Prepared for:

US 550 SOUTH CONNECTION TO US 160

Revised Section 4(f) Evaluation

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Prepared by:

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ACRONYMS AND ABBREVIATION

AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
HOV	high occupancy vehicle
LOS	Level of Service
MOA	Memorandum of Agreement
MP	milepost
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ROD	Record of Decision
SH	State Highway
SFEIS	Supplemental Final Environmental Impact Statement
SHPO	State Historic Preservation Officer
SPUI	single-point urban interchange
TDM	Transportation Demand Management
TSM	Transportation System Management
US 160	US Highway 160
US 550	US Highway 550
U.S.C.	United States Code
USDOT	United States Department of Transportation

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1.0 Introduction

Section 4(f) was created when the United States Department of Transportation (USDOT) was formed in 1966. It is codified in Title 49 United States Code (U.S.C.) Section 303 [Section 4(f) of the USDOT Act of 1966] and Title 23 U.S.C. Section 138, and in the implementing regulations 23 Code of Federal Regulations (CFR) 774. It states:

> *"The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."*

A Section 4(f) "use" occurs when:

1. Land from a Section 4(f) property is permanently incorporated into a transportation facility; land will be considered permanently incorporated into a transportation project when it has been purchased as right-of-way or sufficient property interests have been otherwise acquired for the purpose of project implementation; or

2. There is a temporary occupancy of land that is adverse in terms of the Section 4(f) statute's preservation purposes. Under the Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) regulations, a temporary occupancy of property *does not* constitute a use of a Section 4(f) property when the following conditions are satisfied:

   - The occupancy must be of temporary duration (i.e., shorter than the period of construction) and not involve a change in ownership of the property.
   - The scope of work must be minor, with only minimal changes to the protected resource.
   - There are no permanent adverse physical effects to the protected resource, nor will there be temporary or permanent interference with activities, features or attributes of the property.
   - The land being used must be fully restored to a condition that is at least as good as that which existed prior to the proposed project.

- There must be documented agreement of the officials with jurisdiction over the Section 4(f) resource regarding the above conditions; or

3. There is no permanent incorporation of land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection are substantially impaired. This is called a constructive use of the property.

Section 4(f) further requires consultation with the Department of the Interior and, as appropriate, the offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). Section 4(f) applies only to the actions of agencies within the USDOT. The USDOT is responsible for applicability determinations, evaluations, findings, and overall compliance.

This revised document addresses the potential uses of Section 4(f) properties that would occur as a result of improvements to the US Highway 550 (US 550) South Connection to US Highway 160 (US 160) east of Durango, Colorado. It includes the purpose and need for the proposed project, a discussion of alternatives including avoidance alternatives, a description of the Section 4(f) use that would occur with each alternative considered, and a least overall harm analysis if all the alternatives use Section 4(f) properties. This document provides information and supporting documentation for a final Section 4(f) evaluation within which the FHWA will make a determination of whether there are feasible and prudent avoidance alternatives, and if not, approve the alternative that causes the least overall harm in light of the statute's preservation purpose.

A stand-alone Draft Section 4(f) Evaluation was prepared in March 2011 and updated in June 2012 as a chapter in the *US 550 South Connection to US 160 Supplemental Final Environmental Impact Statement (SFEIS)/Section 4(f) Evaluation* (2012 SFEIS) (CDOT, 2012). This was circulated to the Department of the Interior for review and was submitted to the Colorado State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), and the Section 106 consulting parties for informational purposes. This Revised Section 4(f) Evaluation addresses changes that have been made to the design for the Preferred Alternative that was included in the 2012 SFEIS and updates existing conditions, impacts, and mitigation as appropriate. It also includes a description of another alternative called Alternative R5, which was developed in response to public comments received after the issuance of the 2012 SFEIS.

2.0 Project Background

This revised Section 4(f) evaluation has been prepared because CDOT has assessed a new alternative (Alternative R5) and a re-design of the Preferred Alternative (RGM6 Alternative) for the US 550 South Connection to US 160 project. CDOT has identified two eligible historic properties, the Craig Limousin Ranch and the Webb Ranch, that would be impacted. A brief history of the project is provided in the following discussion.

A Feasibility Study that included the US 160 corridor from Durango to Bayfield and US 550 from the New Mexico Stateline to Durango was completed in 1999 (CDOT, 1999). The Feasibility Study was a planning-level study that identified broad recommendations and strategies. The Feasibility Study recommended widening US 160 between Durango and Bayfield from two lanes to four lanes, and constructing an interchange for the connection of US 550 to US 160. The study recommended the interchange be constructed generally near the existing location of the US 160/US 550 (south) intersection also known as Farmington Hill. These recommendations were carried into the subsequent National Environmental Policy Act (NEPA) processes for US 160 between Durango and Bayfield, and US 550 south of Durango for further evaluation and study.

The NEPA process for US 550 south of Durango was an Environmental Assessment (EA) completed to a Finding of No Significant Impact (FONSI) in 2005 (CDOT, 2005). Improvements to US 550 included widening from two to four lanes along the existing highway from the New Mexico state line to milepost (MP) 15.4.

For the US 160 project between Durango and Bayfield, a preliminary EA was prepared between February 1999 and January 2002. The study area for this corridor included the connection of US 550 to US 160 east of Durango. Based on the preliminary EA and the environmental impacts, the FHWA determined that an Environmental Impact Statement (EIS) was the appropriate level of NEPA documentation for this project.

> The EIS process commenced with publication of the notice of intent to prepare an EIS in the Federal Register on December 24, 2002. A public and agency scoping meeting was held on March 5, 2003, to identify public and agency issues. On September 23, 2005, the Draft EIS/Draft Section 4(f) evaluation was made available to the public. A public hearing was held on the Draft EIS/Draft Section 4(f) evaluation on October 13, 2005. The *US Highway 160 Durango to Bayfield Final Environmental Impact Statement/Final Section 4(f) Evaluation* (2006 US 160 EIS) (CDOT, 2006) was signed in May 2006. The 2006 US 160 EIS was made available

for public review on May 26, 2006 with a public hearing on June 7, 2006. The *US Highway 160 Durango to Bayfield Record of Decision* (2006 US 160 ROD) (CDOT, 2006) was signed by FHWA on November 7, 2006. The 2006 US 160 EIS and 2006 US 160 ROD are available at http://www.coloradodot.info/projects/us160eis. The US 160 ROD limitation on claims notice was published in the Federal Register on May 14, 2007, and was not legally challenged within the 180-day statute of limitations timeframe.

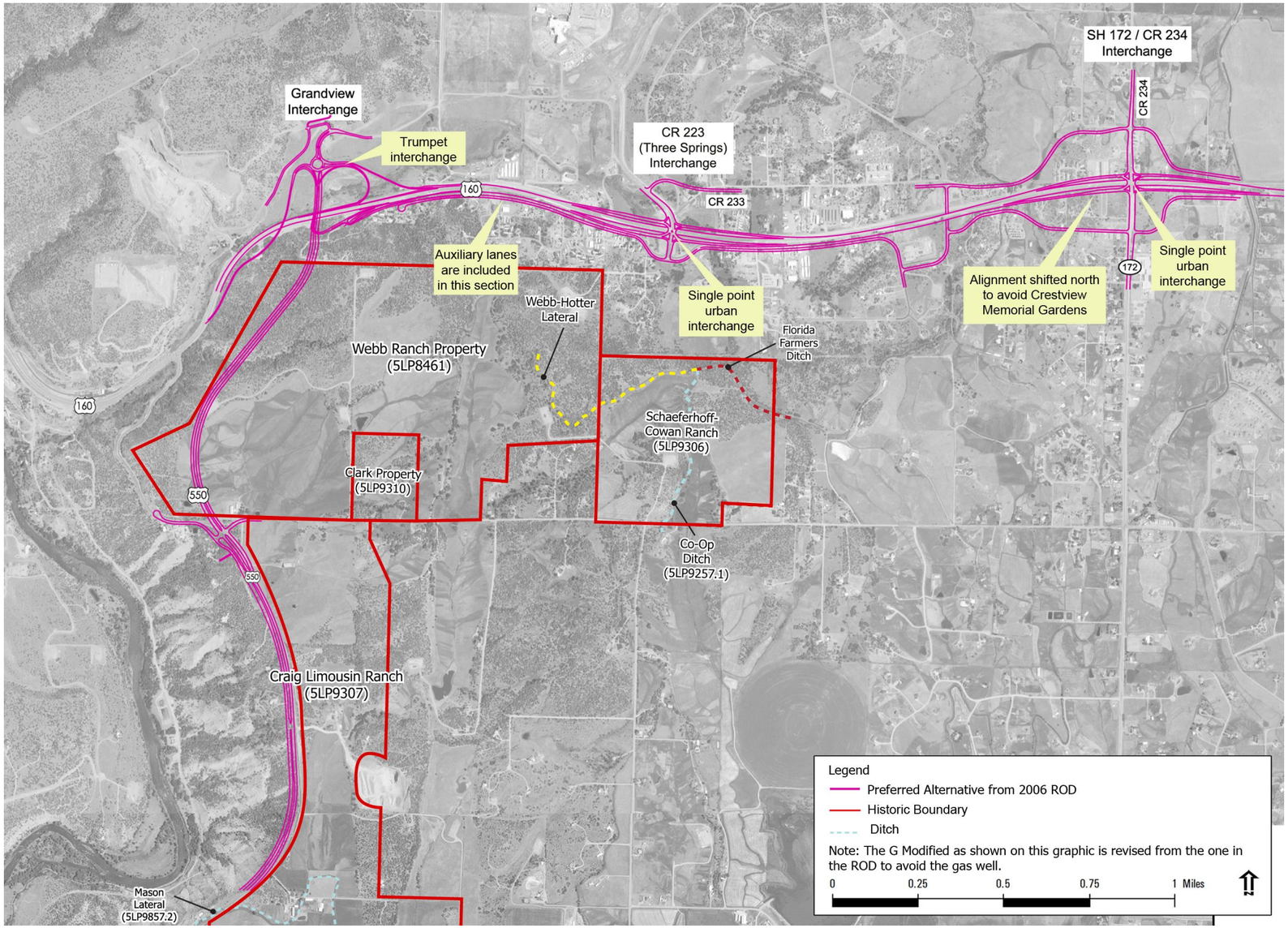
Based on the approved 2006 US 160 ROD, the US 160 corridor will receive phased improvements to a 16.2-mile segment of US 160 between Durango and Bayfield in La Plata County, Colorado (see Figure 1). The Preferred Alternative in the 2006 US 160 ROD included four lanes on US 160 between Durango and Bayfield and in the US 550 south alignment, generally along the existing roadway. The corridor was divided into four sections: Grandview, Florida Mesa and Valley, Dry Creek and Gem Village, and Bayfield.

The Grandview Section is located in the western part of the corridor on US 160 from MP 88.0 west of the Farmington Hill intersection to State Highway (SH) 172/County Road (CR) 234 (i.e., Elmore's Corner), including a segment of US 550 that extends from just south of CR 220 to US 160 (i.e., US 550/US 160 connection). The Preferred Alternative in the Grandview Section, G Modified, includes a trumpet interchange of US 160 and US 550 approximately 0.6 mile east of the current US 160/US 550 (south) intersection, and single-point urban interchanges (SPUI) at CR 233 (Three Springs) and SH 172/CR 234 (see Figure 1).

After the 2006 US 160 ROD was completed, CDOT began design and construction of the trumpet interchange approximately 0.6 mile east of Farmington Hill on US 160. This interchange was planned in phases. During project development for the connection of US 550 to US 160, a gas well was discovered within the alignment selected in the ROD. The US 550 connection was redesigned to avoid this gas well.

As part of the design for the US 550 connection to US 160, CDOT reassessed environmental impacts and conditions. In 2008, a portion of the Marie J. Webb Ranch (Webb Ranch) was identified as an eligible historic resource under Section 106 of the National Historic Preservation Act (NHPA) (Appendix B of the 2012 SFEIS). In addition, an independent cultural resources inventory was conducted on behalf of the Webb family on the western portion of the ranch that identified a number of previously unrecorded archaeological sites (SEAS, 2008). Based on the SEAS report, a formal inventory of these sites was conducted, as described in Section 6.0. Under the selected

Figure 1. Preferred Alternative from the 2006 US 160 EIS, Grandview Section



alternative for the 2006 US 160 ROD, the historic Webb Ranch is crossed by the US 550 connection to US 160, which is a use of the property and therefore triggers the requirement to prepare a Section 4(f) evaluation. In consultation with the SHPO, CDOT determined that the selected alternative would result in an adverse effect to the Webb Ranch as defined in 36 CFR 800.5. Because of this new information, the selected alternative (at the US 550 Connection) from the 2006 US 160 EIS was reevaluated along with other alternatives in the vicinity of the US 550 connection to US 160, resulting in the 2012 Supplemental Final EIS (SFEIS) (CDOT, 2012). This SFEIS focused on evaluating this part of the corridor and changes identified in this area since the 2006 US 160 ROD was completed, including the shift in the alignment of one US 550 south connection to US 160 alternative to avoid a gas well on the historic Webb Ranch and the discovery of additional historic and archaeological resources in the vicinity of where US 550 connects to US 160.

Construction on the interchange located approximately 0.6 mile east of the existing US 160/US 550 (south) intersection was completed in 2012. The interchange (Grandview Interchange) was designed to provide safe and direct access to existing and planned development (including a regional retail center, three schools, a 5,467-unit residential development, and a park) to the north. It does not have a connection to US 550. It also accommodates future projected traffic volumes on US 160 (of 87,000 vehicles a day), facilitates east-west travel, and provides safe and direct access to current and future development (including two banks and a several-hundred-unit residential development) south of US 160 at Three Springs Boulevard signal (as well as north of US 160). Documentation of the need for the Grandview Interchange even without a US 550 connection is provided in an FHWA memorandum from Doug Bennett to Karla Petty dated December 12, 2008 (in Appendix C of the 2012 SFEIS) and in the *Year 2030 Traffic Operations Analysis for Alternatives of the US 160 FEIS* (SEH, 2010) provided in Appendix D of the 2012 SFEIS. This analysis makes it clear that completion of the Grandview Interchange can proceed without a connection to US 550 South, and that the US 550 South Connection to US 160 can proceed in an independent manner from the Grandview Interchange. Each has independent utility from the other.

Each of the alternatives evaluated in this Section 4(f) evaluation can be built and can operate with the Grandview Interchange in its form as described in the September 3, 2008, memo in Appendix C of the 2012 SFEIS. Two of the alternatives do not connect to this interchange but connect to the CR 233 (Three Springs) Interchange instead. Most other elements of the US 160 project can be substantially completed without limiting the alternatives carried forward for further consideration before this Section 4(f) evaluation has been completed. The US 550 South Connection to US 160 has independent utility.

The Section 4(f) Evaluation has been prepared to update the design for the Preferred Alternative, determine whether there are feasible and prudent alternatives to the use of the Webb Ranch and other Section 4(f) properties, develop measures to minimize and mitigate impact to the Section 4(f) properties, and identify an alternative that causes the least overall harm to Section 4(f) properties. It incorporates information contained in the recently completed *US 550 South Connection to US 160 Independent Alternatives Analysis* (2015 Independent Alternatives Analysis; AMEC, 2015). Information included is:

- Development and analysis of a new alternative called Alternative R5.
- Refinement of the Revised G Modified Alternative (now called Revised G Modified 6 [RGM6] Alternative).
- Updated traffic and environmental existing conditions information.
- Updated traffic and environmental analysis of alternatives.

A part of the updated environmental analysis was a survey and National Register of Historic Places eligibility evaluation of buildings and structures within the study area of Alternative R5. This was provided to SHPO on January 16, 2015. A response from SHPO was received on January 28, 2015, and CDOT responded to this on February 17, 2015. Final concurrence from SHPO was received on February 23, 2015.

The 2015 Independent Alternatives Analysis is included in Appendix B of this document.

3.0 Purpose and Need

Proposed improvements to the US 160 Durango to Bayfield corridor were analyzed in the 2006 US 160 EIS and the 2012 SFEIS in accordance with FHWA regulations (23 CFR §771) as a means to improve conditions for the traveling public within the corridor. The purpose of the project is to:

- Increase travel efficiency/capacity to meet current and future needs.
- Improve safety for the traveling public by reducing the number and severity of accidents.
- Control access for safety and mobility flow improvements.

Specific elements of project need, as defined fully in Chapter 1 of the 2006 US 160 EIS include:

- Historical, existing, and future demands placed on highway capacity and efficiency as a result of growth in La Plata County and growth in tourist travel to the Four Corners Region. Traffic volumes along the US 160 corridor are expected to more than double over the next 20 years. These volumes exceed the capacity of the highway and intersections along the corridor.
- The 2012 SFEIS reported higher than average number and severity of accidents in this corridor, compared to other similar highways in the state. This higher number and severity of accidents is attributed to a lack of highway shoulders, turning lanes, clear zones, and wildlife crossings—and steep grades with insufficient lanes for passing. In addition, many of the intersections include steep grades, limited sight distance, sharp angles and lack of left turn storage lanes and acceleration/deceleration lanes.
- The accident data from the 2006 US 160 EIS and from the 2012 SFEIS has been updated in 2013 as documented in the 2015 Independent Alternatives Analysis. The new safety analysis shows better-than-expected safety performance overall, but with some segments having higher-than-expected crash rates of certain types. Along US 550 the majority of the accidents were non-intersection related. Of these, 50% were wild animal related. The next highest percentage was fixed object related at 28%. The narrow outside shoulders likely contribute to the wild animal crashes, because motorists have little to no space to maneuver to avoid a collision.
- Uncontrolled access as a result of a high density of undefined business and private accesses, terrain features that affect sight distance, areas with poorly defined accesses, and anticipated future density of development along the corridor. All of these features contribute to the accident rates.

Supporting documentation and detailed descriptions of the purpose and need for the corridor project are found in Chapter 1 of the 2006 US 160 EIS and Chapter 1 of the 2012 SFEIS.

Since the 2006 US 160 EIS was completed, traffic volumes and analyses have been updated. The traffic analysis conducted in 2015 Independent Alternatives Analysis validated the future year forecasts and traffic analysis contained in the 2012 SFEIS.

Traffic analyses indicate that the No Action Alternative in the Grandview Section requires auxiliary lanes in each direction to extend from the west limit of the Grandview Section to the CR 233 (Three Springs) Interchange. The auxiliary lanes can be added within the right-of-way and identified footprint of the alternatives in the 2006

US 160 EIS and do not create additional impacts that were not disclosed in the 2006 US 160 EIS.

Traffic and engineering analyses also demonstrate the need for three interchanges in the Grandview Section regardless of the location of the US 550 and US 160. In the 2006 US 160 EIS, interchanges were identified at SH 172/CR 234 (Elmore's Corner Interchange), US 160/CR 233 (CR 233 [Three Springs]) Interchange, and the US 550 and US 160 connection (now titled the Grandview Interchange without the US 550 connection). The locations of these interchanges are shown on Figure 1.

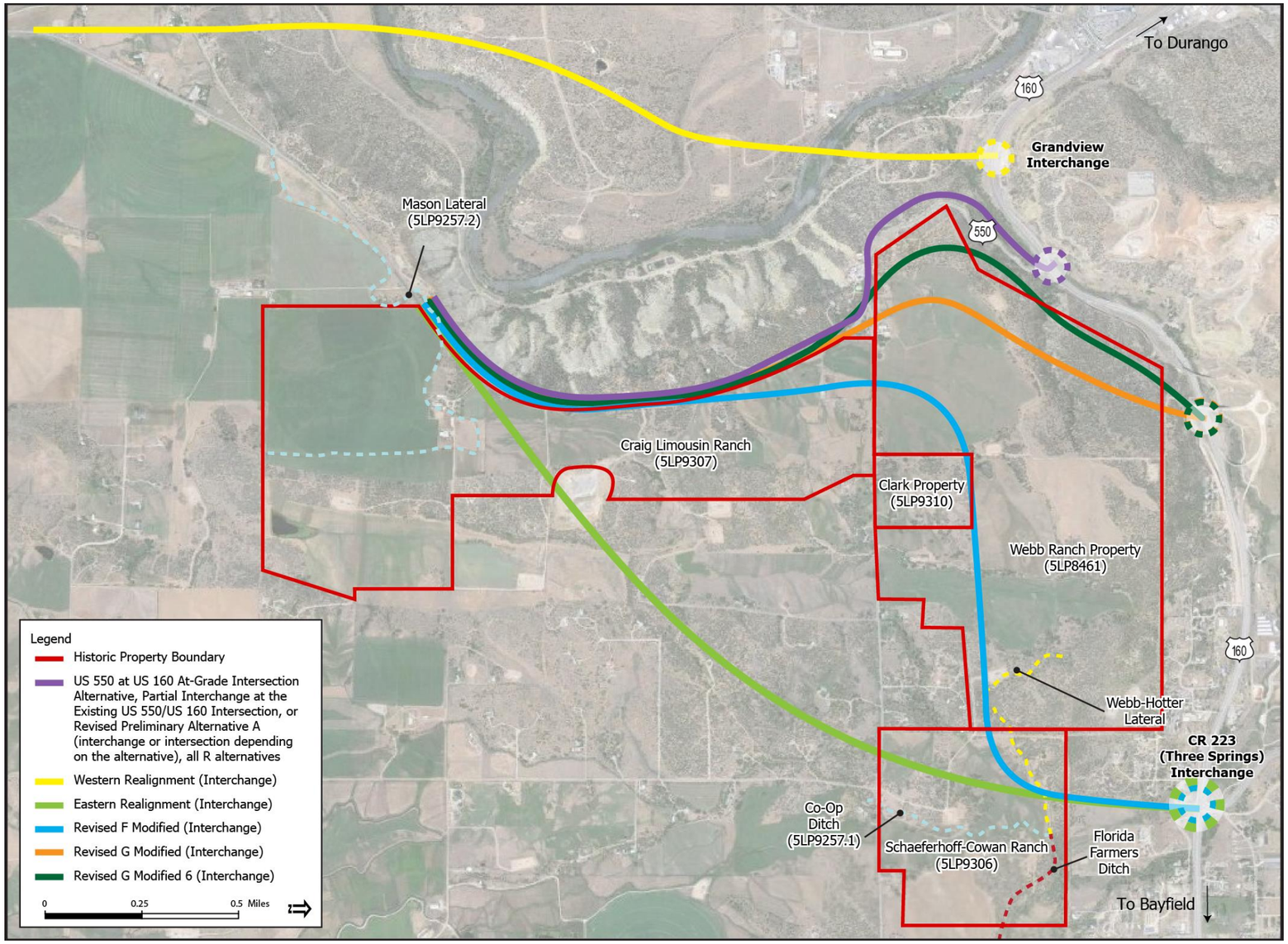
4.0 Project Alternatives

The connection of US 550 to US 160 is in the Grandview Section. The Grandview Section includes US 160 from the west project limit at approximately MP 88 west of the US 160/ US 550 (south) intersection to the SH 172/CR 234 intersection, and US 550 from south of CR 220 to US 160 (see Figure 1). For the 2012 SFEIS, all the alternatives analyzed in the Grandview Section included four lanes on US 160 with auxiliary lanes between the west project limit and the interchange at CR 233 (Three Springs). The additional auxiliary lanes were not included in the alternatives described in the 2006 US 160 EIS. US 160 would remain on the existing alignment except near the SH 172/CR 234 intersection, where it would be shifted north to avoid Crestview Memorial Gardens. US 550 would be four lanes throughout the entire project area addressed in this evaluation.

This revised Section 4(f) evaluation focuses only on the connection of US 550 to US 160. The following describes the alternatives being considered for the Section 4(f) analysis with a focus on the US 550 to US 160 connection.

Alternatives considered in this evaluation include those advanced for consideration in the 2006 US 160 EIS, as well as other alternatives that avoid or minimize the use of the newly identified Section 4(f) properties. In a letter from FHWA to the ACHP dated April 27, 2009, FHWA identified alternatives subject to further study, including alignments designed to avoid the historic Webb Ranch. During development of these alternatives, additional Section 4(f) properties were identified that fall within the alignments being considered. In addition, a new alternative and a refinement of an alternative were identified and developed during the 2015 Independent Alternatives Analysis process. Figure 2 shows alternatives being considered for the location of the US 550 and US 160 connection and the Section 4(f) properties in the vicinity of this connection.

Figure 2. Alignment Alternatives and Section 4(f) Properties in the Grandview Section



The alternatives in this document were developed with a common southern terminus, as illustrated on Figure 2. This was done to allow for equal comparison among alternatives as it relates to their uses of the Section 4(f) properties. In particular, the Craig Limousin Ranch is situated along US 550, and the southern termini of the various alternatives considered in the 2012 SFEIS occur just north of or within the boundary of the property. US 550 will be widened to four lanes (as analyzed in the US 550 EA; CDOT, 2005) and, therefore, will have impacts on the Craig Limousin Ranch regardless of the alternative selected. Therefore, it was decided to include that widening in the Section 4(f) analysis so that the alternatives that end in the northern portion of the Craig Limousin Ranch do not artificially appear to have fewer Section 4(f) impacts than the alternatives that end farther south. Because of the common southern termini, some of the impact quantities contained in this evaluation are different than the impact quantities contained in Chapter 4.0 of the 2012 SFEIS.

