

Description of Phase II Improvements

The Altamont Corridor Express (ACE) Extension Lathrop to Ceres/Merced contains both Phase I and Phase II improvements that are analyzed in this environmental impact report (EIR).¹ Phase I improvements would support the ACE service extension to Ceres possibly as soon as 2020, no later than 2023. Phase II improvements would support the ACE service extension to Merced, with service commencing as soon as 2025.² However, infrastructure improvements and extended passenger service may be provided in an incremental phased approach over time that would include only some of the Phase I or Phase II improvements.

The Proposed Project is the extension of ACE service from Lathrop to Ceres and Merced, and includes the following Phase II improvements.

- The **Merced Extension Alignment** consisting of upgrades to track, new tracks, and bridges within the Fresno Subdivision³ between Ceres and Merced.
- The **Merced Layover Facility** located north of Merced to support extension operations.
- New **Turlock, Livingston or Atwater**, and **Merced Stations** along the extension alignment.

Only one station would be implemented in either Livingston or Atwater. This EIR analyzes both stations at an equal level of detail. At this time, SJRRC is considering them both as a possible station. SJRRC would identify the preferred station in the subsequent project-level environmental documentation for Phase II improvements which would complete the detailed analysis of the impacts and benefits of these two options.

Detailed descriptions of the Phase I improvements are presented in Chapter 2, *Description of Phase I Improvements*. This chapter focuses on the Phase II improvements and provides information regarding operational and maintenance activities, construction activities, potential right-of-way (ROW) and easement needs, costs and funding sources, and required permits and approval for the Phase II improvements.

¹ Phase I improvements are analyzed at a project level of detail based on preliminary engineering analysis in this EIR, and no further environmental analysis under the California Environmental Quality Act (CEQA) is anticipated. Phase II improvements are analyzed at a programmatic, more conceptual level of detail in this EIR because only conceptual engineering has been completed at this time. Subsequent project-level environmental documentation would be required for the Phase II improvements once further service planning has been developed. For an explanation of the difference between project and program analyses, please refer to Chapter 1, *Introduction*, of this EIR and CEQA Guidelines Sections 15161 and 16168.

² The service extension to Merced is analyzed at a programmatic-level at this time because this extension would be implemented at a later date, and because the location of the ACE **Merced Station** is dependent on the final location of the High-Speed Rail station and may be subject to change.

³ A *subdivision* is a portion of railroad or railway that operates under a single timetable (authority for train movement in the area).

3.1 Phase II Improvements Location and Limits

As shown in Figure 1-1, the limits of the Phase II improvements span Stanislaus and Merced Counties. The San Joaquin Regional Rail Commission (SJRRC) proposes to extend ACE passenger rail service from Ceres to Merced in Phase II by constructing and upgrading tracks within the existing Union Pacific Railroad (UPRR) Fresno Subdivision ROW, a distance of approximately 34 miles. New stations and operating facilities would be constructed along the extension alignment. The Phase II improvements include portions of the Fresno Subdivision ROW and additional ROW for new facilities (stations and layover yards) and for any construction or access areas located outside the ROW.

3.2 Background

As described in Section 2.2, *Background*, SJRRC does not own the tracks on which ACE operates, but instead has entered into passenger rights agreements with both the Peninsula Corridor Joint Powers Board (PCJPB, also referred to as Caltrain) and UPRR to operate on portions of their respective tracks. ACE shares tracks with freight trains dispatched by UPRR within the UPRR ROW and with freight trains dispatched by Caltrain in the Caltrain corridor. In addition, other passenger train services (Caltrain, Amtrak Coast Starlight, and Capitol Corridor) also operate on PCJPB and UPRR tracks where ACE trains travel.

ACE currently operates four westbound trains in the morning from Stockton to San Jose and four eastbound trains in the afternoon from San Jose to Stockton during weekdays only. To enhance commuter and intercity rail service and to promote greater transit connectivity between the San Joaquin Valley and the San Francisco Bay Area (Bay Area), SJRRC is proposing to expand ACE service to Ceres with stations in downtown Manteca, Ripon, Modesto, and Ceres in Phase I and to Merced with stations in Turlock, Livingston or Atwater, and Merced in Phase II.

3.3 Phase II Improvements by Segment

For the analytical purposes of this EIR, impacts are discussed relative to the following geographic areas: Lathrop to Stockton, Lathrop to Ceres, Ceres to Merced, and existing ACE stations. Phase II physical improvements are only proposed in the Ceres to Merced segment. No Phase II improvements are proposed between Ceres and Lathrop or along the existing ACE corridors between Stockton and San Jose. However, where applicable, this EIR analyzes Phase II operational impacts due to increased ridership at existing ACE destination stations⁴ in the Bay Area.

Specific physical Phase II improvements are illustrated in Figures 3-1 through 3-5. The environmental footprint⁵ associated with each Phase II improvement is illustrated in Appendix B, *ACE Extension Environmental Footprint*. In addition, Appendix C, *ACE Extension 15% Preliminary Engineering Plans*, contains track plans and section drawings, structure plans, roadway plans, utility plans, station plans, and ROW plans for these Phase II improvements.

⁴ These stations are the San Jose Diridon, Santa Clara, Great America, Fremont, Pleasanton, Livermore, and Vasco Road stations.

⁵ The *footprint* is defined as the area covered by a facility or affected by construction activities.

The programmatic analysis of the Phase II improvements in this EIR would allow subsequent project-level clearance of individual Phase II improvements, and prioritization and phasing of Phase II improvements. For example, depending on funding, service may be extended to Turlock and then Merced in a phased approach. Infrastructure improvements and passenger service can be increased and extended in a phased approach over time. Thus, the development of physical improvements and expanded service should be seen as a range over time, as follows.

- Minimal improvements: Addition of station, parking, and key track/infrastructure improvements and commencement of initial service or expansion of existing service (one or more trains).
- Interim improvements: Construction of additional track improvements, such as the additional new main track, at specific areas of train congestion, and possibly additional parking improvements necessary because of increased ridership, which would allow further expansion of service beyond the initial service or expansion.
- Full build: Completion of all proposed improvements along existing and new ACE corridors.

3.3.1 Ceres to Merced

The Ceres to Merced segment is located in the central portion of Stanislaus County and the eastern portion of Merced County. ACE currently does not operate passenger rail services in this segment. As part of Phase II improvements, ACE proposes to extend passenger rail service from Ceres to Merced on the Fresno Subdivision. Improvements that are part of the Proposed Project include the following.

- **Merced Extension Alignment**
- **Merced Layover Facility**
- Stations along the extension including **Turlock, Livingston or Atwater, and Merced Stations**

Infrastructure improvements and service expansion could be implemented in phases over time, starting with station, parking, and key track/infrastructure improvements and initial service, then additional improvements to key capacity locations and additional service, and then full build.

3.3.1.1 Merced Extension Alignment

As shown in Figures 3-1a through 3-1d, the extension to Merced would construct a second main track and replace portions of existing track on the Fresno Subdivision. Improvements that are part of the **Merced Extension Alignment** are as follows.

- Construction and replacement of tracks between milepost (MP) 117.32 and MP 151.18 on the Fresno Subdivision.
 - Construction of a new 8.75-mile second main track from MP 117.32 to MP 126.07 on the Fresno Subdivision.
 - Construction of a new 0.45-mile second main track from MP 125.92 to MP 126.37 on the Fresno Subdivision.
 - Replacement of 0.34 mile of existing track from MP 126.07 to MP 126.41 on the Fresno Subdivision.

- Construction of a new 24.77-mile second main track from MP 126.41 to MP 151.18 on the Fresno Subdivision.
- Modification of 14 existing undercrossings as shown in Table 3-1 on the Fresno Subdivision.
- Modification of 29 existing at-grade crossings as shown in Table 3-2 on the Fresno Subdivision.
- Construction of new culvert crossings at eight locations as shown in Table 3-3 on the Fresno Subdivision.
- Realignment of 0.09 mile of an existing spur turnout⁶ at MP 127.08 on the Fresno Subdivision.
- Construction of a 0.08-mile crossover track between the new main track and the existing main track from MP 127.13 to MP 127.21 on the Fresno Subdivision.
- Realignment of 0.02 mile of an existing spur turnout at MP 134.12 on the Fresno Subdivision.
- Realignment of 0.04 mile of an existing spur turnout at MP 134.63 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over the Merced River at MP 134.88 on the Fresno Subdivision.
- Construction of a new single-track steel bridge crossing over the State Route (SR) 99 underpass in Livingston at MP 136.00 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over Canal Creek at MP 145.62 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over Weber Canal at MP 146.21 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over an irrigation canal at MP 147.08 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over a cross-swale drainage at MP 148.21 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over Black Rascal Canal at MP 148.38 on the Fresno Subdivision.
- Construction of a new single-track concrete bridge crossing over Bear Creek at MP 149.47 on the Fresno Subdivision.
- Realignment of 0.06 mile of an existing spur turnout at MP 149.59 on the Fresno Subdivision.
- Construction of a 0.06-mile crossover track between the existing main track and the new main track from MP 149.61 to MP 149.67 on the Fresno Subdivision.
- Construction of a 0.06-mile crossover track between the new main track and the existing main track from MP 150.11 to MP 150.17 on the Fresno Subdivision.

The new main track for the **Merced Extension Alignment** would generally be located east of the existing main track, and for the majority of the alignment, would be located between SR 99 and existing tracks. A new 8.75-mile second main track would extend from the new main track (constructed as part of the **Ceres Extension Alignment** in Phase I) at MP 117.32 and join the

⁶ A turnout track enables trains to be guided from one track to another.

existing main track at MP 126.07 on the Fresno Subdivision. In downtown Turlock, a 0.45-mile portion of the new main track on the Fresno Subdivision would be constructed west of the existing main track from MP 125.92 and join the existing siding track⁷ at MP 126.37. Between MP 126.07 and MP 126.41, 0.34 mile of the existing main track through downtown Turlock would be removed and replaced with a new main track that complies with UPRR track standards for train speeds compatible with passenger rail. South of downtown Turlock, a new 24.77-mile second main track would extend from the upgraded track at MP 126.41 and terminate at MP 151.18, south of the **Merced Station** in downtown Merced.

Four short portions of spur turnouts in this segment would be realigned to accommodate the new main track and to allow the continued use of the spur track⁸ to transport materials to and from the industrial uses in the area. These areas include: a 0.09-mile portion of an existing spur turnout at MP 127.08, a 0.02-mile portion of an existing spur turnout at MP 134.12, a 0.04-mile portion of an existing spur turnout at MP 134.63, and a 0.06-mile portion of an existing spur turnout at MP 149.59 on the Fresno Subdivision. In addition, three short crossover tracks would be constructed between the new main track and the existing main track to allow for trains maneuver between the tracks. The new crossover tracks include: a 0.08-mile crossover between MP 127.13 and MP 127.21, a 0.06-mile crossover between MP 149.61 and MP 149.67, and a 0.06-mile crossover between MP 150.11 and MP 150.17 on the Fresno Subdivision.

