

# ESTES TO FLATIRON TRANSMISSION LINES REBUILD PROJECT LARIMER COUNTY, COLORADO

Final Environmental Impact Statement (DOE/EIS-0483)

March 2018



**Western Area  
Power Administration**



## **Mission Statement**

Western is a Federal agency under the Department of Energy that markets and transmits wholesale electrical power through an integrated 17,000-circuit mile, high-voltage transmission system across 15 western states. Western's mission: Market and deliver clean, renewable, reliable, cost-based Federal hydroelectric power and related services. Current vision: Continue to provide premier power marketing and transmission services to our customers as well as contribute to enhancing America's energy security and sustaining our nation's economic vitality.



**Department of Energy**  
Western Area Power Administration  
Rocky Mountain Customer Service Region  
P.O. Box 3700  
Loveland, CO 80539-3003

**MAR 26 2018**

In Reply Refer To:  
DOE/EIS-0483

Dear Reader:

Enclosed for your review is the Final Environmental Impact Statement (EIS) for the Western Area Power Administration (WAPA) Estes to Flatiron Transmission Lines Rebuild Project (Project). The Final EIS informs the public and interested parties of potential environmental impacts associated with implementing each route alternative. This Final EIS has been prepared by WAPA following the National Environmental Policy Act (NEPA) of 1969, as amended, (42 U.S.C. §§ 4321-4347); the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508); and the U.S. Department of Energy (DOE) and United States Forest Service (USFS) NEPA procedures (10 CFR Parts 1021 and 1022, and 36 CFR Part 220, respectively).

### **Project Background**

WAPA currently owns, operates, and maintains two 115-kilovolt (kV) single-circuit transmission lines, dating from 1938 and 1953, which connect Estes Park to the Flatiron Substation in Larimer County, Colorado. The Project would remove both existing 115-kV single-circuit transmission lines and wood structures between Flatiron Substation and the intersection of Mall Road and U.S. Highway 36 in Estes Park and replace them with one of the following options: 1) one double-circuit 115-kV transmission line on steel monopoles within a single right-of-way (ROW), 2) a new double-circuit 115-kV transmission line on steel monopoles within a single ROW with the western portion buried in concrete cable trenches for about 2.6 miles, 3) rebuild of both lines as single-circuit transmission lines on wood-pole H-frame structures on separate ROWs, or 4) the No Action Alternative, which would keep the existing lines in place and continue established maintenance activities.

The proposed Project extends between Lake Estes on the east side of Estes Park and WAPA's Flatiron Substation. The Project area analyzed in the Final EIS encompasses lands east of the Town of Estes Park and west of the City of Loveland, and includes both private lands in Larimer County and public lands administered by the U.S. Department of Interior Bureau of Reclamation, USFS, the Colorado State Land Board, Northern Colorado Water Conservancy District, and Larimer County. Major transportation corridors are U.S. Highways 34 and 36.

The proposed route alternatives would improve access to the transmission lines and widen the ROWs where existing ROWs are inadequate for public and line crew safety and reliable power delivery. They would also implement an integrated vegetation management approach within the ROWs to reduce the risk of trees and other vegetation damaging or interfering with the transmission line and power delivery to Estes Park, Loveland, and nearby Front Range communities. WAPA is the lead Federal agency for the EIS. The USFS, a cooperating agency for the EIS, has jurisdiction over National Forest System lands crossed by the transmission lines and will be making its own decision based on this EIS.

### **Agency Preferred Alternative**

In the Final EIS, WAPA has identified the Agency Preferred Alternative (APA) from seven possible route alternatives and the No Action Alternative. The APA would consist of a new double-circuit line on a consolidated ROW using a portion of two alternatives to respond to local conditions in the west and the east portions of the line. Under the APA, the four-wheel drive portion of West Pole Hill Road would not be reconstructed or improved on National Forest System land, retaining the challenge for four-wheel drive use.

Additionally, special design measures would be considered for the segment within the Meadowdale Hills subdivision, including the use of structures with a lower height and shorter span, if they provide a lower visual impact. On abandoned ROW, existing structures would be removed and the ROW allowed to return to natural vegetation patterns.

The APA identified in the Final EIS was created based on the analysis in the Draft EIS and resulting public and agency input on that analysis. It meets the agencies' respective purpose and needs while balancing federal land management multiple-use mandates and public considerations.

### **Final EIS Availability**

The publication of the Notice of Availability (NOA) in the *Federal Register* by the U.S. Environmental Protection Agency begins WAPA's required 30-day waiting period before making a decision on the Project. Publication of the USFS Draft Record of Decision (ROD) begins their 45-day objection period.

The Estes to Flatiron Transmission Lines Rebuild Project Final EIS and other Project documents are available on the Website at:  
<https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/estes-flatiron.aspx>.

Locations of hard copies will be listed on the Project Website. Should you have any questions, please contact Mark Wieringa, Western Area Power Administration, NEPA Document

Manager, at (720) 962-7448. Any questions or concerns regarding this Final EIS may be addressed to:

E-mail: RMR\_estesflatironeis@wapa.gov;  
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Lakewood, CO 80228-8213

The USFS will issue its own ROD in which it will describe its agency-specific decision and objection process.

Sincerely,



Michael D. McElhany  
Senior Vice President  
Rocky Mountain Regional Manager

Enclosure

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# Estes to Flatiron Transmission Lines Rebuild Project, Larimer County, Colorado, DOE/EIS-0483

## Final Environmental Impact Statement

### Responsible Agencies

#### Lead Federal Agency:

U.S. Department of Energy, Western Area Power Administration

#### Cooperating Federal Agencies:

U.S. Department of Agriculture, Forest Service

### Abstract

The Western Area Power Administration (Western) currently owns, operates, and maintains two 115-kilovolt (kV) single-circuit transmission lines that connect Estes Park to the Flatiron Substation in Larimer County, Colorado. Western is proposing to rebuild the existing 115-kV system between Flatiron Substation and the intersection of Mall Road and U.S. Highway 36 in Estes Park. The Project would remove the existing 115-kV single-circuit transmission lines and wood structures and replace them with: 1) a new double-circuit 115-kV transmission line on steel monopoles within a single right-of-way (ROW), potentially using a combination of two existing ROWs; 2) a new double-circuit 115-kV transmission line on steel monopoles within a single ROW with the western portion buried in concrete cable trenches for about 2.6 miles; 3) both lines rebuilt as single-circuit transmission lines on wood-pole H-frame structures on separate ROWs, or 4) the No Action Alternative, which would keep the existing lines in place and continue established maintenance activities. The Project would improve access to the transmission lines, widen the ROWs where existing ROW is inadequate, and implement an integrated vegetation management approach within the ROWs to ensure electrical clearance requirements are met and maintained for the life of the Project. Western is the lead Federal agency for the Environmental Impact Statement (EIS). The U.S. Forest Service has jurisdiction over National Forest System lands crossed by the transmission lines, and is a cooperating agency for the EIS.

In the Final EIS, Western identified the Agency Preferred Alternative (APA) from seven possible full-length route alternatives. The APA would consist of a new double-circuit line on a consolidated ROW using a revised Alternative C alignment in the west and primarily Alternative C alignment in the center, and Alternative B alignment in the east.

For additional information, contact:

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For additional information on DOE  
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website at <http://energy.gov/nepa/office-nepa-policy-and-compliance>

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## Summary

### Introduction

Western Area Power Administration (Western) is proposing to rebuild and upgrade two 115-kilovolt (kV) single-circuit transmission lines between Flatiron Substation west of Flatiron Reservoir and the intersection of Mall Road and United States (U.S.) Highway 36 in Estes Park, Larimer County, Colorado. The Estes to Flatiron Transmission Lines Rebuild Project (Project) is subject to the environmental review process mandated under the National Environmental Policy Act (NEPA) of 1969.

This Environmental Impact Statement (EIS) analyzes the environmental consequences of seven action alternatives to rebuild and upgrade the existing 115-kV transmission lines, as well as the No Action Alternative. Western is the lead Federal agency for the NEPA document. The U.S. Forest Service (USFS) has jurisdiction over National Forest System lands crossed by the transmission lines, is a cooperating agency for the EIS, and will be providing its own decision on this EIS.

The EIS has been prepared in accordance with the NEPA of 1969, as amended (42 United States Code [U.S.C.] Section 4321 et seq.), the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and U.S. Department of Energy (DOE) and USFS NEPA procedures (10 CFR Part 1021 and 1022, and 36 CFR Part 220).

### Project Location

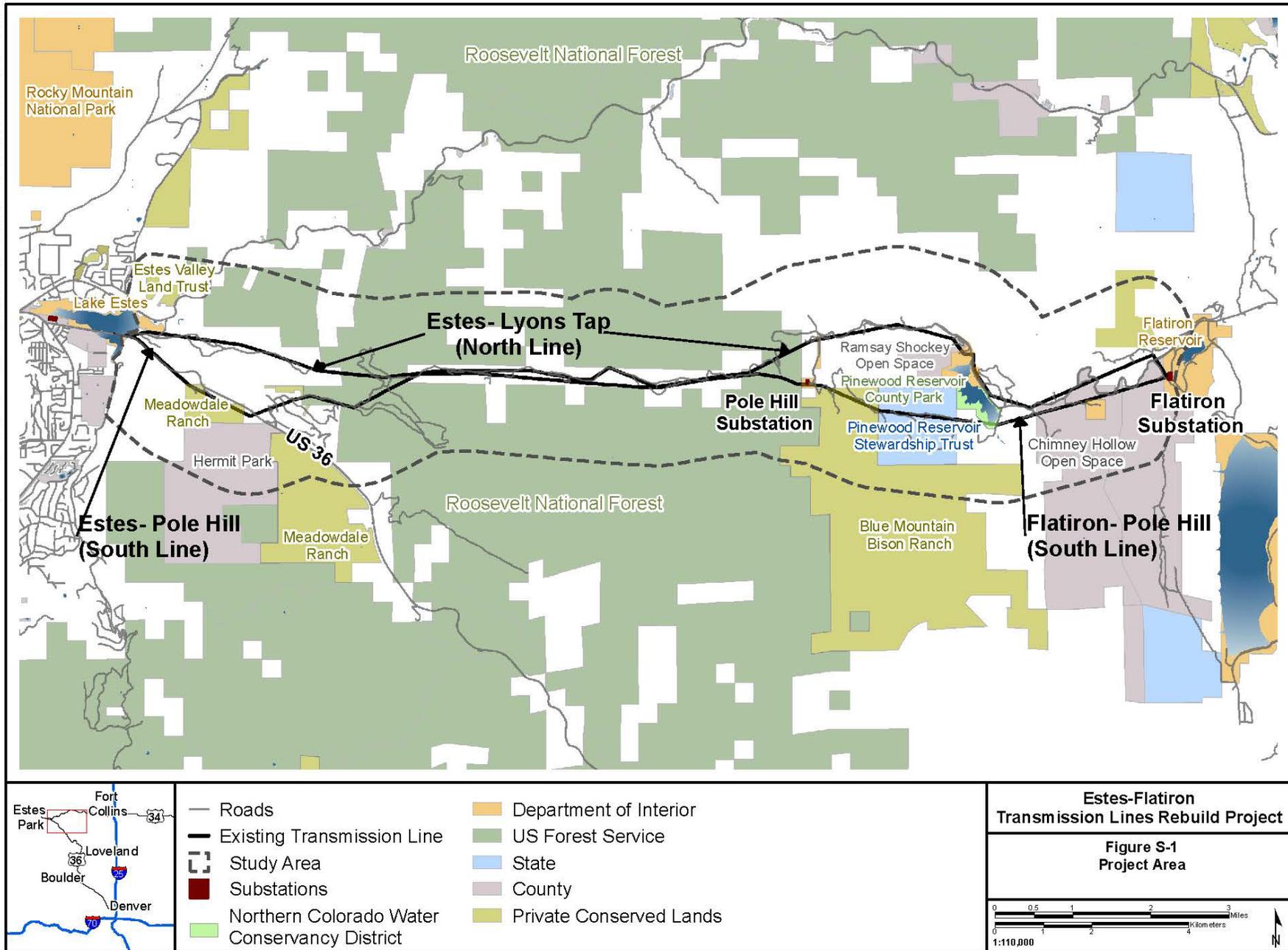
The Project is located in Larimer County, Colorado, and extends between Lake Estes on the east side of Estes Park and Western's Flatiron Substation, west of Flatiron Reservoir. The Project area is situated east of the community of Estes Park and west of the Town of Loveland. Major transportation corridors are U.S. Highways 36 and 34, which provide access between Front Range communities to the east and Rocky Mountain National Park to the west of the Project area. The Project area includes private lands in Larimer County, and public lands administered by the U.S. Department of the Interior (DOI), USFS, the Colorado State Land Board (SLB), Northern Colorado Water Conservancy District (NCWCD) and Larimer County. **Figure S-1** shows the general location of the Project.

### Background

Western's mission is to market and deliver, renewable, reliable, cost-based Federal hydroelectric power and related services. Western undertakes a variety of construction projects, either on its own or in partnership with other utilities or power customers. Western owns, operates, and maintains two single-circuit transmission lines between the Estes Park and Flatiron Substations. Prior to the formation of the DOE, the DOI's Bureau of Reclamation (BOR) constructed and maintained the two existing transmission lines as part of the Colorado-Big Thompson (CBT) project. The lines were constructed to transmit electricity from hydropower generation sources within the CBT Project. After the formation of the DOE and Western in 1977, ownership, operation, and maintenance of the transmission lines transferred from the BOR to Western.

