BNSF alignment, tie into the Downtown Merced Station site instead of the Amtrak Station site.
- Staff identified a large number of land use considerations surrounding the Downtown Merced Station site, and these are noted on the marked up project team map, incorporated into these minutes by reference.
- The Atwater-Merced Expressway, marked on the map, is being studied in a CEQA document.
- A new Campus Parkway to UC Merced, marked on the map, is planned. It will create a loop between the expressway and Campus Parkway. The funding plan is in the CEQA document, and is contingent upon development fees.
- **ACTION ITEM: OBTAIN PLANS FOR BOTH PARKWAYS.**
- Castle/Atwater is extremely interested in having the maintenance facility locate in the vicinity. They view it as an opportunity to benefit from employment opportunities for higher skilled workers, and to partner with CU Merced for training.
- A detailed discussion between Rick Phillips and city staff occurred regarding the Downtown Merced Station.
    - The interchange with SR99 next to the station site was rebuilt by Caltrans within the last ten years and meets current design standards. The other interchanges in the downtown area are older and do not meet current design standards.
    - The area next to the blue hatched "potential" site on the map contains uses that could easily be redeveloped for TOD.
    - The intermodal bus center adjacent to the site feeds many other central California locations, such as Yosemite.
    - Jodi noted that four tracks would likely be needed for one mile on each side of the station to allow express trains to move through while local trains stop at the station.
- Staff had a number of comments about possible cultural sites identified on the project map.

    - There are no remaining structures in the old Chinatown. It is shown on the project map in the same area as the proposed station platform.
    - The fairgrounds, identified as a cultural site on the map, used to be a Japanese intern camp, but there are no longer any remaining structures on the site.
- Staff planners had no knowledge of any existing wetland mitigation banks in either the city or county of Merced.
- A new hospital will be located in north Merced.
- An underpass is proposed at G Street (under the BNSF) to allow emergency access to neighborhoods east of the railroad.

Project team maps marked up by TWG attendees are filed in the project records and are incorporated into these minutes by reference.

DRAFT

Madera County Technical Working Group
July 15, 2009
Meeting Summary

Introductions

John Clerici (CirclePoint) welcomed the TWG Members and then asked for self introductions. He then introduced the technical team. John provided an overview of the meeting goals and agenda.

Jodi Ketelsen (CH2M HILL) provided more detail on the purpose of the meeting and the planning process to date. She noted that the primary purpose of the meeting was to obtain input from city and county staff regarding the proposed alignments and planning constraints within their cities/counties. The initial portion of meeting would be an explanation of current alignments and station areas, and process to date; the second portion of the meeting would consist of breakout groups focused on alignments and station areas.

Overview of Planning Process Since Last TWG Meeting

Jodi provided an overview of the Federal Railroad Authority presentation on June 23, 2009 and walked the group through the 11x17 booklet that was used during that presentation. The booklet provided a quick overview of the alternatives currently under consideration. Jodi noted that the BN2 (A4) alignment was eliminated because it doesn't meet the project purpose and need. She also noted that the nomenclature for the alternatives is changing in order to be consistent with the Fresno to Bakersfield section of this project segment. Jodi briefly walked the group through the Alternatives Analysis Methods Technical Memorandum and noted that, although many of the evaluation criteria can be measured in GIS, there are others that can only be understood through local knowledge and input, which was the purpose of the July 15 TWG meeting.

Rick Phillips (HNTB) explained the station analysis to date. He noted that the project team is recommending that only the three Merced and Fresno station options be advanced to the EIR/EIS. The other stations proposed at Castle Commerce Center, Chowchilla, and Madera will be eliminated because they either do not meet the purpose and need of the project or they reduce travel time in the corridor.

A Madera planner asked whether the maintenance facility will also be allowed to be a public station stop. Jodi and Rick replied that this is unknown at this time. Castle Commerce Center could accommodate both.

Maintenance Facility Status

Carrie Bauen (HRA) explained the status of the maintenance facility planning process. She described some of the criteria the Authority is looking for in a maintenance facility site; she noted that the Authority will have the final criteria developed by the end of the week to distribute to communities. Because the maintenance facility planning is not currently following the same schedule as the alignment and station planning, an additional public process will be held in the Merced to Bakersfield section to address the maintenance facility. Carrie noted that the Authority is unsure if the facility will be part of this EIS/EIR because the its planning process is not running concurrently with the remainder of the process; she planned to discuss this with the FRA the following week.

Workshop Groups

The meeting then dispersed into a workshop format, with one group of attendees focusing on the alignments in Chowchilla and the other on the alignments in Madera.

Input received from Chowchilla Group

- City staff felt the 152 North Wye alignment was not a viable option for their city. The alignment conflicts with their general plan. They also have a brand new sewer line running under this alignment.
- The area near the north wye is acceptable for a maintenance facility but not the overall alignment.
- The curve from the south wye to the UP1 (A2) alignment is acceptable.
- ACTION ITEM: CHOWCHILLA WILL SEND THEIR GENERAL PLAN MAP TO THE TEAM.
- Chowchilla staff were happy with the on-152 alignment proposed by the PTG team.
    - Jodi explained some of the issues with the on-152 alignment, including the need to remain 1000 feet away from 152 (in order to allow roads to cross over or under the HST track and intersect with 152), and the resulting difficulty in accessing the remnant parcels that would be created between the HST track and 152.
- Chowchilla staff felt comfortable with the UP2 (A3) alignment with the south wye, but were concerned about the amount of agricultural land disturbed by the UP2 (A3) alignment.
- Staff noted that the agricultural land along the BNSF (A1) alignment is not as high quality as the land along the UP2 (A3) alignment. The quality of the farmland goes down as it approaches the foothills.
- ACTION ITEM: MADERA COUNTY WILL SEND A LIST OR MAP OF THEIR HIGHER PRIORITY FARM ROADS IN AGRICULTURAL AREAS ALONG THE UP2 (A3) ALIGNMENT.
- There is museum planned at the paleontology site south of Chowchilla. It is one of the largest paleontological sites in the world. This site is marked on the project map, which is incorporated into these minutes by reference.
- Entities the project team should speak with:

    - Farm Bureau – Julia Barry
    - Madera Irrigation District (covers most of the UP2 (A3) alignment)
    - Chowchilla Water District (primarily in the city)
    - Friant Water Authority
- EPA has made waste sites available along the old Highway 99 route; old dump sites are noted there
    - ACTION ITEM: CALL LEONA FOR A COPY OF THE EPA EMAIL REGARDING THESE SITES
- The airport in Chowchilla is staying at its current site. Earlier this year, they thought the airport might move southwest of town, but that is no longer happening.
- Noise levels will be important/concern to citizens where the UP1 (A2) alignment crosses through the city south of the river.
- ACTION ITEM: TALK TO THE COUNTY BOARD OF EDUCATION TO OBTAIN LOCATIONS OF RURAL SCHOOLS
- ACTION ITEM: OBTAIN UTILITY MAPS

Project team maps marked up by TWG attendees are filed in the project records and are incorporated into these minutes by reference.

DRAFT

APPENDIX B: ENGINEERING DRAWINGS

CALIFORNIA HIGH SPEED TRAIN SYSTEM

MERCED TO FRESNO

APPENDIX E - ENGINEERING DRAWINGS

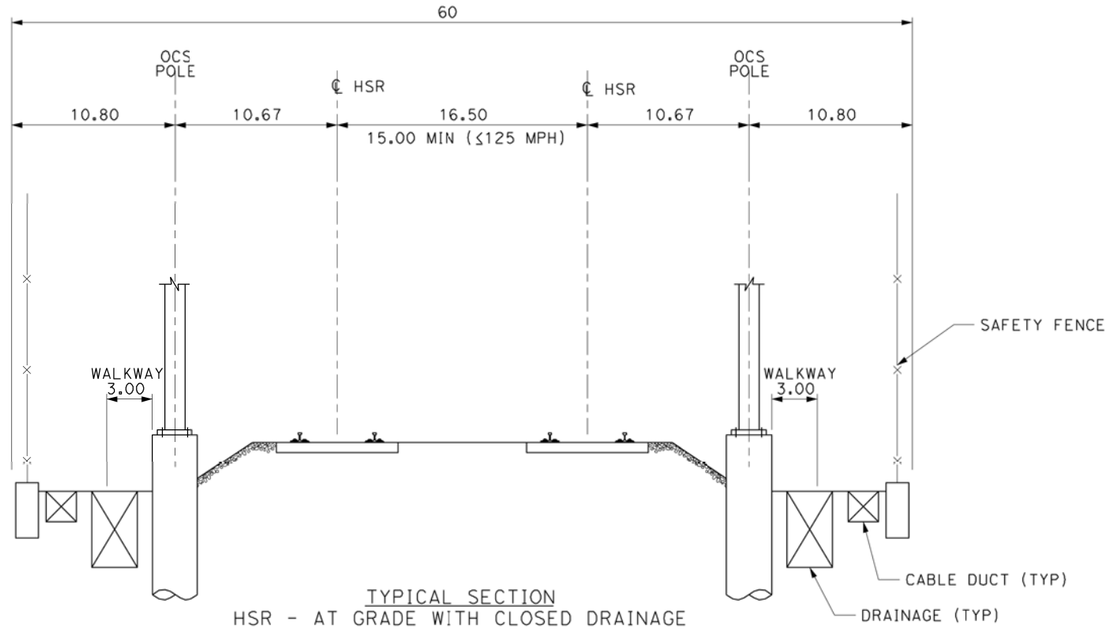
INDEX OF SHEETS

C-1 TO C-3	GUIDEWAY TYPICAL SECTIONS
A1-KEY MAP	ALTERNATIVE A1 KEY MAP
A1-1 TO A1-55	ALTERNATIVE A1 ALIGNMENT PLANS
A2-KEY MAP	ALTERNATIVE A2 KEY MAP
A2-1 TO A2-52	ALTERNATIVE A2 ALIGNMENT PLANS
A3-KEY MAP	ALTERNATIVE A3 KEY MAP
A3-1 TO A3-54	ALTERNATIVE A3 ALIGNMENT PLANS
A4-KEY MAP	ALTERNATIVE A4 KEY MAP
A4-1 TO A4-54	ALTERNATIVE A4 ALIGNMENT PLANS

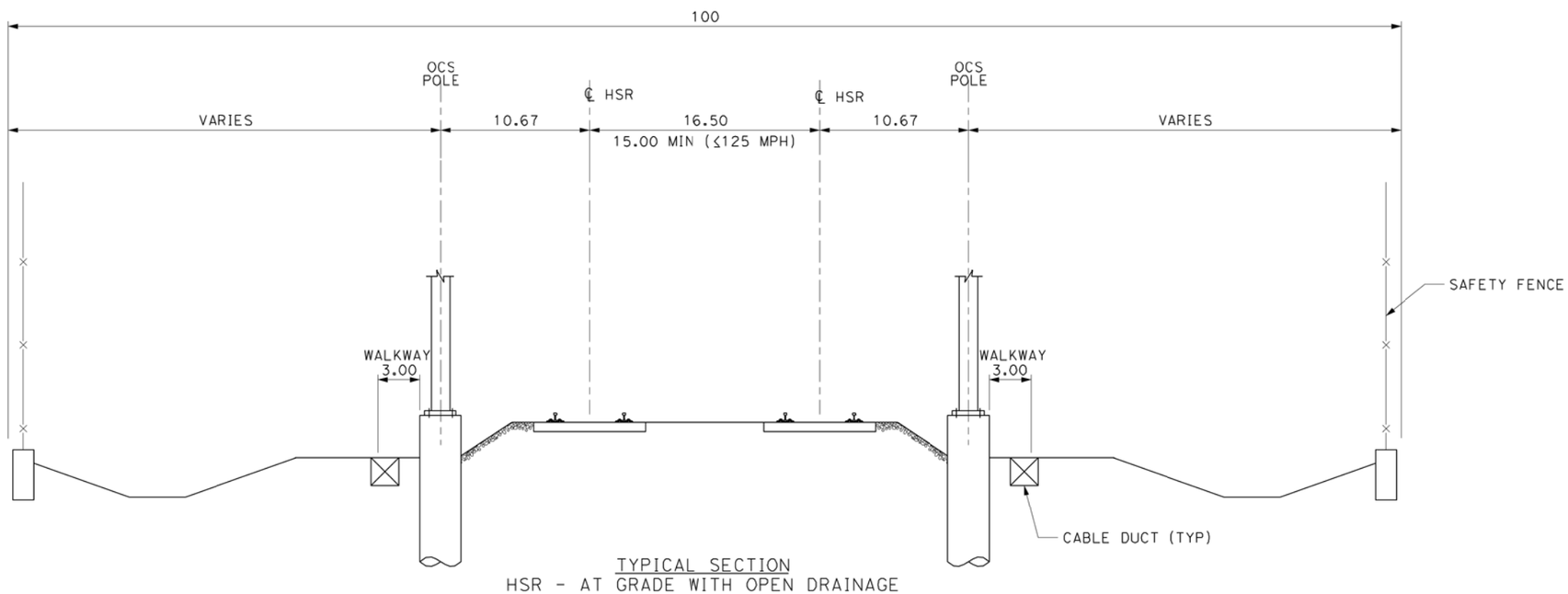
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED RAIL AUTHORITY

AECOM CH2MHILL



TYPICAL SECTION
HSR - AT GRADE WITH CLOSED DRAINAGE



TYPICAL SECTION
HSR - AT GRADE WITH OPEN DRAINAGE

NOTES:

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

5 0 5 10
1"=5'

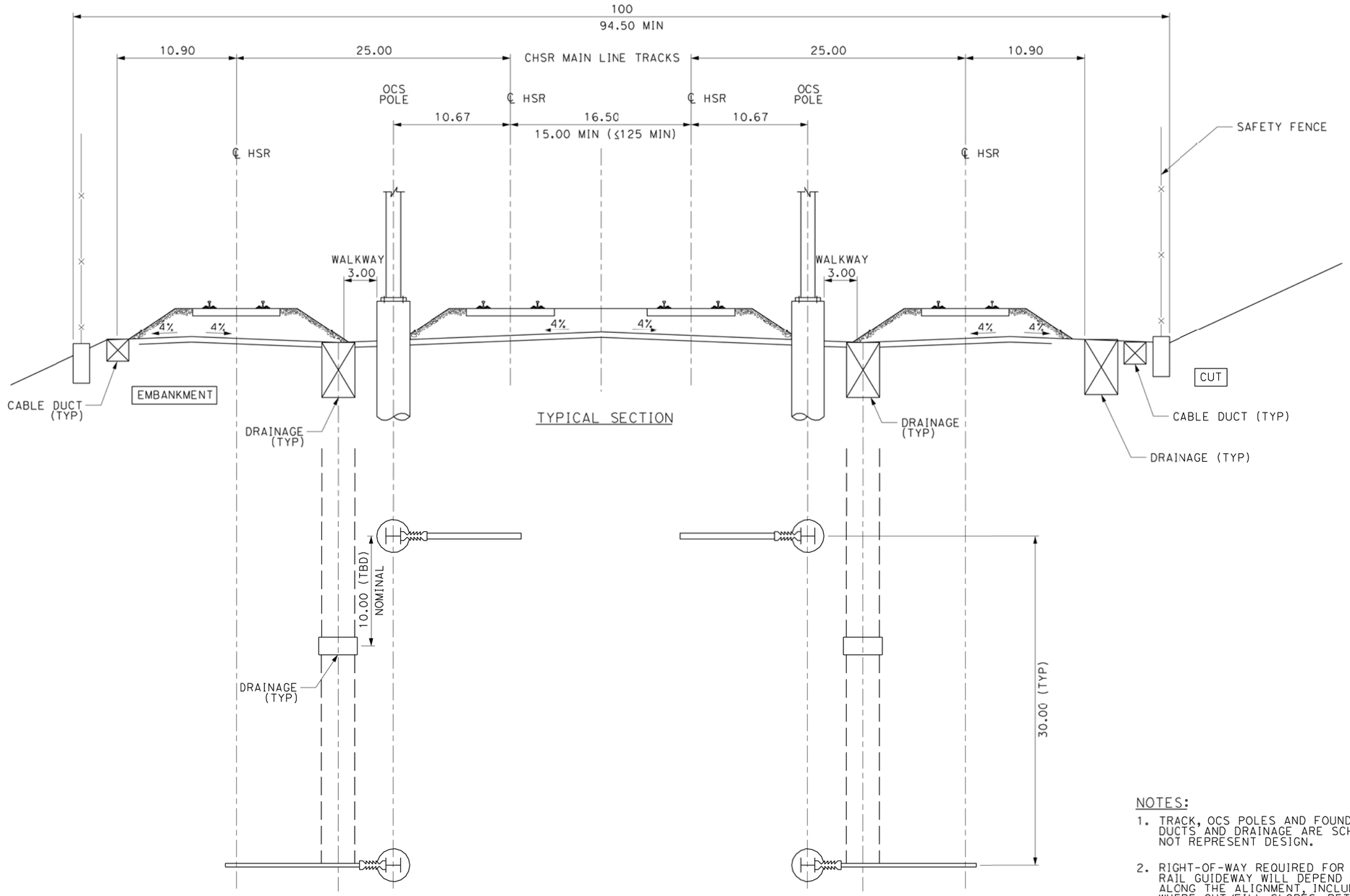
DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 5'
SHEET NO.	C1 TYP. SECTION



NOTES:

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

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1"=5'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
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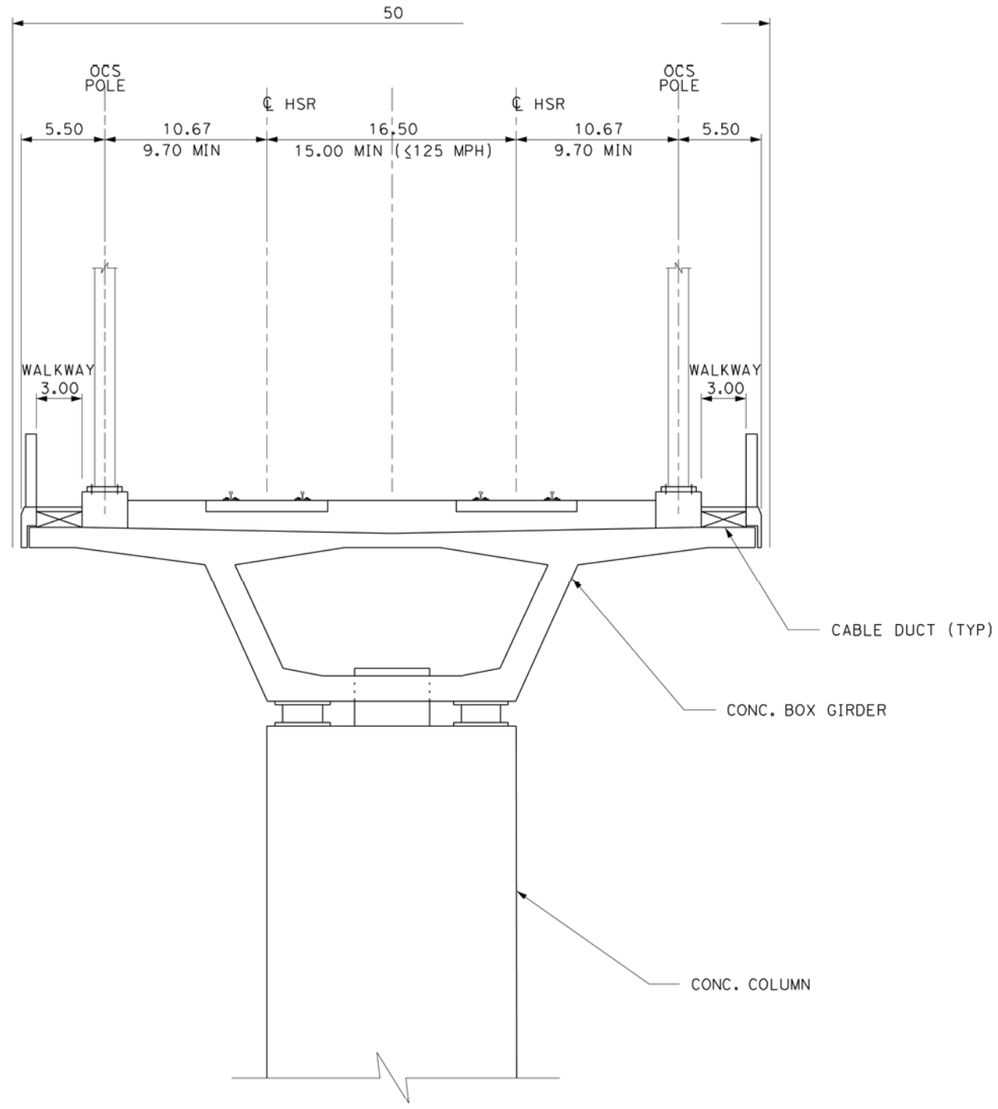
SHEET NO.	C2 TYP. SECTION



TYPICAL SECTION
2-TRACK - AERIAL HSR GUIDEWAY

NOTES:

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

5 0 5 10
1"=5'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION

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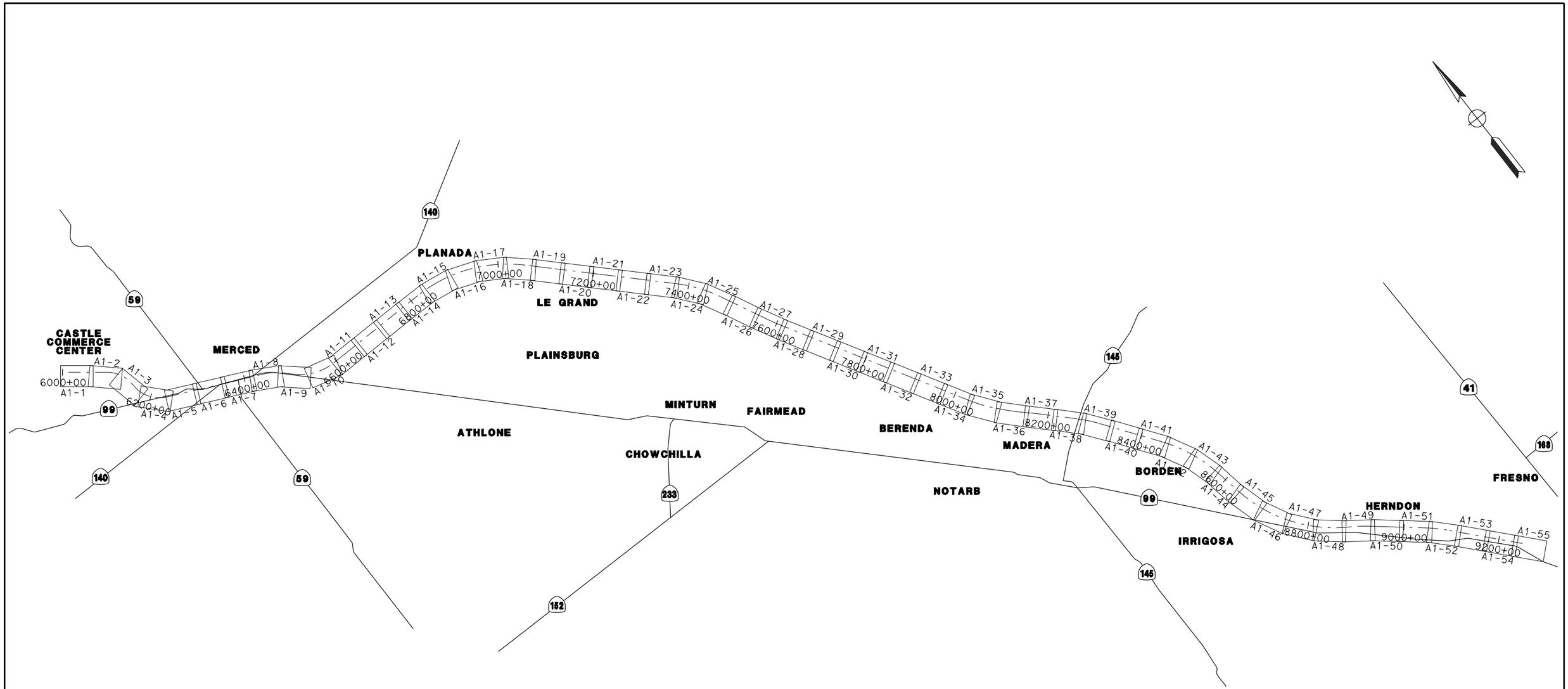
SHEET NO.	C3 TYP. SECTION



10,000 0 10,000 20,000

1"=10,000'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 10,000'
SHEET NO.	A1-KEY MAP

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6000+00 6005+00 6010+00 6015+00 6020+00 6025+00 6030+00 6035+00 6040+00 6045+00 6050+00 6055+00 6060+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
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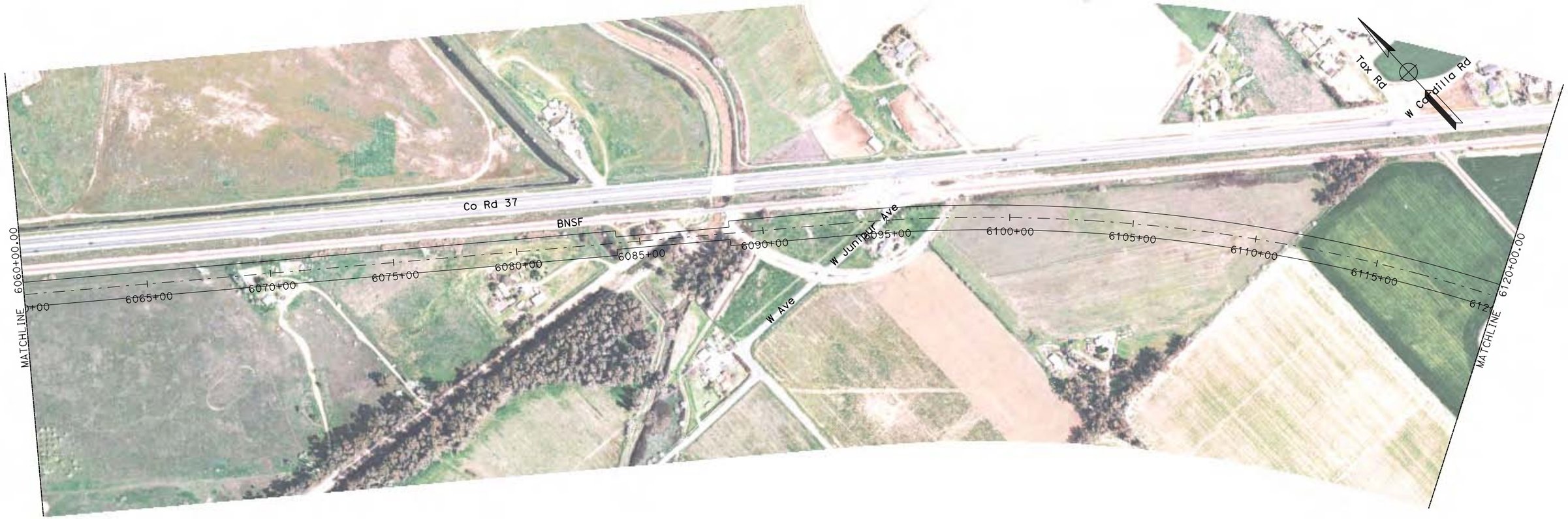
SCALE	1"= 200'
SHEET NO.	A1-1



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

6060+00 6065+00 6070+00 6075+00 6080+00 6085+00 6090+00 6095+00 6100+00 6105+00 6110+00 6115+00 6120+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-2

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

6120+00 6125+00 6130+00 6135+00 6140+00 6145+00 6150+00 6155+00 6160+00 6165+00 6170+00 6175+00 6180+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-3

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

ELEVATED

6180+00 6185+00 6190+00 6195+00 6200+00 6205+00 6210+00 6215+00 6220+00 6225+00 6230+00 6235+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

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SCALE	1"= 200'
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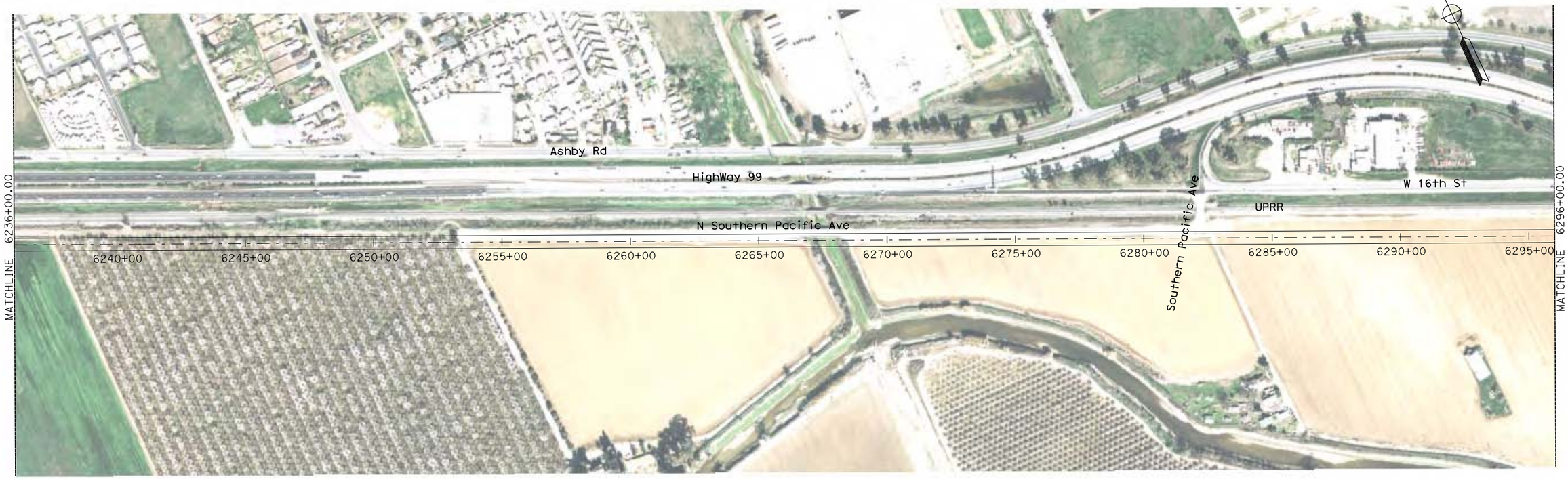

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

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200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-5

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

STATION - ELEVATED

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200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