Following the same alignment as the existing main track, the new track would cross over 29 existing at-grade crossings, under 14 existing overhead structures, and over several roadway and water features that would require the construction of new bridges or culverts. Notable roadways and water features crossed by the track extension to Merced requiring the construction of new bridges or culverts include the Ceres Main Canal, Merced River, Jordan Canal, SR 99 underpass in Livingston, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek.

Tables 3-1 and 3-2 list the modifications to existing undercrossings and at-grade crossings to accommodate the new second main track. Modifications to existing overhead structure undercrossings generally entail installation of pier protection⁹ along the existing piers for the overhead structures and retaining walls along the length of existing abutment slopes. Modifications to the existing at-grade crossings generally require installation of concrete crossing panels¹⁰ where the new main track crosses the roadway; relocation of railroad crossing signals, guards or gates, and signal houses;¹¹ and installation of stop bars.¹²

Tables 3-3 and 3-4 detail the specifications of new culvert and bridge structures crossing waterways and roadways that would be constructed to accommodate the new second main track. New culvert crossings would vary in type and material, but would generally extend from the existing culvert structure for the existing main track. The new bridge structures would be approximately 17-foot-

⁷ A *siding* is a section of track alongside the main track where a train can temporarily pull off the main track for maintenance, coupling up cars or locomotives, or to let other trains pass along the main track.

⁸ A *spur track* is a short, usually dead-end section of track used to access a facility or loading/unloading ramp.

⁹ Overhead structures with a pier closer than 25 feet from the centerline of a new track require *pier protection* in the form of a crash wall. Pier protection is designed to resist impact and redirect equipment in case of derailment.

¹⁰ *Crossing panels* are installed so that the tracks lie flush with the roadway.

¹¹ A *signal house* stores the electrical devices used to operate the at-grade crossing signals.

¹² A *stop bar* is placed near an at-grade crossing to warn drivers and pedestrians of an approaching railroad crossing.

wide single-track structures with varying length, depending on the length of the feature crossed, located adjacent to the existing bridge structure supporting the existing main track.

Table 3-1. Merced Extension Alignment—Undercrossing Modifications

Existing Overhead Structure (west to east)	Modifications
Ceres	
MP 117.47, Pine Street overhead structure	• Install pier protection along three of Pine Street overhead structure's east piers
MP 118.16, East Service Road overhead structure	• Install pier protection along three of East Service Road overhead structure's east piers • Install pier protection along three of East Service Road overhead structure's center piers
Keyes	
MP 120.11, Faith Home Road overhead structure	• Install pier protection along two of Faith Home Road overhead structure's north piers
MP 121.21 East Keyes Road overhead structure	• Install 246-foot-long retaining wall with cable railing at the top of the wall along the length of the existing abutment slope to the east; the retaining wall would vary in height along the abutment slope, but would be approximately 22 feet tall at the highest point • Install pier protection along two of East Keyes Road overhead structure's east piers
Turlock	
MP 122.59, SR 99 overhead structure in Turlock	• Install 276-foot-long retaining wall with cable railing at the top of the wall along the length of the existing abutment slope to the north; the retaining wall would vary in height along the abutment slope, but would be approximately 20 feet tall at the highest point • Install pier protection along two of northbound SR 99 overhead structure's north piers • Install pier protection along two of southbound SR 99 overhead structure's north piers
MP 130.41, West Bradbury Road overhead structure	• Install 246-foot-long retaining wall with cable railing at the top of the wall along the length of the existing abutment slope to the north; the retaining wall would vary in height along the abutment slope, but would be approximately 15 feet tall at the highest point • Install pier protection along two of West Bradbury Road overhead structure's east piers
Delhi	
MP 131.45, Shanks Road overhead structure	• Install pier protection along two of Shanks Road overhead structure's east piers
MP 132.50, South Avenue overhead structure	• Install pier protection along two of South Avenue overhead structure's east piers

Existing Overhead Structure (west to east)	Modifications
Livingston	
MP 136.85, Hammatt Avenue overhead structure	• Install pier protection along two of Hammatt Avenue Road overhead structure's north piers
Atwater	
MP 140.67, Westside Boulevard overhead structure	• Install 218-foot-long retaining wall with cable railing at the top of the wall along the length of the existing abutment slope to the north; the retaining wall would vary in height along the abutment slope, but would be approximately 17 feet tall at the highest point • Install pier protection along two of Westside Boulevard overhead structure's north piers
MPs 142.27, SR 99 overhead structure in west Atwater	• Install pier protection along four of northbound SR 99 overhead structure's south piers • Install pier protection along four of southbound SR 99 overhead structure's south piers
MPs 144.04, SR 99 overhead structure in east Atwater	• Install pier protection along four of northbound SR 99 overhead structure's center piers • Install pier protection along four of southbound SR 99 overhead structure's center piers
MP 147.17, Franklin Road overhead structure	• Install pier protection along two of Franklin Road overhead structure's north piers
Merced	
MP 149.07, SR 99 overhead structure in Merced	• Install pier protection along six of northbound and southbound SR 99 overhead structure's center piers

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Table 3-2. Merced Extension Alignment—At-Grade Crossing Modifications

Existing Roadway (west to east)	Modifications
Turlock	
MP 122.21, West Taylor Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house

Existing Roadway (west to east)	Modifications
MP 123.60, West Monte Vista Avenue	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Relocate railroad crossing signals and guard/gates at the designated turn pocket from North Golden State Boulevard • Install crosswalk and grade-crossing markings at the designated turn pocket from North Golden State Boulevard • Install standard grade-crossing markings at the southbound North Golden State Boulevard approach • Relocate signal house
MP 124.27, West Tuolumne Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Relocate railroad crossing signals and guard/gates at the designated turn pocket from North Golden State Boulevard • Install crosswalk at the designated turn pocket from North Golden State Boulevard • Relocate signal house
MP 124.95, Fulkerth Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house
MP 125.31, North Broadway Avenue	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house
MP 125.60, West Canal Drive	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach
MP 126.10, West Olive Avenue	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach
MP 126.17, East Main Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach

Existing Roadway (west to east)	Modifications
MP 126.31, Marshall Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the eastbound approach • Install stop bar at the eastbound approach • Relocate signal house
MP 126.69, East F Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house
MP 127.49, Golf Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the designated turn pocket from Paulson Road • Install stop bar at the designated turn pocket from Paulson Road • Relocate signal house
MP 128.28, South Daubenberger Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Relocate signal house
MP 129.06, Griffith Road	• Install concrete crossing panels where the new main track crosses the roadway
Delhi	
MP 131.81, El Capitan Way	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house
MP 134.04, Collier Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the westbound approach • Install stop bar at the westbound approach • Relocate signal house
Livingston	
MP 135.16, North Pacific Avenue	• Install concrete crossing panels where the new main track crosses the roadway
MP 136.27, Main Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach • Relocate signal house

Existing Roadway (west to east)	Modifications
Atwater	
MP 141.76, Bert Crane Road North	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Relocate railroad crossing signals and guard/gates at the designated turn pocket from Atwater Boulevard • Install stop bar at the designated turn pocket from Atwater Boulevard • Relocate signal house
MP 142.98, Applegate Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install standard stop marking at the southbound Atwater Boulevard approach • Install stop bar at the southbound approach
MP 143.39, Packer Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install standard grade-crossing markings at the northbound Atwater Boulevard approach • Install stop bar at the southbound approach
MP 143.95, Shaffer Road	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach • Relocate signal house
Merced	
MP 148.66, Southern Pacific Avenue	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the designated turn pocket from Southern Pacific Avenue • Install stop bar at the designated turn pocket from Southern Pacific Avenue • Relocate signal house
MP 149.29, Private Road	• Install concrete crossing panels where the new main track crosses the roadway
MP 149.82, V Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach

Existing Roadway (west to east)	Modifications
MP 150.18, R Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach
MP 150.45, O Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach
MP 150.64, M Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach
MP 150.73, Canal Street	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach
MP 150.91, Martin Luther King Jr. Way	• Install concrete crossing panels where the new main track crosses the roadway • Relocate railroad crossing signals and guard/gates at the southbound approach • Install stop bar at the southbound approach

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Table 3-3. Merced Extension Alignment—New Culvert Structures

Location (west to east)	Culvert Structure
MP 118.72, Ceres Main Canal	• A new 40-foot-long double-cell concrete box culvert, extending from the existing culvert located to the west for the existing track
MP 119.55, Irrigation canal	• A new 26-foot-long double-cell concrete box culvert, connecting to existing culvert located to the west for the existing track • Remove existing headwalls and wingwalls
MP 122.22, Irrigation canal	• A new 47-foot-long single-cell concrete box culvert, extending from the existing culvert located to the west for the existing track
MP 130.83, Irrigation canal	• A new 24-foot-long metal pipe culvert, extending from the existing culvert located to the west for the existing track
MP 133.56, Irrigation canal	• A new 26-foot-long triple-cell concrete box culvert, extending from the existing culvert located to the west for the existing track • Remove portion of existing canal wall
MP 138.27, Irrigation canal	• A new 27-foot-long double-cell concrete box culvert, extending from the existing culvert located to the west for the existing track
MP 141.83, Jordan Canal	• A new 48-foot-long double-cell concrete box culvert

Location (west to east)	Culvert Structure
MP 145.09, Irrigation canal	• A new 37-foot-long concrete pipe culvert, extending from the existing culvert located to the south for the existing track

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Table 3-4. Merced Extension Alignment—New Bridge Structures

Location (west to east)	Bridge Structure
MP 134.88, Merced River	• Single-track concrete bridge with portions of steel bracing, east of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 390 feet, seven-span structure consisting of four 30-foot spans on the northern end approaching the Merced River and three 90-foot spans crossing the Merced River • Supporting structures: two abutments at each end of bridge and six piers located between the span sections; three supporting piers would be placed in the Merced River
MP 136.00, SR 99 underpass in Livingston	• Single-track steel bridge, northeast of the existing single-track bridge • Width of bridge: 22 feet • Length of bridge: 940 feet, five-span structure consisting of three 210-foot truss spans at the northern end, one 168-foot truss span, and one 126-foot truss span at the southern end • Supporting structures: two abutments at each end of bridge and four piers located between the span sections
MP 145.62, Canal Creek	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 150 feet, ten-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and nine piers located between the span sections; nine supporting piers would be placed in the canal
MP 146.21, Weber Canal	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 60 feet, four-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and three piers located between the span sections; three supporting piers would be placed in the canal
MP 147.08, Irrigation canal	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 60 feet, four-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and three piers located between the span sections; three supporting piers would be placed in the canal

Location (west to east)	Bridge Structure
MP 148.21, Cross-swale drainage	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 90 feet, six-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and five piers located between the span sections; five supporting piers would be placed in the drainage feature
MP 148.38, Black Rascal Canal	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 90 feet, six-span structure consisting of 15-foot spans for the length of the bridge • Supporting structures: two abutments at each end of bridge and five piers located between the span sections; five supporting piers would be placed in the canal
MP 149.47, Bear Creek	• Single-track concrete bridge with steel bracing, north of the existing single-track bridge • Width of bridge: 17 feet • Length of bridge: 225 feet, 14-span structure consisting of 13 15-foot spans, and one 30-foot span at the center of the bridge structure • Supporting structures: two abutments at each end of bridge and 13 piers located between the span sections; 13 supporting piers would be placed in Bear Creek

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2 All improvements for the **Merced Extension Alignment** would be located within the existing UPRR
3 ROW, and no new ROW would be acquired for this improvement.

