Finding of No Significant Impact:
Airburst Range 123 Three-Phase Electric Power Line Installation at Fort Carson, Colorado
March 2021

Introduction

The Colorado Air National Guard is proposing to build a new 4.9-mile, primarily buried, three-phase electric power line within Fort Carson, Colorado. The new power line will replace the existing single-phase electric line placed in service in 1978 and has exceeded its useful service life. Frequent repairs and continued maintenance of the line will become more expensive due to aging structures and conductor. Ongoing operational and maintenance problems demonstrate the need for improvements to serve area power loads. The upgraded equipment to a new phase-three electric power line will meet increased power demands with reliable electricity within Fort Carson.

Description of the Proposed Action

The Proposed Action is the installation of a new three-phase electric power line originating approximately 550 feet east of State Highway 110 and terminating at the Airburst Range 123 in Fort Carson. The electric line will tie into an existing line originating from the Penrose Substation located approximately six miles south of Fort Carson. The new facilities include 4.79 miles of buried cable installed adjacent to Route 12 and four (4) power line poles to be installed within approximately 550 feet inside the western boundary of Fort Carson to support the above ground portion of the electric line. Twenty-six (26) maintenance vaults will be placed, at a minimum, every 1,100 feet along the length of the underground, installed cable. Power will be a minimum rating of 700 KVA compatible with the 750 KVA - 277/480-volt pad-mounted transformer which will be installed approximately 50 feet south of the current transformer location directly outside the perimeter fence at the Airburst Range 123.

The new three-phase power line will replace the existing single-phase electric line, which is located adjacent east of Route 13 within Airburst Range 123 and extends to the southeast boundary of the installation. The single-phase line will be abandoned in place.

Additional related activities located outside of Fort Carson boundaries are anticipated. Four (4) new power poles will be installed within the Colorado Department of Transportation road easement on the east side of Highway 115 that will connect the new three-phase line on Fort Carson to an existing line on the west side of Highway 115. The equipment at the top of the nine (9) poles on the west side of Highway 115 will be upgraded and two (2) new poles will be replaced. In addition, eight (8) power poles located along an unnamed road at the southeastern boundary of Fort Carson will be removed.

The Proposed Action will require Fort Carson to issue an easement to Black Hills Energy (BHE). This process is an administrative real property action that allows BHE to install and maintain the Proposed Action infrastructure on Fort Carson property.

No Action Alternative
Under the No Action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. Construction of new power poles to support the underground three-phase electric line would not be necessary. Deteriorated structures and fatigued hardware on the existing line would be repaired or replaced when required.

Alternatives
Four alternative routes (B, C, D and E) for the installation of the three-phase electric line were considered; however, these four alternatives do not meet the underlying need and were therefore eliminated from further analysis.

Alternative B – Under this alternative, the proposed route would originate at an unpaved road approximately 1.6 miles east of State Highway 115, traverse for approximately 1.5 miles to the east and then along Route 12 for approximately 4.5 miles before terminating at the Airburst Range 123 in Fort Carson. This alternative presented greater number of crossings of water features, thus requiring potential permitting under the CWA for impacts to WOTUS.

Alternative C – Under this alternative, the proposed route would originate approximately three miles east of State Highway 115, traverse for two miles in the north-northeast direction and then along Route 12 for approximately 4.5 miles before terminating at the Airburst Range 123 in Fort Carson. This route traverses through rougher terrain and presents greater impacts to training areas within Fort Carson. Additionally, there is a higher cost associated with receiving power from the Penrose Substation to the Fort Carson property line for this route. The route also presented a higher cost to maintain.

Alternatives D and E – Under Alternative D, the route would originate near Red Devil Air Strip located approximately 5 miles north of Airburst Range 123. Under Alternative E, the route would originate approximately 2.5 miles due east of the Red Devil Air Strip. Both alternatives would terminate near the northern extent of Airburst Range 123. These routes present greater impacts to training areas with possible expanded munition areas within Fort Carson. Additionally, there is currently no substation to handle the increased power load that would feed into these routes.

Public Review
Pursuant to 651.14(b), Title 32 Code of Federal Regulations (Environmental Analysis of Army Actions), the Army made the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) was available to the public for review and comment from January 27, 2021 to February 27, 2021, 30 days prior to a final decision. A Notice of Availability (NOA) of the documents was announced in local media. The documents are available online at: http://www.carson.army.mil/organizations/dpw.html#three. No comments were received during the comment period.

Summary of Environmental Consequences
No significant impacts are anticipated as a result of implementing the Proposed Action. The potential impacts have been broken down into four categories: beneficial, none (or

no impacts), negligible, minor, moderate but less than significant, or significant. These are summarized in Section 3.1 of the EA. There were several Valued Environmental Components (VEC) that were dismissed from detailed analysis. These included land use, greenhouse gases, noise, socio-economics, traffic and transportation, and hazardous materials and waste.

The Proposed Action would have minor and less than significant effects on air quality. Construction would have short-term impacts due to increases in fugitive dust caused by the operation of heavy equipment and excavation of soil for the burial of the three-phase electric power line and placement of the power poles; however, once the utility equipment is in place and the area is revegetated, there would be no further effects on air quality. These effects are mitigated to negligible and below significant as described below.

The Proposed Action would have moderate but less than significant effects on biological resources. The Proposed Action requires the temporary removal of vegetation which will modify wildlife habitat. This could affect migratory birds and other wildlife in the area. In addition, the presence of construction activities and noise could disturb birds during the nesting season. There are no Federally listed threatened or endangered species in the project area. The construction activities would increase the risk of introduction and spread of non-native invasive species. These effects are mitigated to minor and below significant as described below.

The Proposed Action would have moderate but less than significant effects on water and soil resources. The Proposed Action would require removal of vegetation and excavation to install the subterranean power line and above-ground poles. Nine swales/gullies and one ephemeral stream, Red Creek, are intersected by the Proposed Action. No wetlands are located within the Proposed Action area. Construction disturbance is anticipated to impact the soil and water resources through the loss of vegetative establishment, soil compaction and productivity, and sedimentation by means of stormwater runoff/soil erosion and fugitive dust. These effects are mitigated to minor and below significant as described below.

The Proposed Action would have minor effects on cultural resources. No known historic properties (prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in, the National Register of Historic Places) will be directly impacted by the Proposed Action. In addition, the installation of new poles will not visually (indirectly) impact known historic properties. However, the construction associated with the Proposed Action could inadvertently cause damage to unknown cultural resources. These effects are mitigated to negligible and below significant as described below.

The Proposed Action would have minor and less than significant effects on air space. The majority of the Proposed Action consists of a subterranean three-phase electric line that would not impact airspace once installed. Four poles will be installed within Fort Carson boundaries but outside of Aerial Range 123. These effects are mitigated to negligible and below significant as described below.

Negligible impacts to facilities, energy demand and generation, and utilities are anticipated as the Proposed Action consists of the upgrade of equipment to better accommodate current energy demands. However, the Proposed Action will include installation of equipment with the capacity to meet increased energy demands.

Mitigation Measures

All activities capable of producing fugitive dust is required to use all available and practical methods that are technologically feasible and economically reasonable in order to minimize such emissions. A summary of the Best Management Practices (BMPs) and recommended fugitive dust mitigations that will be employed as applicable are presented in detail within the *Fort Carson Fugitive Dust Control Plan* (2016).

Disturbed areas will be reseeded with appropriate seed mixtures following construction to promote stability, minimize erosion, and reestablish productivity. A site-specific Noxious Weed Control Plan in compliance with guidance within the *Fort Carson Integrated Natural Resource Management Plan* (2020) and *Fort Carson Integrated Pest Management Plan* (2015) will be generated to minimize establishment of invasive species in disturbed and reestablished areas. Coordination with the Invasive Plant Manager would assist in the prevention of potential weed spread. A long-term vegetation management plan, including invasive species treatments, may be prepared, as necessary.

Pre-disturbance nesting bird surveys shall occur within two weeks of starting any ground disturbance during Migratory Bird Treaty Act (MBTA) nesting season (February 15 through September 15). Surveys shall be conducted following species specific and other appropriate protocols according and will include burrowing owl, mountain plover, raptors, eagles and any other MBTA protected bird species. If any bird species is found nesting, the proponent will consult with DPW-Wildlife for additional USFWS guidance on buffer protection zone sizes until the young have fledged.

Prior surveys by the DPW Wildlife biologist should be done to identify Colorado checkered whiptail habitat. To the extent possible, capture and relocation of whiptails would be done by DPW-Wildlife within the project area before any ground disturbance begins between April and September.

Coordination with DPW-Wildlife is required for avian protection measures. Potential impact to birds can be minimized by designing power poles utilizing guidelines in the *Avian Protection Plan Guidelines* (2005).

Construction within Red Creek will not be conducted during periods of current or anticipated surface water flow. Exposed slopes and stream banks will be stabilized during and immediately upon completion of construction and returned to preconstruction contours and conditions.

All permanent structures will be placed in upland areas. Excess material resulting from vault excavation and pole installation will be hauled offsite as soon as practicable and will be temporarily placed distant from Red Creek and drainage features in such a manner

that it will not be dispersed by currents or other forces. Staging and storage areas will be located in upland areas.

It is anticipated that the Proposed Action impacts will be authorized under RGP 14 for Fort Carson and PCMS; however, the Proposed Action will be reviewed by DPW for compliance with the Section 404 of the CWA and written authorization will be obtained through the USACE, as necessary. Mitigation measures and BMPs specific for compliance with the applicable CWA authorization will further reduce potential impacts of the Proposed Action.

During construction of the project, stormwater runoff and erosion would be managed through implementation of a site-specific approved Stormwater Pollution Prevention Plan (SWPPP) to control for runoff and sediment loading through implementation of BMPs. The site-specific SWPPP will align with procedures and guidelines outlined in the *Fort Carson Stormwater Management Plan* (2017). As land disturbance in connection with the Proposed Action is anticipated to exceed one acre, coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities (CGP) will be obtained. BMPs for sediment and erosion control to protect surface water would be accomplished through a combination of construction techniques, vegetation and re-vegetation, administrative controls, and structural controls.

Ground-disturbing activities will be monitored by a qualified, professional archaeologist, and the Inadvertent Discovery of Archaeological, Cultural, or Paleontological Materials SOP will apply for construction activities.

The placement of the power poles will be coordinated to avoid interference with installation activities. The poles will be equipped with the required aircraft hazard warning devices if specified by the Range Officials.

No mitigation is anticipated for the Proposed Action regarding energy usage; however, as the Proposed Action will include the upgrade of equipment with the capacity to meet increasing energy demands, future projects with energy requirements would need to be evaluated for impacts to supply and effects to the surrounding communities.

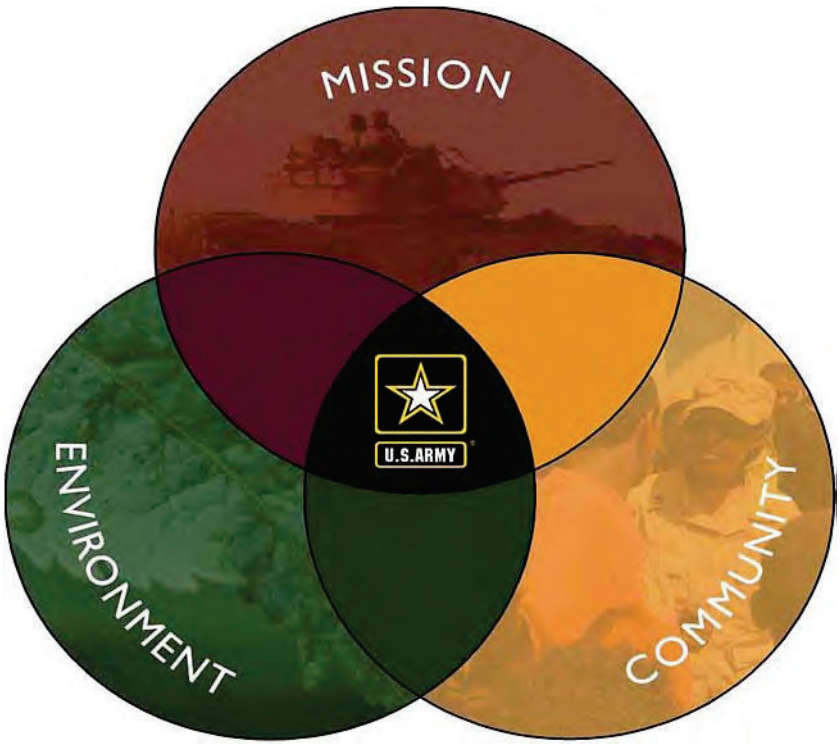
Conclusion and Findings

Based on careful review of the EA, I have determined that no significant direct, indirect, or cumulative impacts to the human or natural environment are anticipated because of the implementation of the Proposed Action. The Proposed Action is not a major federal action that would significantly affect the quality of the environment within the meaning of Section 102(2)(c) of NEPA; and an environmental impact statement is not required, and will not be prepared. My decision is based on the potential environmental and socio-economic impacts associated with the Proposed Action as is analyzed in the EA. This decision complies with legal requirements and will take into account all submitted information regarding reasonable alternatives and environmental impacts.

Date: 8 MARCH 2021

Nathan R. Springer
COL, AR, Garrison Commander
Fort Carson, Colorado

Environmental Assessment for the Airburst Range 123 Three-Phase Electric Power Line Installation at Fort Carson, Colorado
March 2021



Fort Carson

Directorate of Public Works, Environmental Division

Environmental Assessment for the Airburst Range 123 Three-Phase Electric Power Line Installation at Fort Carson, Colorado

March 2021

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8 MARCH 2021

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Contents

Tables

Figures

1 Purpose and Need for the Proposed Action

1.1 Introduction

The Colorado Air National Guard (COANG) is proposing to build a new 4.9-mile, three-phase electric power line within Fort Carson, Colorado. The electric line will tie into an existing line originating from the Penrose Substation located approximately six miles south of Fort Carson. The new facilities include 4.79 miles of buried cable installed adjacent to Route 12 and four (4) power line poles to be installed within approximately 550 feet inside the western boundary of Fort Carson to support the above ground portion of the electric line. The new three-phase power line will replace the existing single-phase electric line, which is located adjacent east of Route 13 within Airburst Range 123 and extends to the southeast boundary of the installation. The single-phase line will be abandoned in place.

Additional related activities located outside of Fort Carson boundaries are anticipated. Four (4) new power poles will be installed within the Colorado Department of Transportation road easement on the east side of Highway 115 that will connect the new three-phase line on Fort Carson to an existing line on the west side of Highway 115. The equipment at the top of the nine (9) poles on the west side of Highway 115 will be upgraded and two (2) new poles will be replaced. In addition, eight (8) power poles located along an unnamed road at the southeastern boundary of Fort Carson will be removed.

Details of the Proposed Action and associated off installation activities are shown in **Appendix B**.

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts of the Proposed Action to install the new three-phase electric power line in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4331 et seq.), regulations issued by the Council on Environmental Quality (CEQ) published in 40 Code of federal Regulations (CFR) Parts 1500-1508, and the Army's NEPA-implementing procedures published in 32 CFR Part 651, Environmental Analysis of Army Actions (Army Regulation 200-2).

1.1.1 Location and Surrounding Land Uses

Fort Carson covers approximately 137,400 acres and is located in central Colorado at the foot of the Rocky Mountain Front Range in El Paso, Fremont, and Pueblo counties (**Figure 1**). Colorado Springs and Denver are approximately eight miles and 75 miles, respectively, to the north, while the City of Pueblo is located approximately 35 miles south of the Main Post area. Surrounding land uses bordering Fort Carson include the City of Colorado Springs to the north; the City of Fountain, conservation areas, and mixed development to the east; the City of Pueblo West, privately-owned ranches, and conservation areas are located to the south; and, the City of Penrose, state parks, and several small residential communities are located to the west. The Main Post area, which consists of developed land and a high density of urban uses, is located in the northern portion of Fort Carson and covers approximately 6,000 acres.

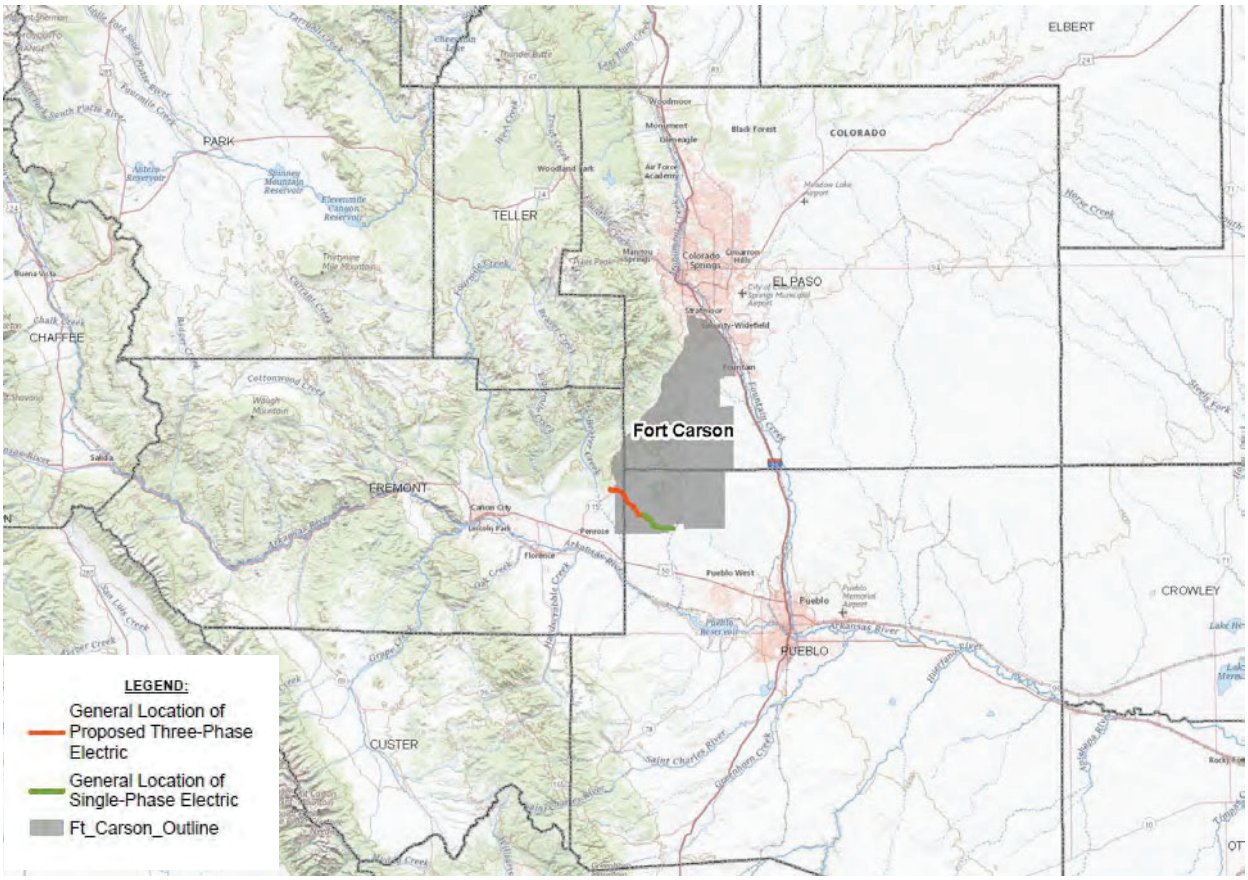

Figure 1: Location of Fort Carson

Additionally, there are approximately 25,600 acres of Army Compatible Use Buffer (ACUB) lands along the eastern and southern boundaries of Fort Carson. These lands buffer military training activities from neighboring communities and protects the unique local shortgrass prairie open spaces from future development. The Army collaborates with partners to identify mutual objectives of land conservation and to prevent development of critical open areas to preserve high-value habitat and limit incompatible development in the vicinity of military installations. This reduces pressure on plants and wildlife to migrate into training areas on Fort Carson, which would result in a reduction of training capabilities. Fort Carson and adjacent areas are depicted on **Figure 2.**

Figure 2: Fort Carson and General Location of Proposed Action and Related Activities

1.2 Purpose and Need

The existing single-phase electric line was placed in service in 1978 and has exceeded its useful service life. Frequent repairs and continued maintenance of the line will become more expensive due to aging structures and conductor. Ongoing operational and maintenance problems demonstrate the need for improvements to serve area power loads. The purpose of the Proposed Action is to upgrade the Airburst 123 Complex with three-phase electric service to meet the increased demands with reliable electricity. There is a need to improve efficiency of training to meet the COANG's mission now and in the future, which can be accomplished through reduced maintenance costs and down time of the existing powerlines. In addition, there is also a need to improve the training area and infrastructure to prepare for future missions and technology. This new 750-kV three-phase design will meet the increased power demands within Airburst Range 123 at Fort Carson.

Following completion of the Proposed Action (construction of a three-phase power line), the COANG will develop and complete a project to convert each facility on the range to three-phase power, providing equipment, automatic transfer switches and all other ancillary items. Once completed, the existing single-phase power line will be abandoned, and any power poles for the single-phase power line removed.

The purpose of the Proposed Action can be summarized as follows: upgrade electrical distribution and equipment capabilities at Airburst Range 123 in Fort Carson to provide reliable, cost efficient power to meet requirements of COANG's current and future training objectives.

1.3 Scope of Assessment

The August 26, 2020 memo from the Assistant Secretary of the Army Installations, Energy and Environment memo which requires NEPA initiated after September 14, 2020 to meet the all-new requirements of the updated CEQ regulations. The initial stakeholder review of this EA was in July 2020. This EA will be developed in accordance with NEPA, as implemented by the President's Council on 2 Environmental Quality regulations governing NEPA (40 CFR Part 1500-1508 (1978, as amended 3 in 1986 and 2005)) and the U.S. Army's rule governing NEPA, Environmental Analysis of Army 4 Actions (32 CFR Part 651). This EA facilitates the planning and decision-making by the United States Army Garrison (USAG) Commander. It helps the Army, stakeholders, and the public understand the potential extent of environmental impacts of the Proposed Action and alternatives, and whether the impacts (direct, indirect, and cumulative) are significant.

This EA includes a no action alternative and a reasonable range of alternatives. Alternatives considered in the analysis are discussed in Section 2 of this document. The Proposed Action was selected because it fully meets the purpose and need. The EA will discuss the affected environment and environmental consequences of the Proposed Action. This EA will include an analysis of the potential impacts the Proposed Action may have on land use, air quality, noise, geology, soils, water resources, biological resources, cultural resources, socioeconomics, transportation and traffic, airspace, and hazardous and toxic materials/wastes.

1.4 Related Environmental Documents

The following environmental documents, available at: https://www.carson.army.mil/organizations/dpw.html#three, will be used as guidance to prepare the EA:

- *Draft Fort Carson Integrated Natural Resource Management Plan (*2020-2025)
- *Fort Carson Stormwater Management Plan* (2017)
- *Fort Carson Fugitive Dust Control Plan* (2016)
- *Fort Carson Integrated Pest Management Plan* (2008)
- *Fort Carson Cultural Resources Management Plan (2017)*

1.5 Public, Agency and Tribal Involvement

NEPA requires that environmental information be made available to the public throughout the decision-making process and prior to actions being taken. Agency and public comments and concerns are taken into consideration in the decision-making process and development of the EA. Interagency coordination, and public outreach and input will be completed in accordance with relevant regulations, guidance, and policies. A Notice of Availability (NOA) will be announced in local media and the documents will be made available online at: https://www.carson.army.mil/organizations/dpw.html#three. This EA was made available to the public for 30 days along with a Draft Finding Of No Significant Impact (FONSI) from January 27,2021 to February 27, 2021. No comments were received during the comment period.

Section 106 of the National Historic Preservation Act requires consultation with the Advisory Council on Historic Properties and Native American tribal consultation to determine if an undertaking could affect historic properties. In addition, the United States Army Corp of Engineers (USACE) will be consulted for impacts to jurisdictional waters of the United States (WOTUS) as defined and protected under the Clean Water Act (CWA).

1.6 Decision Making

The EA will evaluate whether the Proposed Action would result in significant impacts to the environment. As part of the decision-making process, the USAG Commander will consider all relevant environmental information and stakeholder and public issues of concern raised as part of the NEPA process. If the decision-maker determines there are no significant environmental impacts, the decision will be documented in the final FONSI, which will be signed no earlier than 30 days from the publication of the NOA for this PEA and the draft FONSI. The Army may initiate a Notice of Intent (NOI) for an EIS if new information warrants the need for additional analysis of potentially significant environmental impacts. If the decision-maker determines there are no significant environmental impacts, the decision will be documented in the final FONSI, which will be signed no earlier than 30 days from the publication of the NOA for this proposed EA and

the draft FONSI. The Army may initiate a NOI for an EIS if new information warrants the need for additional analysis of potentially significant environmental impacts

2 Proposed Action, No Action Alternative, and Alternative Screening Criteria

2.1 Proposed Action (A)

The Proposed Action is the installation of a new, 4.9 mile, three-phase electric power line originating approximately 110 feet east of State Highway 115 and terminating at the Airburst Range 123 in Fort Carson (**Figure 3** and **Appendix B**). The electric line will tie into an existing line originating from the Penrose Substation located approximately six miles south of Fort Carson. The Proposed Action and all associated workspace and disturbance will be conducted within a maximum of a 30-foot wide workspace corridor for the length of the 4.9-mile route. The proposed underground portion of the electric power line will be a direct burial adjacent to Route 12 on the south side of the road, for approximately 4.79 miles (25,295 feet). The power cable shall be installed as close to Route 12 as possible without causing damage to the road.

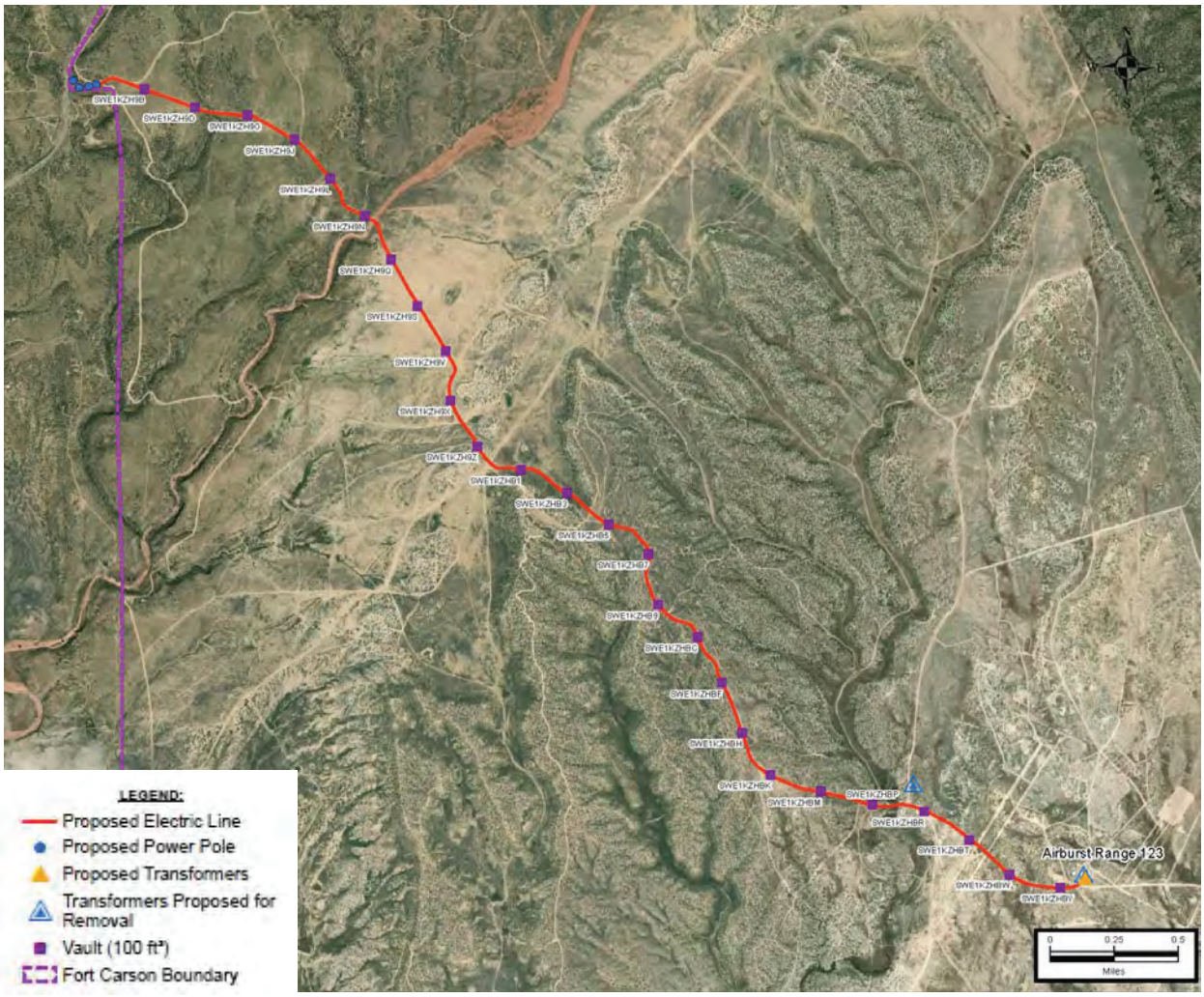

Figure 3: Proposed Action Components and Location within Fort Carson

Four (4) power line poles will be installed within approximately 550 feet inside the western boundary of Fort Carson near Gate 13. The power poles will support the above ground portion of the three-phase power cable, where the direct burial of the power cable begins at the last (eastern most) power line pole. At least two guy wires and anchors per pole will be installed to support three of the power line poles. The poles will be 45 to 50 feet in height above ground surface, 14 inches in diameter, and installed to a depth of six feet below ground surface. The power poles and above-ground portion of the Proposed Action is 0.11 miles (565 feet) in length.

Staging of all construction materials and equipment shall be placed within the 30-foot workspace corridor at intervals needed for construction (typically every 500-1,000 feet). Staging of materials will occur approximately one to two weeks prior to the start of construction. Additional storage areas within the perimeter fence of Airburst Range 123 may be used for staging of equipment and materials. In cases where terrain features such as trees and boulders interfere with the cable installation next to Route 12, the cable will be routed around these features but maintained within the 30-foot workspace corridor.

The cable used for the electric line will be 1/0 AL XLP primary conductor 15kv full neutral cable buried at a minimum depth of 42 inches when buried in soft soils. The cable will be buried a minimum of 36 inches when buried in bedrock and encased in concrete to protect the power line. Bedrock trenching will be formed using specialized cable installation equipment, such as a rock hammer, if boulders or bedrock are uniformly present through the width of the corridor and cannot be avoided. The cable will be installed via plow cut technology, resulting in subsurface soil disturbance of approximately one to two feet wide for every linear foot of the Proposed Action area.

Twenty-six (26) maintenance vaults measuring 100 cubic feet (5 feet wide, 5 feet long, 4 feet deep) each will be placed, at a minimum, every 1,100 feet along the length of the installed cable as shown in **Figure 3** and **Appendix B**. In-vault junctions will be installed and terminated per Fort Carson standards or other standards as agreed to between Fort Carson and the contractor. No maintenance vault will be placed anywhere within the creek/stream bed or in the road. Maintenance vaults will enclose equipment for the electric line; no hazardous substance, oils, or other liquids will be present.

Power will be a minimum rating of 700 KVA compatible with the 750 KVA - 277/480-volt pad-mounted transformer which will be installed approximately 50 feet south of the current transformer location directly outside the perimeter fence at the Airburst Range 123. The proposed transformer is 7.8 feet wide, 6.8 feet long, 3 feet tall, set 1.5 feet into the ground.

The current buried single-phase line originates adjacent east of Route 13 within Airburst Range 123. The line traverses in a southeast-east direction for 3.6 miles, connecting to above-ground facilities at the southeastern boundary of Fort Carson. The existing single-phase line will be abandoned in place. The abandonment of a solitary underground electric line is generally considered to pose a negligible environmental impact. The two-existing pad-mounted transformers (similar dimensions as the proposed transformer) located within the perimeter fence and at the northwest terminus of the single-phase line will be removed.

The Proposed Action will require Fort Carson to issue an easement to Black Hills Energy (BHE). This process is an administrative real property action that allows BHE to install and maintain the Proposed Action infrastructure on Fort Carson property.

Details of the Proposed Action and associated off installation activities are shown in **Appendix B**.

2.2 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. Construction of new power poles to support the underground three-phase electric line would not be necessary. Deteriorated structures and fatigued hardware on the existing line would be repaired or replaced when required.

2.3 Screening Criteria for Alternatives

A rigorous screening was performed to assess whether an alternative would support the implementation of energy resiliency mandates and whether they would be carried forward for evaluation in this EA. The alternatives were evaluated against the following criteria:

- **Mission Compatibility.** Must be compatible with the military missions and training occurring at Fort Carson. Site development and operations may not adversely impact military training or future planned development activities.
- **Grid Access and Electrical Tie-in Potential.** Must be close to transmission facilities (substations) or have technical viability and economic justification for building new electrical lines for interconnection to the Fort Carson distribution system or the grid. The grid infrastructure must be capable of transporting, or being upgraded to transport, electricity generated by the alternative(s).
- **On-Installation Energy Generation Potential for Increased Energy Security.** Must allow Fort Carson to have sufficient control of and access to its energy supplies while reducing the possibility of external distribution failures. Must generate enough power to meet Fort Carson's critical load during a prolonged power outage.
- **Topographic and Soil Factors:** Must have topography, aspect, slope, and soils compatible with the proposed infrastructure.
- **Environmental Factors**. Must minimize environmental constraints and allow acceptable accommodation of cultural or sensitive natural resources.
- **Safety & Munitions and Explosives of Concern (MEC).** Must involve minimized exposure to MEC and damage from munitions. Must not conflict with military training activities or jeopardize personal safety of those constructing or operating the facilities. Ongoing operational needs must not adversely impact traffic safety or security risk.
- **Project Financeability & Use of Proven Technologies**. Must use proven technologies on a site that has reasonable infrastructure upgrade costs to avoid an unnecessary impact to utility rates.
- **Compliance with Federal Mandates and DoD or Army Goals.** Must enhance compliance with some or all government mandates and Department of Defense (DoD) and Army goals and objectives regarding renewable energy production, energy security, increased energy efficiency, water conservation, and waste and greenhouse gas emissions reduction.

The screening analysis allowed Fort Carson to assess the current and future benefits of each alternative and determine how efficiently the alternative met the purpose and need of the project.

2.4 Alternatives Considered but Dismissed from Analysis

Four alternative routes (B, C, D and E) for the installation of the three-phase electric line were considered and screened based on the criteria listed in Section 2.3. The alternatives and the Proposed Action are depicted in **Appendix C**. These four alternatives do not meet the criteria for alternatives and are therefore eliminated from further analysis in the EA.

