

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1. INTRODUCTION

This chapter fully describes the (A) Proposed Action, (B) Parallel 69 kV Line Route Alternative, (C) Cedar Fork Southern Route Alternative, (D) No Action Alternative, and two interconnect options. Various elements for each Action Alternative are described in the sections that follow.

Alternatives considered in the EIS are based on issues identified by the USFS, BLM, and NPS as well as comments received during the public scoping process. NEPA requires a detailed analysis of a range of alternatives that are considered “reasonable,” usually defined as alternatives that are realistic (not speculative), that are technologically and economically feasible, and that respond to the purpose of and need for the project.

This chapter includes the following:

- Section 2.1 introduces the chapter content.
- Section 2.2 briefly discusses the process and criteria by which alternatives were developed and selected for detailed analysis in the EIS; it also provides a descriptive summary of each alternative’s routing.
- Section 2.3 discusses design features, construction standards and techniques, and resource protection measures that would be common to all alternatives in the EIS.
- Section 2.4 provides a detailed description of Alternative A: Proposed Action, associated components.
- Section 2.5 provides a detailed description of Alternative B: Parallel 69 kV Line Route and associated components.
- Section 2.6 provides a detailed description of Alternative C: Cedar Fork Southern Route and associated components.
- Section 2.7 provides a detailed description of the two interconnect options to provide the decision makers flexibility when selecting and approving a final alternative.
- Section 2.8 discusses Alternative D: No Action Alternative and assumes there would be no development of the Proposed Action or other Action Alternative; it also serves as the baseline for environmental conditions.
- Section 2.9 provides descriptions of alternatives that were considered but eliminated from detailed analysis.
- Section 2.10 summarizes and provides a comparison of environmental consequences of the analyzed alternatives.
- Section 2.11 presents the Agency Preferred Alternative.

2.2. OVERVIEW OF ALTERNATIVES

2.2.1. Development of Alternatives

The Proposed Action and Action Alternatives carried forward for detailed analysis in this EIS (**Figure 2.2-1**) were developed during an alternatives development workshop held April 15–16, 2008, and attended by managers and resource specialists from the lead and cooperating agencies.

The purpose of the workshop was two-fold: (1) to develop alternatives to the Proposed Action that responded to the issues and concerns identified by the public and the EIS team for resolution in the EIS process and (2) to identify the alternatives considered but eliminated from further analysis, and why (see **Section 2.9**). Preliminary issues, concerns, and opportunities identified by the public during scoping were used and combined with the local resource expertise of the various agencies represented to identify areas of potential resource conflicts. This was augmented with data from preliminary greater sage grouse surveys that were conducted just prior to the workshop. Geographic Information System (GIS) data were used interactively during the workshop to overlay different routing scenarios on the current environmental data and aid in the process of developing viable alternatives for recommendations.

The following criteria were used to help determine which alternatives would be recommended for detailed analysis and which would be recommended for elimination from further consideration:

- Does the alternative meet the purpose of and need for the action?
- Does the alternative resolve resource conflicts?
- Is the alternative legally, technologically, and economically feasible?

The recommendations were provided to the Line Officers or representatives of the DNF, GSENM, KFO, and BRCA. The alternatives described below and in **Sections 2.4, 2.5, and 2.6** were selected for detailed analysis.

2.2.2. Alternative A: Proposed Action

The proponent's original Proposed Action that was presented in the Notice of Intent to Prepare an EIS (73 FR 9517-9521) was subsequently modified. Early resource survey data along with public input received during scoping and agency resource specialists' concerns were used to adjust various segments of the proponent's original route to resolve resource conflicts and concerns. The original alignment was modified to avoid a large sage grouse lek near the Bryce Canyon Airport while adhering to Federal Aviation Administration (FAA) safety regulations. Further modifications were made to avoid additional sage grouse leks and brood rearing habitat and sensitive Utah prairie dog habitat. In addition, the modification addressed concerns raised regarding SITLA and private lands in the Johnson Bench area, and incorporated a southern route around private property on the western portion of the alignment. Alternative A, as presented and analyzed in this EIS, is that modified route.

The Alternative A 100-foot-wide right-of-way would extend 30.41 miles (**Figure 2.2-1**). The route would begin at the proposed East Valley Substation located east of Tropic and extend northeast to adjoin the Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way. The route would then parallel the west side of the Rocky Mountain Power/PacifiCorp transmission line route to the northwest across GSENM land and through Cedar Fork Canyon through a planning window for a utility right-of-way identified in the 1986 LRMP. The route would diverge from the 230 kV line access route and extend west across John's Valley and skirt just to the north of the Bryce Canyon Airport. The route would continue west for approximately 4 miles and turn south, crossing SR 12, and extend southwest across the Johnson Bench area, passing to the south of Wilson Peak. The route would continue west down Hillsdale Canyon through a planning window for a utility right-of-way identified in the 1986 LRMP and turn north for approximately 0.5 mile. The route would continue to the west, crossing private property (Sunset Cliffs), and extend west to cross U.S. 89 where it would turn to the southwest for approximately 2 miles to the Hatch Substation. The proposed route would cross 17.35 miles of DNF, 3.31 miles of KFO, 3.68 miles of GSENM, 4.23 miles of SITLA, and 1.84 miles of private lands.

Figure 2.2-1. Proposed Action and Action Alternative Routes

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The portion of the existing 69 kV line between the current Bryce Canyon Substation and the Hatch Mountain Substation would be removed (approximately 16.23 miles) and that portion of the right-of-way (including existing centerline access) would be rehabilitated.

Implementation of the Proposed Action would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 100-foot-wide 3.68-mile stretch (44.58 acres) of the Primitive Zone to Passage Zone, and within this area, changing the existing VRM Management Class designation from Class II to Class III.

2.2.3. Alternative B: Parallel Existing 69 kV Route

The Alternative B 100-foot-wide right-of-way would extend 29.11 miles (**Figure 2.2-1**). This alternative route would begin at the proposed East Valley Substation located east of Tropic and extend west through the Tropic Substation (the Tropic Substation would be decommissioned) and then cross SR 12 and continue across BRCA (deviating slightly from the existing right-of-way for approximately 1.5 miles) to a point near the current Bryce Canyon Substation near Bryce Canyon City. For this Alternative, the Bryce Canyon Substation would be decommissioned and a new replacement substation would be built at a new location approximately 1 mile to the west to allow for needed expansion. The route would extend approximately 0.5 mile to the north around Bryce Canyon City, west across SR 63 and then parallel Garkane's existing 69 kV line right-of-way predominately across private and SITLA lands. The alternative route would parallel the existing right-of-way just to the south across the plateau in a northwest direction to Red Canyon, where it would generally follow the existing right-of-way through Red Canyon into Long Valley where it would cross U.S. 89 and continue to the Hatch Mountain Substation. From there the route would follow the existing line south to the Hatch Substation. This route would cross 5.58 miles of DNF, 8.29 miles of KFO, 2.81 miles of BRCA, 3.63 miles of SITLA, and 8.80 miles of private lands.

The entire existing 69 kV line from approximately 1 mile east of the existing Tropic Substation to the Hatch Mountain Substation would be removed (approximately 21.57 miles) and the right-of-way (including existing centerline access) would be rehabilitated.

In addition, under Alternative B approximately 9 miles of distribution lines would need to be constructed primarily on private and SITLA lands in 50-foot rights-of-way in conjunction with the new substations.

Under this alternative the GSENM Management Plan would not be amended.

2.2.4. Alternative C: Cedar Fork Canyon Southern Route

The Alternative C 100-foot-wide right-of-way would extend 29.78 miles (**Figure 2.2-1**). This alternative route would begin at the proposed East Valley Substation located east of Tropic and extend northeast to adjoin the Rocky Mountain Power/PacifiCorp 230 kV transmission line right-of-way. The route would then parallel the west side of the Rocky Mountain Power/PacifiCorp transmission line access to the northwest across GSENM land and through Cedar Fork Canyon through a planning window for a utility right-of-way identified in the 1986 LRMP. The route would diverge from the 230 kV line access and extend west across John's Valley and follow the south side of State Route 22 for just under 2 miles and then follow the western boundary of BRCA for approximately 1 mile. The route would then extend west to the north of Bryce Canyon City and across State Route 63. The route would continue west across the southern portion of Johnson Bench and to the upper reaches of Right Fork Blue Fly Creek. The route would drop off the plateau at this point and traverse an unnamed canyon to Hillsdale Canyon and would extend south of private property and continue west, crossing U.S. 89, where it would turn to the southwest for approximately 2 miles to the Hatch Substation. This route would cross 13.58 miles of DNF, 3.43 miles of KFO, 3.68 miles of GSENM, 2.06 miles of SITLA, and 7.03 miles of private lands.

The portion of the existing 69 kV line between the current Bryce Canyon Substation and the Hatch Mountain Substation would be removed (approximately 16.23 miles) and that portion of the right-of-way (including existing centerline access) would be rehabilitated.

Alternative C would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 300-foot-wide 3.68-mile stretch (133.81 acres) of the Primitive Zone to Passage Zone to accommodate both the proposed right-of-way and the existing 230 kV Rocky Mountain Power/PacifiCorp transmission line, as well as provide for future utility needs; and within this area, changing the existing VRM Management Class designation from Class II to Class III.

2.2.5. Interconnect Route Options

The locations of the North-South and East-West Interconnect options are shown on **Figure 2.2-1**. The purpose of the interconnect route options is to provide flexibility to decision makers to combine segments of the Action Alternatives to select the most appropriate route among the various alternatives to minimize impacts to resource values.

The North-South Interconnect option would extend 1.84 miles across DNF land west of Johnson Bench and could connect segments of Alternatives A and C together.

The East-West Interconnect option would extend 3.70 miles across DNF land south of Johnson Bench and could connect segments of Alternatives A and C together.

2.2.6. Alternative D: No Action Alternative

Though it does not meet the purpose and need statement, the No Action Alternative is required under Council of Environmental Quality regulations for implementing NEPA [40 CFR 1502.14(d)]. For this analysis, the No Action Alternative is considered to be the continued operation of the existing 69 kV transmission line.

If the project were not constructed Garkane would need to conduct major maintenance on the line, overhauling it within its existing right-of-way and permit conditions. Existing diesel-fueled generators would be used to compensate for capacity shortfalls. Under this alternative the GSENM Management Plan would not be amended.

2.3. ELEMENTS COMMON TO ALL ALTERNATIVES

2.3.1. Transmission Line Design Characteristics

Proposed facilities would include a 138 kV transmission line within the right-of-way from the proposed East Valley Substation and terminating at the existing Hatch Substation (**Figure 2.3-1**). **Table 2.3-1** depicts relevant design characteristics of the proposed transmission line.

Table 2.3-1. Design Characteristics

FEATURE	DESCRIPTION
Type of structure	Wood H-Frame
Structure height	Average 65 feet (55 feet above ground)
Structure width	Cross bar 32 feet
Span length	Approximately 500 feet
Number of structures per mile	Approximately 10 per mile

FEATURE	DESCRIPTION
Right-of-way width	100 feet
138 kV conductor size	477 mcm (0.87-inch-diameter) aluminum conductors, steel reinforced
Structure foundations	Tangent structures would be direct buried, turning structure foundations would be guyed, steel structures would require concrete foundations

2.3.1.1. Transmission Line Structures

Garkane proposes to erect standard Rural Utility Service design 138 kV wood H-frame structures (**Figure 2.3-1**). The H-frame structures would consist of two wood poles approximately 65 feet tall and spaced 15.5 feet apart. They would be connected by a cross arm approximately 32 feet wide. Three insulators and three conductors would be attached to the cross arm with two overhead static wires strung near the top of the pole. The purpose of overhead static wires is to protect the conductors from lightning strikes. A number of different turning structure designs would be used; all would be similar to Rural Utility Service design 138 kV turning structures, which consist of three single wood poles with guy wires (**Figure 2.3-2**). The transmission line system would be developed in compliance with Edison Electric Institute recommended practices for avian protection. The structure bases assume 0.0012 acre of long-term disturbance for each structure, or approximately 0.37 acre per mile. Short-term disturbance at each structure location is assumed to occur within an 80-foot radius of the structure (approximately 4.60 acres per mile). This, less the long-term disturbance for each structure, equals approximately 4.23 acres of short-term disturbance per mile.

If the wood structures required for *limited access areas* (including IRAs, NPS-administered lands, and very steep areas) would be too heavy to fly in with a helicopter fiberglass poles may be used instead of wood poles.

In areas where engineering constraints require it, lattice steel structures may need to be installed. The structures would consist of a steel lattice tower that could range from 60 to 100 feet in height. The foundations for steel structures would consist of reinforced concrete approximately 6 to 10 feet in diameter. The foundation would extend above the ground surface approximately 1 to 2 feet. The depth of the foundation would vary depending on guying and load requirements but could range from 4 to 50 feet. Guying would be used to minimize the concrete needed in *limited access areas*. In locations that are accessible by heavy equipment, foundations would be excavated with track-mounted equipment and excavated soil would be hauled away or graded in to match surrounding terrain, at the agency's discretion. In *limited access areas*, guys would be used for transverse loading on the structures, allowing for shallow foundations, approximately 4 feet deep. Foundations in *limited access areas* would be dug by hand or with a mini-excavator.

2.3.1.2. Conductors

The conductor is the wire cable strung between transmission line structures through which the electric current flows. The three conductors proposed for this project would be aluminum with steel reinforcement. The aluminum carries most of the electrical current, and the steel provides tensile strength to support the aluminum strands.

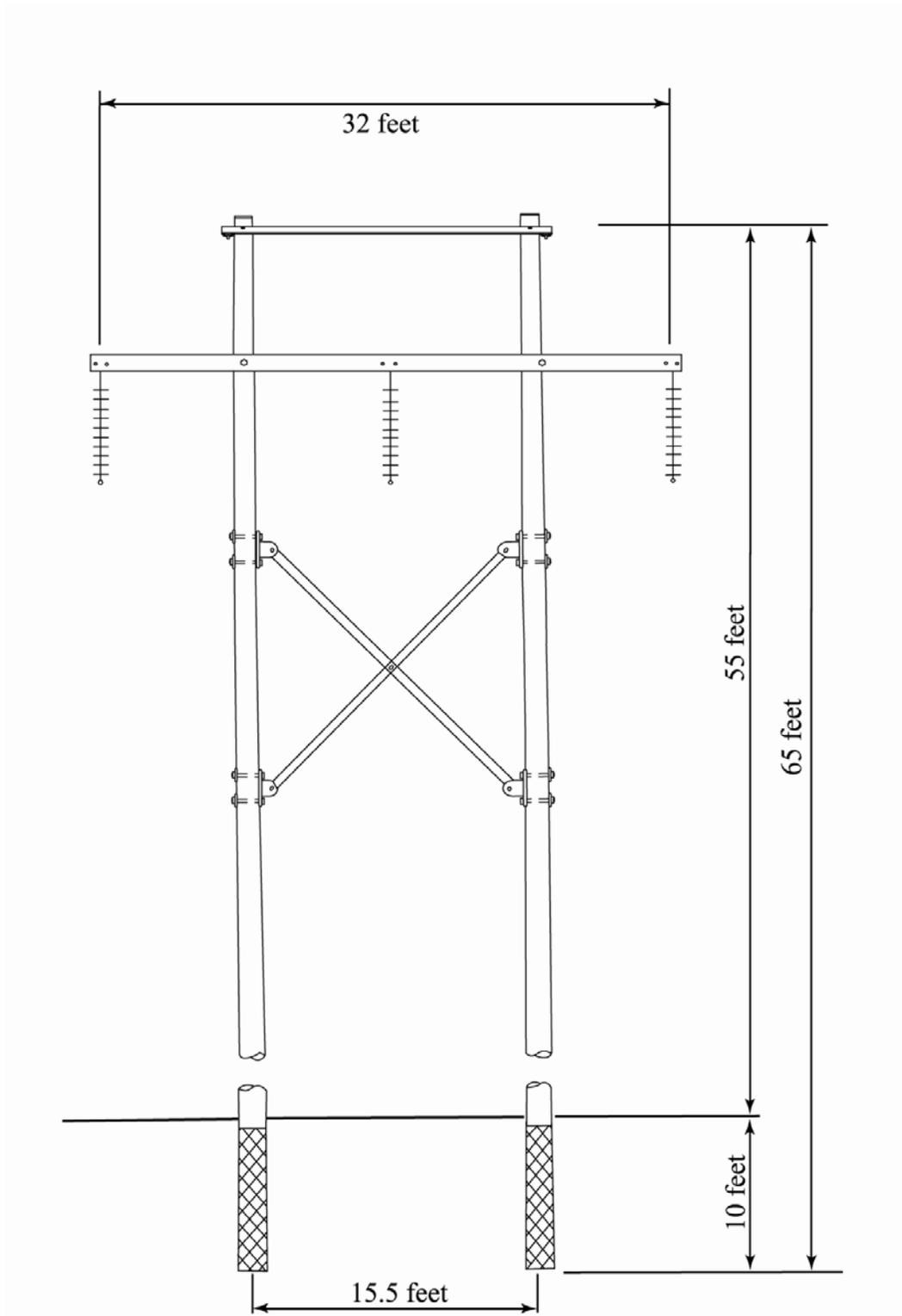


Figure 2.3-1. Concept H-Frame Structure Diagram (not to scale)