4 **3.3.1.2 Merced Layover Facility**

5 To support train layovers, storage, maintenance, and operations associated with the extension to
6 Merced, a new layover facility would be constructed north of downtown Merced. With the
7 completion of this permanent layover facility in Merced, the temporary layover facility in Ceres
8 would be discontinued. As shown in Figure 3-1d, improvements that are part of the **Merced**
9 **Layover Facility** as follows.

- 10 • Construction of a lead track¹³ and four new storage tracks, ranging from 0.40 to 0.50 mile,
11 between MP 148.22 and MP 149.33 on the Fresno Subdivision.
- 12 • Construction of a new single-track concrete bridge crossing over Black Rascal Canal at MP
13 148.38 on the Fresno Subdivision.
- 14 • Construction of new at-grade crossing features at Southern Pacific Avenue at MP 148.43 on the
15 Fresno Subdivision.
- 16 • Modification of the existing Private Road at-grade crossing at MP 149.29 on the Fresno
17 Subdivision.

¹³ A *lead track* is a non-main track connecting a railroad yard or facility to the main line or running track.

The **Merced Layover Facility** would be constructed between the Black Rascal Canal and Bear Creek in Merced. The lead track to the **Merced Layover Facility** would cross over from the existing main track at MP 148.22 and at MP 149.33 on the Fresno Subdivision. The lead track to the layover facility would cross over Black Rascal Canal at MP 148.38, Southern Pacific Avenue at grade at MP 148.43, under the SR 99 overhead structure at MP 149.07, and the Private Road at grade at MP 149.29. The lead track would cross over Black Rascal Canal via a new single-track concrete bridge south of the single-track bridge for the existing main track. The bridge would be approximately 17 feet wide supported by two abutments on each end and five piers located in the canal. New at-grade crossing features including concrete crossing panels where the new main track crosses the roadway, railroad crossing signals, guards or gates, signal houses, and stop bars would be installed at Southern Pacific Avenue at MP 148.43. Modifications to the Private Road at-grade crossing at MP 149.29 for the layover facility lead track would include installing concrete crossing panels where the tracks cross the roadway.

Four new storage tracks, ranging from 0.40 to 0.50 mile, would turn out from the lead track to the layover facility. The layover facility would also include support facilities such as an administrative office, crew facilities, light vehicle repair facilities, parts storage, fueling facilities, wayside power, and train cleaning function areas. Support facilities would be constructed to the north along the length of the new storage tracks and a fence would be constructed around the perimeter of the layover facility.

The majority of improvements for the **Merced Layover Facility** would be located outside the UPRR ROW. Specific ROW and easement needs have not been determined and would be identified in future project-level analysis.

3.3.1.3 Turlock Station

The **Turlock Station** would be constructed between the Fulkerth Road at-grade crossing and the North Broadway Avenue at-grade crossing in Turlock. This proposed station would be in proximity to the Turlock Transit Center located at intersection of West Hawkeye Avenue and Dels Lane to the east. The Turlock Transit Center operates as a hub for local and commuter bus services provided by Turlock Transit, Stanislaus Regional Transit, and Merced County Transit. As shown in Figure 3-2, development of the **Turlock Station** would consist of the following improvements.

- Construction of a station platform and fence between the second main track and existing main track.
- Construction of a new surface parking lot providing a total of 226 parking spaces.
- Construction of a new pedestrian bridge crossing over the railroad tracks and North Golden State Boulevard.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. An approximately 20-foot-wide and 1,000-foot-long station platform would be constructed between MP 124.98 and MP 125.17 on the Fresno Subdivision, south of the Fulkerth Road at-grade crossing. A pedestrian overcrossing over North Golden State Boulevard would be constructed to provide pedestrian access from the areas east of North Golden State Boulevard to the station platform. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, street lamps, guardrails, security equipment, and emergency call box stations, would be installed on the station platform

area. A 1,000-foot-long fence would be constructed between the existing main track and the second main track, which would function as the station track, in the vicinity of the station platform.

To meet future parking demands generated by ACE service, a new surface parking lot (West Lot) would be constructed south of the Fulkerth Road and North Soderquist Road intersection. Vehicle access to the West Lot would be provided by an entrance on North Soderquist Road. The West Lot would encroach on a portion of area used for event space or parking during events held at the Stanislaus County Fairgrounds. SJRCC would work with Stanislaus County Fairgrounds to ensure that parking demand during the Stanislaus County Fair and other fairground events would be met. A pedestrian overcrossing would be constructed between the West Lot, station platform, and the Turlock Transit Center crossing over the railroad tracks and North Golden State Boulevard. In addition, landscaping would be installed at the station, including at surface parking lot areas.

The majority of improvements at the **Turlock Station** would be located outside the UPRR ROW, particularly the parking improvements. Specific ROW and easement needs have not been determined and would be identified in future project-level analysis.

3.3.1.4 Livingston Station

The **Livingston Station** would be constructed in downtown Livingston, northeast of the Main Street grade crossing. As shown in Figure 3-3, development of the **Livingston Station** would consist of the following improvements.

- Construction of a station platform and fence between the second main track and existing main track.
- Construction of a new surface parking lot providing a total of 114 parking spaces.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. An approximately 20-foot-wide and 1,000-foot-long station platform would be constructed between MP 136.33 and MP 136.42 on the Fresno Subdivision, southeast of the Main Street and Court Street intersection. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, street lamps, guardrails, security equipment, and emergency call box stations, would be installed on the station platform area. A 1,000-foot-long fence would be constructed between the existing main track and the second main track, which would function as the station track, in the vicinity of the station platform.

To meet future parking demands generated by ACE service, a new surface parking lot (North Lot) would be constructed north of the railroad tracks. Vehicle access to the North Lot would be provided by two entrances on Main Street. Construction of the North Lot would require the demolition of an existing commercial building onsite. In addition, landscaping would be installed at the station, including at surface parking lot areas.

The majority of improvements at the **Livingston Station** would be located outside the UPRR ROW, particularly the parking improvements. Specific ROW and easement needs have not been determined and would be identified in future project-level analysis.

3.3.1.5 Atwater Station

The **Atwater Station** would be constructed in southwestern Atwater, south of Atwater Boulevard between the Applegate Road at-grade crossing and the Packer Street at-grade crossing. This

potential station would be located adjacent to the Atwater Transpo located south of Atwater Boulevard, between Third Street and First Street. The Atwater Transpo operates as a bus stop for local and intercity bus services provided by Merced County Transit. As shown in Figure 3-4, development of the **Atwater Station** would consist of the following improvements.

- Construction of a station platform and fence between the second main track and existing main track.
- Construction of a new surface parking lot providing a total of 112 parking spaces.
- Modification of Atwater Boulevard to allow vehicle access to parking lot.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. An approximately 20-foot-wide and 1,000-foot-long station platform would be constructed between MP 143.13 and MP 143.32 on the Fresno Subdivision, between the Applegate Road and Packer Street at-grade crossing. Passenger amenities and safety features, such as patron shelters with benches and map boxes, ticket validation machines, street lamps, guardrails, security equipment, and emergency call box stations, would be installed on the station platform area. A 1,000-foot-long fence would be constructed between the existing main track and the second main track, which would function as the station track, in the vicinity of the station platform.

To meet future parking demands generated by ACE service, a new surface parking lot (East Lot) would be constructed just north of the station platform. Vehicle access to the East Lot would be provided by two entrances on Atwater Boulevard. Designated turning lanes on Atwater Boulevard between Fourth Street and Fifth Street would be installed to facilitate vehicles accessing the East Lot. Construction of the East Lot would require the demolition of existing industrial and commercial buildings onsite. In addition, landscaping would be installed at the station, including at surface parking lot areas.

The majority of improvements at the **Atwater Station** would be located outside the UPRR ROW, particularly the parking improvements. Specific ROW and easement needs have not been determined and would be identified in future project-level analysis.

3.3.1.6 Merced Station

A preliminary concept for the **Merced Station** for ACE service was developed based on a location in direct proximity to the proposed location for the California High-Speed Rail (HSR) station as presented in the *Final EIR/EIS for the Merced to Fresno Project Section of the High-Speed Rail System* (California High-Speed Rail Authority 2012). The HSR station is indicated as being adjacent to SR 99 and the Fresno Subdivision on Martin Luther King Jr. Way in downtown Merced.

However, the City of Merced is in conversation with the California High-Speed Rail Authority to consider an alternative HSR station further north in Merced. Should a new location for the HSR Merced Station be identified, then SJRRC would analyze an ACE station compatible with the alternative location in consultation with the City of Merced.

This preliminary concept for an ACE **Merced Station** at the current location is for the purposes of this programmatic analysis. Other station locations could be evaluated during the project-level environmental review for the extension of ACE service to Merced. SJRRC would work with the City of Merced to identify a locally preferred station alternative to carry into the project-level environmental review.

This EIR analyzes the preliminary concept for an ACE station adjacent to the HSR station, but as noted above, this is only one possibility, and the final determination of an ACE **Merced Station** would be made pursuant to the subsequent project-level environmental review.

The **Merced Station** would be constructed at the future Merced HSR station located adjacent to the Fresno Subdivision between Canal Street and G Street in downtown Merced. The ACE station platform would be located within the Merced HSR station plan area (California High-Speed Rail Authority 2017), which would provide drop-off facilities, an entry plaza, a station house area for ticketing and support services, a station box where passengers could wait and access the HSR, and parking facilities. As shown in Figure 3-5, development of the **Merced Station** would consist of the following improvements.