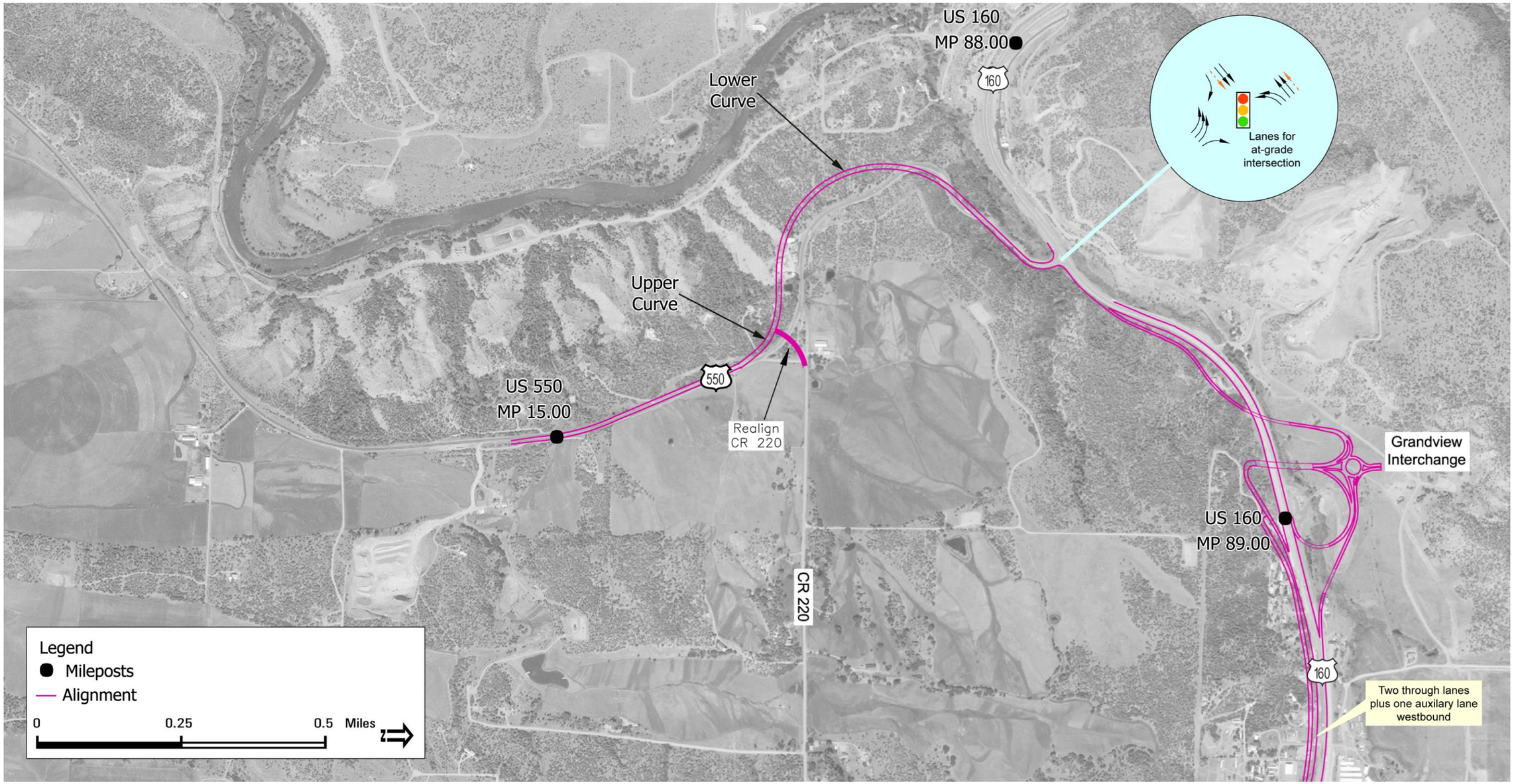
The following alternatives are being considered for the Grandview Section:

US 550 at US 160 At-Grade Intersection Alternative. This alternative includes a revised US 550 at US 160 signalized intersection at its current location in the year 2030 (Feasibility Alternative 1B in the FEIS) with the Grandview Interchange east of the intersection and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. The intersection includes double turn lanes from US 160 westbound to US 550 southbound, triple turn lanes from US 550 northbound to US 160 westbound, and single turn lanes from US 160 eastbound to US 550 southbound and US 550 northbound to US 160 eastbound (see Figure 3).

This alternative is being reexamined in light of the proposals submitted by attorney Thomas McNeill on behalf of the Webb Ranch owners. In particular, a October 28, 2008, letter to FHWA from Mr. McNeill provided seven design variations along the existing US 550 alignment with several of them including at-grade intersections.

This alternative includes these three at-grade design variations: T.1.4, T.1.6, and T.4.4. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550 and US 160 intersection location. The intersection geometry is also the same for T.1.4, T.1.6 and T.4.4, as illustrated on Figure 3. The differences occur in the percent grade and radius for 2 two curves: one approximately 500 feet away from the US 550 and US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve) and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

Figure 3. US 550 at US 160 At-Grade Intersection Alternative



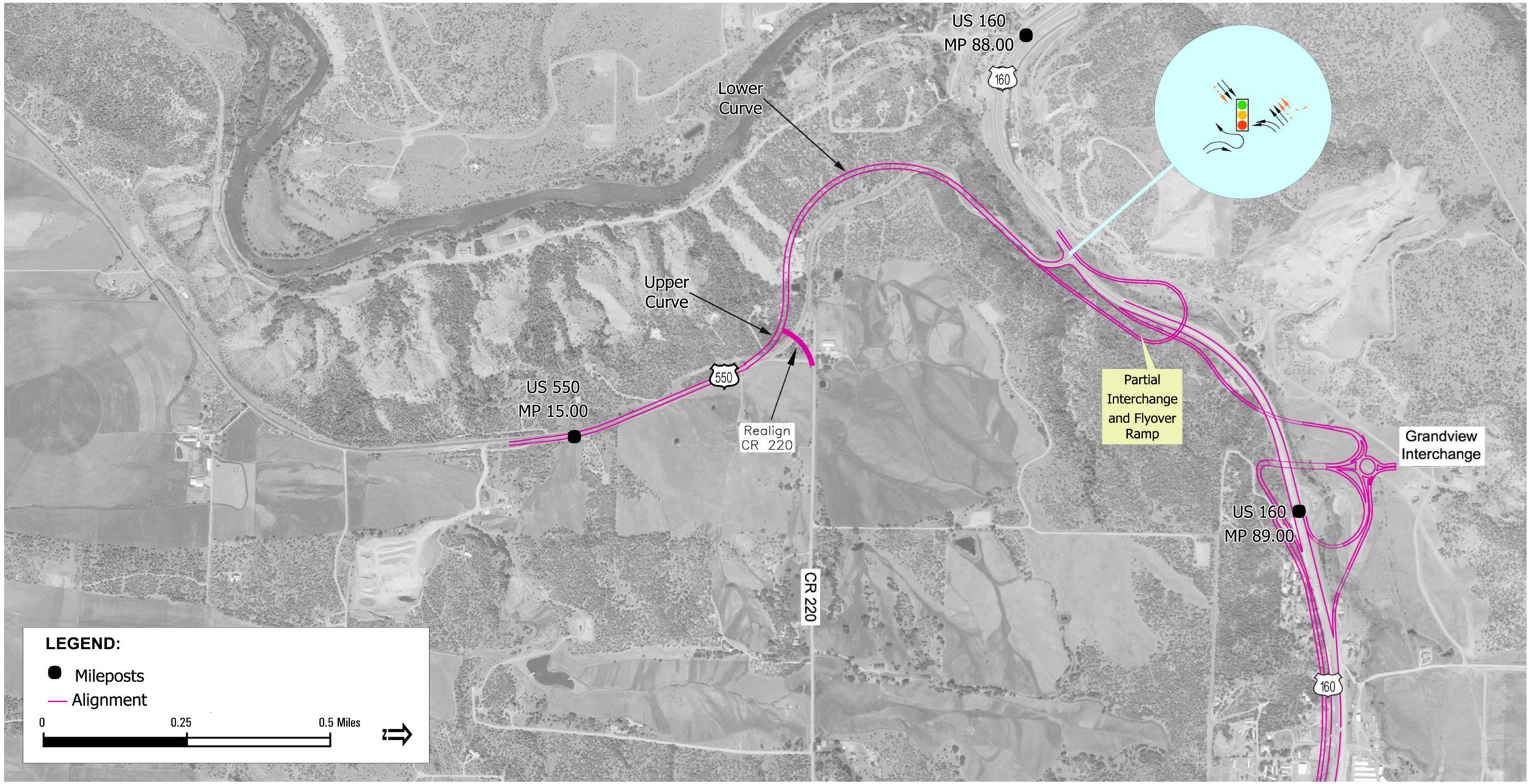
- **Design Variation T.1.4** includes a 1,050-foot radius for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves.
- **Design Variation T.1.6** includes a 925-foot radius for the lower curve and a 700-foot radius for the upper curve, with a six percent uniform grade throughout both curves.
- **Design Variation T.4.4** includes a 1,250-foot radius for the lower curve and a 1,000-foot radius for the upper curve, with a four percent uniform grade throughout both curves.

More details about the alternatives are contained in the 2012 SFEIS.

Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative. This alternative includes a partial interchange at the existing US 550 and US 160 location, the Grandview Interchange east of the partial interchange, and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. This alternative modifies the signalized intersection at US 160/US 550 by eliminating the left turn movement from northbound US 550 to westbound US 160 and replacing it with a loop ramp to service the left turn volumes at the intersection. To accommodate the through volumes, US 160 has two through lanes and one auxiliary lane westbound from the CR 233 (Three Springs) Interchange through the US 550 intersection. US 160 eastbound has two through lanes and one climbing lane from west of the US 550 intersection to the CR 233/Three Springs Interchange.

This alternative (illustrated on Figure 4) includes these four design variations submitted to FHWA on behalf of the Webb Ranch: T.2.4, T.2.6, T.3.4, and T.3.6. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550 and US 160 intersection location, but with a flyover to accommodate the northbound left turn movement. The differences in the "T" design variations occur in the percent grade and radius for 2 two curves: one approximately 500 feet away from the US 550 and US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve), and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

Figure 4. Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative

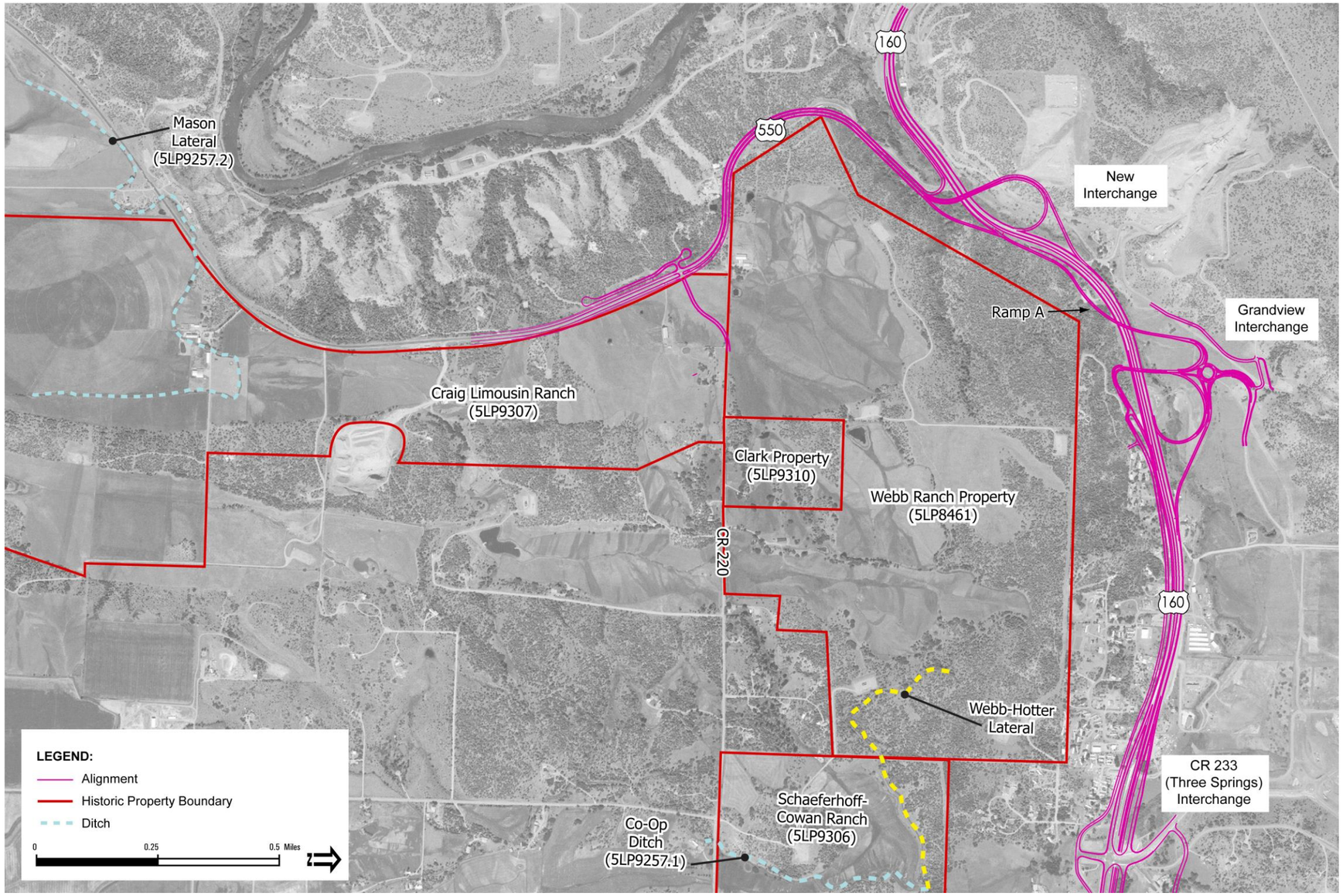


- **Design Variation T.2.4** includes a 1,050-foot radius for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4.25 mile) east of the US 550 and US 160 intersection.
- **Design Variation T.2.6** includes a 925-foot radius curve for the lower curve and 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4 .25 mile) east of the US 550 and US 160 intersection.
- **Design Variation T.3.4** includes a 1,050-foot radius curve for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550 and US 160 intersection.
- **Design Variation T.3.6** includes a 925-foot radius curve and a six percent grade for the lower curve and a 700-foot radius and six percent grade for the upper curve. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550 and US 160 intersection.

Revised Preliminary Alternative A. The Revised Preliminary Alternative A is illustrated on Figure 5. Revised Preliminary Alternative A is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. Therefore, "Revised" was added to the title of this alternative. This alternative contains SPUIs at SH 172/CR 234 and CR 233 (Three Springs) with a grade- separated trumpet interchange at the existing US 550 and US 160 connection and a trumpet interchange (Grandview Interchange) east of the existing US 550 and US 160 intersection. To accommodate the through volumes, US 160 has two through lanes. US 160 eastbound has two through lanes and one climbing lane from west of the US 550 interchange to the CR 233 (Three Springs) Interchange.

Revised Preliminary Alternative A is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. For these reasons, "Revised" has been added to the title of this alternative.

Figure 5. Revised Preliminary Alternative A



Alternative R. This alternative modifies the existing signalized intersection at US 160/US 550 with a hybrid diamond interchange. US 550 bridges US 160, and a signal is incorporated into the design to control specific traffic movements. This interchange is considered a hybrid diamond because it incorporates the traditional diamond design on the northern portion, but limits movements on the south side. On the southern portion, the through movement and the left turns are not included. The interchange includes a tie-in to Ramp A of the existing Grandview Interchange.

This alternative includes four design variations submitted to FHWA on behalf of the Webb Ranch: R1, R2, R3, and R4 (see Figure 6 a and b). It also includes a fifth variation submitted on behalf of the Webb Ranch and further developed during the 2015 Independent Alternatives Analysis, Alternative R5 (see Figure 6c). Each design variation illustrates US 550 intersecting US 160 with a signal-controlled hybrid diamond interchange. The proposed interchange uses a single bridge over US 160 to carry US 160 westbound to US 550 southbound (Bayfield to Farmington) and US 550 northbound to US 160 westbound (Farmington to Durango) traffic. These traffic movements onto and off of US 550 are handled at a signalized intersection. The differences among the Alternative R design variations are at the radius of the upper curve on Farmington Hill near the CR 220 intersection, the proposed design speed, the number of lanes, and slight variations in the alignment that alter the required cut walls/slopes and fill walls/slopes. The design variation descriptions are described as follows:

- **Design Variation R1** has a 35 mph design speed, a 715-foot upper radius curve, a 715-foot lower radius curve, and a six percent grade. This variation has two northbound lanes and three southbound lanes, which include a climbing lane for trucks, 10-foot paved shoulders (4-foot shoulders adjacent to climbing lane), and a 14-foot median with concrete barrier down the center. The location of the alignment roughly follows the existing US 550 alignment, allowing for 3:1 cut slopes and fill walls, and incorporates a signal-controlled hybrid diamond interchange at the US 550 and US 160 connection.
- **Design Variation R2** has a 45 mph design speed, a 1,250-foot upper radius curve, a 1,250-foot lower radius curve, and a five percent grade. This variation has two northbound lanes and two southbound lanes with 10-foot paved shoulders and a 14-foot median with concrete barrier down the center. The location of the alignment roughly follows the existing US 550 alignment, allowing for 3:1 cut slopes and fill walls, and incorporates a signal controlled hybrid diamond interchange at the US 550 and US 160 connection.

Figure 6a. Alternative R: Design Variations 1 and 3

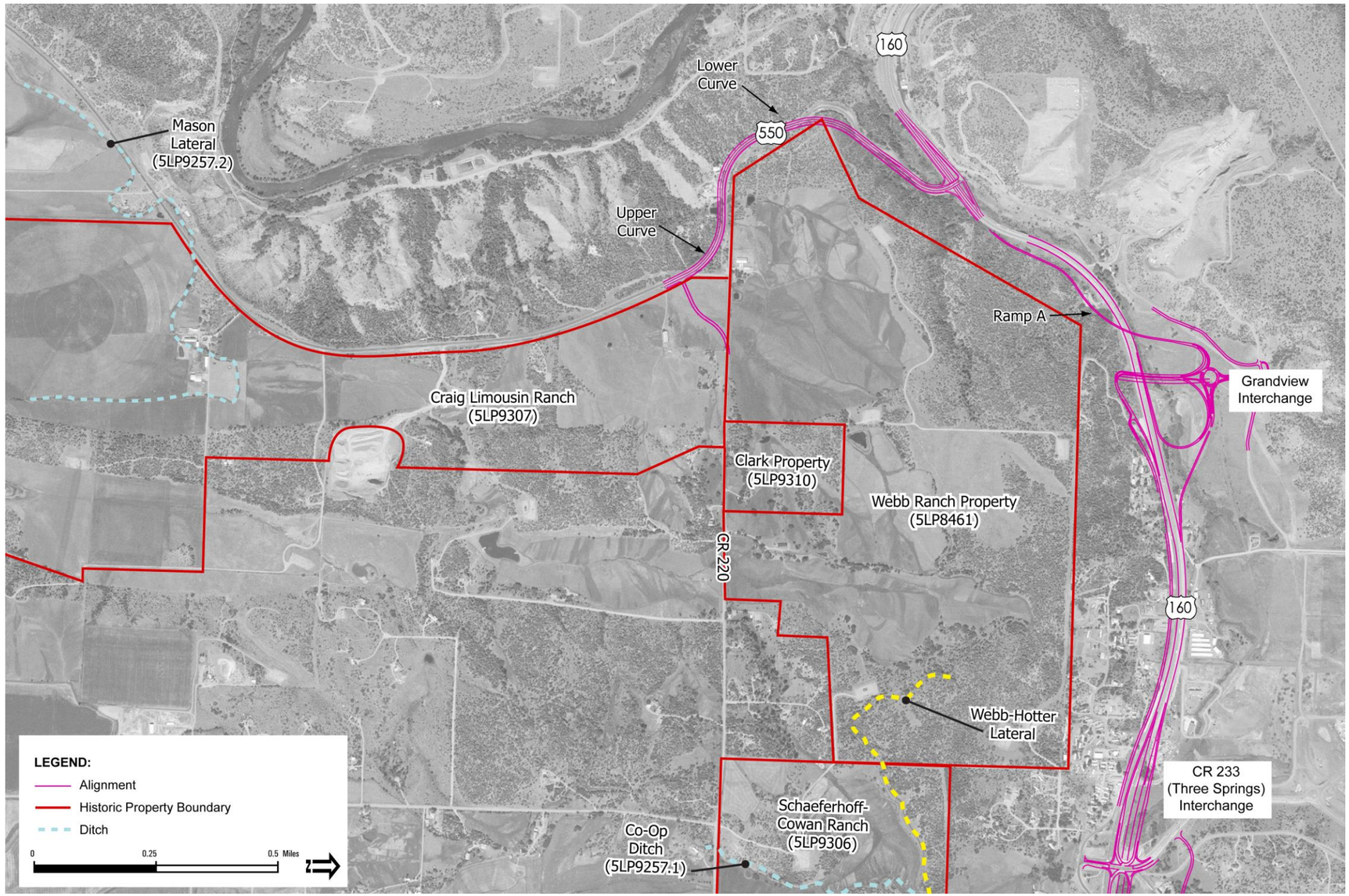


Figure 6b. Alternative R: Design Variations 2 and 4

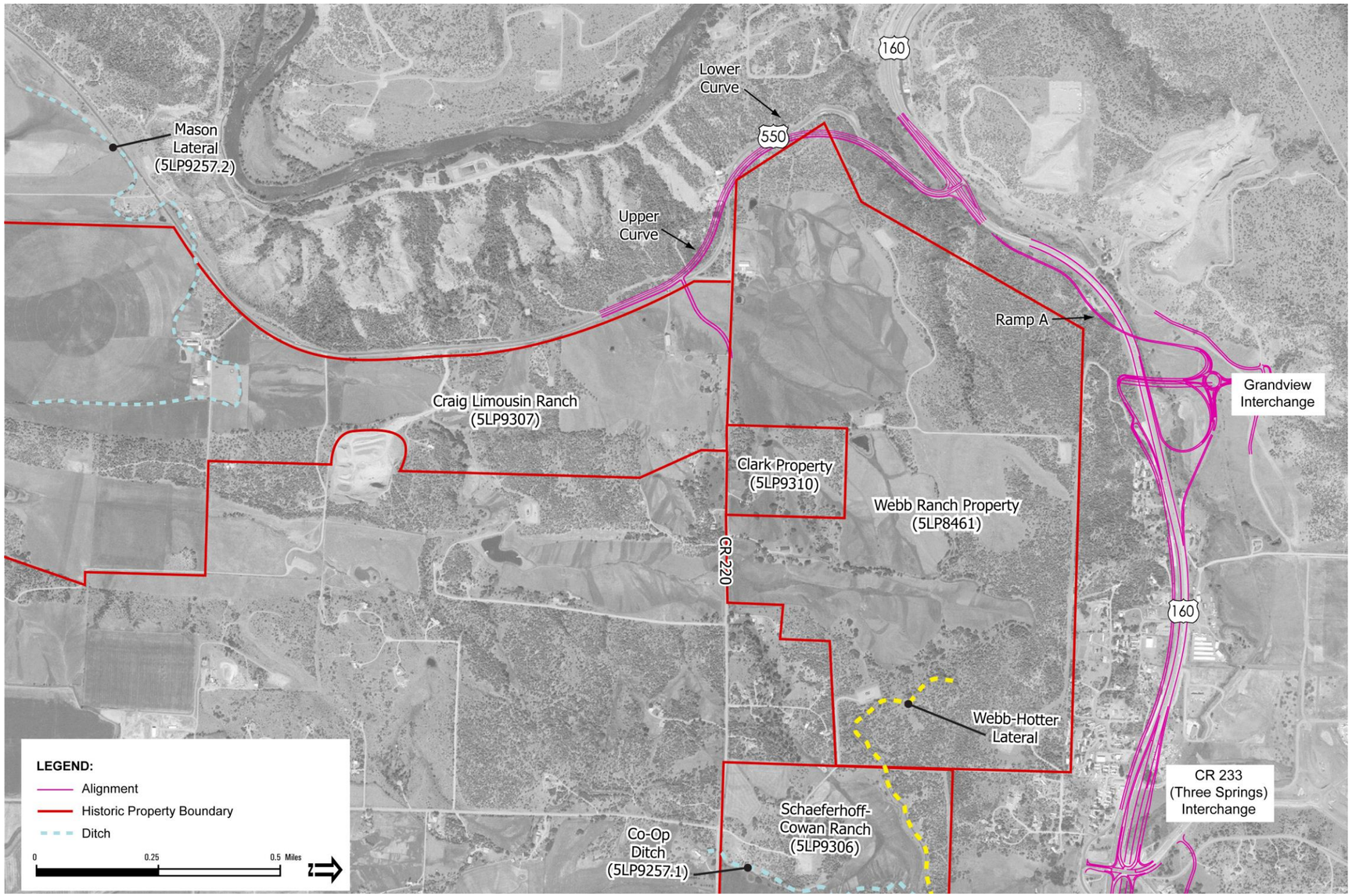
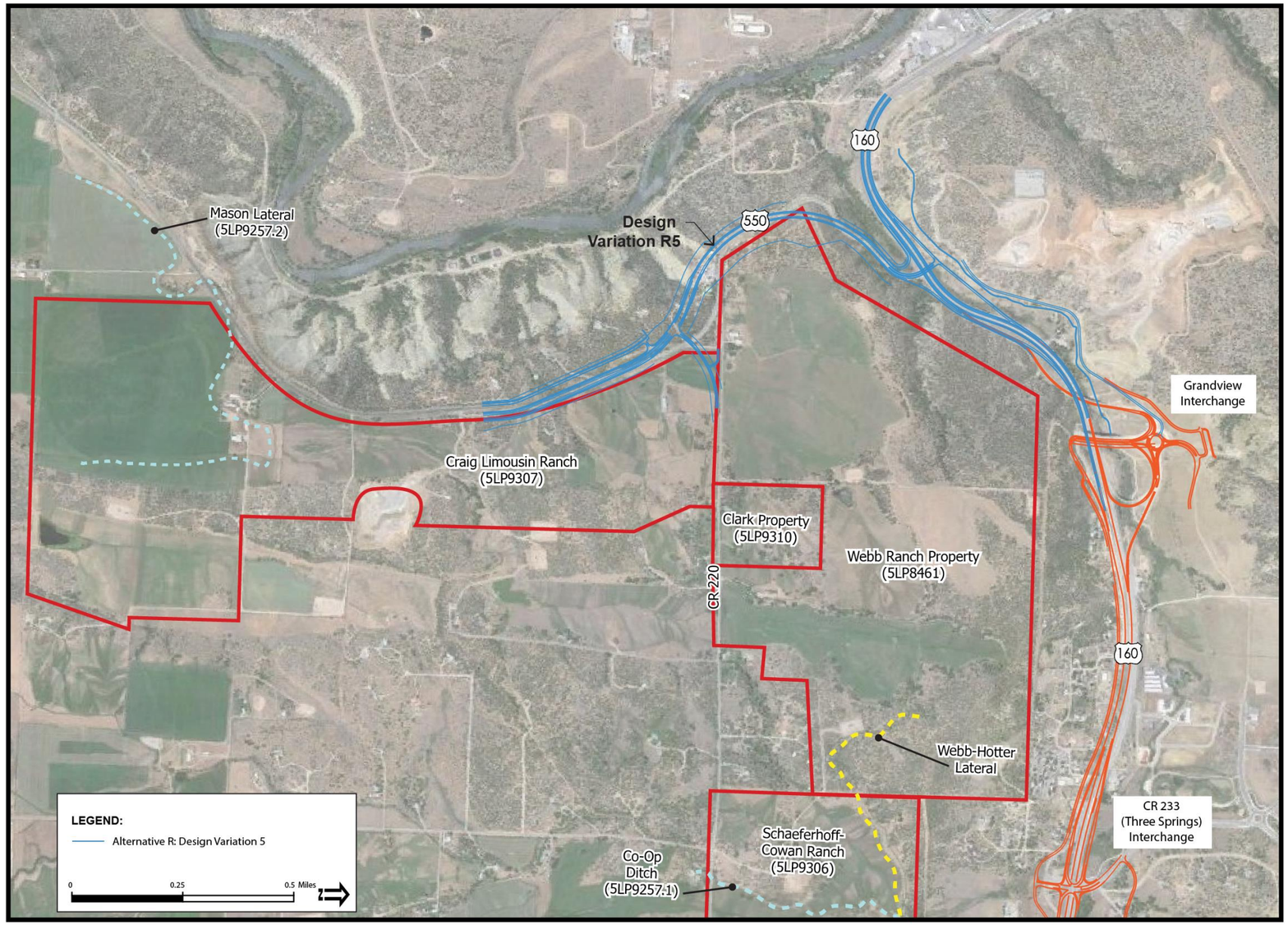