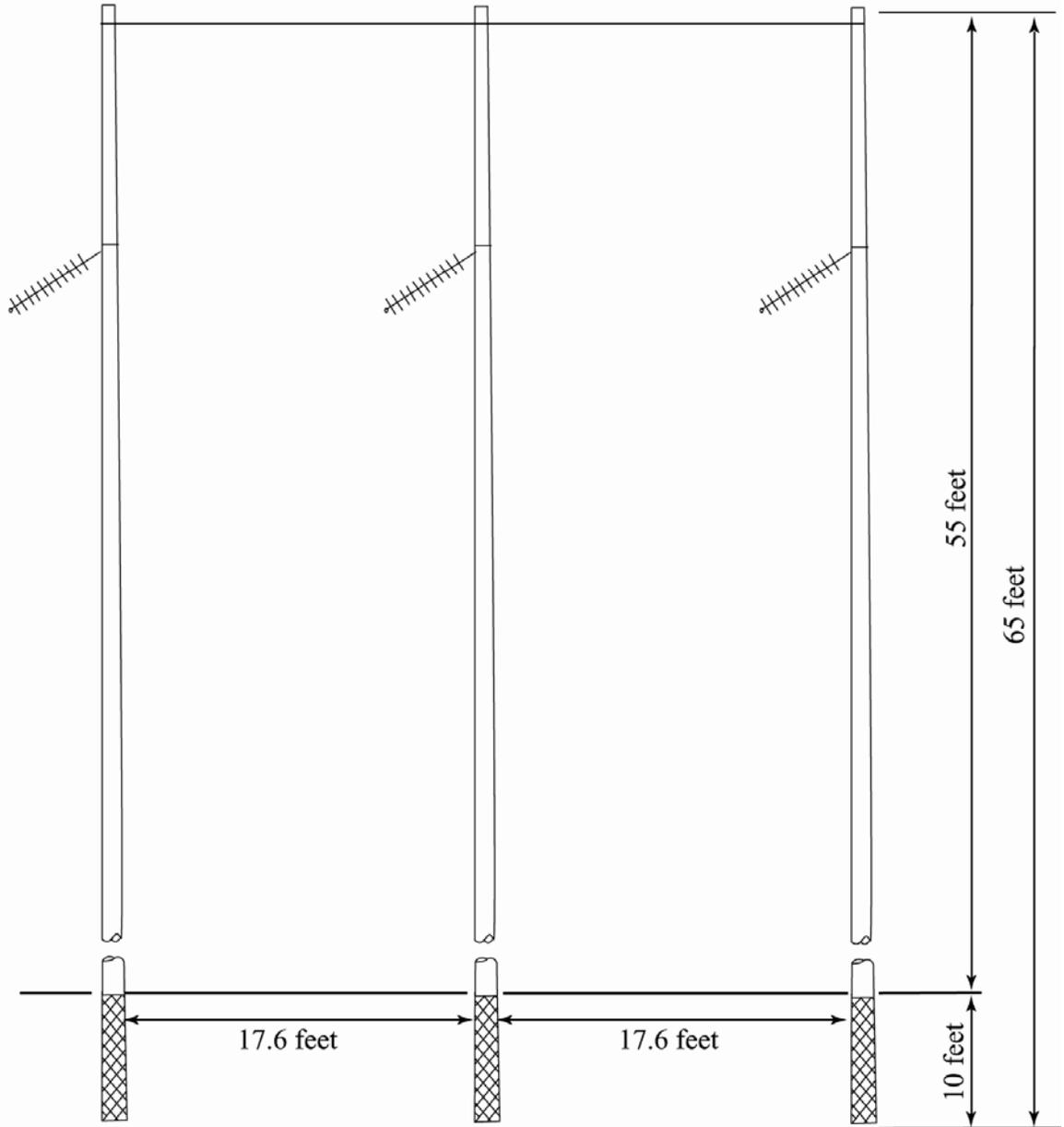


Figure 2.3-2. Concept Turning Structure Diagram (not to scale)

The height of the conductors above the ground would be a minimum of 22 feet, based on the National Electrical Safety Code and Garkane's standards. The minimum vertical conductor clearance dictates the exact height of each structure, based on topography and requirements for safety. The minimum vertical conductor clearances in some instances may be greater in response to logistical requirements or more specific National Electrical Safety Code requirements.

2.3.1.3. Insulators and Associated Hardware

Insulators made of an extremely low conducting material such as porcelain, glass, or polymer would be used to suspend the conductors from each structure. Insulators inhibit the flow of electrical current from the conductor to the ground, or from one conductor to another conductor. A permanent assembly of insulators would be used to position and support each of the three conductors to the structure. The assemblies of insulators are designed to maintain electrical clearances between the conductors, the structure, and the ground.

2.3.2. Construction and Operations Standards

The following construction and operations standards would be used for the Proposed Action and all alternatives. They would be implemented during construction, operation, and maintenance activities as specified below.

2.3.2.1. General

- Prior to construction, all construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address (1) federal and state laws regarding antiquities, fossils, and plants and wildlife, including collection and removal and (2) the importance of these resources and the purpose and necessity of protecting them. All employees would be required to “sign off” when they have completed training.
- The limits of construction activities would be predetermined, with activity restricted to and confined within those limits. The right-of-way boundary would be flagged in environmentally sensitive areas described in the Plan of Development to alert construction personnel that those areas would be avoided.
- Wooden pole structures would be used to the extent practicable. If engineering constraints require the use of structures other than wood, detailed engineering plans would be provided to the agencies for approval prior to construction (see **Section 2.3.1.1**).
- Where feasible, structures would be placed or rerouted not less than 100 feet outside floodplains and wetlands to avoid sensitive features such as, but not limited to, riparian areas, water courses, and cultural sites to allow conductors to clearly span the features, within limits of standard tower design.
- Enclosed containment would be provided for all hazardous materials (if needed) and trash. All construction waste including trash, litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials. Open burning of construction trash would not be conducted.
- Garkane would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line would be patrolled regularly so that damaged insulators or other line materials that could cause interference are repaired or replaced.
- During construction and operation of the transmission line, the rights-of-way would be maintained free of construction-related debris.

2.3.2.2. Access

- Ground vehicles for material transportation and construction activities would not be used in *limited access areas*.
- All construction vehicle movement outside of the right-of-way would be restricted to pre-designated access, contractor acquired access, or public roads.
- Modifications to existing access routes and addition of centerline access would be limited to the minimum necessary for construction and maintenance.
- No long-term blockages of existing roads and trails as a result of project construction would be anticipated. Temporary traffic delays on existing roads and trails would be limited to 15 to 30 minutes. Delays impacting weekend and holiday traffic would be avoided.
- If damaged by construction activities, fences and gates would be repaired or replaced to their original pre-disturbed condition as required by the landowner or agency. Sixteen-foot steel stock gates would be permanently installed at intersections of the right-of-way with existing fences to facilitate access by Garkane and reduce improper All-Terrain Vehicle (ATV) use of the centerline route.
- Construction access routes would be reclaimed back to the minimum necessary for maintenance.
- Access routes solely for maintenance and operation of the transmission line would not be open to public travel. Administrative routes would be determined by authorizing agencies.

2.3.2.3. Helicopter Use

- Helicopters may be used for construction and maintenance where necessary for areas with steep terrain and roadless characteristics.
- An appropriate helispot would be identified prior to construction and would likely be located at the Bryce Canyon Airport if approved by the airport and the FAA.
- Contract helicopter use during an active fire operation must be authorized by the responding agency. Use of helicopters in the Project Area would be subject to all flight restrictions in effect for fire and emergency purposes. Wildfire response would take precedence. If there is a conflict because of fire management activities, the contract helicopter may be grounded for a period of time.
- During an active fire operation, Garkane would be required to contact Color Country Dispatch each morning to get the frequencies of all air attack aircraft in the area and notification of any temporary flight restrictions.
- Helicopter flights over recommended or designated wilderness areas would be avoided or limited to the existing right-of-way. They would follow the right-of-way and remain outside wilderness or recommended wilderness. Garkane would abide by the stipulations in the existing agreement between Garkane and BRCA.
- Only one helicopter at a time would be allowed in the Project Area and staging areas unless otherwise authorized.
- Activities related to helicopter use (e.g., traffic control, dust abatement) would be the sole responsibility of the contractor.

2.3.2.4. Safety

- The design, construction, operation, and maintenance of the transmission line and associated facilities would meet the requirements of the National Electrical Safety Code and U.S. Department of Labor Occupational Safety and Health Standards, as well as Garkane Energy's requirements for the safety and protection of landowners and their property.
- Garkane and any associated contractor would provide a safe work environment at all times. This includes barricading/covering/flagging holes when left for the day. At the end of the day all tools would be gathered, cached, and secured to prevent safety problems and vandalism.
- In FAA-controlled airspace, Garkane would follow all mitigations as required by the agency. These may include painting poles, placing balls on the line for visibility, and placing beacons or strobe lights on poles.

2.3.3. Construction

2.3.3.1. Activities

Surveying and Engineering

Survey and preliminary engineering work would locate the transmission line centerline, determine accurate topographical profiles along the centerline, and determine the exact location of structures. Topographic profiles would determine specific transmission line structure design and location. The substation sites would also be surveyed for site layout and drainage.

Right-of-Way Clearing

Portions of the right-of-way would require tree clearing. Industry standards and guidance were followed to calculate appropriate right-of-way widths and vegetation clearance requirements (RUS 2005, NERC 2008). Tree clearing and trimming is crucial for maintaining reliable service, especially during severe weather or disasters. Tree limb and branch contact with charged lines is a potential cause of power outages and a possible ignition source for fires. Removal of hazards and clearing of vegetation from the right-of-way assists in decreased wildfire risk and increased personnel safety. Clearance between conductors and vegetation must be maintained at all times in all conditions (e.g., sway, sag, snow loading). For a 138 kV transmission line, the required clearance is between 10 and 15 feet from conductors. Trimming would be done before limbs and branches grow to within these distances and would result in greater than the minimum distances to allow for new growth. In addition, the clearances between lines and vegetation must be visible from the ground so personnel working around lines can keep themselves and their tools away from danger. For these reasons, during construction of the line trees would be removed from the right-of-way in two distinct zones: the right-of-way zone and the hazard tree zone. **Figure 2.3-3** depicts vegetation and tree clearances.

The right-of-way zone is within the designated right-of-way where lines, poles, and related facilities are located. The actual right-of-way width, and subsequently the vegetation management area, may vary, particularly at mid-span, to accommodate the maximum sway of the conductors. This zone would be kept clear of trees that can grow into the lines and cause power interruptions and wildfires.

The second vegetation management area is called the hazard tree zone (shaded area in **Figure 2.3-3**). This zone is variable in width and extends out from the edge of the right-of-way. The width of the hazard tree zone is determined by terrain, tree height, and sway of the transmission line. Any tree that can fall and hit the line is a potential hazard. Hazard trees would be felled or topped to avoid outages and to reduce fire hazard.

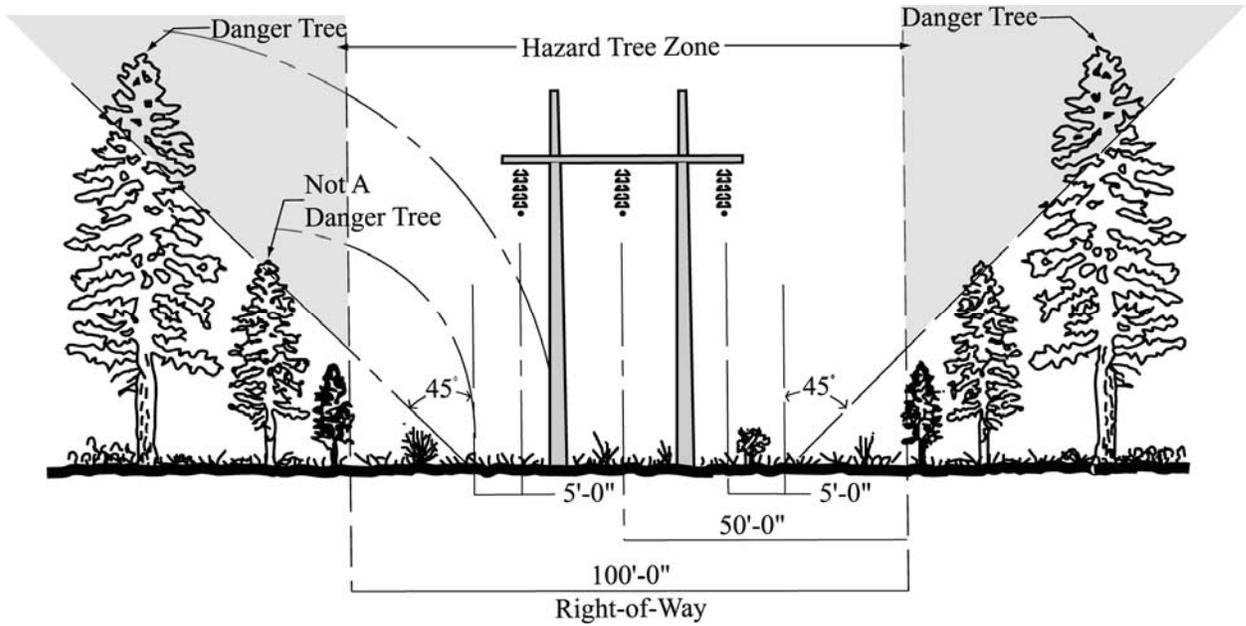


Figure 2.3-3. Vegetation and Tree Clearances (not to scale)

Tree removal would be performed by a contractor familiar with logging practices. Trees would be removed with a tracked feller-buncher and skidded to a nearby staging or pulling area. Removal of merchantable timber would be approved by the DNF or relevant management agency.

During a wildfire, electrical transmission lines can be damaged and taken out of service in three ways: (1) burning of the structures and hardware; (2) excessive heat from the fire below causing sag, melt, or alteration of the wire conductor; and/or (3) ionization caused by the heat and smoke which leads to flashover or arcing between the conductors. Experience has shown that managing the vegetation within the right-of-way to create light fuel conditions reduces the heat and smoke below the line during a wildfire and can avoid the long electrical outage associated with rebuilding a transmission line. In addition to tree removal within the 100-foot-wide right-of-way, all brush vegetation over 4 feet tall would be trimmed and mulched. Mulch could be stockpiled within the right-of-way for post-construction rehabilitation. Trimmings or slash in excess of mulch needs would be buried or removed from the site and disposed of. In areas of steep terrain, the height of the conductors may require little to no vegetation clearing.

Structure Site Clearing and Preparation

Clearing of vegetation would be required for construction purposes at structure site. It may also be required in the long term for electrical safety, maintenance, and transmission reliability. At each new structure site, an approximate radius of 80 feet would be disturbed by the movement of vehicles, assembly of structure elements, and necessary crane maneuvers. Assembly of structures would occur within the right-of-way. An area of 3 to 4 feet around each pole location would be treated with herbicides approved for use by the agency or landowner, except for structures located within 300 feet of riparian areas or BRCA. The herbicides typically leach into the surrounding soil and could affect a radius of 10 feet from the pole location. Disturbed soils in the vicinity that do not receive these herbicides would be reseeded and reclaimed after the structures are in place.

Substation Site Clearing, Grading, and Construction

The substation sites (2 to 3 acres) would be cleared of vegetation and construction equipment would rough-grade the site, establishing drainage for subsurface infrastructure (conduits, foundations, and grounding grids). Conduits, foundations, and grounding grids would be installed and enclosed with an

8-foot chain-link security fence. A 15-foot-wide access road would be cleared and graded for each substation site from the existing road and the substation gate. The substation and access road would be graveled to control vegetation and assist in drainage. Finally, the equipment and control building would be installed. The equipment used for the development of the substation would include graders, excavators, cement trucks, a tractor trailer, bucket trucks, pickup trucks, and a crane. Vegetation trimmings and/or mulch would be handled as described above under “Right-of-Way Clearing.”

Temporary Work Space Disturbance and Restoration (Lay-Down Yards and Pulling and Splicing Sites)

Mobilization activities and unloading of construction materials would occur for short periods of time at specific points along the project alignment called “lay-down yards.” Lay-down yards would likely be cleared of vegetation, and would be extensively disturbed, but for a shorter period of time than construction yards. The number of lay-down yards that would be located along the alignment at approved and existing access roads would vary by alternative. Each would occupy an area of approximately 200 by 600 feet. Lay-down yards would be located on both public and private property. Locations for lay-down yards are identified on figures provided for each alternative.

Conductor pulling and splicing sites, approximately 125 by 400 feet in size, would be established along the proposed alignment. The location and number of pulling and splicing sites would vary by alternative; see proposed locations on figures provided for each alternative. Reels of conductor and overhead shield wire would be delivered to these designated areas spaced about every 2 to 3 miles along the transmission line alignment and at each turning structure. Level locations would be selected so little or no earth moving would be required; however, these sites may have to be cleared of vegetation and would be disturbed by the movement of vehicles and other activities.

Vegetation trimmings and/or mulch from any required clearing of lay-down yards and pulling and splicing sites would be handled as described above under “Right-of-Way Clearing.” Upon completion of the project lay-down yards and pulling and splicing sites would be rehabilitated to standards agreed upon with the agency or landowner.

Construction Materials Hauling

Construction materials would be hauled to the construction yards using the local highway network. Materials would be distributed from construction yards to lay-down yards for temporary storage, and ultimately delivered to structure sites using approved access routes.