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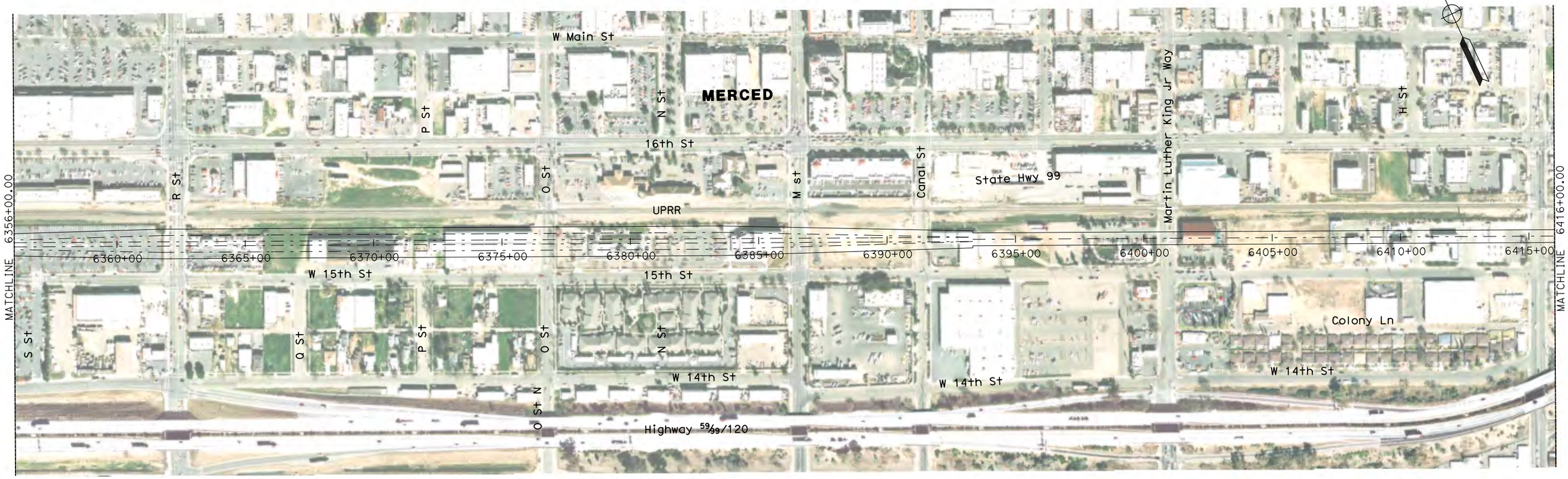
SCALE	1"= 200'
SHEET NO.	A1-6



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

STATION - ELEVATED

ELEVATED

6355+00 6360+00 6365+00 6370+00 6375+00 6380+00 6385+00 6390+00 6395+00 6400+00 6405+00 6410+00 6415+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

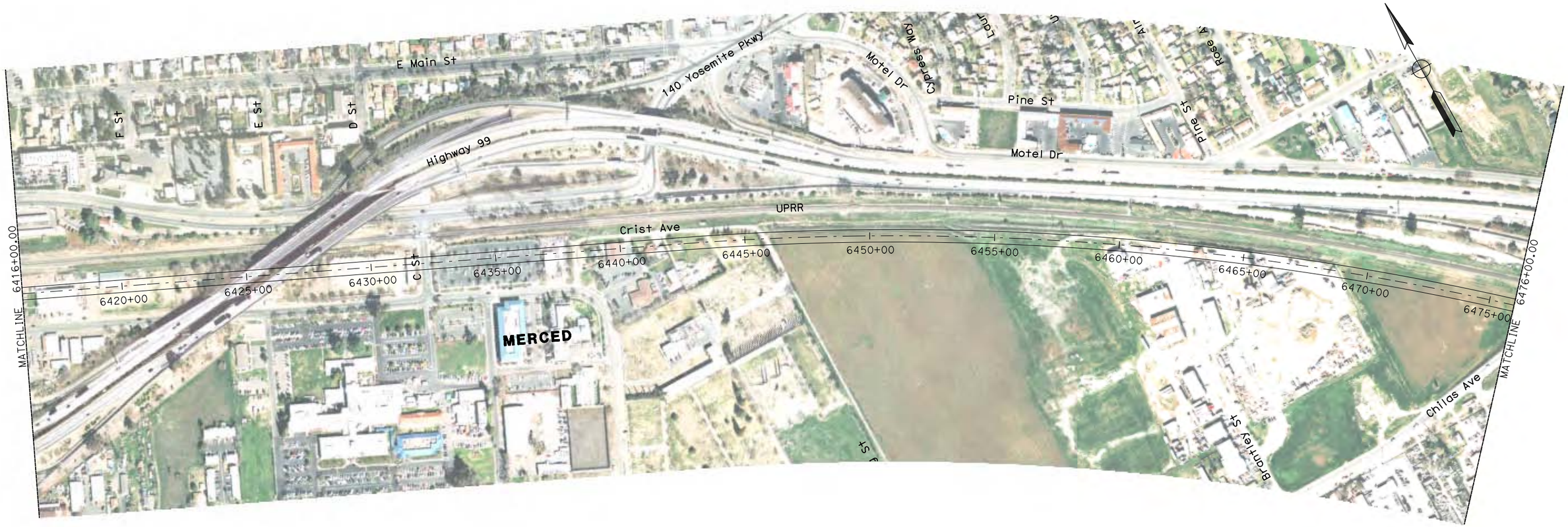
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-7



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

6415+00 6420+00 6425+00 6430+00 6435+00 6440+00 6445+00 6450+00 6455+00 6460+00 6465+00 6470+00 6475+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-8

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

6475+00 6480+00 6485+00 6490+00 6495+00 6500+00 6505+00 6510+00 6515+00 6520+00 6525+00 6530+00 6535+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ENTER 1ST LINE

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-9

ELEVATED

6535+00 6540+00 6545+00 6550+00 6555+00 6560+00 6565+00 6570+00 6575+00 6580+00 6585+00 6590+00 6595+00

200 0 200 400
1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-10

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

6595+00 6600+00 6605+00 6610+00 6615+00 6620+00 6625+00 6630+00 6635+00 6640+00 6645+00 6650+00 6655+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-11

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6655+00 6660+00 6665+00 6670+00 6675+00 6680+00 6685+00 6690+00 6695+00 6700+00 6705+00 6710+00 6715+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-12

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6715+00 6720+00 6725+00 6730+00 6735+00 6740+00 6745+00 6750+00 6755+00 6760+00 6765+00 6770+00 6775+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-13

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6775+00 6780+00 6785+00 6790+00 6795+00 6800+00 6805+00 6810+00 6815+00 6820+00 6825+00 6830+00 6835+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

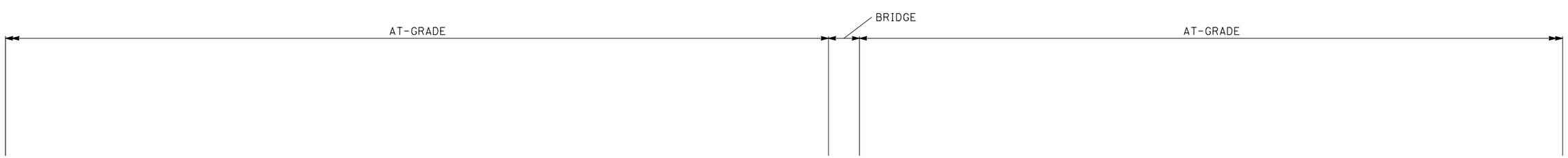
SCALE 1"= 200'

SHEET NO. A1-14

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6835+00 6840+00 6845+00 6850+00 6855+00 6860+00 6865+00 6870+00 6875+00 6880+00 6885+00 6890+00 6895+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-15

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6895+00 6900+00 6905+00 6910+00 6915+00 6920+00 6925+00 6930+00 6935+00 6940+00 6945+00 6950+00 6955+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-16

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6955+00 6960+00 6965+00 6970+00 6975+00 6980+00 6985+00 6990+00 6995+00 7000+00 7005+00 7010+00 7015+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-17

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7015+00 7020+00 7025+00 7030+00 7035+00 7040+00 7045+00 7050+00 7055+00 7060+00 7065+00 7070+00 7075+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLYCALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-18

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

ELEVATED

7075+00 7080+00 7085+00 7090+00 7095+00 7100+00 7105+00 7110+00 7115+00 7120+00 7125+00 7130+00 7135+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-19

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7135+00 7140+00 7145+00 7150+00 7155+00 7160+00 7165+00 7170+00 7175+00 7180+00 7185+00 7190+00 7195+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-20

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

7195+00 7200+00 7205+00 7210+00 7215+00 7220+00 7225+00 7230+00 7235+00 7240+00 7245+00 7250+00 7255+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-21

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7255+00 7260+00 7265+00 7270+00 7275+00 7280+00 7285+00 7290+00 7295+00 7300+00 7305+00 7310+00 7315+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

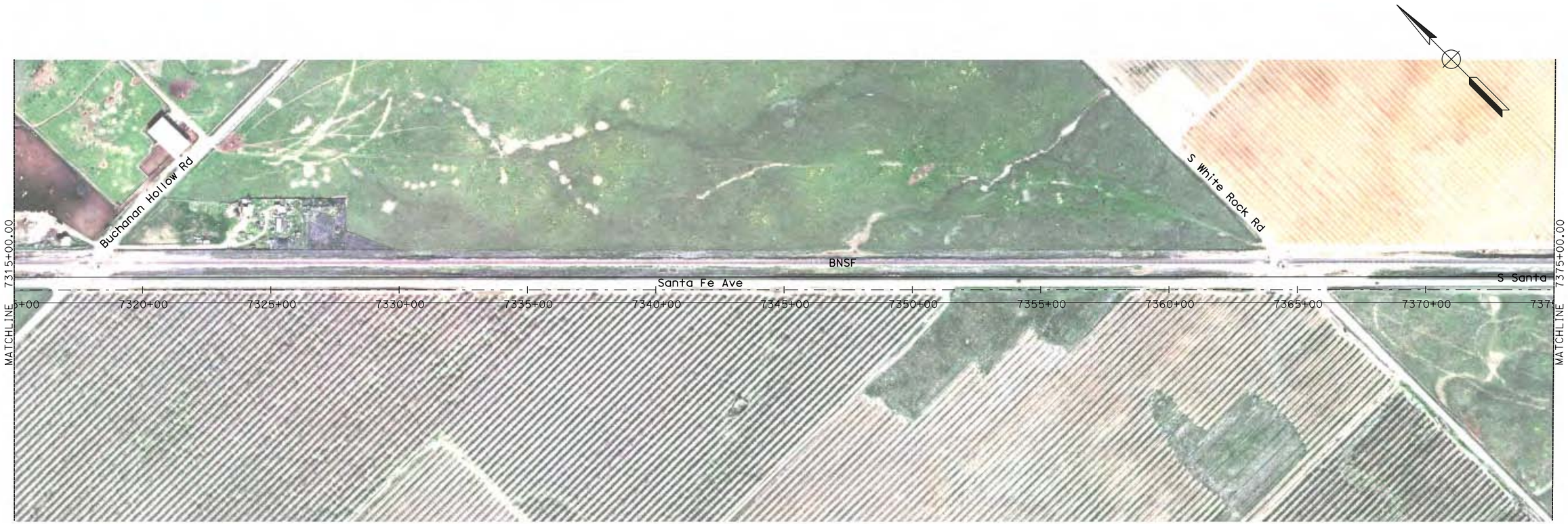
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-22



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7315+00 7320+00 7325+00 7330+00 7335+00 7340+00 7345+00 7350+00 7355+00 7360+00 7365+00 7370+00 7375+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-23

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7375+00 7380+00 7385+00 7390+00 7395+00 7400+00 7405+00 7410+00 7415+00 7420+00 7425+00 7430+00 7435+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

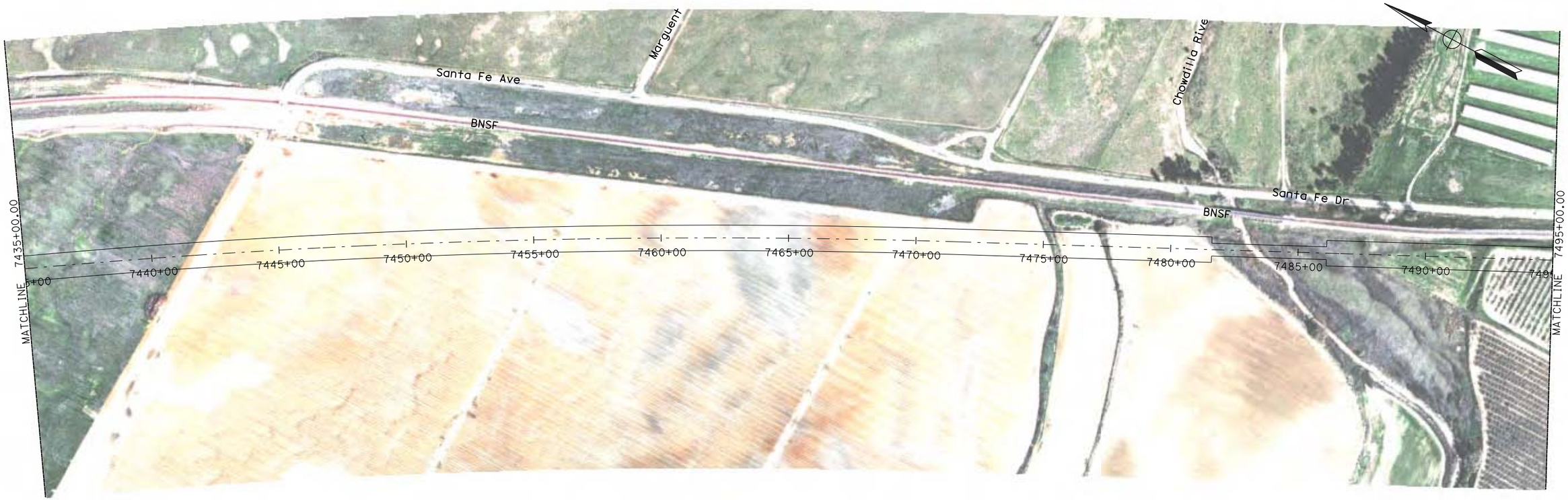
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-24



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7435+00 7440+00 7445+00 7450+00 7455+00 7460+00 7465+00 7470+00 7475+00 7480+00 7485+00 7490+00 7495+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-25

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

BRIDGE

7495+00 7500+00 7505+00 7510+00 7515+00 7520+00 7525+00 7530+00 7535+00 7540+00 7545+00 7550+00 7555+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-26

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7555+00 7560+00 7565+00 7570+00 7575+00 7580+00 7585+00 7590+00 7595+00 7600+00 7605+00 7610+00 7615+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

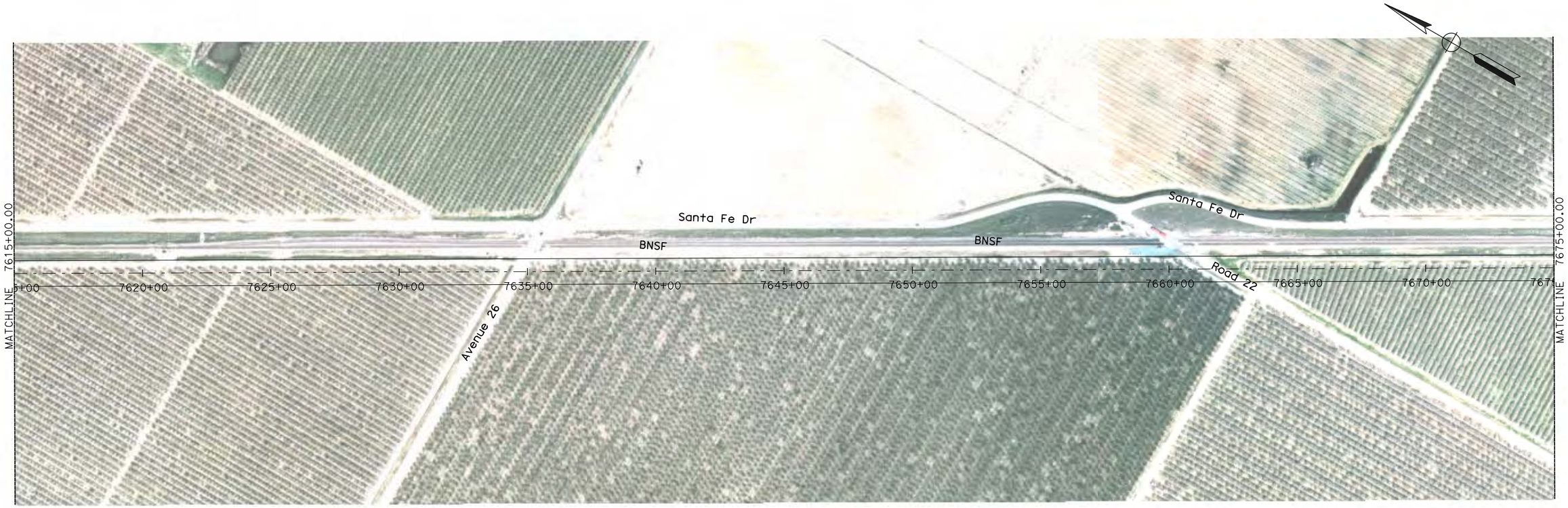
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-27



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7615+00 7620+00 7625+00 7630+00 7635+00 7640+00 7645+00 7650+00 7655+00 7660+00 7665+00 7670+00 7675+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

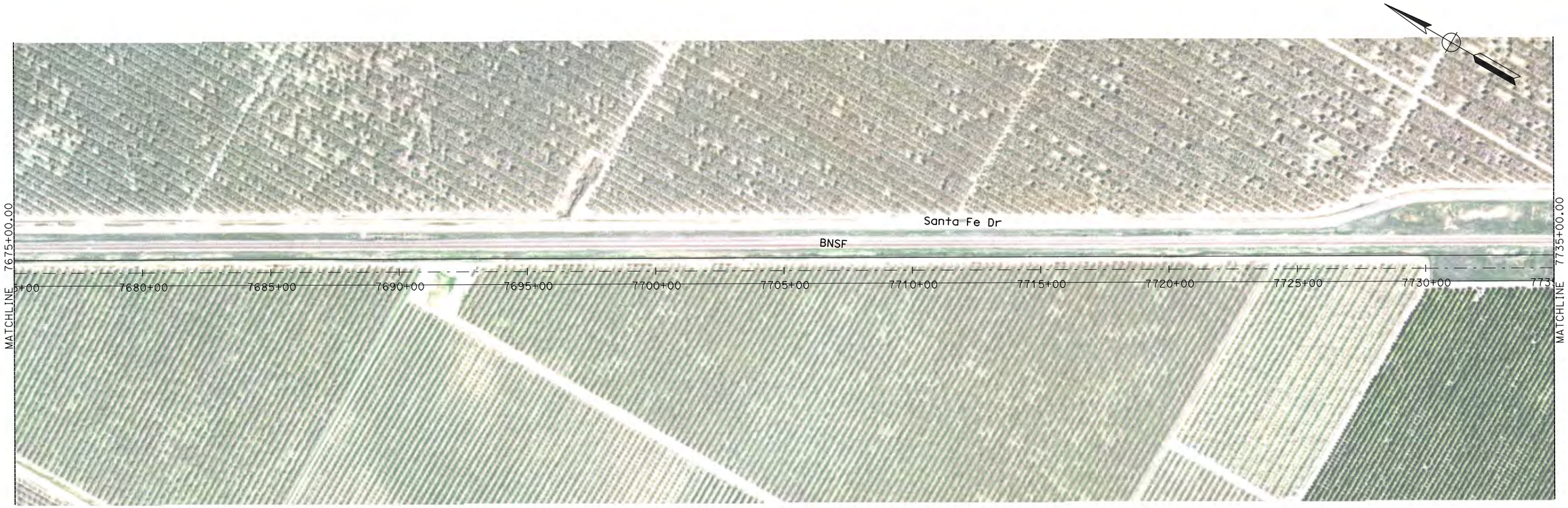
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-28



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7675+00 7680+00 7685+00 7690+00 7695+00 7700+00 7705+00 7710+00 7715+00 7720+00 7725+00 7730+00 7735+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-29

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7735+00 7740+00 7745+00 7750+00 7755+00 7760+00 7765+00 7770+00 7775+00 7780+00 7785+00 7790+00 7795+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-30

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7795+00 7800+00 7805+00 7810+00 7815+00 7820+00 7825+00 7830+00 7835+00 7840+00 7845+00 7850+00 7855+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-31

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

7855+00 7860+00 7865+00 7870+00 7875+00 7880+00 7885+00 7890+00 7895+00 7900+00 7905+00 7910+00 7915+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

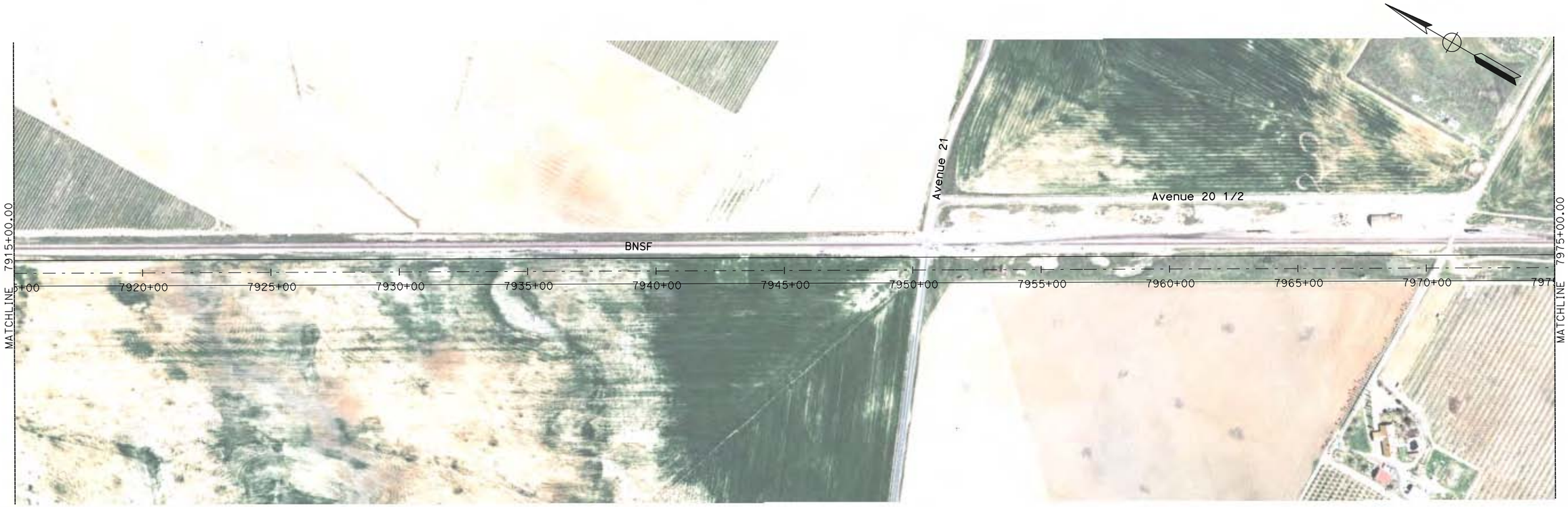
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-32



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7915+00 7920+00 7925+00 7930+00 7935+00 7940+00 7945+00 7950+00 7955+00 7960+00 7965+00 7970+00 7975+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-33

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | RETAINED FILL | BRIDGE | RETAINED FILL

7975+00 7980+00 7985+00 7990+00 7995+00 8000+00 8005+00 8010+00 8015+00 8020+00 8025+00 8030+00 8035+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-34

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

ELEVATED

8035+00 8040+00 8045+00 8050+00 8055+00 8060+00 8065+00 8070+00 8075+00 8080+00 8085+00 8090+00 8095+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-35

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

8095+00 8100+00 8105+00 8110+00 8115+00 8120+00 8125+00 8130+00 8135+00 8140+00 8145+00 8150+00 8155+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-36

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

AT-GRADE

8155+00 8160+00 8165+00 8170+00 8175+00 8180+00 8185+00 8190+00 8195+00 8200+00 8205+00 8210+00 8215+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

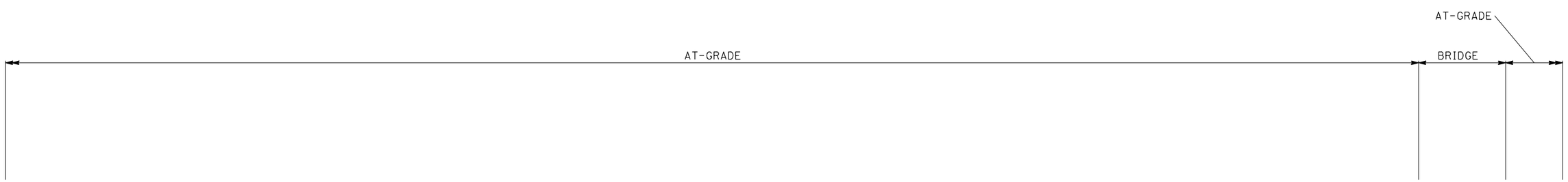
SCALE 1"= 200'

SHEET NO. A1-37

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



8215+00 8220+00 8225+00 8230+00 8235+00 8240+00 8245+00 8250+00 8255+00 8260+00 8265+00 8270+00 8275+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

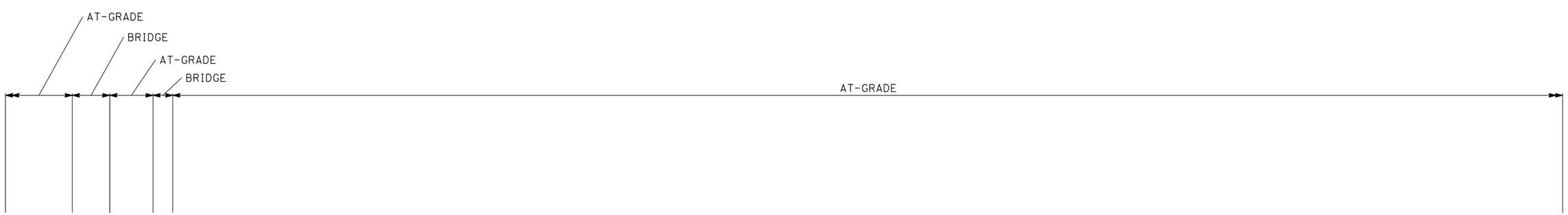
SCALE 1"= 200'

SHEET NO. A1-38

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



8275+00 8280+00 8285+00 8290+00 8295+00 8300+00 8305+00 8310+00 8315+00 8320+00 8325+00 8330+00 8335+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-39

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8335+00 8340+00 8345+00 8350+00 8355+00 8360+00 8365+00 8370+00 8375+00 8380+00 8385+00 8390+00 8395+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-40

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

8395+00 8400+00 8405+00 8410+00 8415+00 8420+00 8425+00 8430+00 8435+00 8440+00 8445+00 8450+00 8455+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-41

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8455+00 8460+00 8465+00 8470+00 8475+00 8480+00 8485+00 8490+00 8495+00 8500+00 8505+00 8510+00 8515+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-42

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8515+00 8520+00 8525+00 8530+00 8535+00 8540+00 8545+00 8550+00 8555+00 8560+00 8565+00 8570+00 8575+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-43

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8575+00 8580+00 8585+00 8590+00 8595+00 8600+00 8605+00 8610+00 8615+00 8620+00 8625+00 8630+00 8635+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

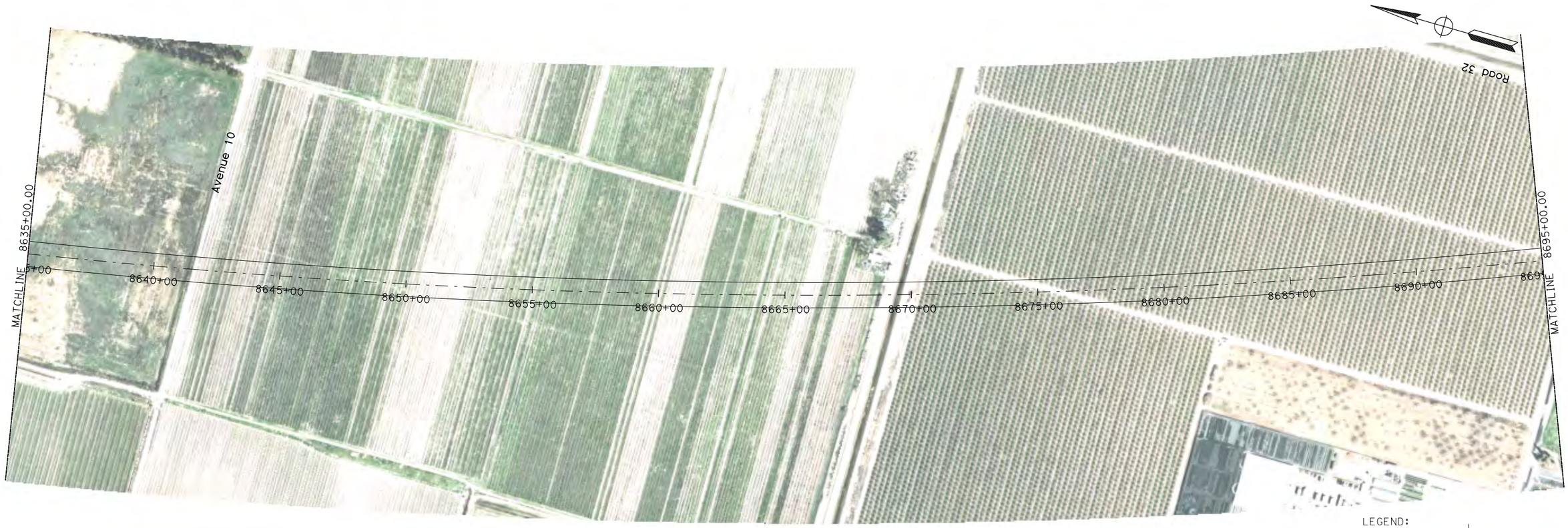
Preliminary 10/29/2009

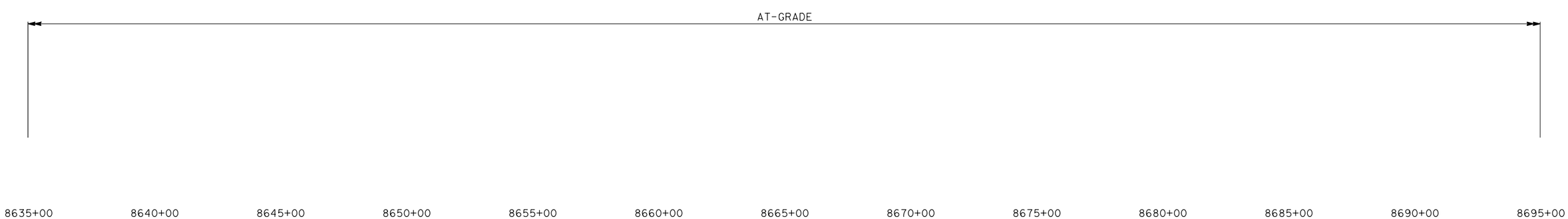
CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-44





