

## Attachment A: Summary of Project Modifications

### 1.0 Introduction

The DesertXpress Enterprises, LLC XpressWest High-Speed Train Project (Project) entails construction and operation of a high-speed passenger train system between Apple Valley, California, and Las Vegas, Nevada. The Project was originally evaluated in the following documents (collectively referenced as the DesertXpress Environmental Impact Statement [EIS]):

- March 2009 *Draft Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train* (DesertXpress DEIS)
- April 2010 *Supplemental Draft Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train* (DesertXpress SEIS)
- March 2011 *Final Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train Victorville, California to Las Vegas, Nevada* (DesertXpress FEIS)

FRA issued the *Record of Decision DesertXpress High-Speed Passenger Train* (DesertXpress ROD) in July 2011.

The purpose of this document is to summarize Project footprint and facility modifications that have been proposed by DesertXpress Enterprises, LLC since the DesertXpress ROD was issued. A full description of the previously evaluated Project can be found in Chapter 2, Alternatives, of the DesertXpress DEIS, SEIS, and FEIS.

Table 1 lists the Project features evaluated in the DesertXpress EIS and summarizes the status of each feature: **“Unchanged”** (Project features unchanged from those evaluated in the DesertXpress EIS) or **“Modified”** (Project features evaluated in the DesertXpress EIS but modified in terms of footprint or design). Figure 1 through Figure 7 (located at the end of this document) depict the Project features discussed below. Project features are organized by the following six Segments, as defined in the DesertXpress EIS:

- Segment 1— Apple Valley to Lenwood
- Segment 2 — Lenwood to Yermo
- Segment 3 — Yermo to Mountain Pass
- Segment 4 — Mountain Pass to Primm
- Segment 5 — Primm to Sloan
- Segment 6 — Sloan Road to Las Vegas

**Table 1 Reevaluation Summary**

Project Feature	Project Feature Status
<b>Alignments and Stations</b>	
Segment 1 – East Side-Running Alignment (approximately 14 miles)	<b>Modified:</b> The modified Project includes a rail alignment on the east side of Interstate (I)-15 freeway through most of Segment 1. The DesertXpress EIS did not evaluate an east side-running alignment through Segment 1; it evaluated a west side-running alignment.

Project Feature	Project Feature Status
Dale Evans Station and Operation, Maintenance, and Storage Facility (OMSF) – Apple Valley	<b>Modified:</b> The modified Project includes a passenger station and OMSF located on the east side of the I-15 freeway at the Dale Evans Parkway interchange. The DesertXpress EIS did not evaluate a passenger station and OMSF at this location; it evaluated a passenger station and OMSF on the opposite (west side) of the I-15 freeway at Dale Evans Parkway.
Segment 2 – Median-Running Alignment (approximately 18 miles)	<b>Unchanged:</b> The DesertXpress EIS evaluated a median-running alignment through Segment 2.
Segment 3 – Median-Running Alignment (approximately 85 miles)	<b>Unchanged:</b> The DesertXpress EIS evaluated a median-running alignment through Segment 3.
Segment 4 - Median-Running Alignment (approximately 16 miles)	<b>Modified:</b> The modified Project includes a rail alignment in the median of the I-15 freeway through Segment 4 (from Mountain Pass to Primm). The DesertXpress EIS did not evaluate a median-running alignment through Segment 4; it evaluated alignments that would deviate from the I-15 freeway corridor both to the north and south.
Segment 5 - Segment 5B Alignment (approximately 24 miles)	<b>Modified:</b> The modified Project includes a rail alignment that would be similar to the Segment 5B alignment evaluated in the DesertXpress EIS, but with minor refinements including a departure from the I-15 freeway median one mile north of the previously analyzed alignment and a reentry into the median near the northern terminus of Segment 5.
Segment 6 – Segment 6D Side-Running Alignment (approximately 9 miles)	<b>Modified:</b> The modified Project includes a rail alignment that would primarily follow the east side of the I-15 freeway, with its southernmost portion following the I-15 freeway median for three miles. The DesertXpress EIS did not evaluate a side-running alignment on the east side of the I-15 freeway through Segment 6; it evaluated a median-running alignment and a side-running alignment on the west side of the I-15 freeway through this Segment.
Warm Springs Station – Las Vegas	<b>Modified:</b> The modified Project includes a passenger station north of Blue Diamond Road and east of the I-15 freeway in Las Vegas. The DesertXpress EIS did not evaluate a passenger station at this location; it evaluated passenger stations at four locations in the Las Vegas area.
Frias Substation – Las Vegas	<b>Modified:</b> This facility was evaluated in the DesertXpress EIS; however, the modified Project would change the orientation and footprint of the facility. The long side of the substation would be rotated to parallel the alignment.
<b>Ancillary Facilities</b>	
Maintenance of Way Facility	<b>Modified:</b> The DesertXpress EIS evaluated a Maintenance of Way (MOW) facility in Baker. The modified Project would locate the MOW facility (the California MOW) adjacent to the California Agricultural Inspection Station approximately six miles south of the California/Nevada state line.
Temporary Construction Areas	<b>Unchanged:</b> 29 temporary construction areas (TCA) were evaluated in the DesertXpress EIS. The modified Project includes a subset of these TCAs and additional TCAs located at the autotransformer sites previously evaluated in the DesertXpress EIS.

Project Feature	Project Feature Status
Negative Shoulders	<b>Modified:</b> Most negative shoulders were previously evaluated in the DesertXpress EIS, although new previously unevaluated shoulders have been added to the Project footprint within the I-15 freeway right-of-way (ROW).
Roadway Reconstruction	<b>Modified:</b> Roadway reconstruction areas were previously evaluated in the DesertXpress EIS, although new unevaluated areas have been added to the modified Project footprint.
Paralleling Sites (formerly Autotransformers)	<b>Modified:</b> The modified Project includes nine paralleling sites to replace the 17 autotransformer sites evaluated in the DesertXpress EIS. The autotransformer sites evaluated in the DesertXpress EIS would be utilized as TCAs.
Utility Corridors and Electrical Substations	<b>Modified:</b> The modified Project replaces the three previously studied electrical substations in Victorville, Baker, and Las Vegas with two electrical substations that were not evaluated in the DesertXpress EIS. The first, the Barstow Electrical Substation, would be located near Azurite Road. The second, the Ivanpah Electrical Substation, would be located near Yates Well Road. The 13-mile utility corridor south of Victorville has been removed.
Double- and Single-Track	<b>Unchanged:</b> Although the Project would initially construct a primarily single-track alignment with passing sidings, the Project footprint includes all areas planned for a double-tracking corridor.
Emergency Crossovers	<b>Modified:</b> The DesertXpress EIS assumed that the Project would require emergency crossovers without specifying emergency crossover locations. The modified Project incorporates nine emergency crossovers along the alignment.
Train Propulsion	<b>Unchanged:</b> The Project includes only a fully electric propulsion system consisting of multiple units or push-pull train options. Electrical propulsion vehicles were evaluated in the DesertXpress EIS.