Structure Foundation Excavation and Installation

Vertical excavations for both direct bury and concrete structure foundations (see **Table 2.3-1**) would be made with power augering equipment. A vehicle-mounted power auger or backhoe would be used where soils permit. In rocky areas, the foundation holes would be excavated by drilling or by installing special rock anchors. Spoil material (excavated soil) would be used for fill where suitable, and the remainder would be spread at the structure site.

For wood and fiberglass structures, foundation excavation and installation would require access to structure sites by truck-mounted power augers or drill rigs, cranes, material trucks, and crew trucks. In *limited access areas* or areas too steep for trucks and heavy equipment, foundations would be excavated using power auger, hand tools, and/or dynamite as approved by authorizing agencies. Larger equipment (i.e., mini-excavator) would be flown in by helicopter and placed within 50 feet of the excavation site. Steel structures would require concrete foundations. Foundations would be excavated with track-mounted equipment and the concrete poured in place. In *limited access areas*, guys would be used to limit foundation depth and would be dug by hand or with a mini-excavator.

Structure Assembly and Erection

Structure placement activities include (1) mobilizing construction vehicles, equipment, and structure components along existing access routes and (2) assembling and erecting the structures. Sections of the new structures and associated hardware would be delivered to each structure site by flatbed truck. Erection crews would assemble new structures on the ground within the proposed right-of-way and lay-down yards. Using a large crane, crews would position the structures in the augered foundation holes and backfill around each pole. Structure placement activities would occur within the 100-foot-wide right-of-way and within temporary work spaces. In *limited access areas* where cranes cannot be used, structures would be positioned using a helicopter.

Conductor Placement and Shield Wire Stringing

The conductors and shield wires would be pulled into place from the pulling and splicing locations. Stringing and tensioning sites would be selected to avoid environmentally sensitive resources. Pulling and splicing sites are proposed within the right-of-way or temporary work spaces.

Crews would install insulators and sheaves at the end of each supporting structure cross arm. Sheaves are rollers that would be temporarily attached to the lower end of the insulators. The sheaves allow crews to pull sock lines (rope or wire used to pull transmission line conductors into place). Once the equipment is set up, a lightweight vehicle would pull the sock line from one supporting structure to the next where access along the line is available. At each structure, the sock line would be hoisted to the cross arm and passed through the sheaves on the ends of the insulators. The sock line would be used to pull the conductor through the sheaves. The conductors would then be attached to the sock line and pulled through each supporting structure under tension. After the conductors are pulled into place, they would be pulled to a pre-calculated sag and tension clamped to the end of each insulator. The final step of the conductor installation process is to remove the sheaves and install vibration dampers and accessories.

Prior to pulling and splicing, workers would install temporary guard structures at crossings of roads and energized electric lines to prevent the sock line or conductors from sagging onto the roadway or other energized lines during the stringing operation.

Right-of-Way Cleanup and Restoration

Garkane would ensure construction sites, lay-down yards, pulling and splicing sites, and access routes are kept in an orderly condition during the construction period. Crews would collect excess mulch and trimmings, waste construction materials, and rubbish from all construction areas, haul them away, and dispose of them at approved sites. All construction areas not needed for normal maintenance would be returned to their original condition, where feasible, as specified by the agency or landowner. Any damaged gates and fences would be repaired. Garkane would be responsible for reseeding all temporarily disturbed areas, as determined by the agency or landowner, and monitoring for weed infestation.

Removal of Segment of Existing 69 kV Transmission Line

Rubber-tired vehicles would use existing access routes. Helicopter and/or pedestrian access would be used to access the pole structures in *limited access areas*, as approved by the authorizing agencies. Removal of the wood pole structures would involve cutting the wood poles at or slightly below the ground surface. The ground surface would be restored to its original grade, and the wood poles would be hauled away or disposed of at an approved landfill. Conductors would be pulled onto reels using a pulling truck and removed. Access routes no longer used for the old right-of-way would be reclaimed or left in place as defined by the policies of the managing agencies. Cleanup and restoration of the 69 kV transmission line right-of-way would be completed as described under “Right-of-Way Cleanup and Restoration” above.

Access

Several existing roads have been identified that would be used to gain access to the proposed alignment and are shown in the maps under **Sections 2.4, 2.5, and 2.6**. Primary roads would not require improvement. Forest roads, BLM roads, and existing utility right-of-way access would also be used to access the proposed right-of-way during construction activities and for subsequent operation and maintenance purposes. Generally, these existing roads would be used in their current condition. Occasionally these roads may need to be slightly improved to allow construction vehicle access. These improvements would be minor and include such things as grading or widening in some locations.

Access within the proposed right-of-way (generally referred to as the centerline route) would also be required for the construction, operation, and maintenance. Heavy construction vehicles and equipment, including tracked vehicles, would require access to the location of each new structure but not necessarily along the entire length of the right-of-way between structures. Access along the right-of-way and to structure sites where no road or trail exists would be by overland travel where soil conditions and terrain (below 12 to 15 percent slope) allows. This centerline access route would not be constructed, but portions of the route may require improvements, particularly in locations that would cross steep slopes, broken terrain, and drainages, to allow passage of the required equipment. For analysis, it is assumed that there would be a two-track access route adjacent to the centerline of the right-of-way except in *limited access areas*. In *limited access areas* the alignment would be accessed via helicopter, mule, horse, and/or foot. Appropriate agency clearances would be acquired based on the method employed.

Existing access and centerline routes used for the operation and maintenance of the existing 69 kV transmission line would be used to the extent possible for removal of the line. Access routes for the portion of the line to be removed would be reclaimed following removal activities as directed by authorizing agencies. In *limited access areas* in Red Canyon and Bryce Canyon (see **Figure 2.3-1**) the alignment would be accessed via helicopter and/or foot.

2.3.3.2. Workforce and Equipment Requirements

Table 2.3-2 provides assumptions for personnel and equipment required for construction of the 138 kV transmission line and substations. Some of the personnel listed below would be used to perform multiple tasks. The tasks would be conducted in stages; therefore, personnel and equipment would not be working on all tasks simultaneously at a given location. Thus, personnel would perform multiple functions and equipment would access work locations on multiple trips. Several of the same activities may be conducted on an as-needed basis for routine or emergency maintenance.

Table 2.3-2. Assumptions for Personnel and Equipment Required for Construction

TASKS	STAFFING	EQUIPMENT
Access routes, fencing, gates, and clearing	2 to 4 laborers/equipment operators	1 motor grader, 1 to 2 pickup trucks, 1 bulldozer, 1 backhoe
Preparation of structure sites, substation site, construction yard, lay-down yards, and pulling and splicing sites	4 to 8 laborers/equipment operators	1 dozer or motor grader, 2 concrete mixer trucks, 2 pickup trucks, 2 flatbed trucks
Materials hauling	4 to 8 laborers/equipment operators	1 to 2 tractor trailers, 1 to 2 tractor-mounted cranes, 1 to 2 pickup trucks, 1 to 2 flatbed trucks

TASKS	STAFFING	EQUIPMENT
Vegetation clearing	2 to 4 laborers/equipment operators	1 tracked feller-buncher, 1 bulldozer, 2 skidders, 1 chopper, 2 to 4 logging trucks
Foundation excavation	2 to 4 laborers/equipment operators	2 mounted auger trucks, 2 pickup trucks, 1 backhoe, 1 air compressor
Foundation setting	4 to 6 laborers/equipment operators	2 flatbed trucks, 2 pickup trucks, 1 air compressor, 1 flatbed truck with boom
Concrete placement	4 to 5 laborers	2 concrete mixer trucks, 2 pickup trucks
Structure assembly and substation equipment placement	4 to 8 linesmen/groundsmen and crane operators	1 to 3 hydraulic cranes, 4 to 6 pickup trucks, 1 to 3 flatbed trucks, 1 compressor
Structure erection	5 to 8 linesmen/groundsmen and crane operators	1 crane, 50- to 100-ton capacity; 2 pickup trucks
Wire stringing	10 to 15 linemen/groundsmen	2 pullers, 2 tensioners, 4 reel-stringing trailers, 1 materials truck, 2 dozers, 5 to 6 pickup trucks
Cleanup	2 to 4 laborers	1 bulldozer with ripper, 1 grader, 1 front-end loader, 1 tractor with harrow/disk, 1 pickup truck

2.3.4. Operation and Maintenance

The day-to-day operation of the line would be directed by system dispatchers in a power control center in Kanab, Utah. These dispatchers use communication facilities to control the transfer of electrical power through the system.

The activities associated with the maintenance of the line fall into three categories: Routine Maintenance, Major Maintenance, and Emergency Maintenance. Examples of routine and major activities involving inspection, maintenance, and reconstruction of the transmission lines are shown in **Tables 2.3-3** and **2.3-4**.

2.3.4.1. Activities

Right-of-Way

Vegetation management subsequent to the initial clearing of the right-of-way would work to maintain vegetation consisting of primarily native grasses, forbs, and smaller brush. The maintenance work would be done on a 3-year cycle. Vegetation-clearing activities are described in **Section 2.3.3.1**.

Routine Maintenance Activities

Routine maintenance activities are ordinary maintenance tasks that are regularly carried out. They are limited in scope, accomplished by relatively small crews using a minimum of equipment, and usually conducted within a time frame from a few hours up to a few days (see **Table 2.3-3**).

Responsibly conducted routine maintenance activities would be anticipated to have minimal impact to resources and are usually authorized under the transmission line easements and right-of-way grant. While carrying out routine maintenance activities, field personnel and contractors would adhere to basic standards and guidelines contained in the project Plan of Development, special use stipulations, and any additional requirements identified in the decision documents that apply to the specific area

where work is to be done. If for any reason the requirements require deviation, field personnel and contractors would notify the designated agency contacts prior to initiating work on the activity and/or during the activity if additional problems are encountered.

Major Maintenance Activities

Major maintenance activities would be relatively large-scale efforts that occur on an infrequent basis. These activities require planning and budgeting in advance and agency coordination. They may involve larger work crews than routine maintenance activities and a variety of equipment, including heavy equipment, and usually require several days or longer to complete (see **Table 2.3-4**).

Garkane would identify proposed major maintenance activities and notify the designated contact for the appropriate public land agency before initiating major maintenance activities. Garkane and the appropriate public land agency would identify what, if any, special notification or additional clearance approvals are required prior to conducting the proposed major activities.

When Garkane field personnel and contractors carry out major maintenance activities, they would be required to adhere to all standards and guidelines contained in the approved Plan of Development, terms and conditions of the Record of Decision, any site-specific activity or timing constraints, and the requirements of any mutually agreed upon additional clearance or special notification requirements.

Emergency Maintenance Activities

The continued operation and maintenance of the transmission line would reduce or prevent, to the greatest extent possible, any emergency activities (defined as situations that could threaten life, property, or resources). Even so, unforeseen emergency conditions may arise. Examples of emergency maintenance include activities necessary to restore power due to a transmission structure or conductor failure due to fire or storm events. In these cases, Garkane would notify the designated contact for the appropriate public land agency concurrently with responding to the emergency. The public land agency may elect to have a representative present during emergency operations and/or to conduct a post-event site visit to evaluate Garkane’s response, assess impacts, and propose remedial measures for discussion. Garkane would adhere to the same constraints identified for routine and major maintenance activities to minimize impacts to resources, when possible.

2.3.4.2. Workforce and Equipment Requirements

Tables 2.3-3 and **2.3-4** present transmission line routine and major maintenance activities.

Table 2.3-3. Transmission Line Routine Maintenance Activities

TYPICAL ACTIVITY	DESCRIPTION OF EXAMPLE	EQUIPMENT NEEDED	FREQUENCY
Aerial inspection	Aerial survey of transmission line	Helicopter/fixed wing	Annual or during emergency outage conditions
Ground inspection	Visual and physical inspection of lines and poles to detect any problems	ATV, 4-wheel drive (wd) truck, pedestrian access	Annual or during emergency outage conditions
Pole testing and treatment	Taking bore samples from poles and treating poles with chemical preservative	ATV, 4wd truck, pedestrian access	10-year cycle
Insulator replacement*	Replacement of an insulator upon failure	ATV, 4wd truck, large equipment	Annual**

TYPICAL ACTIVITY	DESCRIPTION OF EXAMPLE	EQUIPMENT NEEDED	FREQUENCY
Cross arm replacement*	Supporting cross arm to poles dragged or trucked to site and replaced	4wd truck, boom truck, large equipment	Annual**
Anchor wire/anchor replacement*	Replacing anchor wires or anchors	4wd truck, track hoe, other equipment	Annual**
Vegetation management	Clearing of trees and hazard tree branches from right-of-way that are under or within 50 feet of the lines and clearing all vegetation within 10 feet of poles	ATV, 4wd truck, chainsaws, mower, and track mounted brush cutter/chipper	3-year cycle
Weed control	Thistle eradication	sprayer (herbicide)	As described in the Operation and Maintenance Plan
Road maintenance*	Vegetation removal, water bar installation, culvert installation, etc.	4wd truck, bulldozer, grader, excavator	Annual
Hardware tightening*	Tightening of existing hardware on structures	4wd truck, boom truck	10-year cycle
Pole replacement*	Access to site, creating lay-down area, digging new pole holes and anchor holes, framing structure, removing old pole	4wd truck, boom truck, excavator, bulldozer or other tracked vehicle, line truck, helicopter	Annual**

* This activity may require vehicle access to a transmission line structure and therefore may also include site-specific road maintenance activities to facilitate access.

** This activity would occur on approximately 1 to 5 percent of structures as part of the annual inspection as the line ages but may also occur during emergency outage conditions to replace damaged infrastructure.

Table 2.3-4. Transmission Line Major Maintenance Activities

TYPICAL ACTIVITY	DESCRIPTION OF EXAMPLE	EQUIPMENT NEEDED	FREQUENCY
Structure relocation	Access to site, creating landing pad and pole lay-down area, digging new pole holes and anchor holes, framing structure, removing old pole	4wd truck, boom truck, excavator, bulldozer or other tracked vehicle, line truck, helicopter	Annual*
Conductor replacement	Replacing conductor typically associated with a non-emergency pole change-out	4wd truck, boom truck, and line truck, large equipment	Annual*

TYPICAL ACTIVITY	DESCRIPTION OF EXAMPLE	EQUIPMENT NEEDED	FREQUENCY
Access route reconstruction and relocations	Altering the alignment of any existing access routes, creating replacement access routes, grading, and culverts	4wd truck, bulldozer, grader, excavator	As needed

* This activity would occur on approximately 1 percent of structures annually but may also occur during emergency outage conditions to replace damaged infrastructure.

2.3.5. Abandonment

Although highly unlikely, if the proposed transmission line is no longer needed, the transmission structures would be removed. If additional areas are needed outside the proposed right-of-way for removal of structures, a temporary use permit would be requested for public lands. Shield wires, conductors, insulators, and hardware would be dismantled and removed. Structures would be removed by being excavated, cut off at the base, or pulled out. Cranes, large trucks, and pickup trucks, as well as earth-moving equipment, would be required. In *limited access areas*, the poles and conductors would be dismantled and removed via helicopter and/or foot. Following removal of the transmission line, all disturbed areas would be restored as near as possible to their original conditions.

2.3.6. Resource Protection Measures

The following resource protection measures are considered part of the Proposed Action and other Action Alternatives and would be carried out by the proponent in the course of construction, operation, and maintenance activities as specified below.

2.3.6.1. Soils/Vegetation

Soils

- Ingress and egress to pole locations would be on the same path to minimize disturbance to soil and biological soil crusts, especially in sparsely vegetated areas.
- Soil from pole and guy wire hole excavations would be used to refill the hole and any remainder evenly distributed over the disturbance area around the hole. In sensitive visual areas where different soil colors could distract from the view, excess soils would be removed from the site.
- Herbicide use would be applied in accordance with label requirements and comply with the BLM Vegetation Treatments Using Herbicides Final Programmatic EIS (2007a) and the DNF Environmental Assessment for Noxious Weed Management (2000a).
- Where temporary minor changes in contours occur during construction along the route, the area would be returned to near pre-construction contours through reshaping, as required by the authorizing agency. On BRCA lands, the soil would be re-contoured using hand tools to minimize erosion.
- If any areas outside the *limited access areas* have slopes greater than 35 percent, tractor/equipment operation would not be permitted. This measure limits surface disturbance and keeps surface runoff water from concentrating. This practice restricts tractor operation to slopes where corrective measures for proper drainage such as water bars are easily installed and effective. Criteria that may be used to determine slope restrictions are soil stability, mass stability, infiltration rate, and soil water holding capacity. These data may be interpreted from soil and land type inventories, geologic maps, and climatic and hydrologic information. Subsequent field verification may be necessary.

- Tractor/equipment operation would be limited during times of high soil moisture levels to minimize soil compaction, puddling, rutting, and gullyng with resultant sediment production and loss of soil productivity. This measure minimizes surface disturbance during high soil moisture conditions which would result in compaction, puddling, rutting, and gullyng problems. This practice reduces the need to correct these soil and water resource problems later. High soil moisture conditions will be defined and evaluated during construction by USFS Contract Inspectors in concert with representatives from affected cooperating agencies.

Weeds

- A pre-construction weed inventory would be required, and early treatment of weeds would occur prior to construction vehicles entering infested areas.
- To minimize the potential for the spread of noxious weeds, all equipment used during construction would be power washed off-site to remove all soil and plant material prior to entering the Project Area.
- Ongoing monitoring and treatment of noxious and invasive species would be incorporated into the Operation and Maintenance Plan. Garkane would bi-annually (during the growing season) survey and treat, if necessary, the right-of-way for noxious weeds for the first 10 years following end of construction, and submit bi-annual reports to lead and cooperating agencies as requested.
- Control and follow-up treatment of invasive species specific to this project within the right-of-way would be the responsibility of Garkane.
- If chemical weed control is used, only agency-approved chemicals would be used by certified applicators.