200 0 200 400
1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

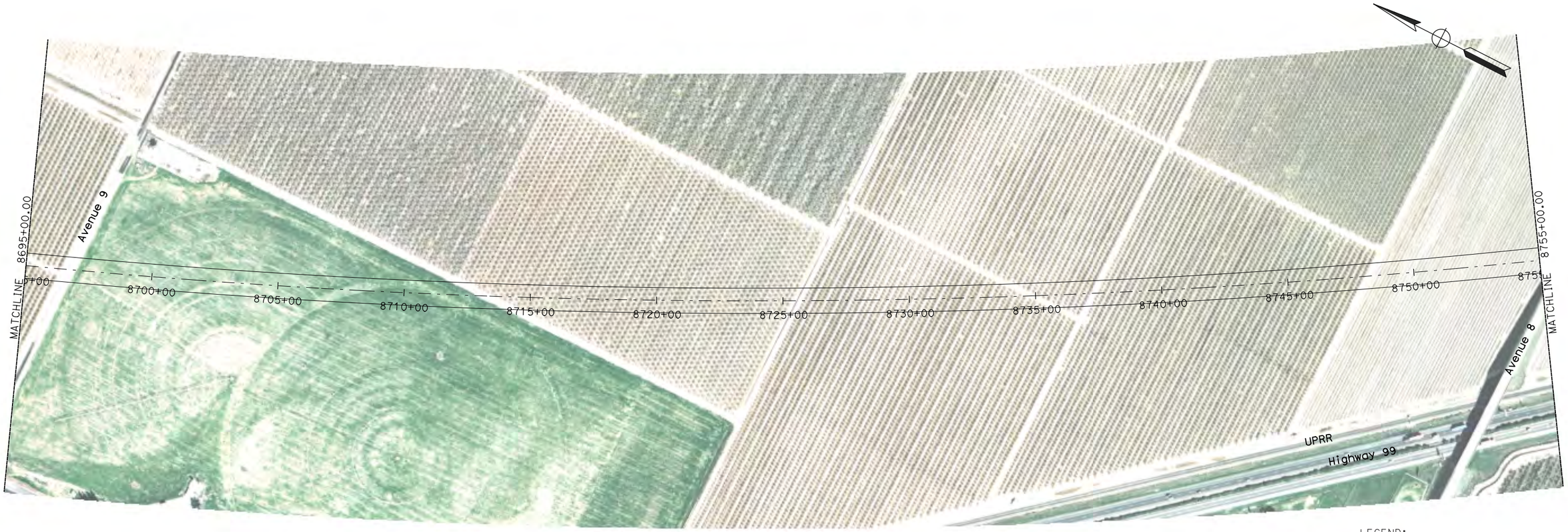
AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-45



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8695+00 8700+00 8705+00 8710+00 8715+00 8720+00 8725+00 8730+00 8735+00 8740+00 8745+00 8750+00 8755+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

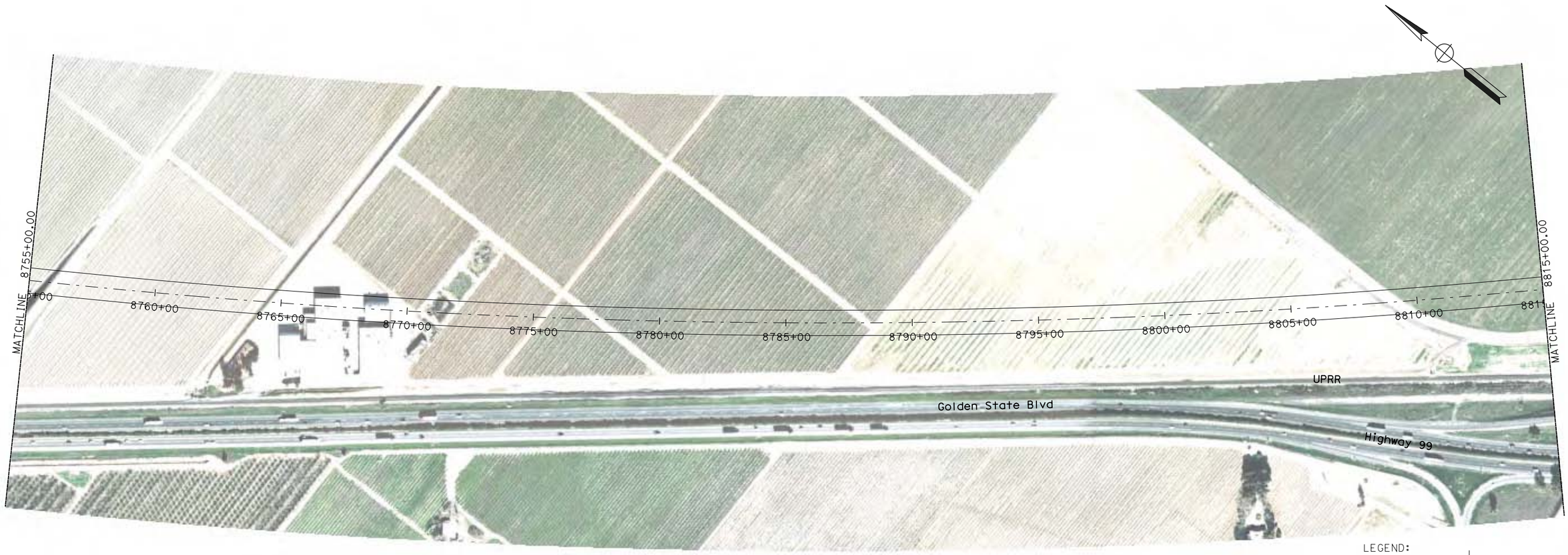
AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-46



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8755+00 8760+00 8765+00 8770+00 8775+00 8780+00 8785+00 8790+00 8795+00 8800+00 8805+00 8810+00 8815+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-47

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

8815+00 8820+00 8825+00 8830+00 8835+00 8840+00 8845+00 8850+00 8855+00 8860+00 8865+00 8870+00 8875+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

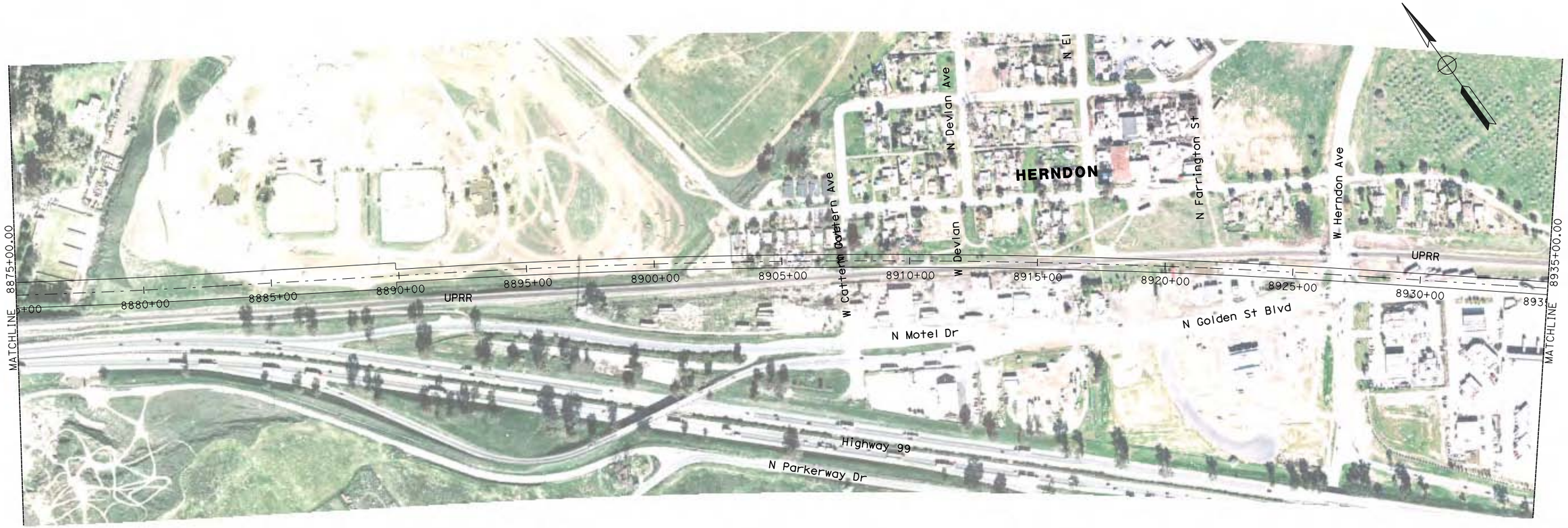
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-48



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

ELEVATED

8875+00 8880+00 8885+00 8890+00 8895+00 8900+00 8905+00 8910+00 8915+00 8920+00 8925+00 8930+00 8935+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-49

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

8935+00 8940+00 8945+00 8950+00 8955+00 8960+00 8965+00 8970+00 8975+00 8980+00 8985+00 8990+00 8995+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX

DRAWN BY Y.YYYY

CHECKED BY Z.ZZZZ

IN CHARGE A.AAAA

DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A1-50

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8995+00 9000+00 9005+00 9010+00 9015+00 9020+00 9025+00 9030+00 9035+00 9040+00 9045+00 9050+00 9055+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-51

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9055+00 9060+00 9065+00 9070+00 9075+00 9080+00 9085+00 9090+00 9095+00 9100+00 9105+00 9110+00 9115+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

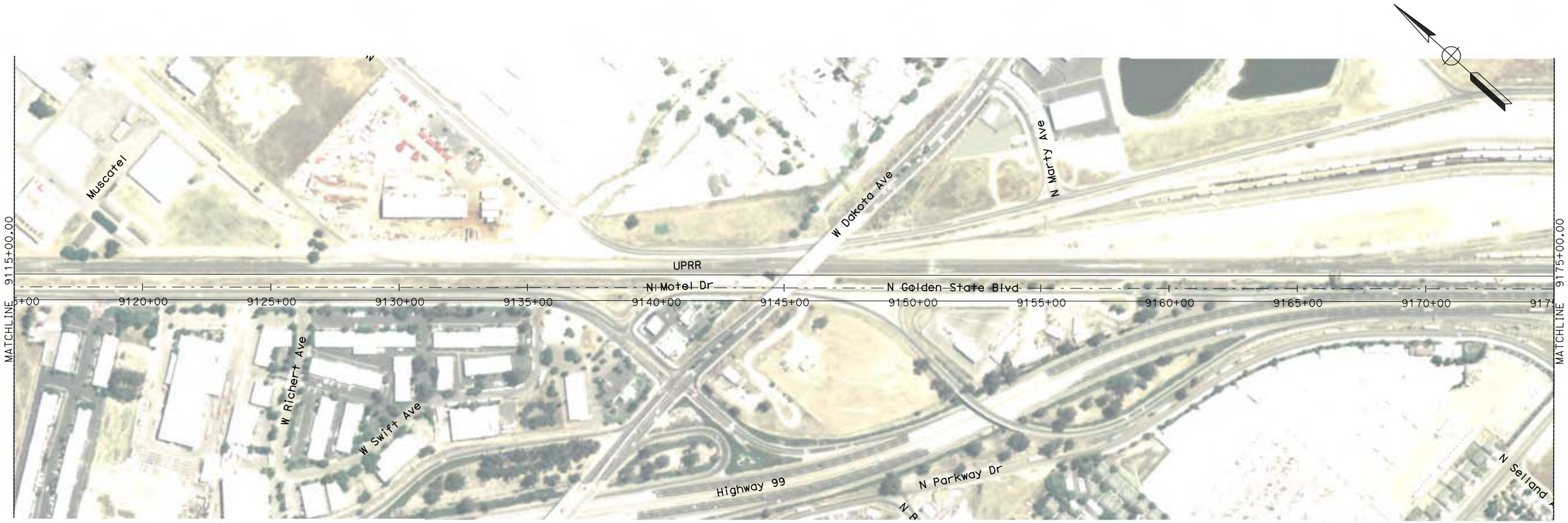
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-52



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9115+00 9120+00 9125+00 9130+00 9135+00 9140+00 9145+00 9150+00 9155+00 9160+00 9165+00 9170+00 9175+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

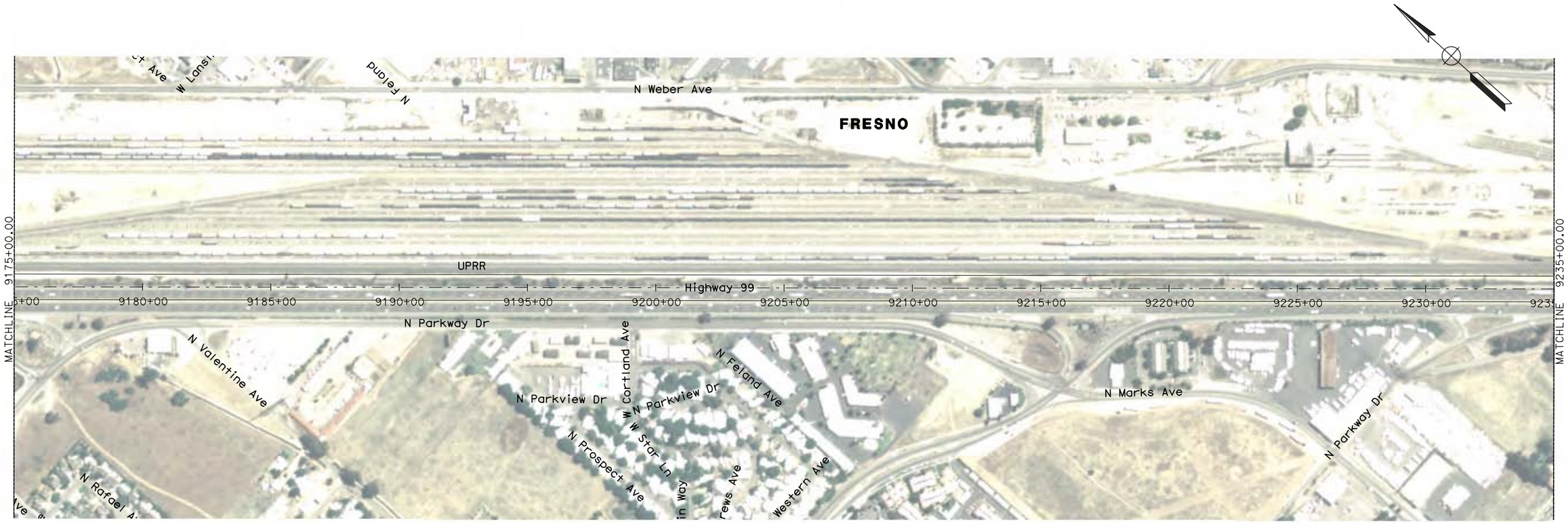
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-53



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9175+00 9180+00 9185+00 9190+00 9195+00 9200+00 9205+00 9210+00 9215+00 9220+00 9225+00 9230+00 9235+00

200 0 200 400

1"=200'

DESIGNED BY X.XXXXX
DRAWN BY Y.YYYY
CHECKED BY Z.ZZZZ
IN CHARGE A.AAAA
DATE ##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A1-54

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9235+00 9240+00 9245+00 9250+00

200 0 200 400

1"=200'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

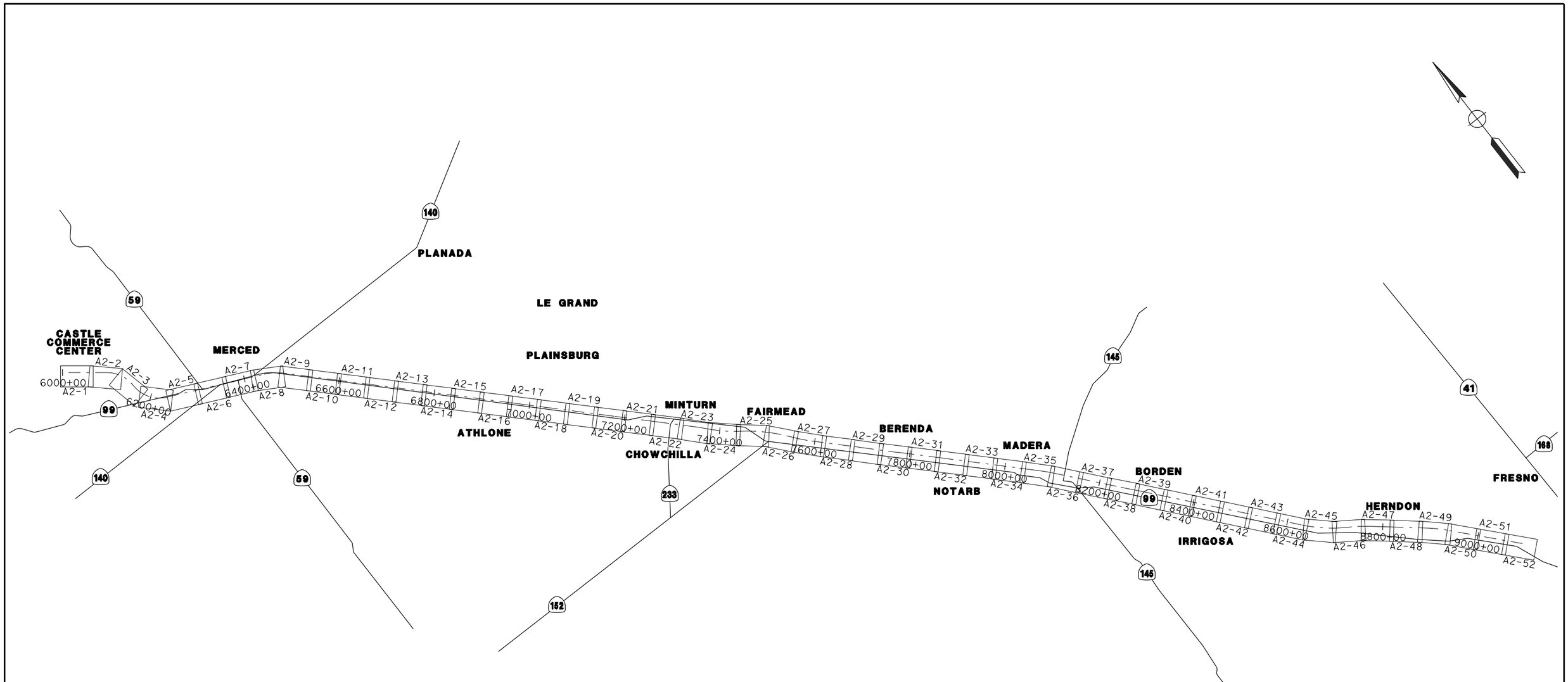
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A1

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A1-55



10,000 0 10,000 20,000

1"=10,000'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

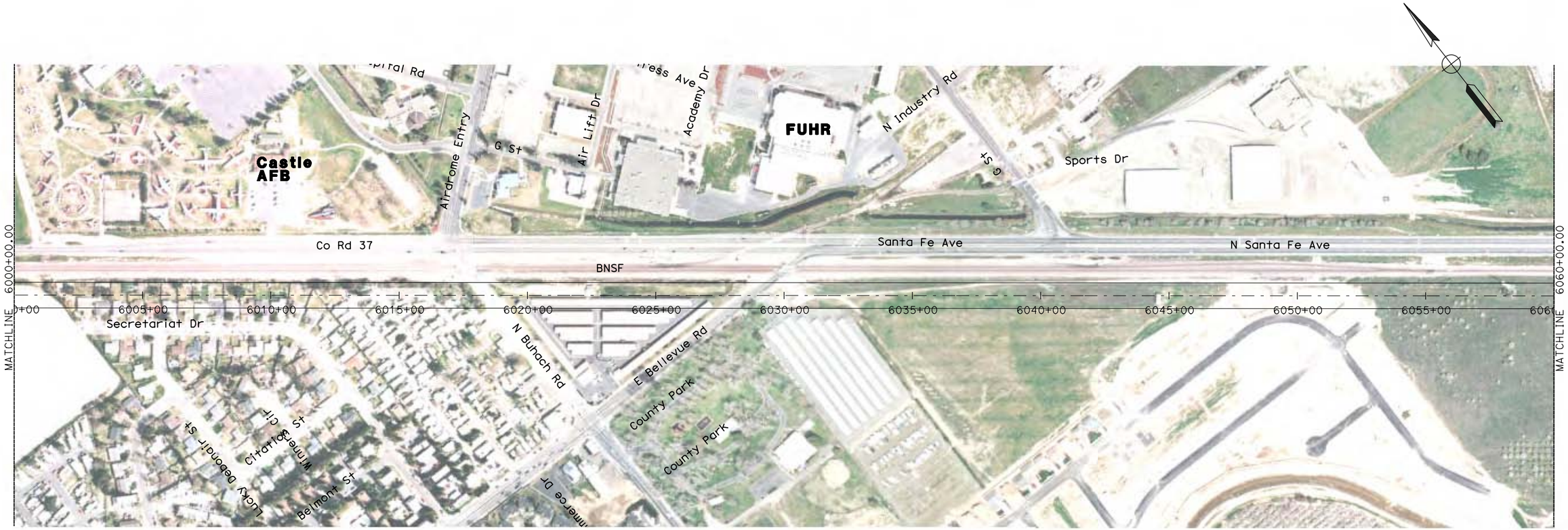
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 10,000'
SHEET NO.	A2-KEY MAP



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6000+00 6005+00 6010+00 6015+00 6020+00 6025+00 6030+00 6035+00 6040+00 6045+00 6050+00 6055+00 6060+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

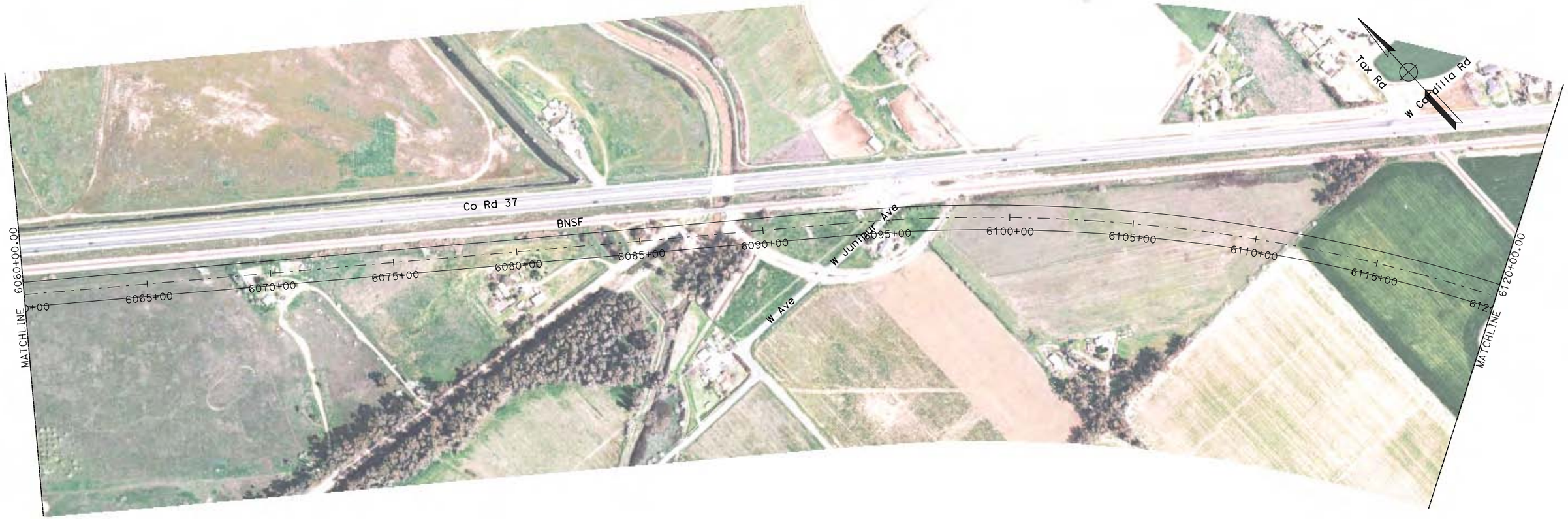
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-1



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6060+00 6065+00 6070+00 6075+00 6080+00 6085+00 6090+00 6095+00 6100+00 6105+00 6110+00 6115+00 6120+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

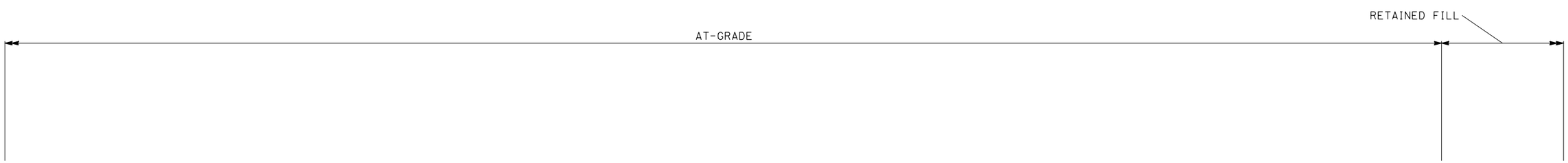
SCALE 1"= 200'

SHEET NO. A2-2

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6120+00 6125+00 6130+00 6135+00 6140+00 6145+00 6150+00 6155+00 6160+00 6165+00 6170+00 6175+00 6180+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLYCALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

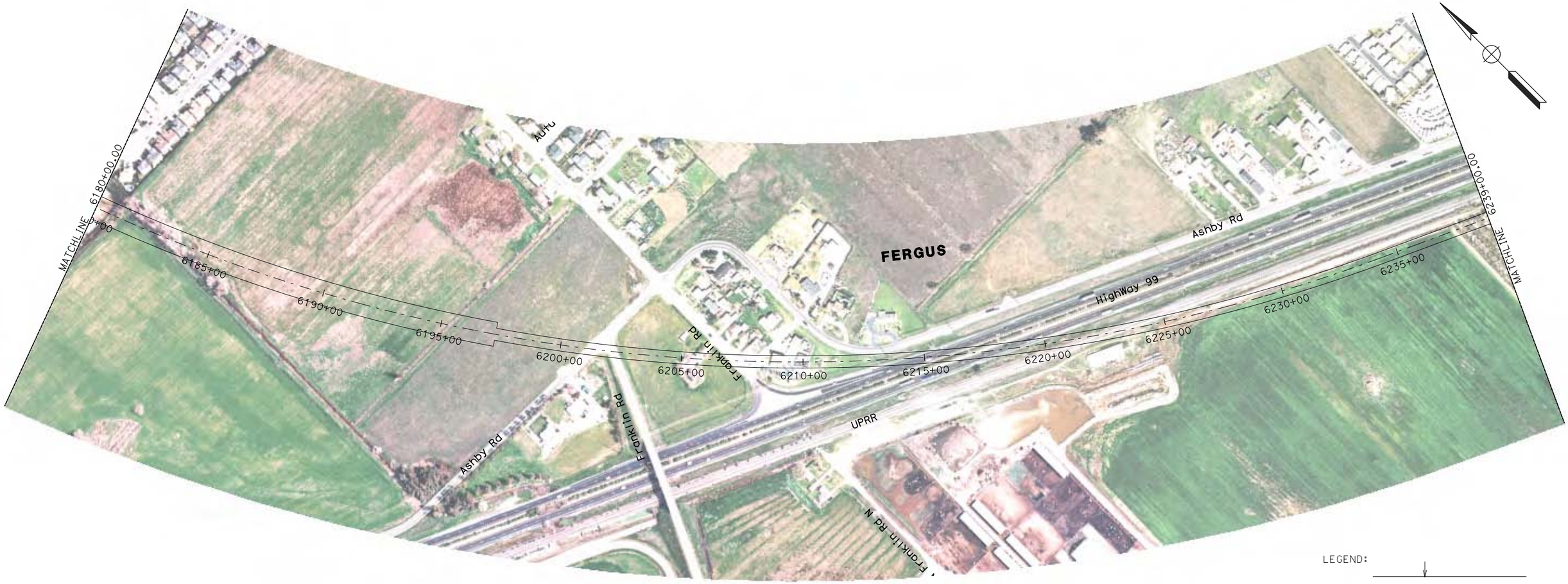
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-3



RETAINED FILL

ELEVATED

6180+00 6185+00 6190+00 6195+00 6200+00 6205+00 6210+00 6215+00 6220+00 6225+00 6230+00 6235+00 6239+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-4

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

6240+00 6245+00 6250+00 6255+00 6260+00 6265+00 6270+00 6275+00 6280+00 6285+00 6290+00 6295+00 6300+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-5

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

STATION - ELEVATED

6300+00 6305+00 6310+00 6315+00 6320+00 6325+00 6330+00 6335+00 6340+00 6345+00 6350+00 6355+00 6360+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

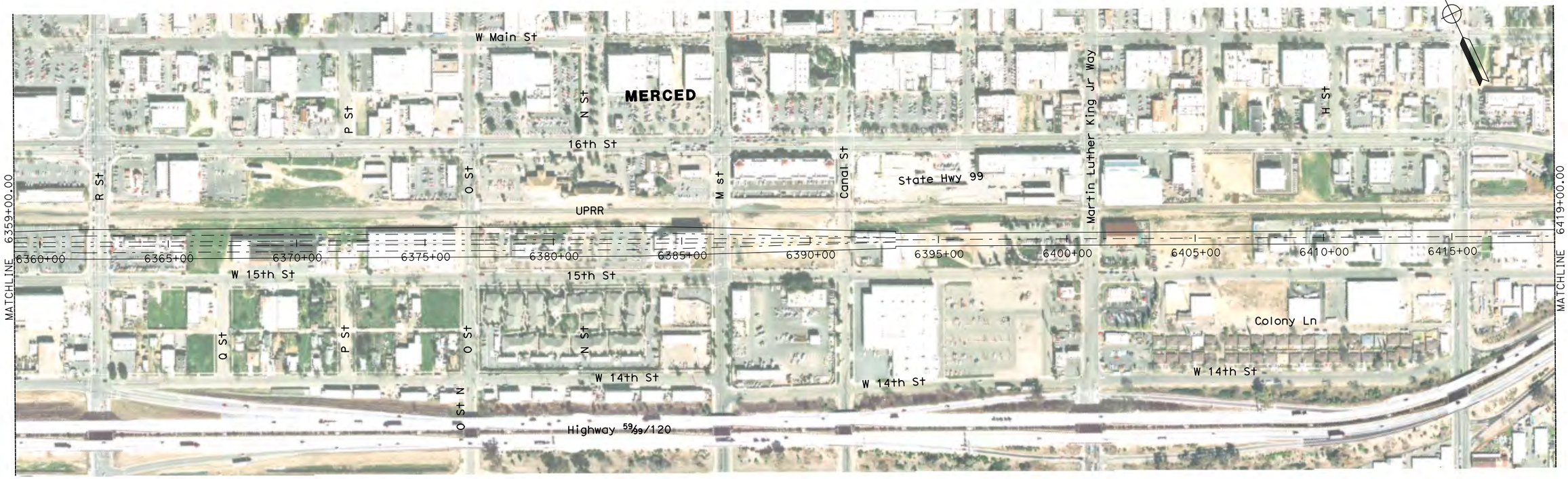
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-6