## 2.0 Modifications by Segment

This section describes the Project modifications in six separate Segments defined in the DesertXpress EIS. Within these Segments, the alignment would follow the I-15 freeway and would not have Project footprint areas outside of the I-15 freeway ROW, with the exception of minimal 'sliver takes' immediately adjacent to the I-15 freeway ROW within Segments 5 and 6. Figure 1 through Figure 7 depict the modified Project Segments and major facilities.

### 2.1 SEGMENT 1 — APPLE VALLEY TO LENWOOD (CA)

#### ALIGNMENT

##### Evaluated Alignment

The DesertXpress EIS evaluated an alignment that travelled along the northwest side of Interstate (I)-15 through Segment 1.

## **Project Modifications**

The modified Project includes an alignment that would travel along the east side of the I-15 freeway for 14 miles before transitioning into the I-15 freeway median near the Sidewinder Road interchange. The alignment would remain in the I-15 freeway median for the rest of Segment 1 (Figure 2).

## FACILITIES

### **Apple Valley Passenger Station**

#### *Evaluated Stations*

The DesertXpress EIS evaluated four station site options (VV1, VV2, VV3A, and VV3B) to serve Victorville and Apple Valley. The VV1 site would be located just north of the southern Stoddard Wells Road exit and the VV2 site would be located to northwest of the northern Stoddard Wells Road exit. The VV1 and VV2 sites would occupy roughly 100 acres each. VV3A and VV3B would be located near the Dale Evans Parkway / I-15 freeway interchange. The VV3A site would occupy roughly 205 acres, while the VV3B site would occupy 218 acres. These station site options were in unincorporated San Bernardino County but were within the City of Victorville's 'sphere of influence', which is a planning boundary outside of an agency's legal boundary (such as a city limit line).

#### *Project Modifications*

A new station site (Dale Evans Station and OMSF) would be constructed within the Apple Valley city limits on an approximately 300-acre parcel located southeast of the Dale Evans Parkway and I-15 freeway interchange in Apple Valley (Figure 2).<sup>1</sup>

### **Apple Valley Operations, Maintenance, and Storage Facility**

#### *Evaluated Facilities*

The DesertXpress EIS evaluated two OMSF sites: OMSF1 and OMSF2. OMSF1 would be within the City of Victorville's sphere of influence to service the VV1 station site. OMSF2 would be north of the VV2 station site and to the southwest of the VV3A and VV3B station sites.

#### *Project Modifications*

The footprint of the OMSF would be collocated with Dale Evans Station in Apple Valley within the 300-acre station footprint.

## **2.2 SEGMENT 2 — LENWOOD TO YERMO (CA)**

### ALIGNMENT

#### **Evaluated Alignments**

The DesertXpress EIS evaluated multiple Segment 2 alignment options (Segment 2A, Segment 2B, and a combined Segment 2A/2B) that would travel through or around Barstow. In addition, the Supplemental

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<sup>1</sup> Although the Dale Evans Station would be located in Apple Valley, it would remain within the sphere of influence of the adjacent City of Victorville, as established in the DesertXpress EIS.

DEIS introduced Segment 2C to follow the I-15 freeway through Barstow, which included side-running (2C Side-Running) and median-running (2C Median-Running) options.

### **Project Modifications**

The modified alignment would be entirely in the I-15 freeway median through Segment 2, similar to the Segment 2C Median-Running option evaluated in the DesertXpress EIS (Figure 3).

### FACILITIES

Segment 2 does not include other facilities.

## **2.3 SEGMENT 3 — YERMO TO MOUNTAIN PASS (CA)**

### ALIGNMENT

#### **Evaluated Alignments**

The DesertXpress EIS evaluated both a Median (Segment 3A) and Side-Running (Segment 3B) alignment through Segment 3.

#### **Project Modifications**

The modified alignment would travel within the I-15 freeway median throughout the entirety of Segment 3 (Figure 4). This alignment would be consistent with the Segment 3A alignment evaluated in the DesertXpress EIS.

### FACILITIES

#### **Evaluated Facilities**

The DesertXpress EIS evaluated a MOW facility adjacent to the I-15 freeway near the community of Baker. This 2.4-acre facility would serve as a headquarters for DesertXpress employees charged with daily inspection of tracks and associated facilities. The site would also contain fuel storage and a radio signal tower.

#### **Project Modifications**

The Baker MOW facility is no longer under consideration and the MOW functions would be relocated to a new California MOW facility (described in Section 2.4).

## **2.4 SEGMENT 4 — MOUNTAIN PASS TO PRIMM (CA)**

### ALIGNMENT

#### **Evaluated Alignments**

The DesertXpress EIS evaluated three alignment options for Segment 4. All three alignment options would follow the I-15 freeway median until reaching the Mountain Pass area. At that point, Segment 4A would divert to the south from the I-15 freeway and traverse a portion of the Mojave National Preserve before returning to the I-15 freeway corridor. Segment 4B would divert to the north from the I-15 freeway and travel through the Clark Mountains before returning to the I-15 freeway corridor. Segment

4C would divert to the north from the I-15 freeway and travel through the Clark Mountains but would avoid impacts to a solar project before returning to the I-15 freeway corridor.

### **Project Modifications**

The modified Project includes a Segment 4 alignment that would travel within the I-15 freeway median directly adjacent to the northbound travel lanes (Figure 5).

## **FACILITIES**

### *Evaluated Facilities*

The DesertXpress EIS did not evaluate any additional facilities for Segment 4.