Figure 6c. Alternative R: Design Variation 5

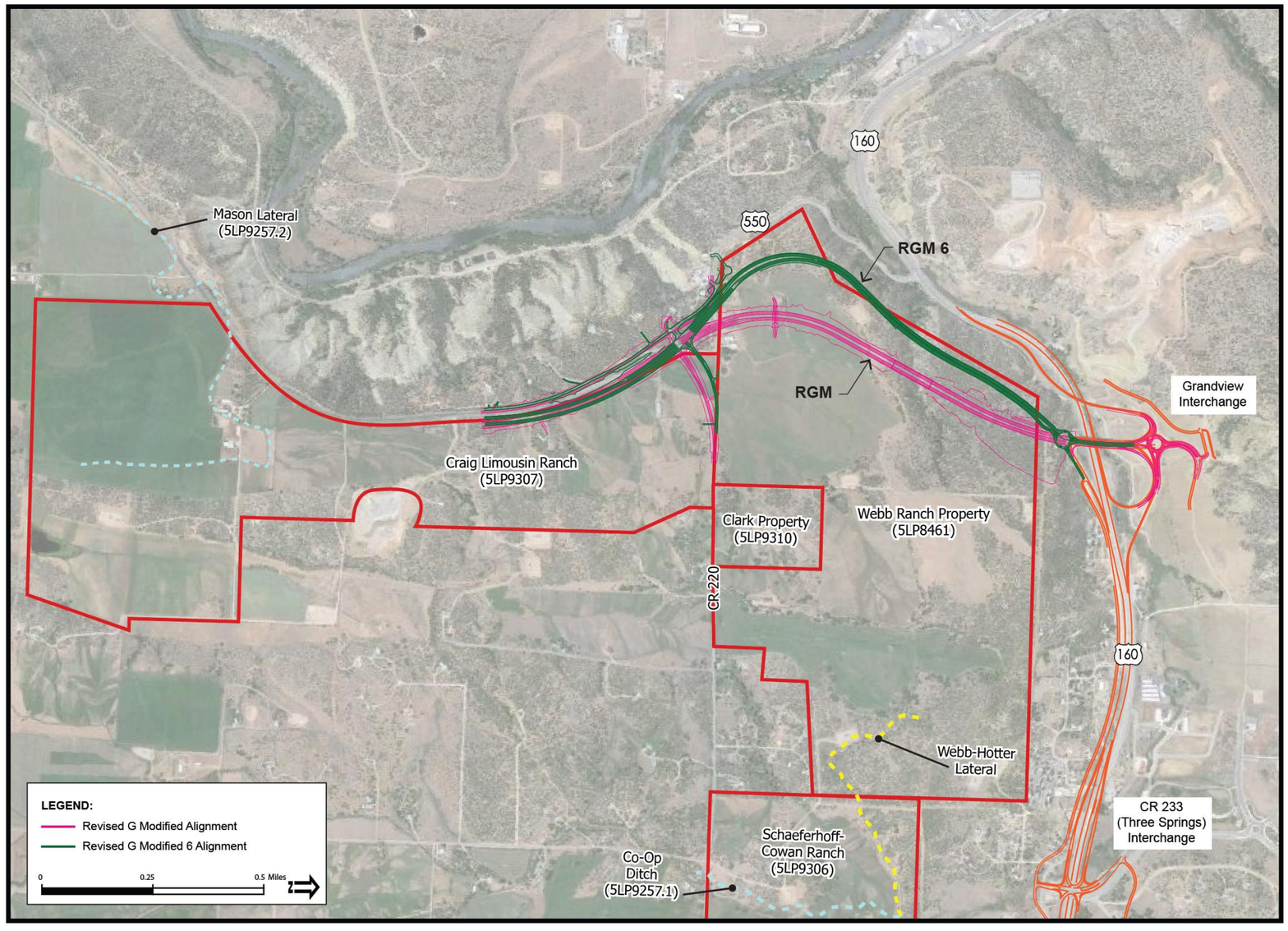


Design Variation R3 has a 35 mph design speed, a 715-foot upper radius curve, a 715-foot lower radius curve, and a six percent grade. This variation has two northbound lanes and three southbound lanes, which includes a climbing lane for trucks, 10-foot paved shoulders (four-foot shoulders adjacent to climbing lane), and a 14-foot median with concrete barrier down the center. The location of the alignment closely follows the existing US 550 alignment, requires 3:1 cut slopes and fill walls with 30-foot vertical soil nail walls, and incorporates a signal-controlled hybrid diamond interchange at the US 550 and US 160 connection.

- **Design Variation R4** has a 35 mph design speed, a 1,250-foot upper radius curve, a 1,250-foot lower radius curve, and a five percent grade. This variation has two northbound lanes and two southbound lanes with 10-foot paved shoulders and a 14-foot median with concrete barrier down the center. The location of the alignment roughly follows the existing US 550 alignment, requires 3:1 cut slopes and fill walls with 30-foot vertical soil nail walls, and incorporates a signal-controlled hybrid diamond interchange at the US 550 and US 160 connection.
- **Design Variation R5** was submitted to CDOT during the public comment period on the 2012 SFEIS. It was further developed and refined during the 2015 Independent Alternatives Analysis to meet a higher design speed (55 mph near the intersection with CR 220 and extending down Farmington Hill until a point approaching the intersection with US 160, where the design speed drops to 35 mph.) It deviates noticeably from the US 550 alignment to meet these design speeds. Alternative R5 includes a modified diamond interchange with US 160. More details about Alternative R5 are contained in the 2015 Independent Alternatives Analysis. Design Variation R5 is illustrated on Figure 6c.

RGM6 (Preferred) Alternative. This alternative (illustrated on Figure 7) connects US 550 to US 160 via the Grandview Interchange (which is approximately 0.6 mile east of the existing US 160/US 550 [south] intersection). Intersections with CR 233 (Three Springs) and SH 172/CR 234 are designed to be SPUI interchanges. This alternative includes two through lanes in each direction through the Grandview Section. The alignment of US 550 for the Revised G Modified (Preferred) Alternative was revised slightly from the alternative in the 2006 US 160 EIS to avoid a natural gas well installed after preliminary alignment designs were completed, as described in the 2012 SFEIS.

Figure 7. Revised G Modified and Revised G Modified 6 (Preferred) Alternative



Revised G Modified was further refined during the 2015 Independent Alternatives Analysis. The route was shifted to the west to avoid more of the irrigated farmland on the Webb Ranch and to reduce impact to the historic property. This alternative also includes a roundabout intersection configuration south of the Grandview Interchange. It is labeled the RGM6 Alternative and has been carried forward in this document as the Preferred Alternative. More details about this alternative are included in the 2015 Independent Alternatives Analysis. Alternative RGM is illustrated on Figure 7 along with the RGM6 (Preferred) Alternative.

Revised F Modified Alternative. The Revised F Modified Alternative is illustrated on Figure 8. Revised F Modified Alternative is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. Therefore, "Revised" was added to the title of this alternative. This alternative includes an additional trumpet interchange at the Grandview Interchange, and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. US 550 connects to US 160 at CR 233 (Three Springs) Interchange. Frontage roads parallel the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160. US 160 has two through lanes.

The following alternatives were developed specifically for this Section 4(f) analysis:

Eastern Realignment Alternative. The Eastern Realignment Alternative is shown on Figure 9. It includes a trumpet interchange at the Grandview Interchange, and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. US 550 connects to US 160 at CR 233 (Three Springs) Interchange but has a different US 550 alignment when compared to the Revised F Modified Alternative. Frontage roads parallel the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160 along the new US 550 alignment. US 160 has two through lanes.

Western Realignment Alternative. This alternative, as shown on Figure 10, relocates the existing US 550/ US 160 intersection to the west where it currently intersects US 160 with a directional interchange. This alternative diverges from the current US 550 at approximately MP 13.17 on the top of Florida Mesa before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately MP 88.0, approximately 0.5 mile west of the existing US 160/ US 550 (south) intersection. This alternative includes the Grandview Interchange and SPUIs at CR 233 (Three Springs) and SH 172/CR 234.

Figure 8. Revised F Modified Alternative

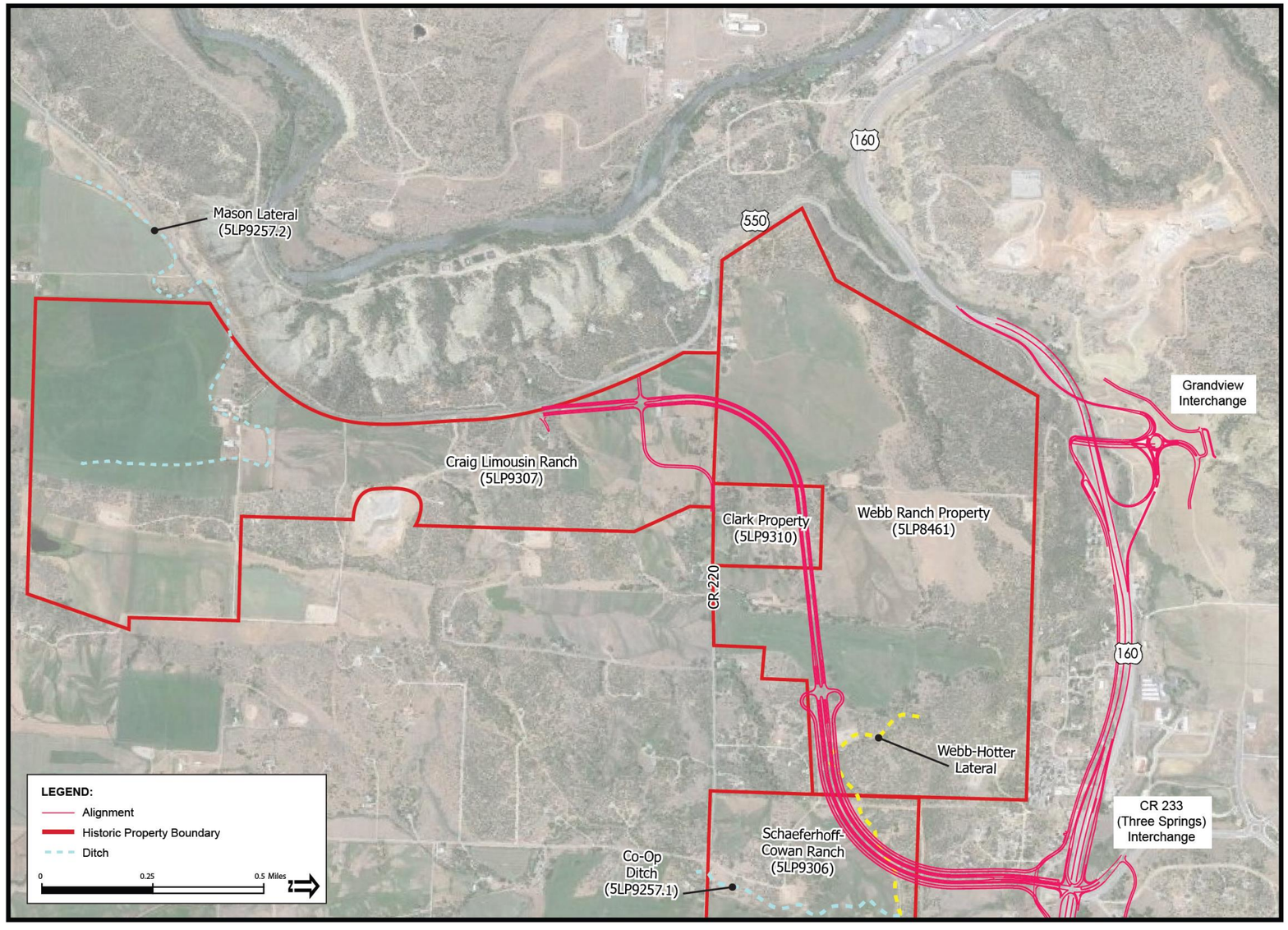


Figure 9. Eastern Realignment Alternative

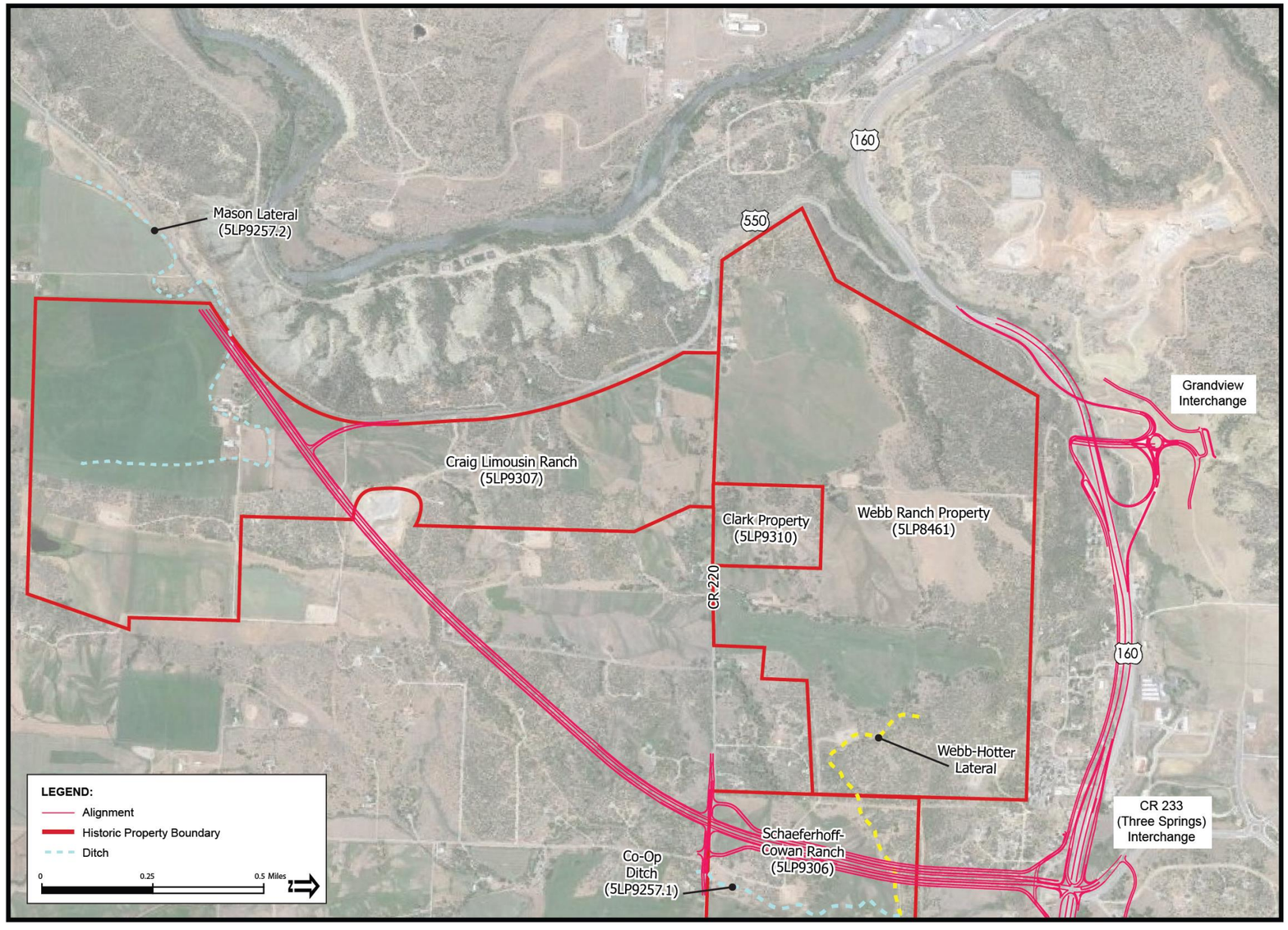
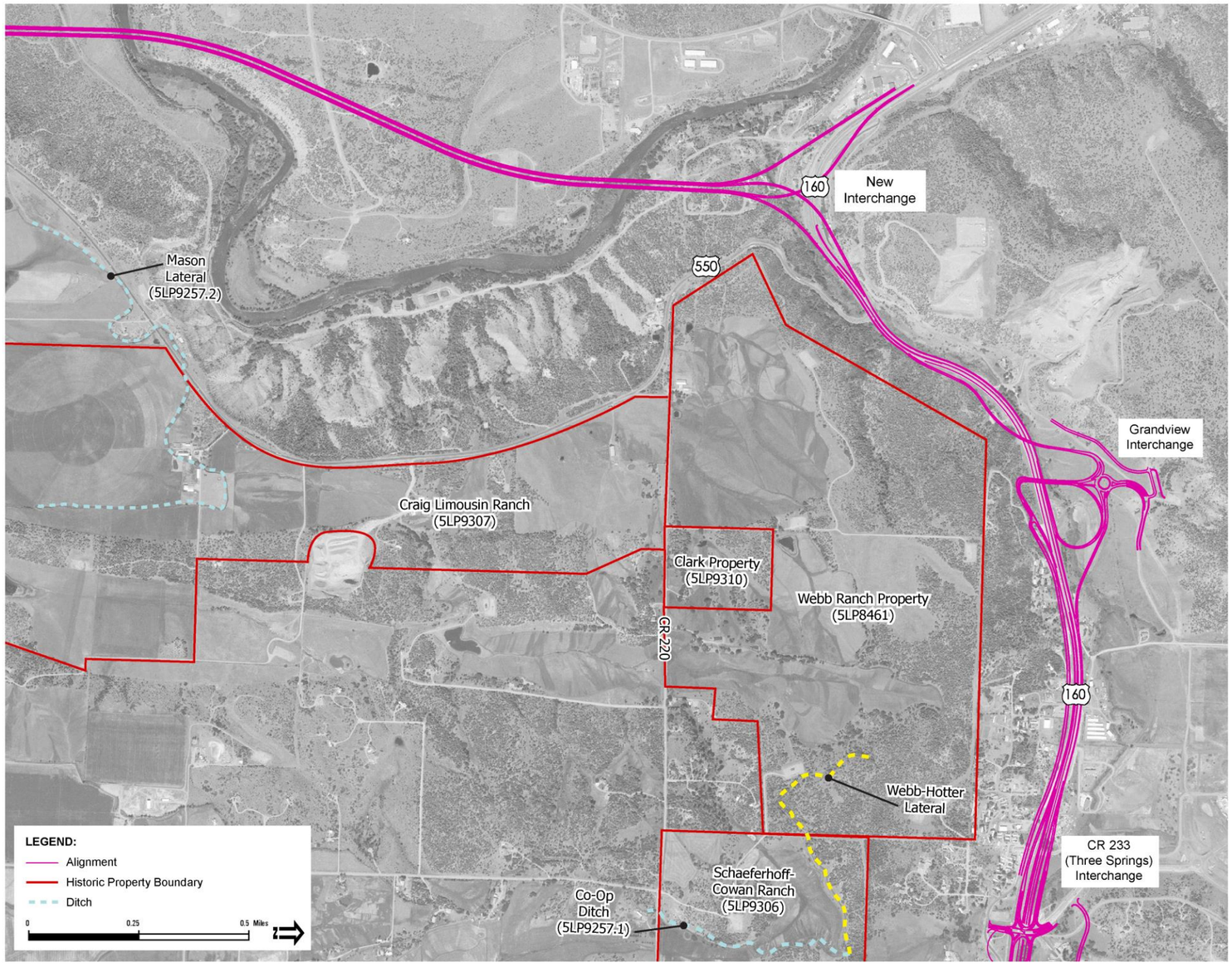


Figure 10. Western Realignment Alternative



5.0 Description of Section 4(f) Properties

The Section 4(f) properties described in this evaluation include historic ranches, a historic residential property, and historic ditches. Archaeological sites are not considered Section 4(f) properties where a determination has been made that their importance is chiefly because of what can be learned by data recovery and where they have minimal value for preservation in place (23 CFR 774.13[b][1]). All of the archaeological sites within the project area fall into this category, so none of them are considered Section 4(f) properties. (See letters in Appendix B of the 2012 SFEIS dated November 9, 2009, and August 6, 2010, from CDOT, and response letters from SHPO dated December 1 and 11, 2009, and August 25, 2010, documenting this finding.)

The Section 4(f) properties described below fall within the alternative alignments in the project area identified on Figure 9. A summary of Section 4(f) properties within the Area of Potential Effects (APE) is provided in Table 1.

Table 1. Summary of Section 4(f) Properties Within the Area of Potential Effects

*The resource number is an identification number (called a Smithsonian number) assigned by the Office of Archaeology and Historic Preservation.

**The criteria listed in this table refer to the National Register of Historic Places criteria to evaluate properties for eligibility. These include properties:

A. That are associated with events that have made significant contribution to the broad patterns of our history; or
B. That are associated with the lives of significant persons in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack historic values; or
D. That have yielded or may be likely to yield information important in history or prehistory.

Resource Name and Number*	Basis for Section 4(f) Eligibility	Important Activities, Features, and Attributes
Clark Property 5LP9310	Historic	Important role as a social gathering place. Eligible under Criteria A and C**.
Craig Limousin Ranch 5LP9307	Historic	Barn, loafing shed, silo, saddle shed, residence, and landscape convey the property's significance as a working ranch on Florida Mesa eligible under Criteria A and C
Schaeferhoff-Cowan Ranch 5LP9306	Historic	Hay barn/milk shed are examples of ranching architecture common in this region of the state, granary is an example of a ranch-related outbuilding association with ranching on Florida Mesa eligible under Criteria A and C.
Webb Ranch 5LP8461	Historic	Integrity of barn, loafing sheds, corrals, and chutes represent an example of ranch architecture in La Plata County eligible under Criteria A and C.

Table 1. Summary of Section 4(f) Properties Within the Area of Potential Effects

*The resource number is an identification number (called a Smithsonian number) assigned by the Office of Archaeology and Historic Preservation.

**The criteria listed in this table refer to the National Register of Historic Places criteria to evaluate properties for eligibility. These include properties:

A. That are associated with events that have made significant contribution to the broad patterns of our history; or
B. That are associated with the lives of significant persons in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack historic values; or
D. That have yielded or may be likely to yield information important in history or prehistory.

Resource Name and Number*	Basis for Section 4(f) Eligibility	Important Activities, Features, and Attributes
Co-op Ditch/Mason Lateral (formerly Co-op Ditch; 2 segments) 5LP9257.1/5LP9257.2	Historic	Important under Criterion A for its role in providing irrigation water to lands under the Desert Land Act and association with the settlement and irrigation of marginal lands on Florida Mesa, significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction.
Webb-Hotter Lateral (2 segments) 5LP9256.1/5LP9256.2	Historic	Important role in the irrigation network on the Webb Ranch and Schaeferhoff-Cowan Ranch properties. Eligible under Criterion A.