Alternative B – Under this alternative, the proposed route would originate at an unpaved road approximately 1.6 miles east of State Highway 115, traverse for approximately 1.5 miles to the east and then along Route 12 for approximately 4.5 miles before terminating at the Airburst Range 123 in Fort Carson. The starting point of this route lies approximately 1.2 miles south of the Proposed Action. This alternative presented greater number of crossings of water features, thus causing greater impacts to WOTUS.

Alternative C – Under this alternative, the proposed route would originate approximately three miles east of State Highway 115, traverse for two miles in the north-northeast direction and then along Route 12 for approximately 4.5 miles before terminating at the Airburst Range 123 in Fort Carson. The starting point of this route lies approximately 2.5 miles south of the Proposed Action. This route traverses through rougher terrain and presents greater impacts to training areas within Fort Carson. Additionally, there is a higher cost associated with receiving power from the Penrose Substation to the Fort Carson property line for this route. The route also presented a higher cost to maintain.

Alternatives D and E – Under Alternative D, the route would originate near Red Devil Air Strip located approximately 5 miles north of Airburst Range 123. Under Alternative E, the route would originate approximately 2.5 miles due east of the Red Devil Air Strip. Both alternatives would terminate near the northern extent of Airburst Range 123. These routes present greater impacts to training areas with possible expanded munition areas within Fort Carson. Additionally, there is currently no substation to handle the increased power load that would feed into these routes.

3 Summary of Environmental Consequences and Proposed Mitigations

3.1 Valued Environmental Components and Focusing of the Analysis

Valued Environmental Components (VECs) are categories of environmental and socio-economic resources for which impact analysis is conducted to enable a managed and systematic analysis of these resources. **Table 1** presents each VEC and corresponding regions of influence (ROI) and thresholds of significance. The table also identifies which VECs are analyzed in this EA and which VECs are dismissed from further analysis; each includes an accompanying rationale. In conducting this analysis, a qualified subject matter expert reviewed the potential direct and indirect effects of the No Action Alternative and the Proposed Action Alternatives relative to each VEC. The subject matter expert carefully analyzed and considered the existing conditions of each VEC within the Proposed Action's ROI.

Through this analysis, it was determined that, for several VECs and VEC sub-components, negligible adverse effects were predicted without the need for detailed analysis. This included land use, noise, socio-economics, traffic and transportation, and hazardous materials and waste. **Table 1** provides a more detailed description of VECs carried forth for further analysis within Sections 4.1 through 4.7 of this EA.

Effects are considered changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, as defined in 40 CFR 1508.1(g).
The severity of environmental impacts is characterized as none/negligible, minor, moderate, significant, or beneficial as described:

- **None/Negligible** – No measurable impacts are expected to occur. A negligible impact may locally alter the resource, but would not measurably change its function or character.
- **Minor** – Primarily short-term but measurable adverse impacts are expected. Impacts on the resource may be slight.
- **Moderate but less than significant** – Noticeable adverse impacts that would have a measurable effect on a wide scale (e.g., outside the footprint of disturbance or on a landscape level). If moderate impacts were adverse, they would not exceed limits of applicable local, state, or federal regulations.
- **Significant** – A significant impact may exceed limits of applicable local, state, or federal regulations or would untenably alter the function or character of the resource. These impacts would be considered significant unless managed by mitigation efforts to a less than significant level.
- **Beneficial** – Impacts would benefit the resource/issue.

Table 1: Need for analysis by VEC

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
Land Use	Land use within and adjacent to Fort Carson	Impacts to land use would be considered significant if the land use was incompatible with existing military land uses and designations (including recreation). These impacts may conflict with Army land use plans, policies, or regulations, or conflict with land use off-post.	Yes	The Proposed Action consists of the placement of a subterranean three-phase electric line and four power poles primarily adjacent to Route 12, therefore no land use change is anticipated. Further evaluation is not warranted.
Air Quality and Greenhouse Gases (GHG)	Air Quality Control Region	An impact to air quality would be considered significant if the Proposed Action were to generate emissions which: • Did not meet Clean Air Act conformity determination requirements to conform with the State	Greenhouse Gas: Yes Fugitive Dust: No	The Proposed Action would not increase the number of vehicles in Fremont and Pueblo Counties and would utilize a minor number of local vehicles and/or emission generating equipment for installation. There would be no measurable increase in greenhouse gas emissions. There may be a minor and temporary increase in dust from construction prior to the completion of reclamation efforts. The effects to air quality are discussed in Section 4.1.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		Implementation Plan • Substantially increase GHG emissions; or • Contribute to a violation of any federal, state, or local air regulation.		
Noise	Areas adjacent to and within Fort Carson	Impacts would be considered to be significant if noise from the Proposed Action were to cause harm or injury to on-post or off-post communities, or exceed applicable environmental noise limit guidelines	Yes	There may be the potential for noise during construction of the Proposed Action; however, this would be short-term and minor. A few scattered residences are located in the vicinity of the western terminus of the Proposed Action; however, the noise from the equipment would be buffered by vegetation, topography, and road noise on Highway 115. The Proposed Action is sited in a very remote location and the nearest population center in the surrounding area is over three miles south from the construction activities footprint. In addition, there will no changes in noise contours for the operation of the three-phase electric line. Further evaluation of this resource is not warranted.
Biological Resources	Biological resources within the cantonment, range and	Impacts to biological resources would be considered significant if: • Substantial permanent conversion or	No	The Proposed Action requires the temporary removal of vegetation which will modify wildlife habitat. This could affect migratory birds and other wildlife in the area. In addition, the presence of construction activities and noise could disturb birds during the nesting season. There are no Federally listed threatened or endangered species in the project area.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
	maneuver training areas	net loss of habitat at the landscape scale, • Long-term loss of impairment of a substantial portion of local habitat, • Loss of population of a species, • Unpermitted or unlawful "take" of Endangered Species Act protected species, or species protected under the Bald and Golden Eagle Protection Act or the Migratory Bird Treaty Act		The construction activities could introduce non-native invasive species. The effects to biological resources are discussed in Section 4.2.
Water Resources	Watersheds, state-designated stream	Impacts to water quality would be significant if: • Results in an excess sediment	No	Nine swales/gullies and one ephemeral stream, Red Creek, are intersected by the Proposed Action. No wetlands are located within the Proposed Action area. Construction disturbance is anticipated to impact the drainages through the loss of vegetative

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
	segments, and groundwater aquifers associated with Fort Carson. U.S. Army Corps of Engineers jurisdictional "waters of the U.S." and wetland resources	load in Fort Carson waters affecting impaired resources, • Results in unpermitted direct effects to waters of the U.S., • Substantially affect surface water drainage or stormwater runoff, • Substantially affect groundwater quantity or quality, or • Do not comply with policies, regulations and permit related to wetland conservation and protection		establishment, soil compaction, and sedimentation by means of stormwater runoff/soil erosion and fugitive dust. The effects to water resources are discussed in Section 4.3.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
Geology and Soil Resources	Geology and soil resources within the cantonment, range, and maneuver training areas	Impacts on geology, topography, and soil resources would be considered significant if: • The landscape could not be sustained for military training over a wide area, or • Excessive soil losses were to impair vegetation growth	No	The Proposed Action would require removal of vegetation and excavation to install the subterranean power line, vaults and above-ground poles. This could decrease compaction and productivity, and increase potential for soil erosion and sedimentation into drainages. The effects to soil resources are discussed in Section 4.4.
Cultural Resources	Cultural resources within the cantonment, range and maneuver training areas	Impacts to cultural resources would be considered significant if they cause direct or indirect alteration of the characteristics that qualify a property for inclusion in the National Register of Historic Places (NRHP). These may include physical destruction, damage, alteration, removal,	No	The Proposed Action includes clearing vegetation and excavation to install infrastructure. The ground disturbance could affect undiscovered cultural resources that may be present in the area. The effects to cultural resources are discussed in Section 4.5.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		changes to or character of the setting, neglect causing deterioration, and transfer, lease or sale. The effects are also considered significant if the Section 106 process is not followed.		
Socio-economics	Socio-economic and environmental justice factors within Fort Carson and immediate surrounding communities	Impacts to socio-economics and environmental justice would be considered significant if: • Substantial changes to the sales volume, income, employment or population of Colorado Springs and surrounding area, • Disproportionate adverse economic, social, or health	Yes	The Proposed Action would have a no effect on the local economy. The proposal would not create jobs, and would not impact children, minorities, low-income or under-served communities. Further evaluation of this resource is not warranted.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		impacts on minority or low-income populations, or • Substantially disproportionate health or safety risk to children.		
Traffic and Transportation	Pubic roadways and key access points within and near Fort Carson and roadways within the Installation boundary	Impacts to traffic and transportation would be considered significant if the activities: • Substantially degrade traffic flow during peak hours, or • Substantially exceed road capacity and design	Yes	The Proposed Action would not impact traffic patterns on Fort Carson or within the surrounding communities. The minor number of vehicles, equipment, and construction traffic associated with the Proposed Action will be coordinated as to not interfere with Fort Carson activities and the surrounding communities. Activities will be conducted adjacent to Route 12 and the road will not need to be closed; however, reduced speeds for through traffic on Route 12 may be necessary during construction. The effects on traffic would be negligible and short-term. Further evaluation of this resource is not warranted.
Airspace	Airspace above and surrounding Fort Carson	An impact to airspace would be considered significant if the Proposed Action violated federal Aviation Administration safety regulations or causes a substantial infringement	No	There would be no change to the airspace as a result of the Proposed Action presuming the proper placement of poles. The effects to airspace are discussed in Section 4.6.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		of private or commercial flights		
Facilities, Energy Demand and Generation, and Utilities	Facilities within Fort Carson. Utilities within Fort Carson and in the immediate surrounding communities and counties	Impacts to facilities, energy demand and generation, and utilities would be considered significant if the Proposed Action were to cause an impairment of the utility service to Fort Carson, local communities, homes or businesses.	No	The Proposed Action consists of the upgrade of equipment to better accommodate current energy demands. Negligible impacts to facilities, energy demand and generation, and utilities are anticipated by the Proposed Action itself; however, the Proposed Action will include installation of equipment with the capacity to meet increased energy demands. Future projects with energy requirements could impact supply and effect to the surrounding communities. The effects to utilities are discussed in Section 4.7.
Hazardous Materials	Fort Carson lands	Impacts to hazardous materials and hazardous waste would be considered significant if substantial additional risk to human health or safety would be attributed to the Proposed Action. This includes direct human exposure.	Yes	The Proposed Action would not generate hazardous wastes or use hazardous materials. The transformers contain minor quantities of mineral oil, but secondary containment structures would be designed and constructed prior to setting the transformers. The secondary containment capacity would correspond to the oil capacity of the transformer. The likelihood of contamination on Proposed Action site is remote. If any contamination is encountered, appropriate measures would be taken to remediate the site. Further evaluation of this resource is not warranted.

3.2 Reasonably Foreseeable Actions

The analysis for each resource considers numerous factors when determining impact conclusions. Significance thresholds are defined for each resource to determine whether identified impacts would significantly affect the human environment. The analysis considers whether these effects are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action or Alternatives. **Table 2** lists the reasonably foreseeable future Army actions (defined as those projects that are well-developed, in mature planning stages, and/or have funding secured) within the ROI that were reviewed when considering effects that may occur at the same time and place as the Proposed Action or Alternatives.

Four (4) new power poles will be installed within the Colorado Department of Transportation road easement on the east side of Highway 115 that will connect the new three-phase line on Fort Carson to an existing line on the west side of Highway 115. The poles will be 45 to 55 feet in height above ground surface, 14 inches in diameter, and installed to a depth of six (6) feet below ground surface. Two to four guy wires and anchors per pole will be installed to support the northernmost and southernmost power line poles. The equipment at the top of the nine (9) poles on the west side of Highway 115 will be reframed and upgraded. In addition, two (2) power poles will be replaced on the west side of Highway 115. The poles will be 45 feet in height above ground surface, 14 inches in diameter, installed to a depth of six (6) feet below ground surface, with two guy wires and anchors per pole. In addition, eight (8) power poles located along an unnamed road at the southeastern boundary of Fort Carson will be removed (**Appendix B**). All associated workspace and disturbance will be conducted within a maximum of a 30-foot wide workspace corridor. Activities outside of Fort Carson consist of an area 1.1 miles (5,808 feet) in length with a maximum total temporary surface area disturbance of four (4) acres. The associated activities located outside of Fort Carson boundaries will be managed similarly and employ all applicable mitigative efforts as the Proposed Action.

Table 2: Projects Considered for Cumulative Effects Analysis

Future Project or Activity at Fort Carson
High Voltage Electrical Training Range
Black Hills Electric High Voltage Line
On-Going Project or Activity at Fort Carson
Fuels reduction including vegetation removal and prescribed burning
Maneuver and Live-Fire Training on Range 123

3.3 Current and Ongoing Environmental Programs and Plans

The Army is committed to sustaining and preserving the environment at all its installations. In keeping with that commitment, USAG Fort Carson has an active environmental management program that employs a full array of best management practices (BMPs) and environmental programs to ensure environmental compliance,

stewardship, and sustainability of those areas potentially impacted by the upgraded power line at Fort Carson. USAG Fort Carson would continue to implement all existing mitigation measures, BMPs, and environmental programs to minimize the impacts of stationing and training. There are several current and ongoing environmental programs and plans that work to mitigate the effects of managing the built environment and training.

The *Fort Carson Integrated Natural Resource Management Plan* 2020-2025 which guides the implementation of a natural resources program at Fort Carson and PCMS to ensure was finalized in September 2020. The INRMP describes the procedures and BMPs used by USAG Fort Carson to ensure that potential impacts to the environment from construction, training, and operational activities are reduced.

The *Fort Carson Integrated Cultural Resource Management Plan* (2017-2022; ICRMP) provides a framework to integrate the legal requirements for cultural resources management into the everyday operation of the USAG Fort Carson military mission and supporting activities. The main purpose of an ICRMP is to establish cultural resources goals, objectives, and policies that the USAG Fort Carson will use to identify and manage its cultural resources. The ICRMP also guides the Garrison Commander, the Cultural Resources Manager, and other key personnel in carrying out their responsibilities and in their decision-making regarding the management of cultural resources. It serves as a funding identification document for the management of cultural resources on military lands. It provides BMPs and standard operating procedures (SOPs) to ensure potential impacts to cultural resources from military training and operational support activities are minimized.

The *Fort Carson Fugitive Dust Control Plan* (2016) focuses on control measures to implement that will minimize fugitive dust emissions and avoid exceeding the threshold levels dictated by the state regulations. Common examples of fugitive dust are those associated with soil storage piles or unpaved roads caused by either wind or human activities such as vehicle traffic. Construction, demolition, and disturbed areas are also examples of fugitive dust emission sources.

USAG Fort Carson has a Regional Permit (Regional General Permit 14) from the USACE that authorizes the discharge of dredged or fil material for erosion control and other minor activities under Section 404 of the Clean Water Act. The permit allows most erosion control activities on Fort Carson to occur without separate permitting actions. The regional permit authorizes erosion control activities that may result in minimal individual and cumulative effects to wetlands. The regional permit also authorizes activities required for the construction, maintenance, repair, and removal of utility lines.

The *Fort Carson Stormwater Management Plan* (SWMP; 2017) describes the procedures USAG Fort Carson implements to comply with requirements of the United States Environmental Protection Agency permit for USAG Fort Carson. This permit provides authorization to discharge stormwater runoff from USAG Fort Carson's Municipal Separate Storm Sewer System (MS4). It also outlines the requirements for Stormwater Pollution Prevention Plans (SWPPP).

Fort Carson's *Integrated Pest Management Plan* (IPMP; 2015) outlines a strategy for preventing and controlling the invasion and spread of non-native invasive and noxious species on Fort Carson. The overall objective is to implement effective, environmentally sound control methodologies for all state and county listed weed species in accordance with any applicable federal, state, and county laws and regulations. Identification of the most effective and environmentally sound control strategies will be based upon factors such as target species, terrain, soil type, condition of the native plant community, extent of the invasion, presence of aquatic resources, wildlife use of the area, and climatic conditions. The best management of invasive species will be achieved through the use of biological, chemical, cultural and physical/mechanical control techniques.

4 Affected Environment and Environmental Consequences

4.1 Air Quality

4.1.1 Affected Environment

The Colorado Department of Public Health and Environment (CDPHE) Air Quality Control Commission (AQCC) Regulation No. 1 (5 Colorado Code of Regulations 1001-3) Part III.D establishes requirements for control of fugitive particulate emissions. Fort Carson is regulated by the CDPHE for any activities that create fugitive dust emissions under AQCC Regulation No. 1.

The most common examples of fugitive dust emissions are those associated with storage piles or unpaved roads caused by either wind or human activities, such as vehicle traffic. Construction and demolition sites, paved roadways and disturbed areas are also examples of fugitive dust emission sources. Certain activities, such as land development projects, may require permits and site-specific fugitive dust control plans. The applicability of permitting with the State and El Paso County are based on area of land disturbed and disturbance duration. No permitting is required for activities within Fremont or Pueblo Counties.

Regardless of project-specific permitting needs, Fort Carson requires that all sources emitting fugitive dust use applicable control measures to minimize such emissions as much as possible by adhering to the control measures and operating procedures outlined in the *Fort Carson's Fugitive Dust Control Plan* (2016). The plan states that personnel, contractors, and Soldiers will implement measures described within the plan to avoid off-property transport and to ensure the associated visible emissions do not exceed 20% opacity or create a nuisance problem. Nuisance is defined as the emission of fugitive particles that constitutes a private or public nuisance as defined in common law – such emissions are unreasonably interfering with another person's use or enjoyment of his or her property, and such interference must be substantial it its nature.

4.1.2 Environmental Consequences

4.1.2.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no increase in fugitive dust emission apart from the dust generated in association with repairs to maintain operation of the equipment.

4.1.2.2 Proposed Action

Construction would have short-term impacts on air quality due to increases in fugitive dust (such as airborne dust caused by vehicles, equipment, and wind) caused by the operation of heavy equipment and excavation of soil for the burial of the three-phase electric power line, vaults, transformers and placement of the power poles; however, once the utility equipment is in place and the area is revegetated, there would be no further effects on air quality. Active construction is anticipated to take 30 days. Operation of the three-phase electric power line would not result in an increase in fugitive dust emission. Future maintenance of the utility equipment may result in sporadic, minor, and short-term impacts on air quality; however, it is anticipated that once the new utility equipment is in operation, it would result in less regular and unforeseen repair than the current degrading, in-use equipment.

The Proposed Action is anticipated to impact a maximum total of approximately 17.8 acres [30 foot wide workspace corridor by the length of the Proposed Action (25,860 feet)], and the disturbance will last approximately 30 days, which is below CDPHE permitting thresholds. By complying with the *Fort Carson Fugitive Dust Control Plan* (2016) BMPs, the effects on dust emissions would be minor and not anticipated to create nuisance conditions.

4.1.2.3 Cumulative Effects

The construction, use, and maintenance of the three-phase electric line, in combination with the associated activities outside of Fort Carson, will remain under the emissions guidelines and permitting thresholds as required by the State. This means that the Proposed Action would not generate fugitive dust that will lead to more than 20% opacity within or outside of Fort Carson. Fort Carson requires all projects to comply with these guidelines. The cumulative effect of all of the projects meeting the fugitive dust requirements is that Fort Carson would continue to comply with State and County regulations. Additional mitigative efforts, such as staggering the timing of dust generating activities associated with the individual projects may be necessary to ensure regulatory compliance if numerous projects are scheduled for construction at the same time.

4.1.1 Mitigations

All activities capable of producing fugitive dust are required to use all available and practical methods that are technologically feasible and economically reasonable in order to minimize such emissions. A summary of the BMPs and recommended fugitive dust mitigations that will be employed, as applicable, are presented in detail within the *Fort Carson Fugitive Dust Control Plan* (2016).

4.2 Biological Resources

4.2.1 Affected Environment

Additional and detailed information regarding the flora and fauna on Fort Carson is located within the INRMP (2020). Unless stated otherwise, information is this section is from those sources.

4.2.1.1 Vegetation

Fort Carson is located within the Central Shortgrass Prairie ecoregion, which encompasses about 56 million acres across Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas and Wyoming. Grassland, shrublands, forest and woodlands dominate Fort Carson. There are at least 30 state-listed noxious weed species that have invaded Fort Carson. Noxious weed management is addressed in the IPMP (2017) that includes control techniques.

The Proposed Action is located in shortgrass prairie grasslands which comprises about 48% of Fort Carson. Major grasses include blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), galleta *(Pleuraphis jamesii)*, sideoats grama (*Bouteloua curtipendula*), sand dropseed (*Sporobolus cryptandrus*), buffalograss (*Bouteloua dactyloides*), little bluestem (*Schizachyrium scoparium*), and needle and thread grass (*Hesperostipa comata*). Various shrubs and other plants scattered throughout the grasslands are prickly pear cactus (*Opuntia* spp.), cholla cactus (*Cylindropuntia* spp.), yucca (*Yucca* spp.), four-winged saltbush (*Atriplex canescens*), rabbitbrush (*Chrysothamnus* spp.), and skunkbush sumac (*Rhus trilobata*). In addition, the Proposed Action is located in forest/woodlands which constitutes about 37% of Fort Carson. Ponderosa pine (*Pinus ponderosa*), piñon pine (*Pinus* spp.), and one-seed juniper (*Juniperus monosperma*) are the dominant species of higher elevation woodlands on rocky and steeper slopes, and cottonwood (*Populus deltoides*), willow (*Salix* spp.), and chokecherry (*Prunus virginiana*) dominate woodlands near drainages.

The vegetation identified within the Proposed Action area and proximity consists mainly of juniper, Plains cottonwood, pinyon pine, galletta, needle and thread, blue grama, yucca, cholla cactus, prickly pear cactus, hedgehog cactus (*Echinocereus* sp.), pincushion cactus (*Coryphantha vivipara*), sand sage (*Artemisia filifolia*), prairie sagewort (*A. frigida*), sagebrush (*A. tridentata*), slender wheatgrass (*Elymus trachycaulus*), and rabbitbrush. As the Proposed Action is sited primarily adjacent to an existing road, the vegetation is regularly disturbed by traffic and sparse.

There are four plant species on Fort Carson that are former federal Endangered Species Act (ESA) candidate species and are currently on the Army Species at Risk (SAR) list. The Arkansas river feverfew (*Bolophyta tetraneuris*), golden blazing star (*Mentzelia chrysantha*), round leaf four o'clock (*Oxybaphus rotundifolius*), and dwarf milkweed (*Asclepius uncialis*) are localized endemics to the Shale "barrens". Fort Carson biologists, in cooperation with the Colorado Natural Heritage, surveyed for the species on Fort Carson, and determined these species were widely distributed on the installation with

many areas not likely to be impacted by maneuvers; however, they are distributed and concentrated within the southeastern and southwestern portions of the installation.

4.2.1.2 Wildlife, including Threatened and Endangered (T&E) Species Federally Listed Species

4.2.1.2.1 Federally Listed Species

The ESA defines an endangered species as any species in danger of extinction throughout all or a major portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Candidate species are those for which the United States Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened, but listing is precluded by other higher priority species. **Table 3** presents federally-listed endangered, threatened, and candidate species found on Fort Carson. No critical habitat has been designated on Fort Carson.

Table 3: Federally Listed Endangered, Threatened, and Candidate Species Known to Occur at Fort Carson

Species	Scientific Name	Species Types	Status	Distribution within Fort Carson
Mexican spotted owl	*Strix occidentalis*	Bird	T	Rare winter migrant
Black-footed ferret	*Mustela nigripes*	Mammal	E	Migrated onto Fort Carson from reintroduction area

Source: Fort Carson, 2020
E- Endangered; T-Threatened.

Mexican Spotted Owl –Threatened Species
The Mexican spotted owl occasionally winters in uneven forested canyons west of Fort Carson. It is a rare winter resident on Fort Carson and known to have occurred only on and in the close vicinity of Booth Mountain They are only known to be present during the winter, and are not present every year. The species does not nest on Fort Carson. Existing protection for the owls includes habitat management and limiting training and recreation in areas occupied by the species. The Booth Mountain area is greater than 2.5 miles from the Proposed Action.

Black-footed ferret – Endangered Species
The black-footed ferret was reintroduced on adjacent private property south of Fort Carson in October of 2013. Fort Carson obtained a Programmatic Safe Harbor Agreement as well as the associated Biological Opinion from the USFWS, to ensure no land use restrictions would occur as result of the ferret reintroduction action. The only area the ferret is known to occur on Fort Carson is in very close proximity to the southern boundary as it has migrated across the border from the introduction site. The ferret is

nocturnal and only known to hunt within the prairie dog colonies on Fort Carson in the vicinity of the southern border.

4.2.1.2.2 Other Protected and/or Sensitive Wildlife

There are several species that are Federal Candidates, Federal Birds of Conservation Concern, State threatened, endangered, or Species of Special Concern, and Army SAR species that may occur on Fort Carson. An exhaustive list and detailed accounts of all species that occur on Fort Carson can be found in the INRMPs (2017 and 2020). Those species that could occur in the Proposed Action area are discussed in the following paragraphs.

Mammals

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

The black-tailed prairie dog, a former candidate for Federal listing, is common on Fort Carson, but numbers are decreasing. On Fort Carson, prairie dog colonies are mapped and in 2019 there were approximately 3,150 active acres. This was an increase from the historic low of 2,515 acres mapped in 2017. The historic high was recorded in 2009 at 6,515 acres. It is listed as a Species of Special Concern in Colorado by the Colorado Parks and Wildlife (CPW) and the Colorado Natural Heritage Program (CNHP). It is considered a keystone species of the shortgrass prairie ecosystem, as it fulfills a significant role in the life cycles of several Species of Special Concern on Fort Carson. Species dependent on prairie dogs on Fort Carson include golden and bald eagles, ferruginous hawks, mountain plovers, burrowing owls, swift foxes, black-footed ferret, and numerous species of reptiles and invertebrates. Prairie dogs are the primary prey of eagles, and they modify grassland habitat making it suitable for burrowing owl and mountain plover nesting. Prairie dogs are managed through a Prairie Dog Management Plan.

There are no black-tailed prairie dog colonies within the Proposed Action area; however, there is one colony within 150 feet of the Proposed Action area as observed in April 2020. This colony, along with one other, were identified as within 150 feet of the Proposed Action area in 2015. As the prairie dog population is currently recovering from the historic low in 2017 throughout Fort Carson, there is potential for the expansion of the mapped colony (ies) within the Proposed Action area from the April 2020 observations.

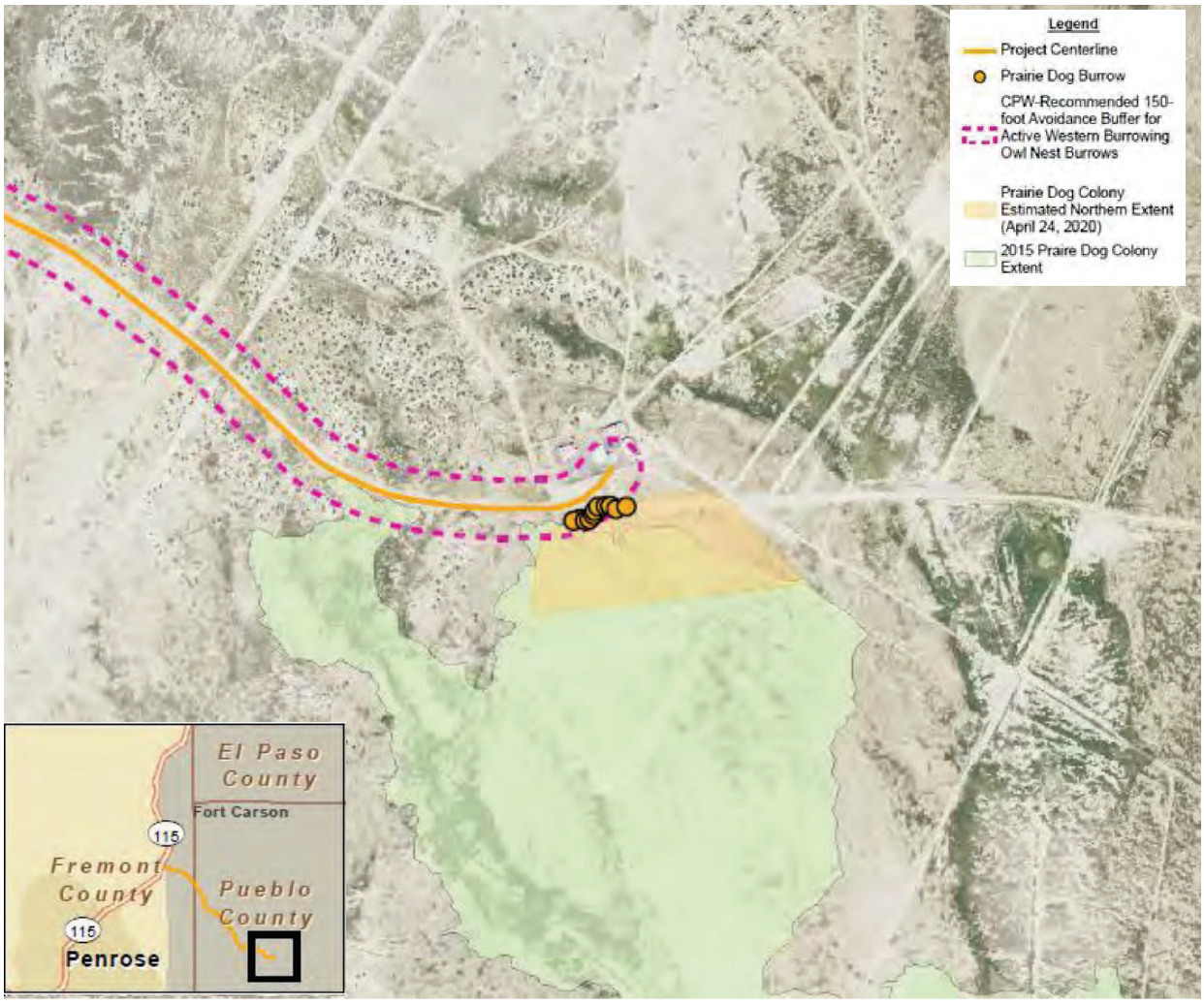

Figure 4: Prairie Dog Colony in the Vicinity of the Proposed Action

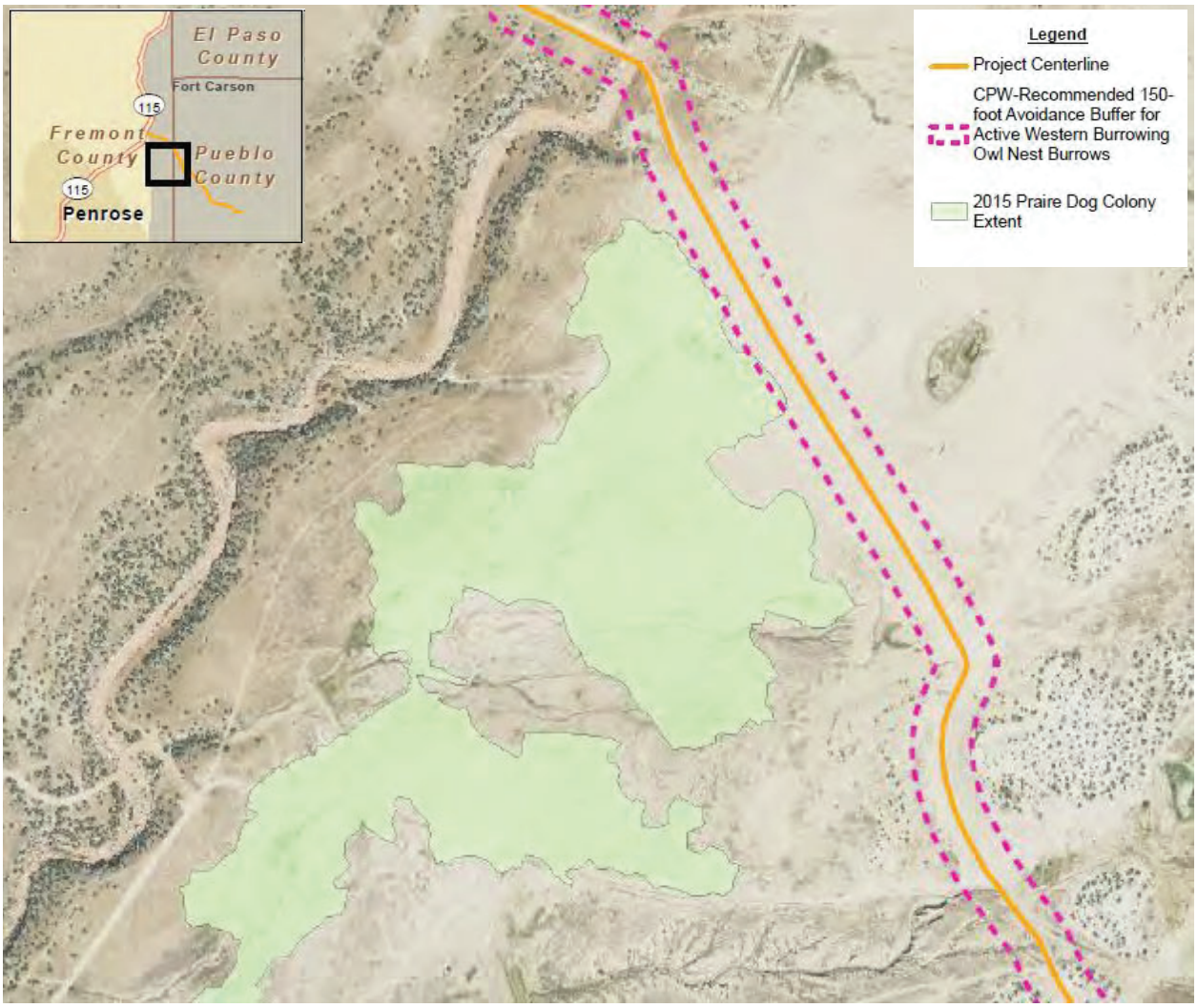

Figure 5: Historic Prairie Dog Colony in the Vicinity of the Proposed Action

Bats

As of October 2019, a total of 13 bat species have been detected on Fort Carson. The tri-colored bat (*Perimyotis subflavus*) is a SAR species and in 2017 the USFWS determined the species may warrant Federal listing. The little brown bat (LBB; *Myotis lucifiugus*) has been under Federal review for listing since 2010. Tri-colored bats and LBB have generally similar habitat requirements. LBBs day/night roosts may be found in tree bark, hollow trees, woodpiles, buildings, and less frequently caves and mines. Tri-colored bats prefer riparian areas and use tree foliage for cover. Maternity colonies use roosting sites that are hot and humid, often in dead and dying trees, caves, attics and other buildings. Winter hibernacula consists of mines, caves and rock crevices.