The Estes-Lyons Tap (E-LT) is the more northern of the two lines and will be referred to in the remainder of this document as the North Line, except where the acronym gives historical context. The second, more southerly line consists of the Estes-Pole Hill (E-PH) and Flatiron-Pole Hill (F-PH) lines which connect the Pole Hill Substation to Estes Park and the Flatiron Substation, respectively (**Figure S-1**). The two south segments will be referred to in this document as the South Line, except where the acronym gives historical context. Both existing transmission lines are 115-kV single-circuit lines constructed on wood pole H-frame structures. The South Line is 14.5 miles in length and the North Line is 14.1 miles long. Western's Project only encompasses the single-circuit wood-pole transmission lines from the east side of the Estes causeway and does not involve the portions of the double-circuit transmission lines located on steel lattice structures along the Estes causeway.

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The North Line was built in 1938 and the South Line in 1953. Most of the wood pole H-frame structures on the two lines are original and date from the time of construction. A single mode fiber optic communication cable used by BOR, Western, and the Platte River Power Authority is part of the two lines. Although the majority of the existing rights-of-way (ROWs) are located on privately owned land, portions of both are located on public lands administered by the USFS, SLB, Larimer County Natural Resources Department, and BOR. Both of the existing lines are located within a designated utility corridor as defined in the 1984 Forest Plan for Arapaho and Roosevelt National Forests and Pawnee National Grassland (ARP) and the 1997 Revision.

### ***Proposed Project***

Western is proposing to rebuild the existing 115-kV system between Flatiron Substation and the intersection of Mall Road and U.S. Highway 36 in Estes Park. The Project would remove the existing 115-kV single-circuit transmission lines and wood structures and replace them with the following potential options: 1) a new double-circuit 115-kV transmission line on steel monopoles within a single ROW, potentially using a combination of two existing ROWs; 2) a new double-circuit 115-kV transmission line on steel monopoles within a single ROW with the western portion buried in concrete cable trenches for about 2.6 miles, 3) both lines rebuilt as single-circuit transmission lines on wood-pole H-frame structures on separate ROWs, or 4) the No Action Alternative, which would keep the existing lines in place and continue established maintenance activities. The USFS action is to issue an authorization for the portion of the transmission line(s) rebuild that crosses National Forest System lands. The Project would improve access to the transmission lines for maintenance, increase the ability to restore outages more quickly, widen the ROWs where the existing ROW is inadequate, and implement an integrated vegetation management approach within the ROWs to ensure electrical clearance requirements are met and maintained for the life of the project.

### **Purpose and Need**

#### ***Western's Purpose and Need***

Transmission systems in the U.S. are planned, operated and maintained to meet North American Electric Reliability Corporation (NERC) reliability standards and National Electrical Safety Code (NESC) safety requirements. These organizations establish reliability, safety, and other standards for the bulk power system in the U.S. To fulfill its statutory mission and meet NERC and NESC standards and comply with relevant legal requirements, Western must ensure its facilities meet current standards, are readily accessible for maintenance and emergencies (including vegetation maintenance), are resistant to wildfire, and are cost effective for its customers. Through field inspections and maintenance records, Western has determined that the existing lines need to be upgraded and rebuilt.

#### ***Forest Service Purpose and Need***

The USFS purpose and need is to determine whether to issue a special use permit for the proposed transmission lines upgrade and rebuild. In conjunction with the issuance, the USFS would bring Western's facilities under a current authorization with a defined ROW and an Operation and Maintenance Plan. The USFS would use the EIS to determine if the Project requires an amendment to the current Forest Plan.

#### ***Decision to Prepare an EIS***

Western initially began preparation of an environmental assessment (EA) for the Project. Western's Project is under a class of actions in the DOE NEPA Implementing Procedures (10 CFR Part 1021) that normally requires the preparation of an EA. Subsequent to the EA determination, Western held public meetings and received numerous written and oral comments from the public and agencies on the Project during the scoping period. The public expressed concerns regarding the impacts of the proposal and some of the stakeholders requested evaluation of additional alternatives. In response to

input received during the initial EA scoping process, Western determined that an EIS would be the more appropriate level of NEPA review.

## **Public Involvement**

### **Scoping**

Potential issues were identified through an expanded public involvement process that included agency discussions, two sets of public scoping meetings, and scoping comments received during two formal scoping periods. The first round of public meetings was held in Estes Park and Loveland, Colorado, on November 29 and 30, 2011. At that time, Western anticipated preparing an EA for the Project. The scoping period for the EA extended from November 29 through January 31, 2012. Additional comments were received through May 2012.

Subsequent to the initial EA scoping period, Western determined that an EIS was the appropriate level of analysis for this Project. A Notice of Intent (NOI) was issued on April 17, 2012 (77 Federal Register 22774). The NOI invited public participation in the EIS scoping process and solicited public comments on the scope of the EIS during a 90-day scoping period initially set to expire on July 16, 2012. An extension of the scoping period to August 31, 2012, was subsequently announced on the Project website, through a press release, email notification, and direct mailing of a Project newsletter. EIS scoping meetings were held on August 6, 2012, in Loveland, Colorado, and August 7, 2012, in Estes Park, Colorado. Both meetings utilized an open house format with exhibits and opportunities for interaction with Western and USFS representatives. In response to public requests to extend the scoping period beyond the August 31, 2012, deadline, Western further extended the scoping period to October 19, 2012.

In total, more than 660 comment letters, forms and emails were received during the two scoping periods for the EA and the EIS. Both the EA and EIS Scoping Summary Reports are available for download from the Project website located at:

<https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/estes-flatiron.aspx>.

### **Alternative Development Workshops**

Western implemented an expanded public involvement process for the Project. The expanded public involvement process included three public alternatives workshops held in Estes Park and Loveland during the public scoping period. The purpose of alternatives workshops was to solicit public input on route options and design features to be considered during the alternatives development process for the EIS. Workshops were held on October 2, 2012, in Loveland, and on October 3 and October 4, 2012, in Estes Park.

Alternatives workshops utilized an open house format, and sought to engage meeting attendees in interactive exercises to identify route options. Large-format informational displays provided information about the public involvement process, transmission line siting considerations, and context-sensitive design options. Maps depicting steep slopes, park and open space, parcel boundaries, and viewsheds were on display, as well as large-format composite opportunity and constraint maps, to assist meeting participants with making informed suggestions on potential route options. Map booklets also provided detailed maps showing existing and proposed ROW in relation to parcel boundaries. Transmission structure options also were available for public review. A total of 49 meeting attendees signed in at the public alternatives workshops, including 27 at the meeting in Loveland, and 22 at the meetings in Estes Park.

### **Issue Identification**

Issues were defined as concerns about the potential effects of the Project. The range of issues was determined through agency, stakeholder, and public scoping, as well as through internal scoping between Western and the USFS. Each potential issue was evaluated to determine its relevance to the

Project. If the issue was determined to be a substantial concern, Western, in consultation with the USFS, evaluated whether it should be considered a “key issue” during the alternative development process. Western and the USFS cooperatively documented Key Issues. Key and other issues identified through scoping for the EIS are described below.

### ***Key Issues***

Key Issues and other scoping inputs were used to guide the development of alternatives and compare the differences between the alternatives analyzed in detail. Key Issues underlined during the alternatives development included the following:

- Effects of new ROW acquisition on land uses, property owners, and Western's customers.
- Effects on scenic travel corridors (e.g., U.S. Highway 36), residential, and recreational viewsheds in the vicinity of Estes Park, residential developments, such as Meadowdale Hills and Newell Lake View subdivisions, and on National Forest System lands.
- Effects of new road construction in inaccessible areas with steep topography.
- Effects on recreational uses and experiences in the vicinity of Estes Park and Pinewood Reservoir, and on National Forest System lands accessed by USFS Road 122 (Pole Hill Road).
- Effects on protected areas, including county open space, lands protected by conservation easement, lands within the Stewardship Trust Program, and State Wildlife Areas. No protected areas have been identified on National Forest System lands.
- Effects of ROW expansion or new ROW acquisition on existing infrastructure (e.g., Upper Thompson Sanitation District's treatment plant) and other structures.

### ***Other Issues Selected for Detailed Analysis***

Other issues define Project effects to be analyzed in detail in the EIS, but that have not driven alternatives development to the extent of the Key Issues. Other issues identified for detailed analysis included:

- Effects on property values and sources of revenue from tourism and outdoor recreation that Front Range communities and the regional economy rely upon.
- Effects of construction activities (e.g., ground disturbance for access, pole removal, and new structure installation) on cultural resources.
- Effects of ROW clearing and road construction, road reconstruction, road reconditioning and ongoing maintenance on wetlands, soils, and water quality.
- Potential effects of electric and magnetic fields from high-voltage power lines on human health.
- Effects on wildlife; plants; fisheries; threatened, endangered and USFS sensitive species; management indicator species; and general species of wildlife, plants (vegetation) and fish.
- Effects of increased traffic on resources due to West Pole Hill Road improvement under Alternatives C and C1.

### ***Issues Considered but Not Analyzed Further***

The following issues were considered but not analyzed further:

- Comments that Western should replace the lattice structures along the causeway of Lake Estes as part of this Project. The lattice structures are already double-circuit and are not part of the scope of this Project.

- Comments that the Estes-Pole Hill transmission line are not within the USFS designated utility corridor as outlined in the ARP Forest Plan, and that consolidating the two lines on the South Line would not be in compliance with the ARP Forest Plan. The USFS has stated that the designated utility corridor includes both the transmission line ROWs (USFS 2012a).
- Comments that the Project is a “waste of taxpayer funds” were determined to be outside the scope of the EIS.
- A request that Western complete a socio-economic analysis of tourist and recreation based economies in Denver, Fort Collins, Boulder, and other Front Range cities supported by the Roosevelt National Forest. Socioeconomic issues are analyzed in the EIS; however, because socio-economic effects of rebuilding the transmission line would not extend beyond the immediate Project vicinity, the analysis area is limited to the Town of Estes Park and Loveland.
- A request that Western expand notification during scoping and publish notices in papers in Denver, Boulder, and Longmont. Newspaper notices have been targeted for those communities where there is the greatest interest and potential for effects. Residents of Estes Park and Loveland would experience the greatest effects, and represent approximately 50 percent of the mailing addresses in the Project mailing list. Therefore, newspaper notices have been published in the Estes Park Trail-Gazette and Loveland Reporter-Herald. The USFS also published notices in their Newspaper of Record, which is the Fort Collins Coloradoan. Direct mailings, press releases, and website updates are the primary means to communicate Project updates to individuals that have shown an interest in the Project and reside outside Estes Park and Loveland.
- Comments expressing general support for, or opposition to, the Project without supporting rationale were determined to be expression of opinion, non-substantive, or outside the scope of the EIS.

### **Decisions Framework**

Western and the USFS prepared the EIS as the lead and cooperating Federal agencies, respectively. The results of the analysis are presented in this EIS and will form the basis for decisions regarding the Project.

Following the Draft EIS review and comment period, Western and the USFS considered comments submitted by the public, interested organizations and government agencies. Responses to all substantive comments are included in Chapter 9.0. Based on the Draft EIS and public input, Western and the USFS designated their Agency Preferred Alternative (APA) and provided rationale. Public notice of the APA was released on Western’s Project website as well as to interested parties December 2016. Western will issue a Record of Decision (ROD) no sooner than 30 days following the issuance of this Final EIS. Western may combine elements of alternatives considered in the EIS in the ROD.

As a cooperating agency, the USFS will prepare its own ROD in accordance with its respective policies and guidelines. The USFS is required to comply with all laws (National Forest Management Act, NEPA, Section 7 of the Endangered Species Act [ESA], National Historic Preservation Act, etc.), regulations, and policies for the portion of the Project on lands under its jurisdiction.