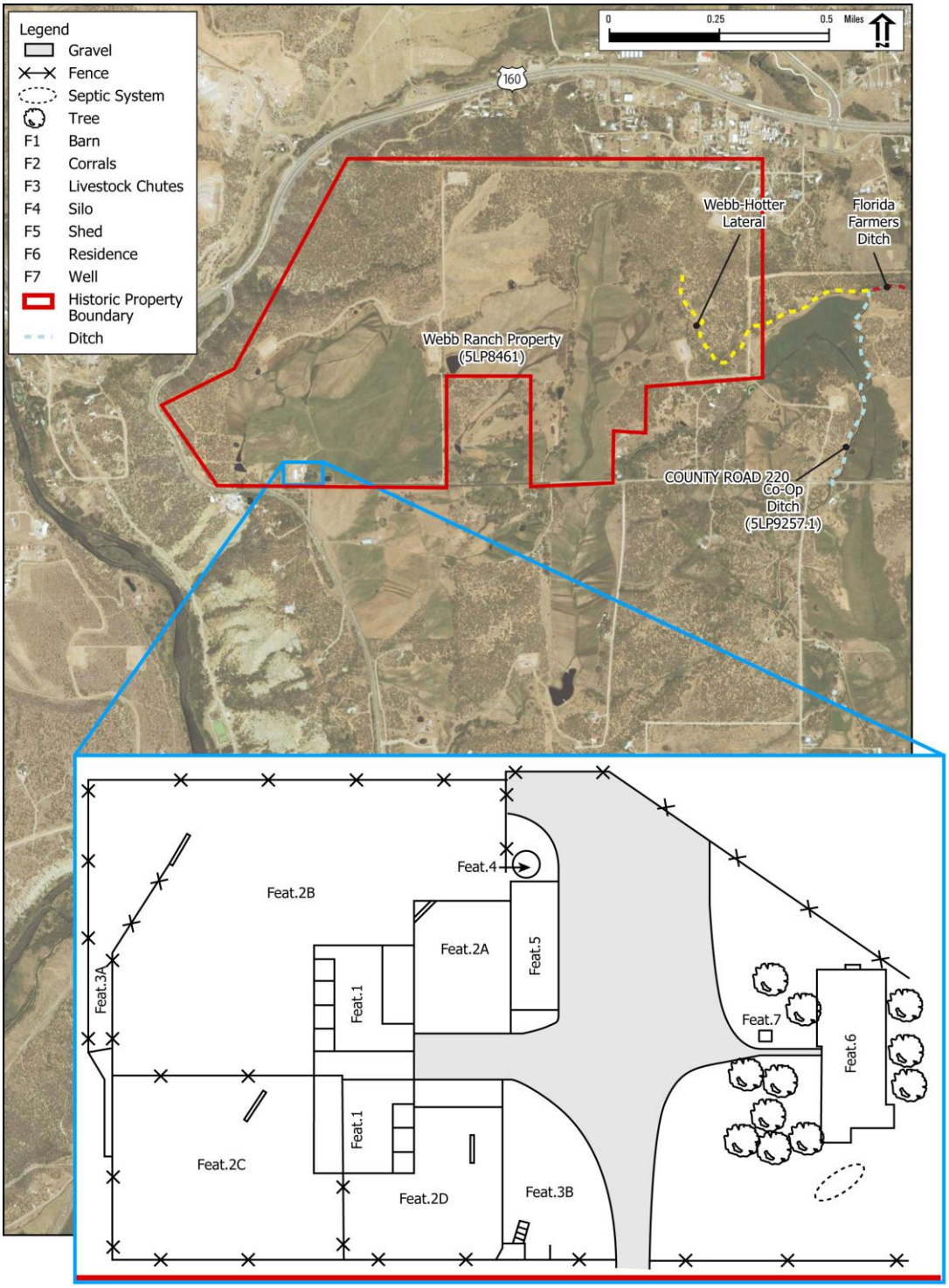
5.1 Historic Ranches

Three historic ranches and one historic residential property within the project area have been identified as eligible for the National Register of Historic Places (NRHP). These are described in the following sections.

5.1.1 Webb Ranch

Site 5LP8461 is the historic Webb Ranch complex on private land at an elevation of 6,800 feet (2,073 meters) as shown on Figure 11. It is approximately 515 acres in size. The ranch is located northeast of the intersection of US 550 and County Road 220. Growing from a patchwork compilation of ranch properties, the Webb Ranch's period of significance ranges from 1910-1957. The land where the ranch buildings sit was originally patented by Gamaliel Hoskinson in 1891 as a cash sale entry. The property that now comprises the ranch was owned by several different people over time. Portions of the property were patented in 1891, 1892 and 1911 while others were not patented until 1916 and 1956. In the mid-1900s, the ranch property passed through several family owners, eventually coming into the hands of the Webbs in 1963. The Webb family still maintains ownership today.

Figure 11. Webb Ranch



The Webb Ranch is eligible under NRHP Criterion A and C for representing ranch architecture in La Plata County. The large barn (Feature 1) with is an unmodified, excellent example of a ranching barn. The barn retains character-defining features such as the built-in loafing sheds, and qualifies for inclusion on the NRHP. The associated corrals (Feature 2) and chutes (Feature 3) also retain excellent integrity and contribute to the site's architectural significance. The other historic outbuildings and residence are nondescript or have been altered to a degree that they no longer contribute to the site's architectural significance.

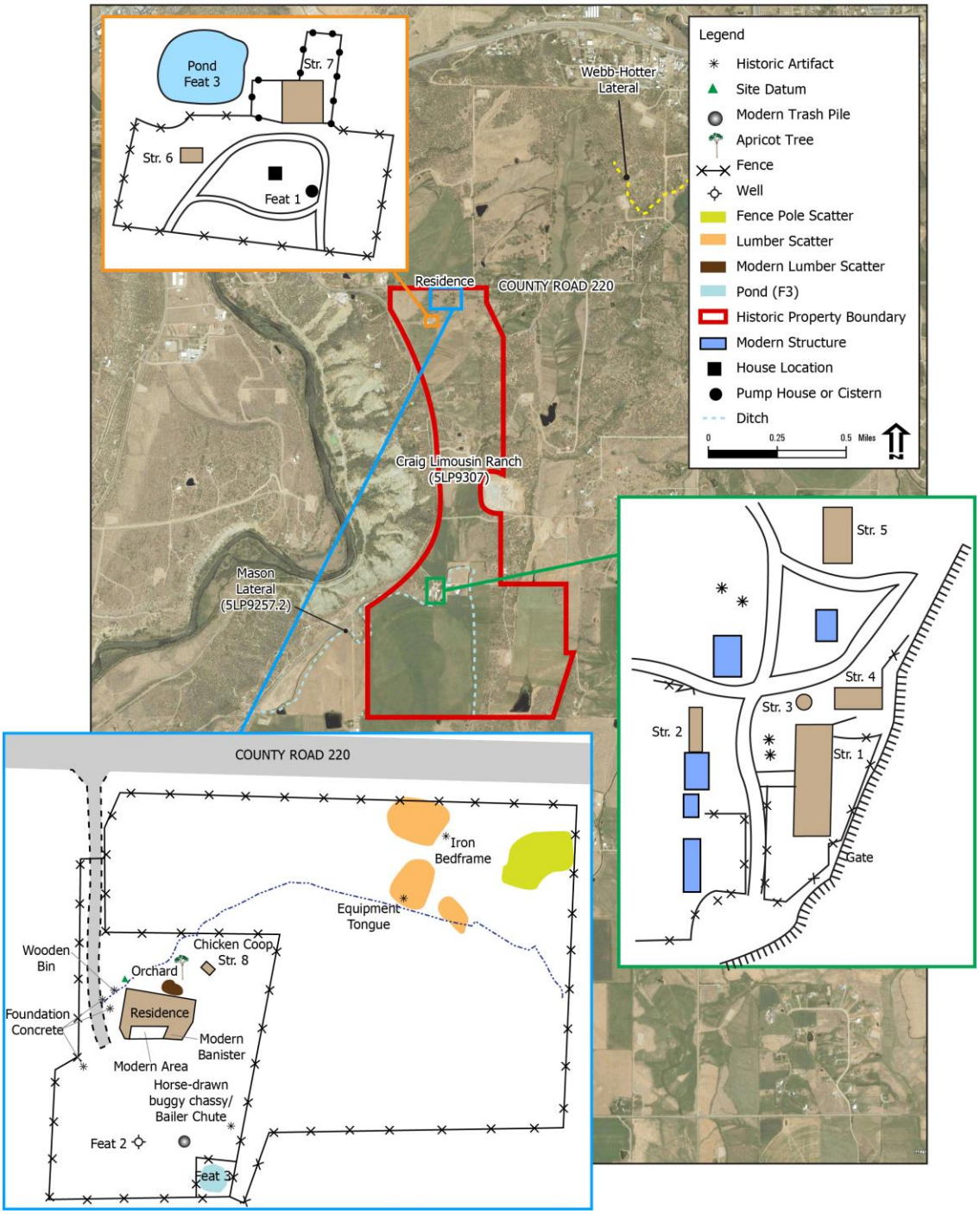
5.1.2 Craig Limousin Ranch

Site 5LP9307 is the historic Craig Limousin Ranch complex on private land at an elevation of 6,660 feet (2,030 meters) as shown on Figure 12. It is approximately 378 acres in size. The site is southwest of Highway 550 on a level to slightly sloping area on the western edge of Florida Mesa. The site soils are a reddish brown silty loam supporting stands of piñon and juniper mainly along the rim of the mesa. Much of the complex grounds have been cleared, leaving sparse trees along the western edge of the complex and the occasional tree that is part of the ornamental landscaping. The ranching complex consists of several buildings—only three of the structures (Structures 1–3) are known to meet the 50-year age criterion. Two additional structures (Structures 4 and 5) are possibly 50 years old. The period of significance for the Craig Limousin Ranch was 1929-1959.

The Craig Limousin Ranch was originally documented in 2009 during the inventory of the Eastern Realignment Alternative. At the time, several buildings (Structures 1-5) at the Craig Limousin Ranch headquarters were recorded, including a large barn, a shed, a grain silo, a milk shed, and a stucco-clad residence. Additionally, another building complex located to the north of the ranch headquarters was also recorded. As a result of the recording, two structures (Structures 6 and 7) and one feature, including a saddle shed, a post-and-beam barn, and a pump house, were documented. Structures 1 through 5 at the Craig Limousin Ranch retain the integrity to convey the property's significance under Criteria A and C.

The barn (Structure 1) is in good structural condition and has remained largely unmodified. It still conveys its original function. It has been part of the ranching landscape of Florida Mesa since it was built in the late 1920s or early 1930s and is highly visible from US 550, making it an important and recognizable symbol of past ranching activities on the mesa. Although the silo (Structure 3) has been modified, it still has the integrity to convey the significance of the property under Criteria A and C. The loafing

Figure 12. Craig Limousin Ranch



shed (Structure 2) is a good example of ranching architecture. The structural integrity of the shed is considered good with no visible modifications made to the structure. Considering its integrity and function, the shed also conveys the significance of the property under Criteria A and C. The cinder block milk shed (Structure 4) and the ranch-style residence (Structure 5) appear to be over 50 years old and are being treated as contributing elements to the overall ranch. The saddle shed (Structure 6) and barn (Structure 7) also retain sufficient integrity to convey the significance of the Craig Limousin Ranch. The landscape features, including the open agricultural fields, also retain integrity and convey the property's significance as a working ranch.

An additional complex associated with the ranch was identified in 2010 during the inventory for the Revised F Modified Alternative alignment. The complex is not on land owned by the Craig family, but is within the original historic boundary of the Craig Limousin Ranch. The complex was the site of the original homestead structure for the ranch, which burned down in 1974. The remains of the site are minimal, consisting of a chicken coop (Structure 8), a well (Feature 2), a small irrigation pond (Feature 3), a sparse scatter of historic artifacts and implements, and a level area where the house was once located, all within a fenced enclosure. After the house burned, a trailer house was put in the same place as the house. The second occupation of the site dates from the late 1970s to 2001, when the trailer was removed (P. Craig, personal communication, May 23, 2010). A moderate density of modern artifacts is present on the site from this later occupation but was not documented as part of the site recording. An orchard is also considered part of the complex and is to the east. It is within a fenced pasture with several apple and apricot trees still present and is watered by an irrigation ditch.

In 2009 the Craig Limousin Ranch as a whole was evaluated as eligible for inclusion on the NRHP under Criteria A and C for its importance to the ranching landscape of Florida Mesa. Although the above-described complex is not currently part of the Craig Limousin Ranch, it was the original homestead for the property and is, therefore, considered part of the ranch's historic boundary. Structure 8 (chicken coop), Feature 2 (well), and Feature 3 (irrigation pond) at the Craig Limousin Ranch retain the integrity to convey the property's significance. The chicken coop (Structure 8) is in good structural condition and has remained largely unmodified. It still conveys its original function. The structural integrity of the coop is considered good, with no visible modifications made to the structure. Considering its integrity and function, it also conveys the significance of the property under Criteria A and C. The well was purportedly dug in 1902 and is one of the first wells dug on the mesa. It is associated with the early history of the ranch and is a contributing element to the overall ranch. The orchard is a landscape feature of the complex and also retains integrity and conveys

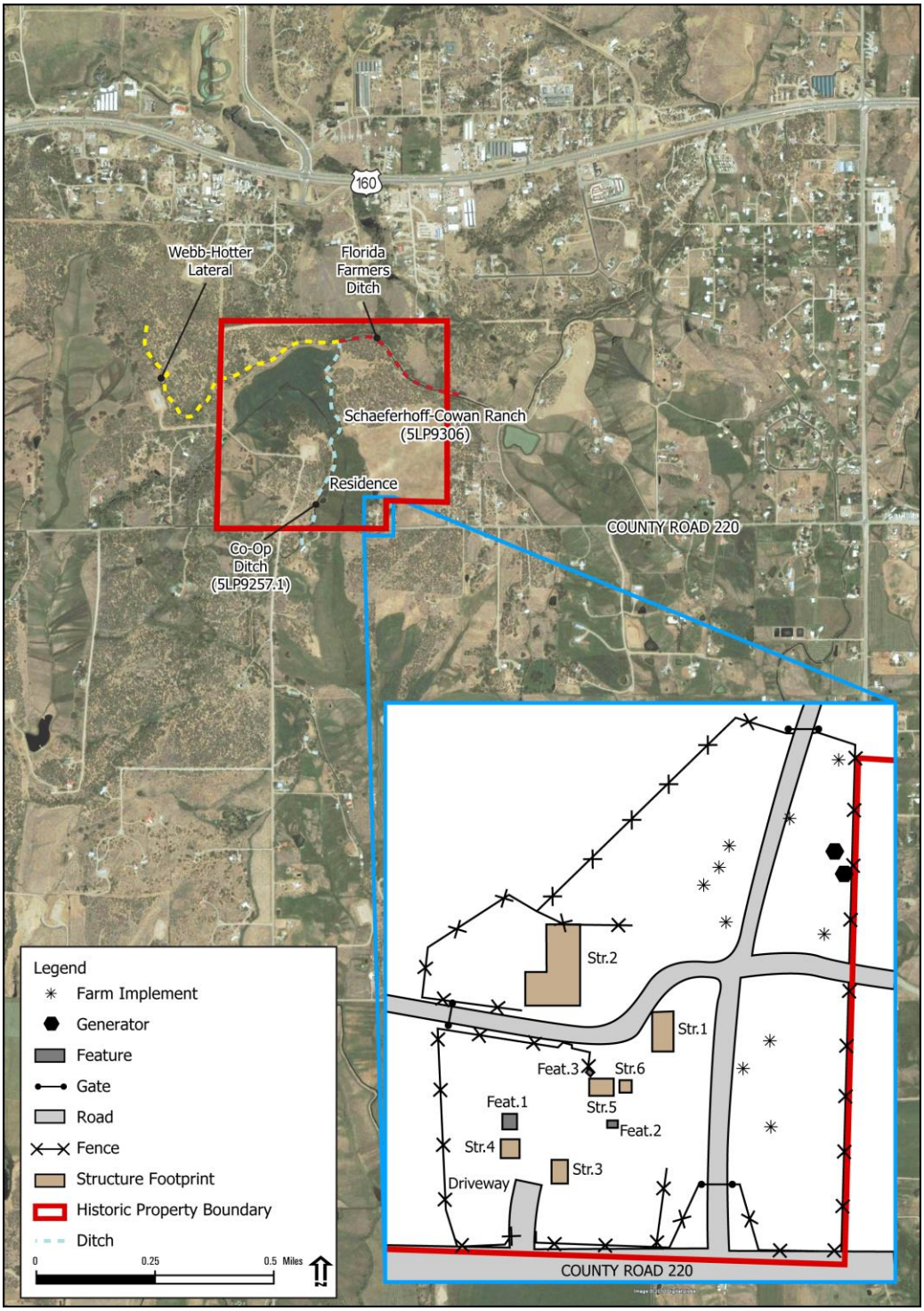
the property's significance as a working ranch. These features and property, together with the currently owned Craig Limousin ranching property, are included in the historic ranch boundary.

5.1.3 Schaeferhoff-Cowan Ranch

Site 5LP9306 is the historic Schaeferhoff-Cowan Ranch complex on private land at an elevation of 6,930 feet (2,112 meters) as shown on Figure 13. It is approximately 160 acres in size. The complex is located north of CR 220 on a southwest-facing slope of a low hill that is along the eastern edge of a shallow drainage valley. The complex of ranch buildings is within a fenced-in area demarking it from the adjacent and more recent structures to the east. The complex encompasses a 336-foot by 271-foot area with several pieces of farm equipment in the fenced compound. Many of these are haying equipment, including tractors, balers, and a hay elevator. Other implements noted in the compound were plows, generators, wooden wagons, and various implement parts. One of the wagons is the only implement in the compound that appears to have antiquity. It is a hay wagon with a wood-plank deck and wooden-spoke wheels from a 1930s model Hudson automobile. The period of significance for the Schaeferhoff-Cowan Ranch was 1900-1959.

Six standing structures (Structures 1-6) and three features were recorded as part of the ranch compound. Site 5LP9306 is recommended as eligible for inclusion on the NRHP under Criteria A and C. The Schaeferhoff-Cowan Ranch is significant under Criterion A for its association with ranching on Florida Mesa and under Criterion C for its examples of ranching architecture in La Plata County. In particular, the hay barn/milk shed (Structure 2) is a good example of a barn type that appears to be common in this region of the state, and the grain shed (Structure 1) is also a good example of a ranch-related outbuilding.

Figure 13. Schaeferhoff-Cowan Ranch



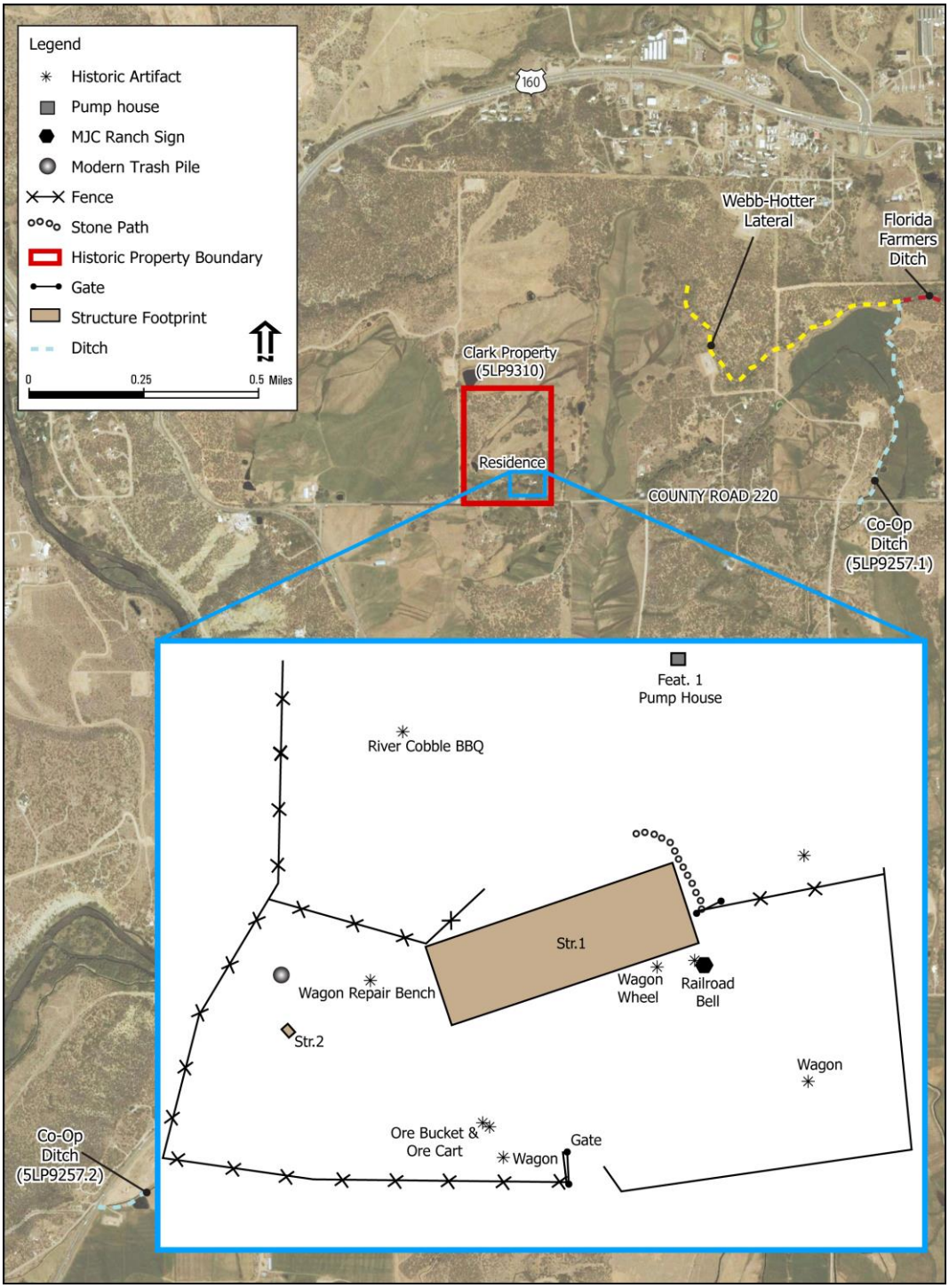
5.1.4 Clark Property

Site 5LP9310 is the historic Clark Property on private land at an elevation of 6,805 feet (2,074 meters), as shown on Figure 14. The property fronts CR 220 along its southern boundary and extends north where the fence boundaries of the property encompass a moderately dense piñon and juniper woodland. The Clark Property consists of two standing structures (Structures 1 and 2), a pump house, wagon parts, two wagons, a train bell, and an ore cart.

The Clark Property is on land originally acquired as a 160-acre homestead entry patent by Henry Sheldon on March 26, 1892. However, the property's period of significance begins when the property was purchased in 1947 by Marguerite Jackson Clark. Its current historic boundary encompasses 29 acres. Shortly after moving to her new home, Marguerite added the Big Room, which became legendary to the people of Durango and Florida Mesa as the entertainment and social center of the valley, when Marguerite threw parties at her house with most of the valley in attendance. By way of a guest book, many of Marguerite's guests signed their names in lipstick on the white walls in her kitchen.

The Clark Property is eligible for inclusion on the NRHP under Criteria A and C. Under Criterion A, the Clark home functioned as a social gathering place for the residents of Durango and Florida Mesa with a period of significance from 1947–1960. The Clark property appears as it did during its period of significance and continues to convey its significance through integrity of design, materials, workmanship, location, setting, and feeling. Under Criterion C, the property is a good example of a residence modified for use as a social and recreational center. The house fronts the county road with landscaping that is aesthetically pleasing, using elements of the old west, such as wagons, ore carts, and a locomotive bell. The design and overall layout of the property convey its function as a social center. Additionally, the recreational function of the house is reflected in the architecture with the addition of the Big Room where social gatherings were held. The integrity of the property is good and continues to be maintained as it was originally designed and constructed during its period of significance.

Figure 14. Clark Property



5.2 Historic Linear Resources

Two historic ditches within the APE have been recommended as eligible for NRHP: the Mason Lateral (formerly Co-op Ditch) and the Webb-Hotter Lateral. These resources are described below.

5.2.1 Webb-Hotter Lateral

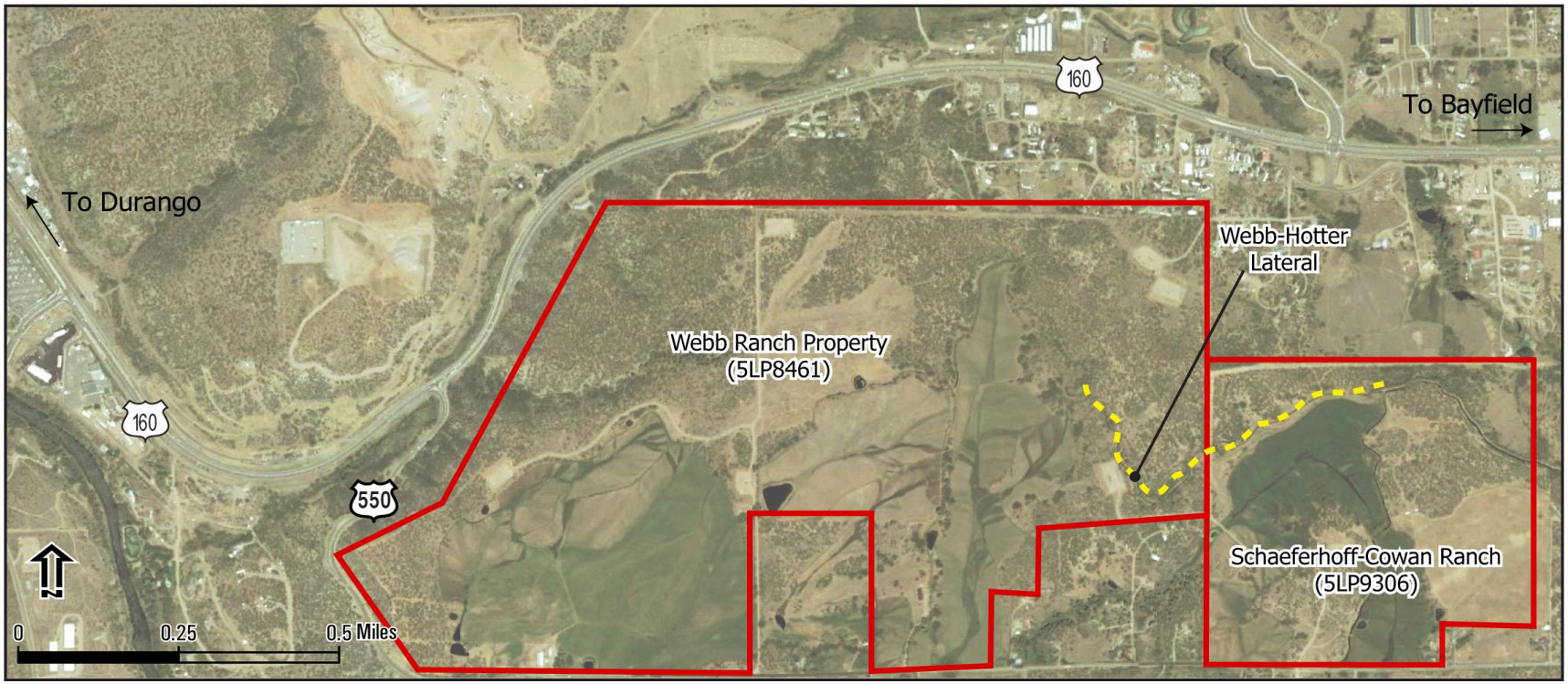
5LP9256 is the Webb-Hotter Lateral, which is significant for its association with two separate historic ranches. This is a lateral of the ditch that was referred to in the 2006 US 160 EIS as the Florida Farmers Ditch (5LP5661). The recorded segments of the lateral extend across private lands at an elevation of 6,900 feet (2,103 meters). The ditch crosses the APE from east to west on the northern end of a hay field just south of the northwestern end of Florida Mesa, as shown on Figure 15. The vegetation along the recorded segment of the ditch includes a variety of grasses and willow.