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

STATION - ELEVATED

ELEVATED

6360+00 6365+00 6370+00 6375+00 6380+00 6385+00 6390+00 6395+00 6400+00 6405+00 6410+00 6415+00 6420+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-7

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

6420+00 6425+00 6430+00 6435+00 6440+00 6445+00 6450+00 6455+00 6460+00 6465+00 6470+00 6475+00 6480+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-8

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

AT-GRADE

6480+00 6485+00 6490+00 6495+00 6500+00 6505+00 6510+00 6515+00 6520+00 6525+00 6530+00 6535+00 6540+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-9

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6540+00 6545+00 6550+00 6555+00 6560+00 6565+00 6570+00 6575+00 6580+00 6585+00 6590+00 6595+00 6600+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

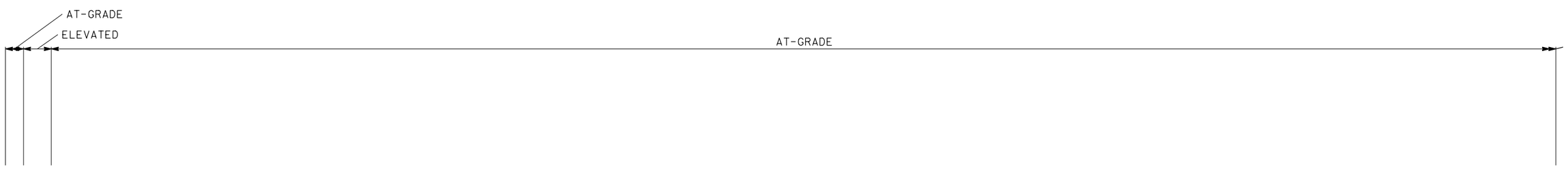
Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-10

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6600+00 6605+00 6610+00 6615+00 6620+00 6625+00 6630+00 6635+00 6640+00 6645+00 6650+00 6655+00 6660+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-11

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

6660+00 6665+00 6670+00 6675+00 6680+00 6685+00 6690+00 6695+00 6700+00 6705+00 6710+00 6715+00 6720+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-12

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6720+00 6725+00 6730+00 6735+00 6740+00 6745+00 6750+00 6755+00 6760+00 6765+00 6770+00 6775+00 6780+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-13

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6780+00 6785+00 6790+00 6795+00 6800+00 6805+00 6810+00 6815+00 6820+00 6825+00 6830+00 6835+00 6840+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-14

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6840+00 6845+00 6850+00 6855+00 6860+00 6865+00 6870+00 6875+00 6880+00 6885+00 6890+00 6895+00 6900+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-15

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6900+00 6905+00 6910+00 6915+00 6920+00 6925+00 6930+00 6935+00 6940+00 6945+00 6950+00 6955+00 6960+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-16

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

6960+00 6965+00 6970+00 6975+00 6980+00 6985+00 6990+00 6995+00 7000+00 7005+00 7010+00 7015+00 7020+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-17

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7020+00 7025+00 7030+00 7035+00 7040+00 7045+00 7050+00 7055+00 7060+00 7065+00 7070+00 7075+00 7080+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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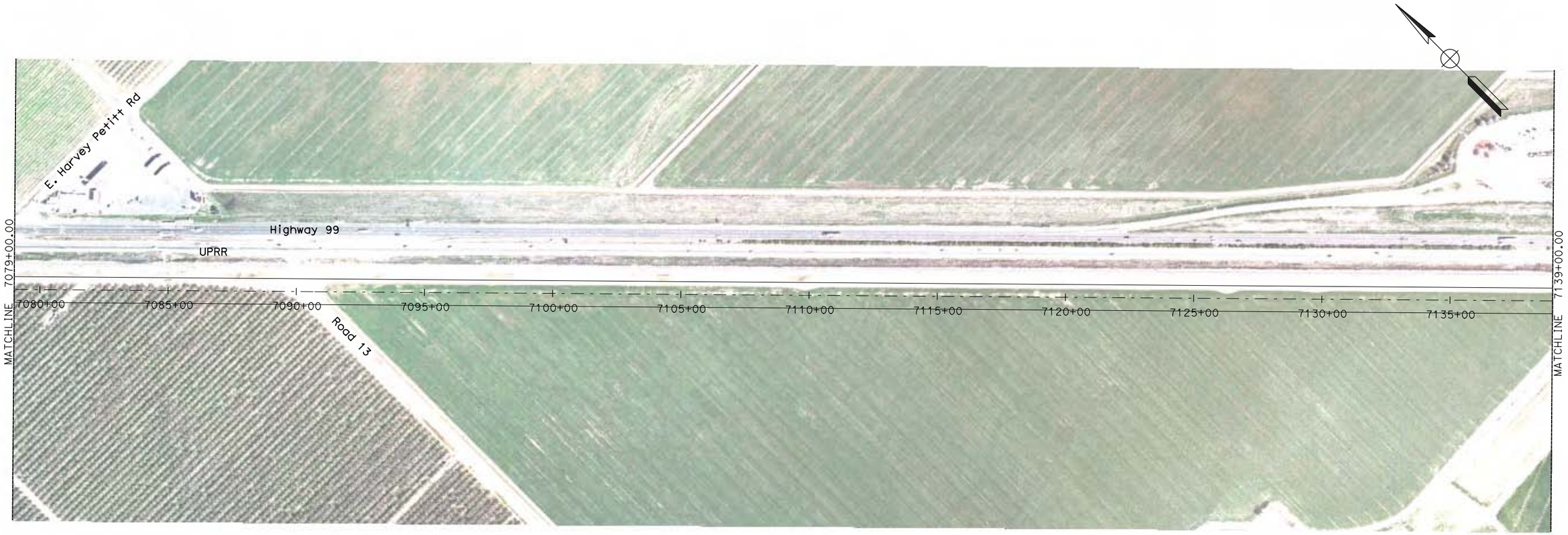
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-18



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7080+00 7085+00 7090+00 7095+00 7100+00 7105+00 7110+00 7115+00 7120+00 7125+00 7130+00 7135+00 7140+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-19

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

7140+00 7145+00 7150+00 7155+00 7160+00 7165+00 7170+00 7175+00 7180+00 7185+00 7190+00 7195+00 7200+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-20

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7200+00 7205+00 7210+00 7215+00 7220+00 7225+00 7230+00 7235+00 7240+00 7245+00 7250+00 7255+00 7260+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-21

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7260+00 7265+00 7270+00 7275+00 7280+00 7285+00 7290+00 7295+00 7300+00 7305+00 7310+00 7315+00 7320+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-22

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7320+00 7325+00 7330+00 7335+00 7340+00 7345+00 7350+00 7355+00 7360+00 7365+00 7370+00 7375+00 7380+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-23

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7380+00 7385+00 7390+00 7395+00 7400+00 7405+00 7410+00 7415+00 7420+00 7425+00 7430+00 7435+00 7440+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-24

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7440+00 7445+00 7450+00 7455+00 7460+00 7465+00 7470+00 7475+00 7480+00 7485+00 7490+00 7495+00 7500+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-25

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

7500+00 7505+00 7510+00 7515+00 7520+00 7525+00 7530+00 7535+00 7540+00 7545+00 7550+00 7555+00 7560+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-26

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

AT-GRADE

7560+00 7565+00 7570+00 7575+00 7580+00 7585+00 7590+00 7595+00 7600+00 7605+00 7610+00 7615+00 7620+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

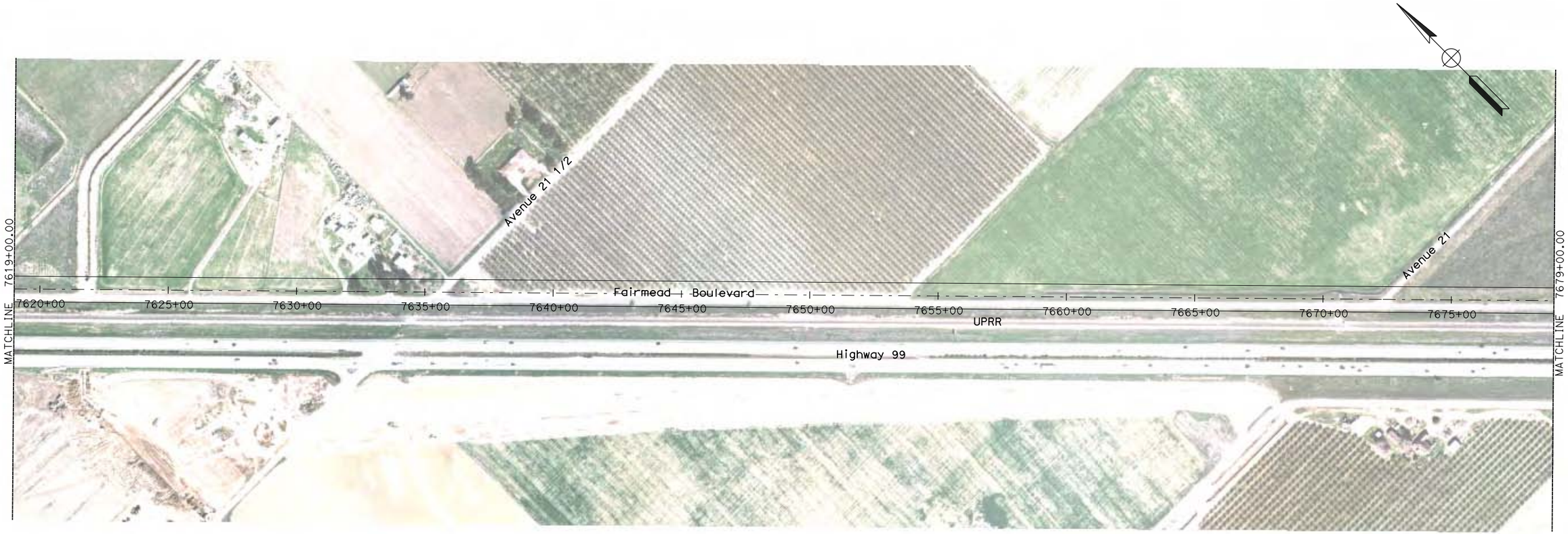
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-27



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7620+00 7625+00 7630+00 7635+00 7640+00 7645+00 7650+00 7655+00 7660+00 7665+00 7670+00 7675+00 7680+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

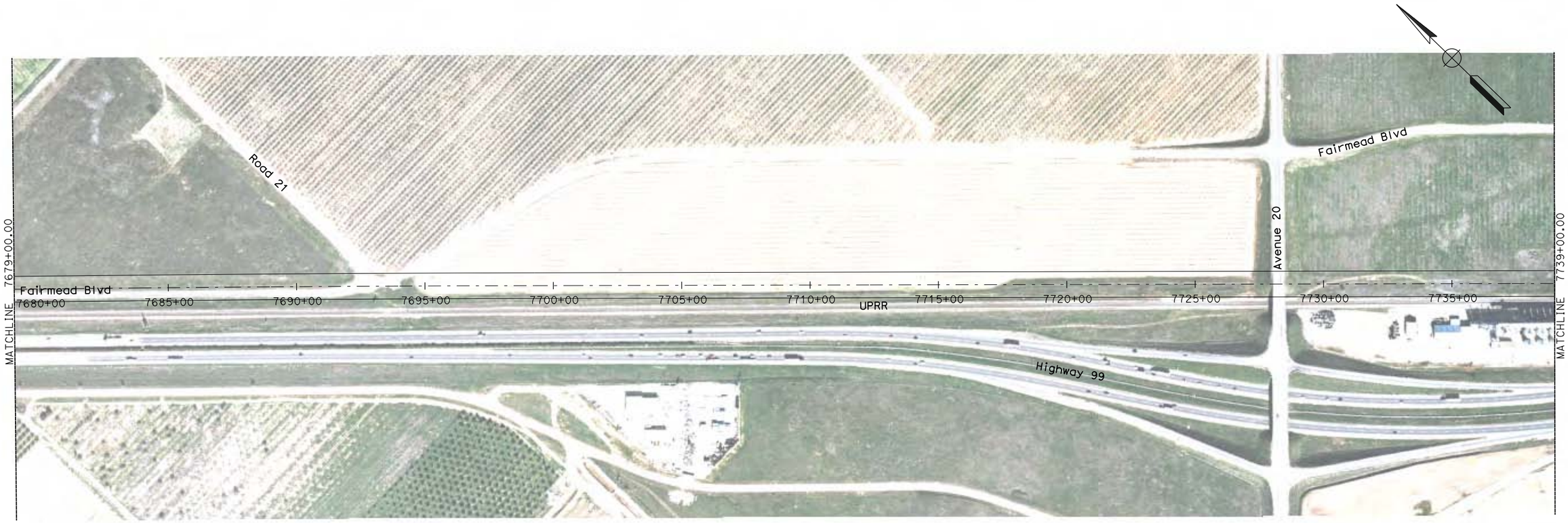
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-28



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7680+00 7685+00 7690+00 7695+00 7700+00 7705+00 7710+00 7715+00 7720+00 7725+00 7730+00 7735+00 7740+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

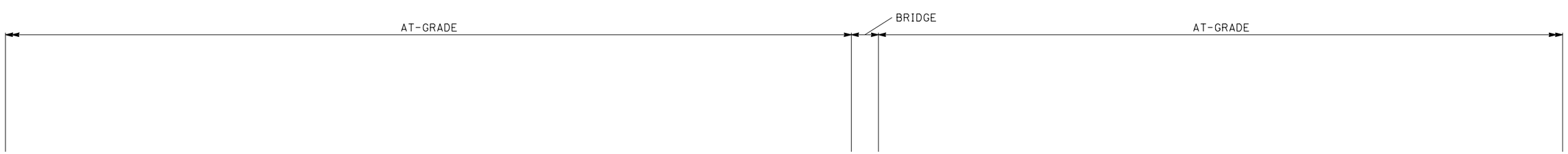
SCALE 1"= 200'

SHEET NO. A2-29

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



7740+00 7745+00 7750+00 7755+00 7760+00 7765+00 7770+00 7775+00 7780+00 7785+00 7790+00 7795+00 7800+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-30

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7800+00 7805+00 7810+00 7815+00 7820+00 7825+00 7830+00 7835+00 7840+00 7845+00 7850+00 7855+00 7860+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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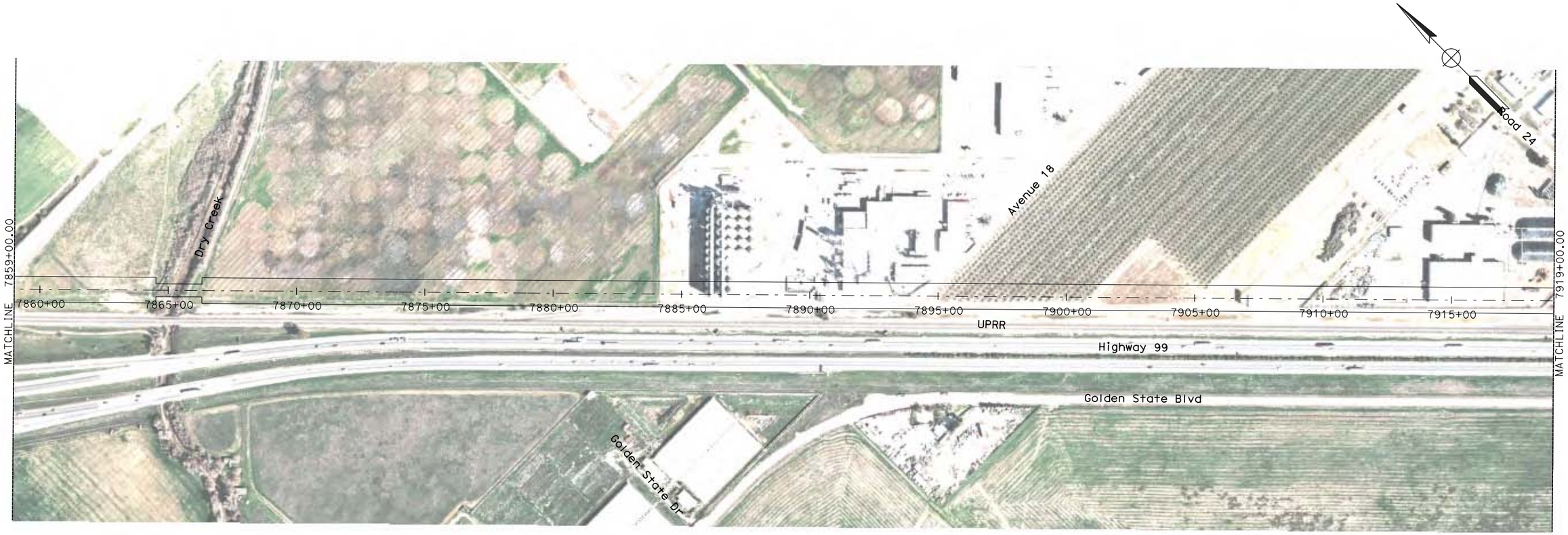
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-31



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7860+00 7865+00 7870+00 7875+00 7880+00 7885+00 7890+00 7895+00 7900+00 7905+00 7910+00 7915+00 7920+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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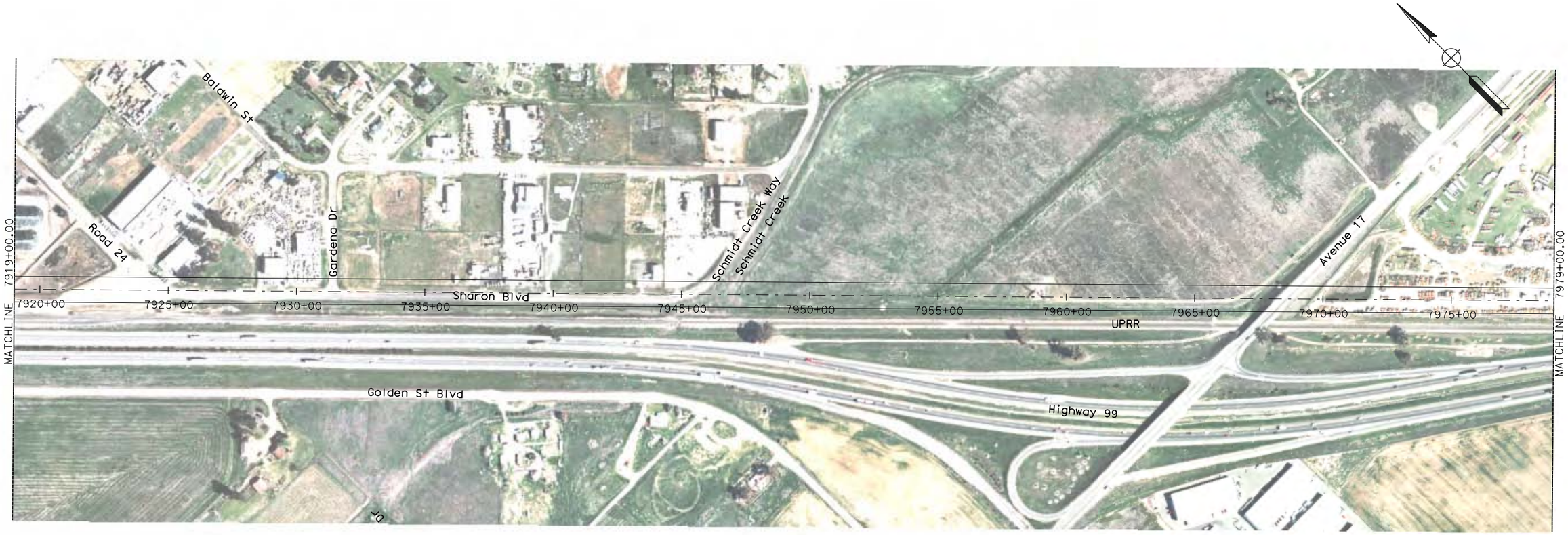
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-32



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7920+00 7925+00 7930+00 7935+00 7940+00 7945+00 7950+00 7955+00 7960+00 7965+00 7970+00 7975+00 7980+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-33

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

7980+00 7985+00 7990+00 7995+00 8000+00 8005+00 8010+00 8015+00 8020+00 8025+00 8030+00 8035+00 8040+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-34

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

ELEVATED

8040+00 8045+00 8050+00 8055+00 8060+00 8065+00 8070+00 8075+00 8080+00 8085+00 8090+00 8095+00 8100+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-35

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

8100+00 8105+00 8110+00 8115+00 8120+00 8125+00 8130+00 8135+00 8140+00 8145+00 8150+00 8155+00 8160+00

200 0 200 400

1"=200'

DESIGNED BY	
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IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-36

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

8160+00 8165+00 8170+00 8175+00 8180+00 8185+00 8190+00 8195+00 8200+00 8205+00 8210+00 8215+00 8220+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-37

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

8220+00 8225+00 8230+00 8235+00 8240+00 8245+00 8250+00 8255+00 8260+00 8265+00 8270+00 8275+00 8280+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-38

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

8280+00 8285+00 8290+00 8295+00 8300+00 8305+00 8310+00 8315+00 8320+00 8325+00 8330+00 8335+00 8340+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-39

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8340+00 8345+00 8350+00 8355+00 8360+00 8365+00 8370+00 8375+00 8380+00 8385+00 8390+00 8395+00 8400+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-40

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8400+00 8405+00 8410+00 8415+00 8420+00 8425+00 8430+00 8435+00 8440+00 8445+00 8450+00 8455+00 8460+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

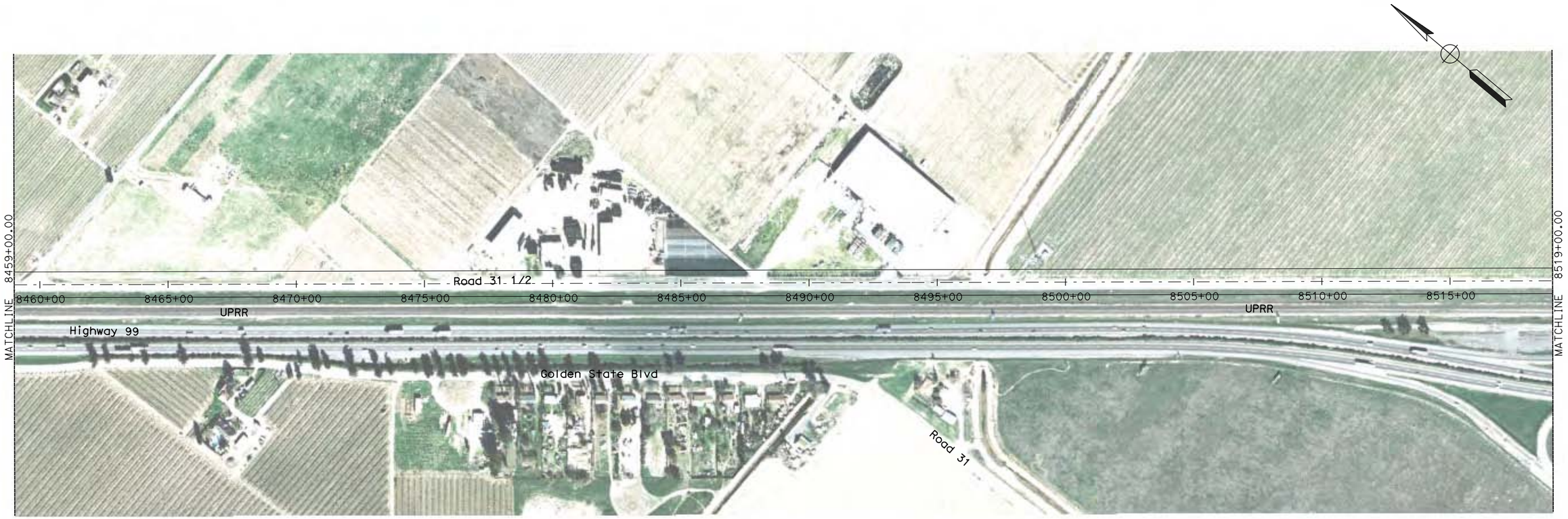
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-41



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8460+00 8465+00 8470+00 8475+00 8480+00 8485+00 8490+00 8495+00 8500+00 8505+00 8510+00 8515+00 8520+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

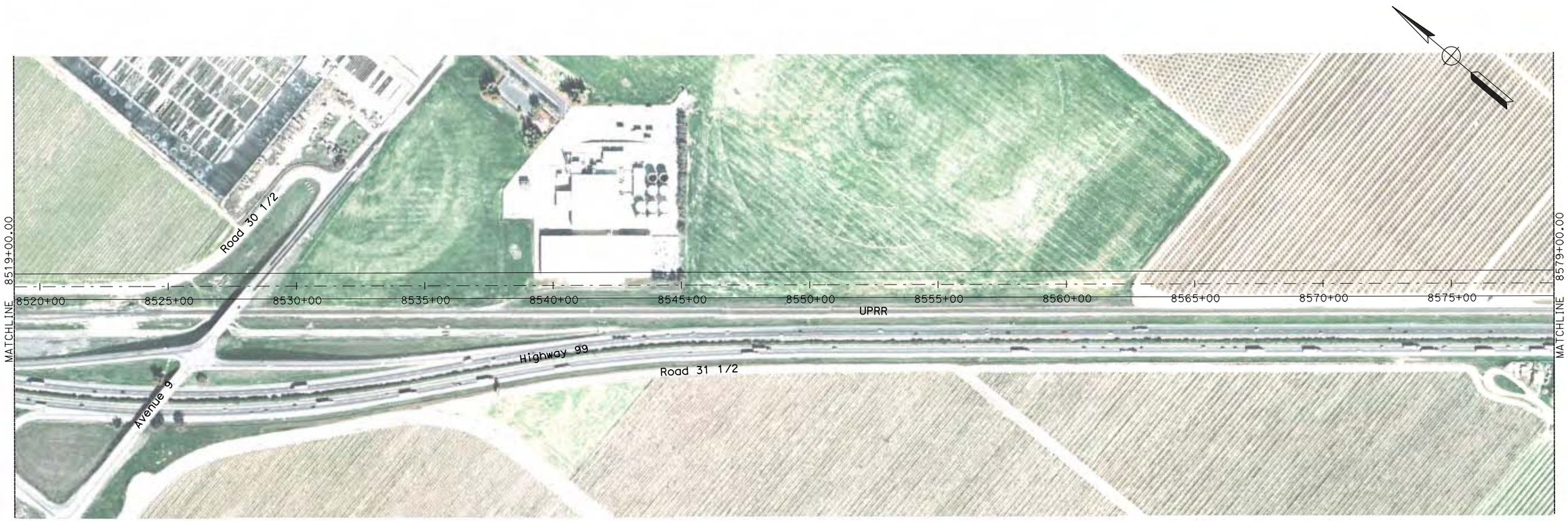
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-42



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8520+00 8525+00 8530+00 8535+00 8540+00 8545+00 8550+00 8555+00 8560+00 8565+00 8570+00 8575+00 8580+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-43

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8580+00 8585+00 8590+00 8595+00 8600+00 8605+00 8610+00 8615+00 8620+00 8625+00 8630+00 8635+00 8640+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

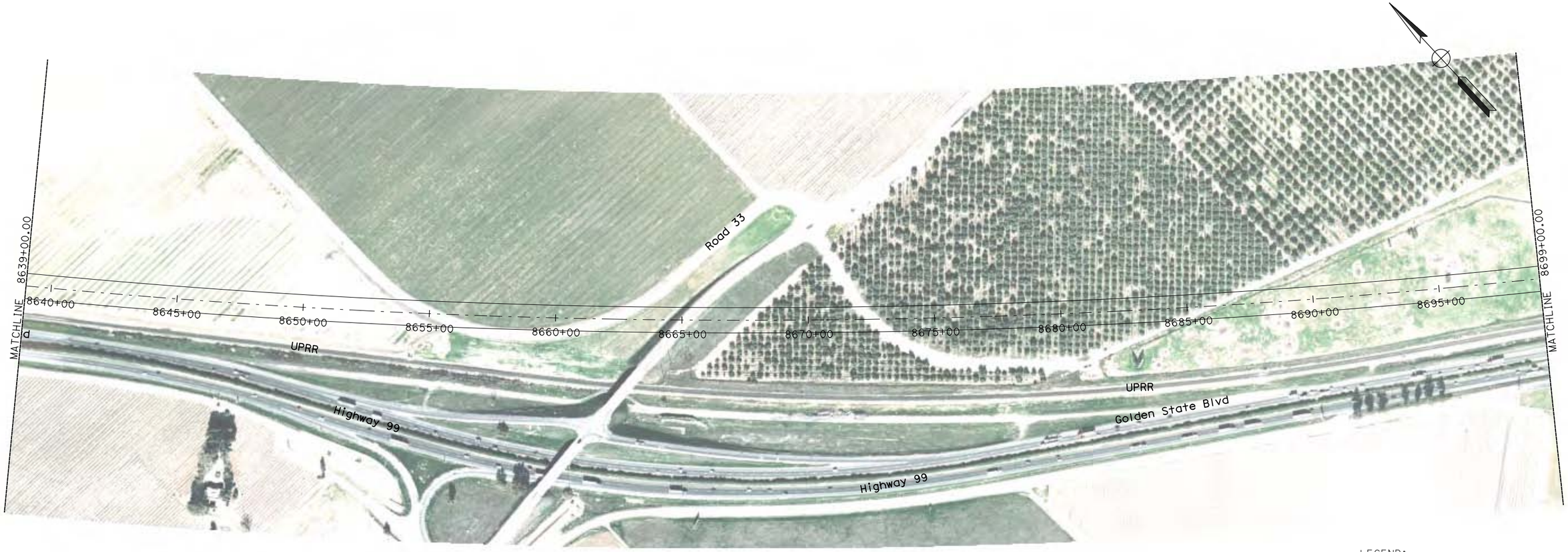
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-44



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8640+00 8645+00 8650+00 8655+00 8660+00 8665+00 8670+00 8675+00 8680+00 8685+00 8690+00 8695+00 8700+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