### *Project Modifications*

Under the modified Project, the MOW facility previously located in Baker, California, would be relocated to the I-15 freeway median adjacent to the CA Agricultural Inspection Station approximately six miles south of the California/Nevada state line. The CA MOW facility would occupy an approximately 25-acre area contained entirely within the I-15 freeway ROW. Access to the CA MOW facility would be provided through a removable barrier on the I-15 freeway. Unlike the original Baker MOW facility evaluated in the DesertXpress EIS, this facility would be utilized for passive equipment storage and would not provide an active staff headquarters. Employee access to the MOW facility would be intermittent on an as-needed basis.

## **2.5 SEGMENT 5 — PRIMM TO SLOAN (NV)**

### **ALIGNMENT**

#### **Evaluated Alignments**

The DesertXpress EIS evaluated two alignments from Primm to Sloan: Segments 5A and 5B. Segment 5A would be constructed within the I-15 freeway median. Segment 5B would follow the east side of the I-15 freeway within the I-15 freeway ROW, before crossing over to the west side of the I-15 freeway near where the alignment passes over Union Pacific Railroad (UPRR) tracks.

#### **Project Modifications**

The modified Project includes a Segment 5B Side-Running alignment (Figure 6). The modified Segment 5B alignment would exit the I-15 freeway median north of Buffalo Mountain Road and would run along the east side of the I-15 freeway for approximately 19 miles. The alignment would then reenter the I-15 freeway median on a bridge south of where the I-15 freeway passes over UPRR tracks and would remain in the median through the remaining five miles of Segment 5. The Segment 5 alignment would necessitate permanent use of an area outside the I-15 freeway ROW approximately 10 miles north of the California/Nevada state line, where two miles of Project alignment would shift outside of the I-15 freeway to traverse land managed by the Bureau of Land Management (BLM) immediately adjacent to the I-15 freeway fence line. This area would be acquired by DesertXpress Enterprises, LLC.

The I-15 freeway would be realigned in two areas of Segment 5 to facilitate the rail alignment transitions in and out of the I-15 freeway median:

- Approximately 1.4 miles of the I-15 freeway would be realigned and elevated to cross over the Segment 5B rail alignment immediately north of Primm.
- Approximately 1.5 miles of the I-15 freeway would be realigned so that the Segment 5B rail alignment can reenter the I-15 freeway median south of the UPRR tracks.

## FACILITIES

No facilities were evaluated in this Segment and no new facilities are included in the modified Project.

## **2.6 SEGMENT 6 — SLOAN ROAD TO LAS VEGAS (NV)**

### ALIGNMENT

#### **Evaluated Alignments**

The DesertXpress EIS evaluated three alignments for Segment 6: Segments 6A, 6B, and 6C. Segment 6A would be constructed within the I-15 freeway median and require elevated structures in urban areas. Segment 6B would cross from the east to the west side of the I-15 freeway corridor and then continue along the west side of the I-15 freeway corridor. A five-mile portion of the alignment would pass outside the I-15 freeway ROW on lands adjacent to Industrial Road and Dean Martin Drive. Segment 6C would follow the UPRR tracks in the area along the east side of the UPRR tracks. Segment 6C would cross over to the west side of the UPRR tracks near where the tracks cross Blue Diamond Road and would then run parallel to the UPRR corridor.

#### **Project Modifications**

The modified alignment for Segment 6 would follow the Segment 6A alignment in the I-15 freeway median for three miles. The alignment would exit the I-15 freeway median on a viaduct structure approximately 2,200 feet south of the I-15 freeway / Saint Rose Parkway interchange and would travel at-grade along the east side of the I-15 freeway into the Warm Springs Station site in Las Vegas (Figure 7). The Segment 6 alignment would permanently occupy areas outside the I-15 freeway ROW near Starr Avenue, near Cactus Avenue, and from Blue Diamond Road to the Warm Springs Station. In these areas, the modified Project alignment would travel through land under BLM management or private property that would be acquired by DesertXpress, LLC.

## FACILITIES

### **Las Vegas Area Passenger Station**

#### *Evaluated Stations*

The DesertXpress EIS evaluated four Las Vegas station site options:

- Southern Station: located along Polaris Road, across the I-15 freeway opposite the Mandalay Bay Resort and Casino.
- Central Station A: located between West Flamingo Road and West Twain Avenue, adjacent to the Rio Suites Hotel property.

- Central Station B: located south of West Flamingo Road in an area adjacent to the UPRR ROW.
- Downtown Station: located along South Main Street between West Bonneville Avenue and Boulder Avenue.

#### *Project Modifications*

A modified Las Vegas Station site (Warm Springs Station) would be constructed north of Blue Diamond Road and east of the I-15 freeway. The station site would occupy roughly 109 acres of vacant land between South Las Vegas Boulevard to the east and the I-15 freeway to the west.

### **Las Vegas Maintenance and Storage Facility (MSF)**

#### *Evaluated Facilities*

The DesertXpress EIS evaluated four MSF sites (Wigwam Avenue, Robindale Avenue, Sloan Road, and Relocated Sloan Road).

#### *Project Modifications*

The Las Vegas MSF sites are no longer under consideration because the MSF functions would be incorporated into the OMSF at the Dale Evans Station and OMSF site.

### **Las Vegas Substation**

#### *Evaluated Facilities*

The DesertXpress EIS evaluated a location for a substation at West Frias Avenue.

#### *Project Modifications*

The modified Project carries forward the West Frias Avenue substation re-oriented from what was evaluated in the DesertXpress EIS. The long side of the substation would be rotated to be parallel with the alignment.

## **3.0 Ancillary Facilities**

This section describes changes to ancillary Project facilities and components.

### **TEMPORARY CONSTRUCTION AREAS**

TCAs are properties that would be temporarily utilized for construction staging and storage. The DesertXpress EIS evaluated 29 TCAs located along the alignment between Victorville and Las Vegas. The modified Project includes a subset of the TCAs evaluated in the DesertXpress EIS, as well as locations previously designated for autotransformers in the DesertXpress EIS (discussed below under “Paralleling Sites”).