LBB are believed to be wide-spread throughout Fort Carson with hibernacula at the Stone City mines (Training Area 45). There has been a single occurrence of the tri-colored bat in abandoned mine in 2008. In 2011, Fort Carson and the CPW installed bat gates on abandoned mine entrances to protect maternal and wintering areas of bats. Both bats are managed on Fort Carson under species-specific management plans

Reptiles

Colorado Checkered Whiptail (*Cnemidophorus neotesselatus*)

The Colorado checkered whiptail species is endemic to southeastern Colorado (Walker *et. al.* 1997) and was evaluated by the USFWS for listing as a Candidate species under ESA. In July 2015 the USFWS determined that the whiptail species petition did not provide substantial scientific or commercial information indicating that the petitioned action be warranted. It is currently listed by CPW and USFWS as a species of special concern and by the Army as a SAR species. The Colorado checkered whiptail habitat occurs in valleys, arroyos (dry creeks), canyons, and on hillsides, in areas dominated by plains grassland or juniper woodland, and may inhabit less suitable areas such as parks with frequent human use and habitat disturbance (Walker et. al. 1997). Whiptails are active in the spring and summer, with hatchlings appearing late summer (mid-August to early September). All age classes of the species are generally inactive and within overwintering refugia from mid-October to early May (Walker et. al. 2018). On Fort Carson, Colorado checkered whiptails are found in mixed piñon pine – juniper habitat throughout the southern portion of the installation, with concentrations in Training Areas 28, 29, 41, 45, 48, 49, 55, and 56. The highest concentration is found in Training Area 48 and the Proposed Action intersects potential habitat in Training Areas 41, 55 and 56. The species is managed through a Colorado Checkered Whiptail Management Plan.

Birds

Birds on Fort Carson have the potential for impacts during nesting season, which for most bird species on Fort Carson occurs April 15th through September 15th, although specific dates vary by species.

Mountain Plover (*Charadrius montanus*)

The mountain plover is listed as a Species of Special Concern by the USFWS. Mountain plovers are rare on Fort Carson, and only a small percent of available habitat is occupied. This species inhabits prairie dog colonies and depends on the species to maintain appropriate habitat conditions. Surveys for this species are conducted annually. The only site for nesting mountain plover was identified at the base of Airburst Range 123.

Burrowing Owl (*Athene cunicularia*)

The burrowing owl is listed as state threatened by CPW. The burrowing owl is a small, burrow-dwelling owl nesting underground in unoccupied prairie dog burrows most often in active towns. The species will occasionally nest in other natural burrows. The burrowing owl is widely distributed across Fort Cason but occupies only a small percentage of available habitat. The owl is generally present from March through October during the nesting season. Nesting surveys are conducted annually. Colorado Division of Wildlife (CDW) recommends a 150-foot activity buffer around active burrowing owl nests (CDW 2008).

Eagles

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940. The golden

eagle is a year-round resident of Fort Carson and is most abundant in winter. Several golden eagle eyries (nests) are present on Fort Carson and two to three nests are occupied annually from January-August. The bald eagle is known to nest within three miles of Fort Carson's northeastern boundary but has not been observed to nest on Fort Carson. The bald eagle is primarily present on Fort Carson in migration and winter from late October through March, and there have been a small number of bald eagles observed foraging on Fort Carson during the nesting season.

An Eagle Incidental Take Permit (#MB24802C-1) was issued to Fort Carson in 2017 for a five-year term with an effective date of April 4, 2017. This permit was issued to Fort Carson due to on-going disturbance to a nest from military training and anticipated work to Teller Reservoir Dam. This permit also has mitigation measures for historical nest locations at Rule Canyon, Teller Reservoir, and Training Area 56. In accordance with the permit, when a golden eagle nest is known to be occupied at Fort Carson, a no-surface-disturbance buffer zone of ½ mile is established. Active eyries are protected January through the fledging season; generally in July.

Both species depend on the prairie dog; a significant prey resource. On Fort Carson, the Proposed Action intersects Training Area 54, identified as one of the most important eagle hunting areas. Although, both golden and bald eagles are observed throughout the installation.

Other Birds of Conservation Concern
Great horned owl nesting period usually occurs from December through September and red-tailed hawks occurs February through August. Many species of raptors that occur in the area could potentially nest and/or roost in the larger junipers and pines, within the nearby cliffs, or on the proposed power lines and poles.

Insects
The monarch butterfly (*Danaus plexippus*) has been under review for Federal listing since 2014 and a listing decision is anticipated in December 2020 (USFWS 2020). This species is known to occur on Fort Carson and solely dependent on milkweed (*Asclepias* spp*.)* for reproduction and utilizes a wide variety of nectar-producing plants for sustenance.

4.2.1.3 Wetlands
Wetlands and activities within them are regulated by Section 404 of the CWA administered by the USACE. There are no wetlands associated with the Proposed Action. Nine swales/gullies and one ephemeral stream, Red Creek, are intersected by the Proposed Action. The locations at which the Proposed Action intersects these features does not support water levels for sufficient time to maintain populations of species with water dependent life stage(s). See Section 4.3 for more details.

4.2.1 Environmental Consequences

4.2.1.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no impact to biological resources.

4.2.1.2 Proposed Action

Vegetation

Short term and minor disturbance to vegetation are expected during the installation of the three-phase electric cable of the vaults, power poles, and transformer. The Proposed Action is considered short term in duration as active construction is anticipated to take 30 days, and all disturbed areas will be appropriately stabilized and restored immediately following disturbance. Complete re-establishment of vegetation may take, at a minimum, one full growing season. The impacts are considered minor as the plowed area for the cable placement will be only approximately one to two feet wide, and will be simultaneously backfilled with the displaced material, preserving the native soil and existing seedbank. As such, the majority of the Proposed Action will consist of temporary impacts. Permanent impacts are limited to vegetation (and productive soil) lost at the 26 vaults locations, totaling only 0.01 acres of surface area. Vegetation lost at the power poles will be negligible (total impact of 0.000098 acres of surface area). The removal of two transformers and installation of one, will have a negligible net positive increase in potential vegetative surface area (0.001 acres). Destruction of vegetation may occur due to equipment compaction in workspace areas; however, these impacts are temporary as the root zone will remain intact allowing relatively rapid flora regeneration and a static means of soil stabilization.

Army Species At Risk (SAR) are known in the area of the Proposed Action and impact during construction is possible; however, impacts are unlikely due to the on-going disturbance created by adjacent and reoccurring vehicular use at Route 12.

Construction activities introduce the potential to increase the density of invasive species within the footprint of the disturbance. Invasive species tend to invade areas in which soils have been disturbed. Vehicular traffic, construction activities related to pole placement and line placement will all potentially increase the density of invasive species already present, as well as possibly contribute to the incursion of new invasive species.

Although the vegetation is very sparse within the Proposed Action area, construction activities will temporarily decrease flora abundance that provides value to wildlife as forage and shelter.

Wildlife

Due to the majority of the Proposed Action located subterranean and adjacent to an existing road frequently disturbed by traffic and training activity, the biological impacts resulting from construction and operation is likely to be minor, but may potentially be moderate if appropriate mitigations are not applied.

Black-footed ferrets
The Proposed Action is distant from known populations and does not intersect potential habitat; however, a prairie dog colony is located in the vicinity of the eastern extent of the Proposed Action. The ferret is known to hunt at the southern boundary of Fort Carson; however, all activities would be conducted during the day when the ferret would not be active or potentially present. No ferrets were historically associated with this colony. No impacts to the black-foot ferret is anticipated.

Mexican Spotted Owl
The Proposed Action is distant from known nests or occurrences of this species. It is unlikely that the Proposed Action will impact these birds.

Bald and Golden Eagles
The Proposed Action is greater than 0.5-mile from Teller Reservoir, Rule Canyon, and Training Area 56 where historic golden eagle nests have been recorded; however, appropriate nesting habitat is located in the vicinity. The Proposed Action is located in an important hunting area for both golden and bald eagles and construction presence, movement, noise and lighting may deter the birds from foraging in the proximity during and following the disturbance; although, disturbance is expected to be relatively short-term.

Both species make extensive use of power poles for perching, therefore electrocution is a risk if poles are not properly designed.

Black-tailed Prairie Dogs, Mountain Plover, and Burrowing Owl
As of April 2020, the Proposed Action does not intersect any prairie dog colonies; however, it is in the vicinity of one at the eastern extent. In addition, there is potential for another recovering colony in the eastern extent to have expanded into the proximity. The eastern portion of the Proposed Action in the vicinity of the colonies consists only of subterranean facilities, therefore, impacts would be limited those related to construction. Lighting and noise generated during construction may cause indirect minor to moderate impacts but should be short-term in nature. In addition, there will be minor and short-term reduction of potential forage for the nearby resident prairie dogs. Construction may be disruptive if conducted during the nesting period of April through August for the mountain plover or March through October for the burrowing owl, if present at the time of activities.

Bats
The Proposed Action eastern extent is over a mile from the Stone City mines; however, trees suitable for day/night roosts for the LBB exist within and in the vicinity of Proposed Action. Trees within the Proposed Action area are very scarce and construction will avoid impact, therefore, LBB mortality while roosting and/or habitat destruction is not anticipated. Lighting and noise generated during construction may cause indirect minor to moderate impacts but should be short-term in nature. The bat with the widest wingspan in Colorado, and known within Fort Carson, is the hoary bat (*Lasiurus cinereus*; CBWG 2010). Their wingspan averages 15.7 inches, which is considerably less than the average shortest phase to phase conductor. Electrocution by the power lines is not expected.

Colorado Checkered Whiptail
Ground disturbance could result in a temporary loss of habitat or mortality of the Colorado checkered whiptail during construction activities. It is likely that construction presence would alarm the majority of nearby individuals, resulting in fleeing and/or avoidance of the area. Impacts are expected to be short-term and minor.

Other Birds of Conservation Concern
If construction is completed during the nesting season (approximately February 15 to September 15), and any trees, shrubs, or previously undisturbed grasslands are removed, there is a potential for disturbing migratory bird nests. In addition, there will be minor and short-term reduction of potential forage. Vegetation and cliffs suitable for nesting are located within the vicinity. Light and noise generated during construction could disturb the potential breeding efforts in these areas.

Many species of raptors and other large birds (such as turkey vultures, American crows, and common ravens) may use the power line structures for perching, roosting, and/or nesting. This presents a risk of electrocution if structures are not properly designed.

Insects
The impact to the monarch is anticipated to be minor to negligible. Vegetation is scarce within the Project Action areas and milkweed species were not observed during field reconnaissance. Construction activities may impact nectar-producing vegetation; however, this is anticipated to be short-term and minor

Wetlands
There are no wetlands located within the Proposed Action area; however, nine swales/gullies and one ephemeral stream, Red Creek, is intersected by the Proposed Action. Construction disturbance is anticipated to impact the drainages through the loss of vegetative establishment, soil compaction, sedimentation through stormwater runoff/soil erosion and fugitive dust. See Section 4.3.1.2. for details.

4.2.1.3 Cumulative Effects
Vegetation
Cumulative impacts are expected to be negligible. The installation of the three-phase electric line is largely adjacent to a road impacted by traffic and training activities. Equipment utilized for the installation would consist of a temporary impact on vegetation, but the disturbance would be localized. Only minor permanent losses due to installation of vaults, power poles and transformers would occur. Associated activities outside of Fort Carson would consist primarily of temporary impacts for equipment workspace and negligible permanent loss due to the installation of four (4) new power poles. The addition of this Proposed Action is unlikely, in combination with other actions, to create significant impacts to vegetation if properly restored.

Wildlife
Cumulative effects resulting from a loss of nesting, foraging and sheltering habitat may occur if a significant amount of vegetation is removed for installation and not appropriately restored. If the power line structures are not designed to minimize electrocutions, mortalities of raptors and other migratory birds could result. The Proposed Action cumulatively with the associated activities outside of Fort Carson and other actions, would not result in significant impacts if proper mitigation measures, as described below, are applied.

Wetlands
Cumulative impacts for the Proposed Action in combination with other present and planned future actions do and would continue to occur at Fort Carson and in the region. Fort Carson will continue to play a key role in sustaining wetlands and water resources through its land management and natural resources programs to minimize these impacts. Fort Carson, and any other off-base development activities, must comply with the CWA, Section 404, so any potential impacts to waters of the U.S. would be minor and mitigated, if required.

4.2.2 Mitigations

Vegetation
Under Executive Order 13751, Fort Carson is dedicated to prevention of introduction of invasive species and strives to control populations and prevent spread. Disturbed areas will be reseeded with appropriate seed mixtures following construction to promote stability, minimize erosion, and reestablish productivity. The appropriate seed mix will be determined by the Installation Pest Management Program Manager. A site-specific Noxious Weed Control Plan in compliance with guidance within the INRMP (2017, 2020) and IPMP (2015) will be generated to minimize establishment of invasive species in disturbed and reestablished areas. Coordination with the Invasive Plant Manager would assist in the prevention of potential weed spread. A long-term vegetation management plan, including invasive species treatments, may be prepared as necessary following the completion of the Proposed Action.

Wildlife
Prior to ground disturbance, wildlife surveys will be conducted within the construction footprint and vicinity, as appropriate.

Pre-disturbance nesting bird surveys shall occur within two weeks of starting any ground disturbance during Migratory Bird Treaty Act (MBTA) nesting season (February 15 through September 15). Surveys shall be conducted following species specific and other appropriate protocols and will include burrowing owl, mountain plover, raptors, eagles and any other MBTA protected bird species. Coordination with the Directorate of Public Works (DPW)-Wildlife should occur to conduct the surveys. If any bird species is found nesting, the proponent will consult with DPW-Wildlife for additional USFWS guidance on buffer protection zone sizes until the young have fledged. If inadvertent active nest(s) are discovered during construction activities, DPW-Wildlife will be contacted immediately to avoid MBTA violation(s).

Prior surveys by the DPW Wildlife biologist should be done to identify Colorado checkered whiptail habitat. To the extent possible, capture and relocation of whiptails would be done by DPW-Wildlife within the project area before any ground disturbance begins between April and September. Coordination with DPW-Wildlife should occur one to two months prior to beginning work to determine what mitigation actions would occur.

Coordination with DPW-Wildlife is required for avian protection measures. Potential impact to birds can be minimized by designing power poles utilizing guidelines in the *Avian Protection Plan* (APP; **Appendix D**). On the three phase power poles, a vertical clearance of at least 43 inches between uninsulated conductors, ground wires and grounded hardware on poles with 8-foot crossarms will provide the 60-inch required clearance. If this design is not possible, installing visibility enhancement devices can reduce the risk of collision on new or existing lines (see pages 41-42 of the APP in **Appendix D**). These devices include marker balls, bird diverters, or other line visibility devices placed in varying configurations, depending on the line design and location.

Wetlands
See Section 4.3.2. for mitigative measures pertaining to water resources.

4.3 Water Resources

4.3.1 Affected Environment

4.3.1.1 Water Resource Management

Surface waters originating in or passing through USAG Fort Carson drain into surface waters that are a part of the Upper Arkansas River Basin [hydrologic unit code (HUC) 1102], ultimately contributing to the Arkansas River's transition to a navigable water of the United States at its confluence with the Neosho River in Muskogee, Oklahoma. Water resources throughout Fort Carson are managed in coordination with United States Geological Survey (USGS), Natural Resources Conservation Service (NRCS), USFWS, and other external agencies. The Water Resources Management Program on Fort Carson includes watershed/sedimentation monitoring and management and project reviews to address erosion and sediment control issues. In addition, the SWMP (2017) is designed to reduce the discharge of pollutants from Fort Carson to drainage ways, to protect water quality, and to satisfy Colorado's water quality standards.

4.3.1.1 Surface Water and Watersheds

Wetland management on Fort Carson consists of all elements related to compliance with the CWA, Section 404, as well as applicable executive orders, Army regulations, and state laws. The Fort Carson Wetlands Management Program adheres to provisions of the CWA to ensure protection from unregulated discharges of dredged or fill material that could permanently alter or destroy valuable water resources on Fort Carson and the PCMS. Executive Order 11990 Protection of Wetlands (1977) and the CWA require no net wetland losses on federal lands in the United States.

In accordance with Executive Order 11990 and the CWA, there has been no net loss of wetlands on Fort Carson. This is managed under the USAG Piñon Canyon Maneuver Site (PCMS) RGP 14 (most recently issued October 2, 2019-October 2, 2025) for erosion control and other minor activities. Proposed projects or activities that may impact wetlands and the WOTUS (often referred to as 'jurisdictional wetlands') must be reviewed for compliance with the CWA, Section 404 (33 USC 1344). There are three types of permits that may be used based on the level and type of impact. They are the RGP for Fort Carson and PCMS, the Nationwide Permit (NWP) and the Individual Permit.

The Proposed Action is in the Red Creek (HUC 110200020505), Pierce Canyon-Beaver Creek (HUC 110200020507), and Lower Turkey Creek (HUC 110200020704) subwatersheds; all located within the Upper Arkansas River (110200) watershed (EPA 2020). One surface water feature, and potential WOTUS, is intersected by the Proposed Action area: Red Creek within the Red Creek subwatershed. Within the Proposed Action area, Red Creek is an ephemeral stream (arroyo) supporting no wetland, riparian, or mesic vegetation. Red Creek is approximately 80-feet wide at the Proposed Action crossing point. Its substrate is very well-drained, coarse sand and its edges are well-defined by steeply rising banks supporting upland vegetation.

Figure 6: Intersection with Red Creek

Nine swales and/or gullies are intersected by the Proposed Action area (**Appendix E**); however, none of them exhibit evidence of relatively recent and continuous surface flows or ponding. These nine features do not exhibit OHWM (physical manifestations of surface flows typically associated with WOTUS)

The wetlands on Fort Carson are linear, small, and isolated features that are typically streamside. They comprise about 1,389 acres of Fort Carson. No wetlands are located within or in the vicinity of the Proposed Action.

4.3.1.2 Hydrogeology and Groundwater

Groundwater at Fort Carson exists in both alluvial and bedrock aquifers. The primary aquifer at Fort Carson is the Dakota-Purgatoire bedrock aquifer. In general, the quality of the groundwater on Fort Carson is good with the exception of localized areas of high dissolved solids and sulfates exceeding secondary drinking water standards and elevated nitrates and Selenium (Se) exceeding primary drinking water standards.

A site wide Se study looking at the occurrence and distribution of Se in groundwater at Fort Carson was conducted in August 2011 (Summit Technical Resources 2011), with results coordinated with and concurred on by the CDPHE (CDPHE 2011). Se has been detected at concentrations greater than the Colorado Ground Water Standard (0.05 milligrams per liter [mg/L] (0.05 parts per million [ppm])) and the Fort Carson background concentration (0.27 mg/L [0.27 ppm]) in samples collected from groundwater monitoring wells located primarily within Fort Carson's main post area. Analysis of qualitative and quantitative data from this study indicates a naturally occurring source (Pierre Shale) for relatively high Se concentrations in Fort Carson's compliance monitoring wells (Summit 2011).

4.3.1.3 Floodplains

Executive Order (EO) 11988, Floodplain Management, as amended in 2015 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative and to use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration (FEMA 2015). To accomplish this objective, the Army is required to take actions to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains for certain federal actions. The acquisition, management, and disposal of federal lands and facilities are specific qualifying federal actions addressed within the EO. Subsequently, the EO requires the application of accepted flood-proofing and other flood protection measures for new construction of structures or facilities within a floodplain. Agencies are required to achieve flood protection, wherever practicable, through elevation of structures above the elevation of the floodplain rather than filling in land.

4.3.1 Environmental Consequences

4.3.1.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no impact to water resources.

4.3.1.2 Proposed Action

Short term and moderate water resources disturbances could be expected during the installation of the three-phase electric cable and excavation and installation of the vaults power poles, and transformers; however, the potential impacts are mitigatable These actions will disrupt vegetation and reduce and cause soil compaction, thereby temporarily

reducing the collective capacity of localized vegetation to slow movement of surface stormwater runoff and to stabilize soils that may be affected by stormwater runoff. Soil displaced by stormwater runoff and fugitive dust may result in sedimentation in downstream creeks and rivers. In addition, the loss and/or overturning of topsoil could reduce the ability of vegetation to reestablish due to lowered quality of substrate for seedling establishment. Ground disturbance may also increase the risk of incursion of invasive species, if not properly managed. The Proposed Action is considered short term in duration as active construction is anticipated to take 30 days, and all disturbed areas will be appropriately stabilized and restored immediately following disturbance. Complete re-establishment of vegetation may take, at a minimum, one full growing season. The plowed area for the cable placement will be only approximately one to two feet wide, and will be simultaneously backfilled with the displaced material, preserving the native soil and existing seedbank. As such, the majority of the Proposed Action will consist of temporary impacts.

Mitigating the potential for these degradations is the gentle terrain across the Proposed Action area, generally lower than three percent and on average one percent grade which decreases opportunity for gathering and acceleration of stormwater runoff. The surface area of disturbance and vegetation loss along the plowed cut for cable construction is minor, approximately one to two square feet for every linear foot of the Proposed Action area. Surface runoff generated within or in the immediate vicinity of the plowed cut and vault installation may be readily absorbed by undamaged, vegetation and unimpacted soils, reducing opportunity for concentration of runoff and formation of erosional features across the natural landscape or into the adjoining road.

Stormwater runoff draining into Red Creek is subject to rapid draining, as Red Creek is an arroyo supporting deep sand and carrying surface flows only during and immediately following significant and intense storm events that, by their nature, are highly erosive. However, the Red Creek drainage and its banks are well established and stabilized, suggesting that, at least in the recent past, no storm events were of such an intensity and volume as to create new head cuts and erosion within the drainage. Relative to the resiliency of Red Creek, any stormwater runoff associated with the minor ground disturbances resulting from the Proposed Action, in excess of the baseline levels, would be readily absorbed into the hydraulic capacity of Red Creek and its well-drained sandy substrate.

No impact to wetlands is anticipated as they were not identified within the Proposed Action area. It is not anticipated that the Proposed Action will impact groundwater due to the shallow depth of the installed three-phase electric line and vaults. In addition, impact to groundwater is not anticipated due to the lack of hazardous materials required for construction or operation of the facilities. Impacts to floodplains and contours are not anticipated as the Proposed Action is primarily subterranean in nature with the exception of the four above-ground power poles, which are positioned in an upland area.

Operation of the three-phase electric power line and power poles would have negligible impact to water resources. Future maintenance of the utility equipment may result in

sporadic, minor, and short-term impacts to soil and vegetation if repair is required outside of established maintenance vaults; however, it is anticipated that once the new utility equipment is in operation, it would result in less regular and unpredicted repair than the current degrading, in-use equipment.

4.3.1.3 Cumulative Effects

Cumulative impacts for the Proposed Action in combination with the associated actions and other present and planned future actions do and would continue to occur at Fort Carson and in the region. Fort Carson will continue to play a key role in sustaining wetlands through its land management and natural resources programs to minimize these impacts. Fort Carson, and other development activities off-base, must comply with the CWA and Section 404, so all potential impacts would be minor and/or mitigated.

4.3.2 Mitigations

Through the application of mitigative efforts construction of the Proposed Action is anticipated to have a minor and short-term effect on water resources. It is Fort Carson's policy is to eliminate the degradation of all water resources on Fort Carson and ensure compliance with all applicable Federal, state and local quality standards (see Sections 4.1 and 4.5). Any impacts from the Proposed Action would be mitigated by use of BMPs to catch and/or retain potential sediment due to runoff or dust, such as reestablishing the area by reseeding, the use of silt fences, monitoring and other rehabilitation efforts.

Construction within Red Creek will not be conducted during periods of current or anticipated surface water flow. Exposed slopes and stream banks will be stabilized during and immediately upon completion of construction and returned to preconstruction contours and conditions.

All permanent structures will be placed in upland areas. Material resulting from vault excavation and pole installation will be hauled offsite as soon as practicable and will be temporarily stored distant from Red Creek and drainage features in such a manner that it will not be dispersed by currents or other forces. Staging and storage areas will be located in upland areas.

Disturbed areas will be reseeded with appropriate seed mixtures following construction to promote stability, minimize erosion, and reestablish productivity. A site-specific Noxious Weed Control Plan in compliance with guidance within the INRMP (2017 and 2020) and IPMP (2015) will be generated to minimize establishment of invasive species in disturbed and reestablished areas.

It is anticipated that the Proposed Action impacts will require authorization under Section 404 of the CWA. It is anticipated that the Proposed Action will be authorized under RGP 14 for Fort Carson. Appropriate coordination with DPW and USACE will be conducted for compliance with Section 404, as necessary. Mitigation measures and BMPs specific for compliance with CWA authorization will further reduce potential impacts of the Proposed Action.

4.4 Geology and Soil Resources

4.4.1 Affected Environment

The soil types commonly occurring at Fort Carson are aridisols (dry, desert-like soils) and entisols (soils that still resemble their parent material). These soil types are characterized by moderate-to-severe erodibility, landslides, and unstable clay formation movement due to variations in moisture content and temperature. Soil erosion is a problem at Fort Carson and soils of greatest concern are clays, silty clays, and clay loams. In particular, the eastern portion of Fort Carson, located within the Fountain Creek Watershed, and the southwest corner of the post draining to Beaver Creek, contain soils that have been identified as being moderately to highly susceptible to erosion. Additional information on soils within Fort Carson can be found in the INRMP (2017 and 2020).

Based on information collected from the NRCS, there are thirteen soil types within the 30-foot workspace corridor. Four of these soil types make up approximately 81 percent of the Area of Interest (AOI) and are described below (NRCS 2019). See **Appendix F** for the entire report.

Kim-Shingle complex
Kim-Shingle complex is a well-drained soil with 3 to 20 percent slopes. A typical profile is 0 to 3 inches loam, and 3 to 60 inches loam and fine sandy loam. Its depth to restrictive feature is greater than 80 inches. The available water storage in the profile is low at about 4.6 inches.

Penrose-Minnequa complex
Penrose-Minnequa complex is a well-drained soil with 1 to 15 percent slopes. A typical profile is 0 to 4 channery loam, 4 to 15 inches channery loam, and 15 to 79 inches bedrock. Its depth to restrictive feature is 10 to 20 inches to lithic bedrock. The available water storage in the profile is very low at about 1.8 inches.

Wilid silt loam
Wilid silt loam is a well-drained soil with 0 to 3 percent slopes. A typical profile is 0 to 6 inches silt loam, 6 to 44 inches silty clay loam, and 44 to 79 inches silt loam. Its depth to restrictive feature is greater than 80 inches. The available water storage in the profile is high at about 10.2 inches.

Wiley-Kim loams
Wiley-Kim loams is a well-drained soil with 1 to 4 percent slopes. A typical profile is 0 to 6 loam, 6 to 15 inches silty clay loam, 15 to 50 inches loam, and 50 to 54 inches unweathered bedrock. Its depth to restrictive feature is 40 to 60 inches to paralithic bedrock. The available water storage in the profile is moderate at about 9 inches.

4.4.1 Environmental Consequences

4.4.1.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no impact to soil or geological resources.

4.4.1.2 Proposed Action

Short term and moderate soil resources disturbances could be expected during the installation of the three-phase electric cable and excavation and installation of the vaults power poles, and transformers; however, the potential impacts are mitigatable. Disturbance of soils may decrease soil productivity, increase the risk of incursion of invasive species and fugitive dust, if not properly managed. Potential impacts on soil may include increased soil erosion by runoff and wind due to loss of vegetation and compaction in work areas. Particularly, soil erosion through runoff may increase sedimentation within the nine swales/gullies and the ephemeral creek, Red Creek, intersected by the Proposed Action. However, the impacts are temporary as the plowed area for the cable placement will be only approximately one to two feet wide, and will be simultaneously backfilled with the displaced material, preserving the native soil and existing seedbank. Permanent impacts are limited to vegetation and soil lost at the 26 vaults locations, totaling only 0.01 acres of surface area and 2,600 cubic feet of soil. Vegetation lost at the power poles will be negligible (total impact of 0.000098 acres of surface area and 27 cubic feet of soil). The removal of two transformers and installation of one, will have a negligible net positive increase in potential vegetative surface area (0.001 acres). Destruction of vegetation may occur due to equipment compaction in workspace areas (maximum of 17.8 acres); however, these impacts are temporary as the root zone will remain intact allowing relatively rapid flora regeneration and a static means of soil stabilization.

Moderate to extreme soil erosion in the work areas could result in instability of the adjacent Route 12; however, mitigating the potential for moderate to extreme erosion is the gentle terrain across the Proposed Action area, generally lower than three percent and on average one percent grade which decreases opportunity for gathering and acceleration of stormwater runoff. However, through the application of mitigative efforts construction of the Proposed Action is anticipated to have a minor and short-term effect on soil resources.

Operation of the three-phase electric power line and power poles would have negligible impact to soil resources. Future maintenance of the utility equipment may result in sporadic, minor, and short-term impacts if repair is required outside of established maintenance vaults; however, it is anticipated that once the new utility equipment is in operation, it would result in less regular and unpredicted repair than the current degrading, in-use equipment.

4.4.1.3 Cumulative Effects

Cumulative, long term effects on soils resulting in loss of productivity, erosion, sedimentation, and/or fugitive dust, could be potentially significant if left unmanaged;

however, it is Fort Carson's policy is to eliminate or minimize dust and the degradation of all soil and water resources on Fort Carson and ensure compliance with all applicable federal, state and local quality standards (Section 4.3). Any impacts from the Proposed Action and associated activities outside of Fort Carson would be mitigated by use of BMPs to catch and/or retain potential sediment, such as reestablishing the area by reseeding, the use of structural controls, and other rehabilitation efforts. It is expected that, with monitoring and employment of standard BMPs, cumulative effects would not be significant.

4.4.2 Mitigations

The Proposed Action and all associated workspace and disturbance will be conducted within a maximum of a 30-foot wide workspace corridor for the length of the 4.9-mile route (a maximum total surface area of 17.8 acres). As land disturbance in connection with the Proposed Action is anticipated to exceed one acre, coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities (CGP) will be obtained. Coverage under the CGP will require the generation of a site-specific Stormwater Pollution Prevention Plan (SWPPP), coordination and approval from DPW, and the filing of a NOI.

During construction of the project, stormwater runoff and erosion would be managed through implementation of the site-specific, approved SWPPP to control for runoff and sediment loading through implementation of BMPs. The site-specific SWPPP will align with procedures and guidelines outlined in the SWMP *(*2017). BMPs for sediment and erosion control to protect soil and surface water would be accomplished through a combination of construction techniques, vegetation and re-vegetation, administrative controls, and structural features. BMPs and recommended fugitive dust mitigations outlined in the *Fort Carson Fugitive Dust Control Plan* (2016) will be employed, as applicable.

Disturbed areas will be reseeded with appropriate seed mixtures following construction to promote stability, minimize erosion, and reestablish productivity. A site-specific Noxious Weed Control Plan in compliance with guidance within the INRMP (2017, 2020) and IPMP (2015) will be generated to minimize establishment of invasive species in disturbed and reestablished areas.

4.5 Cultural Resources

4.5.1 Affected Environment

Cultural resources are the non-renewable remnants of past human activities that have cultural or historical value and meaning to a group of people or a society. For the purposes of this EA, the term "cultural resources" includes historic properties, as defined in the National Historic Preservation Act (NHPA); archaeological resources, as defined in the Archaeological Resources Protection Act (ARPA); cultural items, as defined in the Native American Graves Protection and Repatriation Act (NAGPRA); sacred sites, as defined in Executive Order 13007; and collections, as defined in 36 CFR 79.

As of May 2019, approximately 72% of Fort Carson has been surveyed for cultural resources, which has resulted in the identification of 2,364 cultural resources. One hundred thirty-eight have been determined eligible for inclusion in the National Register of Historic Places (NRHP). These resources represent every period of human occupation from the Paleoindian stage to the present, and include prehistoric lithic scatters, camps, and architecture; prehistoric and historic quarries and mining sites; prehistoric and historic rock art; historical homesteads and ranches; stage and trail remnants; historic districts; historic buildings, structures, and objects; and sacred sites.

The ICRMP details how cultural resources are managed on Fort Carson. To streamline Section 106 consultation in accordance with 36 CFR 800.14(b), USAG Fort Carson, the Colorado State Historic Preservation Officer, and the Advisory Council on Historic Preservation have executed two programmatic agreements that cover routine undertakings occurring on Fort Carson. The first is the *Programmatic Agreement among the U.S. Army Garrison Fort Carson, the Colorado State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding Construction, Maintenance, and Operations Activities for Areas of Fort Carson, Colorado* (Fort Carson Built Environment PA), executed March 27, 2013, and amended March 23, 2018. The second is the *Programmatic Agreement among the U.S. Army Garrison Fort Carson, Colorado State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding Military Training and Operational Support Activities Downrange Fort Carson, Colorado* (Fort Carson Downrange PA), executed March 31, 2014, and amended May 2, 2018. More information on these programmatic agreements is outlined in the ICRMP.

4.5.2 Environmental Consequences

4.5.2.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no impact to cultural resources.

4.5.2.2 Proposed Action

Based on a Section 106 undertaking review by the Fort Carson Cultural Resources Manager (Fort Carson CRM), two areas of potential effects (APEs) have been identified for the Proposed Action: a physical APE where direct impacts could be expected to take place and a visual APE where the potential effects are anticipated to be indirect only (Kolise 2019). The physical APE includes the 30-foot-wide utility corridor with a 50-foot buffer, Fort Carson Airburst Range 123 footprint, and access from Gate 13 to the location of the Proposed Action. The visual APE includes a 1-mile buffer surrounding the overhead electric line project locations. Auditory effects to historic properties are not a consideration given the nature and scope of the project.

Based on Fort Carson CRM's undertaking review, all portions of the Proposed Action within Fort Carson boundaries have been adequately inventoried for cultural resources within the physical and visual APEs. However, a Class III cultural resource inventory was

required within the physical APE outside Fort Carson boundaries on the western end of the Proposed Action area in locations that have not been previously inventoried.

Intensive, pedestrian survey with transects no farther than 15-meters apart was conducted within a 200-foot (60-meter) wide corridor centered on the planned electrical line outside of Fort Carson boundaries. The visual APE outside of Fort Carson was subsequently refined through a viewshed analysis and manipulation of a geographic information systems (GIS) layers. Areas from which the new power poles are not clearly visible to a human based on dense vegetative cover and topography were removed from the visual APE.

Within 100 meters of the physical APE, there are four historic properties: 5FN1073.6, 5PE344, 5PE793, and 5PE8099. One additional historical site (a cabin) was identified in the physical APE but could not be recorded because landowner permission could not be obtained. A reasonable attempt, as verified by the Fort Carson CRM, was made to contact the landowner. The cabin is located within the physical APE (and barely within the visual APE) but is not located within an area that will be impacted by construction of the Proposed Action.