- Construction of a station platform and fence between the second main track and existing main track.
- Construction of a new surface parking lot, providing a total of 173 parking spaces.

To provide ACE service at this new station, a new station platform would be constructed to allow passengers to board and disembark the train. An approximately 20-foot-wide and 1,000-foot-long station platform would be constructed between MP 150.92 and MP 151.11 on the Fresno Subdivision, between the Martin Luther King Jr. Way and G Street at-grade crossings. A 1,000-foot-long fence would be constructed between the existing main track and the second main track, which would function as the station track, in the vicinity of the station platform.

To meet future parking demands generated by ACE service, a new surface parking lot (North Lot) would be constructed in the vicinity of the future HSR station, north of the Fresno Subdivision and west of Martin Luther King Jr. Way. Vehicle access to the North Lot would be provided by two entrances on West 16th Street. Construction of the North Lot would require the demolition of existing commercial buildings onsite. In addition, landscaping would be installed at the station, including at surface parking lot areas.

The majority of improvements at the **Merced Station** would be located outside the UPRR ROW, particularly the parking improvements. Specific ROW and easement needs have not been determined and would be identified in future project-level analysis.

3.3.2 Parking Demand at Stations Established in the Phase I

As described in Section 2.3.1, *Lathrop to Ceres*, Phase I improvements in this segment include: 1) Lathrop station options, and 2) Ceres Extension improvements.

For the Lathrop station options, the Proposed Project would include two stations in Lathrop, consisting of the **Existing Lathrop/Manteca Station** and the **North Lathrop Station**. The **Relocated Lathrop/Manteca Station** is an alternative location considered in lieu of the **Existing Lathrop/Manteca Station** (under both the single-station and two-station scenarios) and **North Lathrop Station** (under the single-station scenario). In addition, each single-station scenario where a station could operate as the only station in the Lathrop area, are also alternatives. The Phase I supply of parking provided at **Relocated Lathrop/Manteca** and **North Lathrop Stations** would be sufficient to accommodate parking needs for Phase II operations with the extension to Merced and no additional parking would be required. The existing parking supply (544 parking spaces) at the **Existing Lathrop/Manteca Station** would be sufficient to accommodate parking needs for Phase II operations with the extension to Merced and no additional parking would be required.

For the Ceres Extension improvements, the Proposed Project would include various track improvements and stations along the extension including the **Downtown Manteca, Ripon, Modesto, and Ceres Stations**. The Phase I supply of parking provided at **Downtown Manteca and Ripon Stations** would be sufficient to accommodate parking needs for Phase II operations with the extension to Merced and no additional parking would be required. With Phase II operations, parking demand at the **Modesto and Ceres Stations** would increase slightly beyond the amount provided by Phase I, by 35 and 20 parking spaces, respectively. This incremental increase in parking demand with Phase II operations is expected to be met by nearby existing City on-street parking. SJRRC would work with the City of Modesto and City of Ceres to identify additional parking areas and no physical improvements are anticipated to be required.

3.3.3 Core Capacity Improvements

Implementation of the ACE service extension in Phase II is anticipated to increase ACE ridership system-wide and may affect ACE core capacity.¹⁴ Service planning for Phase II has not yet been fully developed and ridership analysis cannot be completed until that is completed. As a result, potential changes in ACE equipment needed to maintain adequate core capacity Phase II operations have not been analyzed at this time. Core capacity improvements for Phase II operations would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

3.4 Operations and Maintenance

3.4.1 Conceptual Service Plan

ACE currently operates four westbound trains in the morning from Stockton to San Jose and four eastbound trains in the afternoon from San Jose to Stockton during weekdays only. There is approximately one train per hour in the westbound direction departing the Stockton Station from 4 a.m. until 7 a.m. and one train per hour in the eastbound direction departing the San Jose Station from 3:30 p.m. to 6:30 p.m. ACE currently does not operate on the weekend.

There are two operational scenarios in Phase II, which are dependent on whether SJRRC chooses to implement direct ACE service from Merced to San Jose. Figure 3-6 depicts the conceptual service plans for Phase II operations.

- Phase II operational scenario A: If no direct ACE service between Merced and San Jose is pursued, ACE service in Phase II would consist of the following scenario. This operational scenario represents the “worst-case” (i.e., the greatest level of impact) for the purposes of analyzing potential environmental impacts.
 - In the morning, four westbound trains from Merced to Lathrop, where passengers would transfer onto the four westbound trains from Stockton to San Jose at the selected Lathrop-area station (timed transfers).

¹⁴ The *core* of the ACE system is the existing trunk line between Stockton and San Jose. Extension of ACE service beyond this core, such as the extension of ACE service to Ceres and Merced, would generate new ridership in addition to the established ACE markets. ACE must ensure that enough capacity is available on the trunk line—in other words, *core capacity*—to accommodate ridership from both the existing markets and the added extension markets.

- In the evening, four eastbound trains from San Jose to Stockton, where passengers would transfer onto the four eastbound trains from Lathrop to Merced at the selected Lathrop-area station (timed transfers).
- Phase II operational scenario B: If direct ACE service between Merced and San Jose is pursued, ACE service in Phase II would consist of the following scenario.
 - In the morning, three westbound trains from Merced to Lathrop, where passengers would transfer onto the three westbound trains from Stockton to San Jose at the selected Lathrop-area station (timed transfers); and one westbound train from Merced to San Jose.
 - In the evening, three eastbound trains from San Jose to Stockton, where passengers would transfer onto the three eastbound trains from Lathrop to Merced at the selected Lathrop-area station (timed transfers); and one eastbound train from San Jose to Merced.

As with existing service, there would be four trains supporting the four daily roundtrips to San Jose in Phase II. Both Phase II operational scenarios would involve train operations between Merced and Lathrop that would transfer passengers onto or from trains operating between Stockton and San Jose. Three trains would support the roundtrips between Merced and Lathrop. Two trains would travel from Lathrop to Stockton to layover at the ACE Maintenance Facility mid-day and one train would remain and layover at the selected Lathrop area station.¹⁵ A total of seven trains would support Phase II ACE operations with the Merced Extension. Compared to existing service, there would be three additional trains in service with Phase II operations.

ACE currently provides shuttle services at the Great America and Pleasanton Stations. At the Great America Station, currently 103 daily shuttle trips are provided by 9 routes. In 2025, the No Project Alternative is anticipated to require 110 daily shuttle trips provided by the existing routes at the Great America Station. Implementation of the ACE service extension in Phase II is anticipated to result in increased ridership and result in additional shuttle services at the Great America and Pleasanton Stations to support the increased ridership system wide. The additional shuttle services required at the Great America and Pleasanton Stations with Phase II operations have not been determined. Specific details regarding additional shuttle services would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

For use in the analysis of this EIR, it is anticipated that in Phase II, there would be no more than two trains per hour in both the morning westbound and evening eastbound directions.

3.4.2 Ridership

Implementation of the ACE service extension in Phase II is anticipated to result in increased ridership. The ACE system ridership with Phase II operations have not been determined as service planning has yet to be fully developed. Specific details regarding Phase II ridership would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

¹⁵ Because three trains would support the three or four daily roundtrips between Merced and Lathrop, under only the Phase II operational scenario A, there would be up to two one-way trips to account for the trains returning to the origin station. Between Lathrop and Stockton, there would also be up to four one-way trips to account for the two trains laying over at the ACE Maintenance Facility in Stockton mid-day.

3.4.3 Energy Consumption

The primary sources of energy used to operate ACE trains and at maintenance and station facilities are diesel fuel and electricity. Existing diesel fuel consumption is approximately 455,000 gallons per year (based on 2017 figures). Operations at the existing stations and maintenance facility required approximately 2,353,000 kilowatt hours (kWh) of electricity in 2016.

Energy consumption associated with Phase II operations have not been determined. Specific details regarding Phase II energy uses would be identified and disclosed in future project-level environmental analyses for the Phase II improvements when service planning for Phase II is further developed.

3.4.4 Maintenance Activities

3.4.4.1 Track Maintenance

SJRRRC does not own the tracks on which ACE operates; instead, SJRRRC has entered into trackage rights agreements with host railroads (both PCJPB and UPRR) to operate on portions of their respective tracks. Maintenance of way (MOW) is the responsibility of the host railroad. In general, MOW is the ongoing maintenance of track (e.g., tie replacement, switch greasing, ballast recontouring), track structures, bridges, drainage features, signal apparatus and other signal infrastructure. Maintenance activities are both ongoing responses to daily issues and planned preventive maintenance. Depending on the corridor, host railroads would have other maintenance activities that are required, specific to the features located in the corridor.

PCJPB maintenance activities also include tree pruning and removal in areas where trees would pose a maintenance or safety concern. UPRR maintenance activities include annual vegetation trimming and herbicide application. With Phase II ACE operations, PCJPB and UPRR would continue to conduct maintenance activities associated with the rail corridor in accordance with their current practices.

3.4.4.2 Station Maintenance

ACE stations, served solely by ACE, are maintained by SJRRRC even though the land may be owned by the local jurisdiction. The Fremont, Great America, Santa Clara, and San Jose Diridon Stations are maintained by other transit entities. SJRRRC's Facility Department is responsible for maintenance and cleanup of stations from Pleasanton to Stockton. Maintenance crews are located at the ACE Maintenance Facility in Stockton, and are dispatched as needed from Stockton to the various stations. Typical maintenance activities include trash pickup, landscaping, painting, minor concrete work, and light bulb replacement. Contractors are hired for more extensive maintenance activities, such as major concrete work, platform extension, and paving. Certain stations have specific agreements with the local jurisdictions regarding maintenance activities that would be the responsibility of the local jurisdiction.

New stations would be established with Phase II improvements, including the following: **Turlock, Livingston or Atwater, and Merced Stations**. SJRRRC would own and maintain the station platforms at all new stations. As the **Turlock, Livingston, Atwater, and Merced Stations** are either co-located at existing transit centers and the local jurisdiction owns the parcels identified for surface parking,

or that on-street parking would be utilized at these stations, SJRRC would not maintain parking areas at these stations.

3.4.4.3 Fleet Maintenance

SJRRC's existing fleet maintenance activities for ACE are conducted at the ACE Maintenance Facility located at 1020 East Alpine Avenue in Stockton, approximately 1.5 miles north of the Stockton Station. Regular train maintenance consists of daily inspections of equipment (as required by the Federal Railroad Administration), cleaning, and servicing activities such as fueling, filling of sand boxes, emptying of toilet tanks, and replenishing of fluids, supplies, and consumables (including trail crew supplies). Train washing can occur up to several times per week, or as required for any special event trains. Preventive and periodic maintenance, including light and heavy repairs of passenger coaches and locomotives, are conducted as needed. With Phase II operations, fleet maintenance activities would continue at the ACE Maintenance Facility. The **Merced Layover Facility** would support train layovers, storage, light maintenance, and daily servicing. For heavy maintenance and repairs, trains would be cycled back to the ACE Maintenance Facility.