The Webb-Hotter Lateral extends west from the intersection of the Florida Farmers Ditch and the Mason Lateral (formerly Co-op Ditch; Charlie McCoy, 2009). The lateral was documented as two segments. Segment 5LP9256.1 is a 1,643-foot-long segment that extends from its intersection with the Mason Lateral (formerly Co-op Ditch) through the Schaeferhoff-Cowan Ranch (5LP9306). Segment 5LP9256.2 extends from the west boundary of the Schaeferhoff-Cowan Ranch into the historic Webb Ranch for 1,786 feet before it is split by a diversion structure into two sublateral ditches—one that flows to the east and irrigates the middle and western ranch pastures, and one that flows to the west and irrigates the eastern pastures. These two sublateral ditches are connected to an elaborate 11-mile irrigation network that contains laterals, diversion structures, and storage ponds.

It is not clear when the Webb-Hotter Lateral was built, who was responsible for its construction, or when it was first used to irrigate the Schaeferhoff-Cowan or Webb Ranch properties. Based on a November 3, 2010, contact with Peggy Cooley who grew up on the Schaeferhoff-Cowan Ranch, the ditch is at least 65 years old (P. Cooley, personal communication, 2010).

The Webb-Hotter Lateral is significant under NRHP Criterion A for its association with the two separate historic ranches through which it runs.

Figure 15. Webb-Hotter Lateral



5.2.2 Mason Lateral (formerly Co-op Ditch)

Additional research done in 2014 has found that segment 5LP9257.2 south of CR 220 is actually the Mason Lateral, which has a slightly different history but maintains the location of the ditch identified as the Co-op Ditch in the 2009 consultation. The site number assigned to the Mason Lateral in 2002—5LP6695.1—has been assigned to this ditch and a new set of site forms was prepared and provided to SHPO on January 16, 2015.

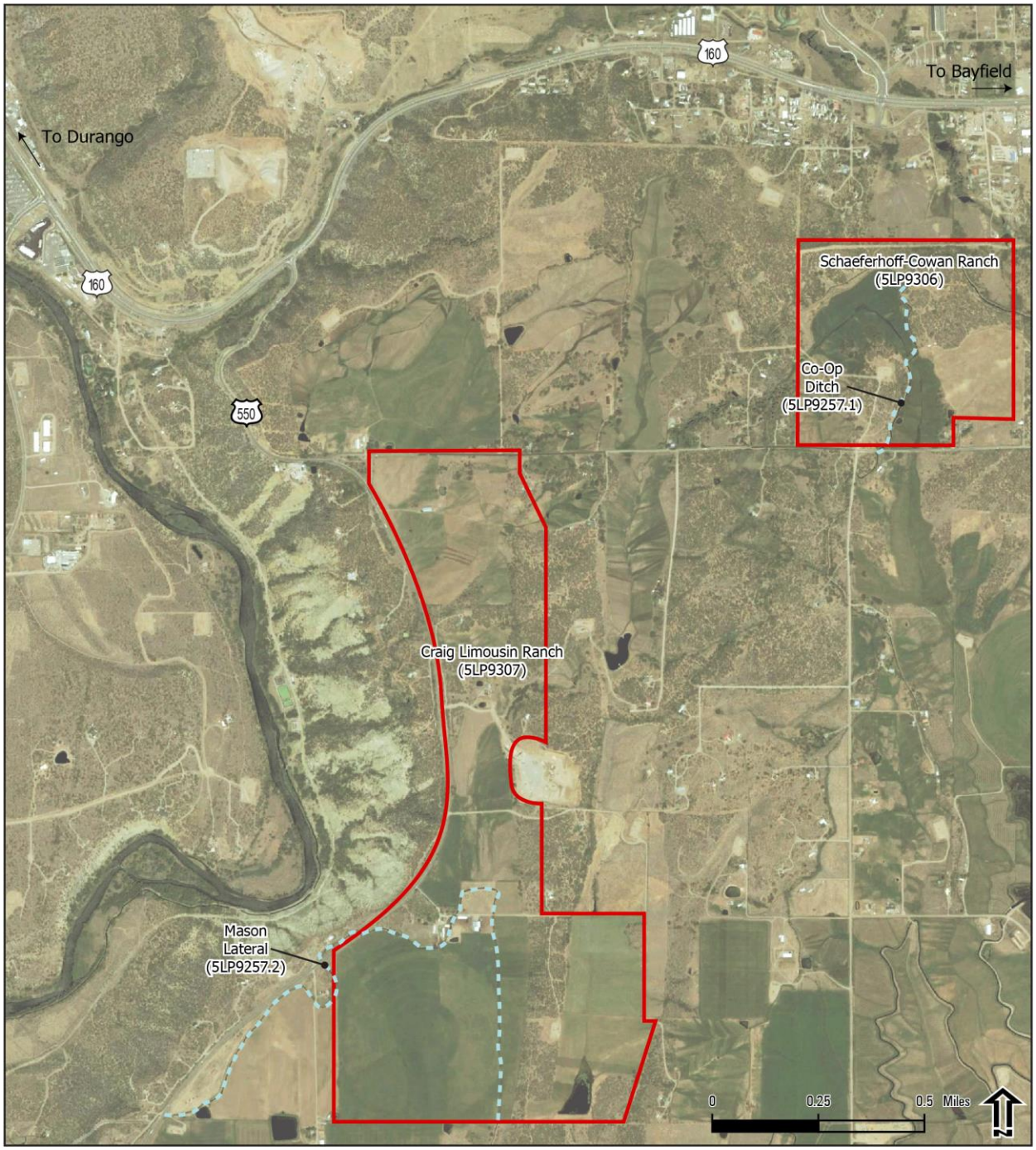
Sites 5LP9257.1 and 5LP9257.2 represent two segments of the Mason Lateral (formerly Co-op Ditch) on private lands between elevations of 6,670 feet (2,060 meters) and 6,660 feet (2,012 meters) as shown on Figure 16. The ditch runs roughly north to south along the western edge of a small valley south of the northwestern edge of Florida Mesa. The ditch passes along the eastern edge of a piñon and juniper forest with a variety of grasses growing along its length and willow growing along its banks.

Site 5LP9257.1 is a 1,295-foot-long (395-meters) segment of the Mason Lateral (formerly Co-op Ditch) that extends through the historic Craig Limousin Ranch (Site RLP9307). The segment begins at CR 220 on its southern end and continues north to a pronounced bend in the ditch. The ditch is an unlined, earthen ditch with sloping walls and an overall U-shaped cross section. From bank crest to bank crest, the ditch measures just under 22 feet, and from wall to wall is just over 14 feet wide. From the base of the ditch to the top of the bank it is just under 4 feet deep; from the base of the ditch to its high-water mark the depth is just over 4 feet. The only features recorded as part of the ditch segment are a modern culvert with concrete headwalls, which serve as an access route over the ditch, and an additional modern culvert that passes under the county road.

Also recorded as part of the Mason Lateral (formerly Co-op Ditch) in this section was a narrow, shallow linear depression that parallels the length of the recorded segment of the ditch on its west side. The linear depression appears to be another smaller ditch that is no longer in use. The abandoned ditch continues south of CR 220 and is far more visible as it continues south of the road.

On average, the abandoned ditch is 4 feet to 6 feet wide and approximately 5 inches deep. It is suspected that the abandoned ditch represents an informal, secondary irrigation ditch that once carried irrigation water southwestward from the Mason Lateral (formerly Co-op Ditch).

Figure 16. Mason Lateral (formerly Co-op Ditch) Locations



The historic research for the Mason Lateral (formerly Co-op Ditch) was completed at the La Plata County Courthouse and through water rights data obtained from the Colorado Division of Water Resources website. Additional research was carried out through an oral interview with the Mason Lateral (formerly Co-op Ditch) rider, Charlie McCoy, who also provided historic documents concerning the ditch.

Segment 5LP9257.2 is a 7,984-foot-long segment of the Mason Lateral (formerly Co-op Ditch) that extends through the historic Schaeferhoff-Cowan Ranch (RLP9306). The segment enters the Craig Limousin Ranch at its southeast boundary and flows north along the base of a low ridge on the eastern edge of the ranch's hay fields. As it flows north, the ditch enters the livestock corrals on the eastern extent of the ranch complex before making a sharp turn west and again south, passing next to the barn. Once the ditch exits the ranch complex, it follows along the north end of the hay fields and passes under US 550 at the west boundary of the ranch. On the west side of the highway, the ditch parallels the highway, crossing it again as it follows the western contour of Florida Mesa. On average, the width of the ditch is 6 feet, but it increases to a width of nearly 10 feet to 12 feet in the livestock corrals. The depth varies from just over 1 foot to nearly 2.5 feet in some places. Four galvanized culverts and one headgate were also noted along the ditch. Two of the culverts were encountered at points where the ditch crosses under the highway. The remaining two culverts were on the Craig Limousin Ranch crossing under a gravel road. The single headgate was also on the Craig Limousin Ranch. The culverts and the headgate appear to be modern.

The Mason Lateral (formerly Co-op Ditch) was constructed by the Florida Co-operative Ditch Company after its incorporation in October 1910. The purpose of the company's formation was to enlarge the Florida Farmers Ditch and build the Mason Lateral (formerly Co-op Ditch) south from the end of the Florida Farmers Ditch (1912 Certificate of Incorporation for the Florida Co-operative Ditch Company, on file at the Florida Cooperative Ditch Company). Based on the Colorado Division of Water Resources water rights data, a substantial increase in the volume of water passing through the Florida Farmers Ditch occurred in November 1910, suggesting that the construction of the Mason Lateral (formerly Co-op Ditch) had been completed by that time. Research performed on the Bureau of Land Management General Land Office Web site suggests that ditch may have been constructed to provide water to several Desert Land Entries that were being patented south of the terminus of the Florida Farmers Ditch on the interior portion of Florida Mesa about 1910. Desert Land Entries were prompted by the Desert Land Act passed by Congress in 1877. The intent of the act was to promote the development of arid and semiarid public lands. Under the act, individuals were allowed to apply for large tracts of land with a promise to irrigate and

cultivate the lands within a three year period. Once proof of irrigation was provided, the individual could purchase the land at a nominal cost per acre.

It also appears, based on the water rights data, that a second substantial increase to the water volume occurred in June 1946. This increase might coincide with the enlargement of the Mason Lateral (formerly Co-op Ditch) as it is currently built.

The Mason Lateral (formerly Co-op Ditch) is significant under NRHP Criterion A for its role in providing irrigation water to lands under the Desert Land Act and for its association with the settlement and irrigation of marginal lands on Florida Mesa. It is also significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction.

6.0 Archaeological Sites

Note: Because of the sensitive nature of archaeological sites eligible for or listed on the NRHP and the possibility of artifact looting, their locations are exempt from the Freedom of Information Act and therefore are excluded from this document.

Numerous archaeological sites are located in the APE. Information about these sites is included in this evaluation because they were evaluated for their possible Section 4(f) status. The first step in determining their possible Section 4(f) status was to evaluate their eligibility for the NRHP. Eligible sites are listed in Table 2, Table 3, and Table 4. The sites identified in Table 4 include some of those identified in the SEAS 2008 Report that fall within the proposed alignments being considered under the Section 4(f) evaluation. Data for the RGM6 (Preferred) Alternative relied on previous inventories conducted for the 2006 US 160 EIS and the SEAS Report. Data for the Revised F Modified Alternative were derived from field inventories conducted for the 2006 US 160 EIS and additional supplemental studies. Archaeological resources are included in this evaluation and provide information relative to Section 10.0 (Least Overall Harm Analysis for Alternatives Considered in the Section 4(f) Evaluation).

Table 2. Previously Recorded Sites in Close Proximity to the Survey Corridor

Site No.	Site Type	Cultural Affiliation	NRHP Status
5LP6670	Prehistoric Artifact Scatter/ Historic Sweat Lodge	Basketmaker III/Pueblo I/ Historic Native American	Officially Eligible
5LP6671*	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Site form indicated Officially Not Eligible, Compass database indicates Officially Eligible
5LP6673*	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible

*Sites within the Eastern Realignment Alternative APE and reevaluated during the 2012 SEIS.

Table 3. NRHP-Eligible Archaeological Sites Within the Eastern Realignment Alternative Project Area

Site No.	Temporary Site No.	Site Type	Cultural Affiliation	NRHP Status
5LP6665	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP6671	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP6673	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9236	AAC-1062	Open Camp	Pueblo II	Officially Eligible
5LP9241	AAC-557	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9242	AAC-556	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9244	AAC-4000	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Prehistoric Officially Eligible/Historic Not Eligible
5LP9245	AAC-500	Prehistoric Artifact Scatter	Ancestral Puebloan	Officially Eligible

Table 4. NRHP-Eligible Archaeological Sites Within the Western Portion of the Webb Ranch Complex

Site No.	Site Type	Cultural Affiliation	NRHP Status
Revised F Modified Alternative			
5LP9308	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9309	Prehistoric Habitation/Historic Artifact Scatter	Pueblo I/Pueblo II/Historic	Officially Eligible (prehistoric component only)
5LP9581	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9582	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9583	Prehistoric Artifact Scatter	Pueblo I	Officially Eligible
5LP9584	Prehistoric Habitation/Historic Habitation	Basketmaker III/Pueblo I/Historic	Officially Eligible
Revised G Modified 6 (Preferred) Alternative			
5LP2223	Prehistoric Artifact Scatter/Habitation	Basketmaker III/Pueblo I	Officially Eligible (2000)
5LP9587	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9588	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9589	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9590	Prehistoric Artifact Scatter/Habitation	Basketmaker III/Pueblo I/Pueblo II	Officially Eligible

The last step in determining the archaeological sites' possible Section 4(f) status is to identify their value or importance for preservation in place. The archaeological sites listed in Table 2, Table 3, and Table 4 are not considered Section 4(f) properties because FHWA has determined that their importance is chiefly because of what can be learned

by data recovery, and they have minimal value for preservation in place. The SHPO was notified of this determination and they did not object. Therefore, these sites fit within the category of an exception to Section 4(f) protection, as defined in 23 CFR 774.13(b)(1).

7.0 Avoidance Alternatives Analysis

The six Section 4(f) properties illustrated on Figure 2 could be used by the alternatives described in Section 4.0. These Section 4(f) properties are described in more detail in Section 5.0. The intent of Section 4(f) is to avoid use of these properties unless there is no feasible and prudent alternative to the use of the land. Therefore, the first step is to determine whether there are feasible and prudent alternatives that avoid these properties. According to 23 CFR 774.17, an alternative is not feasible if it cannot be constructed as a matter of sound engineering judgment. An alternative is not prudent if:

1. It compromises the project to a degree that it is unreasonable to proceed with the project in light of the stated purpose and need.
2. It results in unacceptable safety or operational problems.
3. After reasonable mitigation it still causes:
   a. Severe social, economic, or environmental impacts.
   b. Severe disruption to established communities.
   c. Severe disproportionate impacts to minority or low income populations.
   d. Severe impacts to environmental resources protected under other federal statutes.
4. It results in additional construction, maintenance, or operational costs of an extraordinary magnitude.
5. It causes other unique problems or unusual factors.
6. It involves multiple factors (listed above) that while individually minor, collectively cause unique problems or impacts of extraordinary magnitude.

The avoidance alternatives in this evaluation passed the alternatives screening in the 2006 US 160 EIS and are being analyzed as part of this Section 4(f) reevaluation. In the 2006 US 160 EIS, several screening levels were used to arrive at the advanced alternatives including a Corridor Screening level, a Feasibility Alternatives Screening level and a Preliminary Alternatives Screening level. The criteria used to screen these alternatives are documented in Chapter 2 of the 2006 US 160 EIS. Alternatives in these screening levels were evaluated for whether they avoid the Section 4(f) properties in the

vicinity of the US 550 and US 160 connection and if they are prudent and feasible. In addition, the advanced alternatives in the 2006 US 160 EIS were evaluated for whether they avoid Section 4(f) properties in the vicinity of the US 550 and US 160 connection and whether they are prudent and feasible. Two alternatives developed to avoid the Webb Ranch (the Western Realignment Alternative and the Eastern Realignment Alternative) are considered in this evaluation; as is Alternative R5, a new design variation for the on-alignment alternatives. The Preferred Alternative has also been refined for this evaluation and is called the RGM6 Alternative. A discussion of avoidance alternatives and whether they are prudent and feasible is provided below.

7.1 Corridor Avoidance Alternatives

This section describes corridor alternatives that avoid the use of the Section 4(f) properties identified in this evaluation. None of these alternatives are feasible and prudent avoidance alternatives, as described below.

Alternatives that avoid the Section 4(f) properties in the vicinity of the US 550 and US 160 connection corridor include the No Action Alternative, Transportation System Management and Transportation Demand Management Alternatives, and a Western Corridor Alignment shift. These are the same alternatives as those considered in the 2006 US 160 EIS except that alignment shifts for this evaluation focus on shifting the US 550 connection to the west instead of the US 160 north or south alignment shift. A west shift of US 550 is evaluated because it is the alignment of US 550 that could avoid a use of the Section 4(f) properties near the connection with US 160.

7.1.1 No Action Alternative

The No Action Alternative avoids use of all six Section 4(f) properties. The No Action Alternative assumes completion of the US 160 project as defined in the 2006 US 160 ROD with the exception of the connection of US 550 to US 160. The Grandview Interchange addresses development along US 160 without the connection of US 550. The No Action Alternative does not address the capacity or safety components of the project purpose and need as it relates to the connection to US 550. US 550 remains on its current alignment where poor geometry, low design speeds, and two-lane capacity on a north facing steep grade present capacity and safety issues. This alternative is not prudent.

7.1.2 Transportation System Management Alternative

The 2006 US 160 EIS identified Transportation System Management (TSM) strategies that would minimize the capital investment along US 160 by implementation of strategies to smooth traffic flow and make efficient use of existing transportation facilities, such as signal coordination, intersection improvements, and access control.

Intersection improvements that were considered in the Grandview Section included improvements at CR 220, US 550, CR 232, CR 233, and SH 172/CR 234. At these intersections, minor improvements were considered, such as right or left turn lanes, signalization, and side road approach reconstruction. Other intersection improvements assumed grade-separated interchanges.

Access control strategies were developed, including constructing access or frontage roads parallel to US 160; regulating the location, spacing, and design of driveways; limiting the number of driveways per lot; locating driveways away from intersections; connecting parking lots and consolidating driveways; providing residential access through neighborhood streets; increasing minimum lot frontage on major streets; promoting a connected street system; and encouraging internal access to parcels not located on major streets.

Future projected traffic volumes on US 160 warrant a four-lane roadway to achieve an acceptable level of flow. Therefore, capacity improvements along US 160 are required even with the most optimistic assumptions for trip diversion achieved through TSM implementation.

These strategies avoid use of the six Section 4(f) properties addressed in this evaluation. These strategies provide modest improvements in traffic flow and safety along the US 160 corridor. Additional capacity improvements would still be needed to meet the purpose and need for the project. They do not address the purpose and need requirements of increasing capacity nor do they address the primary safety issues of narrow shoulders, insufficient clear zones, poor sight distance, or steep grades. Intersection improvements and access control features have been incorporated into the Feasibility and Preliminary Alternatives discussion in Section 5.7.2 and the Alternatives Considered discussion in Section 7.3, as appropriate. By themselves, TSM strategies are not prudent because they do not meet the project purpose and need.

7.1.3 Transportation Demand Management Alternative

The 2006 US 160 EIS identified several Transportation Demand Management (TDM) strategies, intended to reduce peak hour demand on US 160 by altering the time or means by which trips occur. These strategies include promoting transit and rideshare programs, creating multimodal routes, encouraging staggered work hours, and creating high occupancy vehicle (HOV) lanes.

Transit improvements included adding or improving bus service, providing bus stop amenities, providing park-n-ride facilities, and offering reduced rate bus passes. Bus

service in the corridor is provided by the City of Durango and the Southern Ute Community Action Program.

Rideshare programs that were evaluated include promoting car and vanpooling through a joint City of Durango/La Plata County marketing program, involving major local employers in a ridesharing program, establishing park-n-ride lots at key locations, establishing computer kiosks at park-n-ride lots for individuals to seek carpooling matches, and encouraging employers to establish an employer-based and -financed ridesharing program.

Multimodal routes are paved paths that can be used by a variety of nonmotorized users. They may be constructed as separate facilities or as part of the US 160 reconstruction.

Staggered work hours reduce peak hour demand by distributing the vehicles over a longer time period. Incentives, such as tax benefits and reduced overhead costs for equipment, office space, and parking, could be provided to area employers.

HOV lanes increase vehicle occupancy by requiring at least two people in a vehicle and thereby reducing the number of vehicles on US 160. The lanes could be constructed in the median or outside the existing lanes on US 160.

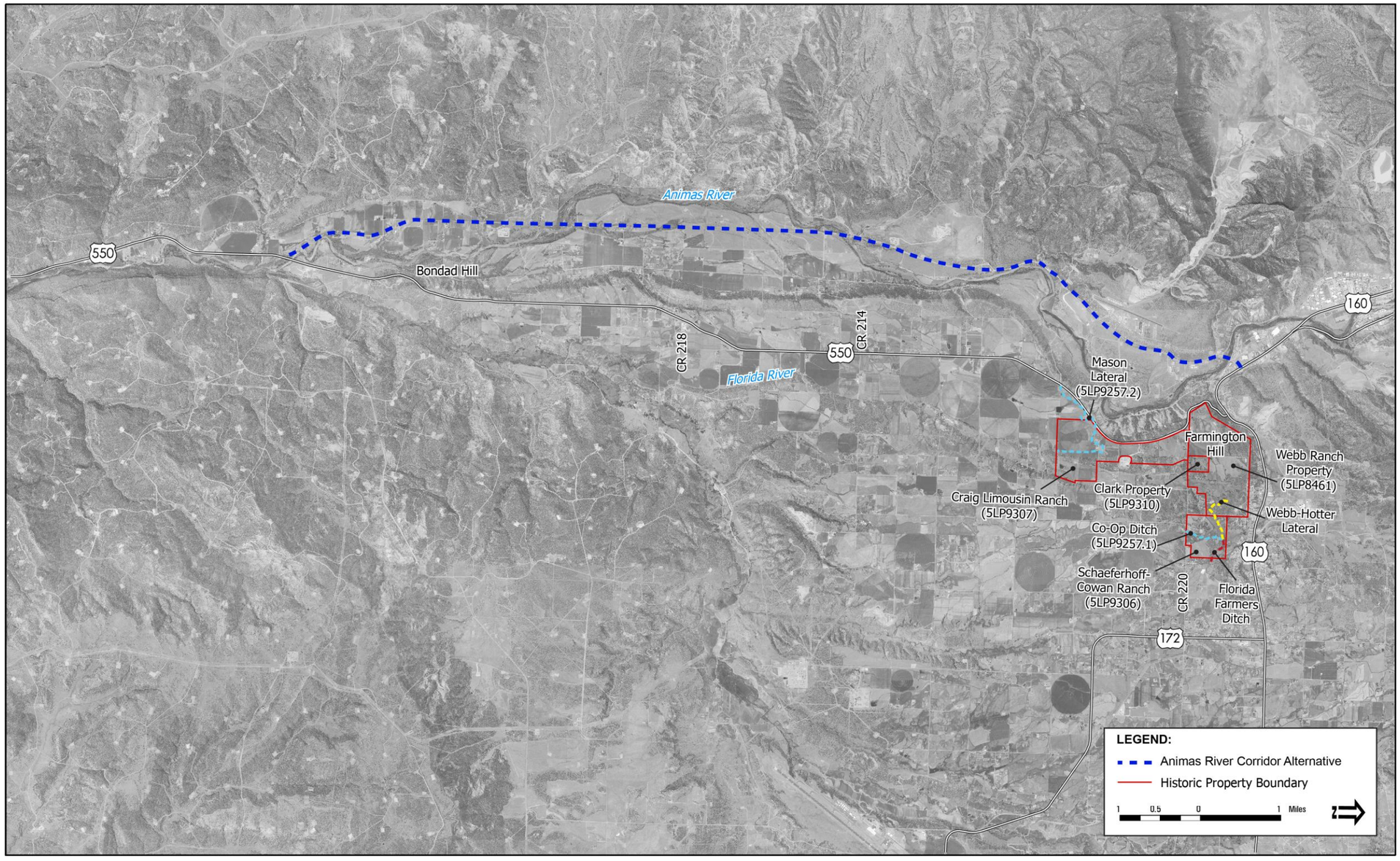
Future projected traffic volumes on US 160 warrant a four-lane roadway to achieve an acceptable level of flow. Therefore, capacity improvements along US 160 are required even with the most optimistic assumptions for trip diversion achieved through TDM implementation.

These TDM strategies avoid use of the six Section 4(f) properties addressed in this evaluation. They do not address the purpose and need requirements of increasing capacity nor do they address the primary safety issues of narrow shoulders, insufficient clear zones, poor sight distance, or steep grades. They are also difficult to implement to achieve consistent results. By themselves, TDM strategies are not prudent because they do not meet the project purpose and need.