The following nine historic properties are located within the visual APEs: 5FN1073.6, 5FN1073.7, 5FN1582, 5PE63, 5PE321, 5PE344, 5PE793, 5PE2211, and 5PE3299.

All of the historic properties, including the unrecorded cabin, are not located in an area that will be directly impacted by the Proposed Action construction. The visual impact assessment of the historic properties within the visual APE found that overall, the visual contrast created by the Proposed Action will be weak. The viewshed of the known historic properties within the visual APE for the western portion of the Proposed Action has been modified extensively and does not contribute to their significance for inclusion in the NRHP (Kolise 2019). In addition, the difference between the existing electrical line and the new line and poles will not be so great as to draw much attention (Alpine 2020). Historic properties within the visual APE for the eastern portion of the Proposed Action will benefit from the removal of the power poles and line.

Fort Carson's Inadvertent Discovery of Archaeological, Cultural, or Paleontological Materials Standard Operating Procedure (SOP) will apply for construction activities.

In accordance with Section 106 of the NHPA, the USAG Fort Carson has determined "no adverse effects to historic properties" will occur due to the Proposed Action. NHPA Section 106 consultation was completed in December 2020. The SHPO concurred with the finding of "no adverse effects to historic properties" (36 CFR 800.5[b]) via correspondence dated December 1, 2020 (HC #75708). Concurrences with the finding of effects were also received from the Fort Peck Assiniboine & Sioux Tribes, Northern Arapaho Tribe, Northern Cheyenne Tribe, and Pawnee Nation of Oklahoma (**Appendix G**).

4.5.2.3 Cumulative Effects

The construction associated with the Proposed Action and association actions outside Fort Carson could inadvertently cause damage to unknown cultural resources.

Cumulative impacts by the Proposed Action in combination with other present and planned future actions do and would continue to occur at Fort Carson and in the region; however, reasonably foreseeable construction project impacts would be minor when following the stipulations in the FC Downrange PA and standard operating procedures in the ICRMP.

4.5.3 Mitigations

Ground-disturbing activities will be monitored by a qualified, professional archaeologist, and the Inadvertent Discovery of Archaeological, Cultural, or Paleontological Materials Standard Operating Procedure (SOP) will apply for construction activities.

4.6 Airspace

4.6.1 Affected Environment

Fort Carson has 152 square miles (394 square km) of Federal Aviation Administration (FAA) designated permanent restricted use and Special Use Airspace (SUA), with no limit in altitude. The airspace is controlled by the FAA of Denver, Colorado. Military Operations Areas (MOAs) (a type of SUA) are located around Fort Carson and are higher altitude MOAs.

Army aviation assets are stationed at and flight operations are conducted out of Butts Army Aviation Facility (BAAF). The types of aircraft that use the airspace are helicopters, fixed-wing aircraft, Unmanned Aircraft System (UAS), and transient aircraft. The United States Air Force (USAF) and Air National Guard also use the installation's airspace.

As described in the *Combat Aviation Brigade Stationing Programmatic Environmental Impact Statement* (2011), Fort Carson implements all applicable regulations and policies on flying to maximize safety and minimize noise complaints.

4.6.1 Environmental Consequences

4.6.1.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. There would be no impact to airspace.

4.6.1.2 Proposed Action

The Proposed Action is at a minimum of 17 miles south of BAAF. The majority of the Proposed Action consists of a subterranean three-phase electric line that would not impact airspace once installed. Approximately 0.8-mile of the buried line is located within the boundaries of the Airburst Range 123. Pole placement at the western extent of the Proposed Action would be located within Fort Carson boundaries (outside of Aerial Range 123) and would be sited so as to ensure it does not negatively impact training/flight operations. In addition, construction will be timed and appropriate approved equipment will be utilized to avoid potential disturbance of training/flight operations.

The three-phase electric line and power poles will be placed within existing road and/or utility right-of-ways, so as to provide access for construction and maintenance as needed with minor disruption. The power poles would be equipped with the required aircraft hazard warning devices if specified by the Range Officials. Impacts are anticipated to be minor, but mitigatable to negligible.

4.6.1.3 Cumulative Effects

As the Proposed Action is primarily subterranean in nature, it would not contribute to congestion or increase competition for airspace. In addition, the Proposed Action and associated activities outside Fort Carson would not cause a change in existing flight patterns or training activities. Impacts are anticipated to be minor, but mitigatable to negligible.

4.6.2 Mitigations

No site-specific mitigation was identified outside of directed placement of poles as to avoid interference with installation activities.

4.7 Utilities

4.7.1 Affected Environment

Fort Carson has long been at the forefront of implementing sustainability practices within the Army. In April 2011, Fort Carson's proposal to begin planning and to implement "Net Zero" waste, water, and energy was approved by the Assistant Secretary of the Army for Installations, Energy and Environment. Addition information regarding this and utilities on Fort Carson is in the *Fort Carson Net Zero Waste, Water, and Energy Implementation EA* (2012).

DPW Environmental Division manages both surface and subsurface water rights at Fort Carson. Water management includes wells that provide downrange industrial use water, and surface water that provides military training, downrange fire protection, recreational waters, wildlife habitat, and irrigation. The Installation recognizes water is a scarce resource in the Fort Carson region and, due to cyclic drought conditions, should always be used wisely and not wastefully.

4.7.1.1 Potable Water

Fort Carson purchases its drinking water from Colorado Springs Utilities. Even with all the growth on Fort Carson, water use since 2001 has been reduced by more than 20 percent through proactive garrison and housing watering policies and initiatives such as rain sensors on irrigation systems. Water storage tanks serve downrange training areas and ranges.

4.7.1.2 Wastewater

Fort Carson operates and maintains a wastewater collection and treatment system for both sanitary and industrial wastewater components. Portable toilets, dry vault, and self-composting latrines are used in the downrange area when septic tanks/leach fields are not available (e.g., during training activities on the downrange area).

4.7.1.3 Stormwater

As a requirement of AR 200-1, it is the policy of the Installation to comply with applicable federal, state, and local regulations regarding water resources management and permitting. As described in the SWMP (2017) all work performed at Fort Carson is subject to stoppage by installation environmental officials for failure to comply with Federal, state, county, local, or Fort Carson stormwater requirements.

4.7.1.4 Solid Waste

The *Integrated Solid Waste Management Plan* (ISWMP) (2011) contains details of the Solid Waste Management Program at Fort Carson. The ISWMP complies with AR 200-1 and is consistent with AR 420-49 and other applicable guidance on solid waste management. Refuse, construction-related solid waste, and recyclable materials are all managed by DPW. Currently, all solid waste from Fort Carson, including waste from the housing units, is shipped 15 miles to offsite landfills, including the Midway Landfill in Fountain, Colorado by a licensed contractor. Midway Landfill and other landfills are permitted Subtitle D landfills.

4.7.1.5 Energy

Fort Carson has an energy goal of 100 percent renewable energy (gas and electric) by 2027, and currently obtains 8 percent of its energy needs from solar panels. The Installation is considering other sources of renewable energy for future use as part of its sustainable assessment.

4.7.2 Environmental Consequences

4.7.2.1 No Action

Under the no action alternative, the Proposed Action would not be implemented. The existing single-phase electric line would be maintained and operated at its current level. Increasing maintenance would be required to sustain the equipment with a capacity that is just satisfactorily meeting current demand. Should the installation require increased energy for operations in the future, the existing equipment may not be sufficient to meet the needs.

4.7.2.2 Proposed Action

The Proposed Action will not have an impact on water, wastewater or solid waste. Stormwater during construction will be managed as discussed in Sections 4.3 and 4.4. The upgrade of the equipment is intended to better accommodate current energy demands at the installation. The Proposed Action will not increase the load on current resources or result in impacts to the area.

4.7.2.3 Cumulative Effects

The construction and operations associated with the Proposed Action would have negligible impacts to energy or water consumption. As the Proposed Action will include the upgrade of equipment with the capacity to facilitate increasing energy demands, future projects with energy requirements would need to be evaluated for impacts to supply and effects to the surrounding communities.

4.7.2.4 Mitigation

No impacts to water, wastewater, or solid waste require mitigation have been identified for the Project Action. Future projects with energy requirements would need to be evaluated for impacts to supply and effects to the surrounding communities.

4.8 Environmental Consequences Summary

Table 4: Summary of Cumulative Effects by VEC

VEC	Direct and Indirect Effects of the Proposed Action	Cumulative Effects of the Proposed Action
Air Quality and Greenhouse Gases	Minor, mitigatable to Negligible	Minor, mitigatable to Negligible
Biological Resources	Moderate, but mitigatable to Minor	Moderate, but mitigatable to Minor
Water Resources	Moderate, but mitigatable to Minor	Moderate, but mitigatable to Minor
Soils Resources	Moderate, but mitigatable to Minor	Moderate, but mitigatable to Minor
Cultural Resources	Minor, mitigatable to Negligible	Minor, mitigatable to Negligible
Air Space	Minor, mitigatable to Negligible	Minor, mitigatable to Negligible
Utilities	Negligible	Moderate, mitigatable to Minor

4.9 Proposed Mitigation Summary

All activities capable of producing fugitive dust are required to use all available and practical methods that are technologically feasible and economically reasonable in order to minimize such emissions. A summary of the BMPs and recommended fugitive dust mitigations that will be employed, as applicable, are presented in detail within the *Fort Carson Fugitive Dust Control Plan* (2016). (***Air Quality, Water Resources, Soil Resources***)

Disturbed areas will be reseeded with appropriate seed mixtures following construction to promote stability, minimize erosion, and reestablish productivity. A site-specific Noxious Weed Control Plan in compliance with guidance within the INRMP (2017, 2020) and IPMP (2015) will be generated to minimize establishment of invasive species in disturbed and reestablished areas. Coordination with the Invasive Plant Manager would assist in the prevention of potential weed spread. A long-term vegetation management plan, including invasive species treatments, may be prepared as necessary following the completion of the Proposed Action. (***Biological Resources, Water Resources, Soil Resources***)

Pre-disturbance nesting bird surveys shall occur within two weeks of starting any ground disturbance during MBTA nesting season (February 15 through September 15). Surveys shall be conducted following species specific and other appropriate protocols according and will include burrowing owl, mountain plover, raptors, eagles and any other MBTA protected bird species. Coordination with DPW-Wildlife should occur to conduct the surveys. If any bird species is found nesting, the proponent will consult with DPW-Wildlife for additional USFWS guidance on buffer protection zone sizes until the young have fledged. If inadvertent active nest(s) are discovered during construction activities, contact DPW-Wildlife immediately to avoid MBTA violation(s). (***Biological Resources***)

Prior surveys by the DPW Wildlife biologist should be done to identify Colorado checkered whiptail habitat. To the extent possible, capture and relocation of whiptails would be done by DPW-Wildlife within the project area before any ground disturbance begins between April and September. Coordination with DPW-Wildlife should occur one to two months prior to beginning work to determine what mitigation actions would occur. (***Biological Resources***)

Coordination with DPW-Wildlife is required for avian protection measures. Potential impact to birds can be minimized by designing power poles utilizing guidelines in the APP (**Appendix D**). On the three phase power poles, a vertical clearance of at least 43 inches between uninsulated conductors, ground wires and grounded hardware on poles with 8-foot crossarms will provide the 60-inch required clearance. If this design is not possible, installing visibility enhancement devices can reduce the risk of collision on new or existing lines (see pages 41-42 of the APP in **Appendix D**). These devices include marker balls, bird diverters, or other line visibility devices placed in varying configurations, depending on the line design and location. (***Biological Resources***)

Construction within Red Creek will not be conducted during periods of current or anticipated surface water flow. Exposed slopes and stream banks will be stabilized during and immediately upon completion of construction and returned to preconstruction contours and conditions. (***Biological Resources, Water Resources***)

All permanent structures will be placed in upland areas. Excess material resulting from vault excavation and pole installation will be hauled offsite as soon as practicable and will be temporarily placed distant from Red Creek and drainage features in such a manner that it will not be dispersed by currents or other forces. Staging and storage areas will be located in upland areas. (***Biological Resources, Water Resources***)

It is anticipated that the Proposed Action impacts will be authorized under RGP 14 for Fort Carson; however, the Proposed Action will be reviewed by DPW for compliance with the Section 404 of the CWA and written authorization will be obtained through the USACE, as necessary. Mitigation measures and BMPs specific for compliance with the applicable CWA authorization will further reduce potential impacts of the Proposed Action. (***Biological Resources, Water Resources***)

During construction of the project, stormwater runoff and erosion would be managed through implementation of a site-specific approved SWPPP to control for runoff and sediment loading through implementation of BMPs. The site-specific SWPPP will align with procedures and guidelines outlined in the SWMP (2017) and the CGP. BMPs for sediment and erosion control to protect surface water would be accomplished through a combination of construction techniques, vegetation and re-vegetation, administrative controls, and structural controls. (***Biological Resources, Water Resources, Soil Resources, Utilities***)

Ground-disturbing activities will be monitored by a qualified, professional archaeologist, and the Inadvertent Discovery of Archaeological, Cultural, or Paleontological Materials SOP will apply for construction activities. (***Cultural Resources***)

The placement of the power poles will be coordinated to avoid interference with installation activities. The poles will be equipped with the required aircraft hazard warning devices if specified by the Range Officials. (***Airspace***)

No mitigation is anticipated for the Proposed Action regarding energy usage; however, as the Proposed Action will include the upgrade of equipment with the capacity to meet increasing energy demands, future projects with energy requirements would need to be evaluated for impacts to supply and effects to the surrounding communities. (***Utilities***)

5 Acronyms

ACUB	Army Compatible Use Buffer
AOI	Area of Interest
AQCC	Air Quality Control Commission
ARPA	Archaeological Resources Protection Act
BAAF	Butts Army Aviation Facility
BGEPA	Bald and Golden Eagle Protection Act
CDPHE	Colorado Department of Public Health and Environment
CDW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CR	Country Road
CWA	Clean Water Act
DPW	Directorate of Public Works
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EO	Executive Order

FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FNSI	Finding of No Significant Impact
HUC	Hydrologic Unit Code
GHG	Greenhouse Gas
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
IPMP	Integrated Pest Management Plan
ISWMP	Integrated Solid Waste Management Plan
NEPA	National Environmental Policy Act
MBTA	Migratory Bird Treaty Act
MOA	Military Operations Areas
NAGPRA	Native American Graves Protection and Repatriation Act
NHPA	National Historical Preservation Act
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWP	Nationwide Permit
PCMS	Pinon Canyon Maneuver Site
ROD	Record of Decision
RGP	Regional General Permit
ROI	Region(s) of Influence
SAR	Army Species at Risk
SOP	Standard Operating Period
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SUA	Special Use Airspace
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
UAF	Unmanned Aircraft System
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USAG	United States Army Garrison
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VEC	Valued Environmental Component
WOTUS	Waters of the United States

6 List of Preparers

Name	Organization	Title or Role
Angie Bell	DPW-ENV	NEPA Program Manager
Jennifer Kolise	DPW-ENV	Cultural Resources Program Manager
Shannon Reed	DPW-ENV	Air Quality Program Manager
Jack Haflett	DPW-ENV	Environmental Specialist
Tyler Conquest	DPW-ENV	Stormwater Program Manager
Joseph Gallegos	DPW-ENV	IRP Program Manager
Jeff McLemore	DPW-ENV	Installation Forester
Cecily Mui	DPW-ENV	Natural Resources Team Leader
Leslie Gerhart	DPW-ENV	Pest Management Program Manager
Anna Joy Lehmicke	DPW-ENV	Wildlife Biologist
Wayne Thomas	DPW-ENV	NEPA and Cultural Resource Branch Chief
James Kulbeth	DPW-ENV	Clean Water Act/404/Wetlands
Mike Camp	DPTMS	Deputy Range Control Officer
Jaime Cardenas	DPW-GIS	GIS Manager

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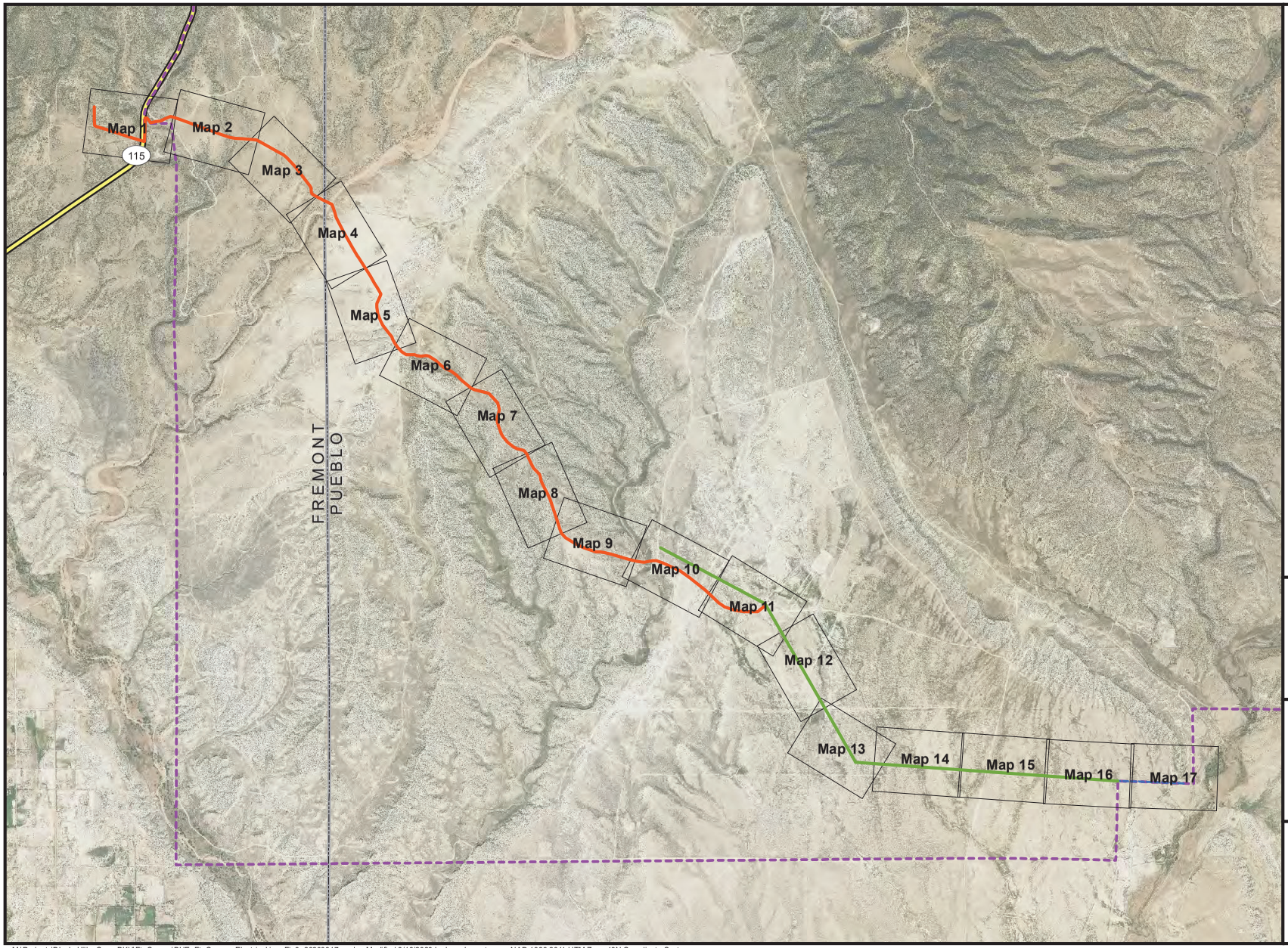
APPENDIX A: Comments Received and Responses

No comments received during 30-day notification period (January 27, 2021 – February 27, 2021).

APPENDIX B: Detailed Project Action Components and Locations



LEGEND:

- Proposed Electric Line
- Abandoned Electric Line
- Highways
- 30-ft Workspace Corridor
- Fort Carson Boundary
- County Boundary

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Apex Companies, LLC
1746 Cole Blvd., Bldg. 21 Suite 250
Lakewood, Colorado 80401
Phone: (303) 487-1020
www.apexcos.com

Black Hills Energy
Fort Carson Airburst Range 123
Three-Phase Electric Line Installation

38.466374, -104.935286

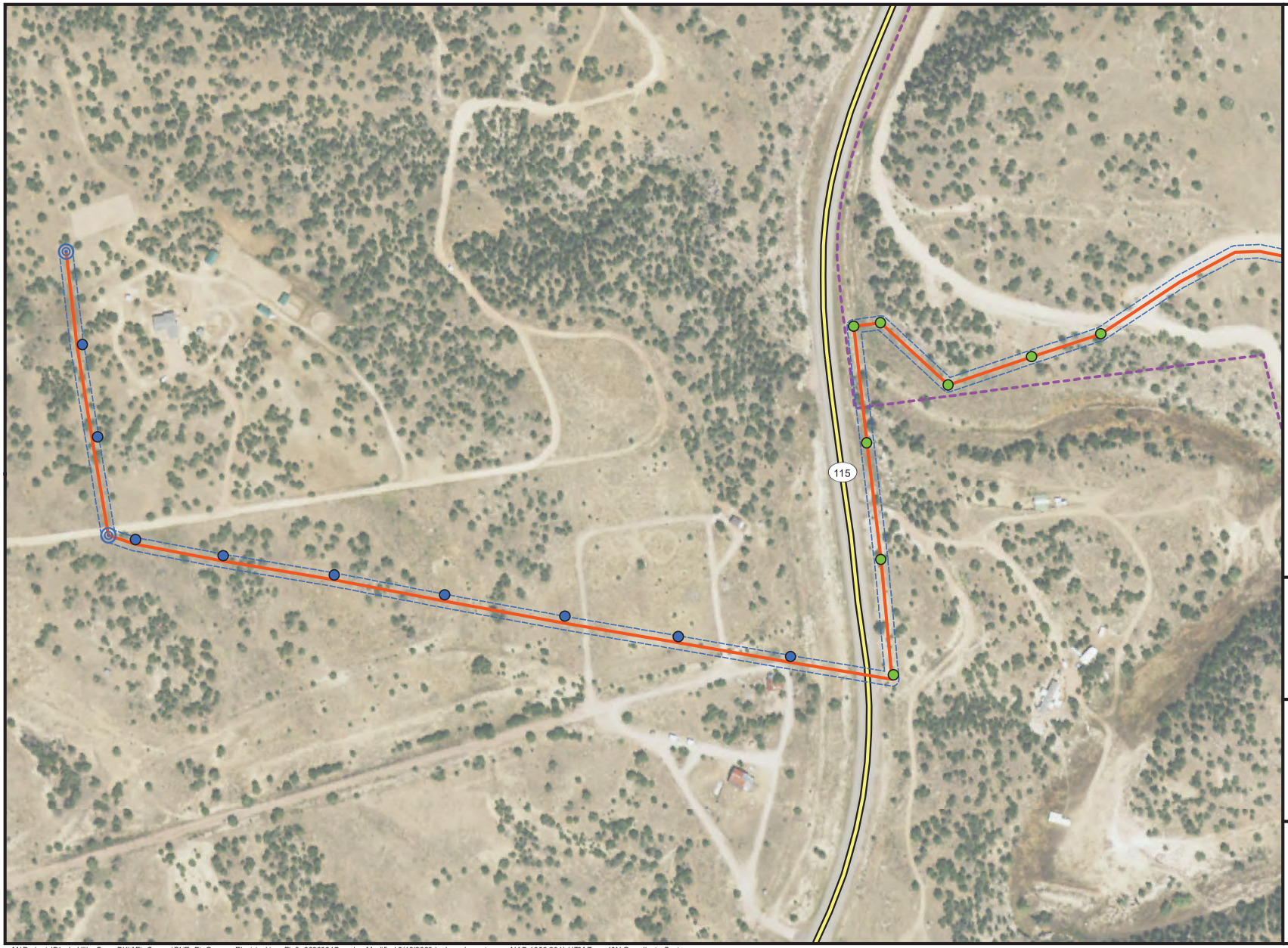
Project No. BLCKHILL-001

Overview Map

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\BHE_Ft_Carson_Electric_Line_Fig3_20200817.mxd Modified 8/18/2020 by beau.bergstrom NAD 1983 2011 UTM Zone 13N Coordinate System



LEGEND:

- Existing Poles
- Poles Proposed for Installation
- Poles Proposed for Replacement
- Proposed Electric Line
- Highways
- 30-ft Workspace Corridor
- Fort Carson Boundary

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Project No. BLCKHILL-001

Map 1 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

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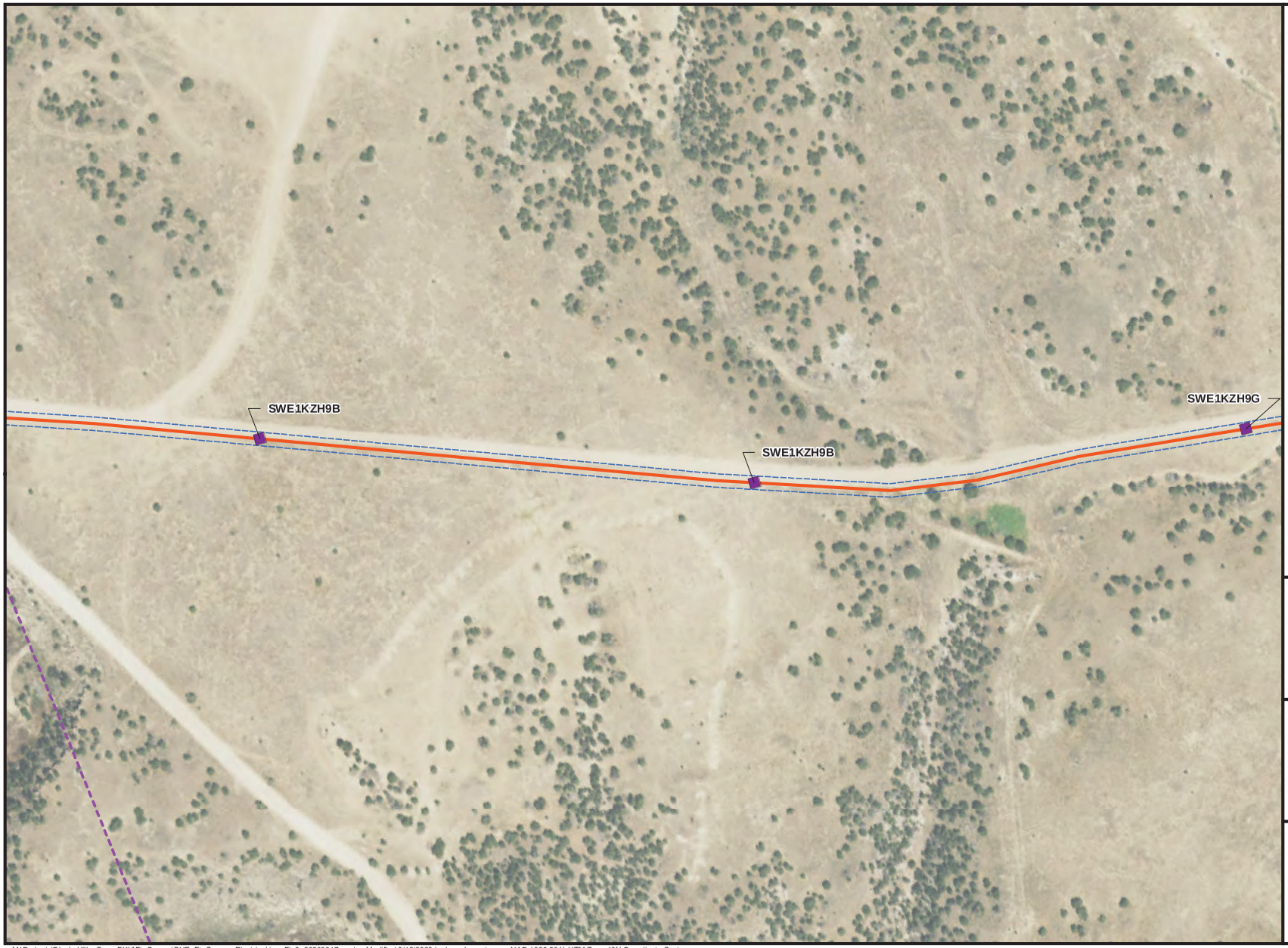

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 2 of 17

Proposed Project Area

Service Layer Credits:
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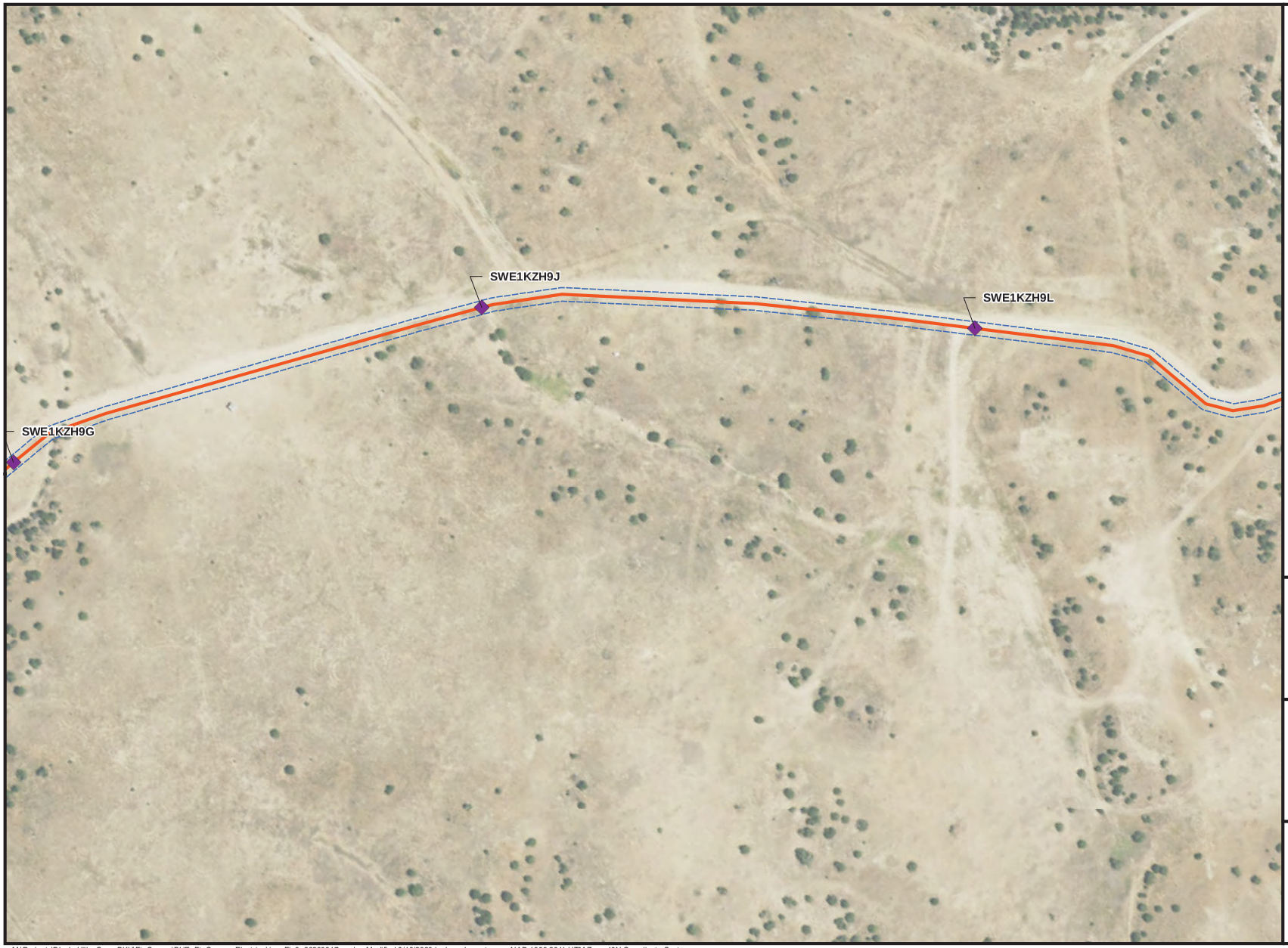

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

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Feet

1:2,500

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Project No. BLCKHILL-001

Map 3 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

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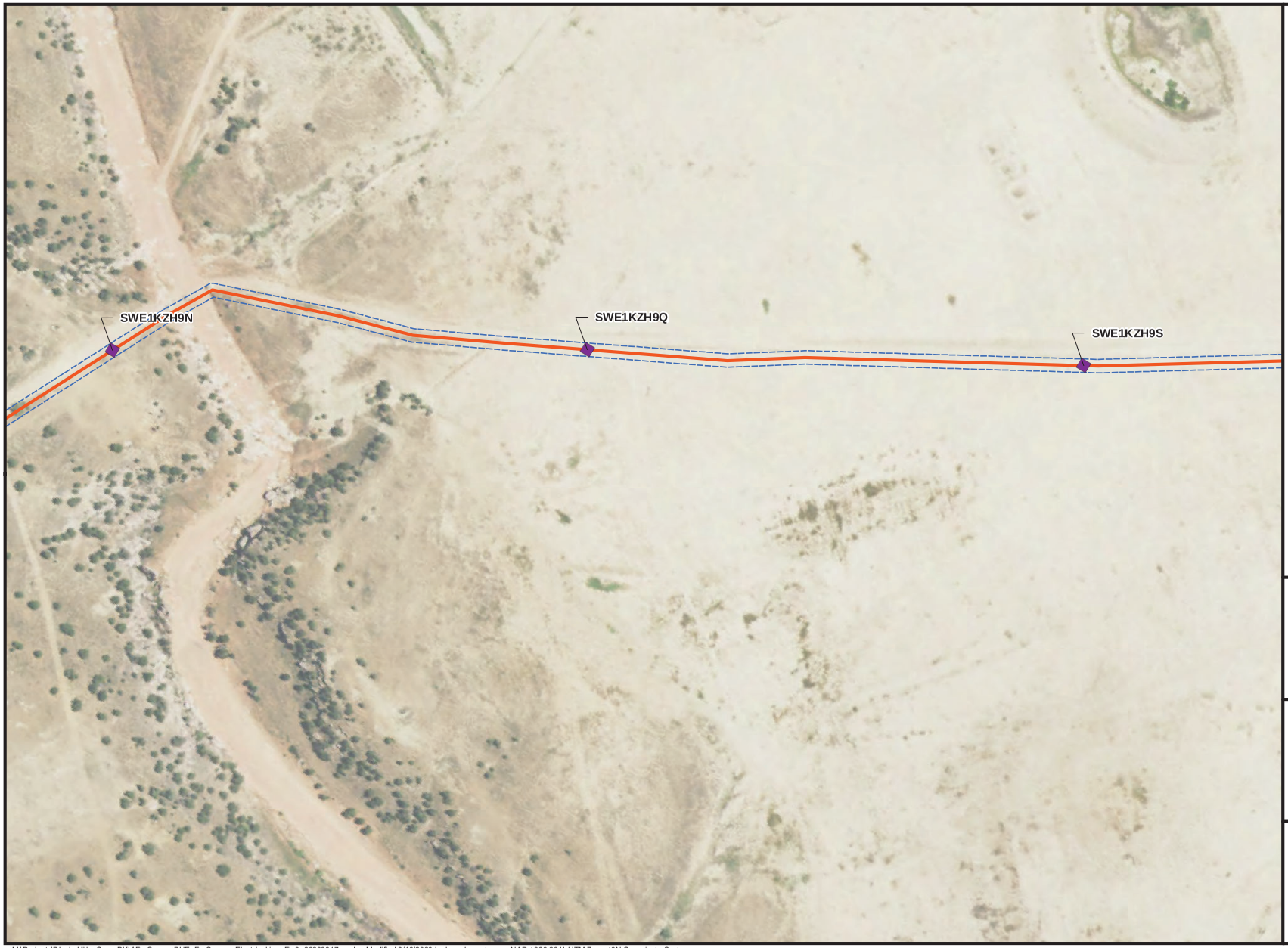