Instrumental to the decisions will be the consideration of measureable indicators that have been defined to evaluate the effects of the different alternatives with regard to key and other issues. The measurable indicators used to compare the alternatives are presented in **Tables S-4, S-5, and S-6**. The USFS decision will be subject to a pre-decisional objection process. In order to have standing to object to the USFS decision, a person(s) or organization must have submitted specific written comments during the 45-day public comment period on the Draft EIS. These comments are addressed in this Final EIS, Chapter 9.0. The Final EIS, Western draft ROD, and USFS draft ROD will be made

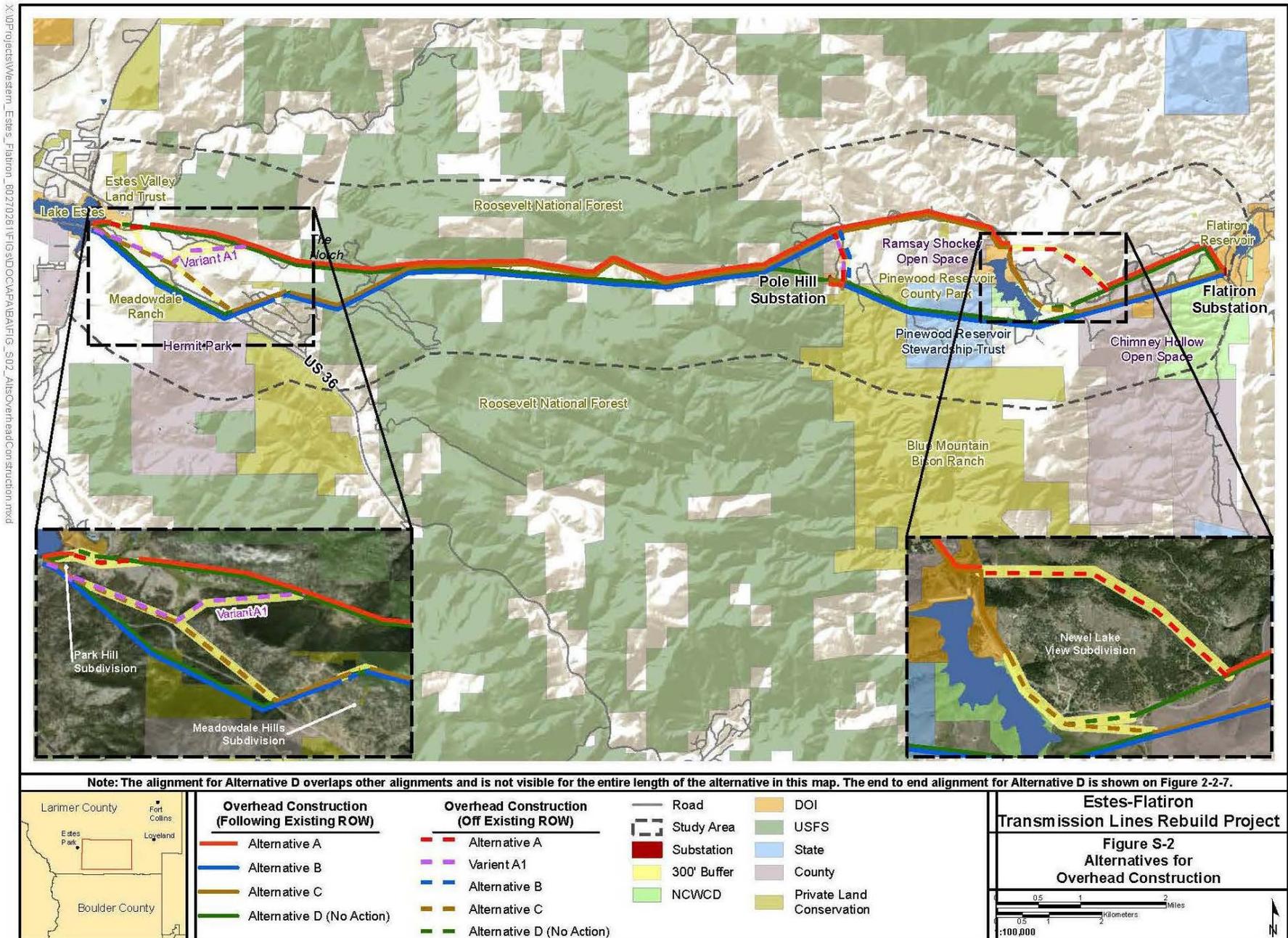
available to the public. The 45-day Objection Period will begin with publication of a legal notice in the USFS newspaper of record, the Fort Collins Coloradoan. This objection process is provided in compliance with the Consolidated Appropriations Act of 2012.

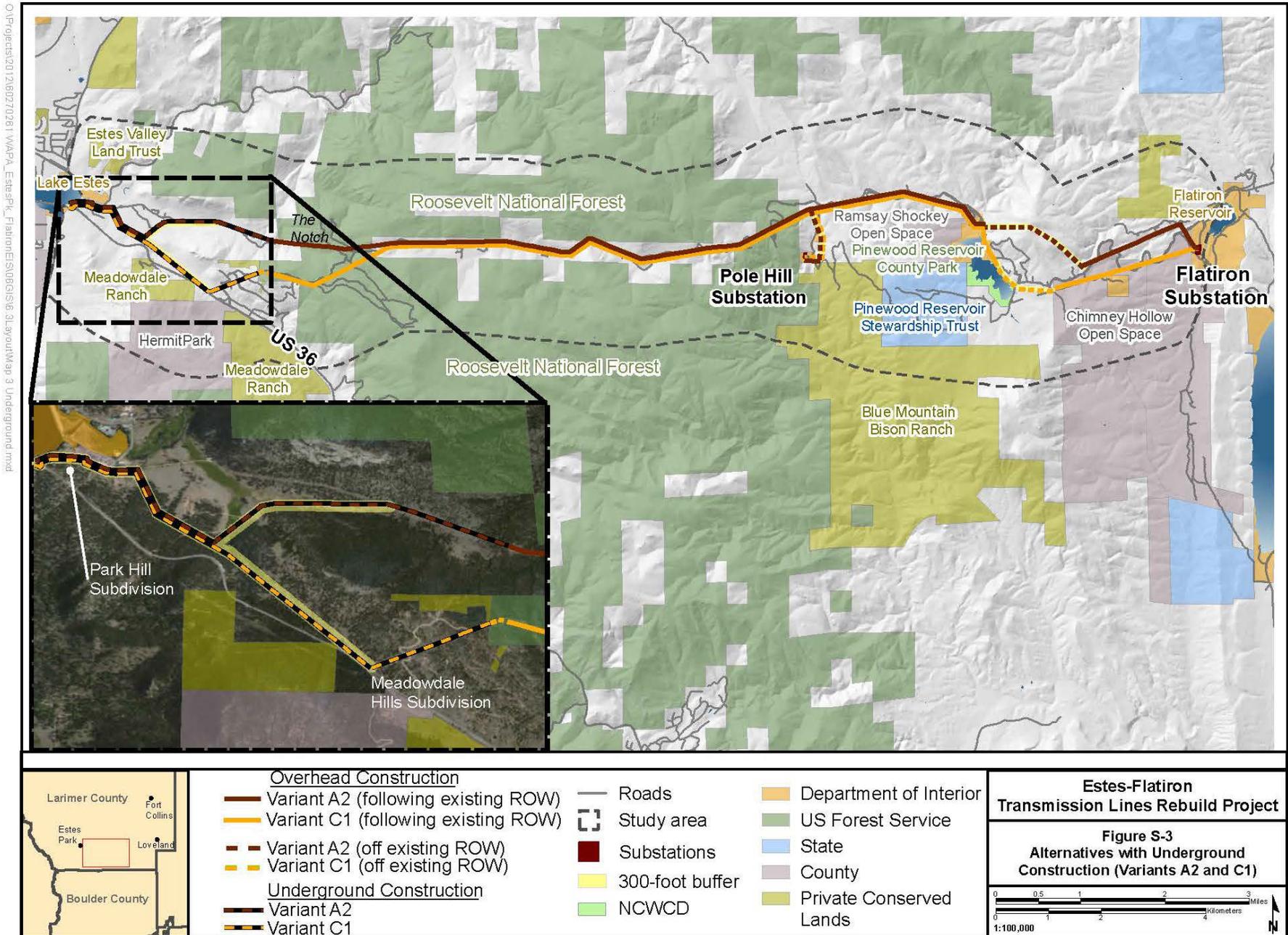
### Alternatives Considered in Detail

A range of reasonable alternatives for the Project was identified by evaluating routing opportunities and constraints, engineering design standards, public comments, and environmental resources that occur within the Project area. The objective was to identify alternatives that address public, environmental, and social concerns, while meeting the Project purpose and need and engineering criteria for the transmission lines rebuild Project. This process resulted in a set of action alternatives evaluated in the Draft EIS.

In the Draft EIS, seven full-length alternatives to rebuild and upgrade the existing 115-kV transmission lines were identified for detailed analysis, in addition to the No Action Alternative. These are described briefly below. In this EIS “variants” refer to alternatives that involve routing variations off the main alternative, whereas “reroutes” are any section of the alignment that is off existing ROW. Variants are considered Project alternatives and are evaluated as such. The alignments of alternatives using overhead construction methods are shown on **Figure S-2**. The alignment alternatives using underground construction methods are shown on **Figure S-3**.

- **No Action Alternative** – Keep the existing transmission lines in service through continuing structure replacement and maintenance. The existing ROWs would be expanded, as needed and minor adjustments made to the alignments where necessary in order to comply with NERC and NESC requirements. A segment through the Newell Lake View subdivision would be relocated and a new ROW acquired if necessary.
- **Alternative A** – Rebuild and consolidate the transmission lines primarily on the existing North transmission line ROW. This alternative includes a reroute to the north and northeast of Newell Lake View subdivision and along Mall Road in Estes Park (**Figure S-2**).
  - **Variant A1** – Variant A1 is identical to Alternative A for all but the westernmost segment (**Figure S-2**). At a point in the valley between Mount Olympus and Mount Pisgah, this routing variation would depart from the alignment of the existing North Line and traverse along the base of Mount Pisgah before turning to the northwest and generally following an alignment parallel to U.S. Highway 36 for the remaining distance to the existing steel lattice double-circuit structure at the intersection of U.S. Highway 36 and Mall Road.
  - **Variant A2** – Variant A2 follows an alignment similar to Variant A1; however, the westernmost 2.7 miles of the transmission line would be constructed underground (**Figure S-3**).
- **Alternative B** – Rebuild and consolidate the transmission line, primarily on the existing South Line ROW. This alternative includes a 0.25-mile reroute along Pole Hill Road on National Forest System lands, and a 0.75-mile reroute to the North Line on new ROW in the vicinity of Pole Hill Substation (**Figure S-2**).
- **Alternative C** – Rebuild and consolidate the transmission lines along an alignment that utilizes a combination of the existing North and South line ROWs. This alternative includes reroutes off existing transmission line ROW east of Pinewood Reservoir, along Pole Hill Road on National Forest System lands, and on privately held land on the west end of the Project area (**Figure S-2**).
  - **Variant C1** – Rebuild and consolidate the transmission lines along an alignment that utilizes a combination of the existing North and South line ROWs. This alternative follows an alignment similar to Alternative C; however, the westernmost 2.7 miles of the transmission line would be constructed underground (**Figure S-3**).





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- **Alternative D** – Rebuild the two existing transmission lines in-kind as single-circuit lines located on separate ROWs. This alternative would utilize structures similar to those currently in use, although structure height could increase by 5 to 10 feet. The existing ROWs would be expanded as needed and minor adjustments made to the alignments where necessary to comply with NERC and NESC requirements. This alignment includes a reroute to Pole Hill Road where there is inadequate ROW through Newell Lake View subdivision and relocation of one structure on the north side of the Upper Thompson Sanitation District parcel in Estes Park, to accommodate future expansion of their facility (**Figure S-2**).

To select an APA, Western looked to the factors within its purpose and need statement that an alternative would have to satisfy (Section 1.4.1). Ideally, the selected APA best meets the purpose and need while having the least impact on the human environment. Alternatives that met the basic purpose and need requirements, but had less impact than an alternative that better met the purpose and need, were carefully considered for selection as the APA. However, alternatives that clearly did not meet purpose and need requirements were not considered for selection.

The detailed analysis of the seven full-length alternatives and the No Action Alternative supported Western's selection of an APA that incorporated parts of several full-length alternatives. As depicted in **Figure S-4**, the APA would be a new double-circuit line between Flatiron Substation and U.S. Highway 36 at the intersection of Mall Road using Alternative C alignment in the west and primarily Alternative C alignment in the center, and Alternative B alignment in the east. Using portions of two alternatives allowed Western to further reduce expected environmental impacts while meeting the purpose and need objectives for the Project. The APA is presented in **Figure S-4** and described in Sections 2.2.1.9 and 2.8.1. The rationale for the selection is presented in Section 2.8.2.

#### **Key Differences between Alternatives**

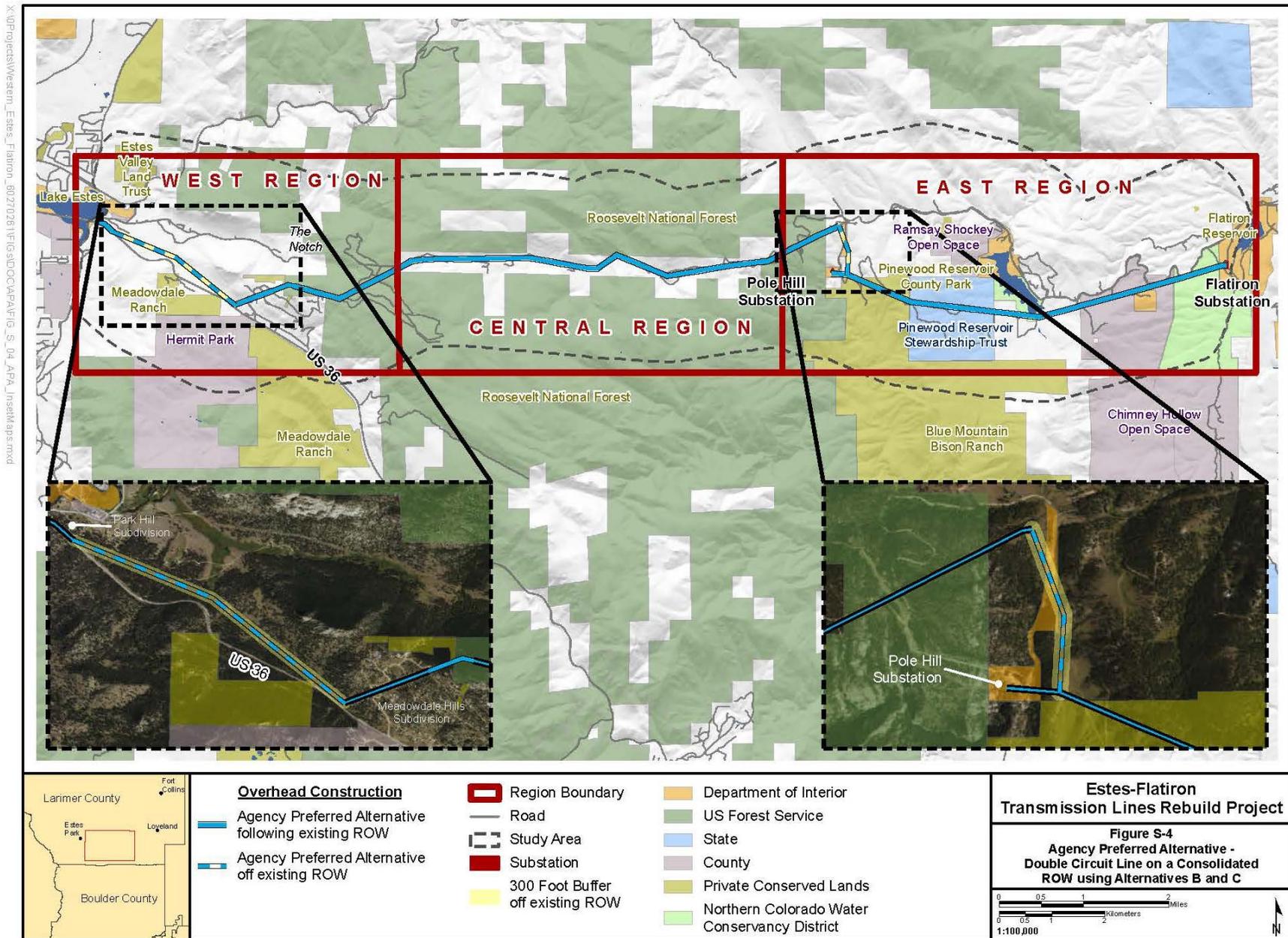
The key differences between the alternatives are route alignment (north or south of Mount Pisgah, and north or south of Pinewood Reservoir), ROW type (new or existing), transmission line type (single-circuit or double-circuit), transmission structure type (steel monopole or wood H-frame), and transmission line construction method (overhead or underground).