### **NEGATIVE SHOULDERS**

Portions of the I-15 freeway median are too narrow to accommodate the Project alignment, which typically occur along tight-radius curves, interchanges, and roadway undercrossings. In these areas, the Project would require slight widening of the I-15 freeway to accommodate an alignment in the I-15 freeway median. As these modifications would reduce the size of the existing shoulder, they are termed *negative shoulders* herein. Negative shoulders would include temporary and permanent impacts that



would occur within the existing California Department of Transportation / Nevada Department of Transportation ROW. Some negative shoulders were evaluated in the DesertXpress EIS; however, the modified Project includes additional areas of negative shoulders which were not evaluated in the DesertXpress EIS.

### ROADWAY RECONSTRUCTION

The alignment would encounter existing freeway interchanges, roadway segments, over/undercrossings, and other roadway facilities that would be temporarily disrupted, closed, or replaced during construction. Apart from the potential mitigation obligations around the stations, all roadway facilities would continue to operate in their existing circulation pattern and capacity after construction. Although roadway reconstruction areas were previously evaluated in the DesertXpress EIS, the modified Project includes additional, previously unevaluated roadway reconstruction areas.

### UTILITY CORRIDORS AND ELECTRICAL SUBSTATIONS

Utility corridors are routes through which utility lines, including electricity and water, would travel. Modified Project utility corridors remain identical to those evaluated in the DesertXpress EIS, with the exception of electrical interconnections. The modified Project would no longer require new transmission lines south of the Apple Valley Passenger Station or in Baker, as originally analyzed in the DesertXpress EIS. Instead, the modified Project would utilize the following substations:

- The Barstow Electrical Substation would be located in Segment 2 southeast of the I-15 freeway ROW near Azurite Road (Figure 3). The Barstow Electrical Substation would require new utility poles to complete a 300-foot-long corridor connecting with an existing overhead electrical system.
- The Ivanpah Electrical Substation would be located in Segment 4 west of the I-15 freeway, and would connect to an existing substation near the BrightSource Ivanpah Solar Electric Generating System south of the California/Nevada state line (Figure 5). The Ivanpah Electrical Substation would require the construction of approximately two miles of utility corridors travelling along existing roads.

### PARALLELING SITES

The Project would use paralleling sites to regulate the voltage of the electrical current supplied to Project trains. Nine paralleling sites would replace the 17 autotransformer sites analyzed in the DesertXpress EIS. Two paralleling sites would be located within the proposed station sites; the remaining seven paralleling sites would be located along the alignment. Although paralleling sites would require footprint outside of the footprint analyzed in the DesertXpress EIS, none would require footprint outside of the I-15 freeway ROW. Autotransformer locations analyzed in the DesertXpress EIS would be used as TCAs.

### DOUBLE- AND SINGLE-TRACK

The Project alignment analyzed in the DesertXpress EIS assumed double-tracking (one track in each direction of travel) throughout the entire alignment to be utilized in the first year of operation. As the two tracks parallel each other, double-tracking requires a wider footprint than single-tracking.

The 169-mile modified alignment would be initially constructed as single-track with passing sidings<sup>2</sup> to facilitate both directions of travel. Upon Project buildout, the entire alignment would be double-tracked except for 19 miles of alignment in the following areas:

- North of Morton Street to east of Riverside Road in Barstow.
- West of Bailey Road near Mountain Pass to west of Nipton Road.
- Near where Basin Road intersects the I-15 freeway.

The modified footprint encompasses all future areas planned for a double-track corridor.

### EMERGENCY CROSSOVERS

The DesertXpress EIS assumed that emergency crossovers would be necessary to facilitate emergency vehicle access across the Project alignment, especially for median-running alignments. However, the DesertXpress EIS did not identify emergency crossover locations. The modified Project would include nine emergency crossover locations: eight in California and one in Nevada. Emergency crossovers would be directly adjacent to the I-15 freeway travel lanes and would include ramp and bridge structures to allow for travel over the rail alignment. Access would be restricted to emergency vehicles. These facilities would require new footprint not previously evaluated in the DesertXpress EIS, including two locations that would extend beyond the I-15 freeway ROW onto land managed by BLM.

## **4.0 Operations, Ridership, and Equipment**

### OPERATIONS AND EQUIPMENT

The modified Project would utilize the same technology as analyzed in the DesertXpress EIS, but with a modified operating plan that would alter train capacity, runtime, and schedule. DesertXpress Enterprises, LLC would operate the California-Nevada service using a fleet of new, high-speed electric trainsets powered by an overhead catenary wire system, as described in the DesertXpress EIS. The operating plan in the DesertXpress EIS anticipated each train set would include 10 cars capable of seating 675 passengers. The modified operating plan would include train sets of eight cars with a total of 544 seats. The modified Project would also allow trains to operate in coupled sets of 16 cars with a total of 1,088 seats. The maximum operating speed under the Project modifications would be 180 miles per hour (mph), whereas the DesertXpress EIS assumed 160 mph maximum operating speeds.

Based on the projected performance of the trains, as established using manufacturer-provided data, the estimated runtime for the modified Project has been calculated to be 81 minutes per trip, per direction. Nine additional minutes have been added to the runtime as a buffer, resulting in a total travel time of 90 minutes. This would constitute an increase from the 80-minute runtime considered in the DesertXpress EIS. The increased runtime is a result of the modified Project's initial use of single-tracking, which requires time for trains to pass. A turnaround time of 45 minutes is planned at each end, allowing sufficient time for passengers to board and alight, light cleaning, and restocking onboard services, while also providing additional time to absorb delays.

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<sup>2</sup>Passing sidings consist of separate sections of track connected to the main alignment at either end. These sidings allow trains travelling in opposite directions on a single-track to pass each other and avoid collision.

Under the modified operating plan, a total of 25 departures would occur in each direction on a typical weekday during the first 10 years of operation, compared to the 17 daily departures considered in the DesertXpress EIS. After the first 10 years, the frequency of departures would increase to meet anticipated growth in demand overtime. Also, operational hours would be reduced from 24 hours to allow for five hours of facility maintenance.

## RIDERSHIP

Table 2 summarizes ridership projections for the modified Project compared to the ridership projections considered in the DesertXpress EIS. Overall, the ridership estimates for the modified Project are equal to or slightly below the original ridership scenarios evaluated in the DesertXpress EIS.