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

N E S W

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www.apexcos.com

Black Hills Energy
Fort Carson Airburst Range 123
Three-Phase Electric Line Installation

38.466374, -104.935286

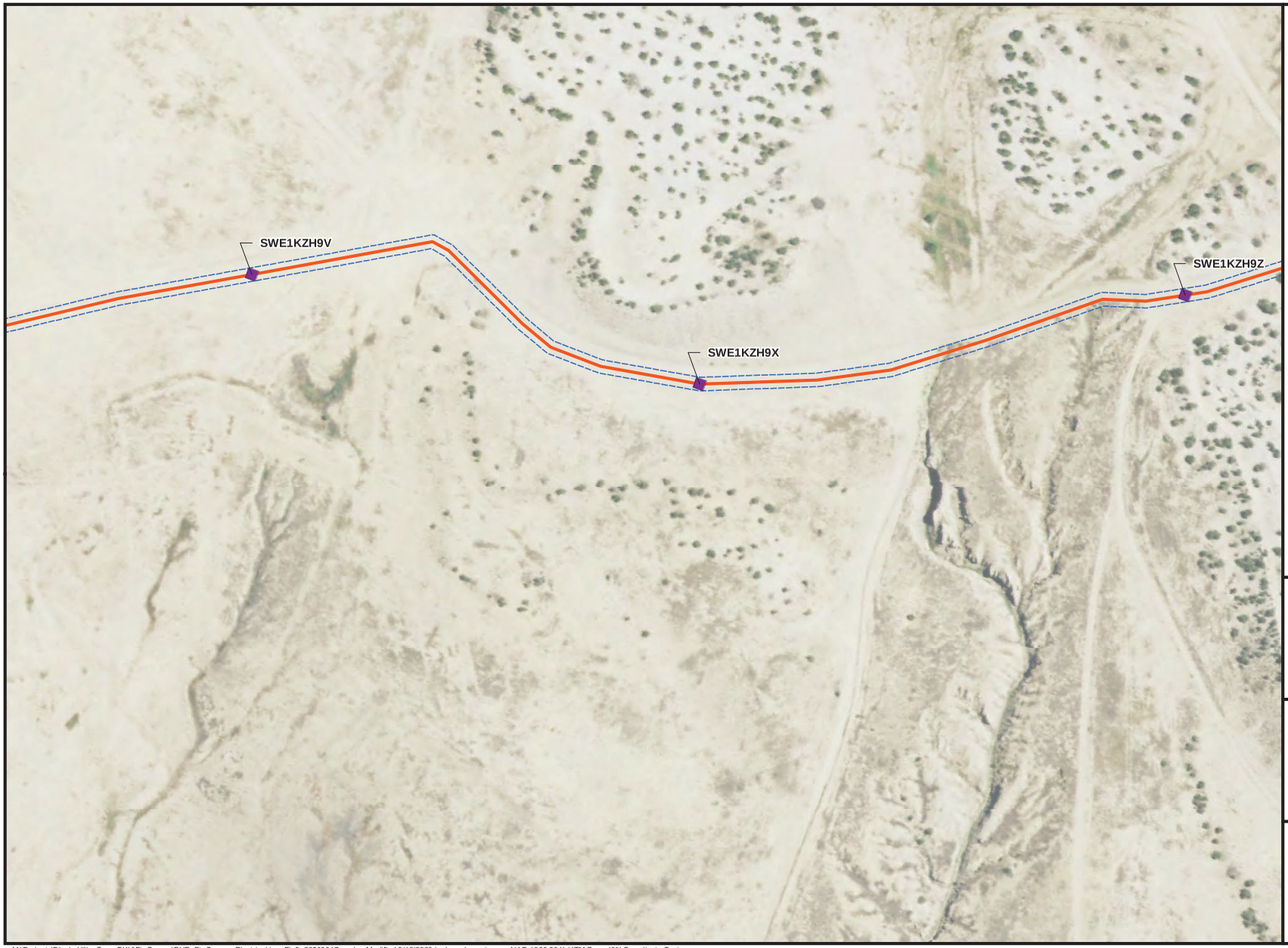
Project No. BLCKHILL-001

Map 4 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\BHE_Ft_Carson_Electric_Line_Fig3_20200817.mxd Modified 8/18/2020 by beau.bergstrom NAD 1983 2011 UTM Zone 13N Coordinate System



LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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38.466374, -104.935286

Project No. BLCKHILL-001

Map 5 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\BHE_Ft_Carson_Electric_Line_Fig3_20200817.mxd Modified 8/18/2020 by beau.bergstrom NAD 1983 2011 UTM Zone 13N Coordinate System

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

N E S W

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Fort Carson Airburst Range 123
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38.466374, -104.935286

Project No. BLCKHILL-001

Map 6 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

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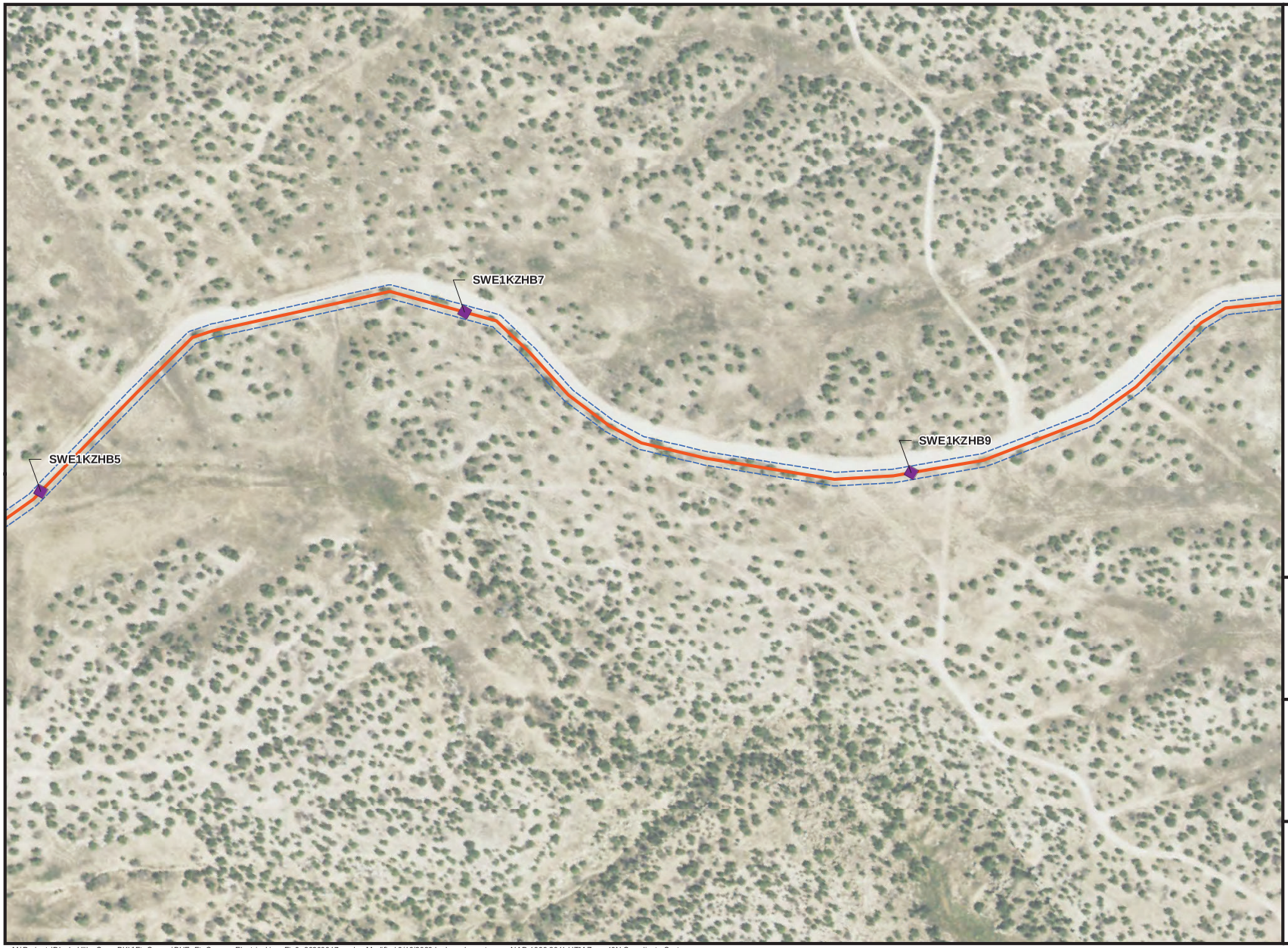

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 7 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

N E S W

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 8 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

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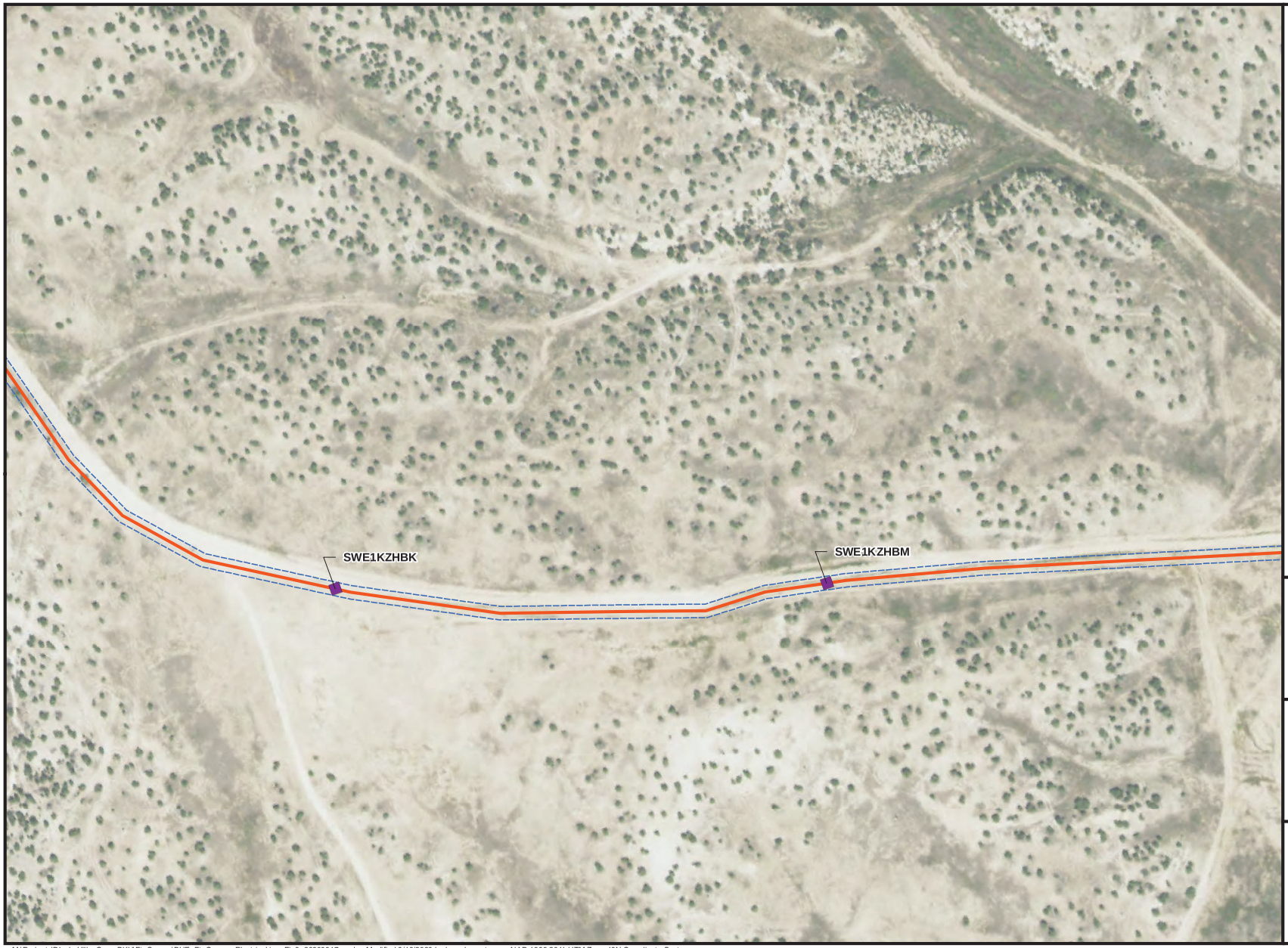

LEGEND:

- Vault (100 ft³)
- Proposed Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 9 of 17

Proposed Project Area

Service Layer Credits:
, INSERT AERIAL DATE/QUADRANGLE NAME, ETC.

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LEGEND:

- Transformers Proposed for Removal
- Vault (100 ft³)
- Proposed Electric Line
- Abandoned Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 10 of 17

Proposed Project Area

Service Layer Credits:
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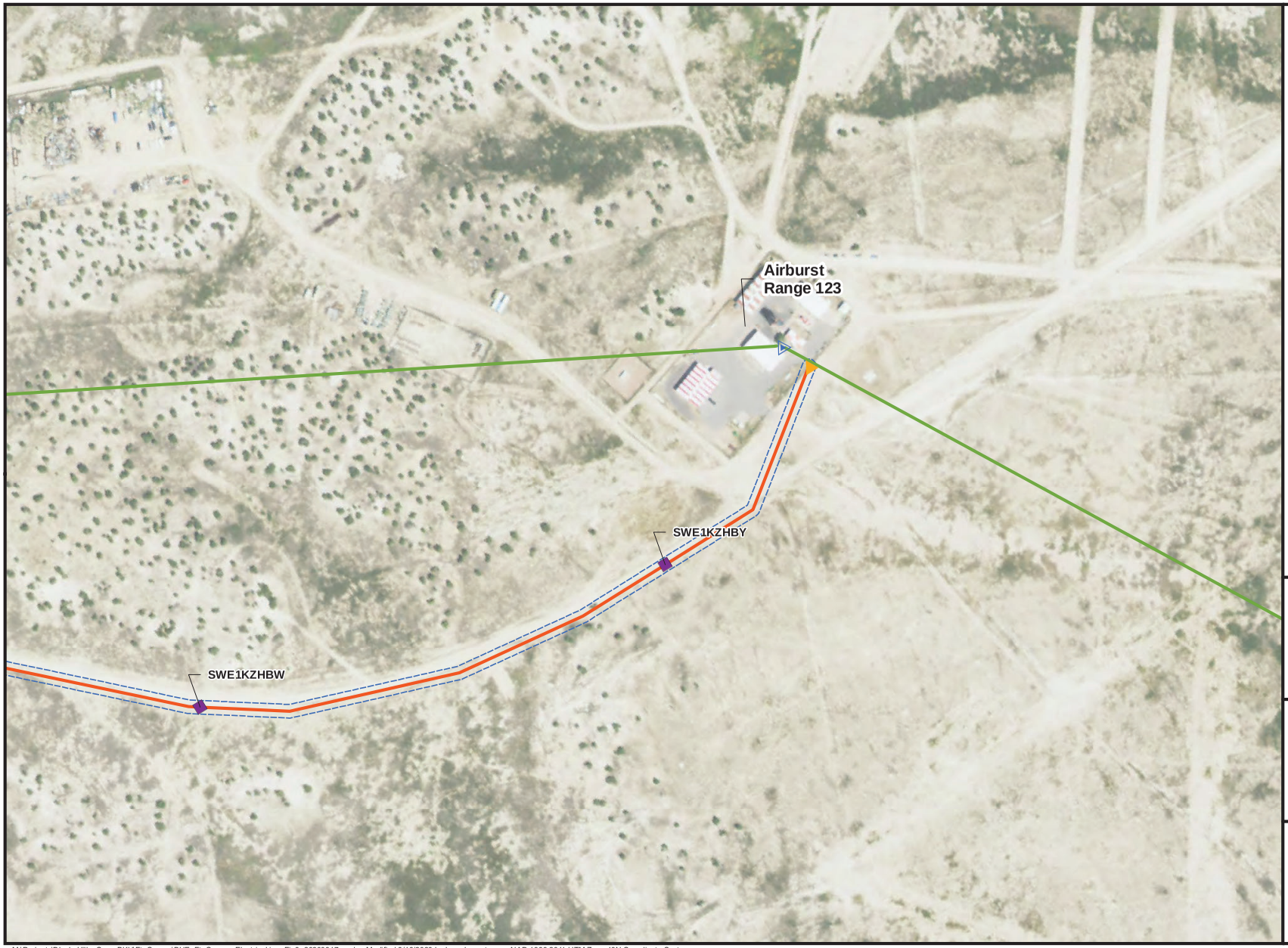
M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\BHE_Ft_Carson_Electric_Line_Fig3_20200817.mxd Modified 8/18/2020 by beau.bergstrom NAD 1983 2011 UTM Zone 13N Coordinate System



LEGEND:

- Proposed Transformers
- Transformers Proposed for Removal
- Vault (100 ft³)
- Proposed Electric Line
- Abandoned Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Project No. BLCKHILL-001

Map 11 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

Abandoned Electric Line

Fort Carson Boundary

0 100 200

Feet

1:2,500

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Project No. BLCKHILL-001

Map 12 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

- Abandoned Electric Line
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Map 13 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

Abandoned Electric Line

Fort Carson Boundary

0 100 200

Feet

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Project No. BLCKHILL-001

Map 14 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

- Abandoned Electric Line
- Fort Carson Boundary

0 100 200
Feet

1:2,500

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Project No. BLCKHILL-001

Map 15 of 17

Proposed Project Area

Service Layer Credits:
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LEGEND:

- Poles Proposed for Removal
- Abandoned Electric Line
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet
1:2,500

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Project No. BLCKHILL-001

Map 16 of 17

Proposed Project Area

Service Layer Credits:
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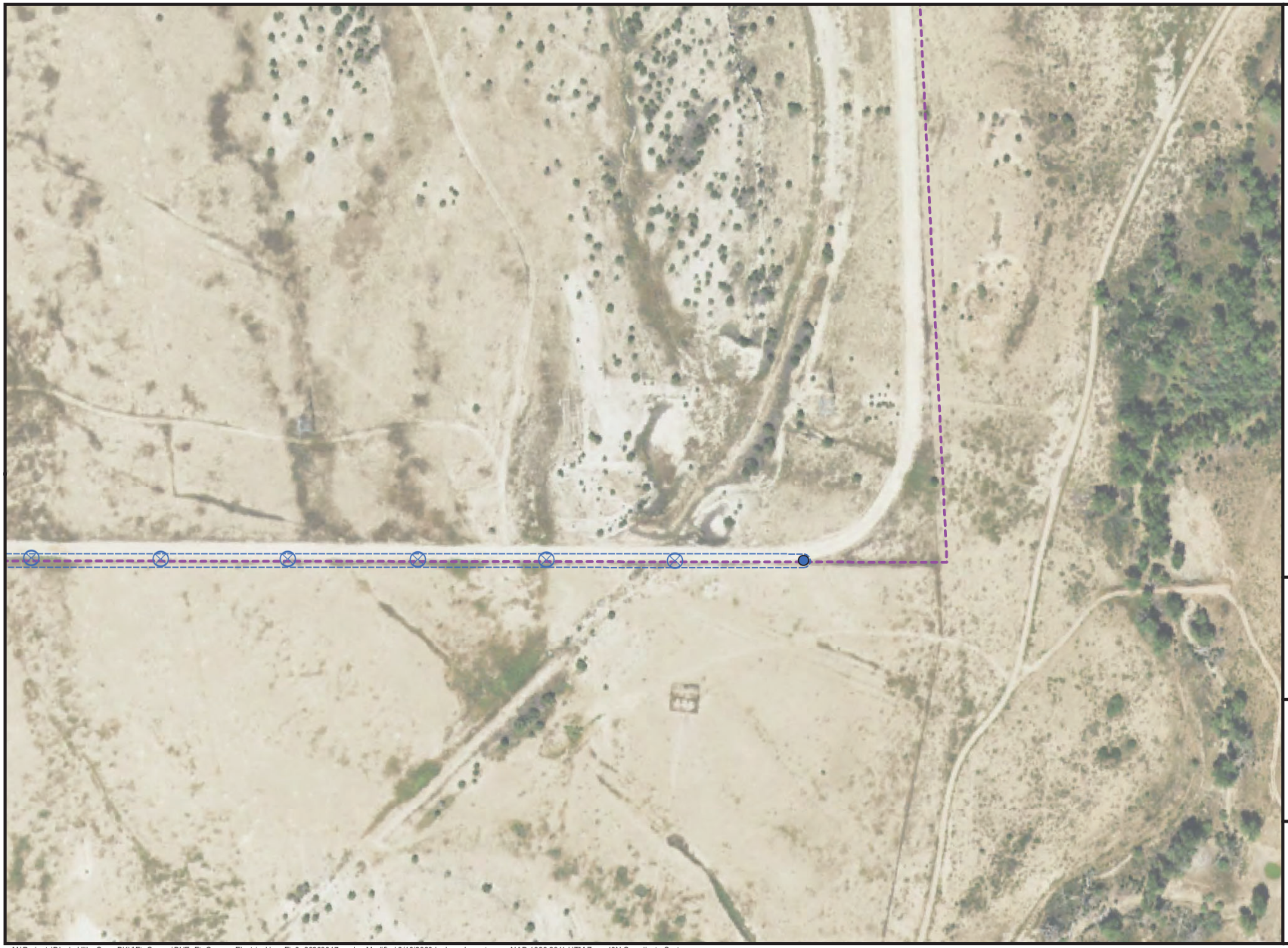

LEGEND:

- Existing Poles
- Poles Proposed for Removal
- 30-ft Workspace Corridor
- Fort Carson Boundary

0 100 200
Feet
1:2,500

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Project No. BLCKHILL-001

Map 17 of 17

Proposed Project Area

Service Layer Credits:
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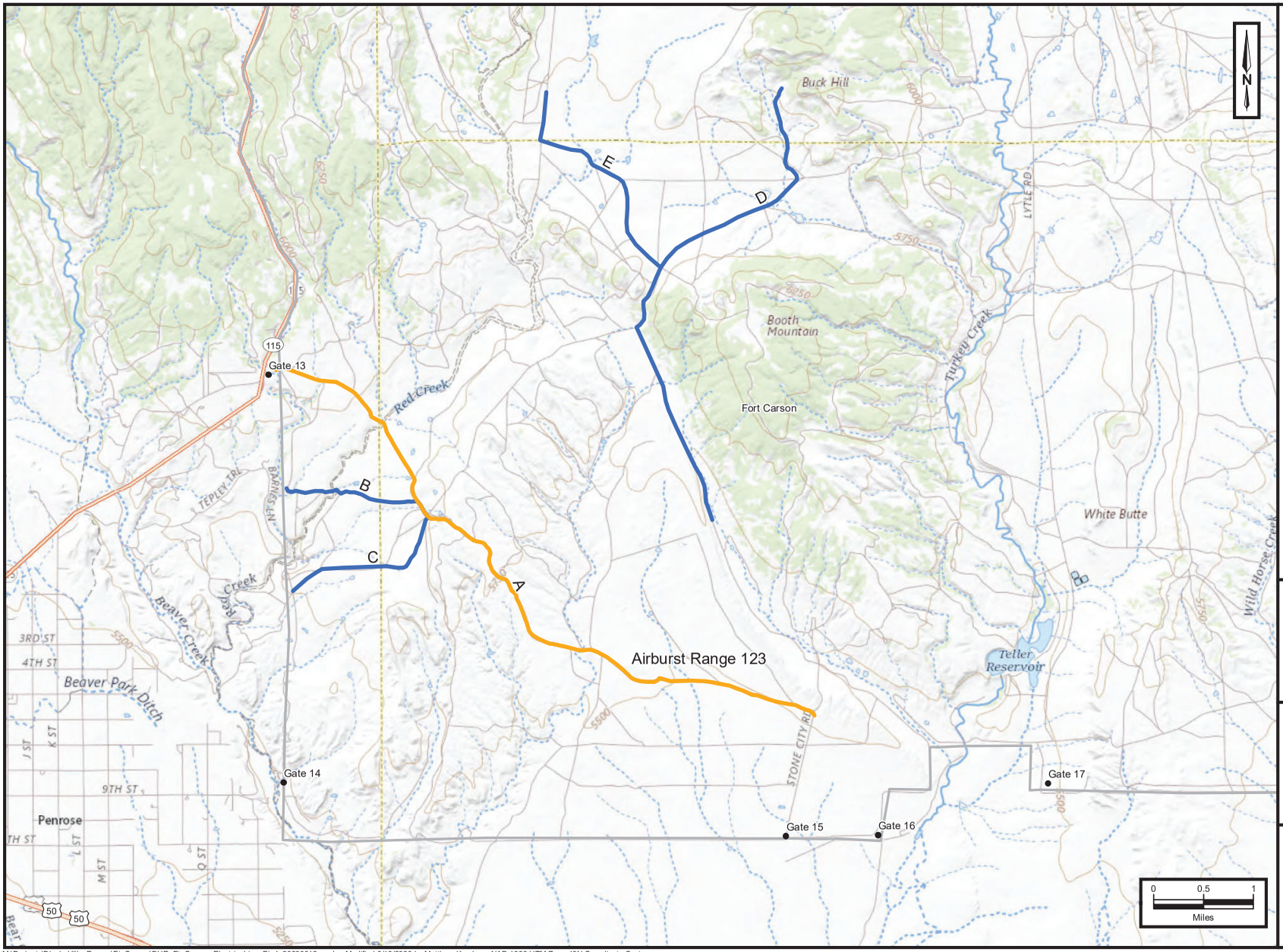
APPENDIX C: Alternatives Considered and Dismissed



LEGEND:

- Proposed Action
- Alternatives
- Gates
- Fort Carson

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Three-Phase Electric Line Installation

38.466374, -104.935286

Project No. BLCKHILL-001

Alternative Routes

Service Layer Credits:
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System,

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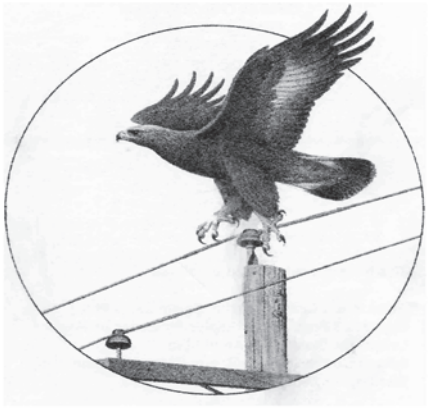
APPENDIX D: Avian Protection Plan

AVIAN PROTECTION PLAN (APP) GUIDELINES



A Joint Document Prepared By

The Edison Electric Institute's Avian Power Line Interaction Committee (APLIC)

and

U.S. Fish and Wildlife Service (USFWS)

April 2005

ACKNOWLEDGEMENT

APLIC and the U.S. Fish and Wildlife Service (Service) have a long history of cooperation and collaboration on avian issues. Like the Service, current APLIC member utilities want to do their part to minimize adverse impacts to protected avian species on power lines. The public expects utilities to deliver cost-effective reliable energy and the Service to protect and enhance trust resources. Working in a partnership to benefit both the birds and the electric utility industry, the voluntary Avian Protection Plan (APP) Guidelines were developed in a joint, collaborative way.

It is the hope of both APLIC and the Service that individual utilities will utilize the voluntary principles in this document to develop an APP specific to their needs, which improves reliability and avian conservation. APPs offer the industry an additional option, one that is voluntary and without the need for formal Service concurrence, to address avian electrocutions and collisions. Utilities are also encouraged to work in partnership with Federal and State resource agencies when developing and implementing their voluntary APPs.

APLIC and the Service would like to acknowledge the efforts of those individuals responsible for the development of these voluntary guidelines. These guidelines demonstrate that through ongoing collaborative efforts the Service and industry can work together to meet energy needs while acting as responsible stewards to the environment.

April 14, 2005

Paul R. Schmidt

Paul Schmidt, Assistant Director Migratory Birds
US Fish and Wildlife Service

Jim Lindsay, APLIC Chairman

Quinlan J. Shea, III Executive Director Environment
Edison Electric Institute

Jim Burruss, Past APLIC Chairman

John W. Holt

John W. Holt
National Rural Electric Cooperative Association

The APP Guidelines presented in this document are intended to serve as a "tool box" from which a utility can select and tailor components applicable to its specific needs. These guidelines are intended to be used in conjunction with APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*, or the most current editions of these documents, which contain more detail on construction design standards and line siting recommendations.

These "guidelines" are being distributed electronically. While the introductory pages of the document are printed, the remainder of this "tool box" is electronic. This is a dynamic document and will be periodically updated as new information and resources become available. Additional copies of the APP Guidelines and current information on related issues can be downloaded from the Avian Power Line Interaction Committee (APLIC) (http://aplic.org) and Edison Electric Institute (EEI) (http://eei.org) websites. In addition, the *Suggested Practices for Raptor Protection on Power Lines* and *Mitigating Bird Collisions with Power Lines* manuals can be obtained from APLIC or EEI.

Editor's note: Although this draft is being distributed in paper format, the final version will be distributed electronically as described above.

TABLE OF CONTENTS

I. INTRODUCTION

Since the formation of the Avian Power Line Interaction Committee (APLIC) in 1989, the electric utility industry and the U.S. Fish and Wildlife Service (USFWS) have worked together to reduce avian electrocution and collision mortality. This has resulted in the cooperative development of guidelines for Avian Protection Plans (APP) by APLIC and USFWS, representing another milestone in avian conservation. The principles presented in these voluntary guidelines are intended to allow utilities to tailor an APP that will best fit their needs while furthering the conservation of avian species and improving reliability and customer service. A utility that implements the principles contained in these APP guidelines will greatly reduce avian risk as well its own risk of enforcement under the Migratory Bird Treaty Act (MBTA). Development and implementation of an APP makes good business sense because animal- and bird-caused outages are costly. A utility that creates an APP following these guidelines and that addresses their specific avian issues can benefit through regulatory compliance, reliability improvements, cost savings and positive recognition from regulators and customers.

What is an Avian Protection Plan?

An Avian Protection Plan is a utility-specific document that delineates a program designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities. Although each utility's APP will be different, the overall goal of any APP should be to reduce avian mortality. This document provides guiding principles and examples to aid utilities in their development of an APP. Although not all of these elements need to be included in every APP because of the specific circumstances of a utility or geographical area, they represent an overview of elements that should be considered for inclusion in an APP and that individual utilities may find helpful in crafting their own, individually-tailored APPs.

Principles of an Avian Protection Plan

1. *Corporate Policy*

   An APP typically includes a statement of company policy confirming the company's commitment to work cooperatively towards the protection of migratory birds. This may include a commitment by the company to balance its goal of providing reliable electrical service in a cost-effective manner with the regulatory requirements protecting avian species, as well as the need to obtain and comply with all necessary permits, monitor incidents of avian mortality, and make reasonable efforts to construct and alter infrastructure to reduce the incidence of avian mortality.

2. *Training*

   Training is an important element of an APP. All appropriate utility personnel, including managers, supervisors, line crews, engineering, dispatch, and design personnel, should be properly trained in avian issues. This training should encompass the reasons, need, and method by which employees should report an avian mortality, follow nest management protocols, dispose of carcasses, and comply with applicable regulations, including the consequences of non-compliance. Supplemental training also may be appropriate where there are material changes in regulations, permit conditions, or internal policies. APLIC-sponsored "short courses" on avian electrocution, collision, and nest issues are conducted annually throughout the U.S. In addition, a two-hour overview presentation of avian issues that can be used for internal company training is available from APLIC (see http://aplic.org).

3. *Permit Compliance*

   An APP can identify the process under which a company obtains and complies with all necessary permits related to avian issues. Particular attention should be given to specific activities that can require take permits including, but not limited

to, nest relocation, temporary possession, depredation, salvage/disposal, and scientific collection.

4. *Construction Design Standards*

Avian interactions with facilities can cause outages or system reliability issues. To improve system reliability, avian interactions should be considered in the design and installation of new facilities, as well as the operation and maintenance of existing facilities. For those reasons, inclusion of accepted construction standards for both new and retrofit techniques also should be included in an APP. Companies can either rely upon existing construction configurations recommended by APLIC (see *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*, or the most current editions of these documents) or may choose to instead develop their own internal construction standards that meet or exceed these guidelines. These standards should be used in areas where new construction should be avian-safe, as well as where existing infrastructure should be retrofitted to provide avian safety.

5. *Nest Management*

An APP may include procedures for nest management on utility structures. These procedures should be explained to company employees during training to ensure uniform treatment of avian nest issues among personnel.

6. *Avian Reporting System*

Although reporting of avian mortalities may be required as a condition of Federal or State permits, a utility may also choose to voluntarily monitor relevant avian interactions, including mortalities, through the development of an internal reporting system. An APP should consider providing for the development of such a reporting system, which can help a company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring, as well as

the extent of such mortalities. Data collected by company personnel can be limited to avian mortalities or injuries, or could be expanded to include historical tracking of avian nest problems, particularly problematic poles or line configurations, as well as remedial actions taken. All data should be regularly entered into a searchable database compatible for use in additional analysis (see Risk Assessment Methodology below). Bird Mortality Tracking System software developed by APLIC is available for free upon request at http://aplic.org.

7. *Risk Assessment Methodology*

A utility can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk to migratory birds. Therefore, as a general matter, an APP should include a method for evaluating the risks posed to migratory birds in a manner that identifies areas and issues of particular concern. A risk assessment study will often begin with an assessment of available data addressing areas of high avian use, avian mortality, nesting problems, established flyways, adjacent wetlands, prey populations, perch availability, effectiveness of existing procedures, remedial actions and other factors that can increase avian interactions with utility facilities. The avian reporting system discussed in the previous section is an integral component of this risk assessment, as well as the use of avian experts, birders, and biologists who can provide additional information on avian distribution. An APP also may provide for the development of models that will enable a company to utilize biological and electrical design information to prioritize poles most in need of modifications, as well as research on the varied causes of avian mortality and the benefits of utility structures to avian species.