Alternatives A, B, and C and Variants A1, A2, C1, and the APA would all consolidate a rebuilt double-circuit transmission line onto a single ROW. The transmission line would be constructed overhead on steel monopoles for the entire length of the line under Alternatives A, B, and C and Variant A1, and the APA; Variants A2 and C1 would construct the westernmost 2.7 miles of the double-circuit line underground on different alignments. Alternative D proposes to rebuild both existing transmission lines as single-circuit lines on primarily existing ROW using wood H-frame structures.

Access requirements also are a key difference between the alternatives. Alternative A and Variants A1 and A2 traverse steep terrain with poor access on National Forest System lands in the vicinity of The Notch (**Figures S-2** and **S-3**). Other areas with steep terrain and poor access include the alignment for Alternative A north of the Newell Lake View subdivision, the alignment for Alternative B on existing ROW south of U.S. Highway 36, and the alignment for Alternative D on existing ROW west of Pole Hill Substation.

Estimates of short-term disturbance areas associated with transmission line construction are provided in **Table S-1** below. Long-term disturbance for structure bases would be less than 0.1 acre for any alternative.

A comparison of rough order of magnitude life-cycle costs for the seven end-to-end alternatives, the APA and the No Action is provided in **Table S-2** below.



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**Table S-1 Summary of Short-term Disturbance for Transmission Line Construction by Alternative**

Project Component	Disturbance Area	Short-term Disturbance by Alternative (acres)						
		A/A1	A2	B	C	C1	APA	D
Structure installation	0.26 acre per structure	18 - 24	15 - 20	20 - 26	19 - 25	15 - 21	19-26	56 - 65
Conductor stringing sites	0.25 acre per site	1 - 3	1 - 2	1 - 3	1 - 3	1 - 2	1-3	2 - 5
Staging areas	2-3 sites; 5 acres per site	10 - 15	10 - 15	10 - 15	10 - 15	10 - 15	10-15	10 - 15
Removal of existing H-frame structures	0.22 acre per structure	45	44	45	45	44	45	41
Pulling sites for line removal	0.25 acre per site	1 - 3	1 - 2	1 - 3	1 - 3	1 - 2	1-3	2 - 5
Underground construction	9 acres per mile	NA	24	NA	NA	25	NA	NA
<b>Total</b>		<b>75 - 90</b>	<b>95 - 108</b>	<b>77 - 92</b>	<b>75 - 90</b>	<b>96 - 108</b>	<b>76-91</b>	<b>112 -132</b>

**Table S-2 Preliminary Transmission Line Cost Estimates by Alternative**

	Alternative (\$ millions)								
	A	A1	A2	B	C	C1	APA	D	No Action
80-year construction cost	18.9	19.2	45.4	17.1	17.2	42.6	16.6	51.8	56.9
80-year maintenance cost	1.2	1.2	1.1	1.1	1.2	1	1.1	3.1	3.1
80-year vegetation management cost	1.6	1.6	1.4	1.8	1.8	1.5	1.7	3.2	3.2
<b>Total 80-year life cycle cost</b>	<b>21.7</b>	<b>21.9</b>	<b>47.8</b>	<b>19.9</b>	<b>20.1</b>	<b>45</b>	<b>19.3</b>	<b>58</b>	<b>63.2</b>
Easement acquisition cost	1.9	1.6	1.6	0.4	0.8	1.4	0.4	1.7	1.7
<b>Total</b>	<b>23.6</b>	<b>23.5</b>	<b>49.4</b>	<b>20.3</b>	<b>20.9</b>	<b>46.4</b>	<b>19.7</b>	<b>59.7</b>	<b>64.9</b>

## Alternatives Considered but Eliminated

### Alternative Alignments

In addition to the alignments carried forward for detailed analysis in the Draft EIS, several additional routing alternatives were identified and considered. Some of these potential alternatives emerged through a series of public workshops held in October 2012 that were intended to review the constraint/opportunity criteria and to solicit public comment on potential alternative alignments. Through this process, a wide range of potential routing alternatives were considered. Some of the potential routing alternatives were carried forward for detailed analysis while others were eliminated following an initial consideration of their feasibility. Alternative alignments considered but eliminated, including the reasons for their elimination, are summarized in **Table S-3** below.

**Table S-3 Alternative Alignments Dismissed from Detailed Analysis**

Potential Reroute	Reason for Dismissal
U.S. Highway 34 and U.S. Highway 36 reroutes	Proposals to reroute the transmission line along U.S. Highways 34 and 36 would not use existing transmission line ROWs and would instead follow existing transportation ROWs. These proposals were not carried forward because they would greatly increase visual impacts, an important consideration in this area. These proposals would not resolve the issues raised during scoping, but would simply displace impacts to new landowners and may require constructing an additional length of transmission line. Locating the lines along these routes also adds flooding as another possible major catastrophic future event that may affect the transmission lines.
Reroute west of Meadowdale Hills subdivision, on the east slope of Mount Pisgah	This potential route crosses steep, rocky slopes without any existing access roads, and would be difficult and costly to construct, and would result in substantial erosion risks as well as increased maintenance costs. Access road construction across this topography would require excessive cut and fill and increase visual impacts, and would potentially result in heightened safety concerns to maintenance crews.
Reroute to the south side of the North Line, below The Notch	This potential route is located in an area with steep slopes and poor access; also it follows a riparian corridor. Western's standard construction practice (SCPs) direct that structure sites, access ways, and other disturbance areas will be located at least 100 feet, where practical, from rivers and streams (including ephemeral streams). Because this route would be in difficult terrain and follows a riparian corridor it was not considered suitable for siting the transmission line.
Reroutes far to the south of the South Line in the vicinity of Pinewood Reservoir Stewardship Trust and Blue Mountain Bison Ranch	This routing strategy was suggested during workshops to reduce effects to recreational and residential viewsheds at Pinewood Reservoir. These reroutes were dismissed because they crossed protected lands, did not fully address the visual resource issue, and displaced existing impacts to new landowners. Some area residents suggested a reroute around the north side of Newell Lake View subdivision to reduce visual impacts to their community, and a routing option was identified and carried forward for detailed analysis (Alternative A).
A reroute that followed a gas pipeline between the North and South Line on the east end of the Project area, between the access road to the Bald Mountain radio facility and the intersection of Pole Hill Road and Chimney Hollow Road	This reroute was suggested as a means to co-locate linear infrastructure. However, the reroute fails to effectively address other scoping issues related to visual impacts and would require new ROW acquisition resulting in new acquisition costs and subsequent new surface disturbance, as well as displacement of impacts to new landowners. There also may be additional mitigation required by the gas utility, if Western were to site a transmission line parallel to an existing gas line.

**Table S-3 Alternative Alignments Dismissed from Detailed Analysis**

Potential Reroute	Reason for Dismissal
Reroute following Flatiron Penstocks (CBT Project)	In an effort to further consolidate linear facilities, consideration was given to an alignment that paralleled the penstocks that descend Bald Mountain to Flatiron Reservoir. The penstocks emerge aboveground well below the summit of Bald Mountain and follow an alignment that is prominent in the viewshed from Flatiron Reservoir, one that doesn't take advantage of the opportunities for concealment provided by the surrounding terrain. Steep and rocky terrain also would contribute to access concerns. Further, the penstocks are facilities that date to the 1940s and have a degree of historic significance.
Reroute along Cottonwood Creek	This reroute would extend from the vicinity of Flatiron Reservoir and follow an alignment to the northwest generally along Cottonwood Creek, rejoining the ROW of the existing North Line near Pinewood Reservoir Dam. This alternative would require several miles of construction through steep terrain with poor access. It was dropped in favor of Alternative A that avoided the Pinewood Reservoir viewshed and the adjacent subdivision in a more direct and effective manner.

### ***Alternative Structure Types***

In addition to routing options, alternative Project designs were considered and presented during the public workshops held in October 2012. Other project structure designs considered included steel lattice structures and double-circuit wood H-frame structures. Double-circuit wood H-frame structures are unconventional and rarely used by Western for reliability reasons. Western does not currently consider lattice steel structures or double-circuit wood H-frame structures a viable option. Neither the lattice nor double-circuit H-frame designs were carried forward for further analysis.

### ***Use of Olympus Tunnel***

The Olympus Tunnel begins below Lake Estes and extends to the east through Mount Olympus eventually meeting up with the Pole Hill Tunnel and other CBT Project facilities that extend all the way to Flatiron Reservoir. The possibility of placing an underground cable system within the Olympus Tunnel and other below ground facilities was identified as a potential opportunity, one that would reduce or eliminate visual impacts and other identified concerns. Although such systems have been installed in other water conveyance tunnels, including the Adams Tunnel through Rocky Mountain National Park, they are only feasible when the facility is specifically designed to accommodate the cables and splices at the time of its initial construction. Placing a cable within a tunnel not designed and constructed to accommodate one would diminish the capacity of the facility to deliver water and function as designed, and also would create considerable operational, scheduling, and maintenance challenges. As an example, water delivery would have to be suspended and the tunnel drained for any kind of cable maintenance. For these reasons, this alternative was not considered feasible and it was dropped from further consideration.

### ***Underground Construction near Pinewood Reservoir***

Due to the sensitivity of the viewshed south of Pinewood Reservoir, underground construction was considered for a segment of the Project through this area, following the alignment of Alternative B. Underground construction presents a number of challenges, including substantially higher costs than conventional aboveground construction. The increase in cost needs to be weighed against the

expected benefits, in this case an incremental decrease in visual impacts. Western also does not currently maintain any underground lines and therefore does not have the expertise, equipment, or replacement material to maintain an underground transmission line. Any maintenance or repair would need to be contracted out, potentially resulting in longer outages. Alternative A would avoid the viewshed south of Pinewood Reservoir, providing an alternative that would eliminate these impacts at a much lower cost. For these reasons, underground construction at this location was dropped from further consideration.

### **Underground Construction on National Forest System Land**

Variant C1 would rebuild the transmission line underground from the Mall Road east to the National Forest System boundary near the north end of the Meadowdale Hills subdivision. Western considered extending Variant C1 further east onto National Forest System lands, but dismissed that potential option based on the following technical reasons.

- Extending Variant C1 further east along the proposed alignment for Alternative C would involve costly trenching within a rocky rough section of Pole Hill Road that is noted for its recreational value to high clearance off road vehicle users (hereafter referred to as four-wheel drive users). Restoring Pole Hill Road to previous conditions following installation of cable trenches would not be possible, unless the cable trenches were buried deeper. Continued use of Pole Hill Road would impact the integrity of cable trenches.
- Terminating the underground section on National Forest System land would require an underground service vault. This vault could not be located on Pole Hill Road and would require that the vault be located off the road. The installation of the vault would require the clearing of a large forested area to accommodate the vault installation and future access.
- Extending Alternative C1 along the existing South Line route would require extensive clearing within a mixed coniferous forest. The width of the clearing would need to accommodate the trench, a spoil pile, and a service road to accommodate the installation of the cable trench and service vault.

### **Impact Comparison**

**Tables S-4, S-5, and S-6** compare the alternatives and APA using measurable indicators, with regard to Key Issues and other issues identified in Section 1.6.3. **Table S-4** compares the alternatives over their full lengths. Based on public input, additional summary impact tables were produced (**Tables S-5 and S-6**) which compare the impacts for just the ends of the Project (west region and east region). **Table S-7** provides a summary comparison of environmental effects by resource and alternative. Data presented in these tables were based on specific effects of each alternative on each resource and can be found in Chapter 4.0. Data presented in **Tables S-4 through S-6** have been modified slightly in comparison to the Draft EIS presentation, to take advantage of new data availability and revised ROW acquisition needs, as well as to include the APA.