**Table 2 Ridership and Operations Projections**

<b>Ridership Scenario (one-way)</b>	<b>Year 1 (2010 EIS)</b>	<b>Year 1 Modified</b>	<b>Year 3 (2010 EIS)</b>	<b>Year 3 Modified</b>	<b>Year 15 (2010 EIS)</b>	<b>Year 15 Modified</b>
Annual Ridership	2,472,305	2,464,165	4,635,012	3,773,697	6,504,131	6,147,554

Notes: XpressWest 2010 ridership estimates assumed the electric multiple unit propulsion option.

## TRAIN PROPULSION OPTION

### *Evaluated Option(s)*

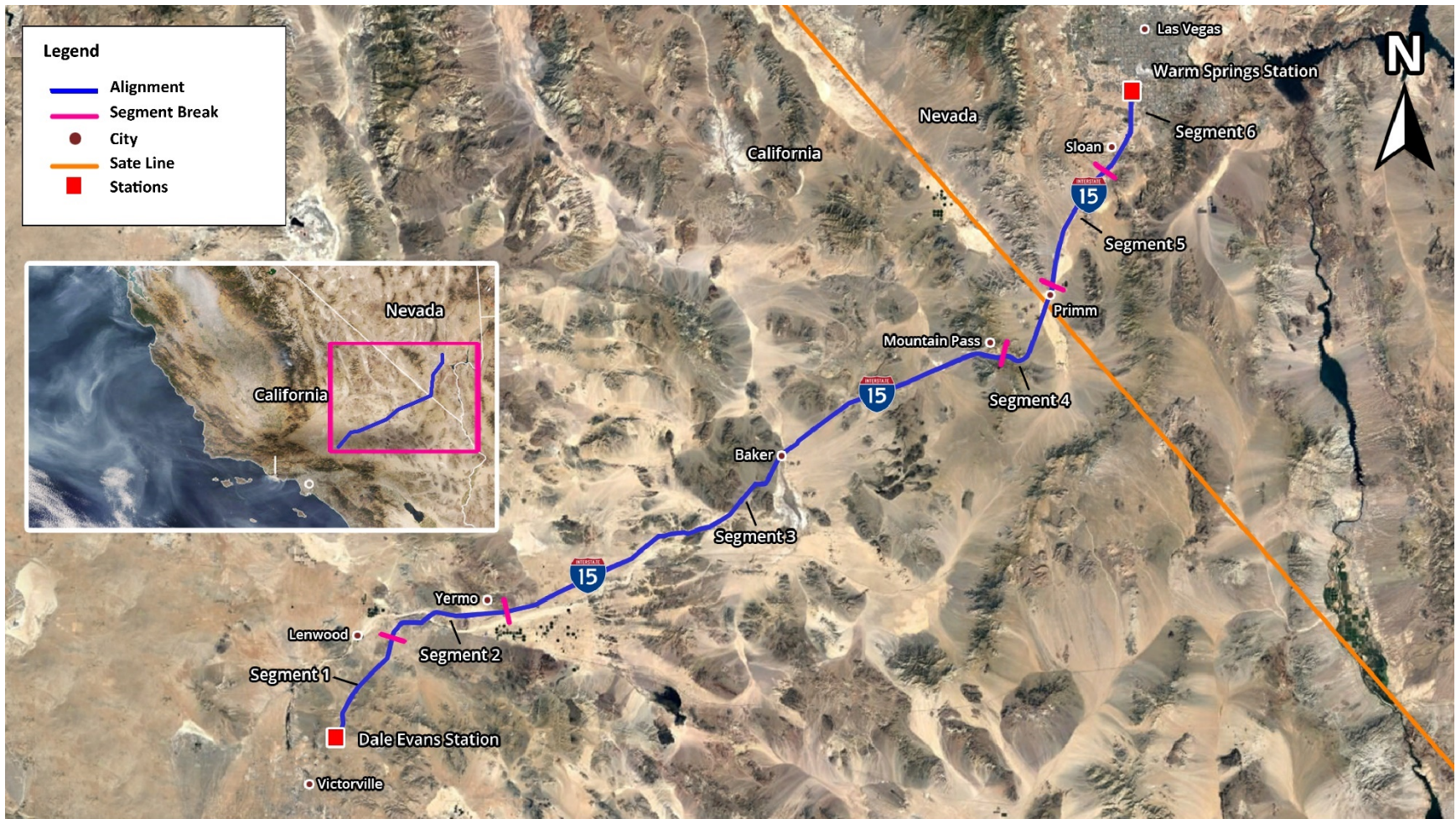
Train propulsion options refer to the energy systems that would power trains. The DesertXpress EIS evaluated two alternatives:

- Fully Electric Trains
- Diesel-Electric Multiple Unit Train

### *Project Modifications*

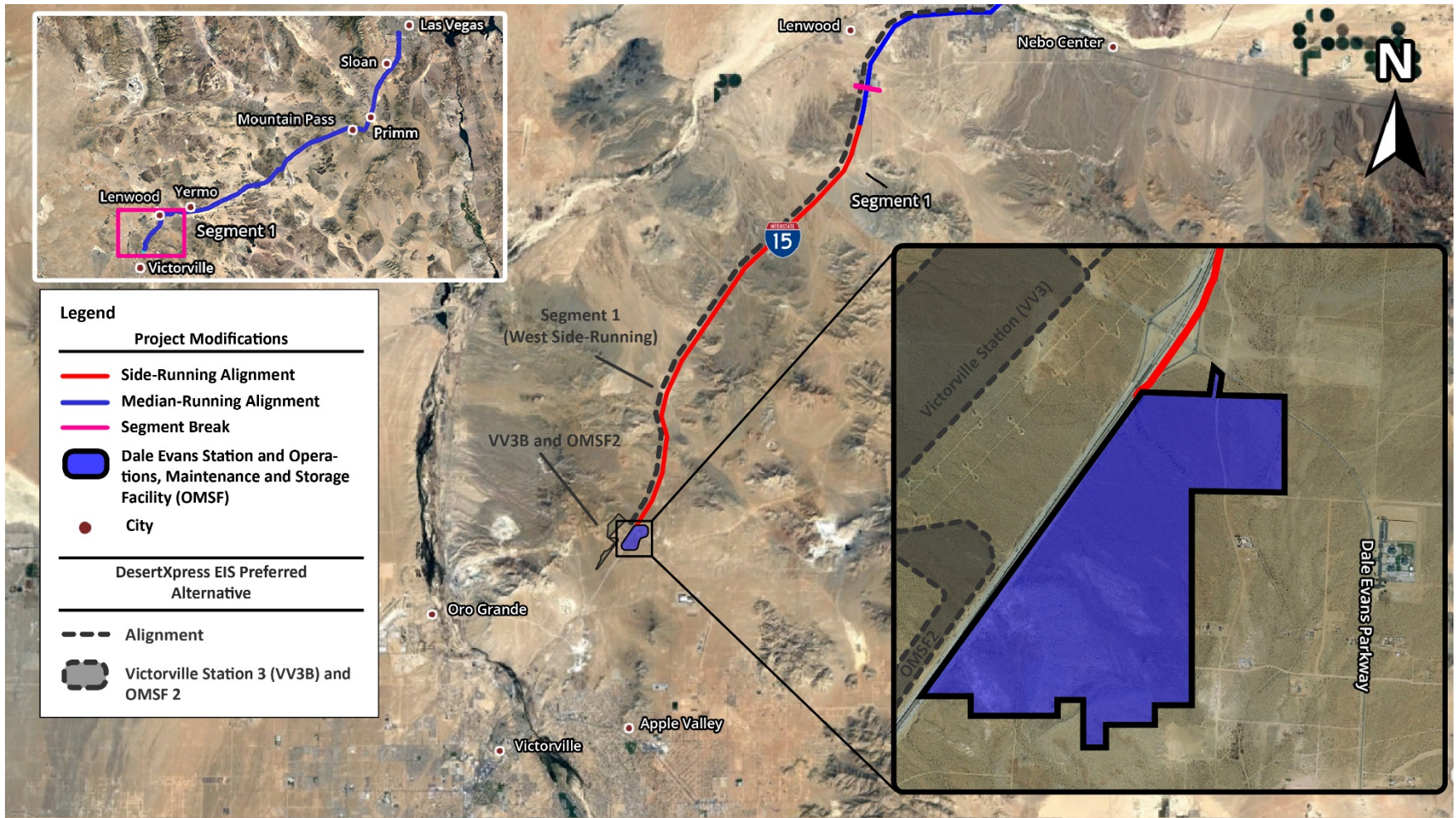
The modified Project would implement the fully electric propulsion option evaluated in the DesertXpress EIS. This option would either include an electric multiple unit system, in which each car has a propulsion system, or a push-pull system, in which only cars at either end of the train have propulsion systems. The DesertXpress EIS evaluated electrical multiple unit trains. However, the use of push-pull system would not substantially change the energy requirements, speed, or other operating characteristics of Project trains.

## PROJECT FIGURES



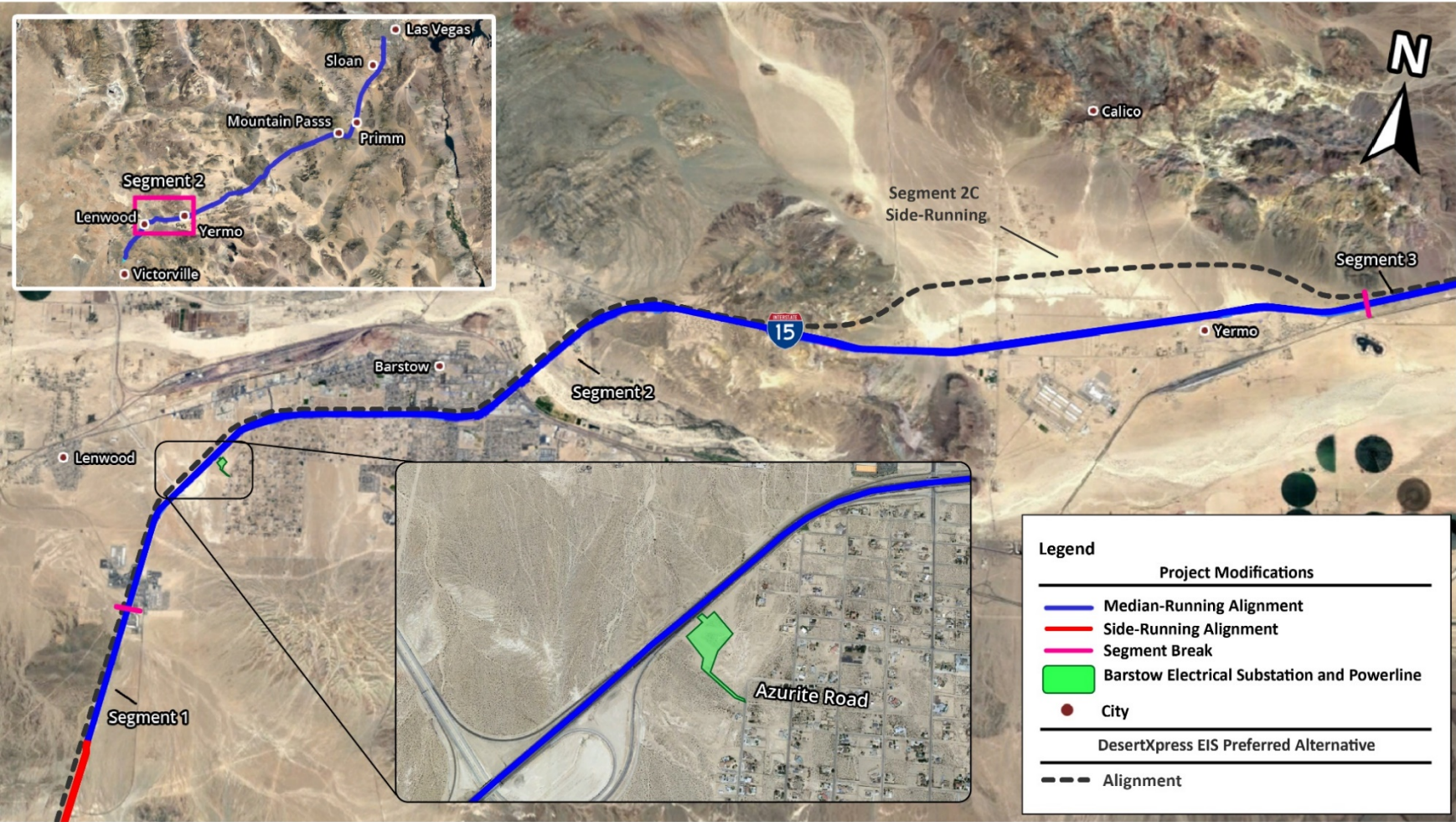
Source: Google Earth, 2019

Figure 1 XpressWest Project Overview



Source: Google Earth, 2019

Figure 2 Apple Valley to Lenwood (Segment 1)