8. *Mortality Reduction Measures*

After completing a risk assessment, a company can focus its efforts on areas of concern, ensure that the activities taken by the utility are not out of proportion to the risks encountered by migratory birds, and then determine whether an avian

mortality reduction plan needs to be implemented in certain areas. An APP could implement this approach by developing such a risk reduction plan, utilizing risk assessment results to direct where system monitoring should occur, where retrofit efforts should be focused, and where new construction warrants special attention to raptor and other bird issues. If a utility finds that implementation of such avian protection measures is appropriate, it also may choose to develop a schedule for implementation.

9. *Avian Enhancement Options*

In addition to taking steps to reduce mortality risk to avian species, an APP also may include opportunities for a utility to enhance avian populations or habitat, including developing nest platforms, managing habitats to benefit migratory birds, or working cooperatively with agencies or organizations in such efforts. Where feasible, such proactive development of new ideas and methods to protect migratory birds should be encouraged and explored.

10. *Quality Control*

An APP also may include a mechanism to review existing practices, ensuring quality control. For instance, a utility may conduct an independent assessment of its avian reporting system to ensure its effectiveness, or invest in research on the effectiveness of different techniques and technologies used to prevent collisions, electrocutions and problem nests.

11. *Public Awareness*

An APP generally should include a method to educate the public about the avian electrocution issue, the company's avian protection program, as well as its successes in avian protection.

12. *Key Resources*

An APP should identify key resources to address avian protection issues including, for example, a list of experts who may be called upon to aid in resolving avian issues. These could include consultants, State and Federal resource agencies, universities, or conservation groups. Engineers may find that internal personnel such as environmental specialists can aid in developing creative solutions to resolve avian interaction problems, and external organizations like APLIC can also serve as helpful resources by providing guidance, workshops, materials, and contacts. An understanding of raptor and other bird behavior can influence how and when avian protection should be utilized, and an APP that connects avian experts with utility decision-makers may reduce the risk of avian incidents and improve system reliability.

II. BACKGROUND

Historical Perspective

Utility poles can benefit raptors by providing perching and/or nesting structures in areas where few natural perches or nest sites exist. However, utility structures can also pose a threat to raptors and other birds through electrocutions or collisions. Although records of electrocutions and collisions date back as early as the late 19th century, avian deaths associated with power lines were not a widespread concern until the 1970's when surveys in the western United States found hundreds of eagles shot, poisoned, and electrocuted in rural areas. Throughout the 1970's, agencies and organizations such as the Rural Electrification Association (now the Rural Utilities Service), USFWS , Edison Electric Institute (EEI), and the National Audubon Society worked together to track raptor electrocutions, identify high risk configurations, and develop methods to reduce electrocutions. In 1989, biologists from the utility industry, USFWS, and the National Audubon Society formed APLIC, initially to address collision issues of sandhill and whooping cranes. The scope of APLIC's mission later expanded to include electrocution and nest issues.

APLIC now serves as a clearinghouse for information and communication on avian/power line issues. Its membership includes electric utilities, EEI, Electric Power Research Institute (EPRI), the National Rural Electric Cooperative Association (NRECA), Rural Utilities Service (RUS) and USFWS. APLIC has produced manuals for addressing electrocutions (*Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*) as well as collisions (*Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*). In addition, APLIC produces videos addressing collisions and electrocutions; offers a short course overview of collision, electrocution, and nest issues; and funds bird/power line-related research. The APP guidelines provided in this document represent a multidisciplinary culmination of several decades of research, field testing, monitoring and assessment to minimize avian mortality associated with utility structures. APLIC encourages the development of APPs as they benefit utilities and wildlife resources through reduced long-term costs, improved reliability, avian

protection, legal compliance, and positive relations between regulatory agencies and customers.

How Electrocution Occurs

Birds are electrocuted by power lines because of two seemingly unrelated, yet interactive factors:

1. Environmental factors such as topography, vegetation, available prey and other, behavioral or biological factors influence avian use of power poles.
2. Inadequate seperation between energized conductors or energized conductors and grounded hardware can provide two points of contact.

Electrocution can occur when a bird completes an electric circuit by simultaneously touching two energized parts or an energized part and a grounded part of the electrical equipment. Most electrocutions occur on medium-voltage distribution lines (4 to 34.5 kilovolts [kV]), in which the spacing between conductors may be small enough to be bridged by birds. Poles with energized hardware, such as transformers, can be especially hazardous, even to small birds, as they contain numerous, closely-spaced energized parts.

"Avian-safe" structures are those that provide adequate clearances to accommodate a large bird between energized and/or grounded parts. Consequently, 60 inches of horizontal separation, which can accommodate the wrist-to-wrist distance of an eagle (which is approximately 54 inches), is used as the standard for raptor protection (Figure 1). Likewise, vertical separation of at least 48 inches can accommodate the height of an eagle from its feet to the top of its head (which is approximately 31 inches; Figure 2). In particular areas (*i.e*. areas with concentrations of wading birds), vertical separation may need to be increased to 60 inches. Because dry feathers act as insulation, contact must be made between fleshy parts, such as the wrists, feet, or other skin, for electrocution to occur. In spite of the best efforts to minimize avian electrocutions, some degree of mortality may always occur due to influences that cannot be controlled, *e.g.* weather.

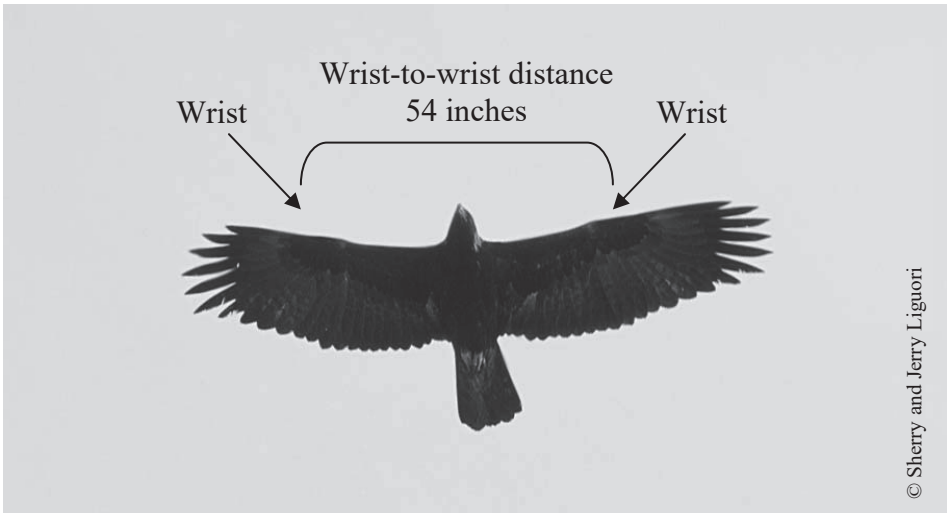


Figure 1. Wrist-to-wrist distance of an eagle.

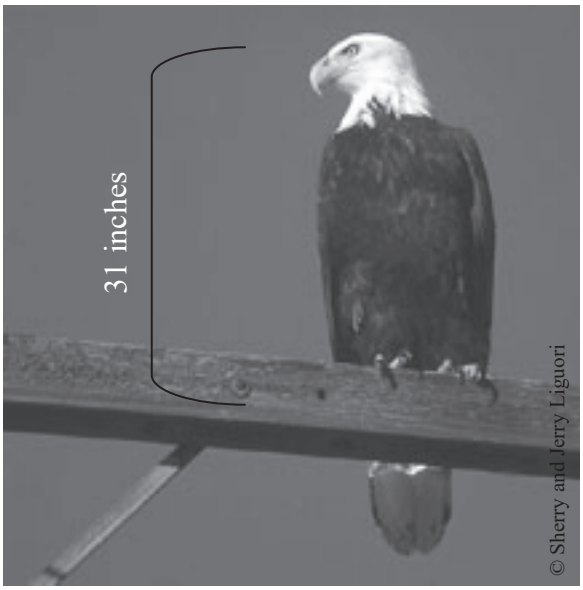


Figure 2. Head to foot distance of an eagle.

Raptors are opportunistic and may use power poles for a number of purposes, such as nest sites, high points from which to defend territories, and perches from which to hunt. "Still hunting" from a perch is energy efficient for a bird, provided that good prey habitat is within view. Some structures are preferred by birds because they provide considerable elevation above the surrounding terrain, thereby offering a wide field of

view. Identification and modification of these "preferred" structures may greatly reduce or minimize the electrocution risk on an entire line. However, in areas where lines run through homogeneous terrain, there is no apparent advantage of some poles over others. Favored perches can be identified by examining crossarms and the ground beneath them for whitewash (feces accumulations), pellets, or prey remains. Since birds such as hawks and owls cannot digest the fur, feathers, and bones of their prey, they regurgitate these parts in the form of a "pellet" or "casting."

What Species are at Risk

Electrocution has been documented as the cause of death in many raptor species in the United States, although large, open-country birds, such as eagles and buteos, are typically at greatest risk. In open habitats where few natural perches exist, such as deserts, grasslands, agricultural fields, and pastures, raptors are attracted to power poles, which provide roosting and nesting sites as well as hunting perches. The large wingspans of raptors such as golden eagles, red-tailed hawks, osprey, and great horned owls enable them to simultaneously touch energized and/or grounded parts, potentially resulting in electrocution. Although raptors are most often considered when addressing electrocution risk, other birds such as crows, ravens, magpies, small flocking birds and wading birds can also be electrocuted. Closely-spaced exposed equipment, such as jumper wires on transformers, can pose an electrocution risk to small birds such as magpies or jays. Wading birds, such as herons, egrets, ibis, or storks, may require increased vertical spacing between lines, as they may exceed 40 inches in height.

Factors Influencing Collisions

Factors that influence collision risk can be divided into three categories: those related to avian species, those related to the environment, and those related to the configuration and location of lines. Species-related factors include habitat use, body size, flight behavior, age, sex, and flocking behavior. Heavy-bodied, less agile birds or birds within large flocks may lack the ability to quickly negotiate obstacles, making them more likely to collide with overhead lines. Likewise, inexperienced birds as well as those

distracted by territorial or courtship activities may collide with lines. Environmental factors influencing collision risk include the effects of weather and time of day on line visibility, surrounding land use practices that may attract birds, and human activities that may flush birds into lines. Line-related factors influencing collision risk include the configuration and location of the line and line placement with respect to other structures or topographic features. Collisions often occur with the overhead static wire, which may be less visible than the other wires due to its smaller diameter.

Why Protect Birds?

All migratory birds in North America are protected under the Migratory Bird Treaty Act of 1918, as amended. In addition, both North American eagle species are protected under the Bald and Golden Eagle Protection Act (BGEPA), as amended. These laws provide civil and criminal penalties for the "take" of such species. "Take" under MBTA is defined as to "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt any of these acts." Take under BGEPA is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The bald eagle is also currently (April 2005) listed as threatened under the Endangered Species Act in the contiguous 48 states.

Power line electrocutions are a cause of mortality for raptors, eagles and other migratory birds. These deaths, many of which could be avoided by making relatively inexpensive modifications to existing power lines and poles, can cause power outages that inconvenience customers, spark grass and forest fires, and result in lost revenue and other costs to utilities.

Government agencies, conservation organizations, and the general public are concerned about avian safety. Industry and the public expect reliable electric service. These concerns and expectations have generated great public demand for both higher service reliability and better protection of avian populations and their habitats.

The electric power industry has long been aware that closely-spaced electric conductors, separated by a horizontal crossarm, can result in the electrocution of raptors and other birds. Thirty years ago, electric companies, USFWS, and interested non-

governmental organizations developed the first edition of *Suggested Practices for Raptor Protection on Power Lines*, which detailed how to reduce or eliminate the risk of avian electrocutions. Since the first *Suggested Practices*, utilities and agencies have worked cooperatively to identify electrocution and collision risks and improve the technology and methods used for reducing such risks.

The development of APPs by electric utilities will represent the continuation of an approach that emphasizes long-term proactive conservation partnerships between the utility industry, the conservation community, and USFWS. These voluntary plans will provide a framework for addressing electrocution hazards, committing utilities to evaluate their power lines and work with USFWS to conserve federally protected migratory birds.

III. APPLICABLE REGULATIONS

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), which is administered by USFWS, is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute wherein proof of intent is not an element of a taking violation. Wording is clear in that most actions that result in a "taking" or possession (permanent or temporary) of a protected species can be a violation.

Specifically, the MBTA states: "Unless and except as permitted by regulations … it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill … possess, offer for sale, sell … purchase … ship, export, import … transport or cause to be transported … any migratory bird, any part, nest, or eggs of any such bird … (The Act) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

A 1972 amendment to the MBTA resulted in inclusion of bald eagles and other birds of prey in the definition of a migratory bird. The MBTA provides criminal penalties for persons who, by any means or in any manner, pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird. The MBTA offers protection to 836 species of migratory birds, including waterfowl, shorebirds, seabirds, wading birds, raptors, and passerines. Generally speaking, the MBTA protects all birds occurring in the U.S. in the wild except for house (English) sparrows, European starlings, rock doves (pigeons), any recently listed unprotected species in the Federal Register and non-migratory upland game birds.

For a complete list of species protected under the MBTA see http://migratorybirds.fws.gov/intrnltr/mbta/mbtintro.html.

A violation of the MBTA by an individual can result in a fine of up to $15,000 and/or imprisonment for up to six months for a misdemeanor, and up to $250,000 and/or imprisonment for up to two years for a felony. Fines may be doubled for organizations. Penalties increase greatly for offenses involving commercialization and/or the sale of migratory birds and/or their parts.

Under authority of the **Bald and Golden Eagle Protection Act** (16 U.S.C. 668-668d; BGEPA), bald and golden eagles are afforded additional legal protection. Penalties for the "take" of an eagle may result in a fine of up to $100,000 and/or imprisonment for up to one year. The BGEPA has additional provisions wherein the case of a second or subsequent conviction of the BGEPA, penalties may be imposed of up to $250,000 fine and/or two years imprisonment.

The **Endangered Species Act** (16 U.S.C. 1531-1544; ESA) was passed by Congress in 1973 in recognition that many of our Nation's native plants and animals were in danger of becoming extinct. The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems. To this end, Federal agencies are directed to utilize their authorities to conserve listed species, and make sure that their actions do not jeopardize the continued existence of these species. Federal agencies are encouraged to do the same with respect to "candidate" species which may be listed in the near future. The law is administered by USFWS and the Commerce Department's National Marine Fisheries Service (NMFS). USFWS has primary responsibility for terrestrial and freshwater organisms, while NMFS has responsibility for marine species such as whales and salmon. These two agencies work with other agencies to plan or modify Federal projects so that they will have minimal impact on listed species and their habitats. Protection of species is also achieved through partnerships with the States, with Federal financial assistance and a system of incentives available to encourage State participation. USFWS also works with private landowners, providing financial and technical assistance for management actions on their lands to benefit both listed and non-listed species.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. Take is defined as ". . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary of the Interior, through regulations, defined the term "harm" as "an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." However, permits for "incidental take" can be obtained from USFWS for take of endangered species which would occur as a result of an otherwise legal activity.

Section 10 of the ESA allows for the development of "Habitat Conservation Plans" for endangered species on private lands or for the maintenance of facilities on private lands. This provision is designed to assist private landowners in incorporating conservation measures for listed species with their land and/or water development plans. Private landowners who develop and implement an approved habitat conservation plan can receive an incidental take permit that allows their development to proceed.

While the Service generally does not authorize incidental take under these Acts, USFWS realizes that some birds may be killed even if all reasonable measures to avoid the take are implemented. USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries who seek to minimize their impacts on migratory birds. Unless the take is authorized, it is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

State Regulations

Individual states may have regulations that protect avian species and a utility should consult with their respective State resource agency(s) to determine what regulations apply and if permits are required.

IV. APP PRINCIPLES

The following chapter provides guidance for implementation of each of the APP principles listed below:

- Corporate Policy
- Training
- Permit Compliance
- Construction Design Standards
- Nest Management
- Avian Reporting System
- Risk Assessment Methodology
- Mortality Reduction Measures
- Avian Enhancement Options
- Quality Control
- Public Awareness
- Key Resources

CORPORATE POLICY

The following are examples of utility Bird Management Policies. These policies have been included as examples to aid other utilities if they choose to develop a bird program policy.

Example 1. PacifiCorp's Bird Program Policy.

PacifiCorp Bird Management Policy

Bird interactions with power lines may cause bird injuries and mortalities, which, in turn, may result in outages, violations of bird protection laws, grass and forest fires, or raise concerns by employees, resource agencies and the public.

This policy is intended to ensure compliance with legal requirements, while improving distribution system reliability. PacifiCorp management and employees are responsible for managing bird interactions with power lines and are committed to reducing the detrimental effects of these interactions.

To fulfill this commitment, PacifiCorp will:

- Implement and comply with its comprehensive Avian Protection Plan (APP).
- Ensure its actions comply with applicable laws, regulations, permits, and APP procedures.
- Document bird mortalities, problem poles and lines, and problem nests.
- Provide information, resources, and training to improve its employees' knowledge and awareness of the APP.
- Construct all new or rebuilt lines in rural areas (outside city limits or beyond residential/commercial developments) and in areas of known raptor use, where appropriate, to PacifiCorp raptor-safe standards.
- Retrofit or modify power poles where a protected bird has died. Modifications will be in accordance with APP procedures.
- Participate with public and private organizations in programs and research to reduce detrimental effects of bird interactions with power lines.

PacifiCorp customer service and regulatory compliance will be enhanced and risk to migratory birds will be reduced through the proactive and innovative resolutions of bird power line interactions guided by this policy.

Signature, Executive Vice President_____ Date_____

Example 2. Southern California Edison's Policy and Procedures.

Avian Protection On or Near Power Lines

1.0 PURPOSE

One or more state and federal laws legally protect many species of birds in SCE's service territory. In order to ensure SCE's compliance with laws and regulations protecting these birds, it is necessary to have procedures in place that will allow SCE to determine where impacts are most likely to occur, what additional measures may need to be implemented to achieve compliance, if mitigation of impacts is needed, and to undertake other activities to facilitate protection of these legally protected birds on or near SCE power lines, substations and other facilities. This document is not intended to set out the specific legal requirements of all laws dealing with birds. Rather, this standard is intended to provide a process for achieving compliance with those laws.

2.0 POLICY STATEMENTS

N/A

3.0 REFERENCES

3.1 ESM 02.002.01, Environmental Policy

3.2 Endangered Species Alert Program Manual

3.3 SCE Distribution Overhead Construction Standards

4.0 OPERATIONS

4.1 Reporting

Raptor electrocutions and power line collisions shall be reported to Environmental Affairs (EA) within 24 hours of discovery of a carcass, using the current reporting mechanism or form. Non-raptor electrocutions and collisions will be reported using the Transmission and Distribution (T&D) Morning Report. Questions concerning reporting of other electrocutions of other animals should be referred to Environmental Affairs or your local T&D Environmental Specialist for guidance.

4.2 Retrofitting of Existing Structures

Any SCE power line structure involved in the electrocution of any eagle, endangered/threatened bird species, or other raptor species will be evaluated to determine if it is raptor safe. If not, the structure will be modified within 30 business days or sooner (for eagles or listed species) to make them raptor-safe. Environmental Affairs should be notified if structures of a similar design and in similar habitat are located in the same vicinity of any electrocution. This will allow Environmental Affairs to work with T&D in determining if these other structures should also be retrofitted to be raptor safe. Structures in the area where clusters of electrocutions have occurred *(i.e.,* three or more electrocutions per USGS quad, or two or more electrocutions per circuit) should be examined for retrofitting. Environmental Affairs will work with T&D to identify these clusters, determine which poles may need to be retrofitted, and the appropriate retrofit required.

Page 1 of 2

Example 2 *(con't).*

As opportunities arise during routine operation and maintenance activities, T&D field personnel will retrofit exposed wires and surfaces, as appropriate, if they are capable of electrocuting raptors and other birds/wildlife. Retrofits may include, but are not limited to, installing approved bushing covers on transformers, insulator hoods, protective covering on jumper wires or taps, and making other modifications, as appropriate.

4.3 New Construction
All new or rebuilt power line structures within Raptor Concentration Areas (RCAs) will be of a raptor-safe construction. All new or rebuilt power line structures on land administered by the federal government (USFS, BLM, etc.) will be evaluated by T&D and Environmental Affairs to determine if it should be made raptor safe. Environmental Affairs has identified and mapped RCAs, and will provide guidance on safe designs and copies of RCA maps.

4.4 Monitoring
Environmental Affairs shall monitor raptor mortality and direct appropriate corrective action.

4.5 Nest Protection
All activity involving active nests on SCE facilities will be coordinated with Environmental Affairs and the local T&D Environmental Specialist. Prior to trimming trees, Line Clearing personnel will inspect the trees during the nesting season (January through August) for nests, and avoid any trees with active *(i.e.,* eggs or young birds present) nests. If the trees with nests present an emergency, then Environmental Affairs Land Services will be contacted. Avoiding trees is especially important in the vicinity of riparian areas (streams, creeks or other water bodies). Line Clearing personnel will make every attempt to schedule tree-trimming activity to avoid riparian areas during the nesting season.

4.6 Training
All appropriate T&D field personnel will receive training on avian protection issues annually. All appropriate T&D contractors will receive some level of training on natural resources issues and will have contractual obligations to abide by this training.

5.0 MAINTENANCE
N/A

6.0 ATTACHMENTS
N/A

EFFECTIVE DATE
Operation & Maintenance Policy & Procedures Manual
SCE Internal
EN-5 New: 10-29-2002
APPROVED
AVIAN PROTECTION ON OR NEAR POWER LINES

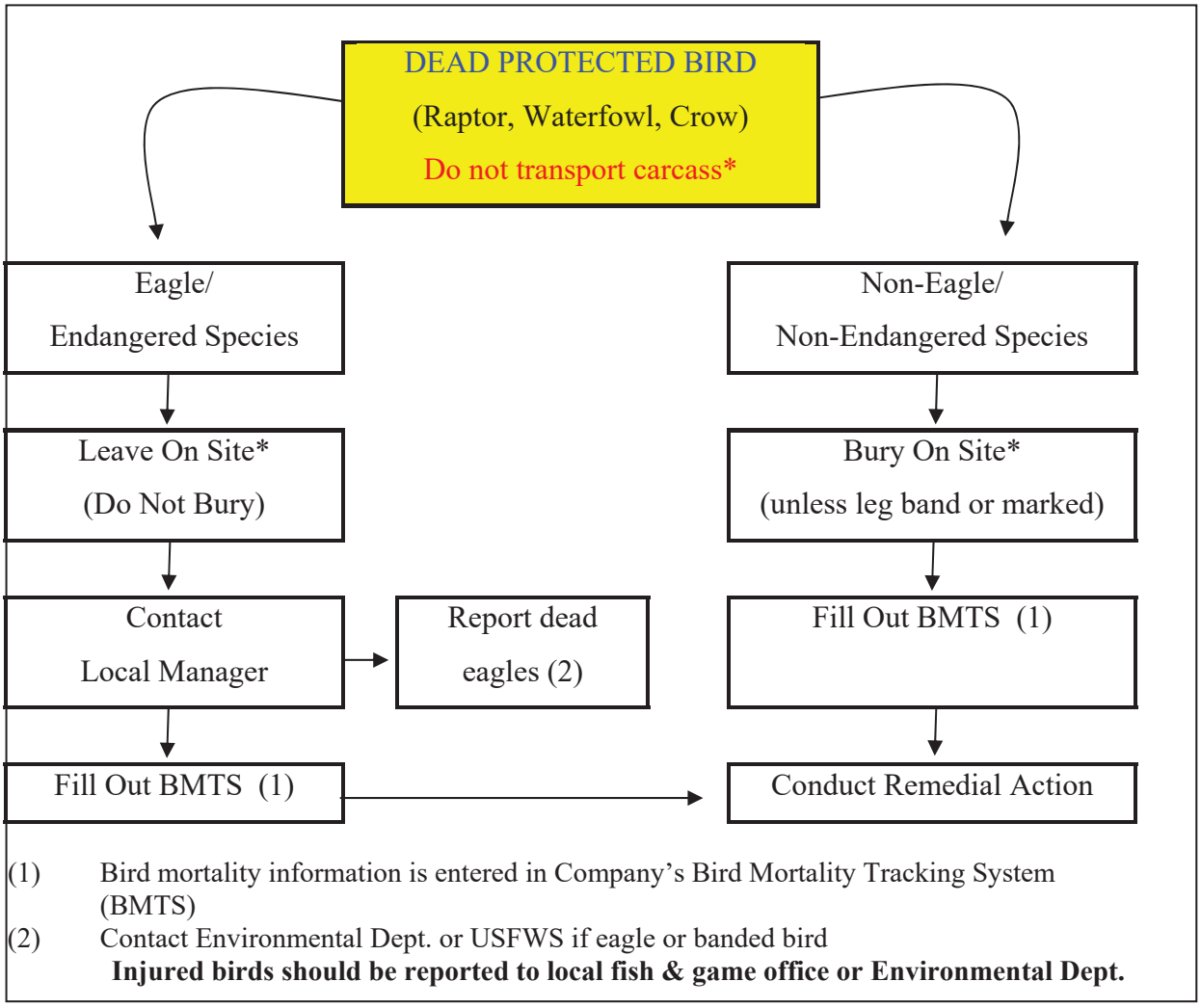
TRAINING

Training is an integral component of an APP. Workshops and short courses on avian/power line interactions are provided by APLIC (http://aplic.org) and EEI (http://eei.org). A two-hour overview of avian electrocutions and collisions intended for training use is also available through the APLIC website as part of the APP "tool box."

The following are examples of PacifiCorp and Southern California Edison training materials, including:

- Flow diagrams of company procedures for bird and nest management that can be distributed to field personnel as part of employee training.
- A brochure describing electrocution and nest issues and company raptor protection procedures.
- A brochure describing nest management procedures and protection.

Example 3. Bird mortality flow diagram based on PacifiCorp training materials.*



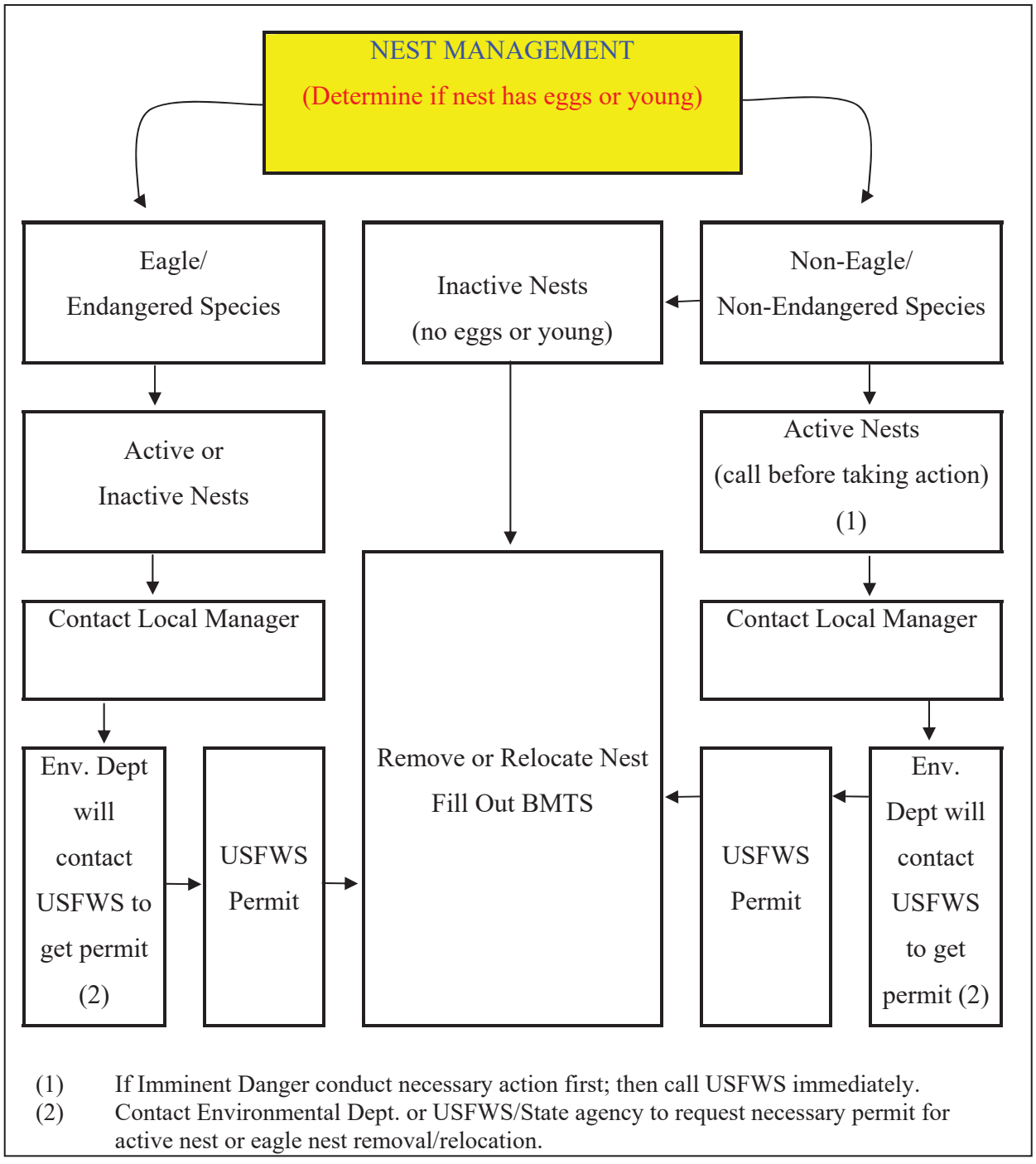
(1) Bird mortality information is entered in Company's Bird Mortality Tracking System (BMTS)

(2) Contact Environmental Dept. or USFWS if eagle or banded bird

Injured birds should be reported to local fish & game office or Environmental Dept.

* *Individual utility permits may contain different conditions regarding transport or salvage.*

Example 4. Nest management flow diagram based on PacifiCorp training materials.*



(1) If Imminent Danger conduct necessary action first; then call USFWS immediately.
(2) Contact Environmental Dept. or USFWS/State agency to request necessary permit for active nest or eagle nest removal/relocation.

* *Individual utility permits may contain different conditions regarding nest management.*

Example 5. "Raptor Protection Program" brochure, Southern California Edison.

SOUTHERN CALIFORNIA EDISON®

An *EDISON INTERNATIONAL*® Company

RAPTOR PROTECTION PROGRAM

Raptor Protection Program Goals

Raptors, or birds of prey, are meat-eating birds that include the hawks, eagles, and owls. Most species of raptors are protected under one or more laws and/or regulations.

Edison's Raptor Protection Program is designed to:

1. Reduce impacts to raptors.
2. Ensure compliance with state and federal laws and rules and regulations protecting these species.
3. Gather and provide information from operating divisions within Edison to Environmental Affairs on facility-caused electrocutions. This information will assist Environmental Affairs in responding to regulatory agency inquiries and provide informed responses to concerns expressed by the public.
4. Assist Company biologists in identifying problem areas where raptor protection may be required. Selectively identify and install cost-effective raptor protection devices to ensure Company compliance with existing laws and regulations.
5. Help identify and isolate where bird-caused outages occur so that these can be minimized, providing higher levels of quality service to our customers.

Example 5 *(con't).*

Raptor Protection

Electrocutions

Raptors often perch or nest on transmission or distribution towers or poles. Occasionally, the birds will make accidental contact between phases or phase and ground, causing harm to or electrocuting the bird. These electrocutions are most common on distribution or subtransmission facilities where energized conductors are close together.

The number of electrocutions can be decreased by either designing the line to minimize contact between phases, or by retrofitting existing lines where necessary with a protective device that prevents this contact. Studies have demonstrated that raptors prefer certain poles for nesting and perching. By identifying these preferred poles, we can modify them, and thus greatly diminish the potential for raptor electrocutions in a cost-effective manner.

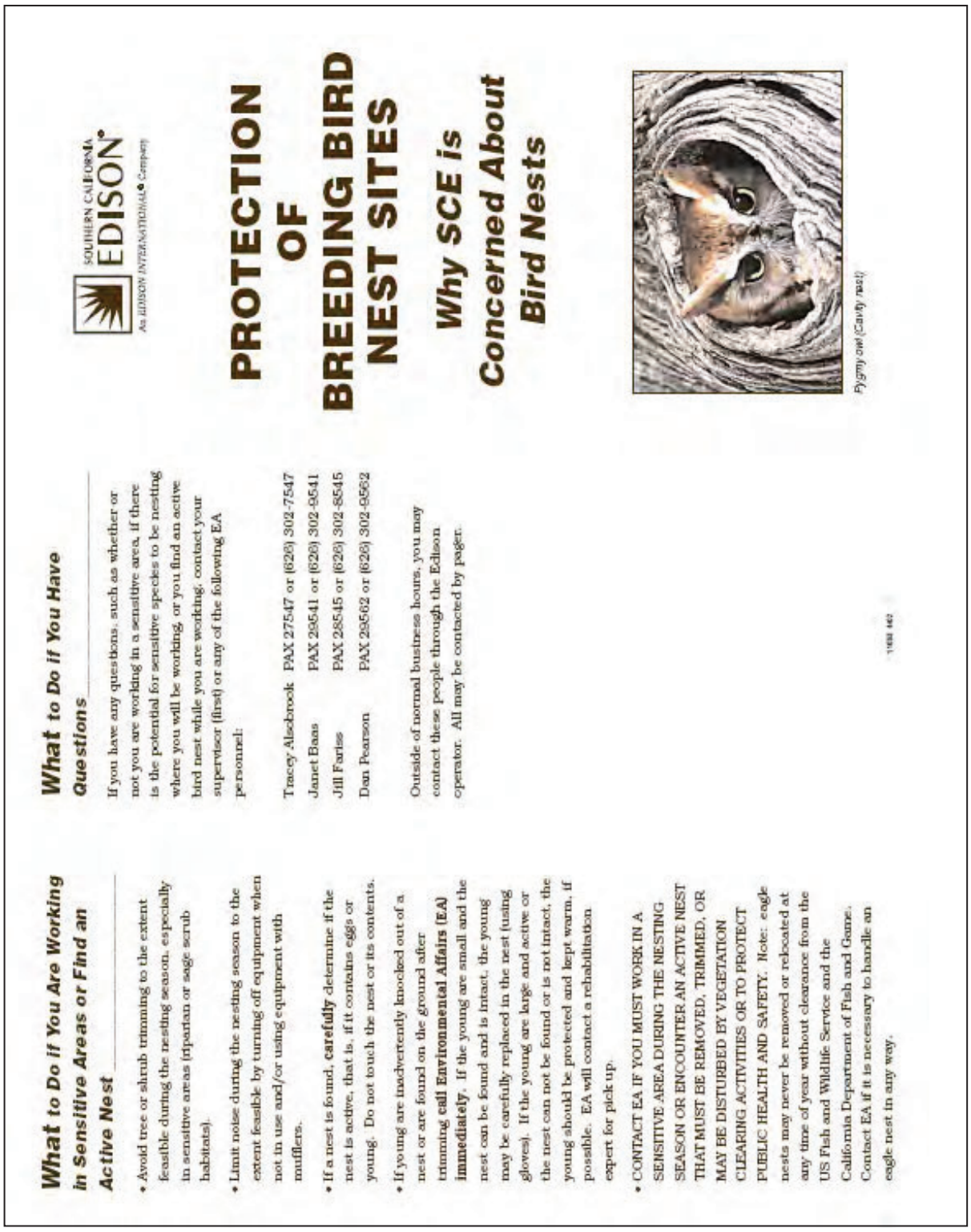
Nest Protection

In the absence of other suitable nest sites, raptors often use transmission towers and distribution poles for nesting. State and federal laws and regulations protect these nests from removal at certain times of the year without necessary permits. It is important that nests not be disturbed when eggs or young birds are in them.