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**Table S-4 Measurement Indicators for Key and Other Issues, Full-length Alternatives**

Measurement Indicators for Issues	Alternative A	Variant A1	Variant A2	Alternative B	Alternative C	Variant C1	Alternative D	APA	No Action Alternative
<b>Issue: ROW acquisition</b>									
Acres of new ROW acquisition <sup>1</sup>	140	144	137	42	101	102	120	87	120
Acres of new ROW acquisition (National Forest System lands) <sup>1</sup>	14	14	14	10	10	10	14	10	14
Acres of ROW to be decommissioned <sup>1</sup>	154	159	158	57	132	131	2	105	2
Linear miles of ROW to be decommissioned <sup>1</sup>	15	16	16	14	16	16	1	15	1
Miles of land ownership crossed	Private - 12.5 USFS - 1.5 DOI - 0.1 SLB - 0.0 NCWCD - 0.4 County - 0.6	Private - 12.7 USFS - 1.5 DOI - 0.1 SLB - 0.0 NCWCD - 0.4 County - 0.5	Private - 12.8 USFS - 1.5 DOI - 0.1 SLB - 0.0 NCWCD - 0.4 County - 0.5	Private - 9.9 USFS - 2.0 DOI - 0.1 SLB - 1.0 NCWCD - 0.8 County - 1.0	Private - 11.2 USFS - 2.0 DOI - 0.1 SLB - 0.0 NCWCD - 1.1 County - 1.1	Private - 11.3 USFS - 2.0 DOI - 0.1 SLB - 0.0 NCWCD - 1.1 County - 1.1	Private - 20.8 USFS - 3.4 DOI - 0.2 SLB - 1.0 NCWCD - 1.5 County - 1.7	Private - 10.0 USFS - 2.0 DOI - 0.1 SLB - 1.0 NCWCD - 0.8 County - 1.0	Private - 20.8 USFS - 3.4 DOI - 0.2 SLB - 1.0 NCWCD - 1.5 County - 1.7
<b>Issue: effects on visual resources</b>									
Existing Scenic Integrity Objective (SIO) (National Forest System lands)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Resulting SIO (National Forest System lands)	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Moderate	Very Low <sup>2</sup>	Moderate
<b>Issue: Forest road construction/reconstruction<sup>3</sup></b>									
Miles of new administrative road on National Forest System land for permanent access	0.9	0.9	0.9	0.6	0.6	0.6	2.0	0.6	2.0
Reconstruction of existing maintenance level 2 (ML2) system road on National Forest System lands (miles)	0	0	0	0	0	0	0	0	0
Limited reconditioning of existing ML2 system road post-construction (miles)	2.5	2.5	2.5	3.4	3.8	3.8	3.4	3.8	3.4
<b>Issue: recreational uses and experiences</b>									
Long-term changes in recreation opportunities on National Forest System lands	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>	Significant adverse impacts to four-wheel drive opportunities due to west Pole Hill Road upgrade; increased opportunities for dispersed recreation.	Significant adverse impacts to four-wheel drive opportunities due to west Pole Hill Road upgrade; increased opportunities for dispersed recreation.	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>
<b>Issue: protected lands</b>									
No. protected lands crossed <sup>5</sup>	4	4	4	5	4	4	6	5	6
<b>Issue: effects on infrastructure</b>									
Conflicts with Upper Thompson Sanitation District	No	No	No	No	No	No	No	No	Limits facility expansion
Colorado-Big Thompson (CBT) Pole Hill Penstocks <sup>8</sup>	No	No	No	No	No	No	No	No	No
<b>Issue: property values and economic effects</b>									
No. of landowners affected by ROW acquisition <sup>1</sup>	59	49	60	23	51	74	61	24	61
New ROW	17	12	23	3	14	37	13	4	13
Expanded ROW	42	37	37	20	37	37	48	20	48
No. of landowners affected by both new ROW and expanded ROW acquisition <sup>1</sup>	53	46	56	21	47	69	55	23	55

**Table S-4 Measurement Indicators for Key and Other Issues, Full-length Alternatives**

Measurement Indicators for Issues	Alternative A	Variant A1	Variant A2	Alternative B	Alternative C	Variant C1	Alternative D	APA	No Action Alternative
Subdivisions affected by ROW acquisition (new or expanded ROW)	Park Hill Newell Lake	Park Hill Newell Lake	Park Hill Newell Lake	Park Hill	Park Hill Newell Lake	Park Hill Newell Lake	Park Hill Newell Lake	Park Hill	Park Hill Newell Lake
No. of landowners with ROW to be decommissioned	58	61	60	61	50	48	17	62	17
Businesses directly affected	NA	NA	NA	NA	Four-wheel drive tour operator	Four-wheel drive tour operator	NA	NA	NA
<b>Issue: cultural resources</b>									
Number of National Register of Historic Places (NRHP)-eligible historic sites potentially impacted	4	5	4	3	5	4	5	5	5
<b>Issue: water resources, floodplains, and wetlands<sup>6</sup></b>									
Waterbodies Crossed	44	41	41	34	42	42	67	38	66
Wetlands Present	15	14	15	9	14	13	21	12	20
Waters of the U.S.	20	18	20	14	22	20	29	20	29
<b>Issue: ROW clearing and maintenance</b>									
<b>Soil types in Analysis Area<sup>7</sup></b>									
Soils with shallow bedrock (within 60 inches of soil surface) (acres)	279	326	266	316	320	271	521	285	515
Low revegetation potential (acres)	32	97	37	101	68	26	144	68	144
Compaction prone (acres)	123	123	122	71	173	161	207	120	200
Water erodible (acres)	164	172	160	114	114	111	215	94	217
<b>Vegetation types in ROW<sup>8</sup></b>									
Ponderosa pine woodland (acres)	136	145	139	103	128	124	210	118	210
Mixed conifer forest (acres)	9	13	9	34	17	17	42	17	42
Mountain shrub mosaic (acres)	29	25	28	28	34	35	63	31	63
Upland meadow, or upland meadow/wetland mosaic (acres)	16	10	15	17	16	20	39	17	39
<b>Issue: electric and magnetic fields</b>									
Electric fields at ROW edge (kilovolt per meter [kV/m]) <sup>9</sup>	0.12	0.12	0	0.12	0.12	0	0.34	0.12	0.34
Magnetic fields at each ROW edge (milligauss [mG]) <sup>10</sup>	5.2/1.8	5.2/1.8	0.05	5.2/1.8	5.2/1.8	0.05	5.2/5.3	5.2/1.8	5.2/5.3
<b>Issue: effects on plants, wildlife, and fish</b>									
<b>Special Status Plants<sup>11</sup></b>									
Threatened and endangered	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII
Species of local concern	LP	LP	LP	LP	LP	LP	LP	LP	LP
<b>Big Game<sup>12</sup></b>									
Elk and Mule Deer Winter Range (acres)	83	84	97	84	82	103	122	81	122
Moose Winter Range (acres)	35	36	39	38	36	42	56	36	56
<b>Special Status Wildlife<sup>13</sup></b>									
Threatened and endangered <sup>14</sup>	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII
Management indicator species	NC	NC	NC	NC	NC	NC	NC	NC	NC

- <sup>1</sup> The transmission line ROW acquisition footprint was revised based on a June 11, 2015 call between Carey Ashton (Western) and Steve Ensley (AECOM). Transmission ROW acreage does not include access roads.
- <sup>2</sup> Would require lowering of SIO and documentation of change of SIO in MA 8.3 - Utility Corridor for this Project area, in accordance with Forest Plan Standard 154 and also documentation in the USFS ROD.
- <sup>3</sup> All construction and reconstruction analyses were calculated with Western provided shapefiles. Forest road construction and reconstruction analysis does not include transmission line ROW acreage.
- <sup>4</sup> The Project would not change existing public road systems, access to recreational opportunities, or the 4-wheel drive section of West Pole Hill Road. Therefore, the Project would have no effect on recreational uses and experiences.
- <sup>5</sup> Protected lands include the Flatiron Reservoir County Park, Chimney Hollow Open Space, Pinewood Reservoir County Park, Ramsay Shockey Open Space, Blue Mountain Bison Ranch, and a SLB Stewardship Trust parcel.
- <sup>6</sup> Wetlands and waterbodies were determined from desktop analysis (U.S. Geological Survey [USGS] National Hydrography Dataset [NHD] data) and augmented with survey data where available. Ground surveys were completed early in the NEPA process during initial EA alternative development. Therefore, survey data were not collected for the full suite of alternatives. A full delineation of wetlands and waterbodies will be performed on the APA during final design and prior to construction. "Waterbodies" encompasses both perennial and intermittent streams.
- <sup>7</sup> The soils analysis was based on a corridor of 200 feet for existing transmission lines centered on the ROW, 300 feet for new routing options, and 75 feet for underground variants. Some locations may have more than one soil characteristic.
- <sup>8</sup> Data were determined based on a 110-foot width centered on the anticipated line and 75 feet for underground variants. Data also are based on Environmental Systems Research Institute, Inc. (ESRI) landcover data/Southwest Regional Gap Analysis Program (SWReGAP).
- <sup>9</sup> New steel pole line has a lower electric field signature than the existing H-frame line because of taller structures and the cancellation effect of the double-circuit line.
- <sup>10</sup> Magnetic fields of new steel pole line would be similar at the edge of the ROW compared to the existing H-frame line, but less when within the ROW. Additionally, magnetic fields differ on either side of the aboveground structures.
- <sup>11</sup> Determinations based on analyses identified in Section 4.8.
- <sup>12</sup> Acreage is based on the overlap of elk and mule deer winter range over the estimated construction surface disturbance within the ROW.
- <sup>13</sup> Determinations based on analyses identified in Section 4.10.
- <sup>14</sup> No federally listed wildlife species have potential to occur within the Project area as determined in the Project Biological Report (Cedar Creek Associates 2014) and further discussed in Section 3.10.1.

Abbreviations:

NA = not applicable or effects would not occur.

LP = low probability of species presence.

MAII = may adversely impact individuals, but not likely to result in a loss of viability on the Planning area, or cause a trend to federal listing.

NLAA = may affect, not likely to adversely affect.

NC = no change in population trend.

**Table S-5 Measurement Indicators for Key and Other Issues, West Region Portions of Alternatives**

Measurement Indicators for Issues	West Region, Alternative A	Variant A1	Variant A2	West Region Alternative B	West Region Alternative C	Variant C1	West Region Alternative D	West Region Only, APA	West Side No Action Alternative
<b>Issue: ROW acquisition</b>									
Acres of new ROW acquisition <sup>1</sup>	36	40	33	4	26	27	35	26	35
Acres of new ROW acquisition (National Forest System lands) <sup>1</sup>	8	8	8	4	4	4	8	4	8
Acres of ROW to be decommissioned <sup>1</sup>	51	57	56	14	40	39	1	40	1
Linear miles of ROW to be decommissioned <sup>1</sup>	4	6	6	4	5	5	0	5	0
Miles of land ownership crossed	Private - 2.7 USFS - 0.9 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.1	Private - 2.9 USFS - 0.9 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 3.0 USFS - 0.9 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 2.6 USFS - 1.4 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 2.6 USFS 1.4 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 2.7 USFS - 1.4 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 5.3 USFS - 2.3 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.1	Private - 2.6 USFS - 1.4 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.0	Private - 5.3 USFS - 2.3 DOI - 0.0 SLB - 0.0 NCWCD - 0.0 County - 0.1
<b>Issue: effects on visual resources</b>									
Existing SIO (National Forest System lands)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Resulting SIO (National Forest System lands)	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Moderate	Very Low <sup>2</sup>	Moderate
<b>Issue: Forest road construction/reconstruction<sup>3</sup></b>									
Miles of new administrative road on National Forest System land for permanent access	0.8	0.8	0.8	0.5	0.5	0.5	1.4	0.5	1.4
Reconstruction of existing ML2 system road on National Forest System lands (miles)	0	0	0	0	0	0	0	0.0	0
Limited reconditioning of existing ML2 system road post-construction (miles)	0.7	0.7	0.7	1.6	2	2	1.6	2	1.6
<b>Issue: recreational uses and experiences</b>									
Long-term changes in recreation opportunities on National Forest System lands	No Changes due to Project <sup>4</sup>	Changes to four-wheel drive opportunities	Changes to four-wheel drive opportunities	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>	No Changes due to Project <sup>4</sup>			
<b>Issue: protected lands</b>									
No. protected lands crossed <sup>5</sup>	0	0	0	0	0	0	0	0	0
<b>Issue: effects on infrastructure</b>									
Conflicts with Upper Thompson Sanitation District	No	No	No	No	No	No	No	No	Limits facility expansion
CB Pole Hill Penstocks <sup>8</sup>	No	No	No	No	No	No	No	No	No
<b>Issue: property values and economic effects</b>									
No. of landowners affected by ROW acquisition <sup>1</sup>	16	6	17	1	3	26	12	3	12
New ROW	9	4	15	0	2	25	3	2	3
Expanded ROW	7	2	2	1	1	1	9	1	9
No. of landowners affected by both new ROW and expanded ROW acquisition <sup>1</sup>	12	5	15	1	3	25	9	3	9
Subdivisions affected by ROW acquisition (new or expanded ROW)	Park Hill	Park Hill	Park Hill	Park Hill	Park Hill	Park Hill	Park Hill	Park Hill	Park Hill
No. of landowners with ROW to be decommissioned	18	22	20	9	10	8	3	10	3
Businesses directly affected	NA	NA	NA	NA	NA: Four-wheel drive tour operator	NA: Four-wheel drive tour operator would	NA	NA	NA