Source: Google Earth, 2019

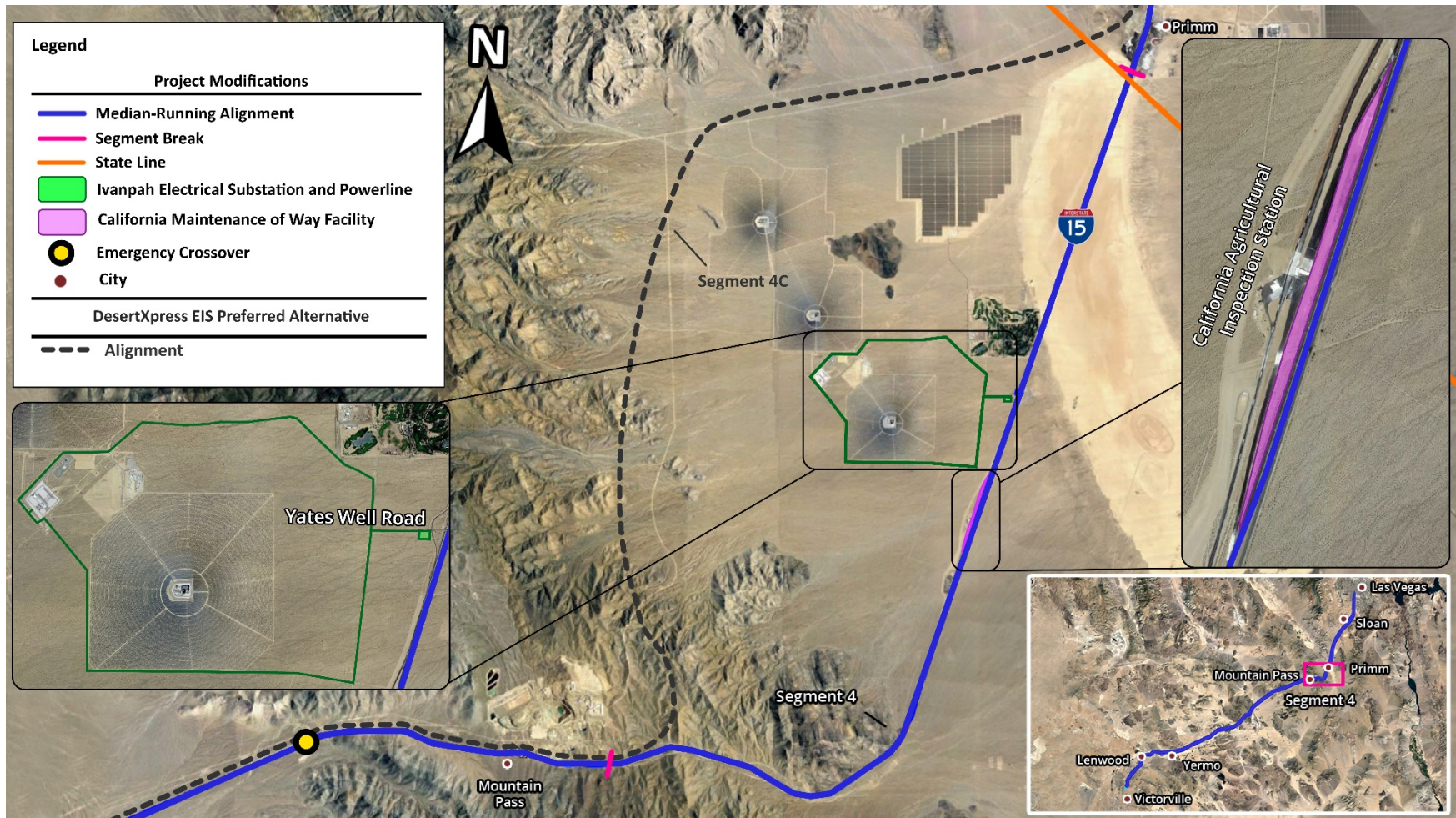
Figure 3 Lenwood to Yermo (Segment 2)