Revegetation

- Where re-contouring is not required, vegetation would be left in place wherever possible to avoid excessive root damage and allow for re-sprouting.
- Re-vegetation of the Project Area, where necessary, would be Garkane’s responsibility and would be coordinated with the appropriate affected agency’s resource division.
- Areas identified by the agency or landowner would be seeded following construction activities using an agency-approved seed mixture and adhering to standards recommended by the specific agency for that portion of the right-of-way. Seed mixes used for rehabilitation purposes would be certified noxious weed free. Revegetation of the Project Area would be subject to agency monitoring and inspection (at agency discretion) to ensure adequate revegetation establishment. Based on these findings, the affected agency may require additional revegetation from Garkane if agency revegetation objectives are not adequately met. Agencies would provide revegetation objectives to Garkane prior to project initiation.
- Reseeded areas within grazing allotments may require additional measures to assure effective revegetation. Reseeded areas around structures and other disturbances within grazing allotments may attract cattle to graze on new growth. Herding, salting, and placement of water sources may be used to attract cattle away from revegetated areas to allow vegetation to mature and become established. Larger reseeded areas (such as lay-down yards or pulling sites) may require temporarily fencing cattle out to allow for effective revegetation.

2.3.6.2. Fire

- Blasting along with use of mechanical equipment may be limited/restricted during drought conditions if fire restrictions are implemented. A waiver may be granted if Garkane can

provide required mitigation measures such as hours of work, available water, and fire lookouts.

2.3.6.3. Wildlife and Sensitive Species

- If a federally listed species is located within the Project Area, work would be immediately halted to allow the appropriate federal agency to respond. Consultation with the USFWS would be initiated immediately upon species discovery and additional mitigation measures may be applied where necessary.
- Construction, demolition, and maintenance activities would be subject to species-specific temporal restrictions to address wildlife concerns. These restrictions would be set based on consultation and coordination with the USFWS and Utah Division of Wildlife Resources.
- Pre-construction/demolition raptor/nesting bird surveys may be required if project implementation occurs more than 2 years from the decision in accordance with USFS and other agency guidelines.
- With the exception of emergency repair situations, right-of-way construction, demolition, restoration, maintenance, and termination activities in designated areas would be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed, threatened, endangered, or other sensitive animal species. The list of sensitive periods would be approved in advance by the authorized officer of the appropriate land management agency.
- Timing limitations for timber clearing and right-of-way vegetation maintenance would be in agreement with Migratory Bird Treaty Act (MBTA) protocol.
- Construction and demolition activities within active raptor nesting areas would be allowed in compliance with the appropriate temporal and spatial buffers as set forth by the management agency.
- Structures would be designed in accordance with the Avian Protection Plan Guidelines developed by the USFWS' Avian Power Line Interaction Committee (2006) to minimize avian conflicts.
- Raptor perch deterrents/discouragers would be used on poles to minimize perching in areas inhabited by Utah prairie dogs, greater sage grouse, and pygmy rabbits as required by each land management regulating agency.
- Additional wildlife mitigation measures may be required if areas where habitat improvement projects have been conducted would be disturbed.
- Committed resource protection measures were considered in the design of the project; see **Appendix A**.

2.3.6.4. Cultural Resources

- Should any of the following be discovered during construction, such activities would cease in the immediate area of discovery and the appropriate agency representative would be notified immediately: (1) previously unidentified surface or subsurface cultural resources and/or (2) human remains and/or objects or materials subject to the Native American Graves Repatriation and Protection Act, as amended. An evaluation of the discovery would be made by the lead USFS authorized officer or relevant cooperating agency representative to determine appropriate actions and avoidance measures that would prevent the loss of any significant cultural or scientific values. The authorized officer would make any decisions pertaining to mitigation measures after consulting with appropriate agencies. No operations

would resume in the immediate area of the discovery until written authorization to proceed is issued by the USFS or appropriate agency.

- Cultural resources would be protected by limiting access to known archaeological sites, educating employees about the importance of cultural resources, and implementing a strict management policy prohibiting collection of artifacts.

2.3.6.5. Paleontology

- Construction- or maintenance-related activities that require ground disturbance of deeper than 12 inches would be monitored when conducted over soil covered areas underlain by bedrock units with a PFYC ranking of 4 or higher. Surveys would be required on all bedrock exposures of units with a PFYC of 4 or higher prior to any surface disturbing activities (ie. the following geologic units: Tropic Shale, Dakota Formation; the Tibbet Canyon, Smoky Hollow and John Henry members of the Straight Cliffs Formation; and the Wahweap and Kaiparowits formations).
- Should any paleontological resources be found during construction, work would be halted and the appropriate agency representative would be notified immediately. The authorized officer would make any decisions pertaining to mitigation measures after consulting with appropriate agencies. No operations would resume in the immediate area of the discovery until written authorization to proceed is issued by the USFS or appropriate agency.

2.3.6.6. Visual

- To the extent possible, placement of access routes and points of ingress and egress would be situated to minimize visual intrusion and to obscure views from local highways and county roads.
- No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.
- Non-reflective wire would be used within USFS High SIO areas, BLM VRM Management Class II areas, and in the GSENM as required by the Management Plan.
- When use of wood pole structures is not practicable, and the use of fiberglass or steel structures is approved, dark colored, non-reflective surfaces would be used.
- To the extent practicable, siting of individual structures would take advantage of both topography and vegetation as screening devices to restrict views of structures from visually sensitive areas.
- Where practicable, the siting of structures would avoid ridgelines, summits, or other prominent locations and use topography as a backdrop to avoid skylining.
- The transmission line alignment would cross linear features (e.g., trails, roads, rivers) at right angles whenever possible to minimize viewing area and duration.
- Vegetation openings for facilities, structures, routes, etc., would mimic the size, shape, and characteristics of naturally occurring openings to the extent practicable.
- Vegetation clearing design in highly visible forested areas could include feathering of right-of-way edges, i.e., progressive, selective thinning of trees from the edge of the right-of-way inward, mixing tree heights from the edge of the right-of-way, and creation of an irregular vegetation outline.

- Lighting for facilities would not exceed the minimum required for safety and security while not affecting wildlife behavior, and designs would be selected that minimize upward light scattering (light pollution).
- Visual impact mitigation objectives and activities would be discussed with equipment operators prior to commencement of construction activities.
- Methods for disposal of slash from vegetation removal would be site dependent. Slash may be mulched and spread to cover fresh soil disturbances (preferred), hauled off site for disposal, or buried.
- Restoration activities specified here or in project-related documents would be undertaken by Garkane immediately after disturbances.
- Disturbed areas would be covered with stockpiled topsoil or mulch and revegetated using a mix of native species selected for visual compatibility with existing vegetation.
- Edges of revegetated areas would be feathered (strategically removing vegetation along the margins of the right-of-way at agency direction) to reduce form and line contrast with existing landscape.
- Excess fill material would not be wasted down slope to avoid color contrast with existing vegetation/soils.

2.3.6.7. Water

- Water needed during construction would be limited to that needed for dust control. The conditions of the Storm Water Pollution Prevention Plan would be imposed on all construction activities to avoid or limit sedimentation to surface waters.
- Equipment operation would be excluded from wetlands, floodplains, stream channels, and wet meadows to limit soil damage, turbidity, and sediment production resulting from compaction, rutting, runoff concentration, and subsequent erosion. This practice is designed to prevent soil puddling, compaction, and displacement, and the concentration of surface water and soil erosion, which may lead to rill or gully erosion and subsequent water quality degradation. This measure is intended to prevent or reduce the need for corrective measures to solve water concentration problems due to equipment use.
- When applying pesticides, an untreated 300-foot buffer strip from each side of surface water, wetlands, or riparian areas will be left to minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, and other non-target areas.

2.3.6.8. Land Use

- Range improvements (e.g., fences, water developments, corrals, cattle guards) would be identified and protected from any damage associated with project activities.
- Proper signage would be posted in affected areas prior to and during construction if temporary road closures or restricted access were anticipated.
- In the event of property damage caused by construction and operations activities, Garkane would quickly investigate and reasonably attempt to settle with the party who incurred property damages.

2.4. ALTERNATIVE A: PROPOSED ACTION

2.4.1. Project Elements

Figure 2.4-1 depicts the Proposed Action route and other project elements (temporary work spaces, substations, access routes). In addition to construction of the transmission line, the Proposed Action includes the development of a new substation east of Tropic and the expansion of the Hatch Substation. Garkane's existing 69 kV transmission line between the Bryce Canyon Substation and Hatch Mountain Substation would be unnecessary once the new transmission line is operational and would be removed and the right-of-way rehabilitated. The Proposed Action would involve the development of overland access routes in portions of the right-of-way where a suitable route is not available and where development of an access route is permitted by the authorizing agency. In *limited access areas*, the alignment would be accessed via helicopter and/or foot.

2.4.1.1. Right-of-Way

As shown in **Figure 2.4-1**, the right-of-way is divided into three segments to aid in analysis (A-1, A-2, and A-3). Temporary use permits would be needed for 35 pulling and splicing sites, at turning structures, and for 7 lay-down yards (see **Figure 2.4-1**). Substations associated with the project would be developed on private land purchased by Garkane and, therefore, would not require a right-of-way grant.

Project construction activities and overland access along the Proposed Action alignment would be conducted within the proposed 100-foot-wide right-of-way and temporary work spaces located in the following township and range sections:

Segment A-1

Sections 31, 32, 33, 34, and 35, T35S, R3W

Sections 33, 34, 35, and 36, T35S, R4W

Sections 7, 17, 18, 20, 28, 29, 32, and 33, T36S, R2W

Sections 2, 11, and 12, T36S, R3W

Sections 5, 6, and 7, T36S, R4W

Segment A-2

Section 7, T36S, R4W

Sections 11, 12, and 14, T36S, R5W

Segment A-3

Sections 8, 9, 11, 12, 13, 14, 15, 16, and 21, T36S, R5W

2.4.1.2. Temporary Work Spaces

Temporary work spaces would include lay-down yards where equipment and materials would be stored during construction activities. Other temporary work spaces would include pulling and splicing sites. Most of these spaces would occur within the right-of-way, though a few would fall outside (see **Figure 2.4-1**). Generally, these areas would be 100 percent disturbed but after use would be rehabilitated to restore natural contouring, drainage, and vegetation. Under Alternative A, 35 pulling and splicing locations would temporarily disturb 1.15 acres each, for a total of 40.25 acres. Seven lay-down yards would temporarily disturb 2.75 acres each for a total of 19.25 acres for staging activities.

2.4.1.3. Substations

The East Valley Substation would be developed on a private 3-acre parcel purchased by Garkane and owned in fee at the eastern end of the Project Area. The site would contain bus work and breakers, conduits, relaying and communication equipment, ground grids, a cinder block control building, and other auxiliary equipment as necessary to operate the facility. A typical site layout is shown in **Figure 2.4-2**. Bus work would be approximately 15 feet in height. The substation compound would be graveled, free of vegetation, and fenced with an 8-foot chain-link security fence. Low-profile sodium lights would illuminate the yard periodically. Cooling fans would periodically operate to cool down the transformers. A 15-foot-wide gravel access road would be installed and maintained between the substation compound gate and the existing paved and gravel county roads.

The existing Tropic and Bryce Canyon substations would remain in their current state. However, the Hatch Mountain Substation would be decommissioned and the step bank and expansion yard on the north side of the road would be completely removed. Although decommissioned, all other equipment would remain at the Hatch Mountain Substation. The Hatch Substation at the western terminus of the project would be expanded by approximately 2 acres.

Two construction yards for worker reporting, vehicle parking, and equipment and material storage would be required for the life of the project. These yards would be co-located with the proposed East Valley and Hatch Substation sites. The sites would be extensively used and disturbed, and may be permanently fenced and graveled as a part of the substation infrastructure.

2.4.1.4. Access Roads

Existing access roads for the Proposed Action are shown in **Figure 2.4-1**. Access to pole locations, temporary work spaces, and substation sites would be from existing highways and county roads as they connect to existing forest and BLM roads. Some roads may need minor improvements (e.g., filling potholes, blading). Thus, no additional resource disturbance is anticipated. Access to the Rocky Mountain Power/PacifiCorp 230 kV transmission line in the Cedar Fork Canyon area would need to be improved by blading, which may widen the route slightly in some locations. For analysis, it is assumed that these access routes would be widened on the west side by an additional 2 feet for additional maximum disturbance of 1.9 acres. A 10-foot-wide two-track access route adjacent to the centerline of the proposed right-of-way would be required for construction and ongoing maintenance for a total of 26.88 miles, but would not traverse *limited access areas* in the Cedar Fork Canyon area and Hillsdale Canyon area.

2.4.1.5. 69 kV Line Removal

Once the 138 kV transmission line is operational, Garkane, or its contractor, would remove the existing 69 kV transmission line infrastructure between the Bryce Canyon Substation and the Hatch Mountain Substation (16.23 miles). The 69 kV line is the main source of electricity to the region and would need to remain in service until the proposed line is constructed and energized. This portion of the existing right-of-way, including the centerline access, would be rehabilitated as described in **Section 2.3.3.1**, Right-of-Way Cleanup and Restoration, and Removal of Segment of Existing 69 kV Transmission Line.

2.4.1.6. GSENM Management Plan Amendment

Implementation of the Proposed Action would require the amendment of the GSENM Management Plan (2000) by changing the designation of a 100-foot-wide 3.68-mile stretch (44.58 acres) of the Primitive Zone to Passage Zone, and within this area, changing the existing VRM Management Class designation from Class II to Class III.

Figure 2.4-1. Alternative A: Proposed Action Route and Project Elements

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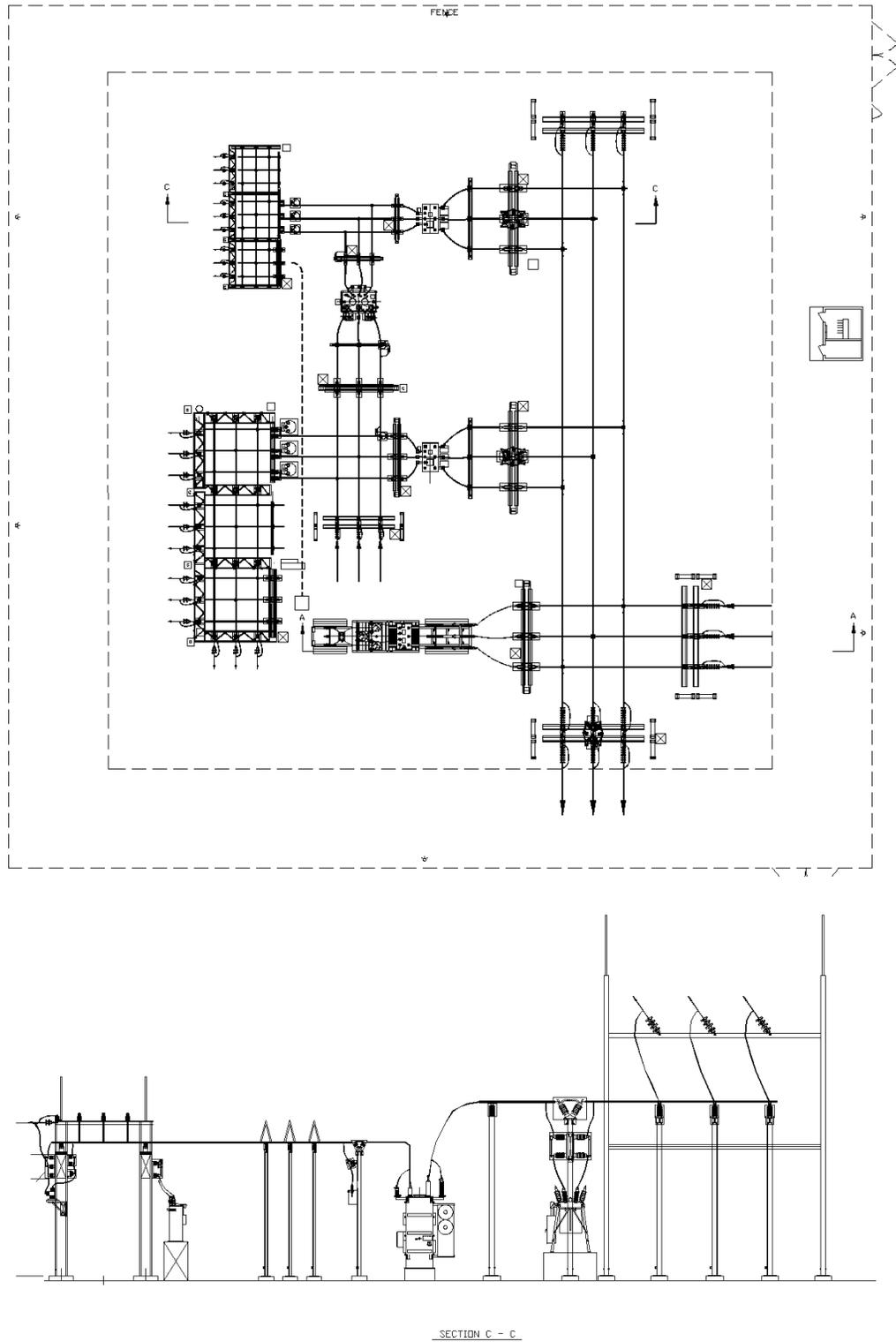


Figure 2.4-2. Typical substation site layout

Surface Disturbance

Tables 2.4-1 and 2.4-2 list the estimated long- and short-term surface disturbance that would be associated with Alternative A.