**Table S-5 Measurement Indicators for Key and Other Issues, West Region Portions of Alternatives**

Measurement Indicators for Issues	West Region, Alternative A	Variant A1	Variant A2	West Region Alternative B	West Region Alternative C	Variant C1	West Region Alternative D	West Region Only, APA	West Side No Action Alternative
					would not be affected, due to a Project Design Change	not be affected, due to a Project Design Change			
<b>Issue: cultural resources</b>									
Number of NRHP-eligible historic sites potentially impacted	0	1	0	0	1	0	0	1	0
<b>Issue: water resources, floodplains, and wetlands<sup>6</sup></b>									
Waterbodies Crossed	13	10	10	5	4	4	16	4	16
Wetlands Present	4	3	4	2	3	2	7	3	7
Waters of the U.S.	5	3	4	3	3	1	8	3	8
<b>Issue: ROW clearing and maintenance</b>									
<b>Soil types in Analysis Area<sup>7</sup></b>									
Soils with shallow bedrock (within 60 inches of soil surface) (acres)	51	98	38	96	97	48	147	97	147
Low revegetation potential (acres)	27	92	32	63	63	21	89	63	89
Compaction prone (acres)	6	6	5	1	19	7	6	19	6
Water erodible (acres)	19	27	15	17	12	9	36	12	36
<b>Vegetation types in ROW<sup>8</sup></b>									
Ponderosa pine woodland (acres)	29	38	32	31	34	30	61	34	61
Mixed conifer forest (acres)	4	8	4	20	14	14	24	14	24
Mountain shrub mosaic (acres)	7	3	6	1	3	4	8	3	8
Upland meadow, or upland meadow/wetland mosaic (acres)	7	1	6	1	1	5	6	1	6
<b>Issue: electric and magnetic fields</b>									
Electric fields at ROW edge (kV/m) <sup>9</sup>	0.12	0.12	0	0.12	0.12	0	0.34	0.12	0.34
Magnetic fields at each ROW edge (mG) <sup>10</sup>	5.2/1.8	5.2/1.8	0.05	5.2/1.8	5.2/1.8	0.05	5.2/5.3	5.2/1.8	5.2/5.3
<b>Issue: effects on plants, wildlife, and fish</b>									
<b>Special Status Plants<sup>11</sup></b>									
Threatened and endangered	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII
Species of local concern	LP	LP	LP	LP	LP	LP	LP	LP	LP
<b>Big Game<sup>12</sup></b>									
Elk and Mule Deer Winter Range (acres)	20	21	21	23	21	23	33	21	33
Moose Winter Range (acres)	20	21	21	23	21	23	33	21	33
<b>Special Status Wildlife<sup>13</sup></b>									
Threatened and endangered <sup>14</sup>	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present	No Effect; None Present
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII	MAII
Management indicator species	NC	NC	NC	NC	NC	NC	NC	NC	NC

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- <sup>1</sup> The transmission line ROW acquisition footprint was revised based on a June 11, 2015 call between Carey Ashton (Western) and Steve Ensley (AECOM). Transmission ROW acreage does not include access roads.
- <sup>2</sup> Would require lowering of SIO and documentation of change of SIO in MA 8.3 - Utility Corridor for this Project area, in accordance with Forest Plan Standard 154 and also documentation in the USFS ROD.
- <sup>3</sup> All construction and reconstruction analyses were calculated with Western provided shapefiles. Forest road construction and reconstruction analysis does not include transmission line ROW acreage.
- <sup>4</sup> The Project would not change existing public road systems, access to recreational opportunities, or the 4-wheel drive section of West Pole Hill Road. Therefore, the Project would have no effect on recreational uses and experiences.
- <sup>5</sup> Protected lands include the Flatiron Reservoir County Park, Chimney Hollow Open Space, Pinewood Reservoir County Park, Ramsay Shockey Open Space, Blue Mountain Bison Ranch, and a SLB Stewardship Trust parcel.
- <sup>6</sup> Wetlands and waterbodies were determined from desktop analysis (USGS NHD data) and augmented with survey data where available. Ground surveys were completed early in the NEPA process during initial EA alternative development. Therefore, survey data were not collected for the full suite of alternatives. A full delineation of wetlands and waterbodies will be performed on the APA during final design and prior to construction. "Waterbodies" encompasses both perennial and intermittent streams.
- <sup>7</sup> The soils analysis was based on a corridor of 200 feet for existing transmission lines centered on the ROW, 300 feet for new routing options, and 75 feet for underground variants. Some locations may have more than one soil characteristic.
- <sup>8</sup> Data were determined based on a 110-foot width centered on the anticipated line and 75 feet for underground variants. Data also are based on ESRI landcover data/SWReGAP.
- <sup>9</sup> New steel pole line has a lower electric field signature than the existing H-frame line because of taller structures and the cancellation effect of the double-circuit line.
- <sup>10</sup> Magnetic fields of new steel pole line would be similar at the edge of the ROW compared to the existing H-frame line, but less when within the ROW. Additionally, magnetic fields differ on either side of the aboveground structures.
- <sup>11</sup> Determinations based on analyses identified in Section 4.8.
- <sup>12</sup> Acreage is based on the overlap of elk and mule deer winter range over the estimated construction surface disturbance within the ROW.
- <sup>13</sup> Determinations based on analyses identified in Section 4.10.
- <sup>14</sup> No federally listed wildlife species have potential to occur within the Project area as determined in the Project Biological Report (Cedar Creek Associates 2014) and further discussed in Section 3.10.1.

Abbreviations:

NA = not applicable or effects would not occur.

LP = low probability of species presence.

MAII = may adversely impact individuals, but not likely to result in a loss of viability on the Planning area, or cause a trend to federal listing.

NLAA = may affect, not likely to adversely affect.

NC = no change in population trend.

**Table S-6 Measurement Indicators for Key and Other Issues, East Region Portions of Alternatives**

Measurement Indicators for Issues	East Region, Alternative A	East Region, Alternative B	East Region, Alternative C	East Region, Alternative D	East Region, APA	East Region, No Action Alternative
<b>Issue: ROW acquisition</b>						
Acres of new ROW acquisition <sup>1</sup>	59	17	31	40	17	40
Acres of new ROW acquisition (National Forest System lands) <sup>1</sup>	6	6	6	6	6	6
Acres of ROW to be decommissioned <sup>1</sup>	61	25	52	1	25	1
Linear miles of ROW to be decommissioned <sup>1</sup>	6	5	6	0	5	0
Miles of land ownership crossed	Private - 5.1 USFS - 0.6 DOI - 0.1 SLB - 0.0 NCWCD - 0.4 County - 0.5	Private - 2.7 USFS - 0.6 DOI - 0.1 SLB - 1.0 NCWCD - 0.8 County - 1.0	Private - 3.9 USFS - 0.6 DOI - 0.1 SLB - 0.0 NCWCD - 1.1 County - 1.1	Private - 6.2 USFS - 1.1 DOI - 0.2 SLB - 1.0 NCWCD - 1.5 County - 1.6	Private - 2.7 USFS - 0.6 DOI - 0.1 SLB - 1.0 NCWCD - 0.8 County - 1.0	Private - 6.2 USFS - 1.1 DOI - 0.2 SLB - 1.0 NCWCD - 1.5 County - 1.6
<b>Issue: effects on visual resources</b>						
Existing SIO (National Forest System lands)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Resulting SIO (National Forest System lands)	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Very Low <sup>2</sup>	Moderate	Very Low <sup>2</sup>	Moderate
<b>Issue: Forest road construction/reconstruction <sup>3</sup></b>						
Miles of new administrative road on National Forest System land for permanent access	0.0	0.0	0.0	0.5	0.0	0.5
Reconstruction of existing ML2 system road on National Forest System lands (miles)	0	0	0	0	0	0
Limited reconditioning of existing ML2 system road post-construction (miles)	1.4	1.4	1.4	1.4	1.4	1.4
<b>Issue: recreational uses and experiences</b>						
Long-term changes in recreation opportunities on National Forest System lands	No Changes due to Project <sup>4</sup>					
<b>Issue: protected lands</b>						
No. protected lands crossed <sup>5</sup>	4	5	4	6	5	6
<b>Issue: effects on infrastructure</b>						
Conflicts with Upper Thompson Sanitation District	No	No	No	No	No	No
CB Pole Hill Penstocks <sup>8</sup>	No	No	No	No	No	No
<b>Issue: property values and economic effects</b>						
No. of landowners affected by ROW acquisition <sup>1</sup>	28	6	33	34	6	34
New ROW	8	2	12	10	2	10
Expanded ROW	20	4	21	24	4	24
No. of landowners affected by both new ROW and expanded ROW acquisition <sup>1</sup>	26	5	29	31	5	31
Subdivisions affected by ROW acquisition (new or expanded ROW)	Newell Lake	NA	Newell Lake	Newell Lake	NA	Newell Lake
No. of landowners with ROW to be decommissioned	26	38	26	14	38	14
Businesses directly affected	NA	NA	NA	NA	NA	NA
<b>Issue: cultural resources</b>						
Number of NRHP-eligible historic sites potentially impacted	3	3	3	4	3	4

Table S-6 Measurement Indicators for Key and Other Issues, East Region Portions of Alternatives

Measurement Indicators for Issues	East Region, Alternative A	East Region, Alternative B	East Region, Alternative C	East Region, Alternative D	East Region, APA	East Region, No Action Alternative
<b>Issue: water resources, floodplains, and wetlands<sup>6</sup></b>						
Waterbodies Crossed	13	16	20	27	16	26
Wetlands Present	5	3	5	7	3	6
Waters of the U.S.	5	7	9	11	7	11
<b>Issue: ROW clearing and maintenance</b>						
<b>Soil types in Analysis Area<sup>7</sup></b>						
Soils with shallow bedrock (within 60 inches of soil surface) (acres)	176	136	171	255	136	249
Low revegetation potential (acres)	1	1	1	14	1	14
Compaction prone (acres)	62	46	99	126	46	119
Water erodible (acres)	134	71	91	141	71	143
<b>Vegetation types in ROW<sup>8</sup></b>						
Ponderosa pine woodland (acres)	58	36	46	67	36	67
Mixed conifer forest (acres)	3	0	0	1	0	1
Mountain shrub mosaic (acres)	18	23	26	47	23	47
Upland meadow, or upland meadow/wetland mosaic (acres)	9	16	15	33	16	33
<b>Issue: electric and magnetic fields</b>						
Electric fields at ROW edge (kV/m) <sup>9</sup>	0.12	0.12	0.12	0.34	0.12	0.34
Magnetic fields at each ROW edge (mG) <sup>10</sup>	5.2/1.8	5.2/1.8	5.2/1.8	5.2/5.3	5.2/1.8	5.2/5.3
<b>Issue: effects on plants, wildlife, and fish</b>						
<b>Special Status Plants<sup>11</sup></b>						
Threatened and endangered	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII
Species of local concern	LP	LP	LP	LP	LP	LP
<b>Big Game<sup>12</sup></b>						
Elk and Mule Deer Winter Range (acres)	37	35	36	50	35	50
Moose Winter Range (acres)	0	0	0	0	0	0
<b>Special Status Wildlife<sup>13</sup></b>						
Threatened and endangered <sup>14</sup>	No Effect; None Present	No Effect; None Present	No Effect; None Present			
Sensitive species	MAII	MAII	MAII	MAII	MAII	MAII
Management indicator species	NC	NC	NC	NC	NC	NC

- <sup>1</sup> The transmission line ROW acquisition footprint was revised based on a June 11, 2015 call between Carey Ashton (Western) and Steve Ensley (AECOM). Transmission ROW acreage does not include access roads.
- <sup>2</sup> Would require lowering of SIO and documentation of change of SIO in MA 8.3 - Utility Corridor for this Project area, in accordance with Forest Plan Standard 154 and also documentation in the USFS ROD.
- <sup>3</sup> All construction and reconstruction analyses were calculated with Western provided shapefiles. Forest road construction and reconstruction analysis does not include transmission line ROW acreage.
- <sup>4</sup> The Project would not change existing public road systems, access to recreational opportunities, or the 4-wheel drive section of West Pole Hill Road. Therefore, the Project would have no effect on recreational uses and experiences.
- <sup>5</sup> Protected lands include the Flatiron Reservoir County Park, Chimney Hollow Open Space, Pinewood Reservoir County Park, Ramsay Shockey Open Space, Blue Mountain Bison Ranch, and a SLB Stewardship Trust parcel.
- <sup>6</sup> Wetlands and waterbodies were determined from desktop analysis (USGS NHD data) and augmented with survey data where available. Ground surveys were completed early in the NEPA process during initial EA alternative development. Therefore, survey data were not collected for the full suite of alternatives. A full delineation of wetlands and waterbodies will be performed the APA during design and prior to construction. "Waterbodies" encompasses both perennial and intermittent streams.
- <sup>7</sup> The soils analysis was based on a corridor of 200 feet for existing transmission lines centered on the ROW, 300 feet for new routing options, and 75 feet for underground variants. Some locations may have more than one soil characteristic.
- <sup>8</sup> Data were determined based on a 110-foot width centered on the anticipated line and 75 feet for underground variants. Data also are based on ESRI landcover data/SWRegap.
- <sup>9</sup> New steel pole line has a lower electric field signature than the existing H-frame line because of taller structures and the cancellation effect of the double-circuit line.
- <sup>10</sup> Magnetic fields of new steel pole line would be similar at the edge of the ROW compared to the existing H-frame line, but less when within the ROW. Additionally, magnetic fields differ on either side of the aboveground structures.
- <sup>11</sup> Determinations based on analyses identified in Section 4.8.
- <sup>12</sup> Acreage is based on the overlap of elk and mule deer winter range over the estimated construction surface disturbance within the ROW.
- <sup>13</sup> Determinations based on analyses identified in Section 4.10.
- <sup>14</sup> No federally listed wildlife species have potential to occur within the Project area as determined in the Project Biological Report (Cedar Creek Associates 2014) and further discussed in Section 3.10.1.