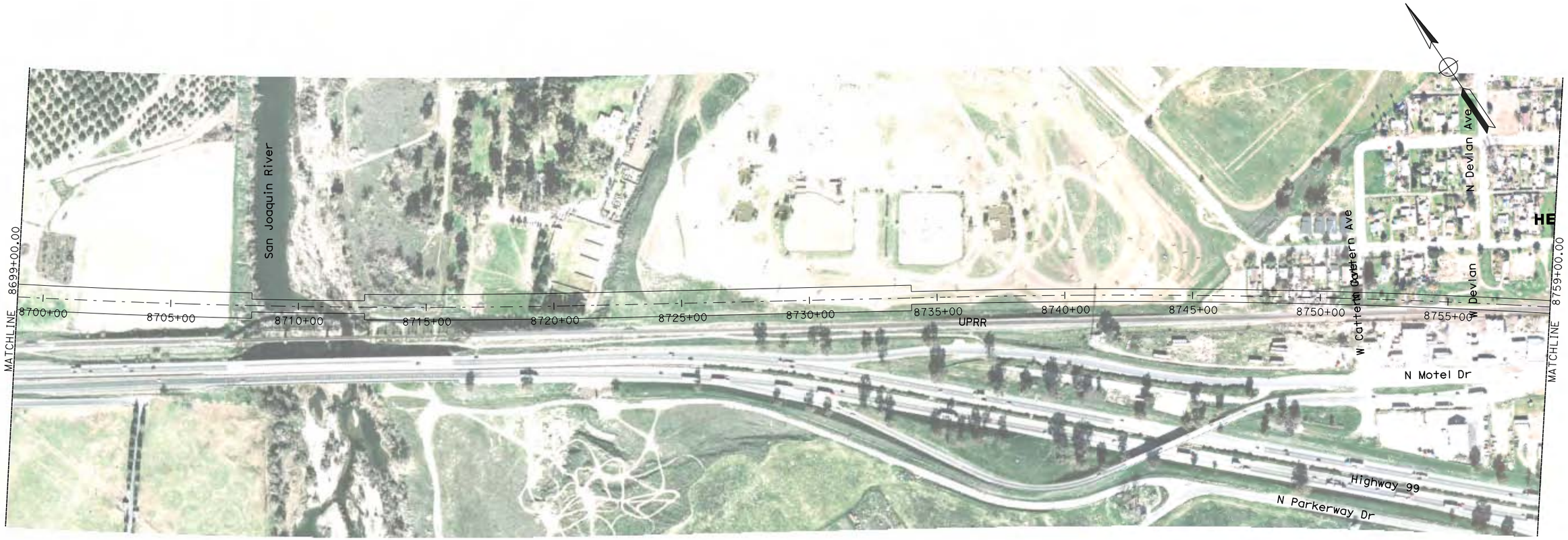
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-45



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

8700+00 8705+00 8710+00 8715+00 8720+00 8725+00 8730+00 8735+00 8740+00 8745+00 8750+00 8755+00 8760+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-46

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

8760+00 8765+00 8770+00 8775+00 8780+00 8785+00 8790+00 8795+00 8800+00 8805+00 8810+00 8815+00 8820+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

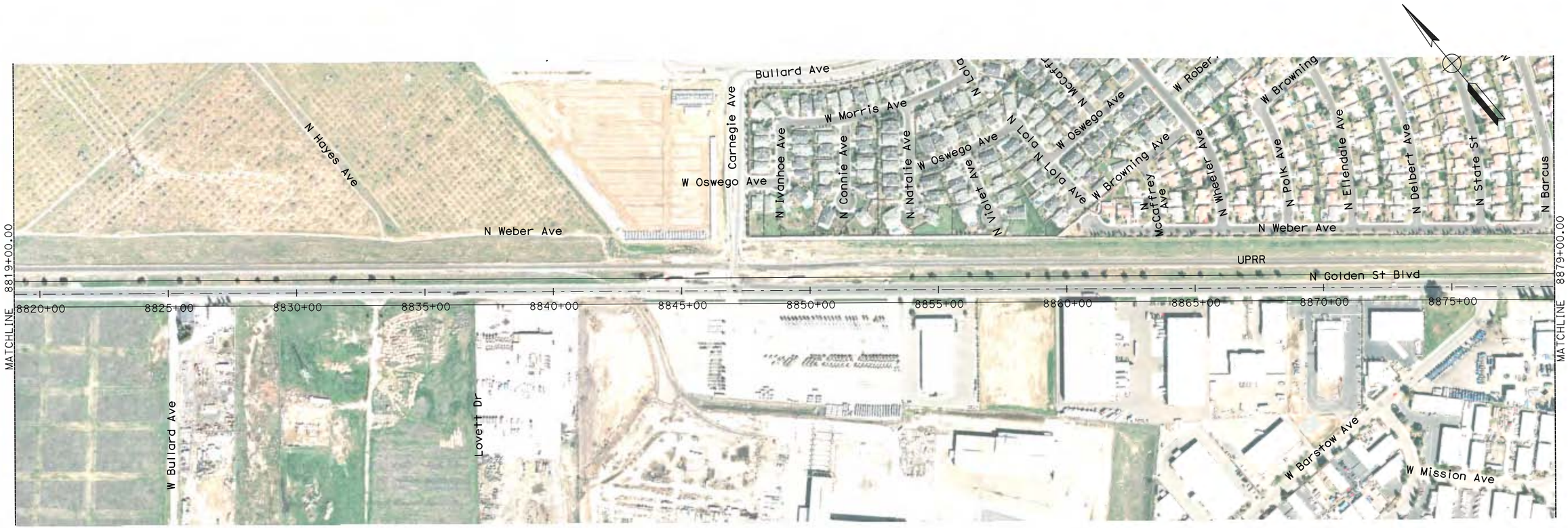
FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-47



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8820+00 8825+00 8830+00 8835+00 8840+00 8845+00 8850+00 8855+00 8860+00 8865+00 8870+00 8875+00 8880+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-48

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8880+00 8885+00 8890+00 8895+00 8900+00 8905+00 8910+00 8915+00 8920+00 8925+00 8930+00 8935+00 8940+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-49

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8940+00 8945+00 8950+00 8955+00 8960+00 8965+00 8970+00 8975+00 8980+00 8985+00 8990+00 8995+00 9000+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-50

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9000+00 9005+00 9010+00 9015+00 9020+00 9025+00 9030+00 9035+00 9040+00 9045+00 9050+00 9055+00 9060+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A2-51

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9060+00 9065+00 9070+00 9075+00 9080+00 9085+00 9090+00 9095+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

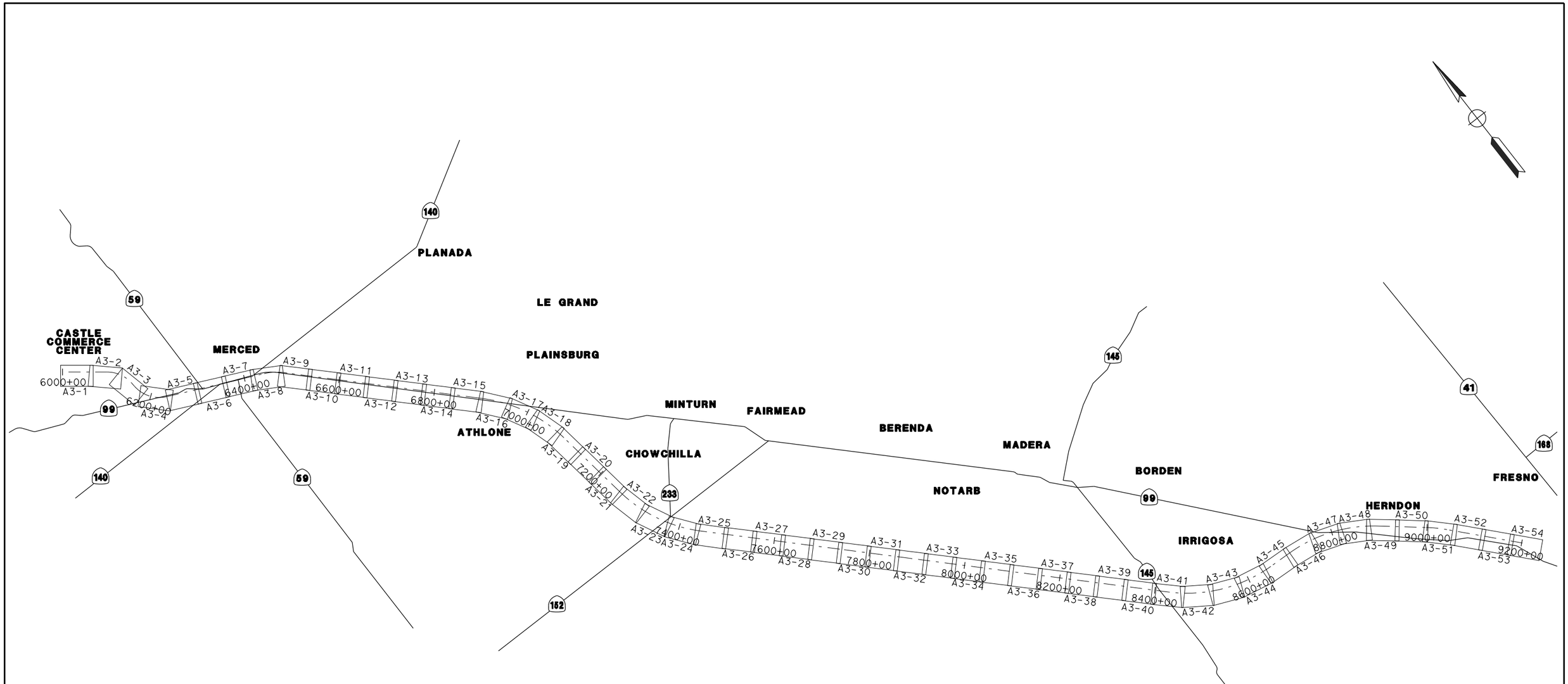
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A2

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A2-52



10,000 0 10,000 20,000
1"=10,000'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

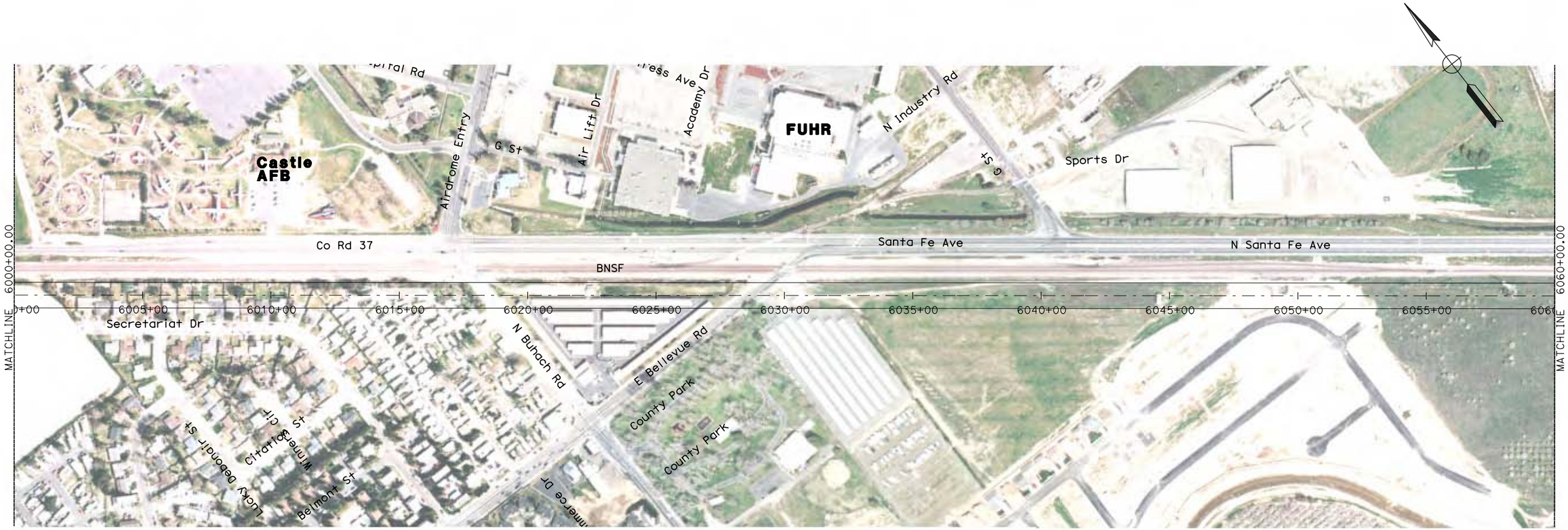
AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 10,000'
SHEET NO.	A3-KEY MAP



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6000+00 6005+00 6010+00 6015+00 6020+00 6025+00 6030+00 6035+00 6040+00 6045+00 6050+00 6055+00 6060+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

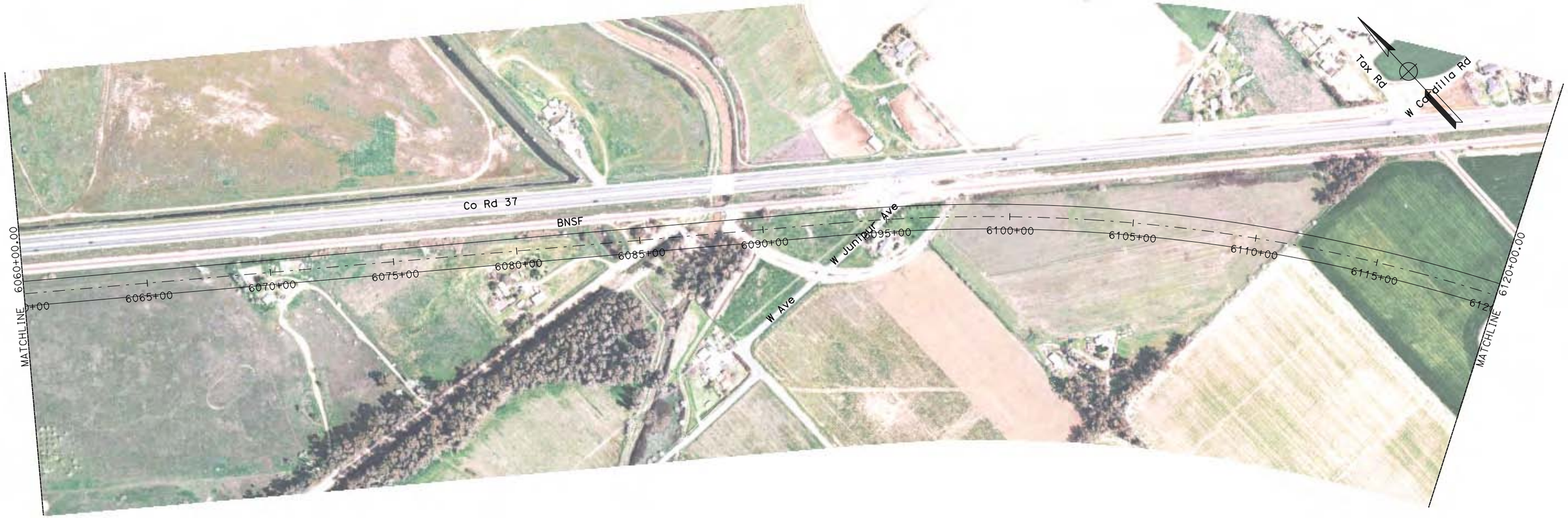
FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-1



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6060+00 6065+00 6070+00 6075+00 6080+00 6085+00 6090+00 6095+00 6100+00 6105+00 6110+00 6115+00 6120+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-2

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

6120+00 6125+00 6130+00 6135+00 6140+00 6145+00 6150+00 6155+00 6160+00 6165+00 6170+00 6175+00 6180+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-3

RETAINED FILL

ELEVATED

6180+00 6185+00 6190+00 6195+00 6200+00 6205+00 6210+00 6215+00 6220+00 6225+00 6230+00 6235+00 6240+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-4

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

6240+00 6245+00 6250+00 6255+00 6260+00 6265+00 6270+00 6275+00 6280+00 6285+00 6290+00 6295+00 6300+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

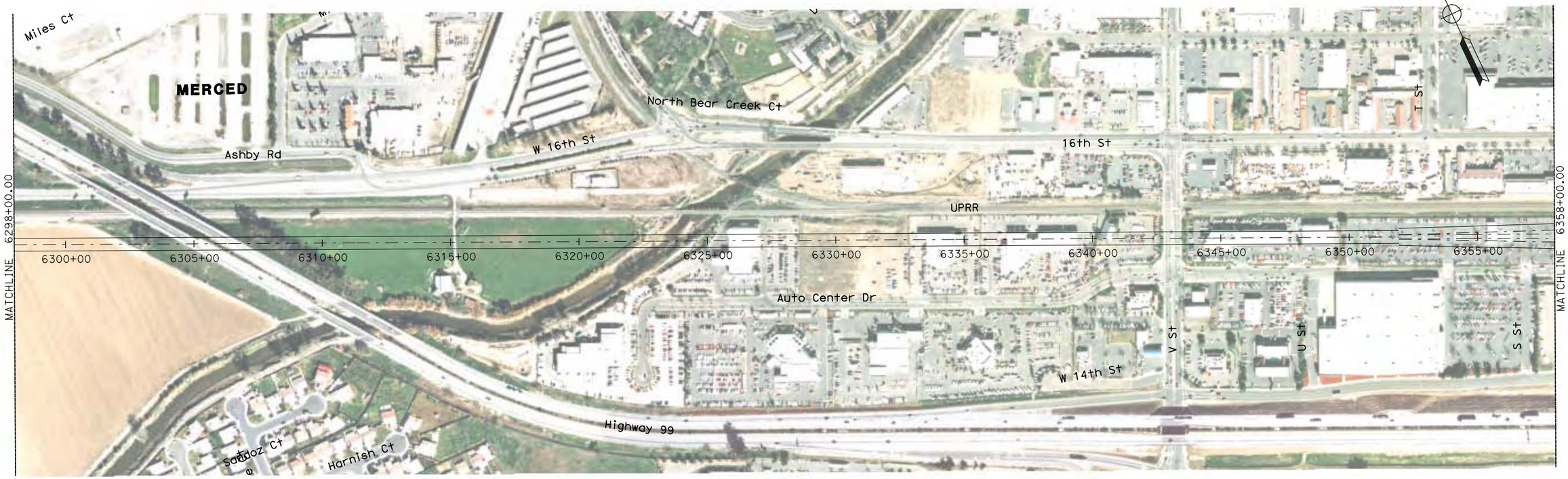
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-5



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

STATION - ELEVATED

6300+00 6305+00 6310+00 6315+00 6320+00 6325+00 6330+00 6335+00 6340+00 6345+00 6350+00 6355+00 6360+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

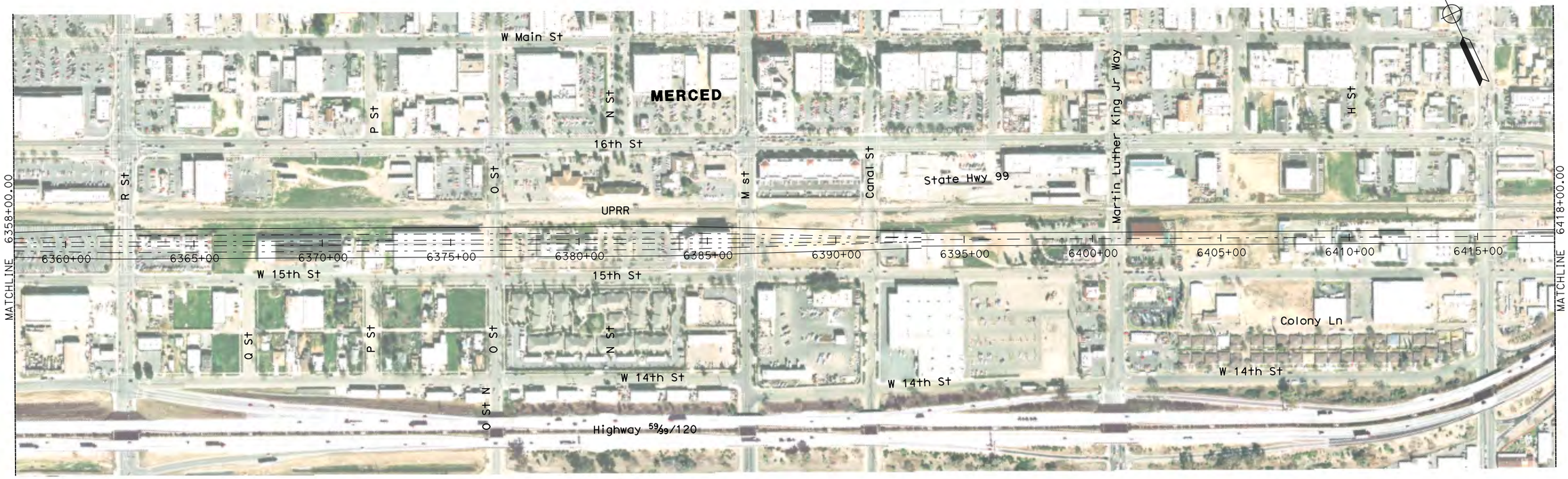
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-6



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

STATION - ELEVATED

ELEVATED

6360+00 6365+00 6370+00 6375+00 6380+00 6385+00 6390+00 6395+00 6400+00 6405+00 6410+00 6415+00 6420+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-7

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

6420+00 6425+00 6430+00 6435+00 6440+00 6445+00 6450+00 6455+00 6460+00 6465+00 6470+00 6475+00 6480+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-8

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

AT-GRADE

6480+00 6485+00 6490+00 6495+00 6500+00 6505+00 6510+00 6515+00 6520+00 6525+00 6530+00 6535+00 6540+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-9

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6540+00 6545+00 6550+00 6555+00 6560+00 6565+00 6570+00 6575+00 6580+00 6585+00 6590+00 6595+00 6600+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

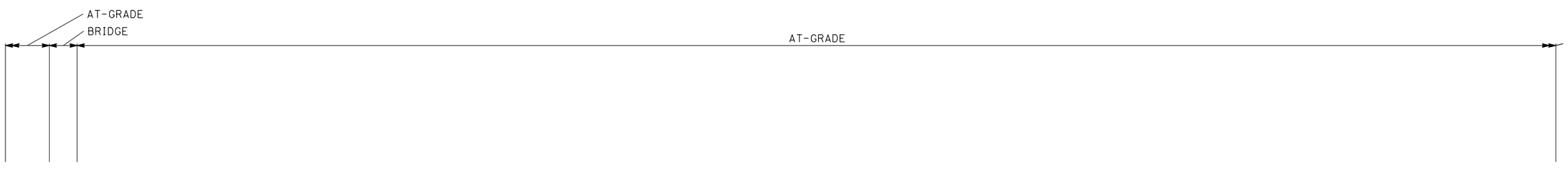
Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-10

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6600+00 6605+00 6610+00 6615+00 6620+00 6625+00 6630+00 6635+00 6640+00 6645+00 6650+00 6655+00 6660+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-11

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

6660+00 6665+00 6670+00 6675+00 6680+00 6685+00 6690+00 6695+00 6700+00 6705+00 6710+00 6715+00 6720+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-12

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6720+00 6725+00 6730+00 6735+00 6740+00 6745+00 6750+00 6755+00 6760+00 6765+00 6770+00 6775+00 6780+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-13

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6780+00 6785+00 6790+00 6795+00 6800+00 6805+00 6810+00 6815+00 6820+00 6825+00 6830+00 6835+00 6840+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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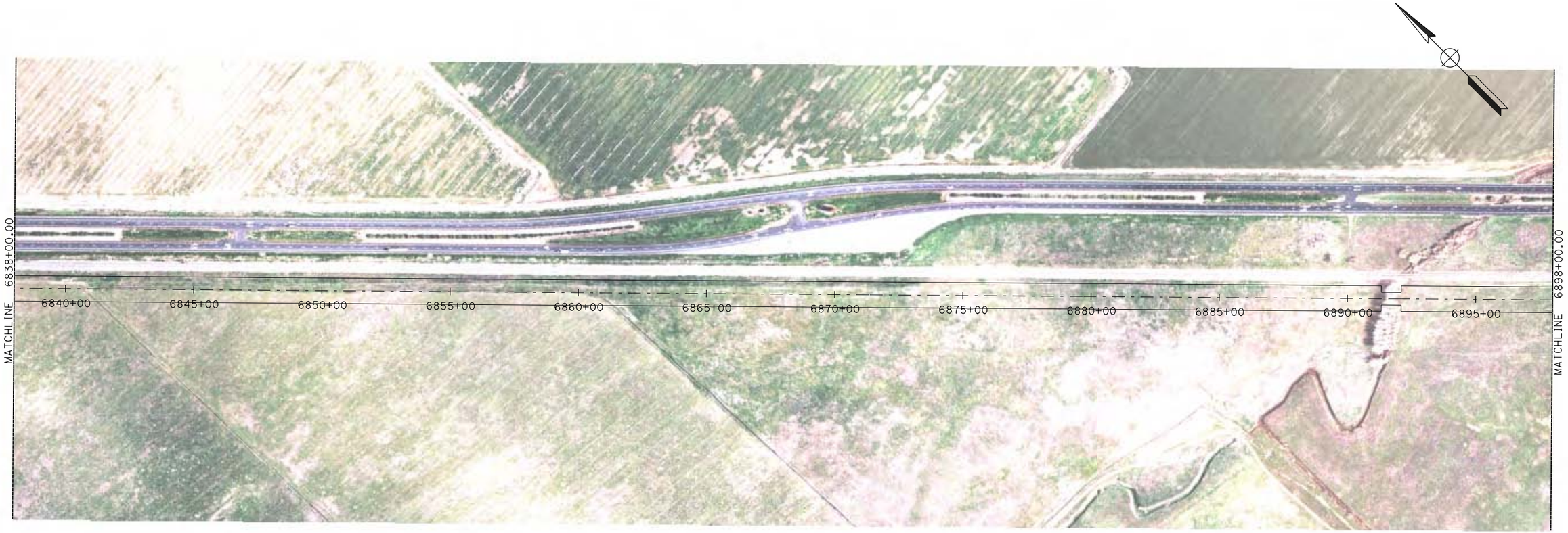
CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-14



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

BRIDGE

AT-GRADE

AT-GRADE

6840+00 6845+00 6850+00 6855+00 6860+00 6865+00 6870+00 6875+00 6880+00 6885+00 6890+00 6895+00 6900+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-15

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6900+00 6905+00 6910+00 6915+00 6920+00 6925+00 6930+00 6935+00 6940+00 6945+00 6950+00 6955+00 6960+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

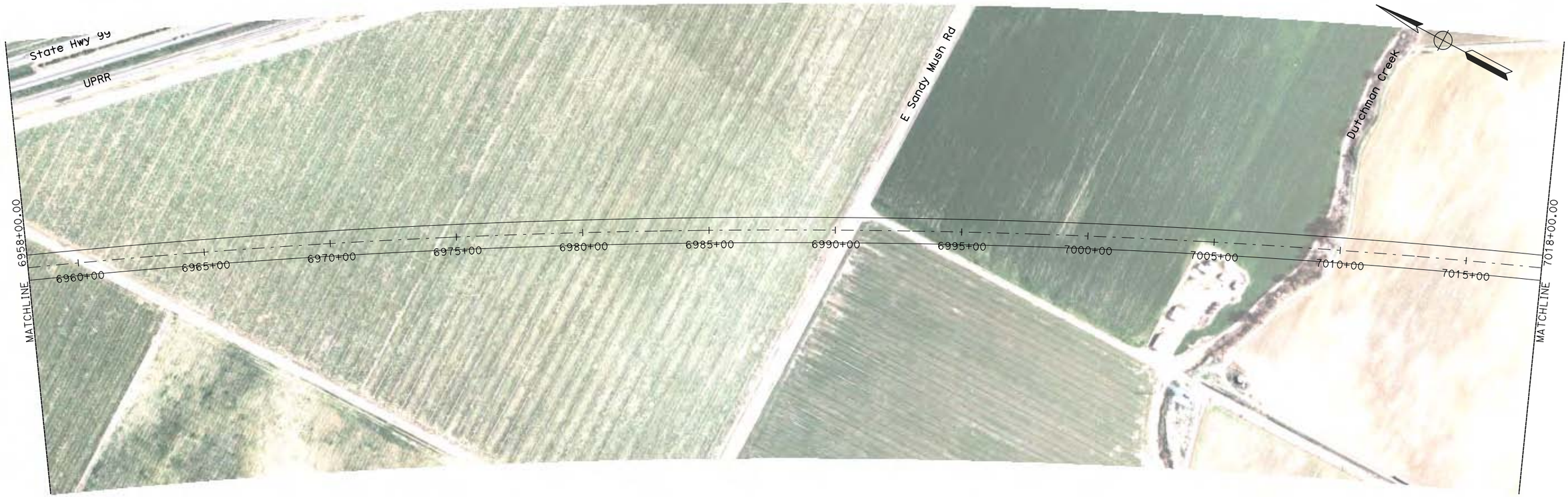
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-16



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6960+00 6965+00 6970+00 6975+00 6980+00 6985+00 6990+00 6995+00 7000+00 7005+00 7010+00 7015+00 7020+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-17

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7020+00 7025+00 7030+00 7035+00 7040+00 7045+00 7050+00 7055+00 7060+00 7065+00 7070+00 7075+00 7080+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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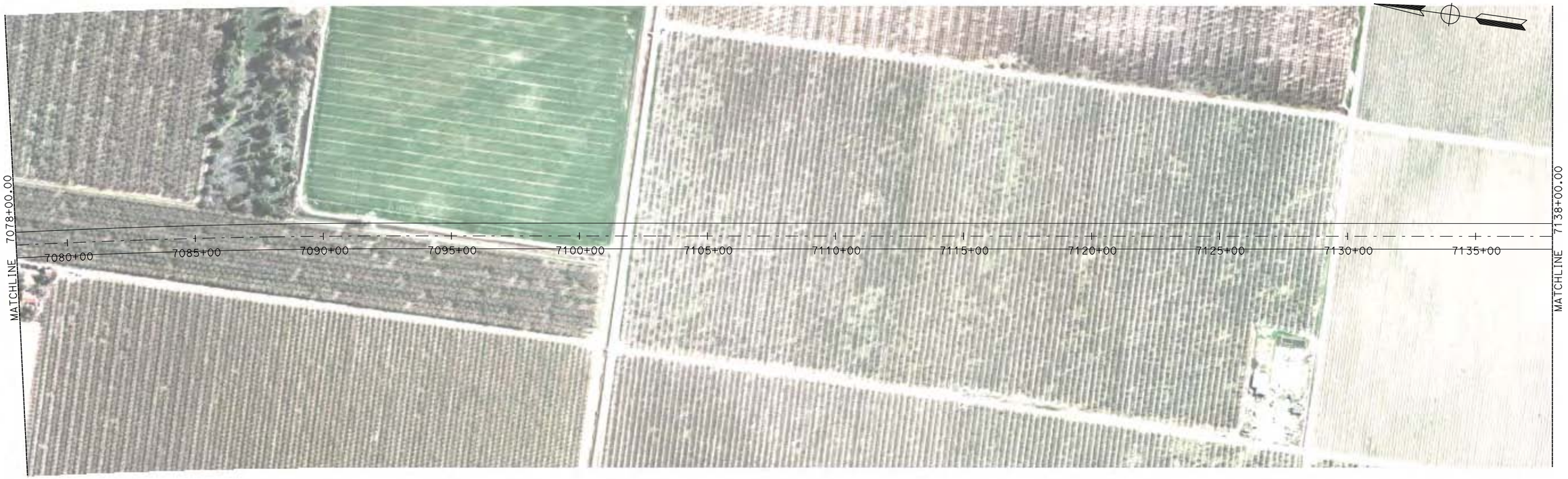
CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-18