3.5 Construction

Specific construction plans for Phase II improvements have not been determined. Specific details regarding construction schedule and duration, methods and equipment to be used during construction, and construction staging areas and access would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

Appendix B and Appendix C include conceptual details regarding the areas of disturbance associated with each improvement, potential utility conflicts and whether the utility would be protected or relocated, and construction staging areas and access for the Phase II improvements. A description of the construction activities that could be undertaken for the Phase II improvements and estimated construction durations based on conceptual engineering are provided in the following subsections.

3.5.1 Construction Methods

3.5.1.1 Track Work

Construction of new track or upgrades to existing track would include grading for the track subgrade with graders and excavators and the placement of subballast and ballast. Concrete ties are then laid out. Continuous Welded Rail (1,000-foot-long rail strings) are welded together and clipped to ties. The ballast is tamped with on-track machinery along with the final adjustments to the alignment and profile. Construction of a new main track within the UPRR ROW would occur in segments; once the subgrade, ballast, and main track are installed for one segment, construction would continue down the alignment. The duration of construction activities for a new track generally lasts approximately a few days to a week for a given location.

Track construction could conflict with existing utility lines, and these lines would be relocated or protected. Appendix C depicts the potential utility conflicts and whether the utility would be protected or relocated.

3.5.1.2 Bridges, Underpasses, and Overpasses

Track work would also involve the construction of track-supporting structures, such as new bridges (track over waterway) and modifications to existing at-grade crossings and grade separation structures such as overheads (roadway over the rail).

Bridges over Waterways

The typical bridge (track over waterway) shown in the preliminary engineering plans consists of a combination of short spans supported on driven steel H-pile bents with precast concrete bent caps. Structures that require longer spans to avoid obstacles or provide adequate opening to pass design flows would likely be supported on cast-in-place reinforced concrete (RC) pier caps and columns extended from RC cast-in-drilled-hole pile shafts. The short spans consist of either precast concrete slab beams or double-cell box girders, and the longer spans would typically consist of either single-cell precast concrete box girders, steel-plate girders, steel-plate through-girders, or a steel through-truss.

Abutment and pier foundations outside the waterway are typically accessed by temporary dirt roads with the construction equipment working in a temporary construction easement that extends about 50 feet from the edges of the bridge deck on both sides. Wherever possible the main waterway is crossed by a single span placed by cranes operating on both banks reaching out and passing the girders across, with the new pier foundations located just outside of the anticipated waterway.

Pier foundations within the waterway may be accessed from the ground by pushing clean fill into the waterway on top of temporary pipe culverts or narrowing or diverting the waterway, then restoring the original condition when done. For the standard railroad trestle consisting of short spans on H-pile bents, it is possible to construct in a top-down, span-by-span process with a crane on the back span reaching out to build the next pier and place the next span. The reach and lifting capacity of the crane limits the feasibility of the span-by-span top-down method for longer spans. An alternative way of accessing pier foundations in the waterway is to build a temporary work trestle bridge from which the construction equipment can work.

A typical construction sequence for the bridges (track over water) follows.

- Prepare temporary construction access road(s).
- Construct temporary work trestle within the waterway.
- Install proposed cast-in-drilled-hole pile shafts.
- Form and cast RC columns.
- Form and cast RC pier caps.
- Place and install precast concrete box girders or steel girders with steel deck.
- Drive steel H-piles for standard railroad trestle bents.
- Place precast concrete bent caps and field weld connections to the piles.
- Place precast concrete abutment wingwalls.
- Place precast beams with attached curbs and sidewalks.

- Install deck waterproofing, ballast and track.
- Restore landscaping (revegetation).

Typical equipment used in the bridge construction may include the following.

- Excavator with bucket or breaker
- Bulldozer with blade or ripper
- Backhoe
- Loader
- Dump truck
- Crane with pile driving rig
- Crane with pile drilling rig
- Trucks with flatbed trailers and large crane(s) to haul, pick and place rebar cages, pile casings, column forms, girders, etc.
- Concrete trucks and pump trucks for cast-in-place concrete

Based on similar projects, construction of a railroad bridge crossing the river could last approximately 14 to 36 months, depending on the access and in-water work windows.

Modifications to At-Grade and Grade-Separated Crossings

Modifications to at-grade crossings to support new tracks generally require clearing and grubbing, for the installation of concrete crossing panels where the new main track crosses the roadway; relocation of railroad crossing signals, guards or gates, and signal houses; and installation of stop bars. Based on similar projects, construction associated with modified at-grade crossings would last approximately 7 to 15 working days, with an average of 9 working days.

Modifications to existing overhead structures generally require clearing, grubbing, and rough grading for the installation of pier protection along the existing piers supporting the overhead roadway structure and retaining walls along the length of existing abutment slopes. The structure types for overhead structures normally follow the code/design guidelines promulgated by either the local agency or California Department of Transportation. Based on similar projects, construction associated with modified overhead structure undercrossings would last approximately 30 to 120 working days, with an average of 60 working days.

3.5.1.3 Station Improvements

Station improvements would include the construction of new station facilities, such as station platforms, station or tail tracks, and passenger amenities including surface parking lots or parking structures and pedestrian connection between the parking areas and station platform.

Construction activities associated with station platforms include clearing and grubbing, rough grading, structural excavation for walls, forming and pouring concrete for the walls, access stairs and ramps, platform surface, installation of signage, shelters, lighting, security, railings, benches and trash receptacles. Based on similar projects, construction of a station platform would last approximately 3 months.

Construction activities associated with station tracks would be similar to track work activities described above in Section 2.5.1.1, *Track Work*.

Construction activities associated with surface parking areas include clearing and grubbing, rough grading, installation of drainage and utilities, final grading, installation of aggregate base, installation of curb and gutter, paving, landscaping, installation of lighting and security, installation of signage and striping.

Construction activities associated with parking garages include clearing and grubbing, rough grading, structural excavation for foundation, installation of drainage and utilities, pouring of the concrete foundation, installation of precast concrete sections or forming and pouring cast-in-place concrete sections, installation of lighting, security and fire suppression, installation of elevators, installation of signage and striping.

Construction activities associated with pedestrian overpasses and underpasses include clearing and grubbing, rough grading, installation of utilities, installation of cast-in-drilled-hole piles, installation of ramp footings, placing column reinforcing steel, pouring structural concrete for columns, placing falsework for ramps and abutments, pouring structural concrete for ramps and abutments, placing reinforcing steel and pouring structural concrete for decks, placing handrails for ramps, erecting steel superstructure and installation of lighting.

3.5.2 Construction Schedule and Durations

The specific duration for construction of each Phase II improvement has not been determined. Specific details regarding construction schedule and duration would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

Construction timing and duration would depend on the timing for permitting, contractor selection, final design, and construction duration. Also, construction may be phased to match funding and service priorities.

3.6 Right-of-Way and Easement Needs

The ROW and easement needs for the Phase II improvements have not been determined. Specific details regarding additional ROW and easement needs would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

3.7 Costs and Revenues

3.7.1 Capital Costs

Capital costs associated with Phase II improvement aspects of the Proposed Project could cost approximately \$350 million for infrastructure improvements, depending on coordination with the host railroad (UPRR) and subsequent project-level environmental analysis.¹⁶ As described in

¹⁶ Rolling stock costs required for Phase II operations are not included in this total. This would be identified and disclosed in future project-level environmental analyses for the Phase II improvements.

Chapter 2, capital costs associated with Phase I aspects of the Proposed Project would be approximately \$303 million. As part of Senate Bill 132 passed in April 2017, SJRRC was awarded \$400 million for the ACE service expansion in the San Joaquin Valley, including associated system improvement.

The extension of service to Merced does not necessarily require the full build of Phase II improvements discussed in this EIR in order to extend service. Train service could be initially expanded or extended with station, parking and key track/infrastructure improvements and then expanded over time with additional improvements, and then be expanded fully with the full build suite of improvements.

As shown in Table 3-5, capital costs associated with the construction of Phase II improvements differ slightly, depending on whether the **Livingston Station** or **Atwater Station** is implemented. Capital costs associated with Phase II improvements are presented in more detail in Appendix E, *ACE Extension Opinion of Probable Cost Report*.

Table 3-5. Construction Cost Estimates for Phase II Improvements

Segment	Element	Construction Cost
Ceres to Merced	Merced Extension Alignment	\$275,055,894
	Merced Layover Facility	\$36,700,184
	Turlock Station	\$15,243,659
	Livingston Station	\$9,670,021
	Atwater Station	\$13,200,389
	Merced Station	\$13,045,340
The Proposed Project would include the Merced Extension Alignment, Merced Layover Facility , the Turlock and Merced Stations and either the Atwater Station or the Livingston Station .		
Total Phase II Proposed Project Costs (Range with Livingston or Atwater Station)		\$349,715,098 - \$353,245,467
Source: Appendix E, <i>ACE Extension Opinion of Probable Cost Report</i> .		

3.7.2 Operating and Maintenance Costs and Revenues

As shown in Table 3-6, existing annual operations and maintenance costs are estimated at approximately \$21.6 million. With Phase II operations, annual operations and maintenance costs are estimated at approximately \$33.2 million to \$35.7 million.

Table 3-6. Summary of Annual Projected Operations & Maintenance Cost (2017, \$ in millions)

Cost Element	Existing	Phase II Operations	
		Scenario A	Scenario B
TOTAL	\$21.6	\$35.7	\$33.2

ACE system revenue associated with Phase II operations have not been determined. Specific details regarding annual fare revenue would be identified and disclosed in future project-level environmental analyses for the Phase II improvements once service planning for Phase II is more

developed and ridership is available. The proposed service increases may be implemented in phases. Phase II operations and maintenance costs and revenues are presented in more detail in Appendix F, *ACE Extension Operating and Maintenance Cost Technical Memorandum*.