Abbreviations:

NA = not applicable or effects would not occur.

LP = low probability of species presence.

MAII = may adversely impact individuals, but not likely to result in a loss of viability on the Planning area, or cause a trend to federal listing.

NLAA = may affect, not likely to adversely affect.

NC = no change in population trend.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
<b>Soils</b>	Potential impacts to soils include compaction and traffic ruts, erosion, and contamination. Compaction and erosion impacts would be minimized through SCPs. Soil contamination would be avoided or mitigated through adherence to SCPs and applicable permit requirements.	Potential impacts would be the same as Alternative A. Acres of impacted soil types would be the same as Alternative A.	The nature of potential impacts would be the same as Alternative A. Fewer acres would be affected than Alternative A. More soil disturbance would result from trenching, possibly reducing soil productivity.	Potential impact factors would be the same as Alternative A. Acres of impacted soil types would be the same as Alternative A2.	The nature of potential impacts would be similar to Alternative A. More acres of bedrock would be affected. Reconstruction along USFS Road 247.D would reduce erosion associated with this ML2 road and have long-term beneficial effects for soils on National Forest System lands.	Potential impact factors would be the same as Alternative A. Soil disturbance acreages would be similar to Alternative C. More soil disturbance would result from trenching, possibly reducing soil productivity. Reconstruction along USFS Road 247.D would reduce erosion associated with this ML2 road and have long-term beneficial effects for soils on National Forest System lands.	Potential impact factors would be the same as Alternative A. The greatest acreage of soils and bedrock would be affected under Alternative D.	Potential impact factors would be the same as Alternative A. Soils having low revegetation potential would be more extensive than Alternative A, the same as Alternative C, and less than Alternatives B and D. The extent of compaction-prone or water-erodible soils would be much less than Alternatives A, C, or D. Less newly acquired ROW would be needed than for Alternatives A, C, or D, reducing the potential for new soil impacts.	Natural causes and human activities would continue to affect soil resources at current levels. Impact characteristics associated with relocation of the line in part of the Newell Lake View development would be similar to Alternative A.
<b>Water Resources and Floodplains</b>	Impacts to surface water quantity and quality would be minor to negligible due to implementation of SCPs and compliance with permit provisions. Impacts to groundwater resources would be negligible. Measurable effects would be avoided within the Federal Emergency Management Agency (FEMA)-designated floodplain.	Compared with Alternative A, further potential for changes in runoff rates, flow turbidity and sedimentation, and spills or leaks would occur in areas of new access roads and ROW construction. Impacts to surface water quantity and quality or groundwater resources would be minor to negligible due to implementation of SCPs and compliance with permit provisions. Measurable effects would be avoided within the FEMA-designated floodplain.	Variant A2 would have impacts similar to Variant A1. In addition, construction for the underground portion of the ROW may encounter groundwater; if this occurred, it would be addressed in compliance with state permit approvals.	Potential impacts would generally be of the same type as Alternative A. Additional potential for impacts to existing runoff conditions, or flow turbidity and sedimentation would occur in the steep terrain near Meadowdale Ranch and Ravencrest areas. Potential impacts would be minor to negligible, and would be addressed similar to Alternative A. The FEMA-designated floodplain would be avoided.	Potential impacts would generally be the same as Alternative B. An area that may have shallow groundwater occurs along Alternative C at the east side of Pinewood Reservoir. Impacts to surface water or groundwater quantity and quality would be minor to negligible through implementation of SCPs and compliance with permit provisions.	Potential impacts would be the same as for Alternative C. Shallow groundwater also may be encountered where deeper excavation could occur for underground construction along the western 2.7 miles of the ROW.	The potential for impacts from ROW use and construction would be similar to Alternatives A and B. The reroute in the vicinity of Pinewood Reservoir would have the potential for shallow groundwater impacts similar to Alternative C. Implementation of SCPs and compliance with permit provisions would reduce impacts to minor or negligible levels.	Impacts to water resources quantity and quality would be minor to negligible due to implementation of SCPs and compliance with permit provisions. This alternative would cross fewer waterbodies and wetlands than any alternative except Alternative B. Areas of potential shallow groundwater in the Pinewood Reservoir locale would be avoided. The least amount of new transmission line ROW acquisition would occur; reducing the potential for increased runoff, flow turbidity, sedimentation, or impacts from spills during new disturbance.	Potential impacts to surface or groundwater quantity and quality would be similar to Alternatives A, B, and D, but would be spread out in space and time. Implementation of SCPs and compliance with permit provisions would limit impacts to minor or negligible levels. Negligible impacts to floodplains would occur.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
<b>Wetlands and Waters of the U.S.</b>	Agency policy is to avoid these sensitive areas where possible. Where disturbance cannot be avoided, impacts to drainage, adapted vegetation, and scarce habitats could occur. These effects would be avoided or mitigated by implementation of SCPs and EPMS.	The nature of impacts, their potential extent, and corresponding agency practices would be similar to Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. Depending on underground construction techniques through wetlands and Waters of the U.S., the extent of impacts could be somewhat more or less than Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. The potential for disturbing wetlands or Waters of the U.S. would be much less for Alternative B than Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. The potential for disturbing wetlands or Waters of the U.S. would be similar to Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. Depending on underground construction techniques through wetlands and Waters of the U.S., the extent of impacts could be somewhat more or less than Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. The potential for disturbing wetlands or Waters of the U.S. would be much greater for Alternative D than Alternative A.	The nature of impacts and corresponding agency practices would be similar to Alternative A. The potential for disturbing wetlands or Waters of the U.S. would be slightly less than Alternative A. It is expected that all wetlands would be avoided by the final design.	The nature of impacts and corresponding agency practices would be similar to Alternative A. Fewer impacts would be anticipated than for other alternatives because of decreased construction disturbance.
<b>Vegetation</b>	Ponderosa pine, mixed conifer forest, mountain shrub mosaic, and upland meadow communities would be impacted by Project disturbance. Effects would include vegetation trampling, removal, or incidental disturbance. Approximately 70 percent of disturbance would occur in ponderosa pine communities.	The nature and extent of potential impacts to vegetation types would be the same as Alternative A. Slightly more disturbance would occur in the ponderosa pine community.	Potential impacts to vegetation types would be similar to Alternative A.	Potential impacts to vegetation types would be similar to Alternative A, but slightly less extensive. Fewer ponderosa pine woodlands would be affected (approximately 55 percent) and more mixed conifer forest, mountain shrub mosaic, and upland meadows would be affected.	Potential impacts to vegetation types would be similar to Alternative A, although slightly less ponderosa pine woodlands would be affected and more mixed conifer forest, mountain shrub mosaic, and upland meadows would be affected.	Potential impacts to vegetation types would be similar to Alternative A, although slightly less ponderosa pine woodlands and mixed conifer forest would be affected and more mountain shrub mosaic and upland meadows would be affected.	The nature of potential impacts to vegetation types would be similar to Alternatives A, B, and C, but the overall acreage of potential impacts would be much more extensive. Approximately 60 percent of the greater disturbance area would occur in ponderosa pine woodlands.	Potential impacts to vegetation types would be similar to Alternative A but slightly less extensive. Of the smaller acreage, fewer ponderosa pine woodlands would be affected (approximately 65 percent) and more mixed conifer forest, mountain shrub mosaic, and upland meadows would be affected.	Potential impacts to all vegetation types would be similar to Alternative D.
<b>Special Status and Sensitive Plant Species</b>	No federally listed species are found along Alternative A. Due to limited distribution of federally listed species and low quality of habitat, no impacts to these species would be expected. Potential impacts to sensitive plant species and species of concern would be minor and short-term due to limited surface disturbance in the ROW, and reclamation of disturbed areas.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternative A.	Due to limited distribution of federally listed species and low quality of habitat, no impacts to these species would be expected. Potential impacts to sensitive plant species and species of concern would be minor and short-term due to limited surface disturbance in the ROW, and reclamation of disturbed areas.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternative A.	Due to limited distribution of federally listed species and low quality of habitat, no impacts to these species would be expected. Potential impacts to sensitive plant species and species of concern would be minor and short-term due to limited surface disturbance in the ROW, and reclamation of disturbed areas.	Due to limited distribution of federally listed species and low quality of habitat, no impacts to these species would be expected. Potential impacts to sensitive plant species and species of concern would be minor and short-term due to limited surface disturbance in the ROW, and reclamation of disturbed areas.	Due to low quality of habitat and reduced surface disturbance, no impacts to federally listed species would be anticipated. Potential impacts to sensitive plant species and species of concern would be minor and short-term due to limited surface disturbance in the ROW, and reclamation of disturbed areas.
<b>Wildlife Habitat</b>	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The extent of impacts due would be somewhat greater than Alternative A.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The nature and extent of impacts would be similar to Alternative A.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The nature and extent of impacts would be similar to Alternatives A and B.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The extent of impacts would be somewhat greater than Alternative A.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The extent of impacts would be much greater than Alternatives A, B, or C.	Elk and mule deer winter range, and moose winter range habitat would be affected by this alternative. The nature and extent of impacts would be similar to Alternatives A, B, and C.	Acres of big-game habitat impacted would be similar to Alternative D.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
Raptors and Other Birds	Implementation of EPMS, as well as seasonal restrictions to prevent impacts to raptors and migratory birds potentially would minimize direct impacts. Additionally, based on conductor placement and orientation, electrocution would not pose a hazard to bird species. Remaining impacts (e.g., loss of habitat) are anticipated to be minor.	Potential impacts would be the same as Alternative A. There would be no risk of raptor collisions where the transmission line would be constructed underground.	Potential impacts would be the same as Alternative A. There would be no risk of raptor collisions where the transmission line would be constructed underground.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternative A. There would be reduced risk of raptor collisions where the transmission line would be constructed underground.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternatives A, B, and C.	Displacement of upland game birds, raptors, and other birds as a result of increased human activity during maintenance activities would be short-term and minor. Relocation of the line would result in potential impacts similar to Alternative A.
<b>Special Status and Sensitive Wildlife Species</b> Habitat Disturbance	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected.	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at the same level as Alternative A	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at approximately the same level as Alternative A.	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at a greater level than Alternative A.	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at approximately the same level as Alternative A.	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at approximately the same level as Alternative A.	Much greater extent of vegetation communities in the ROW that support special status and sensitive wildlife species would be affected than any other alternative.	Vegetation communities in the ROW that support special status and sensitive wildlife species would be affected at approximately the same level as Alternative A	Fewer acres of vegetation communities in the ROW that support special status and sensitive wildlife species would be affected than any action alternative.
<b>Land Use and Recreation</b> Land Use	Long-term adverse impacts to land use from the acquisition of new or expanded ROW would range from negligible to moderate depending on the location and ownership of the acquired ROW. Beneficial effects where existing ROW would be decommissioned.	Impacts are similar to A; however, Variant A1 would require slightly more acres of new ROW.	Impacts are similar to A; however, Variant A2 would require slightly less acres of new ROW.	Impacts are similar to A; however, Alternative B requires the fewest acres of ROW acquisition.	Impacts are similar to A; however, Variant A1 would require less acres of new ROW.	Impacts are similar to A; however, Variant C1 would require less acres of new ROW.	The nature of potential impacts would be similar to Alternative A; however, Alternative D would maintain two ROWs and therefore requires the most ROW acquisition. The beneficial effects of ROW consolidation would not be realized under this alternative.	The APA would require much less acquisition of new ROW than any other alternative except Alternative B. The number of landowners with ROW to be decommissioned would be slightly greater than Alternatives A or B, and much greater than Alternatives C, D, or the No Action Alternative.	Existing ROWs would be expanded to a minimum width of 75 feet. New ROW would be acquired to relocate the line from Newell Lake View subdivision (through which there is inadequate ROW). The beneficial effects of ROW consolidation would not be realized.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
Recreation	Potential short- and long-term impacts to recreation from access roads, staging areas, and construction and maintenance activities would range from negligible to moderate depending on the location and timing of activities. The long-term recreational experience would be enhanced in areas where existing transmission line would be decommissioned.	Potential impacts would be the same as Alternative A.	Potential impacts would be the same as Alternative A.	Short-term recreation opportunities on the Besant Point Trail could be affected depending on the timing of construction. Long-term impacts would include effects to the four-wheel drive recreational setting on West Pole Hill Road caused by the steel structures. Any potential change to the Recreation Opportunity Spectrum classification resulting from the new structures would result in a Forest Service Plan Amendment. Other potential impacts to recreation would be similar to Alternative A. Other potential impacts to recreation would be similar to Alternative A.	Moderate short- and long-term impact to the recreation setting and recreation facilities would occur along the eastern side of Pinewood Reservoir County Park. Other potential impacts to recreation would be similar to Alternative A. four-wheel drive recreation opportunities would be significantly adversely impacted on sections of USFS Road 122 that would be reconstructed. Reconstruction on sections of USFS Road 122 also would result in adverse and beneficial effects to dispersed recreation.	Moderate short- and long-term impact to the recreation setting and recreation facilities would occur along the eastern side of Pinewood Reservoir County Park. Other potential impacts to recreation would be similar to Alternative A. Four-wheel drive recreation opportunities would be significantly adversely impacted on sections of USFS Road 122 that would be reconstructed. Reconstruction on sections of USFS Road 122 also would result in adverse and beneficial effects to dispersed recreation.	Moderate short- and long-term impact to the recreation settings would occur along the eastern side of Pinewood Reservoir County Park. Other potential impacts to recreation would be similar to Alternative A. The beneficial effects of ROW consolidation would not be realized under this alternative.	Potential impacts to recreation would be similar to Alternative A. Under the APA, the four-wheel drive portion of USFS Road 122 would not be reconstructed resulting in no significant adverse impacts to recreation resources.	Moderate short- and long-term impact to recreation settings along would occur on the east side of Pinewood Reservoir County Park. Negligible to minor adverse effects to recreation settings would occur where additional ROW would need to be acquired. The beneficial effects of ROW consolidation would not be realized under this alternative.
Visual Resources	New, taller structures and associated disturbance would result in short- and long-term adverse effects ranging from minor to moderate with localized strong visual changes. Long-term beneficial effects would occur where the South Line would be removed, such as within the Newell Lake View subdivision. Moderate adverse effects would occur from new access roads and vegetation management	Potential impacts would be the same as Alternative A, except for along 0.5 mile of U.S. Highway 36 where the adverse effect would be greater.	Potential impacts would be the same as Alternative A, except for the underground segment near Estes Park which would result in no overhead transmission line structures, but may produce a more visually noticeable cleared ROW.	Incrementally adverse effects would occur to Chimney Hollow Open Space, Pinewood Lake, Meadowdale Hills and Ravencrest subdivisions, and U.S. Highway 36. Conversely, beneficial effects would occur to the Newell Lake View subdivision and the valley between Mount Pisgah and Mount Olympus as seen from the Estes Valley as a result of abandonment of an entire ROW. Other potential impacts to scenic resources would be similar to Alternative A.	Incrementally adverse effects would occur to Chimney Hollow Open Space, and Meadowdale Hills and Ravencrest subdivisions, and along 0.75 mile of U.S. Highway 36. Conversely, beneficial effects would occur to the Newell Lake View subdivision and the valley between Mount Pisgah and Mount Olympus as seen from the Estes Valley as a result of abandonment of an entire ROW. Other potential impacts to scenic resources would be similar to Alternative A.	Potential impacts would be the same as Alternative C, except for the underground segment near Estes Park which would result in no overhead transmission line structures, but may produce a more visually noticeably cleared ROW.	Potential long-term impacts would be the similar as the No Action Alternative. Beneficial changes would result within the Newell Lake View subdivision. Moderate adverse effects would occur from new access roads and vegetation management similar to Alternative A.	Incremental adverse effects would occur to Chimney Hollow Open Space, Pinewood Lake, Meadowdale Hills and Ravencrest subdivisions, and along U.S. Highway 36. Conversely, beneficial effects would occur to the Newell Lake View subdivision and the valley between Mount Pisgah and Mount Olympus as seen from the Estes Valley as a result of abandonment of an entire ROW. Other potential impacts to scenic resources would be similar to Alternative A.	Minor adverse to moderate impacts from visible portions of the two existing transmission lines and ongoing structure replacement and vegetation maintenance activities would continue similar to existing conditions. Beneficial changes would result within the Newell Lake View subdivision.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
<b>Socioeconomics and Community Resources</b>	Beneficial effects associated with job opportunities and to the economic base would be temporary and minor. Minor decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. No environmental justice concerns were identified.	Potential impacts would be the same as Alternative A.	Estimated 80-year life cycle costs would increase approximately 120 percent relative to Alternative A. Some potential for minor, short-term decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. Residences near the underground portion of the variant may experience a minor increase in property values. No environmental justice concerns were identified.	Potential impacts would be the same as Alternative A. Estimated 80-year life cycle costs would be reduced to approximately 92 percent of Alternative A. Some potential for minor, short-term decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. No environmental justice concerns were identified.	Potential 80-year life cycle costs would be similar to Alternative A. Reconstruction of Pole Hill Road would result in significant short-term and long-term effects to a USFS permittee that leads four-wheel drive tours in the West Pole Hill area. Some potential for minor, short-term decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. No environmental justice concerns were identified.	Estimated 80-year life cycle costs would increase approximately 108 percent relative to Alternative A. Reconstruction of Pole Hill Road would result in significant short-term and long-term effects to a USFS permittee that leads four-wheel drive tours in the West Pole Hill area. Some potential for minor, short-term decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. Residences near the underground portion of the variant may experience a minor increase in property values. No environmental justice concerns were identified.	Beneficial effects associated with job opportunities and to the economic base would be temporary and minor. Minor decreases in property values as a result of taller structures. Alternative D would maintain two ROWs and the beneficial effects to property values from ROW decommissioning would not be realized, except where the line would be relocated from Newell Lake View subdivision to Pole Hill Road. Estimated 80-year life cycle costs would increase approximately 170 percent relative to Alternative A. No environmental justice concerns were identified.	Potential impacts would be similar to Alternative A. Estimated 80-year life cycle costs would be reduced to approximately 89 percent of Alternative A. Some potential for minor, short-term decreases in property values as a result of taller structures, and conversely minor increases in property values where structures would be removed. No environmental justice concerns were identified.	Potential impacts include increased maintenance costs as existing lines age and require more maintenance. The No Action Alternative would maintain two ROWs and the beneficial effects to property values from ROW decommissioning would not be realized, except where the line would be relocated from Newell Lake View subdivision to Pole Hill Road. Estimated 80-year life cycle costs would increase approximately 190 percent relative to Alternative A. No environmental justice concerns were identified.
<b>Electrical Effects and Human Health</b>	Effects associated with noise, radio and television interference, and induced current and voltage, as well as effects to cardiac pacemakers would be negligible; SCPs would further minimize noise and induced current and voltage. Electric and magnetic field levels would be less than the existing transmission lines. Health effects would be similar to or less than existing lines.	Potential effects would be the same as Alternative A.	Potential effects would be the same as Alternative A, except that electrical fields would be blocked by the soil where the transmission line is constructed underground and would not be a concern. Additionally, magnetic fields would be higher than those produced by aboveground lines, but would still represent a negligible impact.	Potential effects would be the same as Alternative A.	Potential effects would be the same as Alternative A.	Potential effects would be the same as Alternative A, except that electrical fields would be blocked by the soil where the transmission line is constructed underground and would not be a concern. Additionally, magnetic fields would be higher than those produced by aboveground lines, but would still represent a negligible impact.	Potential effects would be the same as Alternative A.	Potential effects would be the same as Alternative A.	Electric fields at the ROW edge, and magnetic fields within the ROW, would be higher than for action alternatives, although the potential effects would be the similar to Alternative A.