Raptor Protection Program Procedures

1. All incidents of facility-related raptor mortality should be reported to your supervisor. You should then fill out the raptor mortality report form available in all district offices or from your supervisor. The completed form should be sent to Environmental Affairs in the General Office.
2. From February through June, nests should not be removed or disturbed. Under no circumstances should known eagle nests be disturbed at any time of the year.
3. If a nest is discovered during this February–June period that presents a hazardous situation for the continued safe operation of the line, try to trim the nest rather than remove it. If a nest must be removed, call Environmental Affairs. Environmental Affairs possesses or will obtain the necessary permits for removing nests.
4. If at any time you have questions regarding these procedures, please discuss them with your supervisor or call Environmental Affairs, Dan Pearson at PAX 29562, or Janet Baas at PAX 29541.

Example 6. "Protection of Breeding Bird Nest Sites" brochure, Southern California Edison.



PROTECTION OF BREEDING BIRD NEST SITES

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Why SCE is Concerned About Bird Nests

Pygmy owl (Cavity nest)

What to Do if You Have Questions

If you have any questions, such as whether or not you are working in a sensitive area, if there is the potential for sensitive species to be nesting where you will be working, or you find an active bird nest while you are working, contact your supervisor (first) or any of the following EA personnel:

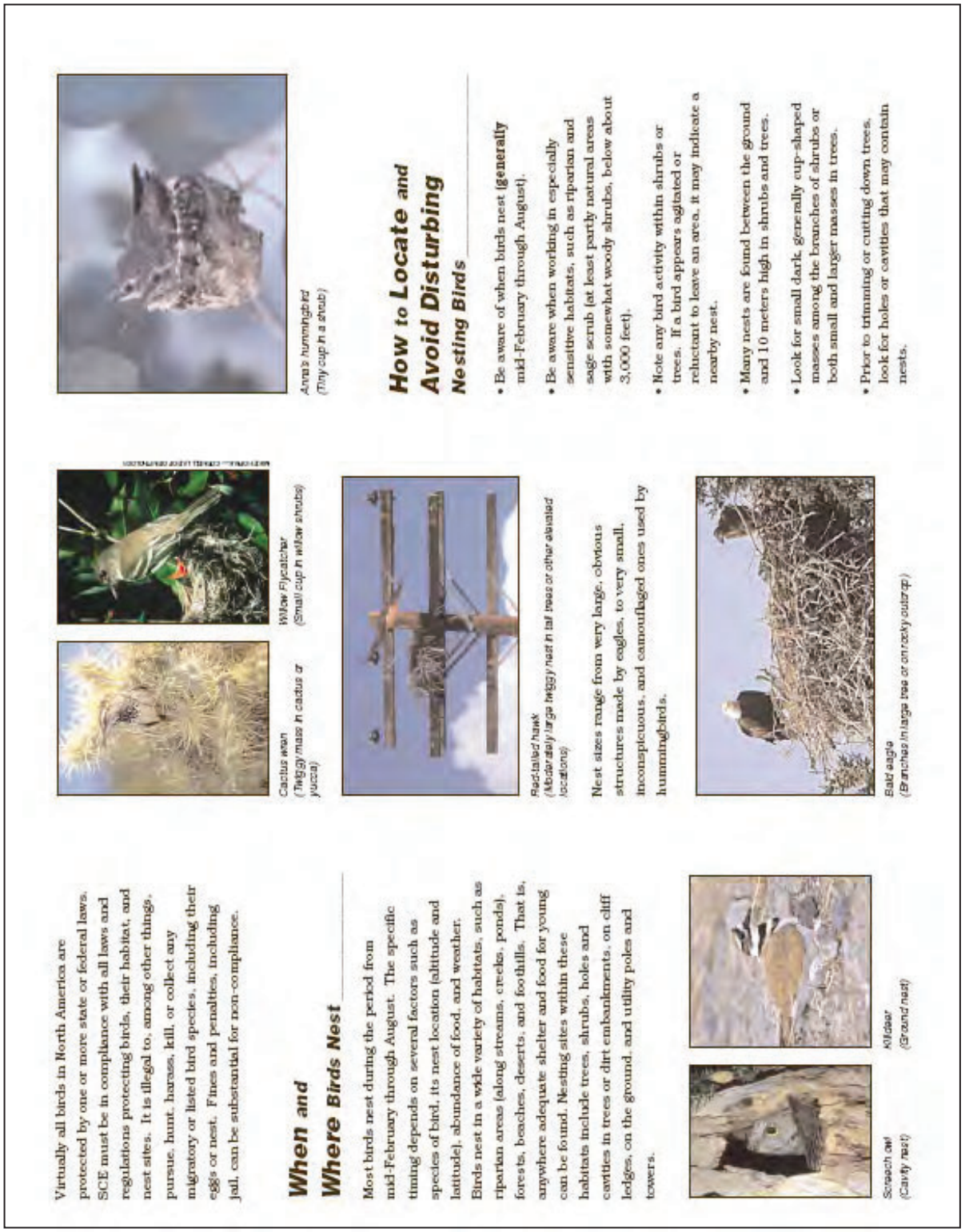
Tracey Alsobrook	PAX 27547	or (626) 302-7547
Janet Baas	PAX 29541	or (626) 302-9541
Jill Farlss	PAX 28545	or (626) 302-8545
Dan Pearson	PAX 29562	or (626) 302-9562

Outside of normal business hours, you may contact these people through the Edison operator. All may be contacted by pager.

What to Do if You Are Working in Sensitive Areas or Find an Active Nest

- Avoid tree or shrub trimming to the extent feasible during the nesting season, especially in sensitive areas (riparian or sage scrub habitats).
- Limit noise during the nesting season to the extent feasible by turning off equipment when not in use and/or using equipment with mufflers.
- If a nest is found, **carefully** determine if the nest is active, that is, if it contains eggs or young. Do not touch the nest or its contents.
- If young are inadvertently knocked out of a nest or are found on the ground after trimming **call Environmental Affairs (EA) immediately.** If the young are small and the nest can be found and is intact, the young may be carefully replaced in the nest (using gloves). If the young are large and active or the nest can not be found or is not intact, the young should be protected and kept warm, if possible. EA will contact a rehabilitation expert for pick up.
- CONTACT EA IF YOU MUST WORK IN A SENSITIVE AREA DURING THE NESTING SEASON OR ENCOUNTER AN ACTIVE NEST THAT MUST BE REMOVED, TRIMMED, OR MAY BE DISTURBED BY VEGETATION CLEARING ACTIVITIES OR TO PROTECT PUBLIC HEALTH AND SAFETY. Note: eagle nests may never be removed or relocated at any time of year without clearance from the US Fish and Wildlife Service and the California Department of Fish and Game. Contact EA if it is necessary to handle an eagle nest in any way.

Example 6 *(con't).*



PERMIT COMPLIANCE

A company should work with resource agencies to determine if permits are required for their operational activities that may impact protected avian species. Particular attention should be given to specific activities that can require Special Purpose or related permits, including, but not limited to, nest relocation, temporary possession, depredation, salvage/disposal, and scientific collection.

While it is recommended that each utility developing an APP familiarize itself with the different permit types and their provisions located in 50 CFR part 21 (http://access.gpo.gov/nara/cfr/waisidx_03/50cfr21_03.html), it is highly recommended that the utility make initial contact with the Migratory Bird Permit Examiner located in the USFWS Region where the utility is specifically planning to implement its APP. The Migratory Bird Permit Offices in each of the USFWS's seven Regions are listed on pages 69 and 70 of the Key Resources section.

To acquire a permit application, contact the Migratory Bird Permit Office in the Region where your business is headquartered or in the Region (if it is different) where you propose to implement your APP. Information about Regional boundaries can be accessed at htpp://permits.fws.gov/mbpermits/birdbasics.html then click on Regional Bird Permit Offices, for locations and addresses (listed on pages 69 and 70 in the Key Resources section).

State permits may also be required to manage protected bird nests or for temporary possession of avian species. Specific information on required permits should be obtained from your State resource agency (see Key Resources, pages 76-78, for State agency contacts). Both State and Federal agencies should be consulted as you develop your APP.

Migratory Bird Treaty Act and Migratory Bird Permits

USFWS Regional offices administer permits for qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, rehabilitation, conservation education, migratory game bird propagation, salvage, take of

depredating birds, taxidermy, and waterfowl sale and disposal. These offices also administer permit activities involving bald and golden eagles, as authorized by the BGEPA.

The MBTA makes it illegal for anyone, including individuals, companies, or agencies, to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except (1) under the terms of a valid permit issued pursuant to Federal regulations or (2)under the terms of a regulation not requiring a permit. The migratory bird species protected by the Act are listed in 50 CFR 10.13 (this list is available online at http://migratorybirds.fws.gov/intrnltr/mbta/mbtintro.html).

Migratory bird permit policy is developed by the Division of Migratory Bird Management and the permits themselves are issued by the Regional Migratory Bird Permit Offices. The regulations governing migratory bird permits can be found in 50 CFR part 13, General Permit Procedures (http://access.gpo.gov/nara/cfr/waisidx_03/50cfr13_03.html) and 50 CFR part 21, Migratory Bird Permits (http://access.gpo.gov/nara/cfr/waisidx_03/50cfr21_03.html).

Bald and Golden Eagle Protection Act and Eagle Permits

The two species of eagles that are native to the United States have additional protection under the BGEPA. Under the Act, USFWS issues permits to take, possess, and transport bald and golden eagles for scientific, educational, and Indian religious purposes, depredation, and falconry (golden eagles). No permit authorizes the sale, purchase, barter, trade, importation, or exportation of eagles, or their parts or feathers. The regulations governing eagle permits can be found in 50 CFR part 13, General Permit Procedures (http://access.gpo.gov/nara/cfr/waisidx_03/50cfr13_03.html) and 50 CFR part 22, Eagle Permits (http://access.gpo.gov/nara/cfr/waisidx_03/50cfr22_03.html).

Federally Listed Species (Endangered Species Act)

To obtain a list of all federally-listed (threatened and endangered) birds, or all federally-listed fauna and flora, consult 50 CFR part 17.11. This list is available online at http://endangered.fws.gov/wildlife.html.

Where power companies propose to construct power generation, transmission, or related equipment on Federal lands, the federal land management agency must first consult under Section 7 of the ESA with USFWS. Before initiating an action, the Federal action agency (the agency authorizing a specific action) or its non-Federal permit applicant (the power company), must ask USFWS for a biological opinion (if a listed species could be impacted) and to provide a list of threatened, endangered, proposed, and candidate species and designated critical habitats that may be present in the project area. USFWS has developed a handbook describing the consultation process in detail, which is available at http://endangered.fws.gov/consultations.

When non-Federal activities (activities not on Federal lands and/or lacking a Federal nexus such as Federal funding) could result in a take of threatened or endangered species, an incidental take permit is required under Section 10 of the ESA. Some states may also have regulations that require issuance of permits or development of conservation plans. The standards for approval of an incidental take permit are found in section 10 of the ESA. Approval of an incidental take permit issued in conjunction with a Habitat Conservation Plan (HCP) requires the Secretary of Interior to find, after an opportunity for public comment, that among other things, the taking of ESA species will be incidental and that the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking. An HCP must accompany an application for an incidental take permit. The HCP associated with the permit is to ensure that there are adequate conservation measures to avoid jeopardy to the species. Information about consultations and HCPs can be obtained from the nearest USFWS Ecological Services Field Office, generally located in each state. A list of those offices and their phone numbers can be accessed at http://info.fws.gov/pocketguide.

CONSTRUCTION DESIGN STANDARDS*

In certain habitats that have power equipment and the potential for avian interactions, the design and installation of new facilities, as well as the operation and maintenance of existing facilities should be bird friendly. Inclusions of accepted construction standards for both new and retrofit techniques are highly recommended for inclusion in an APP. Companies can either rely upon construction design standards found in APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*, or the most current editions of these documents, or may choose to develop their own internal construction standards that meet or exceed these guidelines. These standards should be used in areas where new construction should be avian-safe, as well as where existing infrastructure needs to be retrofitted. An APP bird policy may require that all new or rebuilt lines in identified avian use or problem areas be built to current safe standards. Implementing avian-safe construction standards in such areas will reduce future legal and public relations problems and enhance service reliability.

New Construction

Distribution, transmission and substation construction standards must meet National Electric Safety Code (NESC) requirements and should provide general information on specialized construction designs for avian use areas. Avian-safe construction, designed to prevent electrocutions, must provide conductor separation of 60 inches between energized conductors and grounded hardware, or must cover energized parts and hardware if such spacing is not possible. Some common examples of avian-safe construction and retrofit techniques to reduce electrocution risks are presented in this section. Additional information can be found in *Suggested Practices for Raptor Protection on Power Lines.*

In areas where birds frequently collide with conductors/ground wires, or where

* Only examples of common structure configurations are presented in these Guidelines. See current edition of *Suggested Practices* for additional configurations and recommendations.

agencies are concerned about the safety of protected birds (*e.g.*, near wildlife refuges), appropriate siting and placement of lines will reduce the likelihood of collisions. When possible, avoid siting lines in areas where birds concentrate (*e.g.*, wetlands, stream crossings, historic staging areas, roosts, and nesting colonies) and take advantage of vegetation or topography that naturally shields birds from colliding with the wires (*e.g.*, placement next to cliffs or trees). If this is not possible, installing visibility enhancement devices can reduce the risk of collision on new or existing lines (see pages 43-44). These devices include marker balls, bird diverters, or other line visibility devices placed in varying configurations, depending on the line design and location. The effectiveness of these devices has been validated by Federal and State agencies and independent researchers in conjunction with APLIC. Additional information may be found in *Mitigating Bird Collisions with Power Lines.* In some situations, the additional costs and reliability risk of under grounding a section of line may be justified.

Modification of Existing Facilities

Modification of existing facilities is necessary when dead and/or injured protected birds are found, where high-risk lines are identified, or concerns of legal compliance are at issue. A “problem pole” is one where there has been a documented avian collision, electrocution, problem nest material or where there is a high risk of an avian mortality. The need for this remedial action may result when "problem poles" are identified through bird mortality records or field surveys, or when the company is notified by agency representatives or concerned customers. System reliability concerns due to bird interactions may also result in requests from field operations staff. Retrofitting to prevent electrocutions could include: 1) covering jumper wires, conductors and equipment; 2) discouraging perching in unsafe areas; 3) reframing; or 4) replacing a structure.

The objectives of remedial action are to:

1. Prevent or reduce avian mortality and outages related to bird electrocutions, collisions, or nests;

2. Provide 60-inch minimum horizontal separation between energized conductors and/or energized conductors and grounded hardware;
3. Insulate hardware or conductors against simultaneous contact if adequate spacing is not possible;
4. Discourage birds from perching in unsafe locations;
5. Provide safe alternative locations for perching or nesting; or
6. Increase the visibility of conductors or shield wires to prevent avian collisions.

Site-Specific Plans

The factors that create a hazard for birds near power lines are complex and often site-specific. Therefore, the most efficient solution for correcting a problem line is a site-specific plan that satisfies unique local conditions (*i.e.*, topography, avian populations, prey populations, land use practices, line configuration, adjacent wetlands, historical bird use areas, etc.). The plan is comprised of recommendations for the most appropriate remedial action to the poles or lines causing the problem, and should include a timetable for job completion. When a problem area or line is identified, a site meeting may be conducted with engineering and operations personnel to provide guidance on line modifications, and with company biologists or consultants to provide input on biological aspects of the affected species. The timeframe for action will be based on agency requests, public relations, budget, logistical and manpower constraints, as well as biological considerations that affect species vulnerability. The application of remedial measures to a few "problem poles" or spans can reduce problems over a wide area.

Electrocutions: Avian-Risk Designs

This section provides information about designs which have historically caused avian electrocution problems. These designs should be avoided in known raptor or other protected bird use areas and rural sites.

Most lines that electrocute raptors or other large birds are primary distribution lines. Problems occur most often when:

1. The distance between conductors is less than the wingspan or height of a landing or perching bird (see Figure 3).
2. Hardware or equipment cases are grounded and are in close proximity to energized conductors, energized parts or jumper wires (see Figure 4).

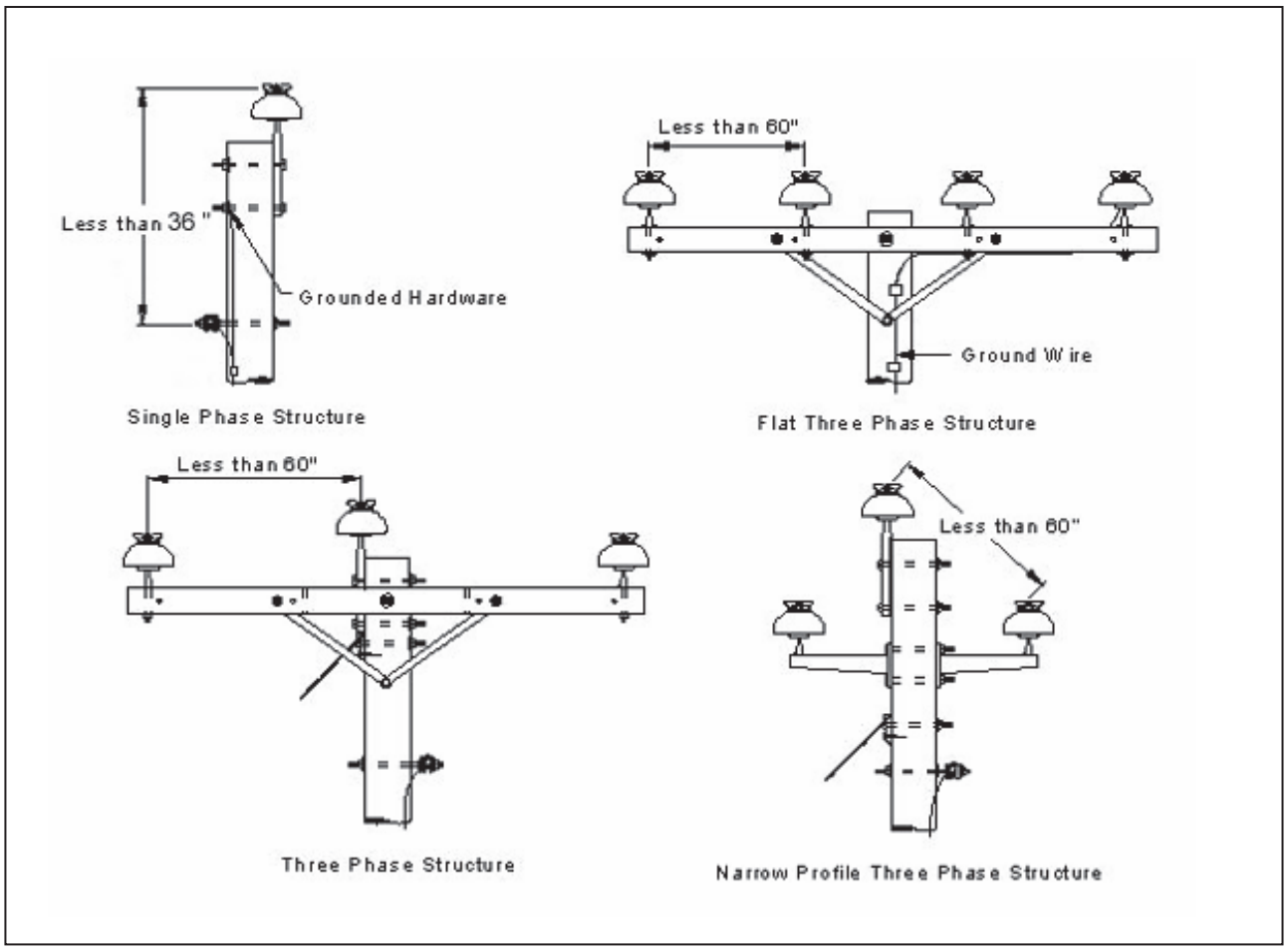


Figure 3. Typical avian-risk structures.

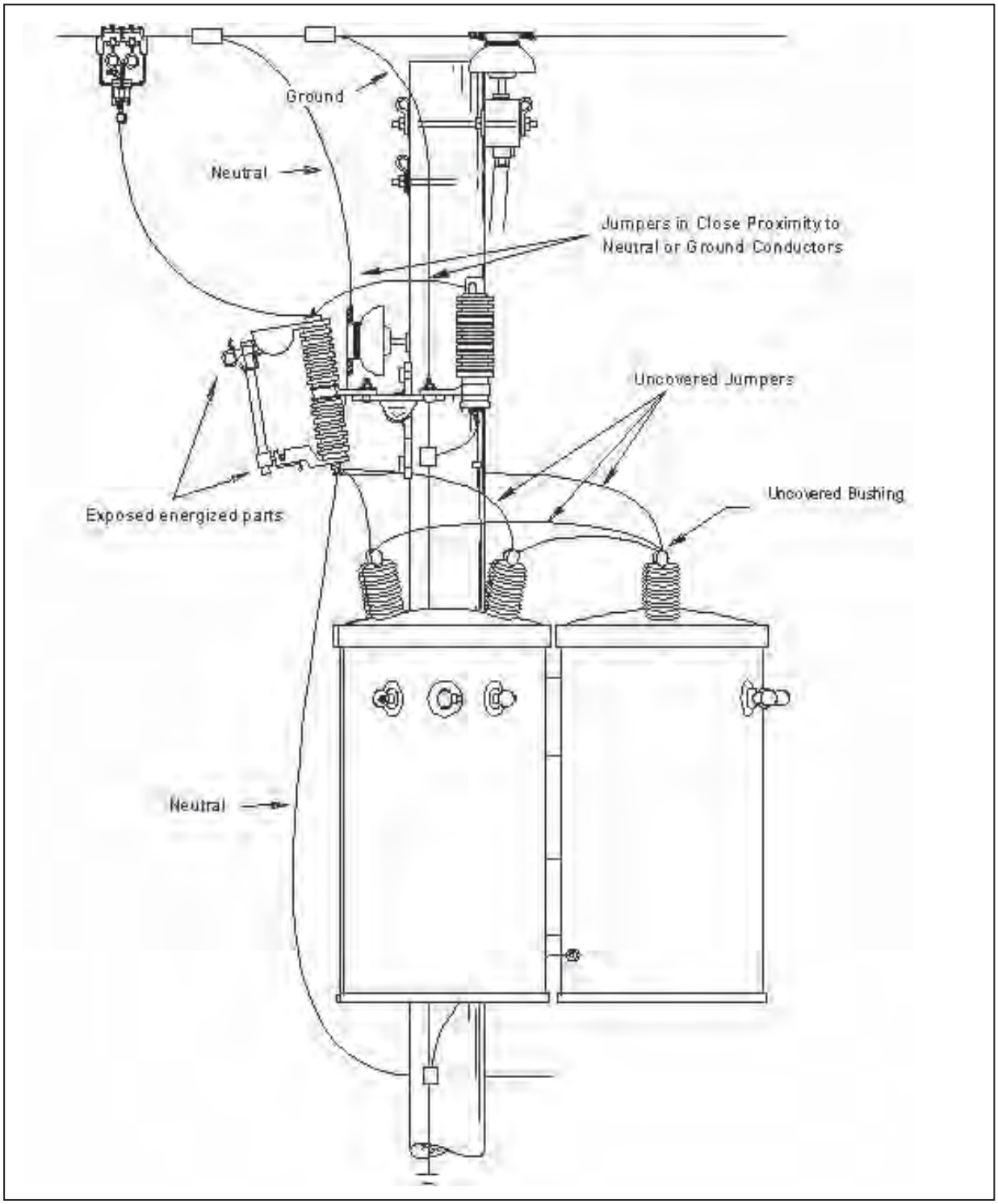


Figure 4. Typical avian-risk equipment structure.

This section provides information on designs and criteria for constructing new lines or rebuilding existing lines to avian-safe standards.

Proper Design of New Facilities

The following dimensions for primary structures are intended for use in areas with populations of raptors or other large birds or in rural sites (areas outside city limits or beyond incorporated areas with commercial or residential development). Nonetheless, avian-safe construction should be considered to improve system reliability and avian protection whenever it does not conflict with other considerations. When a new line or extension is designed, avian-safe standards for construction of the distribution system should be followed (see Figures 5 and 6 for typical safe designs).

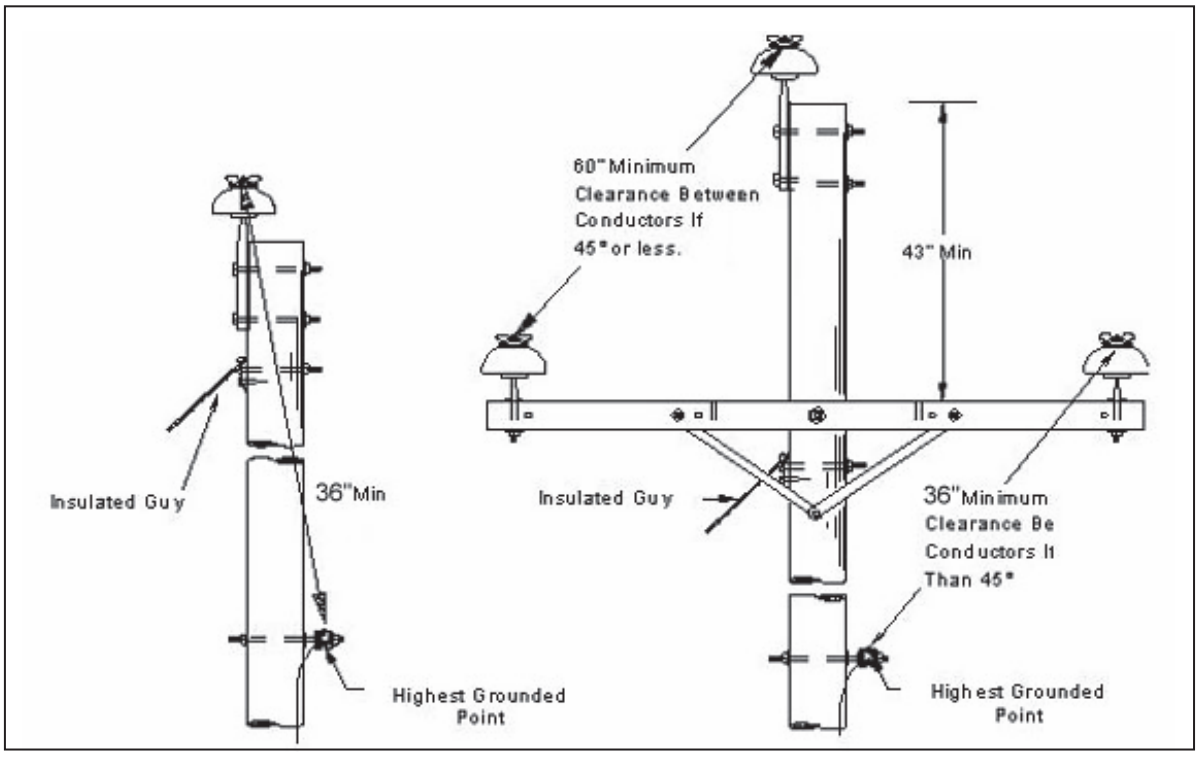


Figure 5. Typical avian safe structures: single phase (left), three-phase with lowered 8-foot crossarm (right).

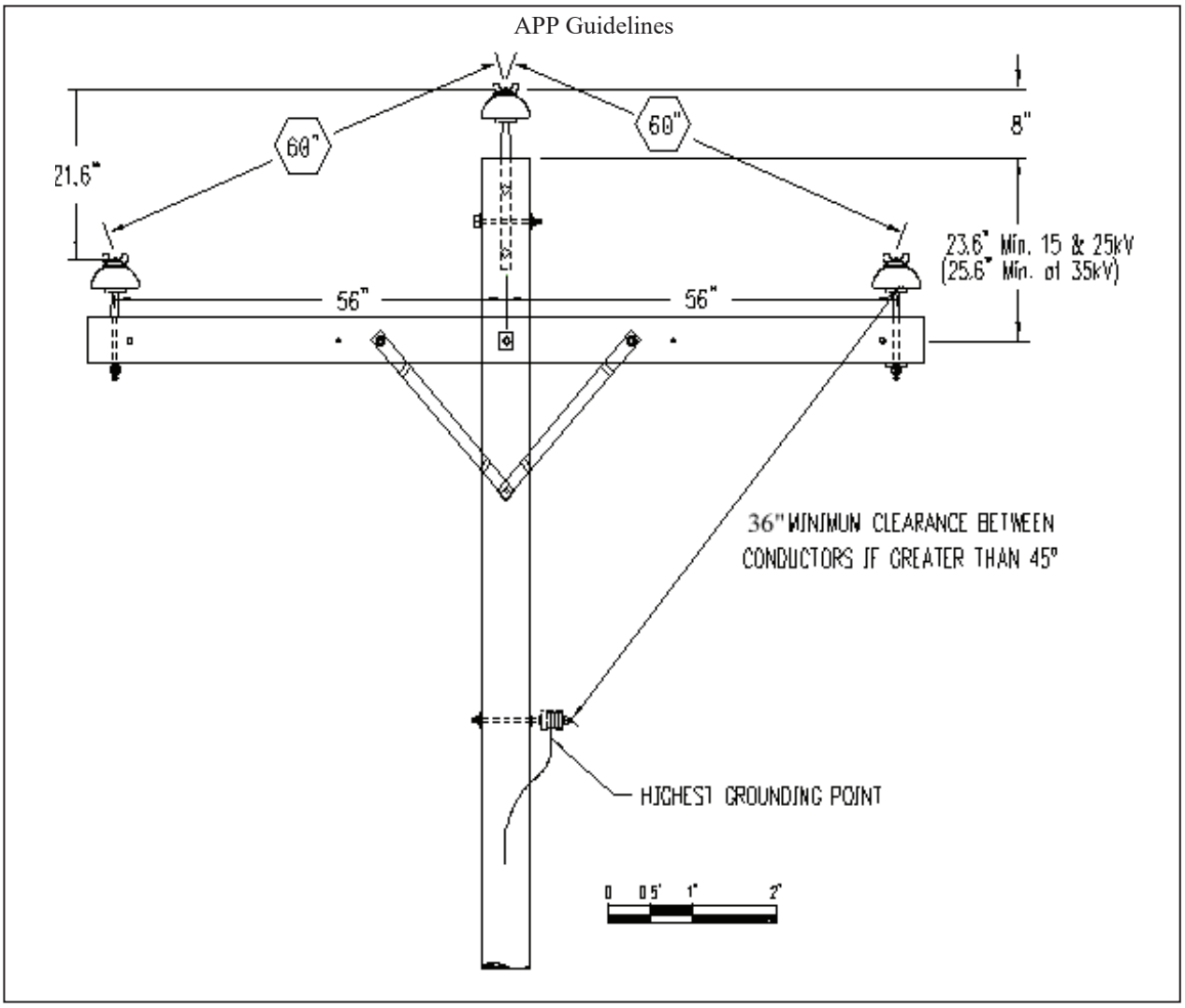


Figure 6. Typical three–phase avian-safe structure with 10–foot crossarm.

On single phase structures, a minimum vertical separation of 36 inches from phase to ground is needed to safely accommodate eagles and most wading birds (Figure 5). On three phase structures, a vertical clearance of at least 43 inches between un-insulated conductors, ground wires and grounded hardware on poles with 8-foot crossarms will provide the 60-inch required clearance (Figure 5). Separation can be accomplished by lowering crossarms and neutral attachments, or if vertical space is not available, an 8–foot crossarm can be replaced with a 10–foot arm (see Figure 6). If there is not enough pole height to drop the crossarm, a 10-foot crossarm can be the economical choice. Structural strength of the longer arm must be considered if the arm is replaced. Also, narrow rights-of-way may dictate the horizontal width of a crossarm, possibly requiring more pole height to achieve avian-safe spacing. Regardless of the configuration, hardware should not be grounded above the neutral position.

An alternate method for ensuring separation of energized conductors is to use vertical construction (see Figure 7). This is not the preferred method of separation, since considerable pole height is required to attain adequate clearance, making this an expensive solution. However, it may be useful in some situations, such as turning corners, where normal separation methods are not possible.