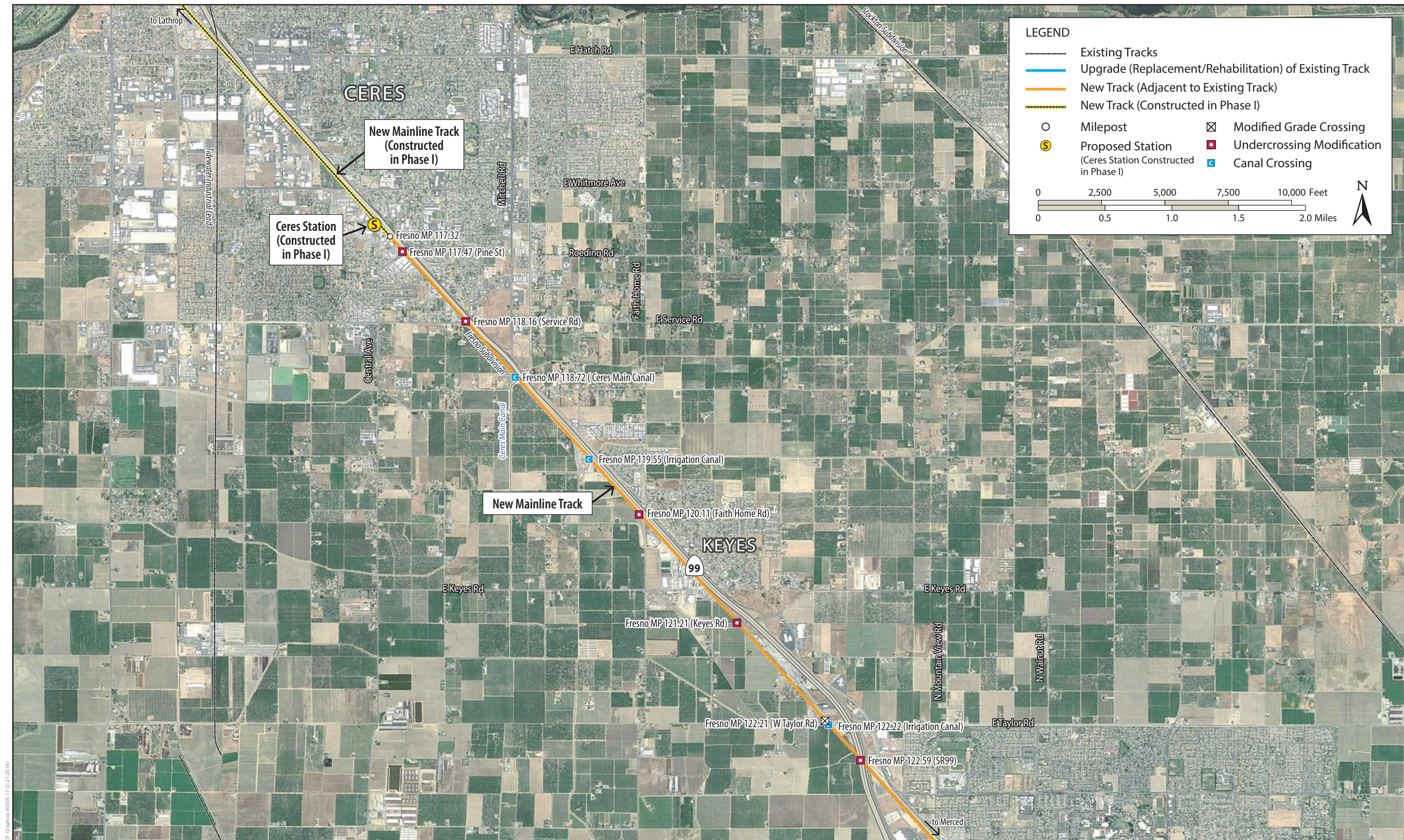
3.8 Permits and Approvals

Table 3-7 lists the anticipated permits and approvals that could be required for the Proposed Project's Phase II improvements. Phase II improvements require a more detailed subsequent project-level analysis prior to approval and obtaining necessary permits. SJRRC would coordinate with all local, regional, and state agencies to ensure that permits and approvals are received to support the schedule for Phase II improvements.

Table 3-7. Permits, Funding, and Other Approvals Anticipated for Phase II Improvements

Agency	Funding, Approval, or Permit
Federal Agencies	
Federal Railroad Administration (FRA)	NEPA review and approval; potential federal funding
National Marine Fisheries Service (NMFS)	Concurrence of effects on listed fish species under the federal Endangered Species Act (ESA) Section 7 consultation process; issuance of a biological opinion
State Historic Preservation Office (SHPO)	Concurrence of effects on historic resources under Section 106 of the National Historic Preservation Act consultation process; potential development of a memorandum of agreement
U.S. Army Corps of Engineers (USACE)	Permit for effects on wetlands and other waters of the United States under Section 404 of the Clean Water Act (CWA)
U.S. Coast Guard	Potential bridge permit for new structures crossing over Merced River, Canal Creek, Weber Canal, Black Rascal Canal, and Bear Creek (if determined navigable)
U.S. Fish and Wildlife Service (USFWS)	Concurrence of effects on listed terrestrial wildlife and plant species under ESA Section 7 consultation process; issuance of a biological opinion
State Agencies	
California State Transportation Authority (CalSTA)	Potential source of funding
California Department of Fish and Wildlife (CDFW)	Permits for the placement of structures affecting waterways under Section 1602 streambed alteration agreement; incidental take permits for effects on listed state wildlife and plant species under the California Endangered Species Act Section 2081
California Department of Toxic Substances (DTSC)	Review of worker health and safety plan
California Department of Transportation (Caltrans)	Encroachment permit for encroachment on state roadways and highways
California Public Utilities Commission (CPUC)	Approvals required for rail crossing improvements

Agency	Funding, Approval, or Permit
California State Lands Commission (SLC)	Approval required for structures crossing over Merced River and Bear Creek
Central Valley Flood Protection Board (CVFPB)	Encroachment permit for CVFPB floodways and levees
Regional Water Quality Control Board (Regional Water Board)—Central Valley	Permit under the CWA Section 401 water quality certification/waste discharge requirements for placement of structures affecting waterways and under the Porter-Cologne Water Quality Control Act
San Joaquin Valley Air Pollution Control District (SJVAPCD)	Permits for authority to construct and to operate emergency generators at the Merced Layover Facility
State Water Resources Control Board (State Water Board)	General construction activity storm water permit under Section 402 National Pollutant Discharge Elimination System (NPDES)
Regional Agencies and Transportation Agencies	
San Joaquin Regional Rail Commission (SJRRRC)	Certification of CEQA environmental document; project proponent; project funding
San Joaquin Council of Governments	Funding coordination
Stanislaus Council of Governments	Funding coordination
Merced Council of Governments	Funding coordination
Local Agencies (in geographic order from west to east)^a	
Stanislaus County	Encroachment permit for construction in county ROW. Use and building permits for improvements outside rail ROW.
City of Turlock	Encroachment permit for construction in the city ROW. Use and building permits for improvements outside rail ROW.
Merced County	Encroachment permit for construction in county ROW. Use and building permits for improvements outside rail ROW.
City of Livingston	Encroachment permit for construction in the city ROW. Use and building permits for improvements outside rail ROW.
City of Atwater	Encroachment permit for construction in the city ROW. Use and building permits for improvements outside rail ROW.
City of Merced	Encroachment permit for construction in the city ROW. Use and building permits for improvements outside rail ROW.
Other Parties	
Union Pacific Railroad (UPRR)	Project approval; right of entry permit(s) for work conducted within UPRR ROW; design and installation permits/construction maintenance agreements for structures and facilities
^a UPRR is not subject to the land use jurisdiction of local governments.	



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Figure 3-1a
Merced Extension Alignment
ACE Extension Lathrop to Ceres/Merced