7.1.4 Alignment Shift of the US 550 Corridor

The six Section 4(f) properties in the vicinity of the US 550 and US 160 connection could be avoided if the US 550 corridor were located to the west of these properties. An entire corridor shift of US 550 to the west was considered in the *US 550 Environmental Assessment* (CDOT, 2005). This corridor shift is illustrated on Figure 17. It is

Figure 17. Animas River Corridor Alternative



approximately 13 miles long, is much more costly than widening the existing US 550 ($125 million compared to $90 million), and uses another likely historic property, the abandoned Farmington Branch of the Denver & Rio Grande Western railroad grade. (For more detail about the likely eligibility of this property, see February 24, 2011, memo from CDOT in Appendix B of the 2012 SFEIS.) This alternative, the Animas River Corridor, does not meet the purpose and need because the existing US 550 roadway still needs to be maintained to provide access to existing properties; therefore, the safety and access issues remain.

In addition, this alternative requires three crossings of the Animas River, and has much greater impacts to wetlands, habitat for the southwestern willow flycatcher (an endangered species), other cultural resources, and wildlife habitat compared to keeping the alignment along the existing US 550 corridor (URS, 2002). It was eliminated during the US 550 EA process. Since the decision to widen US 550 on the existing alignment, property acquisition, corridor preservation, and US 550 widening construction have been underway. Because of these multiple factors, this is not a prudent avoidance alternative.

7.2 Feasibility and Preliminary Alternatives

Feasibility Alternatives is a term used to denote alternatives that were identified during the 1999 Feasibility Study and were defined and evaluated as Feasibility Alternatives during the NEPA process for the 2006 US 160 EIS. The project corridor was divided into 12 numbered sections to address the wide range of conditions along US 160. Section 1 includes the US 550 alignment north of CR 220 and the connection of US 550 to US 160. Six Feasibility Alternatives were considered for the US 550 alignment and connection to US 160: 1A, 1B, 1C, 1D, 1F and 1G. These alternatives cross the Webb Ranch at various locations and connect to US 160 at or east of the current US 160/US 550 (south) intersection. The Feasibility Alternatives are not complete corridor avoidance alternatives because they use portions of the Webb Ranch, Craig Limousin Ranch, and Mason Lateral (formerly Co-op Ditch). Except for 1F, these alternatives avoid use of the Schaeferhoff-Cowan Ranch. Because these alternatives are an avoidance alternative for the Schaeferhoff-Cowan Ranch, they are evaluated further to determine if they are feasible and prudent.

Feasibility Alternatives 1A and 1B remain on the existing US 550 alignment; 1A is an interchange and 1B is an intersection. These alternatives were not advanced for detailed consideration in the 2006 US 160 EIS and are not complete corridor avoidance alternatives. Additional design information for these alternatives, however, was submitted by Mr. Thomas McNeill on behalf of the Webb Ranch owners in an October

28, 2008, letter to FHWA. Because of this new information, these alternatives were retained for further consideration and included as the Revised Preliminary Alternative A and the At Grade Intersection Alternative described in Section 4.3.

Feasibility Alternatives 1C, 1D, and 1F do not meet the safety requirements of the purpose and need because they place the US 550 and US 160 interchange in a location that conflicts with the CR 233 (Three Springs) Interchange. Conflicting vehicle movements from the US 550 eastbound ramp, the Three Springs Interchange, and traffic exiting to the Grandview Area would create an unsafe condition. These Feasibility Alternatives are not prudent alternatives because they do not meet the capacity or safety requirements of the project purpose and need.

Alternatives 1F and 1G were modified with better approach grades and a safer alignment, and to minimize impacts. These modifications allowed Alternative 1F to meet the safety requirement of the purpose and need. The alternatives 1F and 1G were carried forward in the 2006 US 160 EIS as the G Modified and F Modified Alternatives and included in the preliminary and advanced alternatives for the Grandview Section.

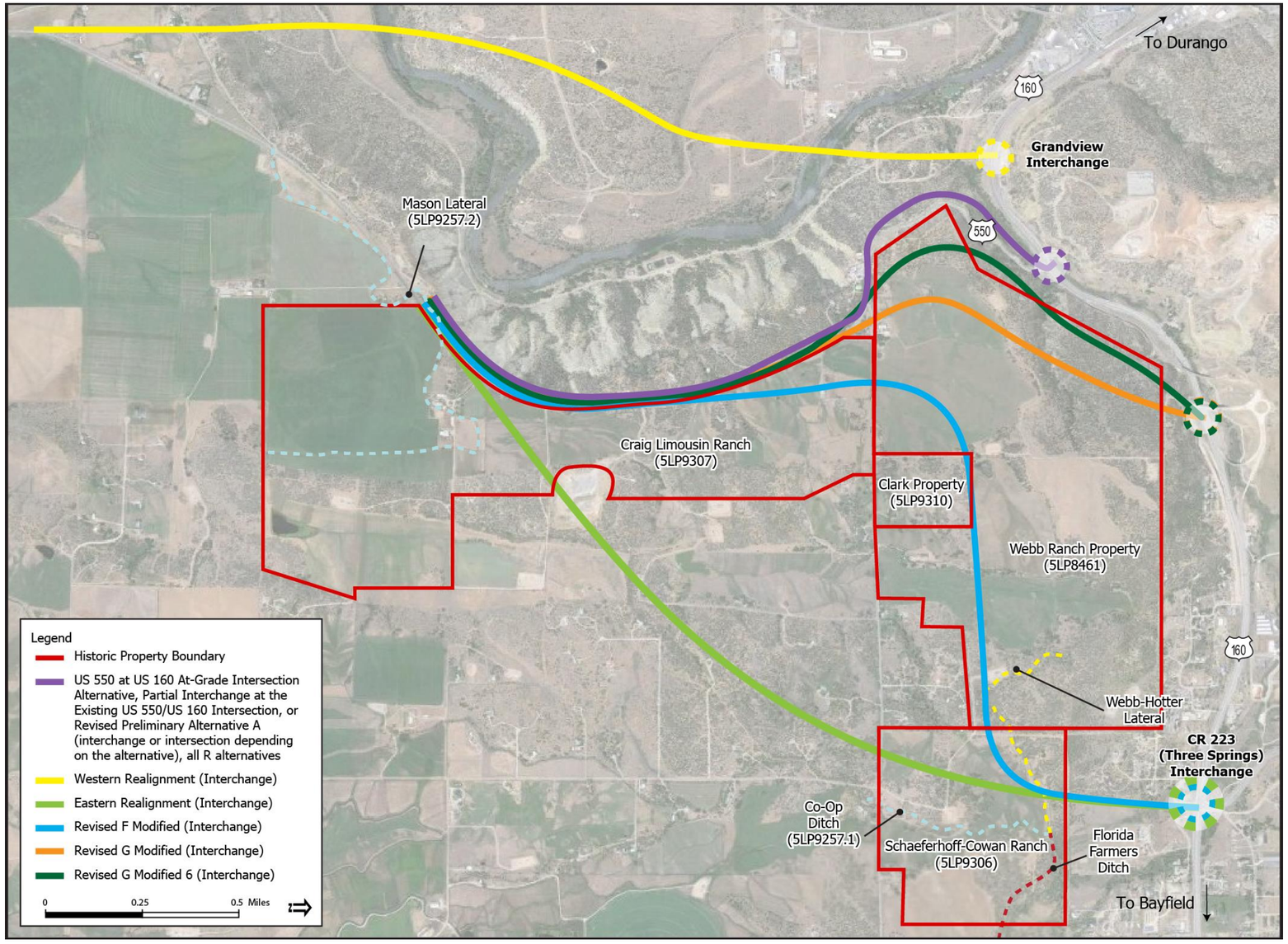
7.3 Alternatives Considered

Section 4.0 describes the project alternatives considered in the 2006 US 160 EIS, as well as those that have been developed specifically to avoid or minimize the use of Section 4(f) properties in the vicinity of the US 550 and US 160 connection. The alternatives advanced in the 2006 US 160 EIS include the US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative, Revised Preliminary Alternative A, Revised G Modified (Preferred) Alternative, and the Revised F Modified Alternative. In addition, various design variations for Alternative R have been developed and evaluated since the SDEIS. In 2013 and 2014 Revised G Modified (Preferred) Alternative was refined and is now called RGM6 (Preferred) Alternative.

Alternatives developed for the resources identified in vicinity of the US 550/US 160 connection include the Eastern Realignment Alternative and the Western Realignment Alternative. These are all illustrated on Figure 18. This section evaluates each of these alternatives to assess whether they are prudent and feasible.

None of these alternatives avoid all six Section 4(f) properties.

Figure 18. Alignment Alternatives



7.3.1 US 550 at US 160 At-Grade Intersection Alternative

This alternative includes an at-grade intersection at the existing location of US 550 to US 160. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses for the at-grade intersection alternatives, including design variations T.1.4, T.1.6, T.4.4, indicate that the design variations fail to meet the capacity requirements for the project purpose and need (see Appendix D of the 2012 SFEIS). This alternative is expected to operate at Level of Service (LOS) D during the morning peak period and LOS E during the evening peak period in 2030, which does not meet the requirement of a LOS D or better (see Appendix D of the 2012 SFEIS). For safety, the alternative includes several design variations with different horizontal and vertical grades. The upper curve is the curve that creates the safety issues. All design variations, including the design with the flattest upper curve (T.4.4 with a 1,000-foot horizontal radius and a four percent vertical grade), provide a 35 mph design (see Appendix F of the 2012 SFEIS). The design speed for US 550 south of this location is 70 mph and is consistent with the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004). The large reduction in design speed from 70 mph to either 30 mph or 35 mph creates an unsafe condition and is unacceptable for the design of roadways (AAHSTO, 2004). In addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades, and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter. All of these safety problems will continue to worsen as traffic volumes grow. This alternative does not sufficiently improve design and safety deficiencies to existing standards and, therefore, does not meet the safety requirement of purpose and need. Access control is included in the alternative and it, therefore, meets the access requirement of purpose and need.

This alternative has challenging geotechnical issues with known subsurface water problems (springs) that create drainage and slope stability problems. This alignment requires the construction of retaining walls approximately 85 feet tall because of topography. Constructing the walls in these difficult conditions is technically challenging. It also has logistical issues related to constructability. Because of the existing narrow roadway and technical challenges associated with maintaining traffic while constructing the new roadway on such a steep slope, temporary construction detours are required. Traffic would be rerouted from US 550 onto CR 220 for a period of two years (see Figure 2-9 in Chapter 2 of the 2012 SFEIS). This forces Durango-bound traffic, including emergency service providers, to travel nearly 7 miles out of direction for each trip into or out of Durango. CR 220 is a narrow county road with poor sight

distance, no shoulders, and numerous access points for residential driveways. The two-year detour results in additional costs to drivers, access restrictions and disruptions to the residents and farming operations along CR 220, delays to the provision of emergency services, notable congestion at the CR 233 (Three Springs) Interchange, and safety problems along CR 220, which was not designed to carry large amounts of traffic. CR 220 could be improved to more easily handle this additional traffic, but such improvements would be costly and would result in Section 4(f) uses to the Webb Ranch, the Clark Property, the Craig Limousin Ranch, and the Schaeferhoff-Cowan Ranch. Additional details are found in Appendix F of the 2012 SFEIS.

This alternative is not expected to result in costs substantially greater than other alternatives.

Because of unacceptable safety and operational problems and inability to meet the project purpose and need, these at-grade intersection alternatives are not prudent.

7.3.2 Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative

This alternative includes a partial interchange that connects US 550 to US 160 at the existing intersection location. Design variations T.2.4, T.2.6, T.3.4, and T.3.6 are included in this analysis. All these design variations have a tight upper curve with a 700-foot radius and either a four or six percent grade. This alternative is evaluated first for whether it meets capacity, safety, and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix D of the 2012 SFEIS). Overall, this intersection alternative is expected to operate at LOS A during the morning peak period and LOS A during the evening peak period in 2030, which meets the requirement of a LOS D or better. For safety, as discussed in Appendix F of the 2012 SFEIS, this on-alignment alternative with a tight upper curve also requires a 35 mph reduction in speed in a short distance and has the same issues as described for the US 550 at US 160 At-Grade Intersection Alternative. US 550 remains near its current alignment where, in addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades, and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter. Therefore, this alternative does not meet the safety requirements for purpose and need. Access control is included in the alternative and it, therefore, meets the access requirement of purpose and need.

This alternative has the same geotechnical problems and constructability issues described for the US 550 at US 160 At-Grade Intersection Alternative. Because it is on

the same alignment, it has subsurface water with drainage and slope stability issues. It also requires temporary detours during construction onto CR 220, as described for the US 550 at US 160 At-Grade Intersection Alternative. Additional details are found in Appendix F of the 2012 SFEIS.

Additionally, this alternative is expected to cost $230,790,000. This compares to $91,000,000 for the RGM6 (Preferred) Alternative, $78,400,000 for the Revised F Modified Alternative, and $93,106,000 for the Eastern Realignment Alternative (see Appendix F of the 2012 SFEIS and the 2015 Independent Alternatives Analysis). The Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative is more expensive than these alternatives because it requires building a new interchange, whereas the RGM6 (Preferred), Revised F Modified, and the Eastern Realignment Alternatives connect to interchanges already planned or built in the Grandview Area. In addition, it requires upgrading and modifying CR 220 for use as a detour, which is not required for the RGM6 (Preferred), Revised F Modified, and the Eastern Realignment Alternatives. Other elements that increase costs for the Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative include large retaining walls of approximately 85 feet and the need to maintain access to businesses along US 160 near MP 88. For these reasons, the estimated cost for this alternative is about three times the cost of the least expensive alternative, Revised F Modified Alternative. Cost is, therefore, a factor in why this alternative is not reasonable. Additional detail on the cost estimate for this alternative is included in Appendix F of the 2012 SFEIS.

In summary, this alternative does not meet the safety requirements for purpose and need. It has substantially higher costs compared to other alternatives. Multiple factors (unacceptable safety problems, disruption to established communities because of the access difficulties along CR 220 during construction, unique and challenging geotechnical issues with springs and unstable slopes) cumulatively cause unique problems and impacts of extraordinary magnitude. For these reasons, the Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative is not prudent.

7.3.3 Revised Preliminary Alternative A

Revised Preliminary Alternative A has a grade-separated trumpet interchange at the existing US 550 and US 160 intersection location. This alternative is not a complete corridor avoidance alternative because it uses portions of the Webb Ranch, Craig Limousin Ranch, and the Mason Lateral (formerly Co-op Ditch). It is, however, an avoidance alternative for Schaeferhoff-Cowan Ranch and Clark property. The reasons this alternative is not prudent are identical to the Partial Interchange at the Existing

US 550 and US 160 (South) Intersection Alternative because they are both on the same alignment. Therefore, Revised Preliminary Alternative A is not prudent.

7.3.4 Alternative R

Alternative R includes modification of the existing signalized intersection at US 160 and US 550 to a hybrid diamond interchange. Four design variations were initially developed. This alternative is not a complete avoidance alternative because it uses portions of the Webb Ranch, the Craig Limousin Ranch and the Mason Lateral (formerly Co-op Ditch). It is an avoidance alternative for Schaeferhoff-Cowan Ranch and the Clark property. The reasons this alternative is not prudent are similar to the Partial Interchange at the Existing US 550 and US 160 (South) Intersection Alternative because they both follow the existing alignment to a certain degree and cannot achieve acceptable design speeds to meet safety requirements. Other factors include unique and challenging geotechnical issues with springs and unstable slopes. For these reasons, Revised Preliminary Alternative R is not prudent.

Alternative R5 is also not a complete avoidance alternative because it uses portions of the Webb Ranch, the Craig Limousin Ranch, and the Mason Lateral (formerly Co-op Ditch). It is an avoidance alternative for Schaeferhoff-Cowan Ranch and the Clark property.

Alternative R5 meets the safety elements of purpose and need to a lesser extent than the other feasible and prudent alternatives. The new US 550 alignment along the face of Florida Mesa precludes providing any grade-separated, large animal wildlife crossings. (Existing crash statistics indicate that wild animal crashes make up 36 percent of the crash totals along US 550—by far the largest percentage. The next largest percentage is 17 percent for overturning.) The means that animals still need to cross US 550 to travel between the top of the mesa and the Animas River or Wilson Gulch.

Other safety problems with Alternative R5 are:

- The eastbound off-ramp at the new US 550/US 160 interchange is steep (at 6.33 percent) and difficult to climb in icy conditions.
- The US 550 mainline is steep (at 5 percent for almost 1/2 mile) and difficult to climb in icy conditions.
- Another interchange ramp at US 550/US 160 has a sharp curve with a low design speed. This curve is on a bridge, so it is very susceptible to icing.

- The US 550 mainline has a sharp curve and a bridge immediately before a traffic signal. The curve makes it difficult to see the signal. The bridge could also become icy, making it difficult to stop at the signal.

Alternative R5 has maintenance and operational issues. Its location, cut into the side of the Farmington Hill hillside, running along the north-facing slope, results in less direct sunlight so is prone to icing. To fit an upgraded road into the hillside, extensive cut and fill and significant retaining walls are required along both sides of US 550. The retaining walls are as high as 90 feet (9 stories tall) in some locations. The tall retaining walls require extensive subsurface drainage systems to allow drainage from the ephemeral seeps and springs in the hillside. The steep hillside above US 550 is composed of decomposed shale overlain by sandy cobbles and boulders, which are prone to falling onto the roadway surface or creating erosion problems. All of these issues combine to present substantial ongoing maintenance and operational challenges.

Alternative R5 has twice the wetland impact of the RGM6 (Preferred) Alternative: 1.29 acre of wetland impact compared to 0.69 acre with the RGM6 (Preferred) Alternative. The wetlands that are impacted are high-functioning wetlands providing fish habitat and valuable riparian habitat, compared to the low-quality wetlands impacted by the RGM6 (Preferred) Alternative.

Alternative R5 results in 0.5 acre of impact to Southwestern willow flycatcher nesting habitat. The Southwestern willow flycatcher is an endangered species. Alternative R5 also results in 0.74 acre of impact to the New Mexico meadow jumping mouse habitat, a proposed endangered species.

Alternative R5 results in acquisition, demolition, and relocation of three residences and one business in the Eagle Block development area. This acquisition encompasses this entire developed area, including the developable portion of the Piccoli property on top of the mesa. The RGM6 (Preferred) Alternative requires no relocations.

Alternative R5 is the most costly of the alternatives considered. Its cost is estimated at over $184 million compared to approximately $91 million for the RGM6 (Preferred) Alternative, $78.4 million for the Revised F Modified Alternative, and $92.8 million for the Eastern Realignment Alternative. Alternative R5 includes extensive retaining walls and three bridges for the on- and off- ramps at US 160/US 550. There is a large amount of excavation and fill associated with alignment cuts through Florida Mesa, where there is an elevation change of approximately 200 feet from the top of the mesa to the

alignment near US 160. This compares to an elevation drop of approximately 90 feet for the RGM6 (Preferred) Alternative.

The Alternative R5 alignment follows the existing US 550 alignment but has a substantially different vertical profile. This makes building the roadway while maintaining traffic on existing US 550 very difficult, expensive, and risky. A complex construction phasing plan is required, including four different phases, each presenting unique challenges and safety concerns. Constructing the new roadway on a steep slope with erodible soils and drainage and slope stability problems, while maintaining traffic on the very narrow existing road, is technically quite difficult. Because the work is split into four phases spanning several construction seasons, multiple mobilizations of specialized equipment would be needed. Multiple risks and unique challenges are associated with this construction phasing plan.

Alternative R5 is not considered prudent because of these multiple safety, maintenance, operational, construction cost, environmental, and community impact factors (acquisition, demolition, and relocation of three residences and one business), in addition to the unique risks associated with building the new alignment while maintaining traffic on US 550 in this extremely challenging topographic environment.

Appendix A of this document includes an August 5, 2014, letter from FHWA concurring with this conclusion.

7.3.5 RGM6 (Preferred) Alternative

The RGM6 (Preferred) Alternative connects US 550 to US 160 via the Grandview Interchange. The RGM6 (Preferred) Alternative is not a corridor avoidance alternative because it uses portions of the Webb Ranch, Craig Limousin Ranch, and Mason Lateral (formerly Co-op Ditch). This alternative, however, avoids use of the Schaeferhoff-Cowan Ranch and the Clark Property. This alternative has been revised several times to minimize impacts. During the 2006 US 160 EIS process, the alternative was modified to follow the western edge of the Webb Ranch to minimize impacts to the ranch. Additionally, it was revised after completion of the 2006 US 160 ROD to avoid a gas well installed in the alignment. The modified alignment (Revised G Modified Alternative) has fewer resource impacts to wetlands, wildlife habitat, and irrigated farmlands compared to G Modified from the 2006 US 160 EIS, while managing to avoid the natural gas well. During the 2015 Independent Alternatives Analysis process, the RGM6 (Preferred) Alternative was further refined to reduce impact to the historic Webb Ranch and to irrigated farmland. This alternative is carried forward for further analysis in this evaluation.

7.3.6 Revised F Modified Alternative

The Revised F Modified Alternative connects US 550 to US 160 via the SPUI at CR 233 (Three Springs). The Revised F Modified Alternative is not a corridor avoidance alternative because it uses portions of all the Section 4(f) properties in the vicinity of the US 550 and US 160 connection. Like the G Modified Alternative, Revised F Modified Alternative also impacts a gas well on the Webb Ranch, so design adjustments to avoid the gas well were considered. The feasibility of avoiding the gas well was explored and not incorporated into this alternative because a shift to the north results in the acquisition of four additional residences, and a shift to the south requires acquisition of two additional residences. This alternative is carried forward for further analysis in this evaluation.

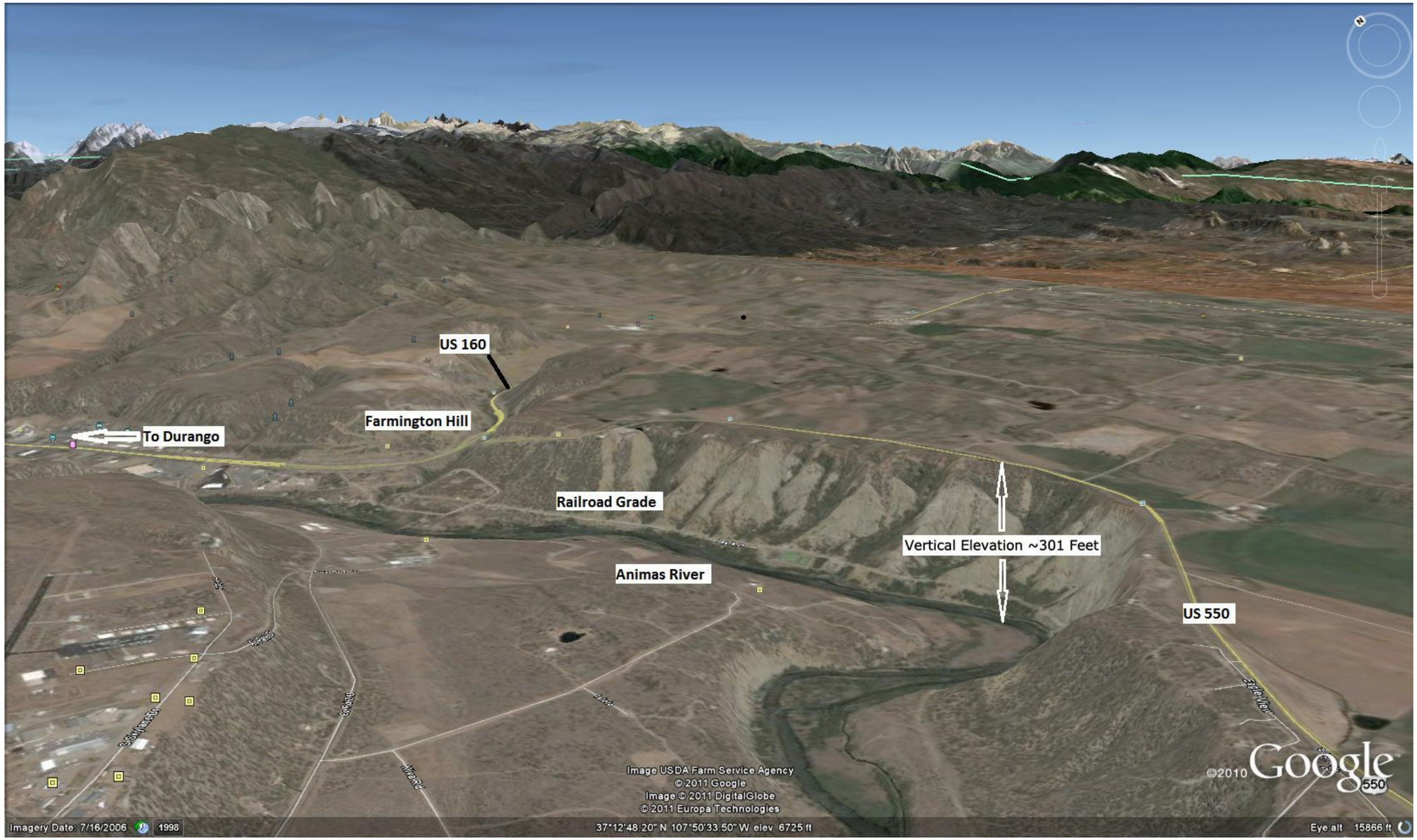
7.3.7 Eastern Realignment Alternative

The Eastern Realignment Alternative connects US 550 to US 160 via the SPUI at CR 233 (Three Springs). The Eastern Realignment Alternative is not a corridor avoidance alternative because it uses portions of the Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, the Mason Lateral (formerly Co-op Ditch), and the Webb-Hotter Lateral. This alternative does, however, diverge from US 550 south of CR 220 and avoids the Webb Ranch and Clark property. The Traffic Operations Memorandum in Appendix D of the 2012 SFEIS concludes that the Eastern Realignment Alternative meets the capacity requirements for 2030 traffic projections. This alternative is carried forward for further analysis in this evaluation.