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7080+00 7085+00 7090+00 7095+00 7100+00 7105+00 7110+00 7115+00 7120+00 7125+00 7130+00 7135+00 7140+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-19

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7140+00 7145+00 7150+00 7155+00 7160+00 7165+00 7170+00 7175+00 7180+00 7185+00 7190+00 7195+00 7200+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

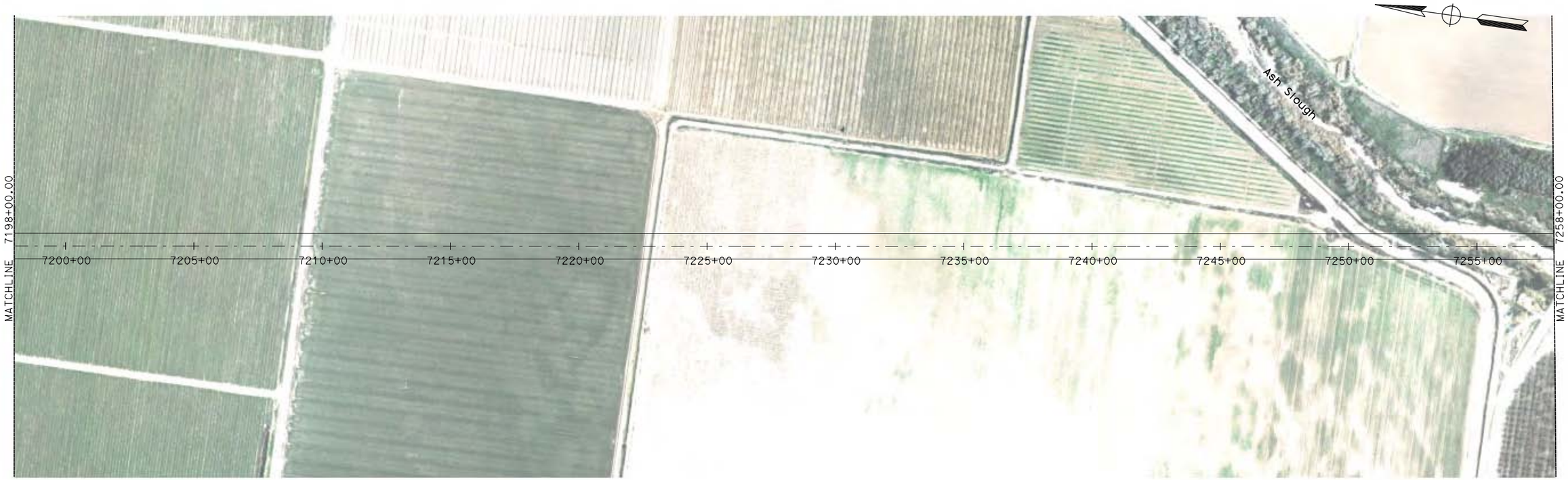
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-20



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7200+00 7205+00 7210+00 7215+00 7220+00 7225+00 7230+00 7235+00 7240+00 7245+00 7250+00 7255+00 7260+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-21

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7260+00 7265+00 7270+00 7275+00 7280+00 7285+00 7290+00 7295+00 7300+00 7305+00 7310+00 7315+00 7320+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-22

AT-GRADE

7320+00 7325+00 7330+00 7335+00 7340+00 7345+00 7350+00 7355+00 7360+00 7365+00 7370+00 7375+00 7380+00

200 0 200 400
1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-23

AT-GRADE

7380+00 7385+00 7390+00 7395+00 7400+00 7405+00 7410+00 7415+00 7420+00 7425+00 7430+00 7435+00 7440+00

200 0 200 400
1"=200'

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

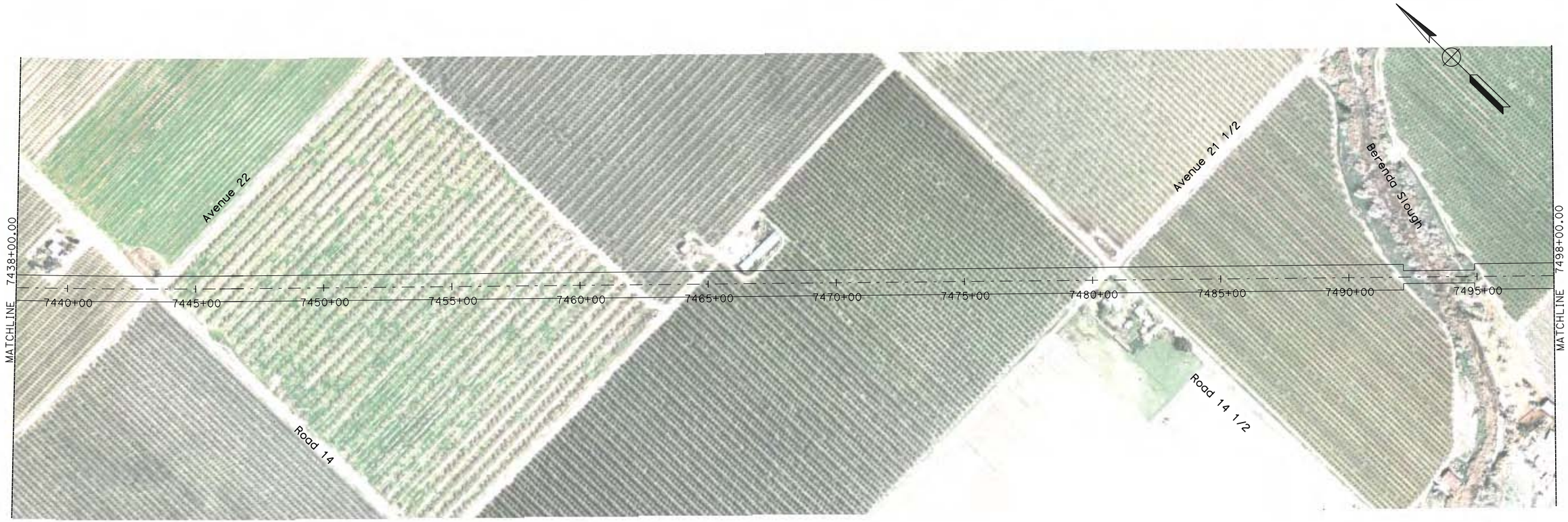
AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000
DRAWING NO. XXX-XXX
SCALE 1"= 200'
SHEET NO. A3-24



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7440+00 7445+00 7450+00 7455+00 7460+00 7465+00 7470+00 7475+00 7480+00 7485+00 7490+00 7495+00 7500+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-25

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7500+00 7505+00 7510+00 7515+00 7520+00 7525+00 7530+00 7535+00 7540+00 7545+00 7550+00 7555+00 7560+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-26

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7560+00 7565+00 7570+00 7575+00 7580+00 7585+00 7590+00 7595+00 7600+00 7605+00 7610+00 7615+00 7620+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-27

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7620+00 7625+00 7630+00 7635+00 7640+00 7645+00 7650+00 7655+00 7660+00 7665+00 7670+00 7675+00 7680+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

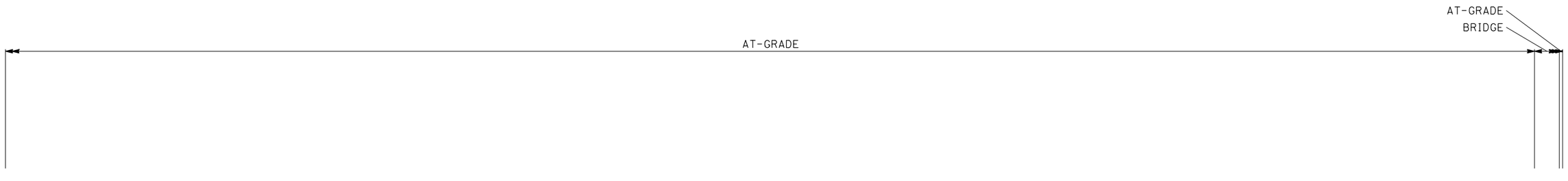
SCALE 1"= 200'

SHEET NO. A3-28

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



7680+00 7685+00 7690+00 7695+00 7700+00 7705+00 7710+00 7715+00 7720+00 7725+00 7730+00 7735+00 7740+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-29

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7740+00 7745+00 7750+00 7755+00 7760+00 7765+00 7770+00 7775+00 7780+00 7785+00 7790+00 7795+00 7800+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. 30

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7800+00 7805+00 7810+00 7815+00 7820+00 7825+00 7830+00 7835+00 7840+00 7845+00 7850+00 7855+00 7860+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-31

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

7860+00 7865+00 7870+00 7875+00 7880+00 7885+00 7890+00 7895+00 7900+00 7905+00 7910+00 7915+00 7920+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-32

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7920+00 7925+00 7930+00 7935+00 7940+00 7945+00 7950+00 7955+00 7960+00 7965+00 7970+00 7975+00 7980+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-33

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7980+00 7985+00 7990+00 7995+00 8000+00 8005+00 8010+00 8015+00 8020+00 8025+00 8030+00 8035+00 8040+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

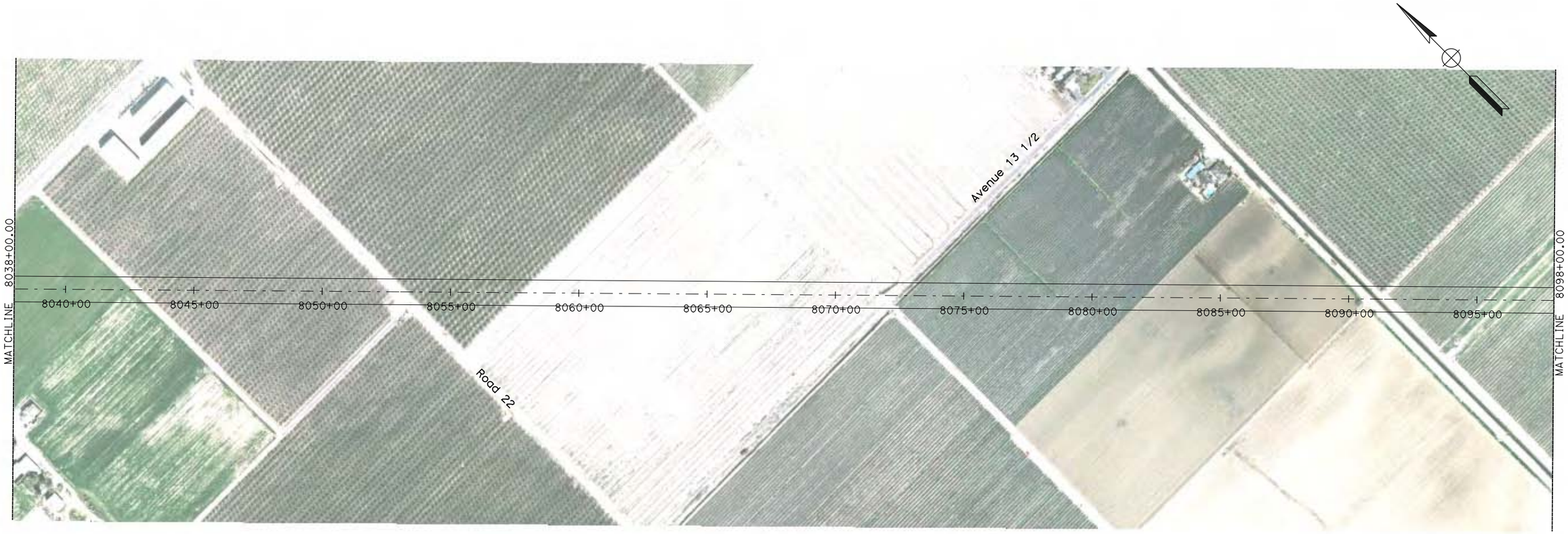
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-34



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8040+00 8045+00 8050+00 8055+00 8060+00 8065+00 8070+00 8075+00 8080+00 8085+00 8090+00 8095+00 8100+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-35

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8100+00 8105+00 8110+00 8115+00 8120+00 8125+00 8130+00 8135+00 8140+00 8145+00 8150+00 8155+00 8160+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-36

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8160+00 8165+00 8170+00 8175+00 8180+00 8185+00 8190+00 8195+00 8200+00 8205+00 8210+00 8215+00 8220+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-37

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8220+00 8225+00 8230+00 8235+00 8240+00 8245+00 8250+00 8255+00 8260+00 8265+00 8270+00 8275+00 8280+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-38

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8280+00 8285+00 8290+00 8295+00 8300+00 8305+00 8310+00 8315+00 8320+00 8325+00 8330+00 8335+00 8340+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

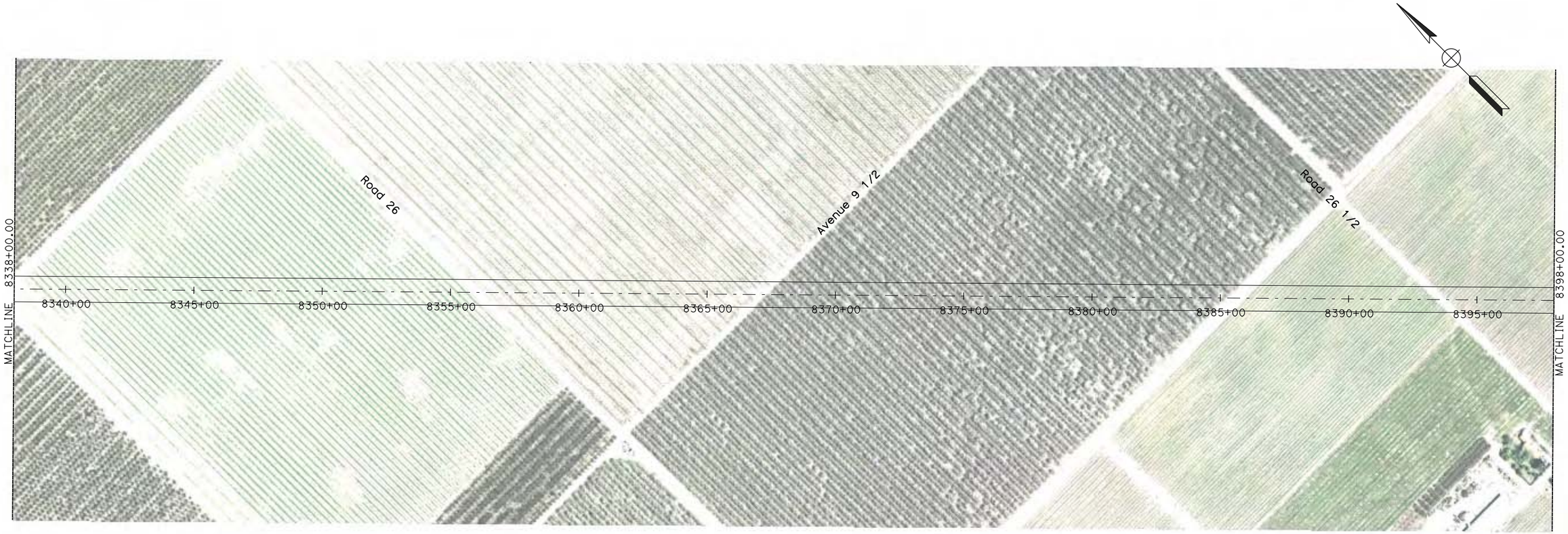
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-39



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8340+00 8345+00 8350+00 8355+00 8360+00 8365+00 8370+00 8375+00 8380+00 8385+00 8390+00 8395+00 8400+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-40

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8400+00 8405+00 8410+00 8415+00 8420+00 8425+00 8430+00 8435+00 8440+00 8445+00 8450+00 8455+00 8460+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-41

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8460+00 8465+00 8470+00 8475+00 8480+00 8485+00 8490+00 8495+00 8500+00 8505+00 8510+00 8515+00 8520+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-42

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8520+00 8525+00 8530+00 8535+00 8540+00 8545+00 8550+00 8555+00 8560+00 8565+00 8570+00 8575+00 8580+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-43

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8580+00 8585+00 8590+00 8595+00 8600+00 8605+00 8610+00 8615+00 8620+00 8625+00 8630+00 8635+00 8640+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-44

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8640+00 8645+00 8650+00 8655+00 8660+00 8665+00 8670+00 8675+00 8680+00 8685+00 8690+00 8695+00 8700+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-45

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8700+00 8705+00 8710+00 8715+00 8720+00 8725+00 8730+00 8735+00 8740+00 8745+00 8750+00 8755+00 8760+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-46

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

ELEVATED

8760+00 8765+00 8770+00 8775+00 8780+00 8785+00 8790+00 8795+00 8800+00 8805+00 8810+00 8815+00 8820+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

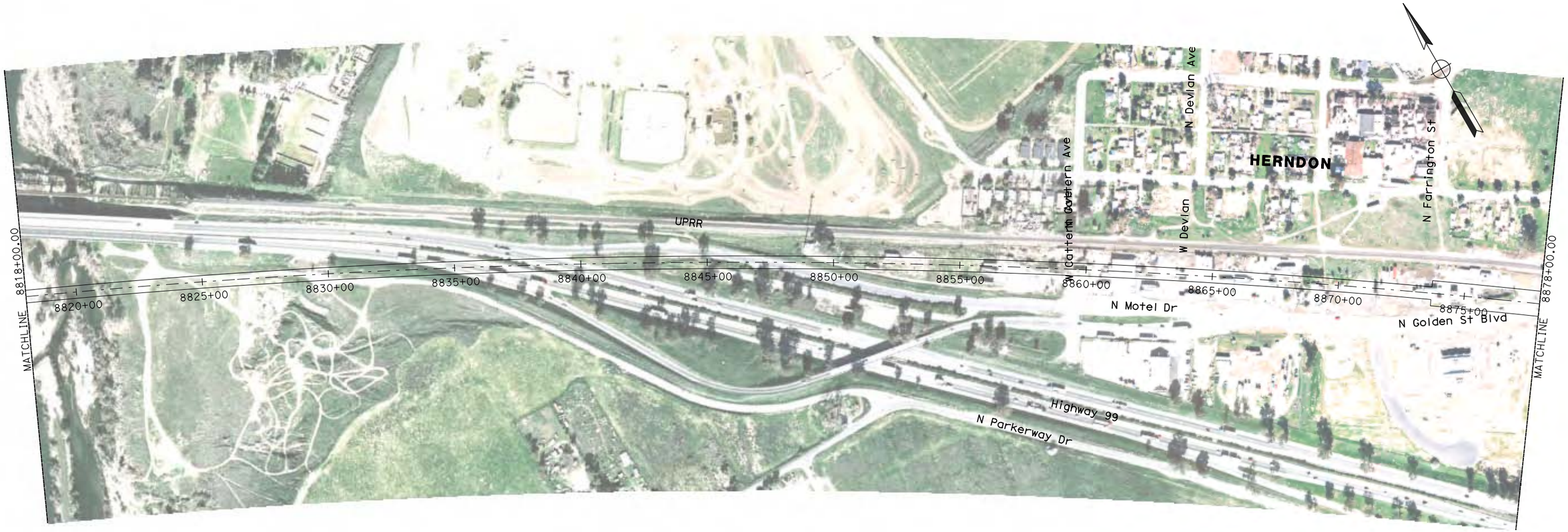
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-47



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

8820+00 8825+00 8830+00 8835+00 8840+00 8845+00 8850+00 8855+00 8860+00 8865+00 8870+00 8875+00 8880+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

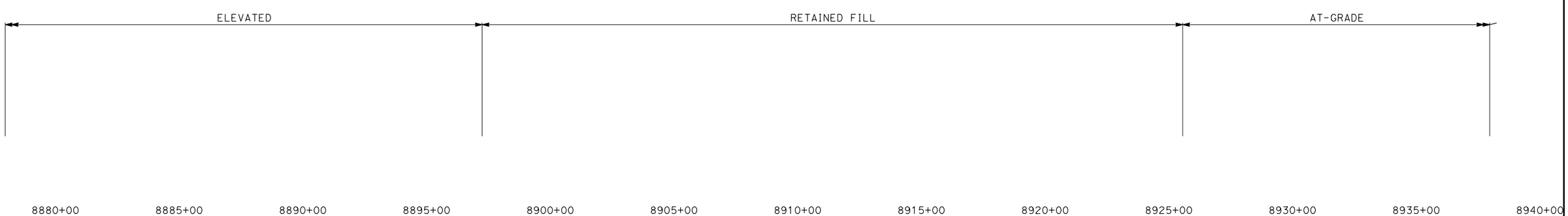
SCALE 1"= 200'

SHEET NO. A3-48

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-49

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8940+00 8945+00 8950+00 8955+00 8960+00 8965+00 8970+00 8975+00 8980+00 8985+00 8990+00 8995+00 9000+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-50

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9000+00 9005+00 9010+00 9015+00 9020+00 9025+00 9030+00 9035+00 9040+00 9045+00 9050+00 9055+00 9060+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-51

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9060+00 9065+00 9070+00 9075+00 9080+00 9085+00 9090+00 9095+00 9100+00 9105+00 9110+00 9115+00 9120+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

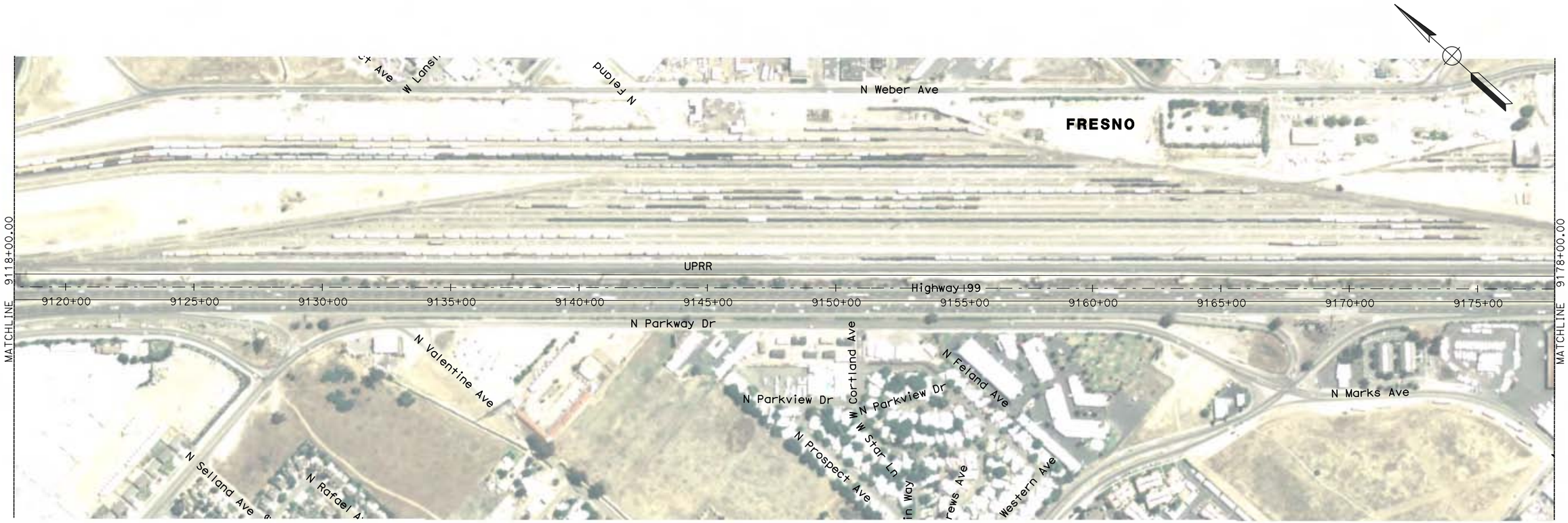
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-52



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9120+00 9125+00 9130+00 9135+00 9140+00 9145+00 9150+00 9155+00 9160+00 9165+00 9170+00 9175+00 9180+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A3-53

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9180+00 9185+00 9190+00 9195+00 9200+00 9205+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

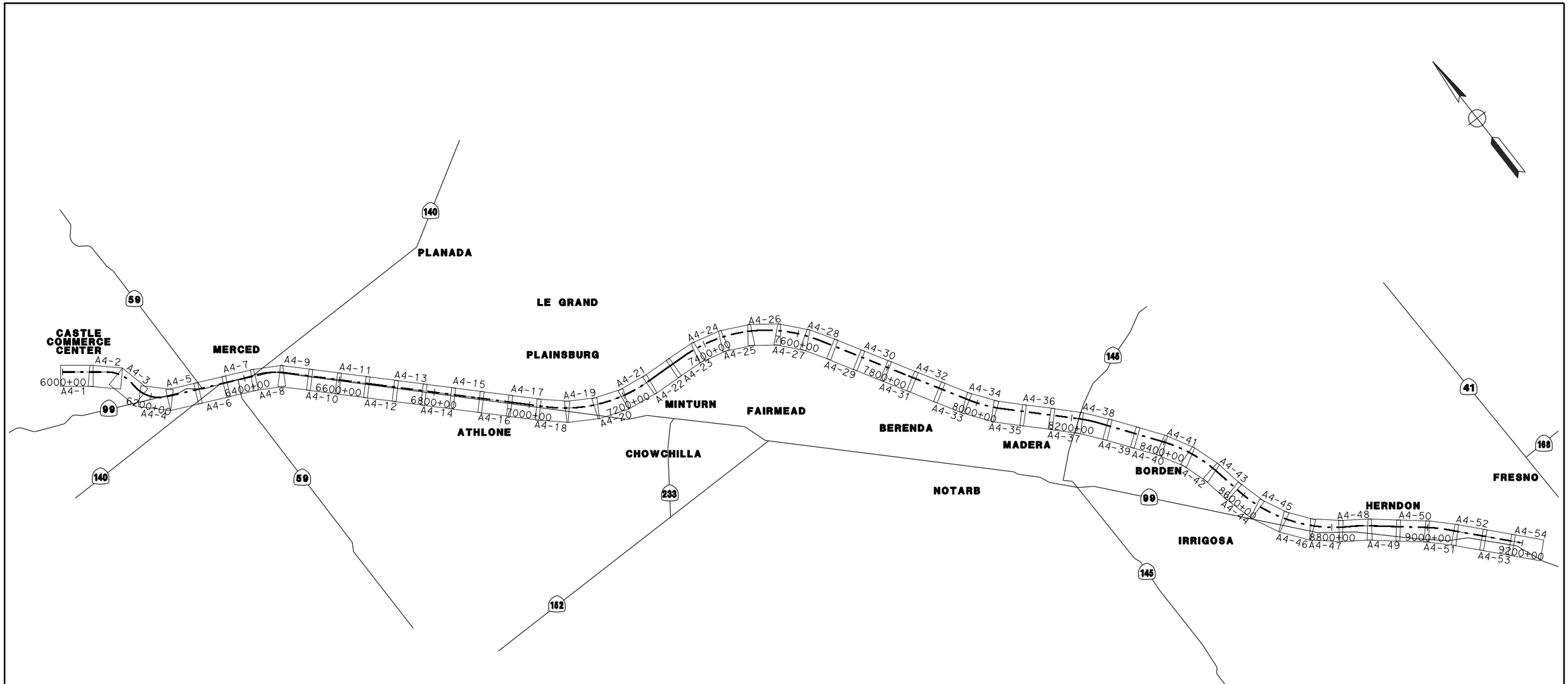
FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A3

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A3-54



10,000 0 10,000 20,000

1"=10,000'

DESIGNED BY	X.XXXXX
DRAWN BY	Y.YYYY
CHECKED BY	Z.ZZZZ
IN CHARGE	A.AAAA
DATE	##-##-##

AECOM CH2MHILL

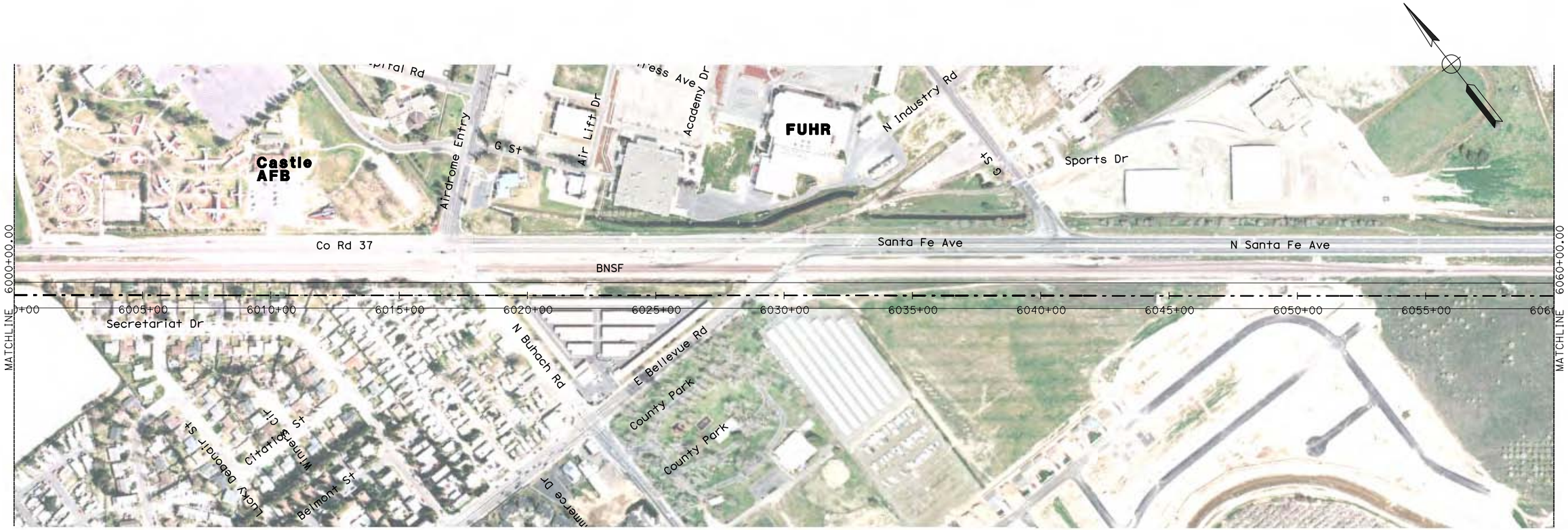
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 10,000'
SHEET NO.	A4-KEY MAP