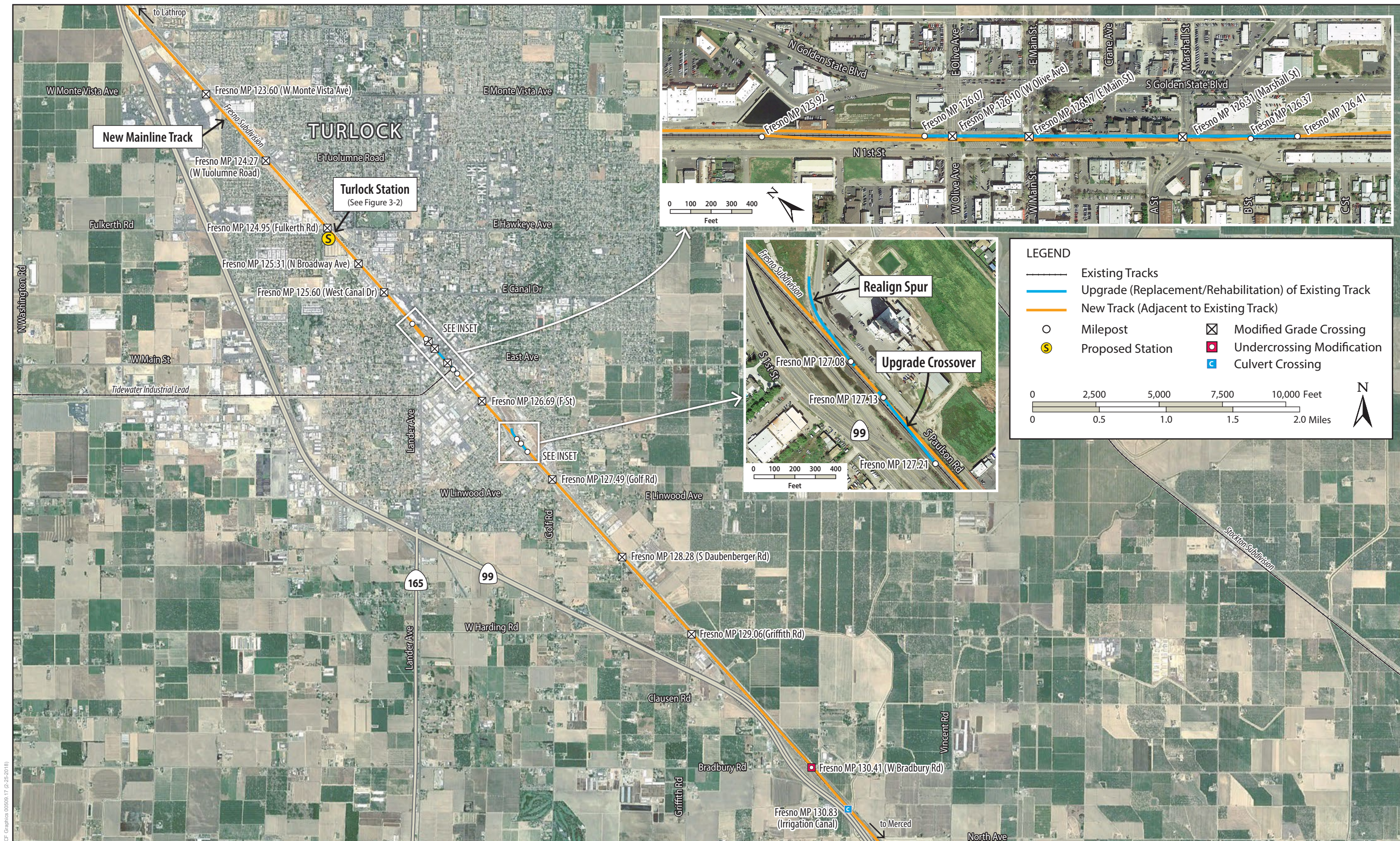
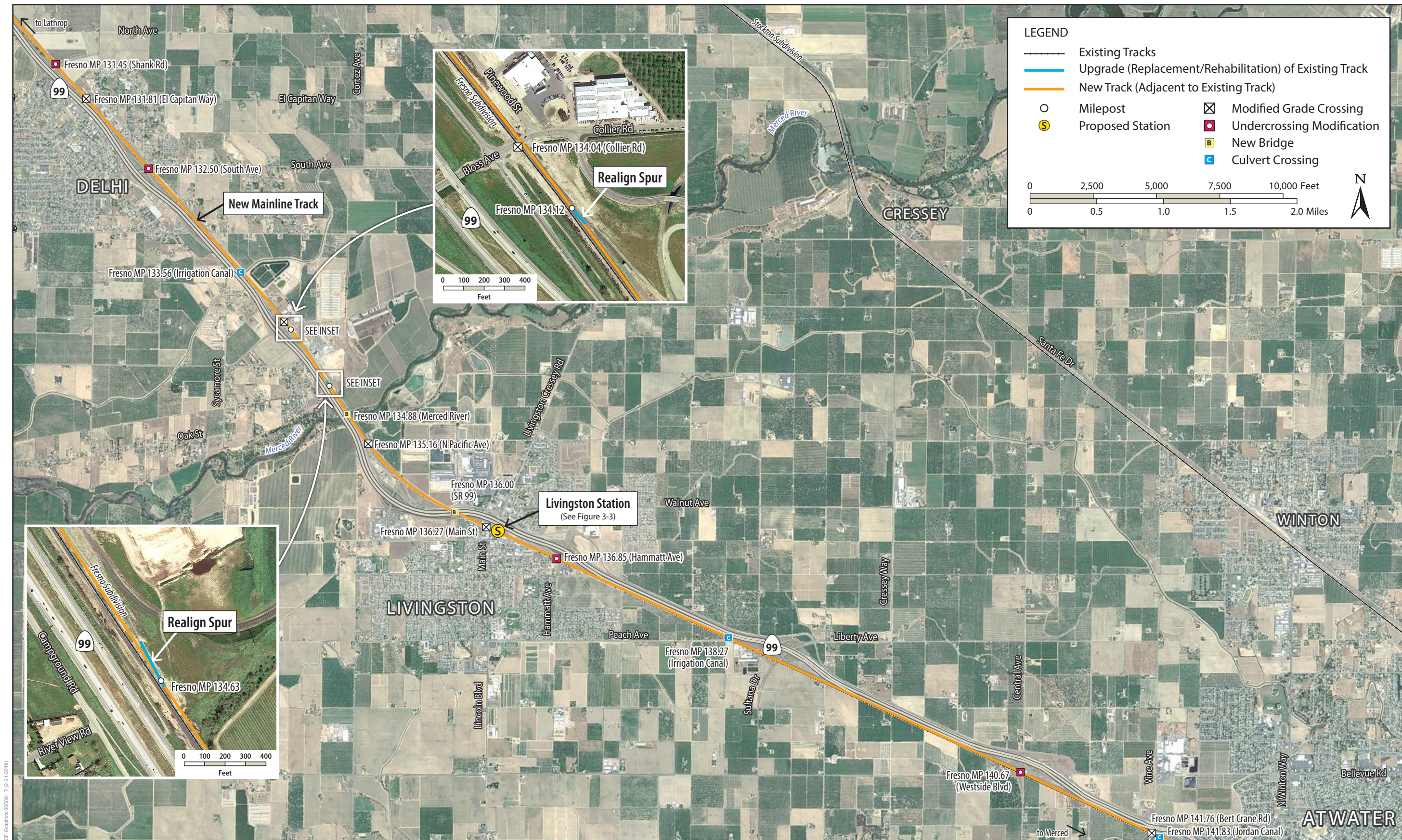
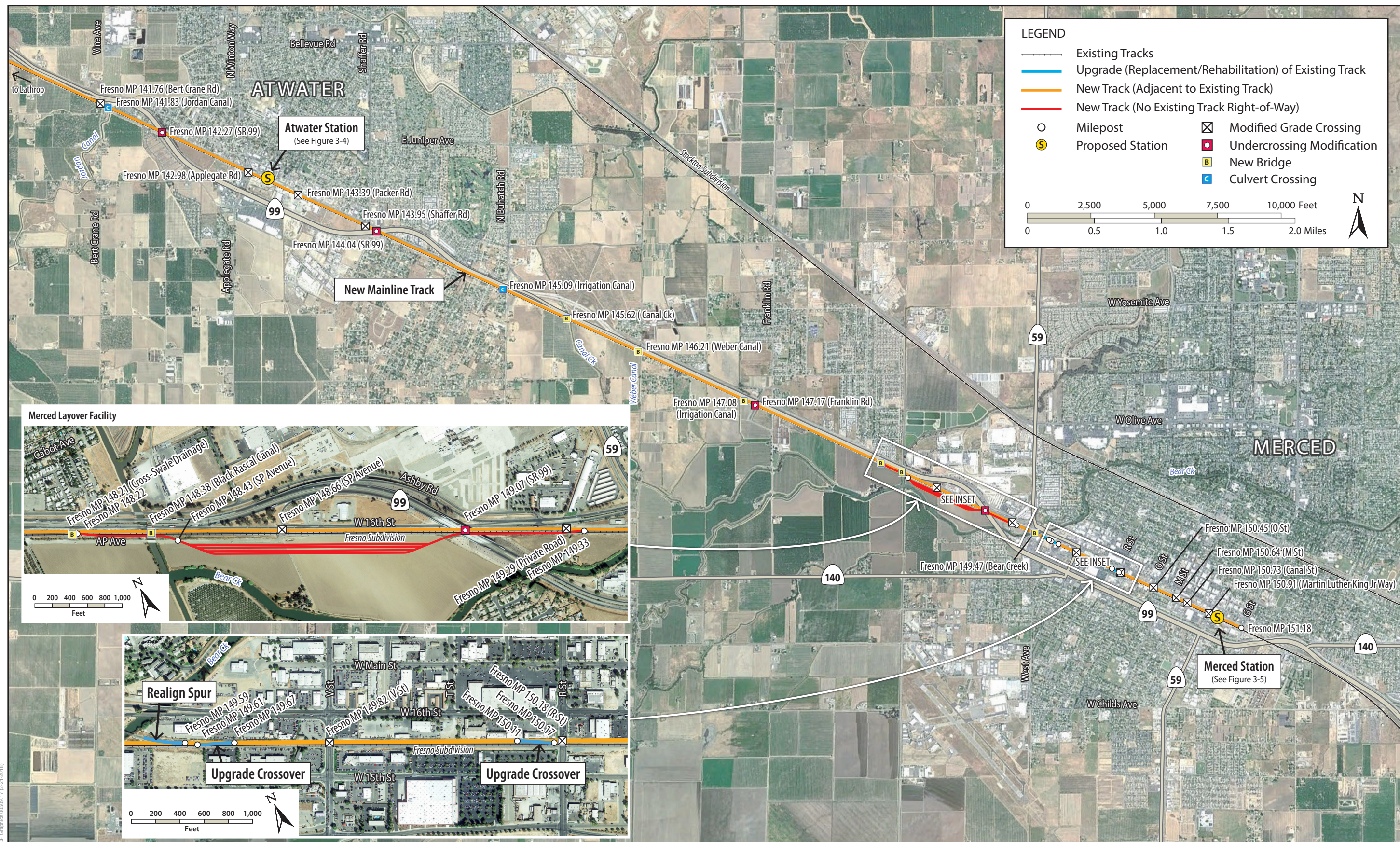


Figure 3-1b
Merced Extension Alignment
 ACE Extension Lathrop to Ceres/Merced



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Figure 3-1c
Merced Extension Alignment
ACE Extension Lathrop to Ceres/Merced