Table 2.4-1. Total Long-Term Surface Disturbance and Land Management for Alternative A: Proposed Action

ALTERNATIVE A SEGMENT	LONG-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	5.31	5.01	0.00	6.74	17.72	0.00	34.78
Segment A-2	0.00	0.00	0.00	0.00	2.87	0.00	2.87
Segment A-3	2.67	1.68	5.23	0.00	5.88	0.00	15.47
Alternative A Total	7.97	6.70	5.23	6.74	26.47	0.00	53.12

*Includes long-term disturbance associated with power poles, substations, substation access routes, existing access road upgrades, and a 10-foot-wide centerline access route.

Table 2.4-2. Total Short-Term Surface Disturbance and Land Management for Alternative A: Proposed Action

ALTERNATIVE A SEGMENT	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	8.76	18.14	0.00	23.27	70.55	0.00	118.39
Segment A-2	0.00	0.00	0.00	0.00	14.21	0.00	14.21
Segment A-3	9.19	6.96	28.14	0.00	23.08	0.00	67.37
Alternative A Total	17.94	25.10	28.14	23.27	107.84	0.00	202.29

*Includes short-term disturbance associated with pulling and splicing sites, lay-down areas, and power pole (H-structure) installation. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. *Limited access areas* were not analyzed for short-term disturbance associated with pole installation. This table does not contain short-term disturbance associated with the removal of the existing 69 kV transmission line; this acreage is found in **Table 2.10-6** at the end of this chapter.

2.5. ALTERNATIVE B: PARALLEL EXISTING 69 KV ROUTE

2.5.1. Project Elements

Figure 2.5-1 depicts the Parallel Existing 69 kV Route Alternative and other project elements. The alignment and project elements are discussed below. This route would have no surface impacts on the GSENM. This alternative would require a new 100-foot right-of-way parallel to but separated from the existing 69 kV line right-of-way for constructibility and safety reasons, in order to safely build and energize the line prior to removal of the existing line. This alternative would also require the building of an additional substation and a larger East Valley Substation than proposed under Alternative A. Because of this, the alternative would also require the construction of 9 miles of new distributions lines with a 50-foot right-of-way.

Figure 2.5-1. Alternative B: Parallel Existing 69 kV Route and Project Elements

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2.5.1.1. Right-of-Way

The proposed right-of-way alignment alternative would follow the route indicated in **Figure 2.5-1**. Temporary use permits would be needed for 29 pulling and splicing locations, at turning structures, and for 7 lay-down yards for staging activities.

The proposed 100-foot right-of-way for Alternative B would be located in the following township and range sections:

Sections 31 and 32, T35S, R4W

Sections 25, 26, 27, 28, 30, 33, 34, 35, and 36, T35S, R5W

Sections 31 and 32, T36S, R2W

Sections 7, 16, 17, 18, 21, 22, 23, 25, 26, and 36, T36S, R3W

Sections 3, 4, 5, 10, 11, 12, and 13, T36S, R4W

Sections 4, 9, 16, and 21, T36S, R5W

2.5.1.2. Temporary Work Spaces

Disturbance associated with temporary work spaces under Alternative B would be similar to the Proposed Action. The primary difference would be the addition of a relatively long *limited access area* through BRCA and Red Canyon that would decrease the number of pulling and splicing sites included as part of the other alternatives. Under Alternative B, 29 pulling and splicing locations would temporarily disturb 1.15 acres each, for a total of 33.35 acres. Seven lay-down yards would temporarily disturb 2.75 acres each for a total of 19.25 acres for staging activities.

2.5.1.3. Substations

The East Valley Substation would be constructed on 3 acres, the same as the Proposed Action. The existing Tropic Substation would be removed and capacity added to the new East Valley Substation. This would not increase the disturbance footprint of the substation but would require that at least two circuits of new distribution lines (total of 6 miles) be built within a 50-foot right-of-way (approximately 37 acres), and the addition of more infrastructure within the substation.

The existing Bryce Canyon Substation would be decommissioned and a new substation would be constructed to the west of Bryce Canyon City on a 2-acre parcel at one of two potential locations: (1) on the DNF or (2) on private land. This would require the construction of at least three circuits of new distribution lines (total of 3 miles) within a 50-foot right-of-way (approximately 19 acres).

As with the other alternatives, the Hatch Mountain Substation would be decommissioned and the step bank and expansion yard on the north side of the road would be removed. Although decommissioned, all other equipment would remain at the Hatch Mountain Substation. The Hatch Substation would also be expanded by 2 acres.

Two construction yards for worker reporting, vehicle parking, and equipment and material storage would be required for the life of the project. These yards would be co-located with the proposed East Valley and Hatch Substation sites. The sites would be extensively used and disturbed, and may be permanently fenced and graveled as a part of the substation infrastructure.

2.5.1.4. Access Roads

Access roads for the alternative are shown in **Figure 2.5-1**. These roads may need minor improvements but are not anticipated to cause additional surface disturbance. A 22.75-mile two-track access route along the centerline of the proposed right-of-way would provide construction access.

Centerline access would not be developed within *limited access areas*, including BRCA and portions of Red Canyon.

2.5.1.5. 69 kV Line Removal

Once the 138 kV transmission line is operational, Garkane, or its contractor, would remove approximately 21.57 miles of the existing 69 kV transmission line infrastructure from approximately 1 mile east of the Tropic Substation to the Hatch Mountain Substation. This portion of the existing right-of-way, including the centerline access, would be rehabilitated as described in **Section 2.3.3.1**, Right-of-Way Cleanup and Restoration, and Removal of Segment of Existing 69 kV Transmission Line.

2.5.2. Surface Disturbance

Tables 2.5-1 and 2.5-2 list the estimated long-and short-term surface disturbance that would be associated with Alternative B.

Table 2.5-1. Total Long-Term Surface Disturbance and Land Ownership/Management for Alternative B: Parallel Existing 69 kV Route

ALTERNATIVE B BRYCE SUBSTATION OPTIONS	LONG-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Option 1	19.36	5.74	13.12	0.00	6.59	1.04	45.85
Option 2	21.30	7.47	13.12	0.00	4.52	1.04	45.62

*Includes long-term disturbance associated with power poles, substations, substation access routes, existing access road upgrades, and a 10-foot-wide centerline access route for the proposed 138 kV transmission line. Does not include disturbance for construction of distribution lines associated with new substations.

Table 2.5-2. Total Short-Term Surface Disturbance and Land Ownership/Management for Alternative B: Parallel Existing 69 kV Route

ALTERNATIVE B BRYCE SUBSTATION OPTIONS	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Option 1 or 2	75.38	20.19	54.08	0.00	18.48	0.78	168.91

*Includes short-term disturbance associated with pulling and splicing sites, lay-down areas, and power pole (H-structure) installation for the proposed 138 kV transmission line. Does not include disturbance for construction of distribution lines associated with new substations. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. This also includes short-term disturbance associated with removal of the existing 69 kV transmission line. *Limited access areas* were not analyzed for short-term disturbance associated with pole installation.

2.5.3. Additional Construction and Operations Standards (as required by BRCA)

The following construction and operations standards would be in addition to those listed under **Section 2.3.2** and would be implemented during construction, operation, and maintenance activities in BRCA for Alternative B.

2.5.3.1. General

- If a reclamation bond is posted, holes within BRCA would be dug primarily by a mini-excavator that would be flown to within 50 feet of the hole location. Hand tools (e.g., hand auger, shovels, picks) may also be used. As noted below, all equipment would be transported in by helicopter or foot. Use of generators and gasoline-powered hand augers would be allowed. Precautions to prevent gasoline spills, such as a tray to hold equipment, must be implemented.
- In BRCA, wheelbarrow use is only allowed at pole locations to transport soil within a 100-foot radius. Any visible tracks must be raked out.
- The Park Superintendent must approve the use of explosives to excavate holes within BRCA. The Superintendent must be notified at least three days before explosives use is planned.
- Collection of plants, rocks, fossils, wildlife, artifacts, or any items or materials from BRCA is prohibited.
- If the 69 kV transmission line is de-energized and removed from BRCA, the guy wires would be removed, the poles would be “flush cut” at or slightly below ground level, the portion of the pole remaining in the ground would be covered with soil, and the area where the pole was removed would be re-vegetated. Poles would be removed by helicopter.
- Garkane would provide BRCA with informational material (project overview and activities) for distribution to the public during periods of project construction.

2.5.3.2. Access

- *Limited access areas* would also include all of BRCA.
- No road building would occur within BRCA.
- Construction access would be allowed for the rim pole on the west boundary of BRCA.

2.5.3.3. Helicopter Use

- All equipment used in BRCA would be transported by helicopter or foot.
- Helicopter use within BRCA must follow the terms and conditions stipulated in the existing Right-of-Way Permit (RW 1330-05-001) for the approved transmission lines.
- When work is conducted within BRCA, Garkane would notify the Chief Ranger at the beginning of each week regarding the work plan for the week and approximate number of overflights expected.
- Helicopter flights over trails and heavily used areas within BRCA would be limited to the right-of-way. Flights over the Mossy Cave Trail would be limited to the extent practicable. Garkane would provide public notice of proposed times and places in local newspapers or other media outlets.
- A “Letter of Authorization to Use Bryce Canyon Radio Frequencies” would be required prior to helicopter use in BRCA.

2.5.4. Additional Resource Protection Measures

The following resource protection measures would be in addition to those listed under **Section 2.3.6** and would be implemented during construction, operation, and maintenance activities for Alternative B as specified below.

2.5.4.1. Soils/Vegetation

- All trees cut within BRCA would be left on the ground. Stumps would be “flush cut” as close to ground as possible.
- Herbicide would not be used within BRCA.

2.5.4.2. Wildlife

- A pre-construction raptor/nesting bird survey would be required within BRCA.

2.6. ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE

2.6.1. Project Elements

Figure 2.6-1 depicts the Cedar Fork Southern Route Alternative and other project elements. The alignment and project elements are discussed below.

2.6.1.1. Right-of-Way

The proposed right-of-way alignment alternative would follow the route indicated in **Figure 2.6-1**. Temporary use permits would be needed for 41 pulling and splicing locations, at turning structures, and for 8 lay-down yards for staging activities.

The proposed 100-foot right-of-way for Alternative C would be located in the following township and range sections:

Segment C-1

Sections 7, 17, 18, 20, 28, 29, 32, and 33, T36S, R2W

Sections 2, 3, 4, 5, 7, 8, 11, 12, 17, and 18, T36S, R3W

Sections 12, 13, 14, 15, and 16, T36S, R4W

Segment C-2

Sections 16, 17, and 18, T36S, R4W

Segment C-3

Section 18, T36S, R4W

Sections 13, 14, 15, 16, 17, 21, 22, 23, and 24, T36S, R5W

The agency entitlements would be the same as for the Proposed Action (**Section 2.4.1.1**).

2.6.1.2. Temporary Work Spaces

Disturbances associated with temporary work spaces would be similar to the Proposed Action. Under Alternative C, 41 pulling and splicing locations would temporarily disturb 1.15 acres each, for a total of 47.15 acres. Eight lay-down yards would temporarily disturb 2.75 acres each for a total of 22 acres. Alternative C was designed to avoid sensitive resources, therefore, it is a more complex route with more turns, which results in additional temporary work spaces.

Figure 2.6-1. Alternative C: Cedar Fork Southern Route and Project Elements

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Substations

Substations would be built, expanded, and decommissioned the same as described under the Proposed Action (Section 2.4.1.4).

2.6.1.3. Access Roads

Access roads for the alternative are shown in **Figure 2.6-1**. These roads may need minor improvements but are not anticipated to cause additional surface disturbance. The two-track access route for a total of 27.80 miles along the centerline of the proposed right-of-way would not traverse *limited access areas*.

2.6.1.4. 69 kV Line Removal

Removal of the 69 kV line would be the same as for the Proposed Action (Section 2.4.1.6).

2.6.1.5. GSENM Management Plan Amendment

Alternative C would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 300-foot-wide 3.68-mile stretch (133.74 acres) of the Primitive Zone to Passage Zone to accommodate both the proposed right-of-way and the existing 230 kV Rocky Mountain Power/PacifiCorp transmission line, as well as provide for future utility needs; and within this area, changing the existing VRM Management Class designation from Class II to Class III.

2.6.2. Surface Disturbance

Tables 2.6-1 and 2.6-2 list the estimated long- and short-term surface disturbance that would be associated with Alternative C.

Table 2.6-1. Total Long-term Surface Disturbance and Land Management for Alternative C: Cedar Fork Southern Route

ALTERNATIVE C SEGMENT	LONG-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	13.97	1.58	0.00	6.74	9.12	0.00	31.41
Segment C-2	0.00	0.00	0.00	0.00	3.92	0.00	3.92
Segment C-3	2.22	1.68	5.42	0.00	7.00	0.00	16.33
Alternative C Total	16.19	3.26	5.42	6.74	20.04	0.00	51.66

*Includes long-term disturbance associated with power poles, substations, substation access routes, existing access road upgrades, and a 10-foot-wide centerline access route.

Table 2.6-2. Total Short-Term Surface Disturbance and Land Management for Alternative C: Cedar Fork Southern Route

ALTERNATIVE C SEGMENT	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment C-1	68.72	7.23	0.00	23.27	48.30	0.00	147.52
Segment C-2	0.00	0.00	0.00	0.00	21.69	0.00	21.69
Segment C-3	1.74	6.95	29.34	0.00	36.19	0.00	74.22
Alternative C Total	70.47	14.18	29.34	23.27	106.18	0.00	243.44

*Includes short-term disturbance associated with pulling and splicing sites, lay-down areas, and power pole (H-structure) installation. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. *Limited access areas* were not analyzed for short-term disturbance associated with pole installation. This table does not contain short-term disturbance associated with the removal of the existing 69 kV transmission line; this acreage is found in **Table 2.10-6** at the end of this chapter.

2.7. INTERCONNECT OPTIONS

The purpose of the interconnect options is to provide flexibility to decision makers to combine segments of the Action Alternatives to select the most appropriate route among the various alternatives to minimize impacts to resource values.

2.7.1. North-South Transmission Line Interconnect Option

The location of the North-South Interconnect option is shown on **Figures 2.4-1 and 2.6-1**. It would be 1.84 miles long and would occur only on DNF land within Sections 7 and 18, T36S, R4W. The North-South Interconnect allows the option of connecting Segment A-1 and Segment C-3 if deemed prudent by the decision makers to resolve resource conflicts or other issues of concern. Long-term surface disturbance on 2.91 acres and short-term construction-related disturbance on 13.78 acres would result from selection of this interconnect option.

2.7.2. East-West Transmission Line Interconnect Option

The location of the East-West Interconnect option is shown in **Figures 2.4-1 and 2.6-1**. It would be 3.70 miles long and would occur only on DNF land within Sections 16, 17, and 18, of T36S, R4W and Sections 11, 13, and 14 of T36S, R5W. The East-West Interconnect allows the option of connecting Segment A-3 and Segment C-1 if deemed prudent by the decision makers. Long-term surface disturbance on 5.85 acres and short-term construction-related disturbance on 24.97 acres would result from selection of this interconnect option.

2.8. ALTERNATIVE D: NO ACTION ALTERNATIVE

Though it does not meet the purpose and need statement, the No Action Alternative is required under Council of Environmental Quality regulations for implementing NEPA [40 CFR 1502.14(d)]. For this analysis, the No Action Alternative is considered to be the continued operation of the existing 69 kV transmission line. Specifically, it means that “no action” could be achieved by any one of the federal agencies declining to grant Garkane permission to build in the agency’s respective jurisdiction.

Adoption of the No Action Alternative does not mean continuation of the status quo. The existing 69 kV transmission line has already passed its life expectancy. To maintain system stability and reliability, Garkane would need to conduct major maintenance activities all along the line within its existing right-of-way and permit conditions. Overhaul of the existing 69 kV transmission line would involve replacement of conductor and poles. Each pole would be inspected; Garkane estimates as much as 90 percent of the poles would need to be replaced. Overhaul would involve disturbance to the centerline access outside *limited access areas* using vehicles and equipment. Overhaul would require the use of temporary disturbance areas identified in conjunction with Alternative B, above, as the sites would be needed for pulling and splicing of wire, and overall project staging. Total overhaul cost would range from 1.4 to 2.1 million dollars.

These activities would increase the amount of trucks, heavy equipment, and crews within the right-of-way far above average annual activity levels.

Existing diesel-fueled generators would be used to compensate for capacity shortfalls. Under this alternative the GSENM Management Plan would not be amended.

2.9. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

According to CEQ regulations and NEPA case law, alternatives may be dropped from further consideration for a number of reasons that include not meeting the objectives in the purpose and need statement, infeasibility, remote or speculative nature, more significant effects than Proposed Action, and effects indistinguishable from Proposed Action. The following five alternatives were initially considered for analysis in the EIS but were eliminated in their entirety from further consideration for the reasons stated below.

2.9.1. Northern Circleville Alternative

This alternative would parallel the existing Rocky Mountain Power/PacificCorp electrical grid east of Tropic northward to Antimony. There it would traverse the north end of the DNF paralleling SR 62 west to Kingston and then turn south and parallel U.S. 89 through Panguitch and then to Hatch.