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6000+00 6005+00 6010+00 6015+00 6020+00 6025+00 6030+00 6035+00 6040+00 6045+00 6050+00 6055+00 6060+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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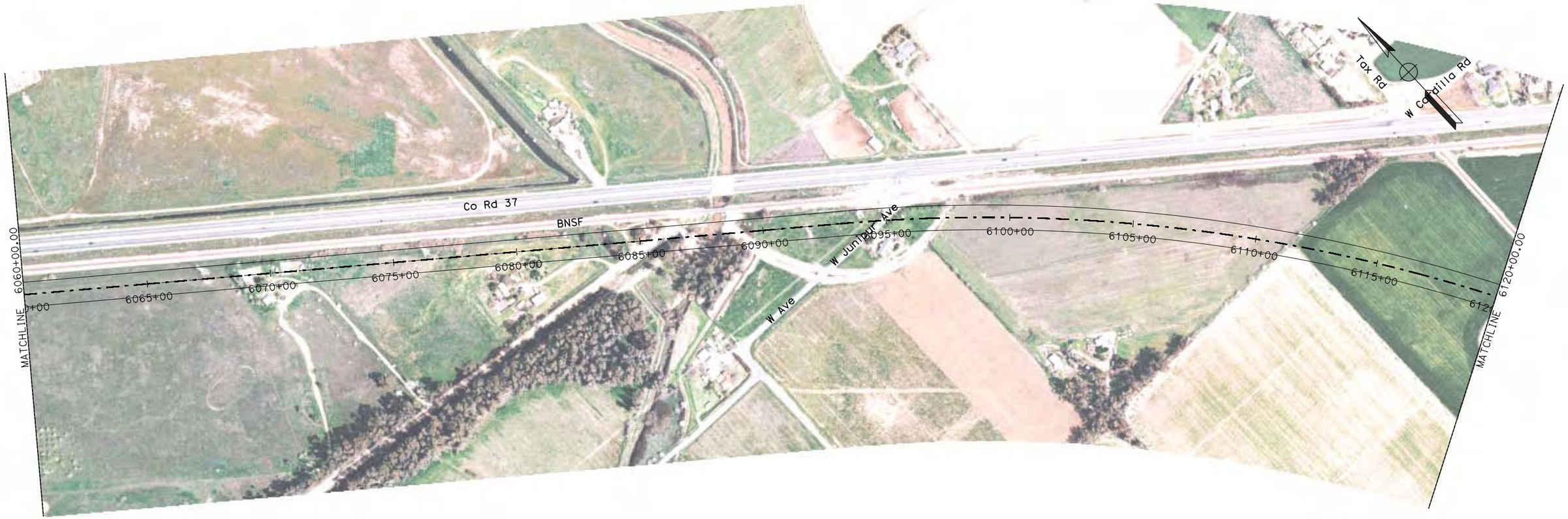
CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-1



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6060+00 6065+00 6070+00 6075+00 6080+00 6085+00 6090+00 6095+00 6100+00 6105+00 6110+00 6115+00 6120+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-2

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

6120+00 6125+00 6130+00 6135+00 6140+00 6145+00 6150+00 6155+00 6160+00 6165+00 6170+00 6175+00 6180+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

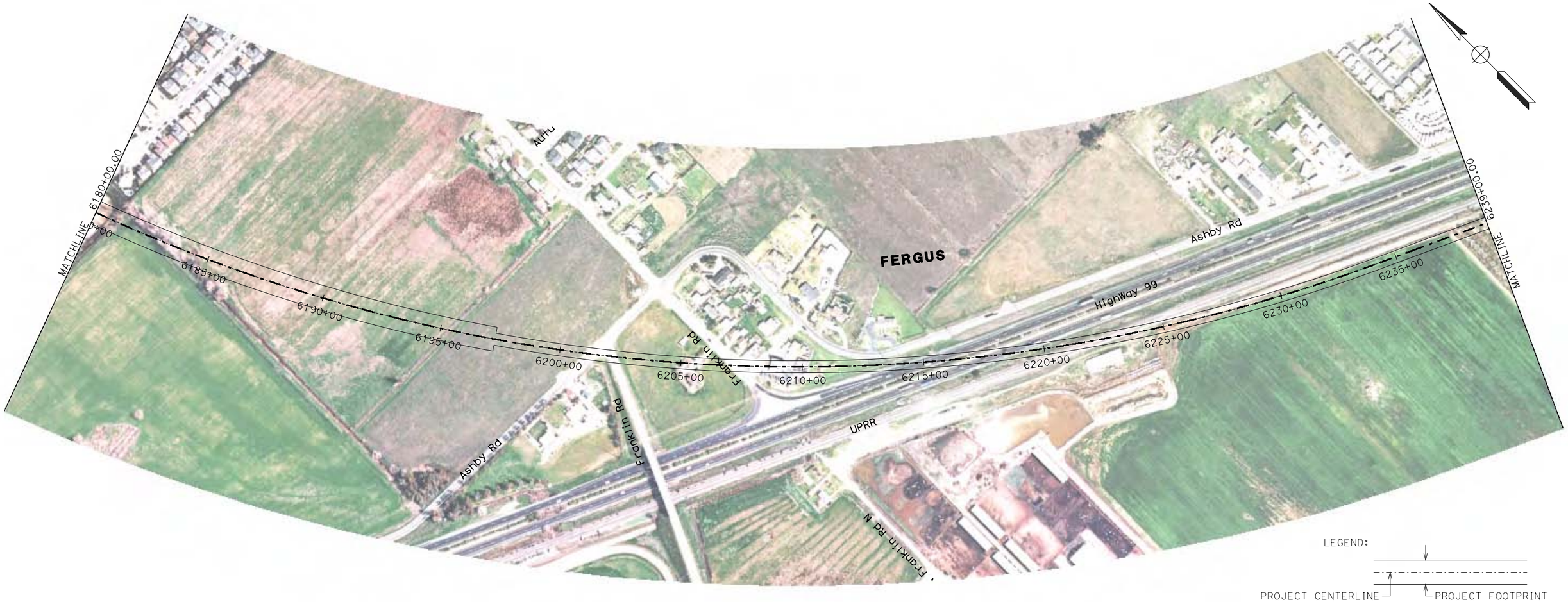
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-3



6180+00 6185+00 6190+00 6195+00 6200+00 6205+00 6210+00 6215+00 6220+00 6225+00 6230+00 6235+00 6240+00

200 0 200 400
1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-4

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

6240+00 6245+00 6250+00 6255+00 6260+00 6265+00 6270+00 6275+00 6280+00 6285+00 6290+00 6295+00 6300+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

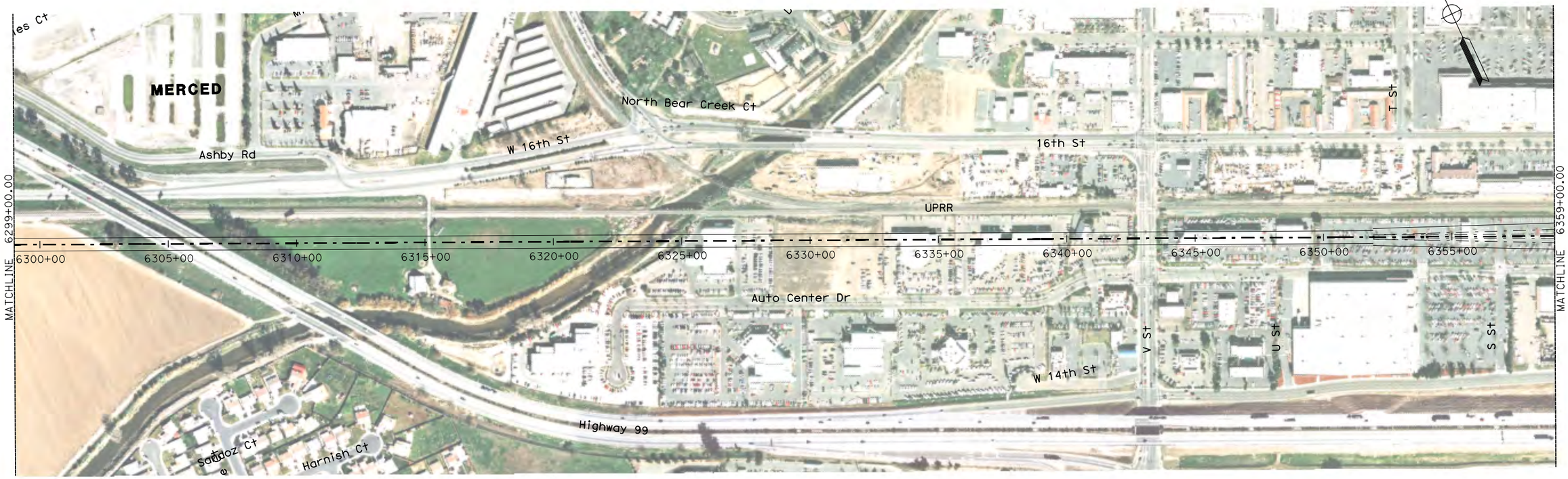
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-5



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

STATION - ELEVATED

6300+00 6305+00 6310+00 6315+00 6320+00 6325+00 6330+00 6335+00 6340+00 6345+00 6350+00 6355+00 6360+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

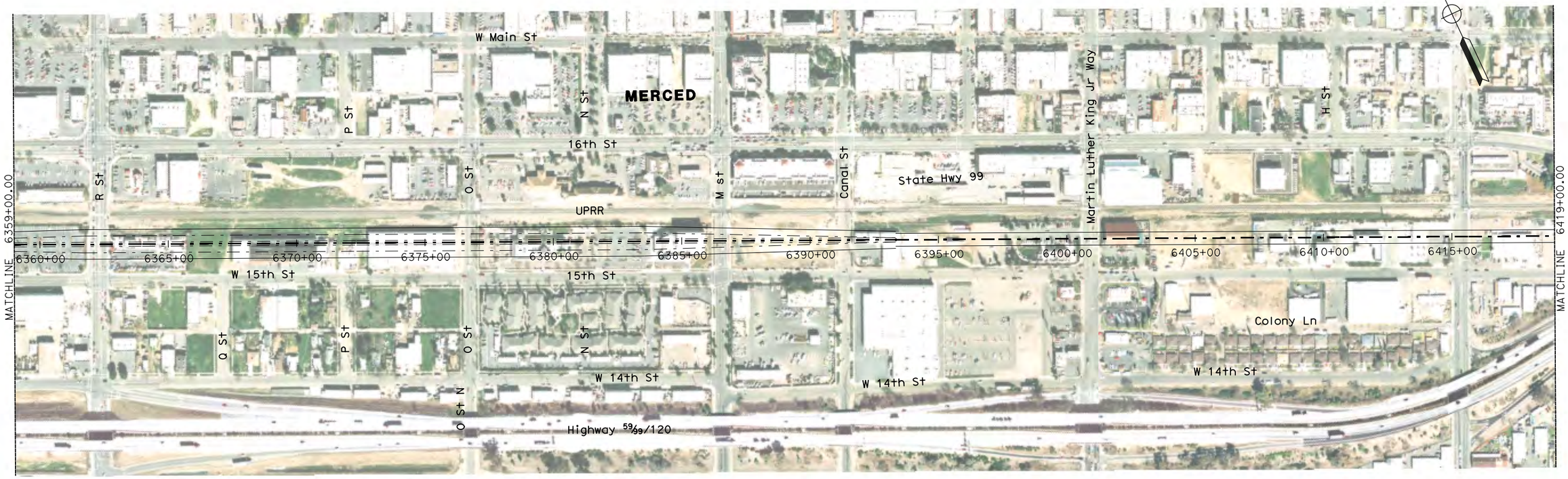
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-6



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

STATION - ELEVATED

ELEVATED

6360+00 6365+00 6370+00 6375+00 6380+00 6385+00 6390+00 6395+00 6400+00 6405+00 6410+00 6415+00 6420+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-7

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

6420+00 6425+00 6430+00 6435+00 6440+00 6445+00 6450+00 6455+00 6460+00 6465+00 6470+00 6475+00 6480+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-8

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

AT-GRADE

6480+00 6485+00 6490+00 6495+00 6500+00 6505+00 6510+00 6515+00 6520+00 6525+00 6530+00 6535+00 6540+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-9

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6540+00 6545+00 6550+00 6555+00 6560+00 6565+00 6570+00 6575+00 6580+00 6585+00 6590+00 6595+00 6600+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

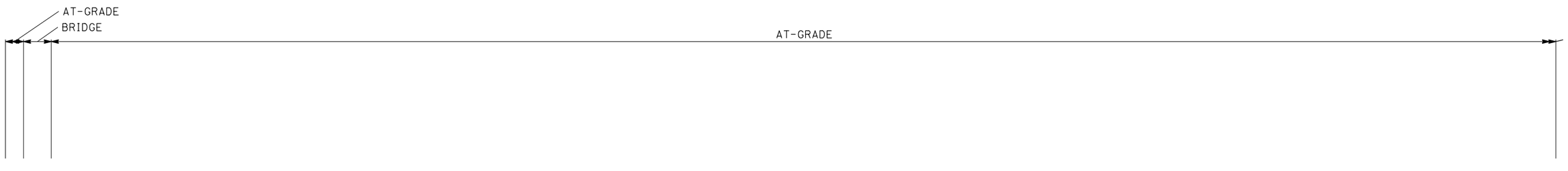
Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-10

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6600+00 6605+00 6610+00 6615+00 6620+00 6625+00 6630+00 6635+00 6640+00 6645+00 6650+00 6655+00 6660+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-11

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

6660+00 6665+00 6670+00 6675+00 6680+00 6685+00 6690+00 6695+00 6700+00 6705+00 6710+00 6715+00 6720+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

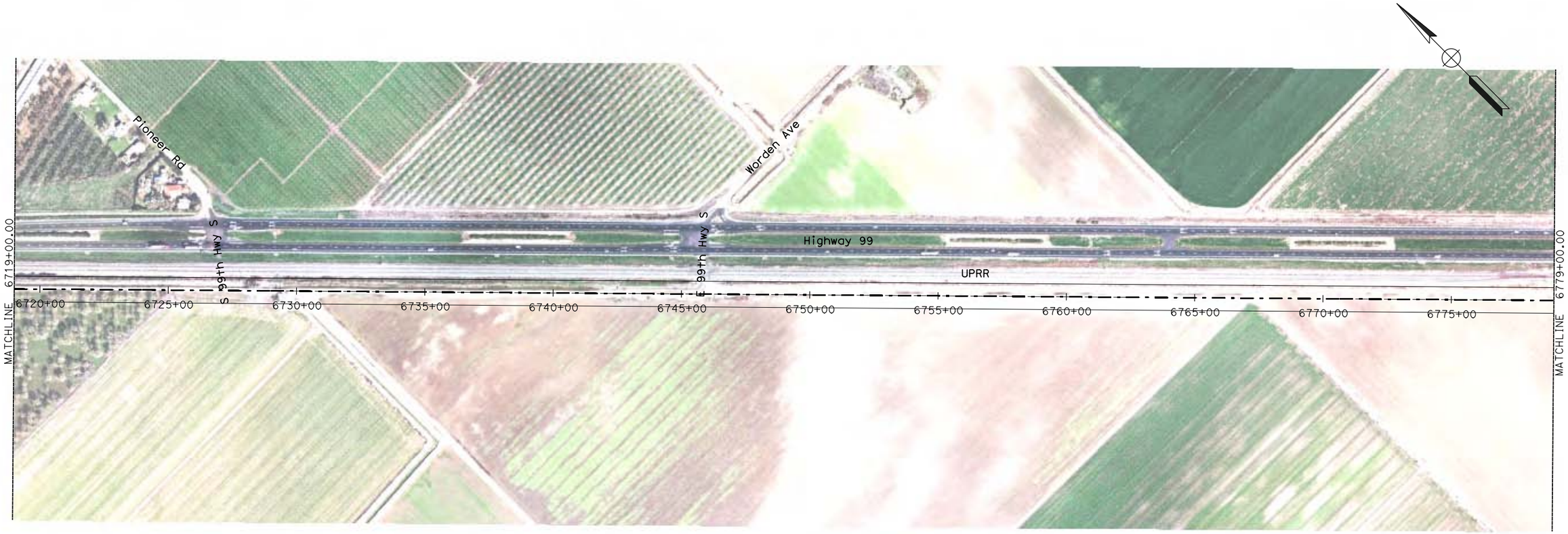
CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-12



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6720+00 6725+00 6730+00 6735+00 6740+00 6745+00 6750+00 6755+00 6760+00 6765+00 6770+00 6775+00 6780+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-13

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6780+00 6785+00 6790+00 6795+00 6800+00 6805+00 6810+00 6815+00 6820+00 6825+00 6830+00 6835+00 6840+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

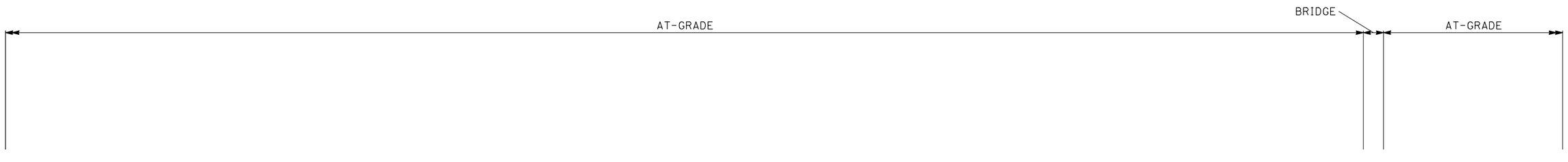
Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-14

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



6840+00 6845+00 6850+00 6855+00 6860+00 6865+00 6870+00 6875+00 6880+00 6885+00 6890+00 6895+00 6900+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

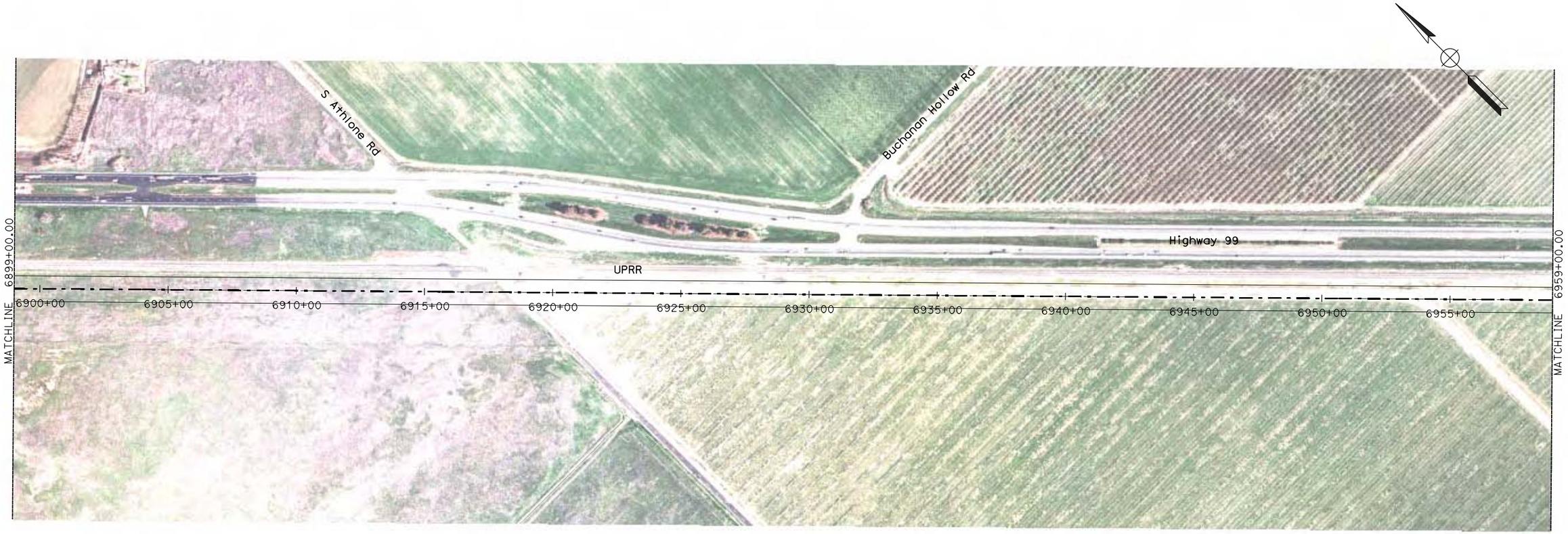
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-15



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

6900+00 6905+00 6910+00 6915+00 6920+00 6925+00 6930+00 6935+00 6940+00 6945+00 6950+00 6955+00 6960+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-16

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

RETAINED FILL

ELEVATED

6960+00 6965+00 6970+00 6975+00 6980+00 6985+00 6990+00 6995+00 7000+00 7005+00 7010+00 7015+00 7020+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-17

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7020+00 7025+00 7030+00 7035+00 7040+00 7045+00 7050+00 7055+00 7060+00 7065+00 7070+00 7075+00 7080+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-18

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7080+00 7085+00 7090+00 7095+00 7100+00 7105+00 7110+00 7115+00 7120+00 7125+00 7130+00 7135+00 7140+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

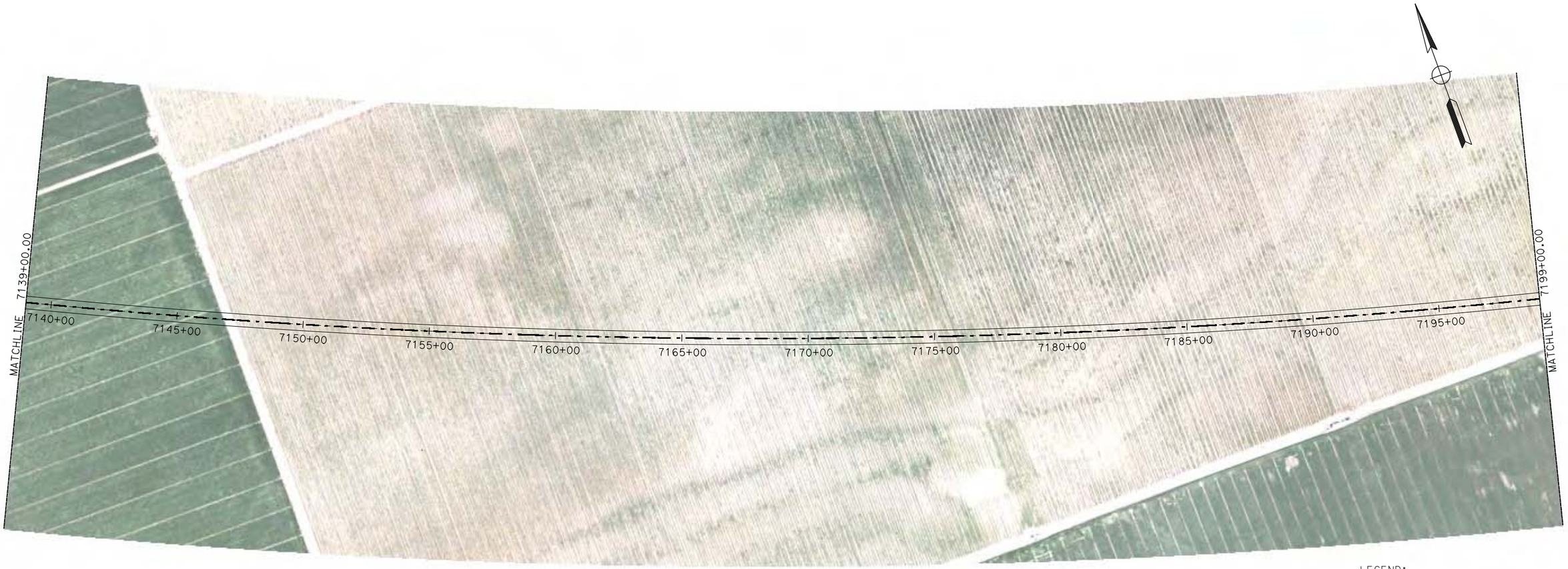
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-19



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7140+00 7145+00 7150+00 7155+00 7160+00 7165+00 7170+00 7175+00 7180+00 7185+00 7190+00 7195+00 7200+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-20

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

7200+00 7205+00 7210+00 7215+00 7220+00 7225+00 7230+00 7235+00 7240+00 7245+00 7250+00 7255+00 7260+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

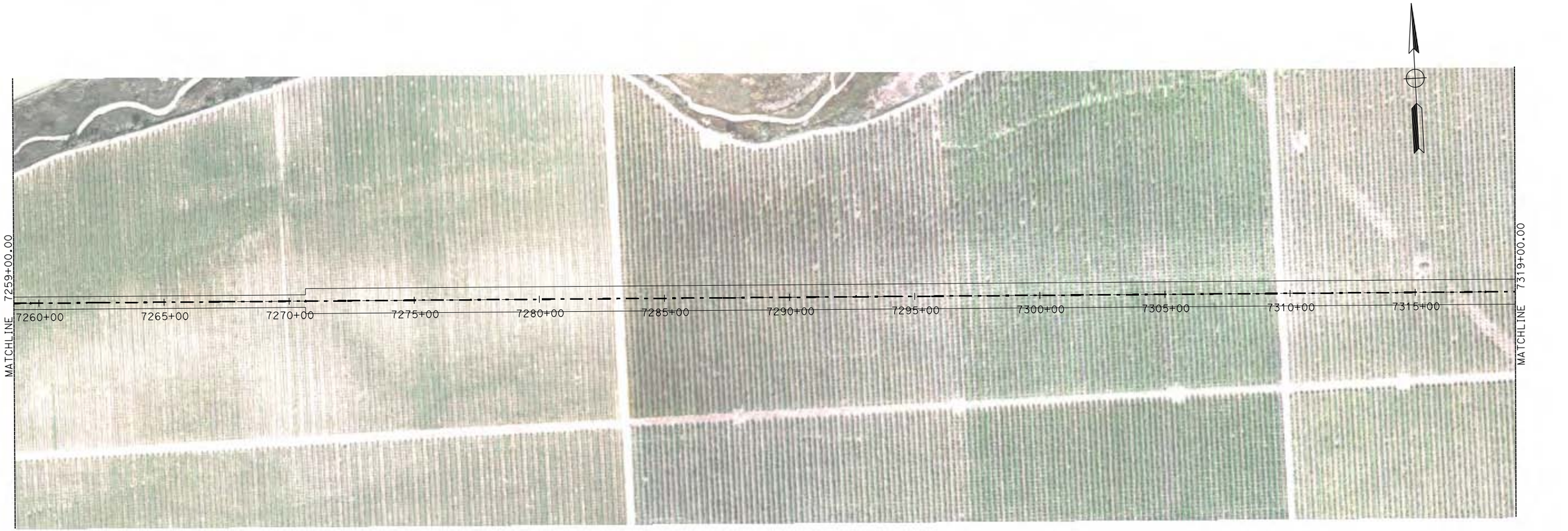
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-21



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

7260+00 7265+00 7270+00 7275+00 7280+00 7285+00 7290+00 7295+00 7300+00 7305+00 7310+00 7315+00 7320+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

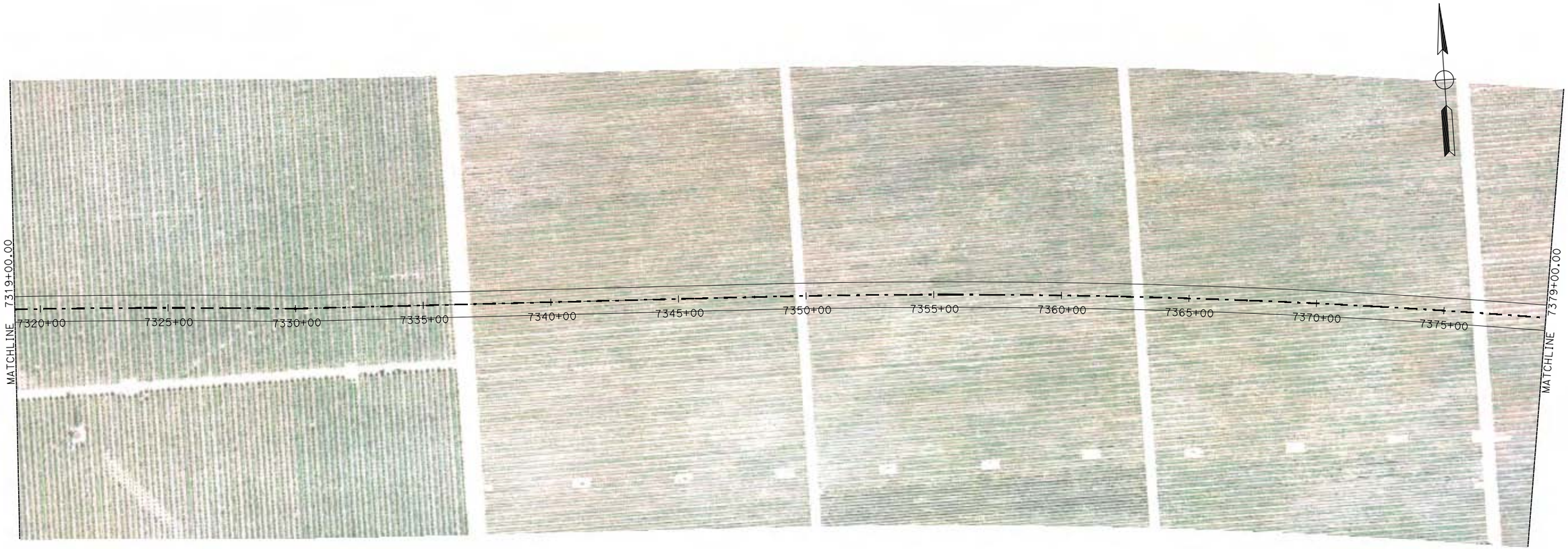
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-22



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7320+00 7325+00 7330+00 7335+00 7340+00 7345+00 7350+00 7355+00 7360+00 7365+00 7370+00 7375+00 7380+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-23

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7380+00 7385+00 7390+00 7395+00 7400+00 7405+00 7410+00 7415+00 7420+00 7425+00 7430+00 7435+00 7440+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

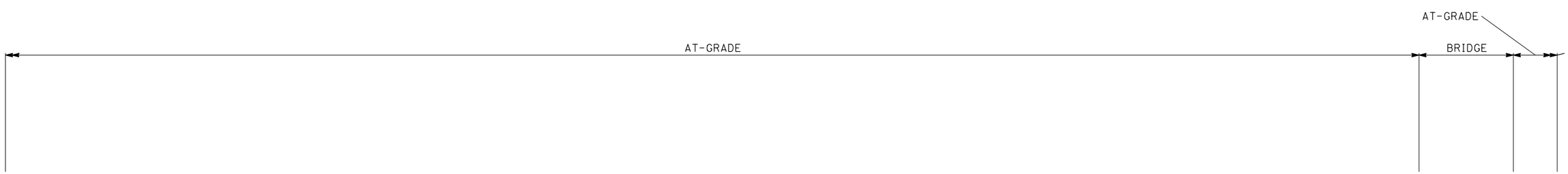
SCALE 1"= 200'