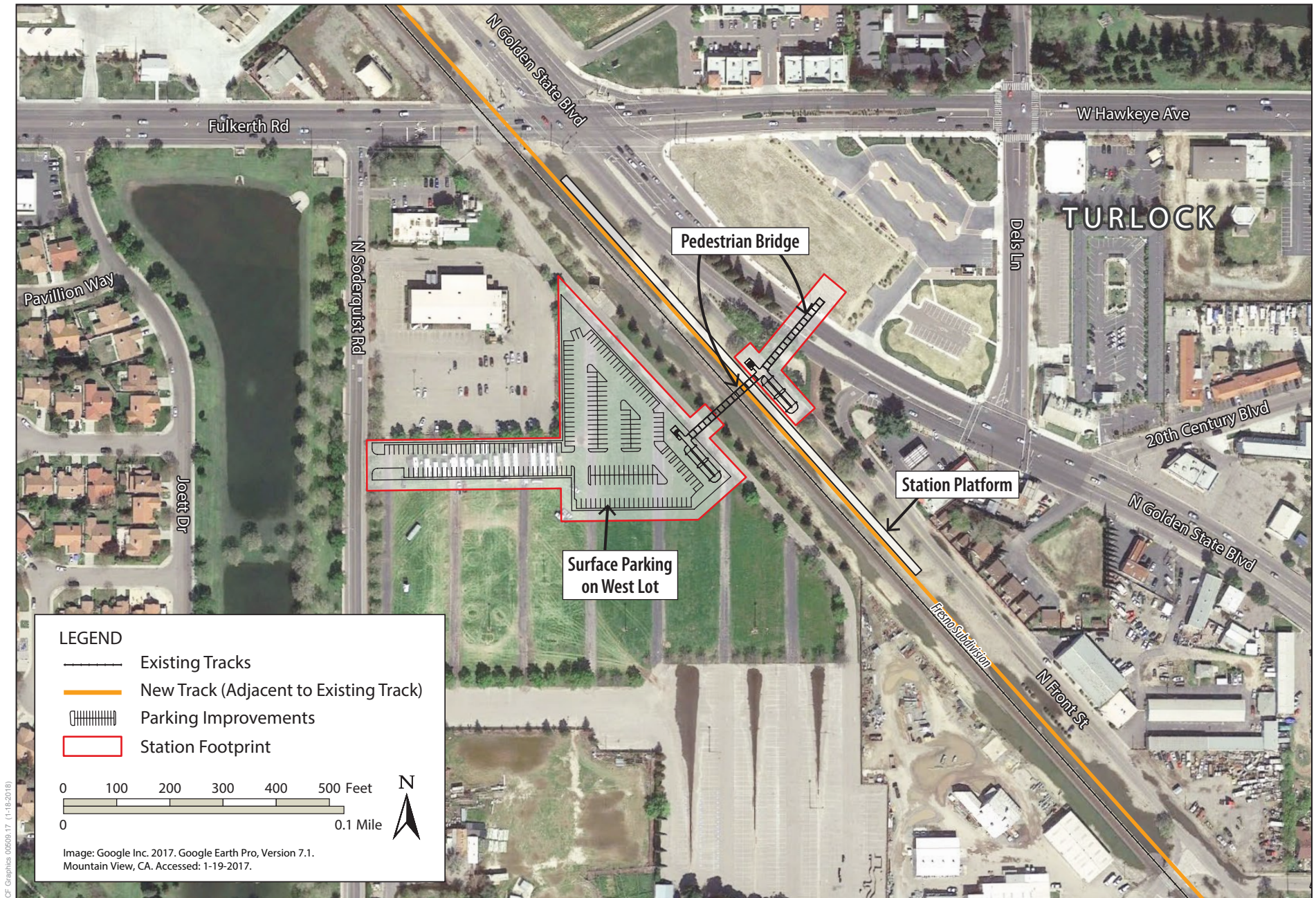


Figure 3-2
Turlock Station
ACE Extension Lathrop to Ceres/Merced



Figure 3-3
Livingston Station
ACE Extension Lathrop to Ceres/Merced

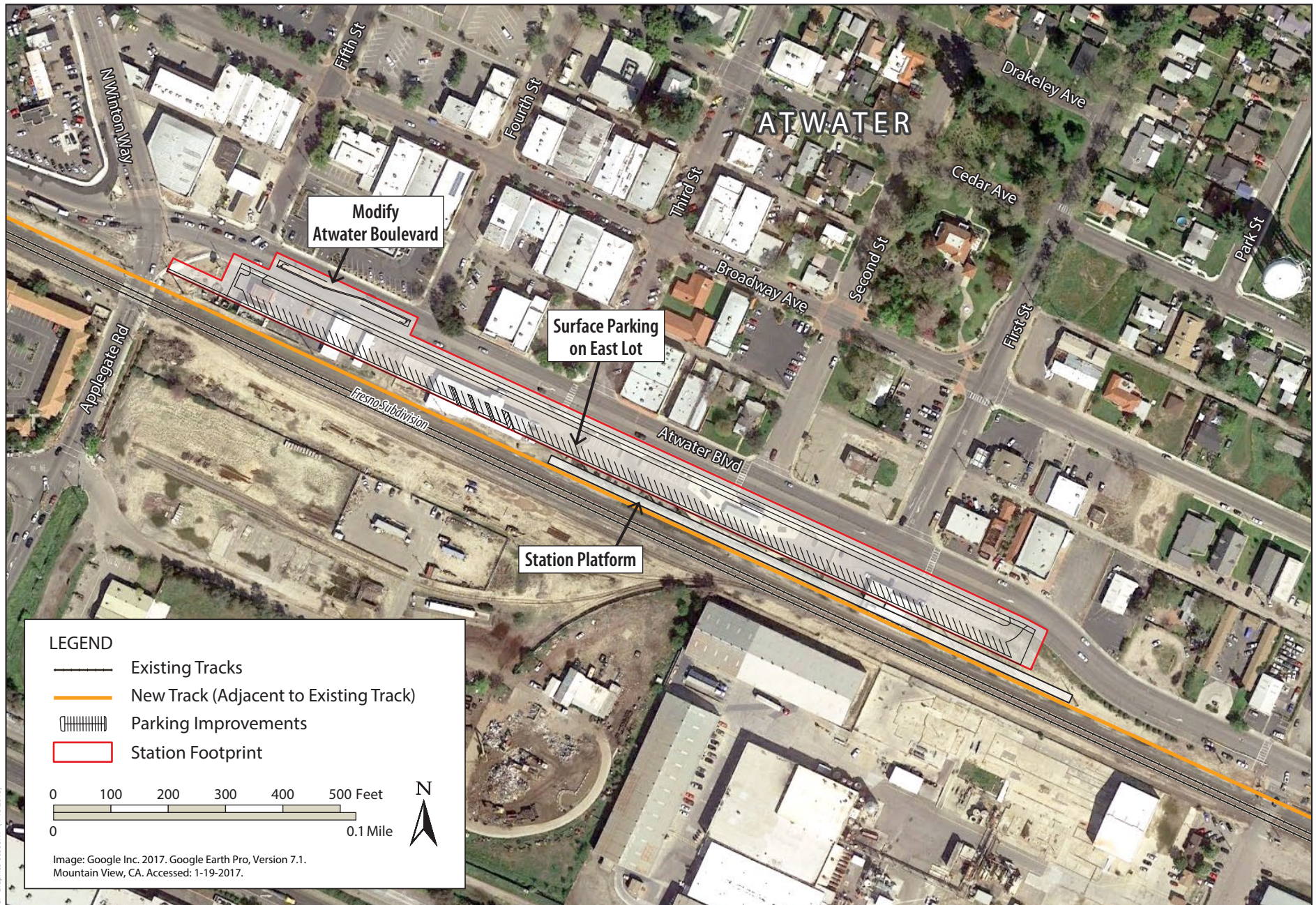
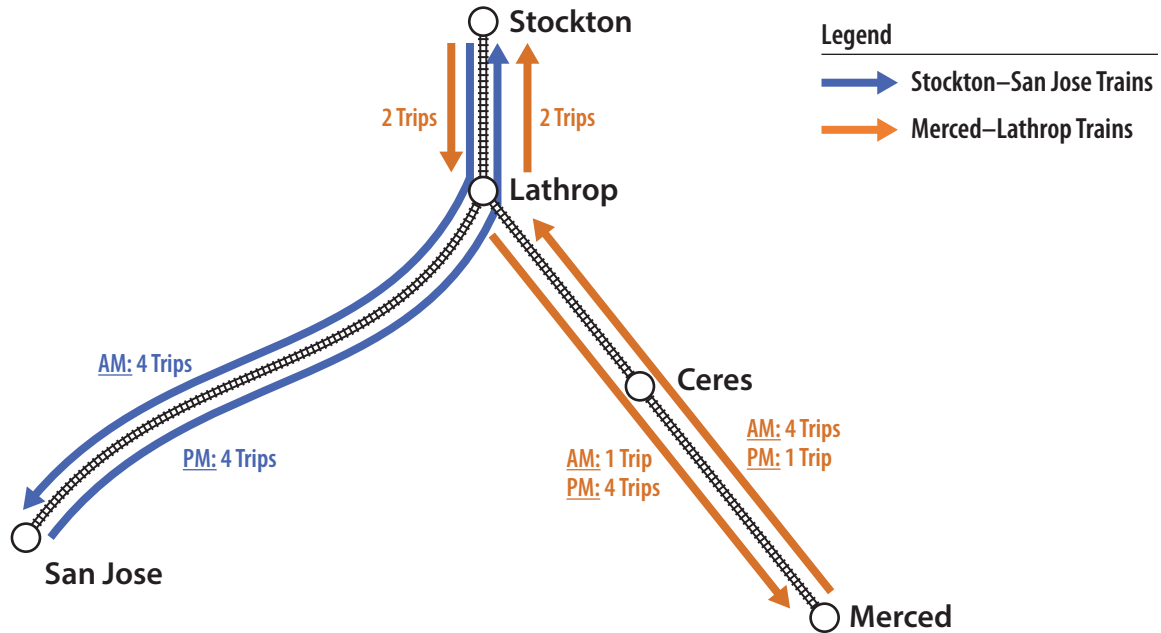


Figure 3-4
Atwater Station
ACE Extension Lathrop to Ceres/Merced

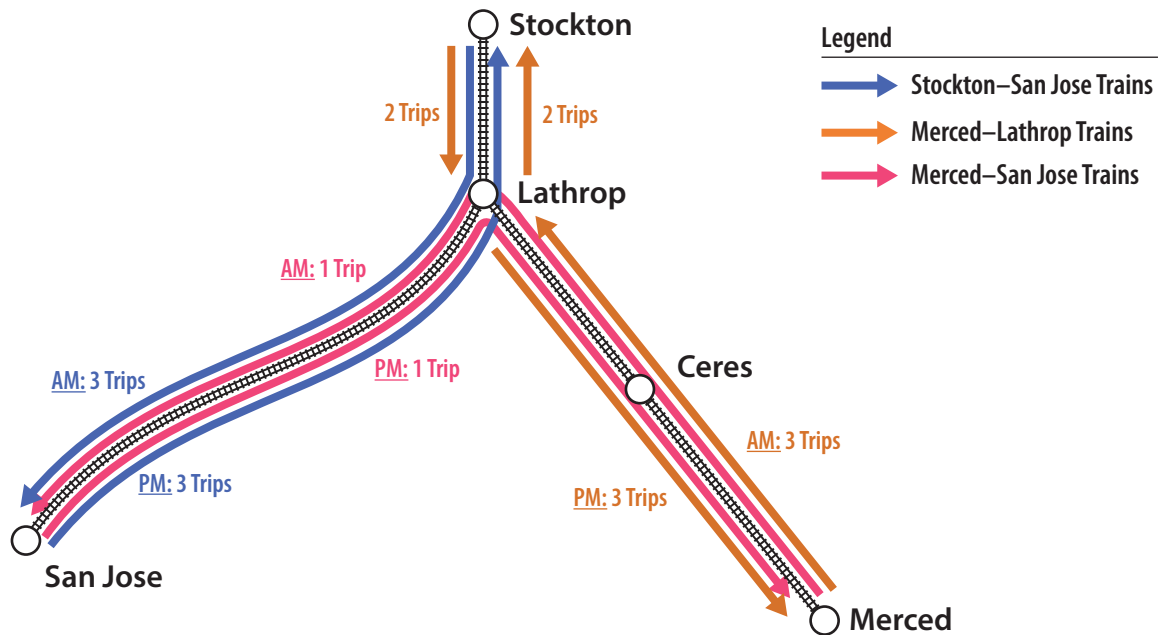


Figure 3-5
Merced Station
ACE Extension Lathrop to Ceres/Merced

Operational Scenario A: Without Direct Service Between Merced and San Jose



Operational Scenario B: With Direct Service Between Merced and San Jose



ICF Graphics 00509.17 (3-14-2018)