There were several concerns associated with this alternative. It would increase the needed alignment length by approximately 90 miles, easily tripling the potential surface disturbance, including impacts to as much as 5 to 20 times more sage grouse and prairie dog habitat. Though it is not a central concern in selecting an alternative for analysis, the additional length would significantly increase proponent costs for analysis, construction, and maintenance. There would also be increased visual impacts as viewed from the Kanab Scenic Byway (U.S. 89). The alternative alignment would fall outside of Garkane's service area and require negotiation with other utility providers and many more private property owners.

This alternative would not reduce or resolve identified resource conflicts. It increases total surface disturbance and has the potential for equal or greater impacts to TES species and scenic quality than the proposed route. Though technically possible, the cost and location outside of Garkane's service area reduces project feasibility as it would increase the time required to meet customer demand. For these reasons, this alternative was eliminated from further analysis.

2.9.2. Southern Kanab Alternative

This alternative would originate at the Buckskin Substation east of Kanab. From the substation the line would travel west, paralleling U.S. 89 to Kanab. There the line would turn north, paralleling U.S. 89 to Hatch. This alignment would cross GSENM, KFO, SITLA, and private lands.

One of the key issues associated with this alternative was that it would increase the needed alignment length by approximately 60 to 90 miles. This would double to triple the potential surface disturbance over the Proposed Action, including potential impacts to southwest willow flycatcher habitat. The alignment has the potential for equal or greater impacts to sage grouse and prairie dog habitat and increased visual impacts as viewed from about 40 miles of the Kanab Scenic Byway (U.S. 89). Though it is not a central concern in selecting an alternative for analysis, because of the length of the alignment, costs for analysis, construction, and annual maintenance would be significantly increased. This alternative would also require rebuilding the line from the Buckskin Substation to Kanab to handle the increased load, further adding to disturbance and costs.

This alternative would not meet purpose and need, as it would not extend the available energy supply at Tropic to Hatch and the surrounding area. Further, this alternative would not reduce or resolve resource conflicts, and in fact it has the potential for impacts to additional threatened, endangered, and sensitive species (southwestern willow flycatcher) and equal or greater impacts to other threatened, endangered, and sensitive species (sage grouse and prairie dog) and scenic quality. For these reasons and because of its limited feasibility, this alternative was eliminated from further analysis.

2.9.3. Buried Line Alternative

Under this alternative, the transmission line from Tropic to Hatch or significant portions thereof would be buried.

The concern with this alternative was that underground lines of this voltage class last an average of 10 years before needing replacement. Underground lines of this magnitude (kV) are not feasible for this length and in this terrain. Buried lines of this length require redundancy (back-up service) should repairs be required. Any maintenance needs for an underground line would require a long shut-down period of electrical service from weeks to months, due in part to availability of materials. If lines were buried additional lines would be required to provide service during repairs.

This alternative would not meet purpose and need of the project, as it would not meet the needed service life. Nor does a buried line meet the purpose and need of this project to improve the reliability of the electrical system in a cost effective manner. Further, this alternative is not technologically feasible for the needed length or service during outages or maintenance, or in this terrain. For these reasons, this alternative was eliminated from further analysis.

2.9.4. Citizen-Proposed Segment Alternative North of Sunset Cliffs Property

This proposed alignment segment originated from public scoping as a way to avoid crossing private property. The segment diverges from the proposed alignment at the mouth of Wilson Canyon, traverses DNF land to the east and north of the private property, and rejoins the proposed alignment just to the east of U.S. 89. One other citizen proposed alternative was considered and is analyzed as a part of Alternative C.

The primary concern with the proposed northern segment was that it was much longer than the proposed southern segment (Alternative C). This would increase costs and encumber more DNF lands. The northern alignment would cross 13,081 feet (30 acres) of the DNF and 16,526 feet (37.9 acres) of BLM land, whereas the southern alignment would cross 8,342 feet (19 acres) of DNF and 13,746 feet (31.6 acres) of BLM lands.

Because the proposed northern segment would increase impacts to resources as compared with an equally viable alternative (southern segment) that accomplishes the same objective of avoiding the private parcel, this alternative was eliminated from further analysis.

2.9.5. Retention of a Portion or All of the Existing 69 kV Transmission Line

Should the existing 69 kV transmission line be retained – for any reason – it would require ongoing maintenance at an operational level. The National Electrical Safety Code requires that all lines be maintained at a level equal to or exceeding the code requirements at the time of construction or reconstruction. As described under the No Action Alternative, the existing 69 kV transmission line would require overhaul in order to remain operational.

Retention of the existing 69 kV transmission line was considered to provide an alternate transmission line in case of outage. Based on outage records for the past 2 years, consumers served by the existing 69 kV transmission line would have experienced no less outage time had an alternate transmission route been available. Therefore the cost of maintenance of the existing 69 kV transmission line would not improve reliability of the electrical system.

Retention of the existing 69 kV transmission line was also considered to provide transmission capacity in addition to the proposed 138 kV transmission line. Existing infrastructure transmitting electricity from Glen Canyon Dam to Tropic provides a maximum of 138 kV service. In order for the existing 69 kV transmission line to provide additional electrical service, the existing infrastructure would have to be upgraded to 230 kV service at a maximum cost of \$5 million, in addition to the cost of overhaul of the existing 69 kV transmission line, which would not be an economically viable option. (Garkane 2009) For these reasons, alternatives to retain a portion or all of the existing 69 kV transmission line were eliminated from further analysis.

2.10. COMPARISON OF ALTERNATIVES AND SUMMARY OF IMPACTS

Tables 2.10-1—2.10-6 compare the proposed project elements, project area, right-of way acreage that would be encumbered, and long- and short-term surface disturbance of the alternatives. Table 2.10-7 summarizes the environmental effects associated with each alternative.

Table 2.10-1. Comparison of Alternatives by Project Elements

ALTERNATIVE A—PROPOSED ACTION	ALTERNATIVE B—PARALLEL 69 kV LINE ROUTE	ALTERNATIVE C—CEDAR FORK SOUTHERN ROUTE
Transmission Line		
100-foot right-of-way along entire length of line (368.5 acres).	Same as Alt. A (353.17 acres).	Same as Alt. A (361.48 acres).
Wood H-frame structures (poles 15.5 feet apart) and approximately 65 feet tall. Poles would be buried approximately 10 feet. Span length of approximately 500 feet (10 poles per mile). Assume 0.37 acre of long-term disturbance per mile. Assume 80-foot radius (0.46 acre) of short-term disturbance for each pole location (4.6 acres per mile).	Same as Alt. A.	Same as Alt. A.

ALTERNATIVE A—PROPOSED ACTION	ALTERNATIVE B—PARALLEL 69 kV LINE ROUTE	ALTERNATIVE C—CEDAR FORK SOUTHERN ROUTE
Turning structures would consist of three poles and be 17.5 to 23.5 feet apart. These structures would be guyed.		
Line Removal		
Portion of existing 69 kV line between current Bryce Canyon Substation and Hatch Mountain Substation would be removed (16.23 miles).	Existing 69 kV line from approximately 1 mile east of the Tropic Substation to the Hatch Mountain Substation would be removed (21.57 miles).	Same as Alt. A.
Substations		
New and expanded substations would have bus work approximately 15 feet tall. Area would be graveled, free of vegetation, and fenced. Low-profile sodium lights would be used periodically.	Same as Alt. A.	Same as Alt. A.
New (East Valley) Substation would be constructed on 3 acres.	New (East Valley) Substation would be constructed on 3 acres and would include more structures and equipment than under Alternatives A and C.	Same as Alt. A.
Existing Tropic Substation would remain as it is currently.	Existing Tropic Substation would be removed. The proposed East Valley Substation would have a total footprint of 3 acres.	Same as Alt. A.
Existing Bryce Canyon Substation would remain as it is currently.	One new substation would be required in Bryce Valley. The existing Bryce Canyon Substation would be decommissioned and a new replacement substation to the west of Bryce Canyon City would be built. It would be located in one of two new locations (Option 1 on DNF land. Option 2 on private land.). Total disturbance footprint of 2 acres.	Same as Alt. A.
Hatch Mountain Substation would be decommissioned.	Same as Alt. A.	Same as Alt. A.
Existing Hatch Substation would be expanded by 2 acres.	Same as Alt. A.	Same as Alt. A.

ALTERNATIVE A—PROPOSED ACTION	ALTERNATIVE B—PARALLEL 69 kV LINE ROUTE	ALTERNATIVE C—CEDAR FORK SOUTHERN ROUTE
Distribution Lines		
No additional distribution lines would be required.	Construction of a total of 9 miles of additional distribution lines within 56 acres of 50-foot-wide right-of-way on a combination of public and private property.	Same as Alt. A.
Temporary Workspaces		
7 lay-down yards of approximately 2.75 acres each (19.25 acres total).	7 lay-down yards of approximately 2.75 acres each (19.25 acres total).	8 lay-down yards of approximately 2.75 acres each (22.00 acres total).
35 pulling and splicing areas of approximately 1.15 acres each (40.25 acres total).	29 pulling and splicing areas of approximately 1.15 acres each (33.35 acres total).	41 pulling and splicing areas of approximately 1.15 acres each (47.15 acres total).
Access Roads/Routes		
<i>Limited access areas</i> in Cedar Fork Canyon of Segment A-1 (0.82 mile), Blue Fly Canyon* area of Segment A-3 (.71 miles), and Red Canyon for line removal (3.55 miles) for a total of 5.08 miles.	<i>Limited access areas</i> in BRCA (2.52) and Red Canyon for line removal (3.55) for a total of 6.07 miles.	<i>Limited access areas</i> in Cedar Fork Canyon of Segment C-1 (0.82 mile), two small portions of Segment C-3 (1.16 miles), and Red Canyon for line removal (3.55 miles) for a total of 5.53 miles.
Existing forest roads and BLM roads would be used to access the right-of-way. Though some minor maintenance would be required, no additional disturbance is assumed for these existing roads. Forest Roads—Maintenance Class 2 (suitable for high clearance vehicles) BLM Roads—all considered open (“native, unimproved” and “native, maintained”).	Same as Alt. A.	Same as Alt. A.
The existing access route through Cedar Fork Canyon area would need to be improved. The route would be bladed and new material would be brought in where needed. Additional disturbance of 2 feet in width along the west side of the route is assumed (1.89 acres).	No access roads would be needed in Cedar Fork Canyon area. There would be no access roads within BRCA. One-time access for construction would be granted for the rim pole just inside the Park boundary.	Same as Alt. A.

ALTERNATIVE A—PROPOSED ACTION	ALTERNATIVE B—PARALLEL 69 kV LINE ROUTE	ALTERNATIVE C—CEDAR FORK SOUTHERN ROUTE
<p>A two-track access route (10-foot-wide area of disturbance is assumed) would be developed along the entire centerline of the proposed right-of-way, except the portions of the right-of-way that traverses <i>limited access areas</i>, for a total of 26.88 miles.</p>	<p>A two-track access route (10-foot-wide area of disturbance is assumed) would be developed along the centerline of the proposed right-of-way, except the portions of the right-of-way that traverses <i>limited access areas</i>, including BRCA, for a total of 22.75 miles.</p>	<p>Same as Alt. A, except that there would be a total of 27.80 miles.</p>
<p>GSENM Management Plan Amendment</p>		
<p>Change designation of a 100-foot-wide 3.68-mile stretch (44.58 acres) of the Primitive Zone to Passage Zone, and within this area, change the existing VRM Management Class designation from Class II to Class III.</p>	<p>No Passage Zone or amendment to the Management Plan would be required as Alternative B does not traverse the GSENM.</p>	<p>Change designation of a 300-foot-wide 3.68-mile stretch (133.74 acres) of the Primitive Zone to Passage Zone, and within this area, change the existing VRM Management Class designation from Class II to Class III.</p>

*For the purposes of this project, references to *Blue Fly Canyon* are defined as the tributary of Hillsdale Canyon that drains westward out of the head of the Right Fork of Blue Fly Creek.

Table 2.10-2. Comparison of Alternatives by Project Area

ALTERNATIVE	PROJECT AREA* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	21.19	41.48	0.00	50.58	153.14	0.00	266.39
Segment A-2	0.00	0.00	0.00	0.00	26.65	0.00	26.65
Segment A-3	13.93	14.40	51.45	0.00	61.00	0.00	140.78
69 kV Line Removal – Alternative A	27.44	3.94	8.37	0.00	9.89	0.00	49.64
Alternative A Total	62.56	59.82	59.82	50.58	250.68	0.00	483.46
Alternative B Total	146.04	45.84	115.61	0.00	76.33	34.44	418.26
Segment C-1	118.44	14.63	0.00	50.58	92.86	0.00	276.77
Segment C-2	0.00	0.00	0.00	0.00	38.71	0.00	38.71
Segment C-3	4.97	14.4	53.71	0.00	78.50	0.00	151.58
69 kV Line Removal – Alternative C	6.35	3.94	8.37	0.00	9.89	0.00	28.55
Alternative C Total	129.76	32.97	62.08	50.58	219.96	0.00	495.61
North-South Interconnect	0.00	0.00	0.00	0.00	27.24	0.00	27.24
East-West Interconnect	0.00	0.00	0.00	0.00	48.65	0.00	48.65

*The Project Area contains the 100-foot right-of-way, substation sites and their associated access roads; all temporary work spaces outside the right-of-way; and the disturbance area associated with the existing 69 kV transmission line removal. The Alternative B total includes disturbance from removal of the existing 69 kV transmission line.

Table 2.10-3. Comparison of Alternatives by 100-foot Right-of-Way Encumbrances

ALTERNATIVE	RIGHT-OF-WAY (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	17.32	38.41	0.00	44.58	136.47	0.00	236.78
Segment A-2	0.00	0.00	0.00	0.00	21.19	0.00	21.19
Segment A-3	6.05	12.87	39.24	0.00	52.37	0.00	110.53
Alternative A Total	23.37	51.28	39.24	44.58	210.03	0.00	368.50
Alternative B Total	107.02	43.9	100.61	0.00	67.67	33.97	353.17
Segment C-1	83.11	12.59	0.00	44.58	70.42	0.00	210.70
Segment C-2	0.00	0.00	0.00	0.00	30.19	0.00	30.19
Segment C-3	2.56	12.86	40.71	0.00	64.46	0.00	120.59
Alternative C Total	85.67	25.45	40.71	44.58	165.07	0.00	361.48
North-South Interconnect	0.00	0.00	0.00	0.00	22.48	0.00	22.48
East-West Interconnect	0.00	0.00	0.00	0.00	44.99	0.00	44.99

*Buffer of 50 feet on each side of transmission line. Not all acres would be disturbed within the right-of-way, but the right-of-way is considered to be long-term encumbrance for the duration of the permit.

Table 2.10-4. Comparison of Alternatives by Total Long-Term Surface Disturbance and Land Ownership/Management

ALTERNATIVE	LONG-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	5.31	5.01	0.00	6.74	17.72	0.00	34.78
Segment A-2	0.00	0.00	0.00	0.00	2.87	0.00	2.87
Segment A-3	2.67	1.68	5.23	0.00	5.88	0.00	15.47
Alternative A Total	7.97	6.70	5.23	6.74	26.47	0.00	53.12
Alternative B Total (Bryce Substation option 1)	19.36	5.74	13.12	0.00	6.59	1.04	45.85
Alternative B Total (Bryce Substation option 2)	21.30	5.74	13.12	0.00	4.52	1.04	45.62
Segment C-1	13.97	1.58	0.00	6.74	9.12	0.00	31.41
Segment C-2	0.00	0.00	0.00	0.00	3.92	0.00	3.92
Segment C-3	2.22	1.68	5.42	0.00	7.00	0.00	16.33
Alternative C Total	16.19	3.26	5.42	6.74	20.04	0.00	51.66
North-South Interconnect	0.00	0.00	0.00	0.00	2.91	0.00	2.91
East-West Interconnect	0.00	0.00	0.00	0.00	5.85	0.00	5.85

*Includes long-term disturbance associated with power poles, substations, substation access roads, existing access road upgrades, and a 10-foot-wide centerline access route.

Table 2.10-5. Comparison of Alternatives by Total Short-Term Surface Disturbance and Land Ownership/Management

ALTERNATIVE	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Segment A-1	8.76	18.14	0.00	23.27	70.55	0.00	118.39
Segment A-2	0.00	0.00	0.00	0.00	14.21	0.00	14.21
Segment A-3	9.19	6.96	28.14	0.00	23.08	0.00	67.37
Alternative A Total	17.94	25.10	28.14	23.27	107.84	0.00	202.29
Alternative B Total	75.38	20.19	54.08	0.00	18.48	0.78	168.91
Segment C-1	68.72	7.23	0.00	23.27	48.30	0.00	147.52
Segment C-2	0.00	0.00	0.00	0.00	21.69	0.00	21.69
Segment C-3	1.74	6.95	29.34	0.00	36.19	0.00	45.06
Alternative C Total	70.47	14.18	29.34	23.27	106.18	0.00	243.44
North-South Interconnect	0.00	0.00	0.00	0.00	13.78	0.00	13.78
East-West Interconnect	0.00	0.00	0.00	0.00	24.97	0.00	24.97

*Includes short-term disturbance associated with pulling and splicing sites, lay-down areas, and power pole (H-structure) installation. Some overlap between disturbance areas exists because a single area could be used for multiple alternatives. *Limited access areas* were not analyzed for short-term disturbance associated with pole installation. Alternative B also includes short-term disturbance associated with removal of the existing 69 kV transmission line.