Source: Google Earth, 2019

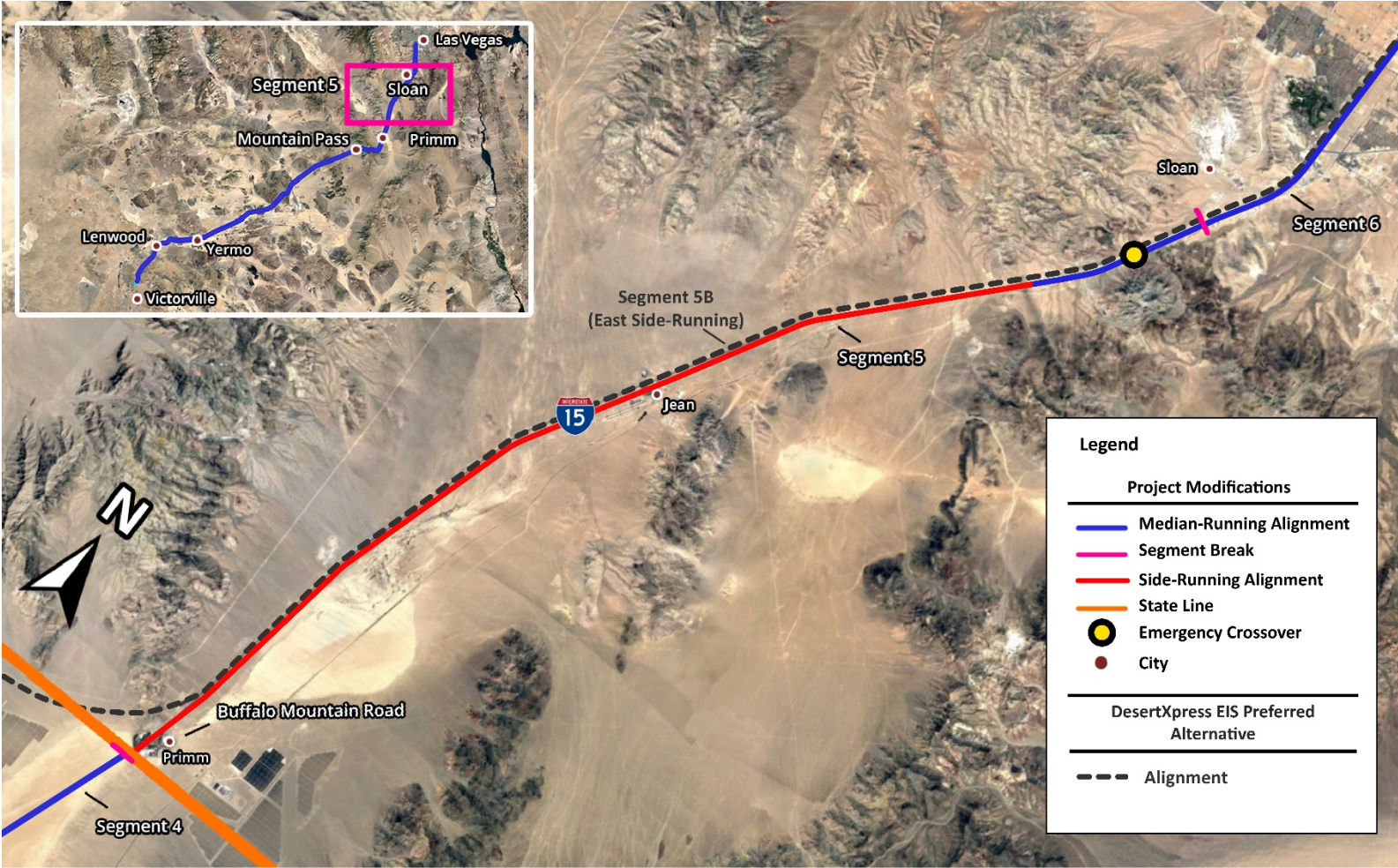
Figure 4 Yermo to Mountain Pass (Segment 3)





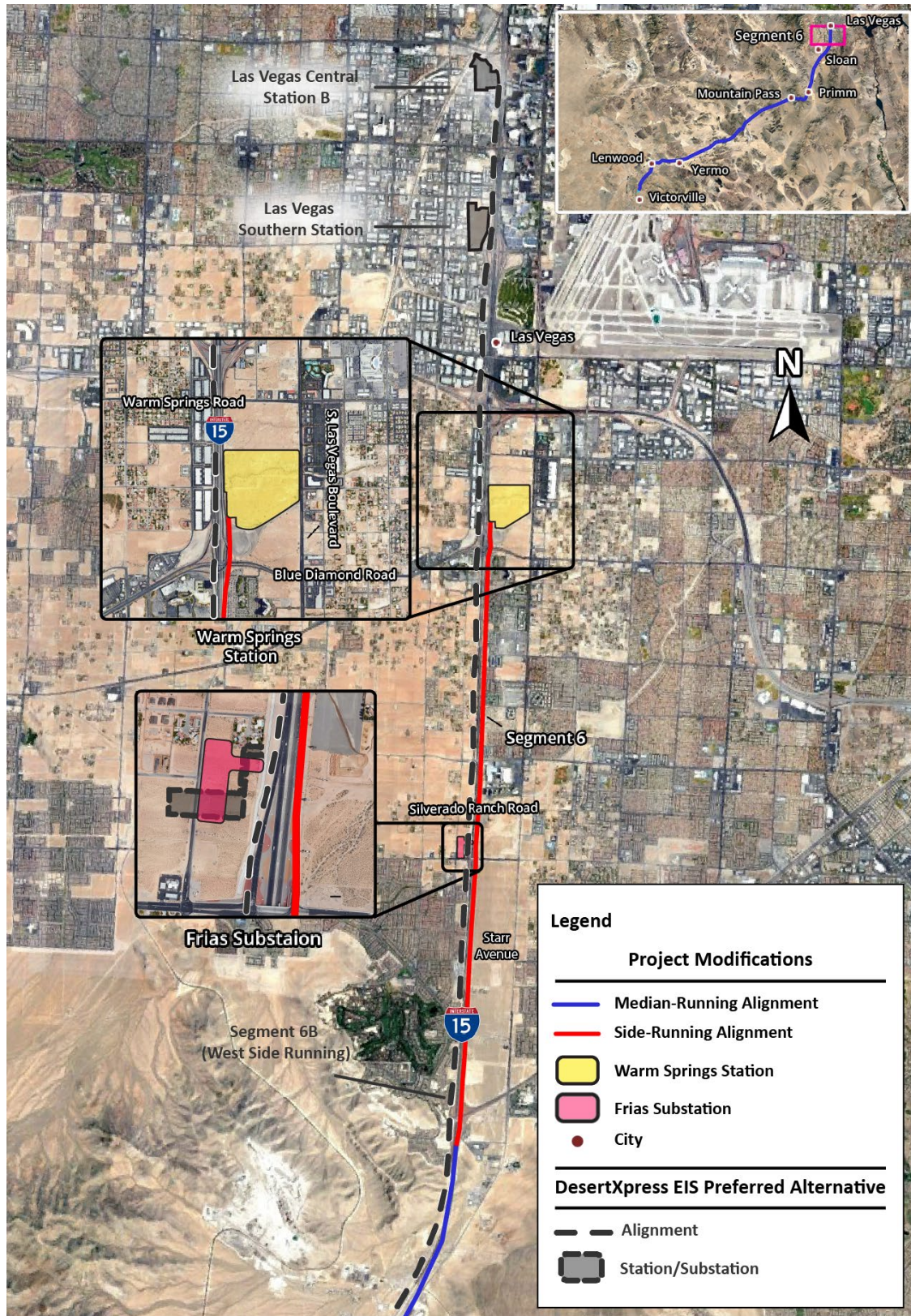
Source: Google Earth, 2019

Figure 5 Mountain Pass to Primm (Segment 4)



Source: Google Earth, 2019

Figure 6 Primm to Sloan (Segment 5)



Source: Google Earth, 2019

Figure 7 Sloan Road to Las Vegas (Segment 6)

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