7.3.8 Western Realignment Alternative

The Western Realignment Alternative diverges from the current US 550 at approximately MP 13.17 on the top of Florida Mesa (approximately 2 miles south of where the Eastern Realignment Alternative diverges from US 550) before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately MP 88.0, approximately 0.5 mile west of the existing US 160/US 550 (south) intersection. This alternative avoids the six Section 4(f) properties described in this evaluation, however, it is not considered to be an avoidance alternative because it uses the Farmington Branch of the Denver & Rio Grande Western Railroad. (For more detail about the likely eligibility of this property, see e-mail dated February 24, 2011, in Appendix B of the 2012 SFEIS). Figure 19 illustrates the severe topographic constraints associated with this alternative. Two new bridge crossings of the Animas River (see Figure 17) are required in addition to an interchange at the US 160 connection and an intersection or interchange at the US 550 South Connection. Two of the ramps from the interchange terminate approximately 700 feet from the existing River Road signalized intersection on US 160.

Figure 19. Florida Mesa's Severe Topographic Constraint



The US 550 connection to US 160 presents safety and operational problems that do not meet the project purpose and need (SEH, 2010, also Appendix D of the 2012 SFEIS). The proximity of the existing intersection at River Road north of the proposed interchange creates queue conflicts, congestion, and backups on the northbound-to-westbound interchange ramp. River Road is the first intersection encountered when entering Durango from the south and east where Home Depot and a large subdivision along the Animas River already contribute to traffic conflicts. The interchange ends very close (700 feet) to the River Road intersection. The addition of more conflicts in this already congested area creates unacceptable traffic and safety conditions inconsistent with the project purpose and need. A detailed explanation of traffic and safety problems associated with the Western Realignment Alternative is provided in Appendix D and Appendix F of the 2012 SFEIS (see *Year 2030 Traffic Operations Analysis for the US 550 at US 160 Section 4(f) Alternatives Memorandum;* SEH, 2010).

The Western Realignment Alternative requires a large amount of excavation and fill. This alignment cuts through the Florida Mesa where it has a drop in elevation of approximately 210 feet from the high point of the alignment on the mesa to the low point of the alignment near US 160. This compares to a drop in elevation from the high point of the alignment on the mesa to the low point of the alignment near US 160 of approximately 63 feet for the RGM6 (Preferred) Alternative and approximately 120 feet for Revised F Modified and Eastern Realignment Alternatives. The drop in elevation of approximately 210 feet for the Western Realignment Alternative occurs within less than a 0.5 mile.

AASHTO's *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004) discusses maximum grades for freeways. For a design speed of 70 mph, in rolling terrain, the maximum grade is four percent. However, in areas that are constrained by terrain, a 5 percent grade can be used (AASHTO, 2004). To achieve a grade of five percent, approximately 3,541,000 cubic yards have to be removed from Farmington Hill. This equates to approximately 236,000 truck equivalents at 15 cubic yards per truck. If it is assumed that the material is removed and placed in the fill section, and that the material could be moved at a rate of 10 truckloads per hour at 8 hours per day for a 5-day workweek, it would take 197 workdays or 9.5 months to move all this material. This compares to approximately 1,800,000 cubic yards of material that have to be removed for the RGM6 (Preferred) Alternative, 2,247,000 cubic yards of material that have to be removed for F Modified Alternative, and 2,742,000 cubic yards for the Eastern Realignment Alternative.

The Western Realignment Alternative is the most costly of all the alternatives evaluated. Its cost is estimated at $326,931,000 compared to $91,000,000 for the RGM6 (Preferred) Alternative, $78,400,000 for Revised F Modified Alternative, and $93,106,000 for the Eastern Realignment Alternative.

Based on the unacceptable safety and operational problems, construction challenges and costs described above and further supported in Appendix D and Appendix F of the 2012 SFEIS, the Western Realignment Alternative does not meet purpose and need and is not a prudent alternative.

8.0 Section 4(f) Avoidance Alternatives Summary

For the US 550 connection to US 160, there are no feasible and prudent corridor avoidance alternatives. Corridor avoidance alternatives in this location include the No Action Alternative TSM and TDM strategies, the alignment shift of the US 550 corridor (described in Section 7.1), and the Western Realignment Alternative (described in Section 7.3.8). None of these alternatives are feasible and prudent. Table 5 provides a summary of all of the alternatives that were considered and how each was evaluated against the prudent and feasible criteria.

Table 5. Summary of Prudent and Feasible Screening Criteria

Alternative	Section 4(f) Property Use	Prudent and Feasible	Explanation
No Action	No	No	Not feasible and prudent, does not meet Purpose and Need (see Section 7.1.1).
Transportation System Management and Transportation Demand Management	No	No	Not feasible and prudent; does not meet purpose and need (see Section 7.1.2 and Section 7.1.3).
Alignment Shift of the US 550 Corridor to the West	No	No	Not feasible and prudent, does not meet Purpose and Need (see Section 7.1.4).
Feasibility and Preliminary Avoidance Alternatives 1C, 1D and 1F	Yes	No	Not feasible and prudent, does not meet safety requirements of the purpose and need (see Section 0).
US 550 at US 160 At-Grade Intersections (Alternative 1B) (including T.1.4, T.1.6, and T.4.4)	Yes	No	Not feasible and prudent; does not meet capacity requirement to maintain LOS D in evening peak hour (see Appendix D memorandum of the 2012 SFEIS).
Partial interchange at the US 550 and US 160 Existing Intersection Alternative (including T.2.4, T.2.6, T.3.4, and T.3.6)	Yes	No	Unacceptable safety and operational problems due to dramatic decreases in design speeds, sharp curves and north facing slopes which are subject to icing problems in the winter. For this reason, partial interchange alternatives are not feasible and prudent (see Appendix F of the 2012 SFEIS).
Revised Preliminary Alternative A	Yes	No	Not feasible and prudent because of unacceptable safety and operational problems, community disruption

Table 5. Summary of Prudent and Feasible Screening Criteria

Alternative	Section 4(f) Property Use	Prudent and Feasible	Explanation
			along CR 220 during construction, greater wetland impacts and unusual problems with springs and unstable slopes. It has low design speeds, sharp curves, 8 percent super elevation, 4 percent vertical grades, north facing steep slopes, geotechnical issues with springs and unstable slopes, constructability and out of direction travel (see Appendix F of the 2012 SFEIS).
Alternative R	Yes	No	Unacceptable safety and operational problems due to dramatic decrease in design speeds, sharp curves and north-facing slopes, which are subject to icing problems in the winter. For these reasons, Alternative R is not feasible and prudent.
Alternative R5	Yes	No	Not prudent because of multiple safety, maintenance, operational, construction cost, environmental, and community impact factors, in addition to the unique risks associated with building the new alignment while maintaining traffic on US 550.
RGM6 (Preferred) Alternative	Yes	Yes	Feasible and prudent, but results in a use of Webb Ranch, Craig Limousin Ranch, and the Mason Lateral (formerly Co-op Ditch).
Revised F Modified Alternative	Yes	Yes	Feasible and prudent, but results in a use of Webb Ranch, Craig Limousin Ranch, the Clark Property, the Schaeferhoff-Cowan Ranch, the Webb-Hotter Lateral, and the Mason Lateral (formerly Co-op Ditch).
Eastern Realignment Alternative	Yes	Yes	Feasible and prudent, but intersects the Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, the Mason Lateral (formerly Co-op Ditch) and the Webb-Hotter Lateral (see Figure 2).
Western Realignment Alternative	No	No	Not feasible and prudent because of unacceptable safety and operational, construction challenges, and costs (see Appendix F, Western Alignment Memorandum, of the 2012 SFEIS).

Alternatives that are carried forward for further analysis under this Section 4(f) evaluation include the following:

- Eastern Realignment Alternative
- Revised F Modified Alternative
- RGM6 (Preferred) Alternative

9.0 Use of Section 4(f) Properties

As defined in 23 CFR Part 774.17, the use of a Section 4(f) property occurs when:

- Land is permanently incorporated into a transportation facility.
- There is a temporary occupancy of the land that is adverse in terms of the statute's preservation purposes.
- There is no permanent incorporation of land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features or attributes that quality the property for protection are substantially impaired. This type of use is called a constructive use.

This section describes each Section 4(f) property, the use by alternative associated with each property, and which alternatives constitute avoidance alternatives. All uses described for the Section 4(f) properties are considered to be direct uses. There are no additional temporary occupancies of land in the project area that are expected to be adverse in terms of the preservation purpose of Section 4(f). Similarly, there are no additional proximity impacts that are so severe that the attributes or features that qualify the Section 4(f) property for protection are substantially impaired. In all cases, if an alternative does not have a direct use of a particular Section 4(f) property, that alternative is located far enough away from that property so that the alternative's noise, visual, or access impacts are not severe and do not affect the features or attributes that made that property eligible for inclusion on the NRHP, thereby qualifying it for Section 4(f) protection.

Table 6 provides a summary of Section 4(f) property use by alternative.

Table 6. Direct Uses (and Section 106 Effects) of Section 4(f) Properties

Alternatives	Section 4(f) Properties: Direct Uses/Section 106 Effect Determination					
	Webb Ranch	Craig Limousin Ranch	Schaeferhoff-Cowan Ranch	Clark Property	Webb-Hotter Lateral	Mason Lateral and Co-op Ditch*
RGM6 (Preferred) Alternative	Yes/Adverse	Yes/Adverse	No	No	No	Yes/Not Adverse
Revised F Modified Alternative	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Not Adverse
Eastern Realignment Alternative	No	Yes/Adverse	Yes/Adverse	No	Yes/Adverse	Yes/Not Adverse

*The effects listed pertain to both the Mason Lateral (formerly the Co-op Ditch) south of CR 220 and the Co-op Ditch north of CR 220. All three alternatives affect the Mason Lateral (formerly the Co-op Ditch.) The Eastern Realignment Alternative is the only alternative that also affects the Co-op Ditch, which is located north of CR 220.

9.1 Description of Use, Webb Ranch (5LP6481)

Webb Ranch is used by two of the Section 4(f) alternatives.

9.1.1 RGM6 (Preferred) Alternative

This alternative enters the Webb Ranch property substantially west of (approximately 1,000 feet) the main barn, then proceeds along the western edge of Florida Mesa along a northerly track through mostly forested land before leaving the Webb property and descending the mesa to connect with the Grandview Interchange. Some minor improvements to CR 220 also result in a use. Approximately 31.8 acres of right-of-way is transferred to a transportation use for RGM6 (Preferred) Alternative.

9.1.2 Revised F Modified Alternative

This alternative enters the historic boundary of the Webb Ranch around 400 feet east of the ranch building and structures. The structures are not physically impacted. The alignment curves toward the east and remains on the ranch property for a distance of approximately 3 miles, requiring that approximately 32.6 acres of right-of-way be transferred to a transportation use.

9.1.3 Eastern Realignment Alternative

No use of the Webb Ranch occurs as a result of the Eastern Realignment Alternative.

9.1.4 Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative, which does not meet the purpose and need for the project and is therefore not feasible and prudent; and the Eastern Realignment Alternative, which avoids use of the Webb Ranch but uses four other Section 4(f) properties, as indicated in Table 6.

9.2 Description of Use, Craig Limousin Ranch (5LP9307)

The Craig Limousin Ranch is used by all three of the Section 4(f) alternatives.

9.2.1 RGM6 (Preferred) Alternative

This alternative uses 19.9 acres of Craig Limousin Ranch along the far western edge because it requires widening of US 550. Minor use also occurs to accommodate minor improvements to CR 220.

9.2.2 Revised F Modified Alternative

This alternative uses the western boundary along an expanded US 550 and the northwest corner of the Craig Limousin Ranch, resulting in the need to convert 35.6 acres to a transportation use. Some minor improvements to CR 220 also result in a use. This use occurs well away from the main complex of buildings. Part of this alignment

may also cross a small area of the original homestead site (now in ruins), which is a contributing element to the overall ranch property.

9.2.3 Eastern Realignment Alternative

This alternative enters the Craig Limousin Ranch property at the point where it diverges from US 550. It separates the main ranch complex (including the dairy barn and outbuildings) from the saddle shop and barn in the northern section of the ranch. It brings the new highway alignment closer to the building complex and introduces a significant visual element to the property. Approximately 21 acres of Craig Limousin Ranch is converted to a transportation use.

9.2.4 Avoidance Alternatives

Avoidance alternatives include the No Action Alternative and the Western Realignment Alternative, neither of which meets the project purpose and need and are therefore are not feasible and prudent.

9.3 Description of Use, Schaeferhoff-Cowan Ranch (5LP9306)

The Schaeferhoff-Cowan Ranch is used by two of the Section 4(f) alternatives.

9.3.1 RGM6 (Preferred) Alternative

No use of the Schaeferhoff-Cowan Ranch occurs as a result of the RGM6 (Preferred) Alternative.

9.3.2 Revised F Modified Alternative

This alternative enters the ranch property on its western edge and then turns north. Approximately 20.7 acres of ranch property are converted to a transportation use.

9.3.3 Eastern Realignment Alternative

This alternative traverses through the western half of the property and includes some improvements along CR 220. None of the buildings are directly affected, but the new highway alignment extends through open agricultural land, which contributes to the significance of this ranch property. Approximately 42.7 acres of ranch property are converted to a transportation use.

9.3.4 Avoidance Alternatives

Avoidance alternatives for the Schaeferhoff-Cowan Ranch include the No Action Alternative and the RGM6 (Preferred) Alternative. The No Action Alternative does not meet the project purpose and need and is therefore not feasible and prudent. The RGM6 (Preferred) Alternative uses three other Section 4(f) properties, as indicated in Table 6.

9.4 Description of Use, Clark Property (5LP9310)

The Clark Property is used by one of the Section 4(f) alternatives.

9.4.1 RGM6 (Preferred) Alternative

No use of the Clark Property occurs as a result of the RGM6 (Preferred) Alternative.

9.4.2 Revised F Modified Alternative

This alternative extends through the northern end of the Clark Property boundary. The main house on the Clark Property is approximately 725 feet south of the conceptual right-of-way for US 550 and about 190 feet north of the improvements associated with CR 220. Approximately 2 acres of historic Clark Property are converted to a transportation use with this alternative.

9.4.3 Eastern Realignment Alternative

No use of the Clark Property occurs as a result of the Eastern Realignment Alternative.

9.4.4 Avoidance Alternatives

Avoidance alternatives include the No Action Alternative, the Eastern Realignment Alternative, and the RGM6 (Preferred) Alternative. The No Action Alternative does not meet the project purpose and need and is therefore not feasible and prudent. The Eastern Realignment Alternative uses four other Section 4(f) properties. The RGM6 (Preferred) Alternative uses three other Section 4(f) properties.

9.5 Description of Use, Webb-Hotter Lateral (5LP9256.1 and 5LP9256.2)

The Webb-Hotter Lateral is used by two alternatives. The RGM6 (Preferred) Alternative does not impact the Webb-Hotter Lateral.

9.5.1 RGM6 (Preferred) Alternative

No use of the Webb-Hotter Lateral occurs as a result of the RGM6 (Preferred) Alternative.

9.5.2 Revised F Modified Alternative

This alternative touches or crosses the ditch in two locations. There is a use of 1,423 feet of segment 5LP9256.1, which crosses the Schaeferhoff-Cowan Ranch, and a use of 1,096 feet of segment 5LP9256.2, which extends onto the Webb Ranch. Portions of the ditch will likely be placed in a siphon structure (a closed conduit placed underground).

9.5.3 Eastern Realignment Alternative

This alternative directly impacts approximately 1,423 feet of segment 5LP9256.1 of the lateral on the Schaeferhoff-Cowan Ranch. The water in this section of the ditch will be relocated to a siphon structure.

9.5.4 Avoidance Alternatives

Avoidance alternatives include the No Action Alternative, and the RGM6 (Preferred) Alternative. The No Action Alternative is not feasible and prudent because it does not address the project purpose and need. The RGM6 (Preferred) Alternative uses three other Section 4(f) properties: the Webb Ranch, the Craig Limousin Ranch, and the Mason Lateral (formerly Co-op Ditch).

9.6 Description of Use, Mason Lateral (formerly Co-op Ditch; 5LP9257.2)

The Mason Lateral (formerly Co-op Ditch) is used by all three alternatives that require widening of US 550: RGM6 (Preferred) Alternative, Revised F Modified Alternative and the Eastern Realignment Alternative.

9.6.1 RGM6 (Preferred) Alternative

Revised F Modified Alternative and RGM6 (Preferred) Alternative use the same amount, which is 488 lineal feet. The 488 feet of Mason Lateral (formerly Co-op Ditch; 5LP9257.2) will be destroyed for the RGM6 (Preferred), Revised F Modified, and Eastern Alignment Alternatives. The irrigation ditch will be redirected in the 645 feet of new irrigation ditch and piped in either a pipe or a siphon under US 550.

9.6.2 Revised F Modified Alternative

The description of use for Revised F Modified Alternative is identical to that described for RGM6 (Preferred) Alternative.

9.6.3 Eastern Realignment Alternative

The Eastern Realignment Alternative uses the most lineal feet of the Mason Lateral (formerly Co-op Ditch): 678 feet. Approximately 190 feet of the Co-op Ditch (5LP9257.1) on the Schaeferhoff-Cowan Ranch is directly impacted, including a 330-foot existing structure under CR 220. Because of the angle of the pipe in this location, the water will likely be placed in a new longer pipe and not in an extension of the existing pipe. In addition, approximately 488 feet of the Mason Lateral (formerly Co-op Ditch; 5LP9257.2) on the Craig Limousin Ranch is impacted where there are two existing structures that run beneath US 550. These are replaced with longer structures, and 645 feet of ditch will need to be re-graded to address issues with slopes. The 645 feet is a new irrigation ditch that will have to be constructed to get the ditch to work at Mason

Lateral (formerly Co-op Ditch; 5LP9257.2). The 678 feet is the total impact of the existing ditch at both the Mason Lateral (formerly Co-op Ditch) and Co-op Ditch sites (5LP9257.2 and 5LP9257.1, respectively).

9.6.4 Avoidance Alternatives

The No Action Alternative is an avoidance alternative that is not feasible and prudent because it does not address the project purpose and need. The Western Realignment Alternative is an avoidance alternative that is not feasible and prudent because of unacceptable safety and operational problems, construction challenges, and cost.

10.0 Least Overall Harm Analysis for Alternatives Considered in the Section 4(f) Evaluation

FHWA has determined that there is no feasible and prudent avoidance alternative and the three remaining alternatives (including the Preferred Alternative) include all possible planning to minimize harm to the Section 4(f) properties resulting from such use. FHWA may approve only the alternative that causes the least overall harm in accordance with 23 CFR §774.3(c)(1). The three alternatives identified in Section 8.0 (Eastern Realignment Alternative, Revised F Modified Alternative, and RGM6 (Preferred) Alternative are compared in the least harm analysis. The least overall harm is determined by balancing the following factors in light of the statute's preservation purpose:

- The ability to mitigate adverse impacts to each Section 4(f) property.
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection.
- The relative significance of each Section 4(f) property.
- The views of the officials with jurisdiction of each Section 4(f) property.
- The degree to which each alternative meets the purpose and need for the project.
- The magnitude, after reasonable mitigation, of any adverse impacts to resources not protected by Section 4(f).
- Substantial differences in costs among the alternatives.

A discussion of each alternative being considered with respect to the least harm factors is provided in the following sections.

10.1 Quantitative Impact Assessment for Section 4(f) Alternatives

The following subsections provide a description by alternative of the use of the various Section 4(f) properties. These quantified impacts provide the basis for subsequent least overall harm discussions in Sections 10.1.3, 10.3, and 0 that assess the various factors considered to determine least overall harm. Section 10.3 discusses additional information relative to balancing factors for selecting the least overall harm alternative, including social and environmental impacts and relative costs.

Table 7 provides a quantitative assessment of uses to Section 4(f) properties for each alternative. More detailed engineering layouts of the three build alternatives are provided on Figure 20.

Table 7. Quantitative Impact Summary

Alternatives	Section 4(f) Properties Impacts					
	Webb Ranch (~ 515 total acres) (acres)	Craig Limousin Ranch (~ 378 total acres) (acres)	Schaeferhoff-Cowan Ranch (~ 160 total acres) (acres)	Clark Property (29 total acres) (acres)	Webb-Hotter Lateral (3,429 total linear feet) (linear feet)	Mason Lateral and Co-op Ditch (9279 total linear feet) (linear feet)
Eastern Realignment Alternative	0.0	21.0	42.7	0.0	1,423	678
Revised F Modified Alternative	32.6	35.6	20.7	6.5	2519	488
RGM6 (Preferred) Alternative	31.8	24	0.0	0.0	0	488

*The effects listed pertain to both the Mason Lateral (formerly the Co-op Ditch) south of CR 220 and the Co-op Ditch north of CR 220. All three alternatives affect the Mason Lateral (formerly the Co-op Ditch.) The Eastern Realignment Alternative is the only alternative that also affects the Co-op Ditch, which is located north of CR 220.

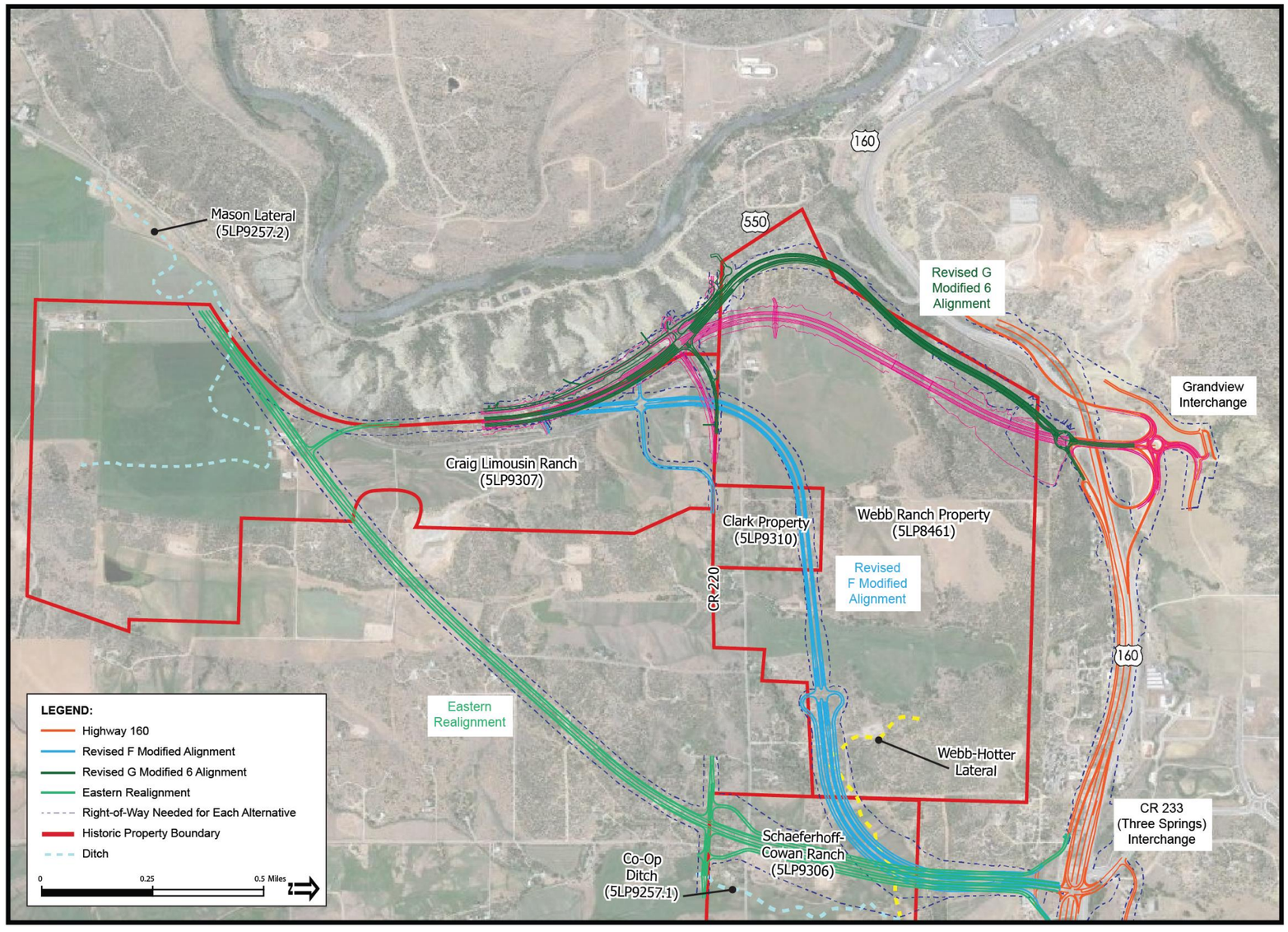
10.1.1 Eastern Realignment Alternative Use of Section 4(f) Properties

This alternative uses four Section 4(f) properties, including the historic Craig Limousin and Schaeferhoff-Cowan Ranches and the Mason Lateral (formerly Co-op Ditch) and Webb-Hotter Lateral ditches. Quantities of land required are greatest from the Schaeferhoff-Cowan Ranch. Total acreage used from the two ranches is 63.6 acres. Lineal feet of ditches used is 2,101.

10.1.2 Revised F Modified Alternative Uses of Section 4(f) Properties

This alternative uses 95.4 acres of 3 historic ranches and historic residential property, and 3,007 lineal feet of two historic ditches. This alternative uses the most acreage from the Craig Limousin Ranch and is the only alternative that uses the Clark Property.

Figure 20. Detailed Engineering Layouts of the Three Section 4(f) Alternatives



10.1.3 RGM6 (Preferred) Alternative Uses of Section 4(f) Properties

This alternative uses three Section 4(f) properties: the Webb Ranch, the Craig Limousin Ranch, and the Mason Lateral (formerly Co-op Ditch). This alternative uses the least acreage from the two ranches. Lineal feet of the Mason Lateral (formerly Co-op Ditch) used is 488.