SHEET NO. A4-24

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



7440+00 7445+00 7450+00 7455+00 7460+00 7465+00 7470+00 7475+00 7480+00 7485+00 7490+00 7495+00 7500+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-25

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7500+00 7505+00 7510+00 7515+00 7520+00 7525+00 7530+00 7535+00 7540+00 7545+00 7550+00 7555+00 7560+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-26

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7560+00 7565+00 7570+00 7575+00 7580+00 7585+00 7590+00 7595+00 7600+00 7605+00 7610+00 7615+00 7620+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-27

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7620+00 7625+00 7630+00 7635+00 7640+00 7645+00 7650+00 7655+00 7660+00 7665+00 7670+00 7675+00 7680+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-28

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7680+00 7685+00 7690+00 7695+00 7700+00 7705+00 7710+00 7715+00 7720+00 7725+00 7730+00 7735+00 7740+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-29

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7740+00 7745+00 7750+00 7755+00 7760+00 7765+00 7770+00 7775+00 7780+00 7785+00 7790+00 7795+00 7800+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

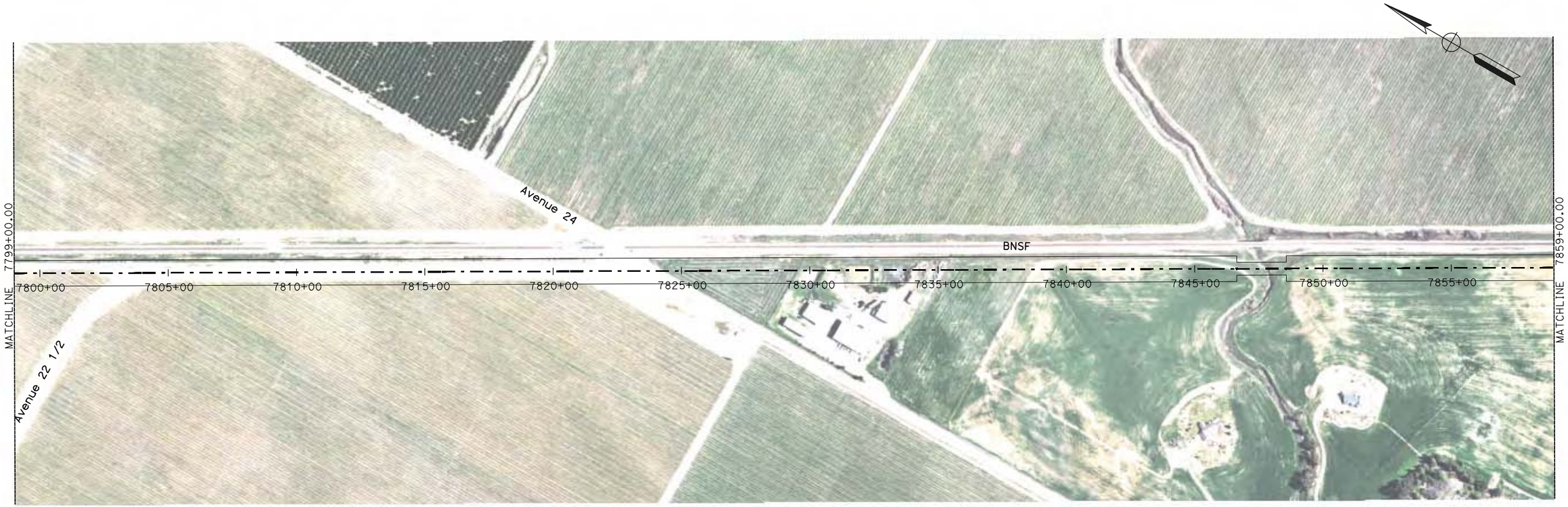
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-30



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

7800+00 7805+00 7810+00 7815+00 7820+00 7825+00 7830+00 7835+00 7840+00 7845+00 7850+00 7855+00 7860+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

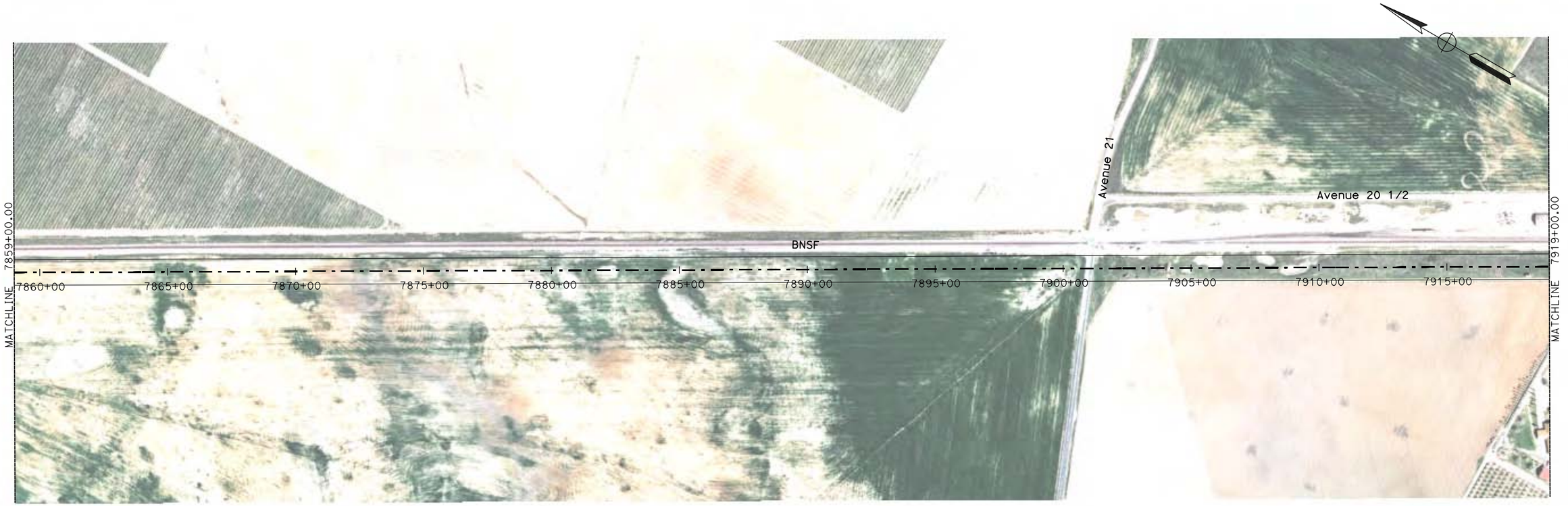
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-31



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7860+00 7865+00 7870+00 7875+00 7880+00 7885+00 7890+00 7895+00 7900+00 7905+00 7910+00 7915+00 7920+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-32

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7920+00 7925+00 7930+00 7935+00 7940+00 7945+00 7950+00 7955+00 7960+00 7965+00 7970+00 7975+00 7980+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

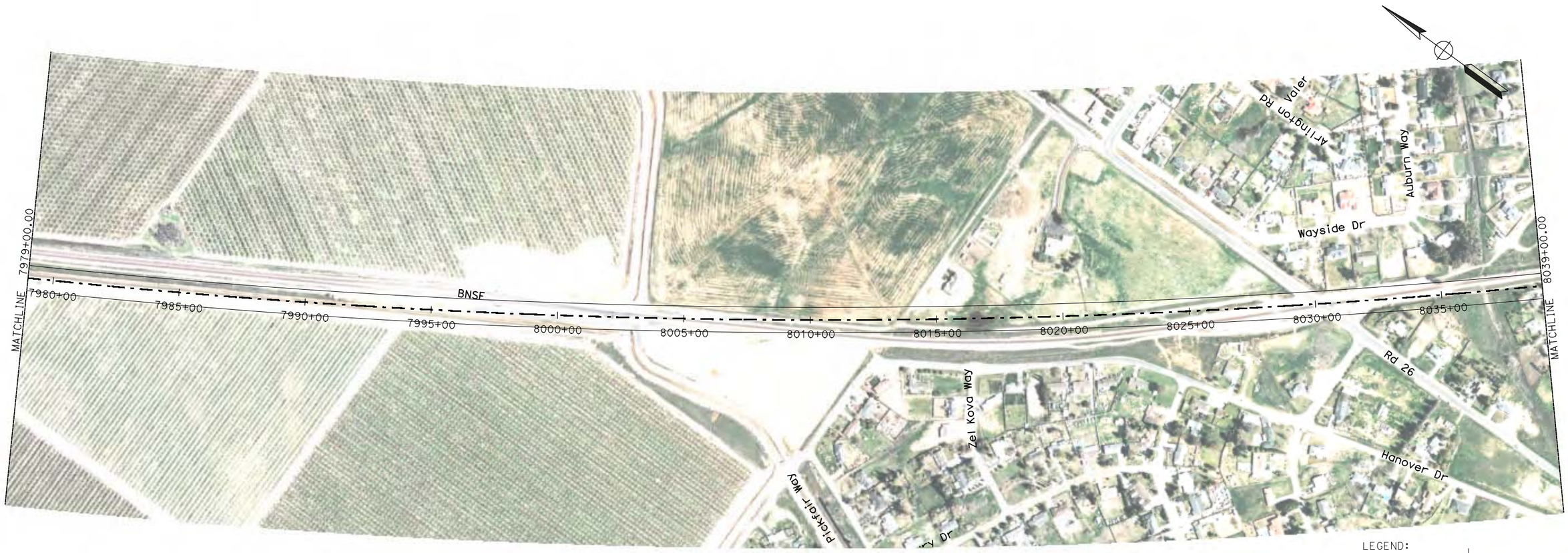
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-33



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

7980+00 7985+00 7990+00 7995+00 8000+00 8005+00 8010+00 8015+00 8020+00 8025+00 8030+00 8035+00 8040+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-34

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8040+00 8045+00 8050+00 8055+00 8060+00 8065+00 8070+00 8075+00 8080+00 8085+00 8090+00 8095+00 8100+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-35

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8100+00 8105+00 8110+00 8115+00 8120+00 8125+00 8130+00 8135+00 8140+00 8145+00 8150+00 8155+00 8160+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-36

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8160+00 8165+00 8170+00 8175+00 8180+00 8185+00 8190+00 8195+00 8200+00 8205+00 8210+00 8215+00 8220+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

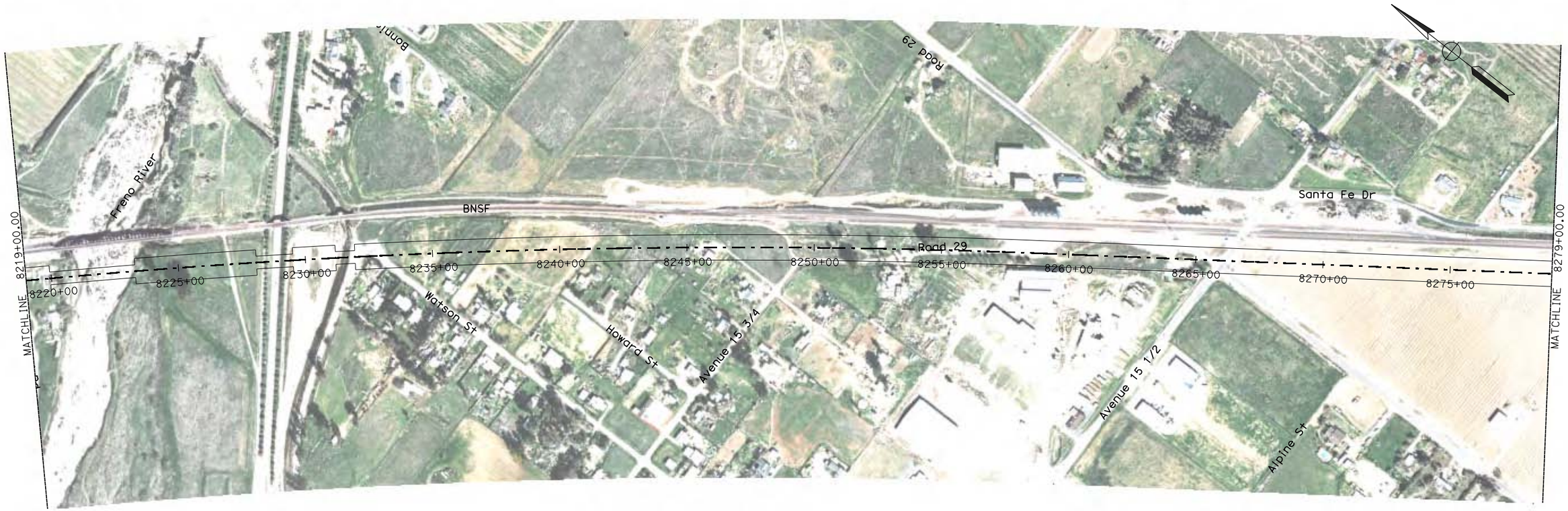
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-37



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

8220+00 8225+00 8230+00 8235+00 8240+00 8245+00 8250+00 8255+00 8260+00 8265+00 8270+00 8275+00 8280+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-38

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8280+00 8285+00 8290+00 8295+00 8300+00 8305+00 8310+00 8315+00 8320+00 8325+00 8330+00 8335+00 8340+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-39

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE | BRIDGE | AT-GRADE

8340+00 8345+00 8350+00 8355+00 8360+00 8365+00 8370+00 8375+00 8380+00 8385+00 8390+00 8395+00 8400+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

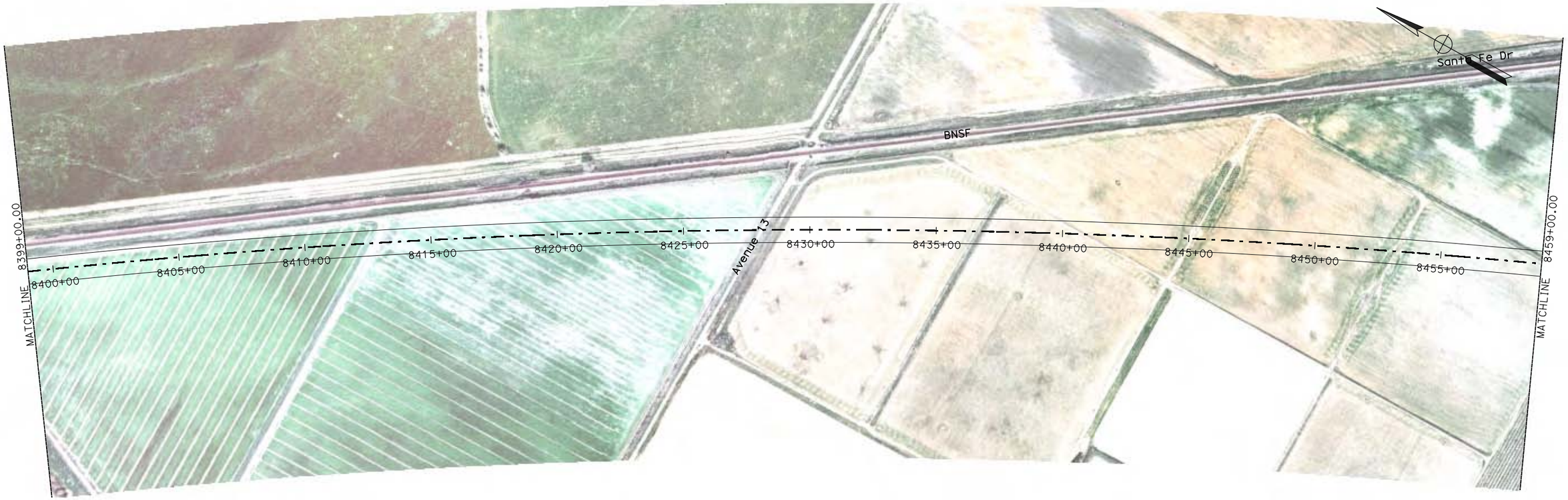
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-40



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8400+00 8405+00 8410+00 8415+00 8420+00 8425+00 8430+00 8435+00 8440+00 8445+00 8450+00 8455+00 8460+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-41

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8460+00 8465+00 8470+00 8475+00 8480+00 8485+00 8490+00 8495+00 8500+00 8505+00 8510+00 8515+00 8520+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

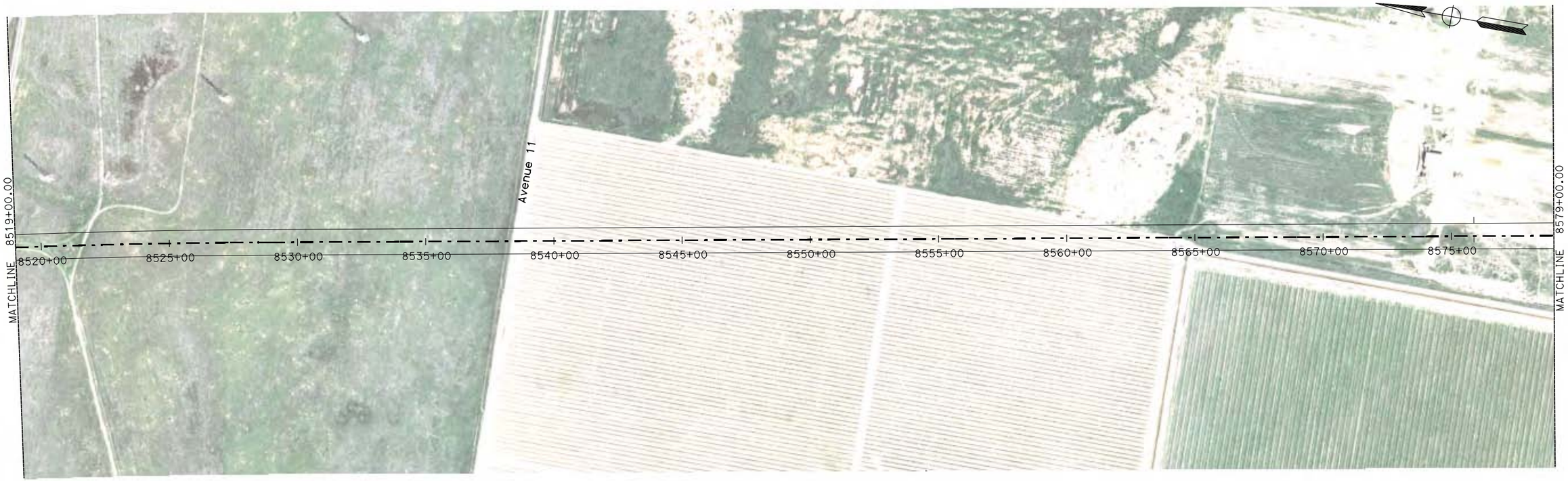
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-42



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8520+00 8525+00 8530+00 8535+00 8540+00 8545+00 8550+00 8555+00 8560+00 8565+00 8570+00 8575+00 8580+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-43

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8580+00 8585+00 8590+00 8595+00 8600+00 8605+00 8610+00 8615+00 8620+00 8625+00 8630+00 8635+00 8640+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

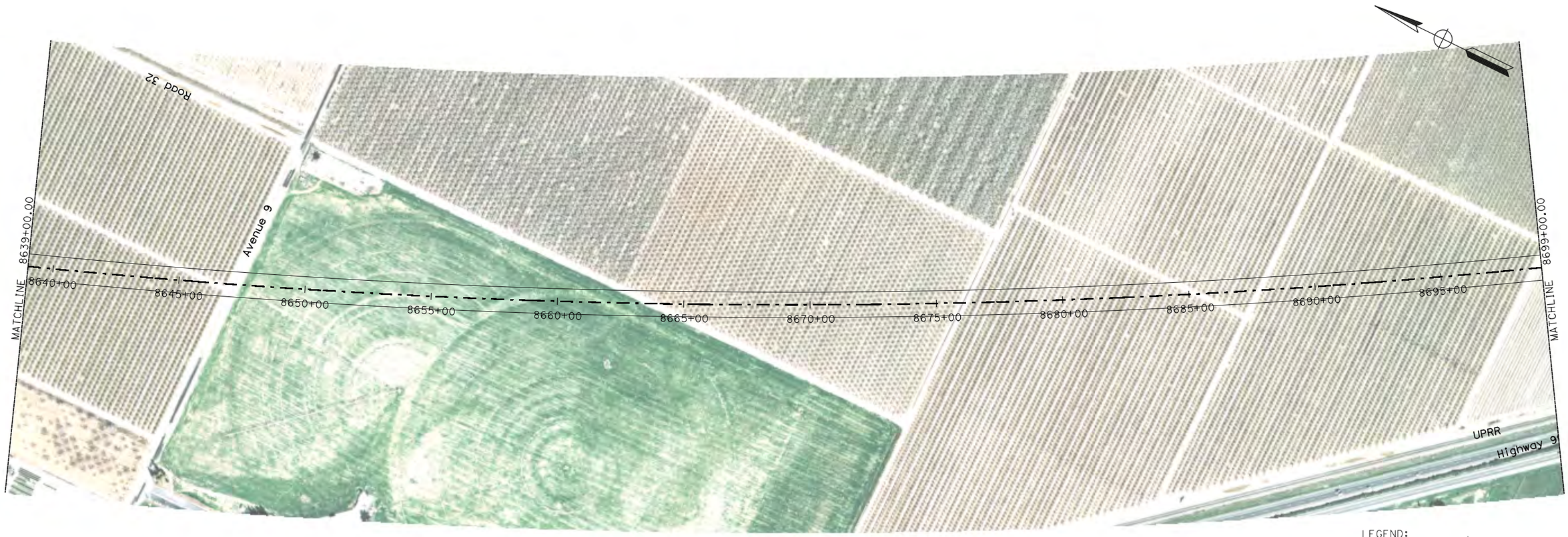
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-44



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8640+00 8645+00 8650+00 8655+00 8660+00 8665+00 8670+00 8675+00 8680+00 8685+00 8690+00 8695+00 8700+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLYCALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-45

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8700+00 8705+00 8710+00 8715+00 8720+00 8725+00 8730+00 8735+00 8740+00 8745+00 8750+00 8755+00 8760+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

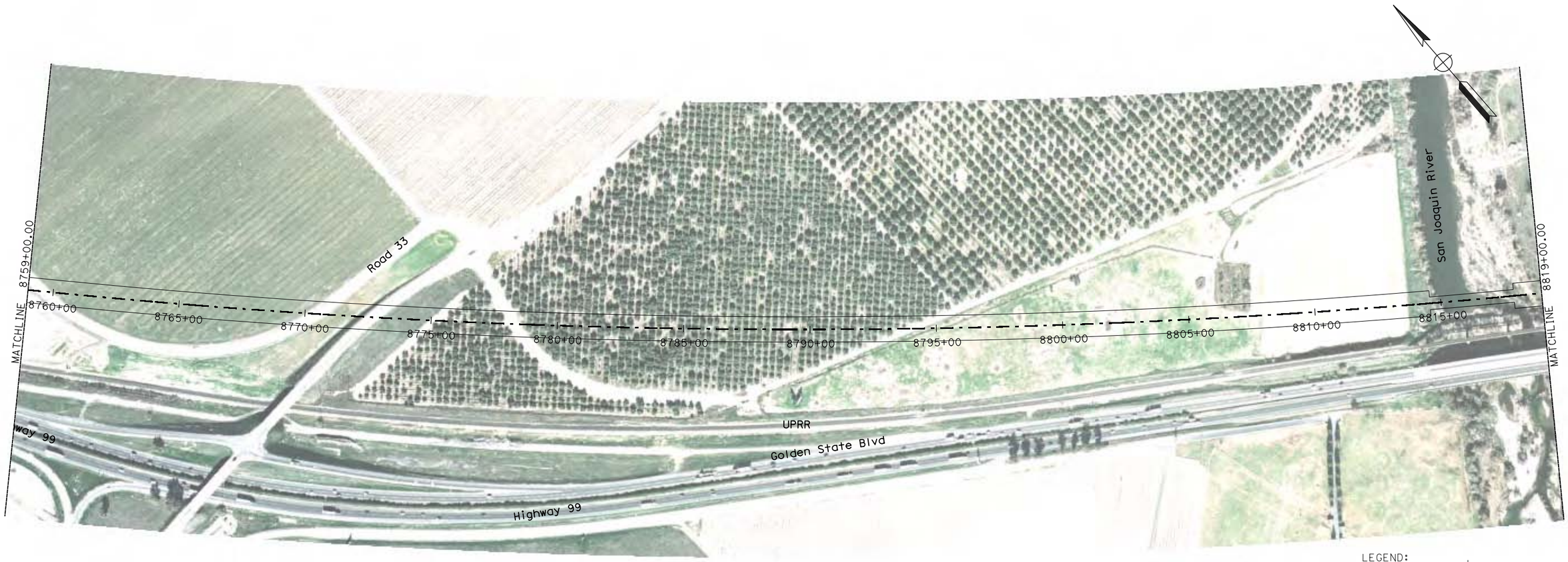
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

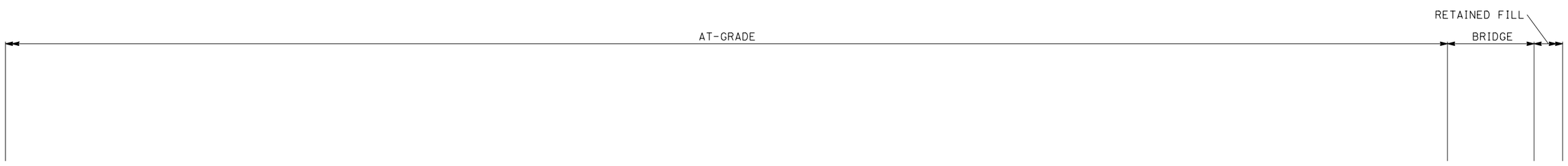
SHEET NO. A4-46



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT



8760+00 8765+00 8770+00 8775+00 8780+00 8785+00 8790+00 8795+00 8800+00 8805+00 8810+00 8815+00 8820+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-47

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

RETAINED FILL

ELEVATED

8820+00 8825+00 8830+00 8835+00 8840+00 8845+00 8850+00 8855+00 8860+00 8865+00 8870+00 8875+00 8880+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-48

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

ELEVATED

RETAINED FILL

AT-GRADE

8880+00 8885+00 8890+00 8895+00 8900+00 8905+00 8910+00 8915+00 8920+00 8925+00 8930+00 8935+00 8940+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-49

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

8940+00 8945+00 8950+00 8955+00 8960+00 8965+00 8970+00 8975+00 8980+00 8985+00 8990+00 8995+00 9000+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-50

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9000+00 9005+00 9010+00 9015+00 9020+00 9025+00 9030+00 9035+00 9040+00 9045+00 9050+00 9055+00 9060+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-51

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9060+00 9065+00 9070+00 9075+00 9080+00 9085+00 9090+00 9095+00 9100+00 9105+00 9110+00 9115+00 9120+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

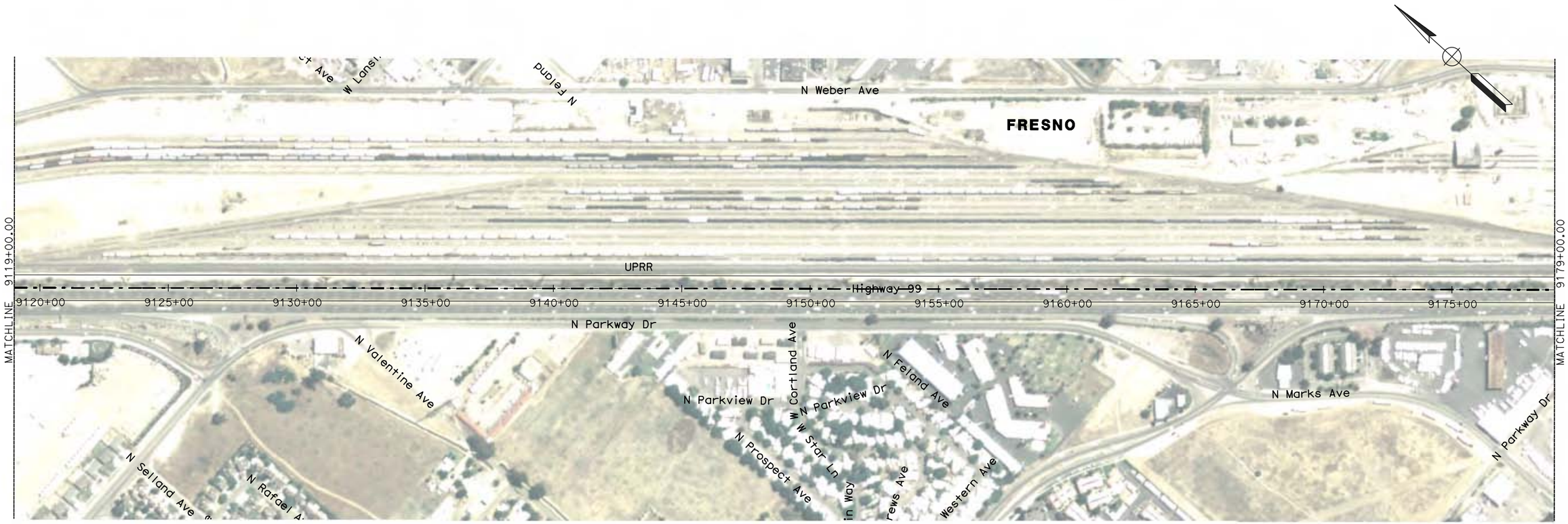
Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-52



LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9120+00 9125+00 9130+00 9135+00 9140+00 9145+00 9150+00 9155+00 9160+00 9165+00 9170+00 9175+00 9180+00

200 0 200 400

1"=200'

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT

SACRAMENTO TO FRESNO ALIGNMENT STUDY

MERCED TO FRESNO SECTION

ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO. C-0-000

DRAWING NO. XXX-XXX

SCALE 1"= 200'

SHEET NO. A4-53

LEGEND:

PROJECT CENTERLINE

PROJECT FOOTPRINT

AT-GRADE

9180+00 9185+00 9190+00 9195+00 9200+00 9205+00

200 0 200 400

1"=200'

DESIGNED BY	
DRAWN BY	
CHECKED BY	
IN CHARGE	
DATE	

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
SACRAMENTO TO FRESNO ALIGNMENT STUDY
MERCED TO FRESNO SECTION
ALTERNATIVE A4

Preliminary 10/29/2009

CONTRACT NO.	C-0-000
DRAWING NO.	XXX-XXX
SCALE	1"= 200'
SHEET NO.	A4-54