Table 2.10-6. Short-Term Disturbance Associated with Removal of Existing 69 kV Line (Parallel to Alternative B)

ALTERNATIVE	SHORT-TERM DISTURBANCE* (ACRES)						
	PRIVATE	SITLA	KFO	GSENM	DNF	BRCA	TOTAL
Alternative A & C	27.44	3.94	8.36	0.00	9.89	0.00	49.63

*This short-term disturbance area includes lay-down yards and pulling and splicing sites needed for the existing 69 kV line removal. For analysis, short-term surface disturbance for line removal is assumed to include all of the short-term disturbance areas (i.e., lay-down areas, pulling/splicing sites) that are included under Alternative B. This effectively reduces the amount of disturbance shown for Alternative B as these areas are the same as those counted for the installation of the 138 kV line. In reality these areas needed for removal would be very similar to, but slightly offset from, the installation sites.

Table 2.10-7. Summary of Environmental Effects of Proposed Action and Alternatives

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION	
				NORTH-SOUTH	EAST-WEST			
General Disturbance Acreage (acres)	Project Area	483.46	418.26	495.61	27.24	48.65	N/A	N/A
	Right-of-Way, 100' Wide	368.50	353.17	361.48	22.48	44.99	N/A	N/A
	Long-Term Disturbance	53.12	B-1=45.85 B-2=45.62	51.66	2.91	5.85	N/A	N/A
	Short-Term Disturbance	202.29	168.91	243.44	13.78	24.97	49.63	N/A
Paleontological Resources	PFYC Class	Project Area Disturbance Acreage by Alternative						Impacts would be similar to but less than construction impacts under Alternative B.
	1	22.07	57.03	22.07	0.00	0.00	4.98	
	2	182.42	189.48	219.46	0.00	7.94	32.02	
	3	21.01	48.94	21.00	0.00	0.00	2.30	
	4	134.82	73.99	98.65	11.07	0.00	10.31	
	5	122.91	48.65	137.25	16.16	40.73	0.00	
	Total 3-5	278.74	171.58	256.90	27.23	40.73	12.61	
	Total All	483.23	418.09	498.43	27.23	48.67	49.61	
	PFYC Class	Short- and Long-Term Disturbance Acreage by Alternative						
	1	7.64	29.08	6.46	0.00	0.00	4.98	
	2	100.03	116.20	134.16	0.00	6.39	32.03	
	3	23.73	24.01	19.69	0.00	0.00	2.30	
	4	63.64	24.10	56.53	12.49	0.00	10.32	
	5	54.44	23.47	71.05	4.19	24.43	0.00	
	Total 3-5	141.82	71.58	147.27	16.68	24.43	12.62	
	Total All	249.48	216.86	287.89	16.68	30.82	49.63	
	General	Overall risk for all action alternatives was determined to be negligible with implementation of mitigation measures						

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C		ALTERNATIVE D: NO ACTION	
								NORTH-SOUTH		EAST-WEST					
Indicator		Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
Soils	Disturbance (acres)	202.29	53.12	168.91	45.85/45.62	243.43	51.66	13.78	2.91	24.97	5.85	49.00	49.00	Impacts would be similar to but less than construction impacts under Alternative B.	
	Displacement (acres)		16.29		18.27/18.14		16.08		0.68		1.37	N/A	N/A		
	Compaction (acres)		5.06		7.50/7.37		5.06	-0	0.00	-0	0.00	N/A	N/A		
	Ground cover/ Coarse Woody Debris (acres)	199.97	11.23	168.91	10.77	235.74	11.02	13.78	0.68	24.97	1.37				
	Highly Erodible Soils (acres)	36.56	7.97	22.87	3.74/3.04	55.75	4.68	4.1	1.53	17.26	4.07	N/A	N/A		
	Biological Soil Crusts (Observation Points)	19 Points		2 Points		12 Points		1 Point		1 Point		N/A	N/A		
	Potential Erosion (lbs/acre/yr)	5.68		3.60		4.92		N/A		NA		N/A	N/A		
	General	Impacts to soils from all alternatives would be within the DNF and Region 4 USFS <i>Soil Standards and Guidelines</i> , which require impact of less than 15% for the total project area.													
	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
Water Resources	Linear Feet of Streams	1,303		417		1,208		20		101		Minor, adverse	Negligible to minor, beneficial		
	Number of Stream Crossings	183		B-1=63 B-2=65		200		5		25					
	Wetlands and Waters of the U.S. Disturbed (Acres)	0.00	0.022	0.00	0.009	0.00	0.025	0.00	0.00	0.00	0.003	Negligible to minor, beneficial			
	Floodplains Disturbances	Negligible		None		Negligible		None		None		None			
	Highly Erodible Soils Disturbed (Acres)	4.51	3.03	0.92	1.09/1.90	6.85	2.81	0.046	0.16	0.96	0.13	Short-term, negligible	Long-term, minor beneficial		

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C		ALTERNATIVE D: NO ACTION	
								NORTH-SOUTH		EAST-WEST					
Number of Springs in Proximity to Right-of-Way		1		0		1		0				0			
Water Quality Impacts		Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	None				Short-term, minor adverse	Long-term, minor beneficial		
Number of Water Rights within a 1-mile of right-of-way		104		218		138		0		3		131			
General		Potential impacts to water resources would be minor adverse level, short-term or long-term.													
Vegetation	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
	Acres of disturbance	Grass	1.08	0.15	0.16	0.13	0.58	0.25	13.78 acres short-term total across ponderosa pine, pinyon-juniper and sagebrush	24.96 acres short-term among grass, mixed conifer. Ponderosa pine, pinyon-juniper and sagebrush			0.00		Impacts would be similar to but less than construction impacts under Alternative B.
		Mixed conifer	0.00	0.00	0.00	0.03	0.00	0.00					0.00		
		Pinyon-juniper	30.07	6.05	29.64	7.71	29.96	5.30					4.69		
		Ponderosa pine	49.77	8.59	22.61	2.94/3.42	58.10	9.79					13.57		
		Rock	10.94	1.75	7.57	0.93	14.35	1.72					0.68		
		Sage	134.66	30.29	94.30	29.41/27.70	145.52	30.75					26.34		
		Other shrub	10.03	3.48	1.70	0.70	7.52	1.89					0.00		
		Spruce fir	0.32	0.03	0.00	0.00	0.08	0.03					0.00		
		Riparian	0.26	0.09	0.80	0.31/0.42	2.59	0.79			0.03				
Other	5.86	0.00	11.35	1.35/1.54	6.66	0.31	2.91 acres long-term among same cover types	5.84 acres long-term among the same cover types			1.88				

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C		ALTERNATIVE D: NO ACTION		
								NORTH-SOUTH		EAST-WEST						
	Proximity to noxious weeds	Noxious and undesirable weed infestations are common throughout the area of analysis for all alternatives. It is assumed that the spread of weeds can and likely would occur. The magnitude of this spread would be directly related to the diligence with which mitigation measures and best management practices (BMPs) are employed by the construction crews and enforced by the managing agencies.														
	General	Impacts to all cover types were determined to be negligible to minor relative to the overall abundance of each cover type in the surrounding area.														
Forest Products	Indicator															
	Public land no longer suitable for timber management (acres)	17.23		63.40		23.14		1.26		0.00				0.00		
	Acres suitable for timber gained	7.31				7.31		0.00		0.00				7.31		
	Board feet removed from public lands		~10,000 board feet		~14,000 board feet		~21,000 board feet									
	General	Impacts determined to be negligible for all action alternatives														
Wildlife and Wildlife Habitat	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term		
	Acres habitat disturbance	Mammals & Reptiles	195.81	50.44	168.14	43.55	237.23	50.91	N/A	N/A	N/A	N/A				
		Mule deer & elk winter range	33.20	16.30	37.40	13.70	69.20	16.10	0.00	0.00	5.3	2.60			35.0	
		Mule deer & elk summer range	20.60	6.90	4.10	1.20	18.80	6.00	6.00	2.20	4.00	1.90			4.10	
Impacts would be similar to but less than construction impacts under Alternative B.																

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
							NORTH-SOUTH		EAST-WEST			
Mule deer habitat	181.57	48.68	149.21	41.26	216.23	48.88	13.80	2.91	25.00	5.84	44.63	
Rocky Mountain elk habitat	37.60	8.77	22.70	3.11	58.85	10.07	6.80	1.64	5.70	2.22	13.57	
Pronghorn habitat	3.60	0.50	9.80	7.30	3.60	0.50	0.00	0.00	0.00	0.00	5.00	
Mule deer fawning	40.90	10.30	17.10	9.80	37.20	9.80	6.00	2.20	4.00	1.90	14.3	
Elk calving	9.60	2.30	3.20	0.1	11.90	3.80	6.00	2.20	4.00	1.90	3.20	
Mig birds - sagebrush	108.32	30.29	94.30	29.44	127.03	30.75	6.36	1.24	15.53	3.35	26.34	
Mig birds - ponderosa pine	36.20	8.59	22.61	2.94	53.19	9.79	7.36	1.64	7.90	2.17	13.57	
Mig birds- Pinyon/juniper	25.38	6.05	29.64	7.71	25.27	5.30	0.07	0.03	1.35	0.26	4.69	
Mig birds-cliff/canyon	5.10	0.85	0.68	0.00	7.50	0.76	0.00	0.00	0.00	0.00	0.70	
Mig birds-other scrub/shrub	10.03	3.48	1.70	0.70	7.52	1.89	0.00	0.00	0.00	0.00	0.00	
Mig birds-agriculture	0.00	0.00	1.10 /1.30	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	
Mig birds - riparian	0.23	0.09	0.80	0.31	2.56	0.87	0.00	0.00	0.00	0.00	0.03	
Mig birds-grassland	1.08	0.15	0.16	0.13	0.58	0.25	0.00	0.00	0.07	0.03	0.00	

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
								NORTH-SOUTH		EAST-WEST			
	Aquatic habitat-intermittent streams-linear ft	2,123	1,535	704 /764	101	1,522	1,511	0.00	0.00	0.00	0.00		
	Fragmentation	<p>Mammals and reptiles: LIKELY. Populations of small mammals or reptiles could be fragmented by the transmission line due to construction activities if heavy machinery directly removes a portion of the population and isolates the remaining cohort(s). Big game: UNLIKELY Migratory birds: POSSIBLE. Secondary fragmentation could occur via noxious weed infestation. Aquatic species and habitat: POSSIBLE. Fragmentation of aquatic habitat may occur after ephemeral drainages are crossed, if sedimentation or alteration of the drainage occurs (due to alterations made during the dry crossing) when the reach is flowing at a later time.</p>										N/A	
	Noise	<p>Mammals and reptiles: DISTURBANCE POSSIBLE. Larger animals such as mammal predators and big game could move away from loud construction noises and they would be temporarily displaced from the area for the duration of construction. Smaller mammals and reptiles may not easily escape construction noises and could be impacted more adversely if individuals cannot find refuge underground and the hearing in some individuals is damaged. Big game: DISTURBANCE POSSIBLE. Temporary displacement during construction and emergency maintenance. Migratory birds: DISTURBANCE POSSIBLE. Disturbance during construction and emergency maintenance if activities occurred during nesting. Pre-construction surveys would be required during the nesting season to document the presence or absence of nesting migratory birds, including raptors. If songbird nests are found, a general buffer may be implemented (May 15 – July 15) with exact dates determined by the USFS as the lead agency. For raptors, species-specific buffers following agency guidelines would be implemented if nests are found.</p>										Short-term disturbance during removal. Long-term beneficial impacts due to reduced human presence and associated noise from maintenance of the line.	
	Invasive species and noxious weeds	<p>Migratory birds: POSSIBLE. Invasive plant infestations, particularly brome grasses (<i>Bromus</i> spp.) into migratory bird habitats directly remove the amount of nesting substrate for ground-nesting migratory bird species. Resource Protection Measures, if completely effective, would eliminate the risk of invasive plant increases. Aquatic species and habitat: POSSIBLE. An increase in invasive plant species would not perceptibly affect aquatic habitat because the Sevier River is wide enough that vegetation composition has a minimal effect on the river.</p>											
Proximity to reproduction sites	Big Game	FAWNING AND CALVING - ALL ALIGNMENTS. Fawning areas occur in western half of alignment and in Hatch Valley. Calving occurs mainly throughout the middle portions of each alignment within ponderosa pine habitat.					Calving		Calving		FAWNING AND CALVING: Short-term disturbance during removal. Long-term beneficial impacts due to reduced human presence and associated noise from maintenance of the line.		
	Migratory Birds	NESTS – ALL ALIGNMENTS. Refer to Noise (above). Surveys would document the presence of migratory birds prior to construction activities and buffers may be implemented. No surveys would be conducted for emergency maintenance.											
	Number & type of crossings	<p>Aquatic species and habitat: IMPACTS POSSIBLE/UNLIKELY. Crossings would occur when aquatic species are not present and indirect impacts during flow periods would be minimized by the use of stabilizing materials during the crossing. MIS Trout (Dixie): NO IMPACTS. Culverts would not be used under any alternative and low-water crossings would be preferred. Perennial streams where trout may occur would not be crossed. Aquatic species and habitat: IMPACTS POSSIBLE/UNLIKELY. Crossings would occur when aquatic species are not present and indirect impacts during flow periods would be minimized by the use of stabilizing materials during the crossing. MIS Trout (Dixie): NO IMPACTS. Culverts would not be used under any alternative and low-water crossings would be preferred. Perennial streams where trout may occur would not be crossed.</p>											
Compliance	Dixie MIS standards & guidelines	In compliance											

RESOURCE TOPIC			ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS						69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION		
						NORTH-SOUTH		EAST-WEST							
NPS guidelines & mitigation			N/A	In compliance	N/A	N/A		N/A		In compliance					
General			Any Action Alternative would result in minor or moderate impacts on wildlife and aquatic species. Major impacts may occur in wildlife habitats if cheatgrass infestations are spread further as a result of any Action Alternative (A, B, or C).												
Special Status Species	Indicator		Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term		
	Acres habitat disturbance	Mexican spotted owl Critical Hab	14.7	7.8	0.00	0.00	14.7	7.80	0.00	0.00	0.00	0.00		0.00	Impacts would be similar to but less than construction impacts under Alternative B.
		Utah prairie dog colonies	2.90	1.50	14.30	3.30	13.40	1.10	0.00	0.00	0.00	0.00		14.3	
		Greater sage-grouse Brooding	47.10	20.80	47.80	21.30	84.00	21.70	0.90	0.80	5.30	2.30		37.8	
		Greater Sage-grouse Use Area	25.90	10.60	14.50	11.20	14.50	4.80	0.00	0.00	0.00			9.5	
		Burrowing owl ¹	108.32	30.29	94.30	29.44	127.03	30.75	6.36	1.24	15.53	3.35		26.30	
		Northern goshawk ²	36.20	8.59	22.61	2.94	53.19	9.79	7.36	1.64	7.90	2.17		13.57	

¹ Sagebrush habitat common to Utah prairie dog, burrowing owl, pygmy rabbit, Greater sage grouse, and Ferruginous hawk

² Ponderosa pine habitat common to Northern goshawk, flammulated owl, and Lewis's woodpecker

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
							NORTH-SOUTH	EAST-WEST				
Sensitive plants ⁴	Ferruginous hawk – Pinyon/juniper	23.38	6.05	29.64	7.71	25.27	5.30	0.07	0.03	1.35	0.26	4.69
	Peregrine falcon ³	5.10	0.85	0.68	0.00	7.50	0.76	0.00	0.00	0.00	0.00	0.70
	Sensitive plants ⁴	14.10	5.00	3.2	1.0	13.50	3.07	6.00	2.20	4.30	2.40	3.2
Fragmentation	Transmission line may reduce the size of potential territories. Existing colonies would not be affected.											
	Utah prairie dog	Unlikely to be adversely affect (potential new territories).		More adverse than Alt A, due to Johnson Bench concentration (potential territories).		Less likely. Fragmentation of potential territories less likely due to lower habitat quality.		Negligible		Negligible		N/A
	Pygmy rabbit	Impacts likely long-term, moderate		Same as Alternative A		Same as Alternative A		Long-term, moderate		Long-term, moderate		N/A
	Greater sage-grouse	The transmission line would isolate portions of use areas and could disrupt seasonal movements or prevent sage-grouse from using all parts of their habitat if transmission lines were avoided.										
Noise	Mexican spotted owl	DISTURBANCE POSSIBLE. Temporary disturbance to individuals roosting within 0.5 mile of activities, during construction or emergency maintenance. Pre-construction surveys in suitable habitats would document the presence of nesting spotted owls in the area.										
	Utah prairie dog	Individuals may be temporarily displaced. Some individuals may enter hibernation early (not expected).										
		LIKELY	LIKELY		LESS LIKELY due to fewer colony areas.		UNLIKELY. No displacement		UNLIKELY. No displacement		Short-term disturbance during removal. Long-term beneficial impacts due to reduced human presence and associated noise from maintenance of the line.	