10.2 Summary of Least Harm Factors for Ability to Mitigate, Severity, Significance, and Views of the Officials with Jurisdiction

The historic features of the Clark Property, and the Webb, Craig Limousin, and Schaeferhoff-Cowan Ranches, including the historic buildings and structures, the functional irrigation systems, and the majority of the properties' acreage, remain intact regardless of the alternative selected. The character, setting, feeling, and association that contribute to the residential property and each ranch's historic eligibility would, however, be compromised by aligning the US 550 and US 160 highway connection through any of these historic properties, as described below.

10.2.1 Ability to Mitigate

This section describes the ability of each of the alternatives to mitigate adverse impacts to the various Section 4(f) properties that are used by that particular alternative. It also discusses benefits that result from implementation of that particular alternative.

Mitigation for the ranches, residential property, and ditches includes measures to be taken during final design, such as possible retaining walls, underpass and irrigation design, and steeper slopes. This mitigation applies to all of the alternatives. Functional irrigation systems will be restored during construction with no interruption of service. The irrigation system is important to the historic function of the ranch. CDOT would compensate landowners if a temporary loss of irrigation service during construction of the US 550 South Connection to US 160 resulted in a loss of crops. A farm equipment/ livestock underpass will be installed to provide passage for continued farming and ranching operations and livestock.

10.2.1.1. RGM6 (Preferred) Alternative

The RGM6 (Preferred) Alternative results in uses to three Section 4(f) properties: two ranches and the Mason Lateral (formerly Co-op Ditch). For the two ranches (Webb Ranch and Craig Limousin Ranch) the ability to mitigate is simpler than the other alternatives because the alignment is located at the edge of the historic property, thereby reducing impacts to the historic attributes, including integrity of setting, feeling, and association. The ability to mitigate impacts to the Mason Lateral (formerly

Co-op Ditch) is also relatively high because ditch functions can be restored and a small percentage of the overall resource is impacted, as shown in Table 7.

The RGM6 (Preferred) Alternative improves mobility and safety for the owners and managers of the Webb Ranch and the Craig Limousin Ranch.

10.2.1.2. Revised F Modified Alternative

The Revised F Modified Alternative results in uses to six Section 4(f) properties: three ranches, one residential property (the Clark Property), and two ditches. The ability of this alternative to mitigate the impact to the three ranches and residential property is difficult because of the permanency of the loss. The loss amounts to 32.6 acres for Webb Ranch, 35.6 acres for Craig Limousin Ranch, 20.7 acres to Schaeferhoff-Cowan Ranch, and 6.5 acres to the Clark Property. Each of these properties (Webb Ranch, Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, and the Clark Property) could continue to function and the buildings and other structures are retained, but some of the historic attributes, including their integrity of setting, feeling, and association, are permanently lost. Mitigation of impacts to Mason Lateral (formerly Co-op Ditch) is identical to RGM6 (Preferred) Alternative, because the lineal feet and locations are identical. Mitigation of impacts to the Webb-Hotter Lateral is more difficult since the Revised F Modified Alternative touches or crosses the ditch in two locations—one location as it crosses the Webb Ranch and a second as it crosses the Schaeferhoff-Cowan Ranch. Ditch functions can be restored, but the historic attributes are difficult to restore because over 3,000 lineal feet of both ditches are impacted.

The Revised F Modified Alternative improves mobility and safety for the owners and managers of the four ranches.

10.2.1.3. Eastern Realignment Alternative

The Eastern Realignment Alternative uses four Section 4(f) properties: two ranches and the two ditches. As with the Revised F Modified Alternative, the ability to mitigate the impact to the ranch properties (Craig Limousin Ranch and Schaeferhoff-Cowan Ranch) is difficult. The amount of property used is 21.0 acres from the Craig Limousin Ranch and 42.7 acres from the Schaeferhoff-Cowan Ranch. These two ranches continue to function, but some of their historic attributes, including the integrity of setting, feeling, and association, are permanently lost. Mitigation of impacts to the Co-op Ditch is similar to the other two alternatives, even though the total amount of lineal feet impacted by this alternative is greater. Mitigation of impacts to the Webb-Hotter Lateral is easier with this alternative than with the Revised F Modified Alternative because only one segment is impacted—the Schaeferhoff-Cowan Ranch. Ditch functions can be

restored, but historic attributes are more difficult to restore because more of the resource is impacted. This alternative results in an adverse effect to the Webb-Hotter Lateral.

The Eastern Realignment Alternative improves mobility and safety for the owners and managers of the two ranches.

10.2.2 Relative Severity of the Remaining Harm

For each alternative, this section describes the relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection.

10.2.2.1. RGM6 (Preferred) Alternative

The relative severity of the remaining harm to the Webb Ranch is minimal because the RGM6 (Preferred) Alternative is located approximately 1,000 feet west of the large barn on the historic property. The RGM6 (Preferred) Alternative is also located west of the livestock chutes and corrals which both contribute to the site's architectural significance. The relative severity of the remaining harm to the Craig Limousin Ranch is similar to that of the Eastern Realignment Alternative. Some of the historic attributes of the Craig Limousin Ranch, including setting, feeling, and association, are permanently lost. This alternative and the Revised F Modified Alternative are also similar in the relative severity of remaining harm to Mason Lateral (formerly Co-op Ditch). In both cases, ditch functions can be restored and historic attributes are retained. Compared to the other two alternatives, this alternative results in the least severity of remaining harm to the Webb-Hotter Lateral, since it has no effect to this Section 4(f) property.

10.2.2.2. Revised F Modified Alternative

The relative severity of remaining harm to the affected ranches (Craig Limousin Ranch, Webb Ranch, and Schaeferhoff-Cowan Ranch) for this alternative is similar to the Eastern Realignment Alternative. However, since this alternative uses the most ranches (three instead of two), the relative severity is greater because some of the historic attributes, including setting, feeling, and association of the three ranches are permanently lost. This alternative is also the only alternative that results in a use of the Clark Property.

The relative severity of remaining harm to Mason Lateral (formerly Co-op Ditch) is similar to the other alternatives. This alternative has the greatest relative severity of remaining harm to the two Webb-Hotter Lateral segments, since it touches or crosses

the ditch in two locations. Although ditch functions can be restored, the historic attributes of the stand-alone segment are difficult to restore.

10.2.2.3. Eastern Realignment Alternative

The relative severity of the remaining harm to the two ranches for this alternative is similar to the Revised F Modified Alternative, which also uses the two ranches. (The Revised F Modified Alternative uses one additional ranch and one residential property, however.) Some of their historic attributes, including setting, feeling, and association, are permanently lost. This alternative has the most impact to the Co-op Ditch, resulting in greater remaining harm to its historic attributes. In both cases, ditch functions can be restored and historic attributes are retained. Compared to the other two alternatives, this alternative results in the most severity of remaining harm to the stand-alone segment of the Webb-Hotter Lateral.

10.2.3 Relative Significance of Each Section 4(f) Property

The six Section 4(f) properties evaluated in this document are not noticeably different from each other in terms of their relative significance. Each of the three ranches has similar importance in terms of its historic associations with ranching in the Florida Mesa area and its intact examples of ranching-related architecture and other features. Similarly, the two ditches are similar in relative significance to each other: each was important in the development of the historical ranching communities on Florida Mesa. The residential property is important because it historically served as a social gathering place for the residences of Durango and Florida Mesa.

10.2.4 Views of the Officials with Jurisdiction over the Section 4(f) Properties

Although there was no specific consultation with SHPO regarding the relative significance of the Section 4(f) properties, the SHPO did concur that the ranch properties, the residential property, and the linear resources are eligible to the NRHP. The SHPO also agreed with the finding of adverse effect for the ranches and the residential property, and with the finding of no adverse effect for the ditches.

10.3 Degree to Which Each Alternative Meets Project Purpose and Need

This section describes the degree to which each of the three alternatives evaluated for least harm meets the project purpose and need. To summarize, all three alternatives satisfactorily meet project purpose and need and are able to meet the projected 2030 traffic volumes at LOS D or better. In order to determine which alternative best meets the project purpose and need, various factors were compared to identify how well each alternative achieves this criteria. Access, safety, and capacity components of the

purpose and need are addressed in the following sections. Additional analyses and documentation are provided in Appendix D of the 2012 SFEIS and in the 2015 Independent Alternatives Analysis.

10.3.1 Access

Access control was evaluated to determine which alternative better promotes an access management system that meets the expectations of a high-speed, high-volume highway through appropriate control of access frequency and spacing.

All three alternatives have two through lanes in each direction through the Grandview Section with interchanges at the Grandview Area location, CR 233 (Three Springs), and SH 172/CR 234. Local access within this corridor is managed with a local frontage road system to limit direct access to the highway only at the interchanges. Additionally, each alternative includes establishing an access line along the corridor to preclude future additional accesses. Within the Grandview Section, there are no other accesses proposed other than the three interchanges. The approximate distances between the interchanges are tabulated below:

- Between Grandview Interchange and CR 233 (Three Springs) Interchange = 5,600 feet
- Between CR 233 (Three Springs) Interchange and SH 172/CR 234 Interchange = 7,150 feet

The analysis shows that access for the three alternatives exhibit the same frequency and spacing between interchanges. Regardless of where US 550 connects to US 160, local access to US 160 is managed by a frontage road system to minimize access to US 160 only at the planned interchanges. Therefore, the degree to which the alternatives meet purpose and need for access is the same for all three alternatives.

10.3.2 Safety

Safety was evaluated to determine which alternative most safely accommodates the traffic volumes associated with the connection of US 550 to US 160.

The RGM6 (Preferred) Alternative connects US 550 to US 160 via the Grandview Interchange, and traffic on US 550 is accommodated at its intersection with US 160 by a roundabout that is expected to operate at an acceptable level of service in 2030.

The Revised F Modified Alternative and the Eastern Realignment Alternative connect US 550 to US 160 via the Three Springs SPUI. Traffic on US 550 is accommodated at its

intersection with US 160 by a SPUI and controlled by a traffic signal that is expected to operate at an acceptable level of service in the year 2030.

Roundabouts have specific benefits over intersections from a safety standpoint, such as:

- **Lower speeds and lower speed differential.** Lower speeds associated with roundabouts allow drivers more time to react to potential conflicts.
- **Fewer number of driver decisions.** Drivers only need to be aware of vehicles to their left at entry of roundabouts. Drivers at traffic signals need to be aware of traffic coming from as many as three directions at any time. In addition, the driver must remain aware of the signal indication while monitoring the vehicle movements through the intersection.
- **Less severe crashes.** Severity of crashes is based on the relative speed and angle of the conflicting streams. Most vehicles travel at similar speeds through roundabouts with a small angle between the vehicle paths. The potential for hazardous conflicts, such as right angle and left turn head-on crashes, is eliminated in roundabouts.

The analysis shows that a roundabout-controlled intersection is more likely to provide safer operations than a conventional traffic signal because of the lower speeds, fewer conflicting movements, and the elimination of head-on and broad-side crashes that are typically associated with injury crashes. Based on these factors, the RGM6 (Preferred) Alternative has a higher degree of safety benefit compared to Revised F Modified Alternative and the Eastern Realignment Alternative.

10.3.3 Capacity

The capacity analysis evaluates the connection of US 550 to US 160 to determine which alternative can accommodate more future traffic volume growth beyond the year 2030 forecasted volumes. The year 2030 volumes and traffic represent the basis for which the reserve capacity is measured in the additional analysis. The process to evaluate the alternatives is as follows:

- Begin with the year 2030 traffic volumes and report results.
- Inflate the traffic volumes at the intersection of US 550 and US 160 in two percent increments until an intersection or individual movement for an alternative fails.
- For the traffic signal operations, optimize the signal phasing and cycle length to see if a timing solution could extend the capability of the traffic operations to have capacity for more volume.

- After optimization of the signal phasing and cycle length, increase the volumes to the point where a movement cannot meet LOS D or better, and the alternative is considered to fail.
- The last alternative that continues to meet the purpose and need for capacity is considered to have the most reserve capacity.

Under the RGM6 (Preferred) Alternative for the year 2030, the roundabout overall and each approach are expected to operate well at LOS A during the morning and evening peak periods. The merge from Ramp C is expected to operate at LOS C during the morning peak period and LOS C during the evening peak period. Inflating the traffic volumes by two percent to determine if the intersection is able to absorb this level of volume increase beyond the year 2030, the roundabout and each approach are expected to operate well--at LOS A during the morning and evening peak periods. The merge from Ramp C is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period.

Under Revised F Modified Alternative and the Eastern Realignment Alternative for the year 2030, the signalized intersection at the CR 233 (Three Springs) SPUI is expected to operate at LOS C during the morning and evening peak periods, and all individual movements are expected to operate at LOS D or better during both peak periods. Inflating the traffic volumes by two percent, the signalized intersection at CR 233 (Three Springs) is expected to operate at acceptable LOS C during the morning and evening peak periods, but the northbound left turn is expected to operate at LOS E during the evening peak period due to a failing northbound left turn movement.

The analysis shows that for Revised F Modified Alternative and the Eastern Realignment Alternative, a traffic signal at CR 233 (Three Springs) intersection fails if traffic volumes are increased by 2 percent beyond the year 2030 projected traffic volumes. Increasing traffic volumes by 2 percent beyond the year 2030 for RGM6 (Preferred) Alternative results in a LOS A with more reserve capacity for the roundabout. Based on these projections, the roundabout at the Grandview Interchange (RGM6 [Preferred] Alternative) has more reserve capacity and a better LOS beyond year 2030. This demonstrates a higher degree of meeting capacity than a signalized intersection at the CR 233 (Three Springs) Interchange (Revised F Modified Alternative and Eastern Realignment Alternative).

10.4 Magnitude, After Reasonable Mitigation of Adverse Impacts, to Resources not Protected by Section 4(f)

Impacts to environmental and social resources were quantified for each alternative using a combination of on-the-ground reconnaissance, aerial photography interpretation, and available mapping data from agency GIS files. Archaeological resource surveys were completed for the Eastern Realignment Alternative, Revised F Modified Alternative, and RGM6 (Preferred) Alternative alignments. Table 8 summarizes the impacts of each alternative to social and environmental resources. Agreements to mitigate the Section 106 properties are outlined in the Memorandum of Agreement (MOA) signed by CDOT, FHWA, and the SHPO on June 20, 2012.

The RGM6 (Preferred) Alternative has the least amount of impact to 12 of the 15 environmental resources: irrigated farmlands, deer and elk winter and severe winter range, Southwestern willow flycatcher habitat, Bald eagle winter range, wetlands, eligible archaeological sites, number of residences, total right-of-way needed, and commercial use impacts. The RGM6 (Preferred) Alternative impacts the most high-priority wildlife habitat: 27.2 acres, compared to 14.5 acres with the Revised F Modified Alternative and 4.2 acres with the Eastern Realignment Alternative. For the Southwestern willow flycatcher habitat, the Revised F Modified Alternative and the RGM6 (Preferred) Alternative have no impact.

The RGM6 (Preferred) Alternative has fewer wetland impacts compared to the other alternatives. Approximately 0.43 acre of wetlands is likely impacted by the RGM6 (Preferred) Alternative compared to the Revised F Modified Alternative (0.82 acre) and the Eastern Realignment Alternative (3.22 acres). This impact will be mitigated on a 1:1 basis.

The RGM6 (Preferred) Alternative results in adverse effect determinations to only six archaeological sites. The Revised F Modified Alternative results in adverse effect determinations to the most archaeological sites (eight). The Eastern Realignment Alternative results in adverse effect determinations to seven archaeological sites. None of these archaeological sites are afforded protection under Section 4(f); however, they are all eligible properties and protected under Section 106 of the NHPA. Agreements to mitigate the Section 106 properties are outlined in the MOA.

Table 8. Social and Environmental Resource Impacts by Alternative

Alternative	Irrigated Farmland (acres)	Wildlife Habitat (acres)	Elk Winter Range (acres)	High-Priority Wildlife Habitat (acres)	Elk Severe Winter Range (acres)	Elk Winter Conc. Area (acres)	Deer Winter Range (acres)	Deer Severe Winter Range (acres)	SWWF Habitat (acres)	Bald Eagle Winter Range (acres)	Bald Eagle Winter Conc. Area (acres)	Wetlands (acres)	Eligible Archaeo-logical Sites	Relocation Impacts (No. of Residences)	ROW Impacts (Total Acres)	Commercial Use
Eastern Realignment Alternative	33.7	49.1	114.4	4.2	114.4	0.0	114.4	114.4	1.1	114.4	19.6	3.22	7 sites	6	133.0	Gravel pit
Revised F Modified Alternative	38.2	42.2	109.2	14.5	109.2	0.0	109.2	109.2	0.0	109.2	38.5	0.82	8sites	4	106.2	Gas well
RGM6 (Preferred) Alternative	6.1	54.8	64.9	27.2	64.9	22.3	64.9	64.9	0.0	64.9	41.4	0.43	5 sites	0	66.9	None

Abbreviations:
SWWF = Southwestern willow flycatcher
ROW = right-of-way

None of the alternatives restrict the continuation of commercial ranching operations on the four historic ranches. Both the Revised F Modified Alternative and the Eastern Realignment Alternative have other commercial impacts, namely the replacement of a gas well and removal from production of a gravel pit, respectively. All effects to commercial properties will be mitigated pursuant to the Uniform Relocation Act, as amended.

10.5 Cost Comparison Among Section 4(f) Alternatives

Estimated costs for all alternatives considered under the Section 4(f) evaluation are documented in Appendix F of the 2012 SFEIS and in the 2015 Independent Alternatives Analysis. Estimated costs for the Section 4(f) alternatives are presented in Table 9.

Alternatives evaluated in the least harm analysis have comparable costs, with a 20 percent disparity between the lowest cost (Revised F Modified Alternative) and highest cost (Eastern Realignment Alternative).

Table 9. Relative Costs for US 550 and US 160 Connection Alternatives

Alternative	Estimated Cost	Comments
Eastern Realignment Alternative	$92,753,000	Right-of-way estimated at $20,000/acre residential and $100,000/acre commercial; does not include costs for Grandview, Three Springs, and Elmore's Corner Interchange
Revised F Modified Alternative	$78,394,000	Right-of-way estimated at $14,000/acre of agricultural land; includes farm access, wildlife crossings, bridges and ramps at Grandview Interchange; does not include costs for Grandview, Three Springs, and Elmore's Corner Interchange
RGM6 (Preferred) Alternative	$91,000,000	Right-of-way estimated at $14,000/acre of agricultural land; includes additional ramps and bridges at Grandview Interchange for US 550 connection; does not include costs for the Three Springs and Elmore's Corner Interchanges

The relative difference in costs among the alternatives that were eliminated as not feasible and prudent range from approximately 250 percent to 400 percent higher than the least harm alternatives. Although costs were not considered in the prudent and feasible determination because of other outstanding factors that rendered certain alternatives not feasible and prudent, the large discrepancy in costs between the least harm alternatives compared to the eliminated alternative is substantial enough to warrant additional support for their elimination.

10.6 Summary of Least Overall Harm Analysis

The RGM6 (Preferred) Alternative has less overall harm to Section 4(f) properties because it uses three Section 4(f) properties: the Webb Ranch, Craig Limousin Ranch, and Mason Lateral (formerly Co-op Ditch). The Revised F Modified Alternative uses the

Webb, Craig Limousin and Schaeferhoff-Cowan Ranches, the Clark Property, and the Webb-Hotter Lateral ditch at three locations. The Eastern Realignment Alternative results in a use of two historic ranches (the Schaeferhoff-Cowan Ranch and the Craig Limousin Ranch Property), as well as uses to segments of the Webb-Hotter Lateral and Co-op Ditches.

Quantitative comparison of impacts provided in Table 7 shows the relative magnitude of associated impacts to the ranches and ditches for consideration. The RGM6 (Preferred) Alternative impacts the lowest amount of acreage. The Revised F Modified and the RGM6 (Preferred) Alternatives have the lowest impacts to Mason Lateral (formerly Co-op Ditch), and the RGM6 (Preferred) Alternative has no impacts to the Webb-Hotter Lateral Ditch.

Use of historic ranches and the historic residential property weighs heavily in the least harm analysis because the magnitude of impacts from highway construction cannot be easily mitigated. The severity of remaining harm to the Webb Ranch is clearly the least with the RGM6 (Preferred) Alternative. For the other ranches, it cannot be directly compared based on acreages of impact alone because of the inability to mitigate the character, setting, feeling, and association that contributes to the historic eligibility of each of these properties. For example, the relatively smaller size of the Schaeferhoff-Cowan Ranch, or the lower percentage of use of land on the Webb Ranch, does not necessarily justify any of the other two alternatives as having the least harm.

The relative severity of remaining harm to the two segments of the Webb-Hotter Lateral is worse with the Eastern Realignment Alternative and with the Revised F Modified Alternative, simply because the RGM6 (Preferred) Alternative does not affect this property.

For the least harm analysis, all three ranches are considered to be similarly important as historic properties based on their historic associations with ranching in the Florida Mesa area and their intact examples of ranching-related architecture and other features. Protection of structures and aligning the highway along the property boundaries provides a measure of separation for continued ranching operations, thereby lessening the harm. However, these measures provide only minor considerations in the least harm analysis because the historic integrity of any of the ranches would be irreparably harmed by highway construction. Revised F Modified Alternative uses three ranches and one residential property. The residential property is considered important as a historic property because it historically served as a social gathering place and is a good example of a residence modified for use as a social and recreational center. The Eastern

Realignment Alternative and the RGM6 (Preferred) Alternative each use only two ranches.

The RGM6 (Preferred) Alternative better responds to both the safety and capacity components of the project purpose and need.

Comparison of impacts to environmental and social resources for the three alternatives on the Webb Ranch provides additional factors to consider in the least harm analysis. Fewer impacts to irrigated farmland; deer and elk winter and severe winter range; bald eagle winter range; wetlands; eligible archaeological sites; and residential, commercial, and total right-of way-use support the RGM6 (Preferred) Alternative as the least harm alternative. Lower relative costs for the Revised F Modified Alternative makes it more favorable over the other alternatives.

In summary, the RGM6 (Preferred) Alternative is considered to be the least overall harm alternative based on the following:

- This alternative uses three Section 4(f) properties; all other feasible and prudent alternatives use more than three Section 4(f) properties.
- This alternative uses the least area from Section 4(f) properties.
- This alternative is simpler to mitigate and has the least severity of remaining harm.
- This alternative better responds to both the safety and the capacity elements of the project purpose and need.
- This alternative results in adverse effect determinations to five archaeological sites. Revised F Modified Alternative results in adverse effect determinations to eight archaeological sites, and the Eastern Realignment Alternative results in adverse effect determinations to seven sites.
- This alternative has fewer wetland impacts compared to the other alternatives.
- This alternative has the least impacts to irrigated farmlands, elk winter range, elk severe winter range, deer winter range, deer severe winter range, south western willow flycatcher habitat, and bald eagle winter range.
- This alternative has the least impacts to existing land uses: number of residences, number of commercial uses, and total right-of-way required.

Table 10 summarizes the three alternatives and their relative responsiveness to the seven least overall harm factors.

Table 10. Summary of Least Overall Harm by Alternative

Alternative	Summary of Section 4(f) Use	Ability to Mitigate	Severity of Remaining Harm	Significance of Properties	Views of Officials with Jurisdiction	Purpose and Need Responsiveness	Impacts to other Resources	Substantial Differences in Cost
Eastern Realignment Alternative	2 ranches Total acreage: 63.6 2 ditches Total lineal feet: 2,101	Simpler to mitigate than Revised F Modified Alternative.	Remaining harm is not as severe.	Neutral	Neutral	Not as responsive to safety and capacity elements.	Most impact to 11 of 16 resources evaluated. Least impact to 2 resource.	Most costly
Revised F Modified Alternative	3 ranches and 1 residential property Total acreage: 95.4 2 ditches Lineal feet: 3,007	Most difficult to mitigate.	Greatest remaining harm.	Neutral	Neutral	Not as responsive to safety and capacity elements.	Most impact to 2 resources. Moderate impacts to 11 resources. Least impact to 3 resources.	Lowest cost
RGM6 (Preferred) Alternative	2 ranches Total acreage: 55.8 1 ditch Lineal feet: 488	Simplest to mitigate.	Least remaining harm, especially to the Webb Ranch.	Neutral	Neutral	Most responsive to safety and capacity elements.	Least impact to 12 of 16 resources evaluated. Most impact to 3 resources.	Moderate costs

11.0 All Possible Planning to Minimize Harm

Section 4(f) requires all possible planning to minimize harm as defined in CFR 774.3(a)(2). In addition to the mitigation measures discussed in Section 10.1.3, other measures to minimize harm that will be considered during final design of the roadway include such design options as narrower roadway width, retaining walls, underpass and irrigation designs, and steeper slopes. Mitigation measures are outlined in the signed MOA (see Appendix I of the 2012 SFEIS).

12.0 Record of Coordination

Coordination with the appropriate agencies for eligibility and determination of effects has occurred. The coordination effort included submittal of site forms, recommendation of eligibility and effects, and the mitigation measures to the SHPO and La Plata County Historical Society on January 4, 2008, and again on November 9, 2009, and August 6, 2010, with written concurrence from the SHPO dated January 18, 2008, December 1 and 11, 2009, and August 25, 2010 (see Appendix B of the 2012 SFEIS). Supplemental correspondence with the SHPO occurred on December 8, 2010, with concurrence received on December 16, 2010, and on January 16, 2015, with final concurrence received on February 23, 2015. SHPO will be included in future coordination with the local government agency as requested in the concurrence letters.

In addition, six Section 106 consulting parties have received the letters with recommendations of eligibility and effects. These consulting parties are the Webb Ranch/family, Peggy Cooley (Cowan Ranch), Shannon Bennett (Clark Property), the Southern Ute Indian Tribe, the Pueblo of Laguna, and the Hopi Tribe. Letters received from the consulting parties in 2014 are in 0 of this document. Letters received in 2012 are in Appendix B of the 2012 SFEIS.

The ACHP has elected to participate in the project and has been provided with the Section 106 consultation documentation.

13.0 References

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