**Table S-7 Comparison of Alternative Effects <sup>1</sup>**

Resource	Alternative A	Alternative A1	Alternative A2	Alternative B	Alternative C	Alternative C1	Alternative D	APA	No Action Alternative
<b>Cultural Resources</b>	A total of 6 historic properties, 2 contributing elements of the CBT Project Historic District, and 2 unevaluated sites have been documented along this alternative. Unavoidable adverse effects would be minimized through a treatment plan, and through implementation of SCPs.	A total of 6 historic properties, 2 contributing elements of the CBT Project Historic District, and 2 unevaluated sites have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	A total of 6 historic properties, 2 contributing elements of the CBT Project Historic District, and 2 unevaluated sites have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	A total of 8 historic properties and 2 contributing elements of the CBT Project Historic District have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	A total of 9 historic properties and 2 contributing elements of the CBT Project Historic District have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	A total of 9 historic properties and 2 contributing elements of the CBT Project Historic District have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	A total of 12 historic properties, 4 contributing elements of the CBT Project Historic District, and 2 unevaluated sites have been documented along this alternative. Minimization of adverse effects would be the same as Alternative A.	Potential impacts would be similar to Alternatives B and C. Minimization of adverse effects would be the same as Alternative A.	A total of 12 historic properties, 4 contributing elements of the CBT Project Historic District, and 1 unevaluated site have been documented along this alternative. At this time, no inventories have been conducted along the line that would be relocated.
<b>Transportation</b>	Potential direct and indirect impacts would be less than significant due to low levels of Project-generated traffic. This alternative requires 1.3 miles of temporary access and 1.3 miles of permanent access on National Forest System land.	Potential impacts would be similar to Alternative A.	Potential impacts would be similar to Alternative A.	Potential direct and indirect impacts would be less than significant due to low levels of Project-generated traffic. This alternative requires 1.7 miles of temporary access and 0.8 mile of permanent access on National Forest System land.	Potential direct and indirect impacts would potentially be less than significant due to creation of road conditions that would require frequent and recurring roadway repair and maintenance low levels of Project-generated traffic. This alternative requires 1.7 miles of temporary access and 0.8 mile of permanent access on National Forest System land. Increased recreational traffic on Pole Hill Road under Alternative C resulting from the reconstruction of USFS Road 122 would potentially create road conditions that would require frequent and recurring roadway repair and maintenance, causing significant adverse impacts to transportation.	Potential direct and indirect impacts would potentially be less than significant due to creation of road conditions that would require frequent and recurring roadway repair and maintenance low levels of Project-generated traffic. This alternative requires 1.7 miles of temporary access and 0.8 mile of permanent access on National Forest System land. Increased recreational traffic on Pole Hill Road under Alternative C1 resulting from the reconstruction of USFS Road 122 would potentially create road conditions that would require frequent and recurring roadway repair and maintenance, causing significant adverse impacts to transportation.	Potential direct and indirect impacts would be less than significant due to low levels of Project-generated traffic. This alternative requires 2.5 miles of permanent access on National Forest System land.	Potential impacts from miles of temporary and permanent access on National Forest System land would be similar to Alternative B and C; however, under the APA, the four-wheel drive portion of USFS Road 122 would not be reconstructed resulting in no significant adverse impacts.	Potential direct and indirect impacts would be less than significant due to low levels of Project-generated traffic. There would be no new temporary or permanent access authorized on National Forest System lands.

<sup>1</sup> Note: Impacts summarized in this table were determined as described in Chapter 4.0 with implementation of design criteria, SCPs, and EPMs.

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## Acronyms and Abbreviations

°F	degree Fahrenheit
µg/m <sup>3</sup>	microgram per cubic meter
AAQS	Ambient Air Quality Standards
ACSR	Aluminum Conductor Steel-Reinforced
AM	amplitude modulated
amsl	above mean sea level
ANSI	American National Standard Institute
APA	Agency Preferred Alternative
APCD	Air Pollution Control Division
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
ARP	Arapaho and Roosevelt National Forests and Pawnee National Grassland
ATV	all-terrain vehicle
BCC	Birds of Conservation Concern
BOR	Bureau of Reclamation
CAA	Clean Air Act
CBT	Colorado-Big Thompson
CDA	Colorado Department of Agriculture
CDPHE	Colorado Department of Public Health and Environment
CDWR	Colorado Division of Water Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
CO <sub>2</sub> e	carbon dioxide equivalent
CPW	Colorado Parks and Wildlife
CWA	Clean Water Act
DAU	Data Analysis Unit
dBA	decibel (A-weighted)
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
E-LS	Estes-Lyons
EMF	electric and magnetic fields
EO	Executive Order
EPA	U.S. Environmental Protection Agency
E-PH	Estes-Pole Hill
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FM	frequency modulated
F-PH	Flatiron-Pole Hill
FR	Federal Register

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FRCC	Fire Regime Condition Class
FSH	Forest Service Handbook
FSM	Forest Service Manual
GHG	greenhouse gas
GPS	Global Positioning System
HUC	hydrologic unit code
kcmil	thousand circular mil
KOP	key observation point
kV	kilovolt
kV/m	kilovolt per meter
MBTA	Migratory Bird Treaty Act
mG	milligauss
MIS	Management Indicator Species (Forest Service)
ML2	maintenance level 2
NAAQS	National Ambient Air Quality Standards
NCWCD	Northern Colorado Water Conservancy District
NDIS	Natural Diversity Information Source
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFMA	National Forest Management Act
NHPA	National Historic Preservation Act
NO <sub>2</sub>	nitrogen dioxide
NOI	Notice of Intent
NO <sub>x</sub>	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O <sub>3</sub>	ozone
OHV	off-highway vehicle
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
Pb	lead
PM	particulate matter
PM <sub>10</sub>	particulate matter aerodynamic diameter of 10 microns or less
PM <sub>2.5</sub>	particulate matter aerodynamic diameter of 2.5 microns or less
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
SCP	standard construction practice
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office

SIO	Scenic Integrity Objective
SIP	State Implementation Plan
SLB	State Land Board (Colorado)
SMS	Scenery Management System
SO <sub>2</sub>	sulfur dioxide
SWReGAP	Southwest Regional Gap Analysis Project
TCP	traditional cultural properties
tpy	tons per year
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
Western	Western Area Power Administration

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