³ Cliff/canyon habitat common to Peregrine falcon and sensitive bats

⁴ Mapped occurrences and suitable habitat (DNF only)

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION		
					NORTH-SOUTH	EAST-WEST				
Greater sage-grouse	Temporary displacement during construction or emergency maintenance. Adverse reproductive impacts if activities occurred May 1 – July 15.	LIKELY. Displacement from leks or breeding habitat.	LIKELY. Displacement from leks or breeding habitat.	LESS LIKELY. Displacement from leks or breeding habitat less likely due to lower habitat quality and less habitat.	UNLIKELY. No use areas	UNLIKELY. No use areas				
		DISTURBANCE POSSIBLE. Temporary disturbance to individuals roosting within 0.25 mile of activities, during construction or emergency maintenance.								
		DISTURBANCE POSSIBLE. Temporary disturbance to individuals roosting within 0.5 mile of activities, during construction or emergency maintenance.								
		DISTURBANCE POSSIBLE. Temporary disturbance to individuals roosting in the vicinity of activities. Communal roosts occur along the Sevier River.								
		POSSIBLE. Further infestations of thistle, hoary cress, and cheatgrass would degrade habitat by replacing native grasses and forbs with plants that do not provide required nutrients and habitat structure, i.e., young shoots and leaves/flowers of forb species. Resource Protection Measures, if completely effective, would eliminate the risk of invasive plant increases.								
	POSSIBLE. Further infestations of thistle and cheatgrass would degrade sage-grouse habitat because invasive species do not provide the same level of nutritious forage as sagebrush plants. Cheatgrass could replace sagebrush over time through fire, which would rapidly reduce the amount of suitable habitat. Resource Protection Measures, if completely effective, would eliminate the risk of invasive plant increases.									
	POSSIBLE. Further infestations of thistle and cheatgrass would diminish the likelihood that sensitive plants will establish in the area, and that established populations of sensitive plants will expand. Invasive species take up space, water, and nutrients from sensitive plants species and generally out-compete them. Resource Protection Measures, if completely effective, would eliminate the risk of invasive plant increases.									
	Distance to sage-grouse leks	John L. Swale Lek	0.5 miles	N/A	N/A	N/A	N/A	N/A		
		Lek 1	NA	1 mile	0.45 miles	N/A	N/A	1 mile		
		Lek 2	0.25 miles	0.20 miles	N/A	N/A	N/A	0.20 miles		
	Compliance with NPS guidelines and mitigation	N/A	In compliance	N/A	N/A	N/A	In compliance			

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
		Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
Range Resources	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
	Number of Allotments Impacted	9		6		6		1		1			Impacts would be similar to but less than construction impacts under Alternative B.
	Grazing allotment acres lost (acres/percent)	142.13 0.20%	33.24 0.05%	109.13 0.13%	22.71 0.03%	155.34 0.19%	27.36 0.03%	Negligible		Negligible		DNF: 0.5%, BLM: 0.1%	
	AUMs lost – long- and short-term	<12		<6.7		<6.6		<1		<1		<2 AUM short-term loss; long-term negligible beneficial impacts from restoration	
	Effects to range improvements	1 water supply which can be avoided; 12 fences which would be repaired		1 water supply which can be avoided; 1 fence which would be repaired		1 water supply which can be avoided; 11 fences which would be repaired		1 fence would be repaired		2 water supplies, which can be avoided		1 water supply, which can be avoided	
	General	Impacts determined to be negligible for all action alternatives										No adverse long-term impacts	
Land Use	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
	Displaced existing or approved land uses (acres)	202.29	53.12	168.91	45.62/45.85	243.44	51.66	13.78	2.91	24.97	5.85	49.64 short-term	No impacts on existing land uses from continued operation or anticipated major maintenance activities.
	Land use relative to management goals	Consistent with mitigation for prairie dogs and FAA regs; and creates 100-foot-wide Passage Zone crossing GSENM Primitive Zone (reducing Primitive Zone by 44.58 ac; 6.74 ac long-term disturbance; 23.27 ac temporary); existing 230 kV line would continue to not conform to GSENM MP management objectives.		Consistent except through East Bryce non-WSA lands and BRCA (4.44 ac long-term; 0.78 ac temporary)		Same as Alternative A, but outside FAA-regulated area; creates 300-foot-wide Passage Zone crossing GSENM Primitive Zone (reducing Primitive Zone by 133.82 ac); both the proposed 138 kV and existing 230 kV transmission lines would conform to the GSENM MP management objectives.		Consistent (all USFS)		Consistent (all USFS)		Beneficial in the long-term	
	General	Impacts determined to be consistent with management plans except as noted above, and otherwise negligible where adverse (i.e. private agricultural land where inconsistent with management policies) with mitigation											
Distinctive Land Areas	Indicator												
	Acres of roadless/natural characteristics lost	597.81		0.00		395.21		0.00		0.00		Same as Alternative A	Major maintenance would create a short-term minor reduction in opportunities for solitude in lands with

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION		ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2		ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE		INTERCONNECTS				69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
								NORTH-SOUTH		EAST-WEST			
Lost opportunity for solitude & primitive recreation experience		Impacts to Table Cliffs-Henderson Canyon IRA & unroaded area, Shakespear Point IRA & unroaded area, and Red Canyon South unroaded area		Impacts to East of Bryce natural area		Impacts to Table Cliffs-Henderson Canyon IRA & unroaded area and Shakespear Point IRA & unroaded area		N/A		N/A		N/A	wilderness values and characteristics and conflict with primitive non-motorized and self-directed recreation uses of the special designation areas adjacent or in proximity to the right-of-way.
Recreation	Indicator	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term		
	Acres of ROS settings where project would conflict with characteristics	174.9	37.06	85.21/85.13	20.41/18.42	166.51	32.15	127.39	27.62	103.25	19.82	Long-term impacts where adjacent to 138 kV line would be negligible; where two right-of-ways are separate, rehabilitation of the 69 kV right-of-way would have a negligible to minor impact in the immediate area. Temporary impacts similar to Alternative B	Impacts would be similar to but less than construction impacts under Alternative B.
	Change in Pattern of use and quality of experience at dispersed sites (SPNM, Primitive Zone, BRCA)	SPNM minor GSENM negligible	SPNM minor GSENM Primitive Zone Minor	SPNM moderate BRCA moderate	SPNM moderate BRCA moderate	SPNM minor GSENM Negligible	SPNM minor GSENM Primitive Zone Minor	SPNM minor	SPNM minor	SPNM minor	SPNM minor	Long-term impacts where adjacent to 138 kV line would be negligible; where two right-of-ways are separate, rehabilitation of the 69 kV right-of-way would have a negligible to minor impact in the immediate area. Temporary impacts similar to Alternative B	
	Change in Pattern of use and quality of experience at developed sites	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM minor RN moderate BLM-KFO negligible	SPM minor RN moderate BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	SPM & RN negligible BLM-KFO negligible	Long-term impacts where adjacent to 138 kV line would be negligible; where two right-of-ways are separate, rehabilitation of the 69 kV right-of-way would have a negligible to minor impact in the immediate area. Temporary impacts similar to Alternative B	
	General	DNF: Impacts would range from negligible to minor except for impacts to areas designated SPNM under Alternative B would have moderate adverse impacts. BLM-GSENM: Minor adverse impacts under Alternatives A and C; proposed 138 kV line would conform to with objectives under Alternative A with management plan amendment; both the proposed 138 kV and existing 230 kV lines would conform to with objectives under Alternative C. BLM-KFO: Negligible impacts. BRCA: Moderate adverse impacts under Alternative B.											

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
					NORTH-SOUTH	EAST-WEST		
Visual Resources	Viewpoint 1	Short-term adverse impacts from construction; long-term, adverse impacts that would likely exceed VRM Class III objectives at and near the U.S. 89 Byway crossing. Minor, short-term, adverse impacts from removal of existing line.	Minor, long-term, adverse impacts. Minor, indirect, beneficial long-term impacts from existing line removal.	Same as Alternative A	No effect	No effect	Minor impacts on visual resources because of the long viewing distance.	No additional impacts to visual resources, and the viewscape would remain subject to existing trends and conditions.
	Viewpoint 2	Minor, adverse short-term and long-term impacts that would meet VRM Class III objectives. Minor, beneficial impacts from removal of existing line.	Short-term and long-term, moderately adverse impacts, but consistent with VRM objectives because of existing disturbances in the area.	Same as Alternative A	No effect	No effect	Minor, beneficial impacts from removal of existing line.	
	Viewpoint 3	No impacts because of viewing distance. Short-term, minor adverse impacts from existing line removal; long-term, minor beneficial impact to scenic quality.	Short-term and long-term, moderate impacts, but would meet VRM Class III objectives.	Same as Alternative A	No effect	No effect	Temporary, minor adverse impacts from existing line removal; long-term, minor beneficial impact to scenic quality.	
	Viewpoint 4	No impacts from line construction west of Red Canyon. Minor, beneficial long-term impacts from existing line removal.	Moderate, adverse, long-term impacts from line construction along existing route.	Same as Alternative A	No effect	No effect	Minor, beneficial long-term impacts from existing line removal.	
	Viewpoint 5	No impacts to scenic quality within Red Canyon. Long-term, beneficial impacts from existing line removal.	Short-term and long-term, adverse, substantial impacts from line construction, which would likely exceed High SIO level.	No impacts to scenic quality within Red Canyon.	No effect	No effect	Long-term, beneficial impacts from existing line removal.	
	Viewpoint 6	Short-term and long-term, adverse impacts to High SIO along SR 12. This would likely exceed USFS management objectives. Beneficial, minor impacts from existing line removal.	Minor to moderate, adverse impacts on scenic quality.	Same as Alternative B	No effect	No effect	Beneficial, minor impacts from existing line removal.	

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
				NORTH-SOUTH	EAST-WEST		
Viewpoint 7	No impacts. Long-term, minor, beneficial impacts from existing line removal.	Moderate short-term and long-term, adverse impacts from line construction.	Short-term and long-term, moderate, adverse impacts from construction in High SIO area along scenic backway.	Similar to Alternative C, but less pronounced impacts due to distance.	Similar to Alternative C, but less pronounced impacts due to distance.	Long-term, minor, beneficial impacts from existing line removal.	
Viewpoint 8	Moderate, adverse, long-term scenic quality impacts. Minor, adverse long-term impacts to night sky from FAA safety devices.	No impacts	Same as Alternative A	No effect	No effect	Minor, beneficial long-term, indirect impacts from existing line removal.	
Viewpoint 9	Minor, adverse long-term impacts. Minor, beneficial long-term, indirect impacts from existing line removal.	No impacts	Moderately adverse impacts, but consistent with existing level of scenic quality.	No effect	No effect	Minor, beneficial long-term, indirect impacts from existing line removal.	
Viewpoint 10	Minor, long-term, adverse impacts. Minor, long-term, beneficial indirect impacts from existing line removal.	No impacts	Moderate, adverse short-term and long-term impacts from line construction.	No effect	No effect	Minor, long-term, beneficial indirect impacts from existing line removal.	
Viewpoint 11	No impacts. Long-term, minor, adverse impacts from maintained existing line.	Moderate, adverse short-term and long-term impacts.	Same as Alternative A	No effect	No effect	Long-term, minor, adverse impacts from maintained existing line.	
Viewpoint 12	No impacts to scenic quality from Park overlook.	Minor, adverse impacts on scenic quality due to distance from viewpoint.	Same as Alternative A	No effect	No effect	Minor, long-term, beneficial indirect impacts from existing line removal.	

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
				NORTH-SOUTH	EAST-WEST		
Viewpoint 13	No impacts along Mossy Cave Trail.	Short-term, adverse impacts from line construction and removal across trail. No impacts in the long-term.	Same as Alternative A	No effect	No effect	Moderate, long-term, beneficial impacts from existing line removal.	
Viewpoint 14	Minor, adverse long-term impacts on scenic quality. Moderate, adverse, impacts from maintenance of existing line.	Long-term, moderate, adverse impacts from increased visual contrasts within the viewscape.	Same as Alternative A	No effect	No effect	Moderate, adverse, impacts from maintenance of existing line.	
Viewpoint 15	Minor, long-term, adverse impacts.	No impacts	Same as Alternative A	No effect	No effect	No effect	
GSENM Plan Amendment	Would amend GSENM Management Plan to designating a 100-foot-wide Passage Zone corridor through a designated Primitive Zone, and to change the existing VRM Class designation from Class II to Class III within the Passage Zone.	N/A	Would amend GSENM Management Plan to designating a 300-foot-wide Passage Zone corridor through a designated Primitive Zone, and to change the existing VRM Class designation from Class II to Class III within the Passage Zone.	N/A	N/A	N/A	N/A
General	Clearing of right-of-way in forested areas would leave noticeable linear element in landscape. This would be somewhat mitigated by selected clearing of vegetation at periphery of right-of-way to mimic natural vegetative patterns. Two-track access route would be noticeable outside of limited access areas along centerline of route. Consistency with agency visual resource management guidance is assumed, unless otherwise noted.						

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
				NORTH-SOUTH	EAST-WEST		
Cultural Resources	The Proposed Action and all alternatives including the No Action have been evaluated and a concurrence of No Adverse Effect was determined by Utah SHPO and the federal agencies. Mitigation measures have been determined to avoid all Historic Properties.						
	Indicator						
Socio-economics & Environmental Justice	Estimated temporary & long-term increases in local employment & wages	46 new temporary jobs (23 local) (1.8% increase)	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	None. All work performed by existing staff over a three year period
	Estimated outside workers and effect on local economy & services	22 new temporary workers from outside the local area (population increase of 0.45 % relative to 2007) If workers bring families, the population would increase by 1.35 %) Total estimated economic activity generated is \$29,352,400, of which \$22 million is direct project cost	Same workers and population increase as Alternative A, but over a longer time period. Total estimated economic activity generated is \$48,031,200 of which \$36 million is direct project costs.	Same workers and population increase as Alternative A. Total estimated economic activity generated is \$26,684,000 of which \$20 million is direct project costs.	Same workers and population increase as Alternative A. Economic activity between Alternatives A and C	Same workers and population increase as Alternative A. Economic activity between Alternatives A and C,	None
	Projected impacts to housing	Negligible	Negligible	Negligible	Same as Alternative A	Same as Alternative A	None
	Impacts on local infrastructure & community services, incl schools	Negligible due to low number of "new" people, dispersed nature of the project, and existing capacity in schools, etc	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	None
	Changes in demographics	None to negligible	None to negligible	None to negligible	None	None	None

RESOURCE TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION	
				NORTH-SOUTH	EAST-WEST			
Effects on taxes – property, sales & use	Garkane would purchase approximately \$7 million worth of materials on which sales or use tax would be paid. A percentage of this tax would go to county and local governments.	Same as Alternative A	Same as Alternative A	N/A	N/A	None		
	Would be financed at the prevailing rate at the time of the loan. Cost will be added to rate payers bills	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	None		
	Increase capacity from 3500 meters/customers to 13,000	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	N/A		
	Negligible, in part because very little of the land is private	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	N/A		
	No minority or poor populations identified, therefore no economic justice issues. Benefits to economy would benefit poor and minorities as well.							
	Overall economic impacts beneficial.							
Transportation	Indicator							
	Percent increase AADT	US 89	1.7	2.2	1.7	Same as Alternatives A & C	Same as Alternatives A & C	No additional increase.
		SR-12 (US 89 to SR-63)	1.5	1.9	1.5			
		SR-12 (SR-63 to Tropic)	2.0	2.6	2.0			
	Number line crossings	US 89	1	1	1	No crossings	No crossings	1
		SR-12 (US 89 to SR-63)	1	0	0			0
		SR-12 (SR-63 to Tropic)	0	1	1			1
Impacts would be similar to but less than construction impacts under Alternative B.								

RESOURCE TOPIC		ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: PARALLEL EXISTING 69 kV ROUTE (INCLUDING REMOVAL OF 69 kV LINE) OPTION 1/2	ALTERNATIVE C: CEDAR FORK SOUTHERN ROUTE	INTERCONNECTS		69 kV LINE REMOVAL, ALTERNATIVES A & C	ALTERNATIVE D: NO ACTION
					NORTH-SOUTH	EAST-WEST		
	SR-63	0	1	1			1	
	SR-22	1	0	0			0	
	Miles new access route	27.9	22.75	27.80	1.84	3.70	N/A	
	Miles route widening	7.8	0.0	7.8	0.0	0.0	0.0	

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2.11. AGENCY PREFERRED ALTERNATIVE

The Agency Preferred Alternative was developed through a joint effort of all agencies (USFS, BLM, NPS) taking into consideration the impacts of all of the resources along the routes. The Agency Preferred Alternative (**Figure 2.11-1**) is Alternative C modified by combining components from the East-West Interconnect option and Alternative A. The 100-foot-wide right-of-way for the preferred route would begin at the proposed East Valley Substation following Segment C-1 for 17.36 miles where it would connect to the East-West Interconnect and travel for 3.7 miles to the eastern end of Segment A-3. The preferred route would then follow Segment A-3 for 1.6 miles to the point where it intersects Segment C-3. The route would follow the remainder of Segment C-3, terminating at the Hatch Substation for 6.76 miles. The total length of the preferred route would be 29.41 miles.

Approximately 16.23 miles of the existing 69 kV transmission line infrastructure from the Bryce Canyon Substation to the Hatch Mountain Substation would be removed using the techniques discussed in **Section 2.3.3**.

The Agency Preferred Alternative would also require the amendment of the GSENM Management Plan (2000) by changing the designation of a 300-foot-wide 3.68-mile stretch (133.74 acres) of the Primitive Zone to Passage Zone, and within this area, changing the existing VRM Management Class designation from Class II to Class III.

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Figure 2.11-1. Agency Preferred Alternative

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