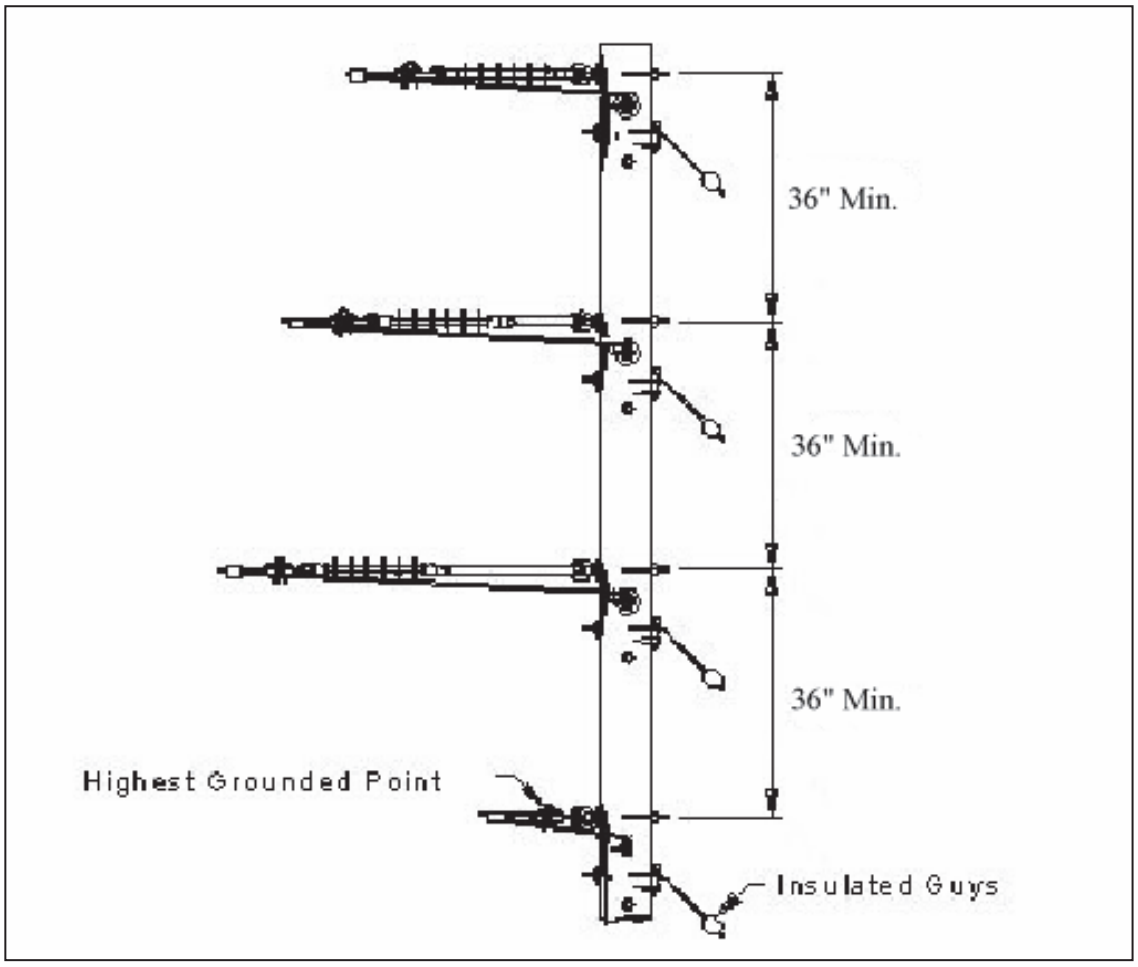


Figure 7. Typical avian-safe three-phase vertical corner configuration.

Modification of Existing Structures

On existing structures where raptors or other large birds have been electrocuted or injured, the preferred remedial measure is to provide 60–inch separation between energized conductors. Reframing using a 10–foot crossarm which allows 60–inch separation between conductors may be a suitable alternative to pole replacement.

However, pole replacement utilizing a safe design may be required on poles where bird mortalities have been documented and other safe modifications are not feasible due to pole height or condition.

Other remedial options include covering conductors and equipment or installing bird perch guards (triangles) or triangles with perches. These options do not offer total protection for birds, but may greatly reduce the chance of avian electrocutions. These options should be used when separation of the conductors is not possible, or where equipment is on the pole.

Perches and Guards

If conductor separation cannot be achieved and covering or reframing is impractical, perch guards (triangles) with optional perches may be used for large perching bird protection (Figure 8). Since raptors will often perch on the highest vantage point, the installation of perch guards between closely-spaced conductors and the placement of perches above existing arms and conductors may keep a bird from contacting energized parts or wires. Perches may not be effective when used without perch guards. Perches and guards, when properly installed, are not an absolute solution, but they do reduce the risk to birds. Ideally, when a perch guard is installed, an alternative, safe perch site should be provided. The open part of the crossarm, as shown in Figure 8, could serve as such a site. Perch guards are generally 18 to 22 inches wide and should not be used when conductor spacing is greater than 32 inches. When spacing is between 32 and 60 inches, use an insulator cover (see Figure 9) instead of a triangle or perch. Protective equipment should not be installed when conductors are more than 60 inches apart.

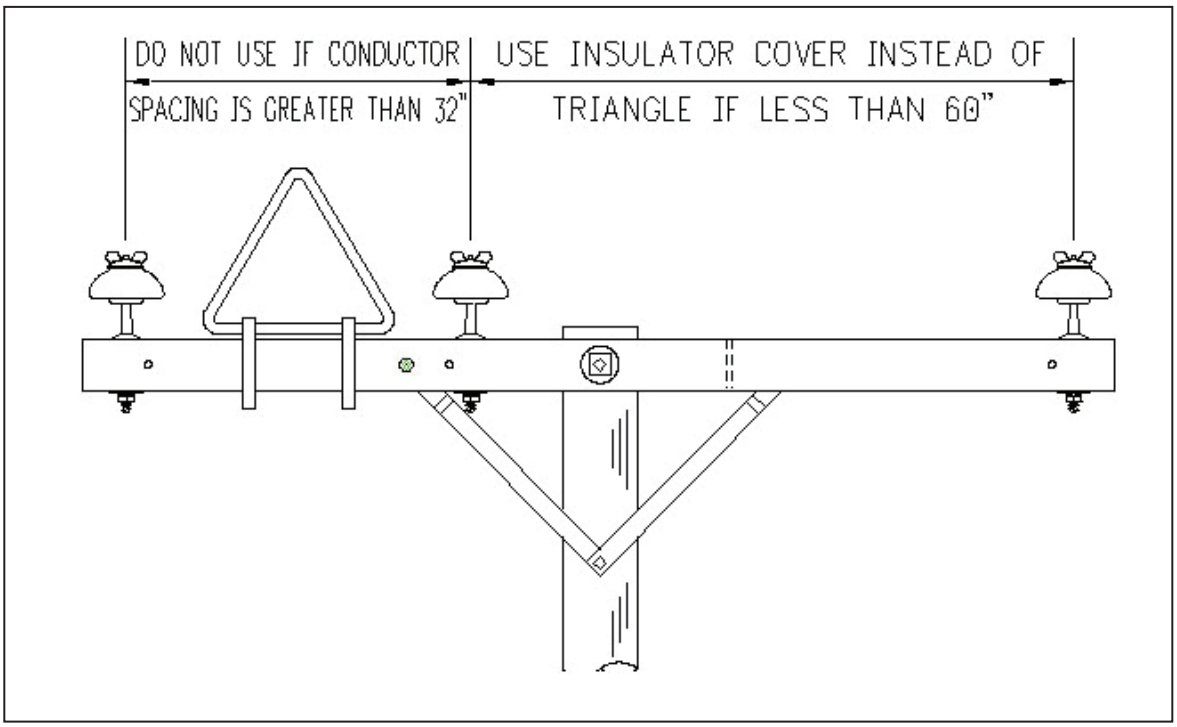


Figure 8. Properly installed perch guard.

Covering Conductors

Where adequate separation of conductors, or conductors and grounded parts, cannot be achieved, covering conductors may be the only solution short of reframing or replacing structures. Covering material should be used to cover both the conductor and the insulator. On three phase structures, the cover should extend a minimum of three feet from the pole top pin insulator (see Figure 9). Occasionally, on double circuits or distribution underbuild, a smaller (32 to 36-inch) one–piece cover may be used in areas where eagles or other large birds are absent. There are many manufactures of insulator covers. Insulator covers are similar to the temporary cover-ups used to protect crews working on energized lines. ***However, the products should not be used for human protection or considered as insulation.***

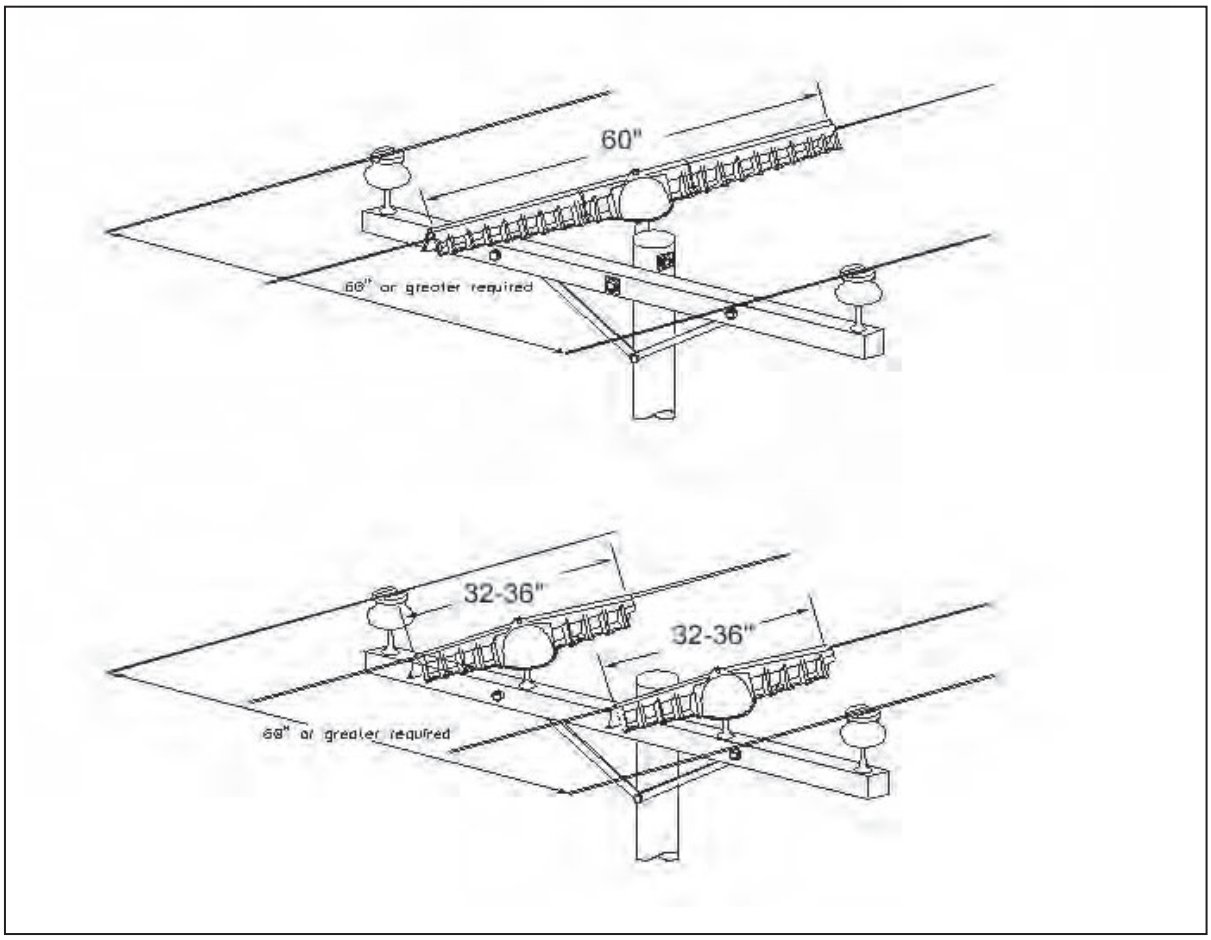


Figure 9. Conductor and insulator covers.

Covering Equipment Parts

If transformers, cutouts or other energized or grounded equipment are present on the structure, jumpers, cutouts and bushings should be covered to decrease the chance of a bird electrocution (Figure 10). For jumper wires, use a bird jumper wire guard, cover-up hose or insulated power cable. For cutouts, various covers are available to fit different sizes and styles of cutouts. For bushings, use a bushing guard that provides the protection needed. (*Note* - Your APP should include specifications on materials your utility will accept).

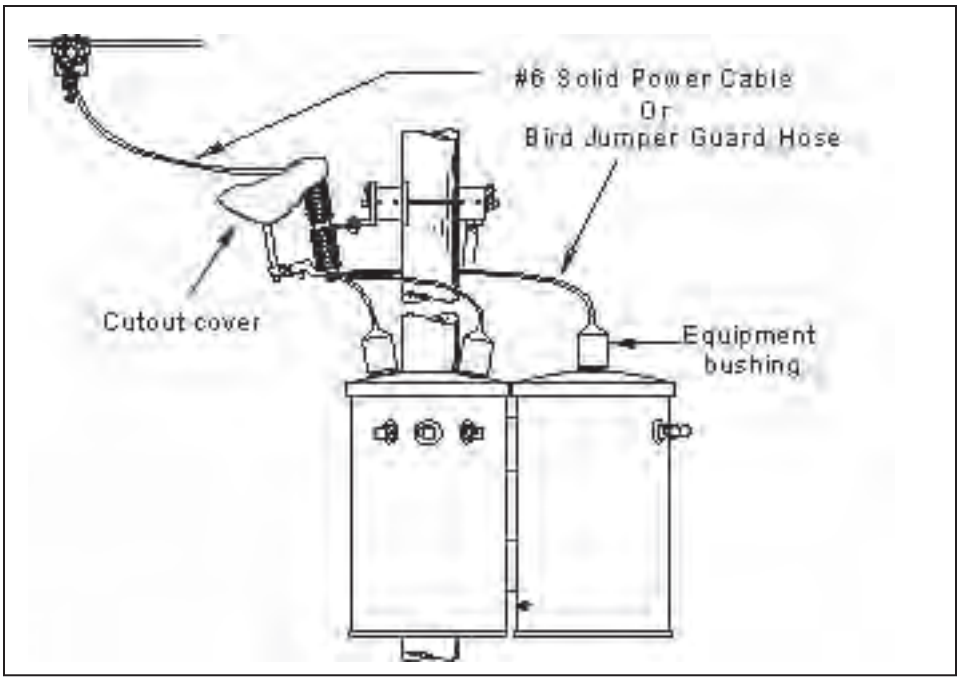


Figure 10. Hose and bushing caps.

Collisions: Bird Protection

The proximity of a line to high bird-use areas, vegetation that may attract the birds, and topographical features that affect local and migratory movements should be considered when determining the extent of necessary remedial action or when siting a new line. Avoiding construction of new lines in areas of high bird use may be the best way to prevent or minimize collision issues.

On existing lines, the risk of collision may be reduced or eliminated by burying or relocating the line, reconfiguring the line, removing the overhead ground wire, or marking the line to increase visibility. Because in most instances remediation of only a few spans will eliminate the problem, burying, relocating or reconfiguring the line are not cost-effective solutions. Removal of the overhead ground wire may not be feasible due to operational or safety concerns. However, research indicates that marking the shield wire (transmission lines) or conductors (distribution lines) to increase visibility significantly reduces the incidence of avian collisions.

Marker balls, swinging markers, bird flight diverters, or other similar devices are commercially available products designed to increase the visibility of overhead wires to

birds. Examples of one type of swinging marker and a bird flight diverter are shown in Figure 11. While some older clamping devices could damage lines, some of the newer devices have been designed to prevent damage to lines.

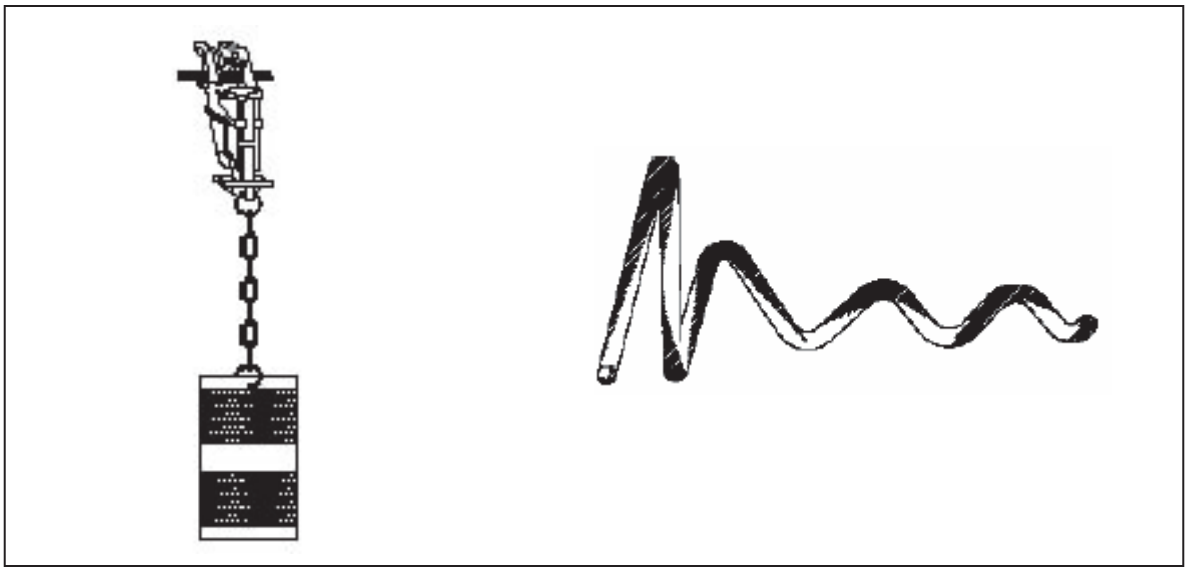


Figure 11. Swinging marker device (left) and bird flight diverter (right).

NEST MANAGEMENT

Raptors, and some other avian species, benefit from the presence of power lines by utilizing distribution poles and transmission structures for nesting. Although electrocution of birds that nest on transmission towers is infrequent, bird nests can cause operational problems. Removal of nests generally does not solve the problem because most species are site-tenacious and rebuild shortly after the nest material is removed. There are also regulatory and public relations components to nest removal (see Permit Compliance section for information on nest-related permits). Further, companies may experience public relations benefits by providing safe nesting locations. All active nests (eggs or young present) of designated migratory birds are protected by the Migratory Bird Treaty Act. A permit issued by USFWS may be required before managing an active nest. If a problem with a specific nest is anticipated, permit requirements may be avoided by removing the nest or taking the appropriate action during the non-breeding season while it is inactive (excluding eagles and endangered/threatened species). The breeding season and dates when nests may be active varies by location and species, but for most North American raptors falls between February 1 and August 31. However, a nest is considered active only when eggs or young are present. If there are questions whether a problem nest is active or inactive, company environmental staff, USFWS, or State wildlife agencies should be consulted.

A memorandum from USFWS on nest management and nest destruction is provided in Figure 12 (page 47). This document can also be accessed online at http://permits.fws.gov/mbpermits/PoliciesHandbooks/MBPM-2.nest.PDF.

Nesting platforms have proven to be valuable tools in dealing with problem nests, both in terms of reducing outages and increasing positive publicity. Nesting platforms are generally needed more often for problem nests on distribution poles (because of closely spaced conductors) than for those on transmission towers. Platforms provide for the needs of the birds, while preventing electrocutions and electrical outages. Artificial nesting substrates in a variety of designs are often accepted by nesting raptors, especially ospreys. Because birds usually tend to stay at the pole where the initial nesting attempt occurs, a nesting platform should be placed nearby on a new, non-energized pole and

perch discourager(s) installed on the existing structure. The new nest platform pole should be as tall as or taller than the existing pole and should be placed adjacent to or near the existing pole with the problem nest. In some cases a new pole cannot be installed so a nest platform can be mounted above the crossarm. Mounting a nest platform above energized equipment is not encouraged because birds are likely to drop nest materials that could cause a fire or outage. Nest discouragers should be erected on the original nest pole to prevent birds from rebuilding. The existing nest, or other nesting material, should be relocated to the new platform to attract the birds. Nest platforms are commercially available or can be constructed with materials on hand such as wire spool ends or wooden pallets. In addition, volunteers can be solicited to construct nest platforms. Dimensions for a raptor nest platform are provided in the Avian Enhancement Options section (see Figure 14 on page 65). Additional designs can be found in *Suggested Practices.*

There may be times when nesting should be discouraged to prevent avian electrocutions or risks to electrical equipment. Concerns of local customers should be considered and proper placement of perch discouragers is important. Plastic or metal spike discouragers are not recommended to prevent nesting because they may actually provide a nest substrate attachment point for some species. PVC or fiberglass material perch discouragers, mounted on the crossarm, will usually prevent the placement of nesting material. See *Suggested Practices* for additional recommendations on nest deterrents.

Figure 12. USFWS memo on migratory bird nest destruction.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Washington, D C 20240
MBPM-2
Date: APR 15, 2003

MIGRATORY BIRD PERMIT MEMORANDUM

SUBJECT: Nest Destruction

PURPOSE: The purpose of the memorandum is to clarify the application of the Migratory Bird Treaty Act (MBTA) to migratory bird nest destruction, and to provide guidance for advising the public regarding this issue.

POLICY: The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. To minimize MBTA violations, Service employees should make every effort to inform the public of how to minimize the risk of taking migratory bird species whose nesting behaviors make it difficult to determine occupancy status or continuing nest dependency.

The MBTA specifically protects migratory bird nests from *possession, sale, purchase, barter, transport, import,* and *export,* and *take.* The other prohibitions of the MBTA - *capture, pursue, hunt,* and *kill* - are inapplicable to nests. The regulatory definition of *take,* as defined by 50 CFR 10.12, *means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt hunt, shoot, wound, kill, trap, capture, or collect.* Only *collect* applies to nests.

While it is illegal to collect, possess, and by any means transfer possession of any migratory bird nest, the MBTA does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. The MBTA does not authorize the Service to issue permits in situations in which the prohibitions of the Act do not apply, such as the destruction of unoccupied nests. (Some unoccupied nests are legally protected by statutes other than the MBTA, including nests of threatened and endangered migratory bird species and bald and golden eagles, within certain parameters.)

However, the public should be made aware that, while destruction of a nest by itself is not prohibited under the MBTA, nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA.

Due to the biological and behavioral characteristics of some migratory bird species, destruction of their nests entails an elevated degree of risk of violating the MBTA. For example, colonial nesting birds are highly vulnerable to disturbance; the destruction of unoccupied nests during or near the nesting season could result in a significant level of take. Another example involves ground nesting species such as burrowing owls and bank swallows, which nest in cavities in the ground, making it difficult to detect whether or not their nests are occupied by eggs or nestlings or are otherwise still essential to the survival of the juvenile birds. The Service should make every effort to raise public awareness regarding the possible presence of birds and the risk of violating the MBTA, the Endangered Species Act (ESA), and the Bald and Golden Eagle Protection Act (BGEPA), and should inform the public of factors that will help minimize the likelihood that take would occur should nests be destroyed (i.e., when active nesting season normally occurs).

The Service should also take care to discern that persons who request MBTA permits for nest destruction are not targeting nests of endangered or threatened species or bald or golden eagles, so that the public can be made aware of the prohibitions of the ESA and the BGEPA against nest destruction.

In situations where it is necessary (i.e., for public safety) to remove (destroy) a nest that is occupied by eggs or nestlings or is otherwise still essential to the survival of a juvenile bird, and a permit is available pursuant to 50 CFR parts 13 and 21, the Service may issue a permit to take individual birds.

Steve Williams
Director

AVIAN REPORTING SYSTEM

USFWS Avian Mortality Reporting System

USFWS attempted in the 1970's, and again within the last few years, to estimate bird strike and electrocution mortality caused by power lines and utility structures nationwide. These estimates have been based on actual counts, extrapolations from industry, other data, and estimates based on the best information available. However, they cannot be considered conclusive, since a comprehensive nationwide study has not yet been conducted on power structures and their overall impacts on bird populations.

The former US Bureau of Sport Fisheries and Wildlife (now USFWS) published a one-time summary of bird mortality in 1979, entitled, *Human Related Mortality of Birds in the United States* (Banks 1979[1]). The report estimated annual avian mortality from varying causes between 1966 to 1972, mentioning strikes with electrical transmission wires as likely low at that time, while raising concerns about electrocutions from power transmission lines (now defined as power distribution lines) and electric fences (Banks 1979). Unfortunately, no updated mortality summary broadly encompassing hunting, scientific collecting, automobile collisions, communication tower strikes, picture window strikes, lead poisoning, electrocutions and power line strikes has been published more recently by USFWS. USFWS has published several papers on more current estimates of avian mortality, including estimates for power line strikes and electrocutions (Manville 2001a[2], 2001b[3], 2004[4]), but these publications are nowhere as comprehensive as the Banks (1979) paper. John Bridges of the Western Area Power Administration (Bridges

[1] Banks, R.C. 1979. Human related mortality of birds in the United States. U.S. Fish & Wildlife Service, National Fish and Wildlife Lab, Special Scientific Report -- Wildlife No. 215:1-16. GPO 848-972.

[2] Manville, A.M., II. 2001a. The ABCs of avoiding bird collisions at communication towers: next steps. Pp 85-103 in R.L. Carlton (editor). Avian interactions with utility and communication structures. Proceedings of a workshop held in Charleston, South Carolina, December 2-3, 1999. EPRI Technical Report, Concord, CA. 343 pp.

[3] Manville, A.M., II. 2001b. Avian mortality at communication towers: steps to alleviate a growing problem. Pp 75-86 in B.B. Levitt (editor). Cell towers -- wireless convenience? or environmental hazard? Proceedings of the "Cell Towers Forum," state of the science/state of the law, December 2, 2000, Litchfield, Connecticut. New Century Publishing 2000, Markham, Ontario. 348 pp.

[4] Manville, A.M., II. 2004. Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science -- next steps toward mitigation. Bird Conservation Implementation in the Americas; Proceedings 3rd International Partners in Flight Conference 2002. C.J. Ralph and T.D. Rich, Editors USDA Forest Service GTR- PSW-191, Albany, CA 14 pp. In press.

2002 and 2003, personal communication) has provided annual summaries for avian strike mortality at a power transmission line across the Audubon National Wildlife Refuge, ND. That information, however, is site- and project-specific. The Division of Migratory Bird Management (DMBM) maintains a mortality fact sheet (prepared and periodically updated by Al Manville for public dissemination), but it is not comprehensive.

Utility Bird Mortality Tracking System

An important part of an APP is a utility's system for documenting bird mortalities and nest management activities. This system should be designed to meet the needs of the specific utility and be compatible with other data management and analysis programs. The system could utilize paper forms such as the following examples or may be an internal web-based program. The information collected should be used to help a utility conduct risk assessments by identifying avian problem areas and potential or known high risks. To protect birds and minimize outages, these data can be prioritized for corrective actions. Avian information collected by a utility should be maintained internally. Data may be required as a condition of an annual Federal permit for direct take of birds or their nests. If a Federal permit is issued, an annual report is required. The USFWS does not issue "accidental, incidental or unintentional" take permits. Bird Mortality Tracking System software developed by APLIC is available upon request for free at http://*aplic.org*.

Example 7. Dead bird/nest reporting form. This form can be used in conjunction with the Bird Mortality Tracking System software available from APLIC.

Dead Bird/Nest Form

Operations Area:

Dead Bird (circle one)		**or**	**Nest (circle one)**
Crow/magpie/raven	Eagle		Active
Hawk/falcon/osprey	Owl		Inactive
Small bird (protected)	Waterfowl		
Unknown species			

Bird Count_____

Date Found_____ **Time Found**_____

Sign of Death (circle one)

Collision	Electrocution	Shot	Unknown

County_____

Finder's Name_____

Finder's Phone_____

Line Name/Circuit No._____

Pole Identification No._____

Recommended Action (circle)

Dead Bird Actions	*Nest Actions*
Cover transformer equipment	Install nest platform
Install insulator cover(s)	Relocate nest
Install triangle(s)	Trim nest
Reframe structure	Install nest guards
Replace structure	Remove nest
Remove pole	Evaluate to determine appropriate action
De-energize	No action
Install bird flight diverters/fireflies	
Evaluate to determine appropriate action (Provide action in comments)	
Continue to monitor line (Justification required)	
No action (Justification required)	

Comments_____

Example 8. Southern California Edison's reporting and training materials.*

Avian Protection

Electrocutions

Raptors often perch or nest on transmission or distribution towers or poles. Occasionally, the birds make accidental contact between phases or phase and ground, injuring or electrocuting the bird. These electrocutions are most common on distribution or subtransmission facilities where energized conductors are close together. The number of electrocutions can be decreased by either designing the line to minimize contact between phases, or by retrofitting existing lines where necessary with a protective device that prevents this contact. Studies have demonstrated that raptors prefer certain poles for nesting and perching. By identifying these preferred poles, we can modify them, and thus greatly diminish the potential for raptor electrocutions in a cost-effective manner.

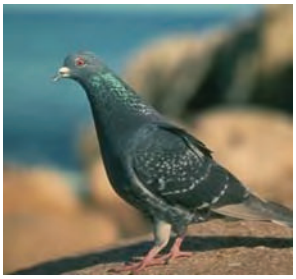
Nest Protection

In the absence of other suitable nest sites, raptors (and other protected species such as ravens) often use transmission towers and distribution poles for nesting. State and federal laws and regulations protect these nests from removal at certain times of the year without first obtaining authorization from state and federal wildlife agencies. It is important that nests not be disturbed when eggs or young birds are in them. An important note is that **there are only a few species of birds that are NOT protected by law** in SCE's service territory: **house sparrow, European starling, rock dove (common pigeon)** and certain game birds. All other species, including crows and ravens are protected by law and cannot be moved without proper authorization.

If there is a threat to power operations SCE must sometimes move an active nest (a nest with eggs or young in it). If you must move an active nest ensure environmental compliance and contact an Environmental Affairs biologist for assistance. They will make the necessary contacts with the regulatory agencies to obtain authorization for the nest to be moved.

House sparrow

European starling



Rock dove (common pigeon)

* Note: information presented in this example is specific to Southern California Edison. Contact USFWS for information on permits related to transporting eagles.

Example 8 *(con't).*

Raptor Mortality Procedures

When a dead or injured raptor is found near or on SCE equipment and facilities (e.g., poles, towers, substations) an internal report must be filed with Environmental Affairs (EA). EA will make the determination if a report to government agencies must also be filed. This is a step-by-step guide to help in the process of completing the raptor mortality report.

Both bald and golden eagles occur within SCE's service territory. Though rare, eagle electrocutions do occur on our lines, especially golden eagles. When an eagle is electrocuted, EA must be contacted immediately and special arrangements must be made for transport of the bird. It is illegal to transport eagles in the U.S. **DO NOT transport any eagle unless authorized by EA**.

1. Identify the species of raptor.
Identify the species if possible, especially to determine whether the raptor is an eagle or other raptor. Adult bald and golden eagles range anywhere from 30" to 40" in length and have a 72" to 84" wingspan while other raptors, such as red-tailed hawks are considerably smaller at about 19" in length and a 48" to 56" wingspan. See the attached guide. Whenever there is a doubt, contact Environmental Affairs (EA) for guidance. Take pictures (digital preferred) and send to EA so we can identify the bird.

If the bird is an eagle, follow the instructions directly below. For all other species, go directly to Step Number 2.

Eagle electrocutions:
Call or page EA immediately. You will be given guidance on the next course of action to take. It is illegal to transport eagles in the U.S. Do NOT transport an eagle unless authorized by EA. If the incident occurs after business hours, have the Edison operator connect you with EA staff.

All structures where an eagle electrocution has occurred must be corrected right away. Please contact EA for assistance in making these corrections to the structures.

After contacting EA and following the instructions given, continue to number 2.

2. Fill out a Raptor Mortality Report.
This form is available through EA or can be found on the Environmental Affairs website on SCE's Intranet. Fill out the report as completely as possible. Include maps of the area and, if possible, pictures of the structure, the bird, and the surrounding area (so we have an idea of the habitat in the vicinity of the pole.) Submit this report to EA as soon as possible after the incident.

Whenever multiple electrocutions occur within a few span lengths or on the same structure, these structures should be made raptor safe as soon as possible. Please contact EA for assistance in making these corrections to the structures.
Species other than eagles can be buried on site (away from the pole). You should have a current copy of SCE's U.S. Fish & Wildlife Permit in your vehicle in order to do this legally.

This permit requires us to maintain records of electrocutions. If you do not have a copy of this document, please contact EA.

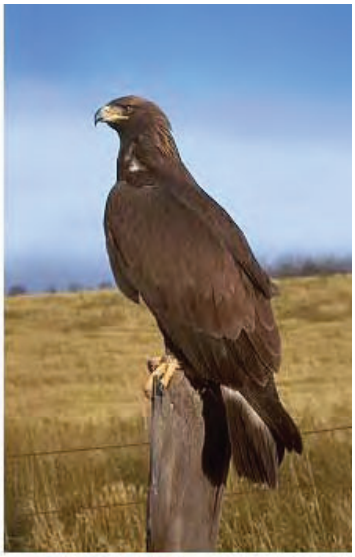
3. Send the completed form and attachments to EA.
Send the completed form and any pictures to:
Tracey Alsobrook, Environmental Affairs, G.O. 1

Remember, ordinary people and agencies are watching our activities. We must comply with the laws that protect almost all birds in the U.S. Report all known mortalities to EA. We need your assistance to keep the Company in compliance with the laws and in protecting these natural resources.

Call us when you need help with raptor mortality procedures or raptor protection.

	PAX		PAX
Daniel C. Pearson	29562	Janet Baas	29541
Tracey Alsobrook	27547	Jill Fariss	28545

Golden Eagle



Eagles:
(e.g., golden & bald eagles)
Length: 30-40”
Wingspan: 6½ to 7 feet

Red-Tailed Hawk

Hawks:
(e.g., red-tailed & red-shouldered hawks)
Length: 15-23”
Wingspan: 4 to 4½ feet

Great-horned Owl

Owls:
(e.g., great-horned, barn & great gray owls)
Length: 16-27”
Wingspan: 3½ to 4 ½ feet

Golden Eagle Silhouette

General Hawk Silhouette

Example 8 *(con't).*

Animal/Bird Mortality Report

To: Tracey Alsobrook Date: _____
Environmental Affairs (EA)
GO1, Quad 1A

From: Name _____
Work Location_____ PAX _____

Describe the species of the Animal or Bird that was mortally injured by SCE facilities (electrocuted/hit by a SCE vehicle, etc.).

_____
_____

If any bands or tags please return to EA or write number and agency here

_____
_____

Describe how the Animal or Bird was mortally injured by SCE facilities (bird contacted transformer bushings, etc.).

_____
_____
_____
_____

Weather Conditions (e.g. rainy and cold, sunny and warm, etc.)

_____
_____
_____

Circuit Name & Voltage_____

Specific Problem Location (e.g. Pole #/Address/Cross Streets, etc.)

_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)

_____
_____
_____

Please attach picture of the Bird or Animal if possible.

Example8 *(con't).*

Raptor/Bird Nesting Record

To: Tracey Alsobrook
Environmental Affairs
GO1, Quad 1A

Date: _____

From: Name _____
Work Location_____ PAX _____

Species of Raptor/Bird (if known) _____

Circuit Name and Voltage _____

Specific Nest Location (pole no.) _____

Condition of Nest
_____
_____

Are Eggs or Young Birds Apparent? If so, please describe.
_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)
_____
_____
_____

History of Previous Nesting on This Circuit
_____
_____
_____

History of Electrocutions/Mortality on This Circuit
_____
_____
_____

Recommendations
_____
_____
_____

Please attach picture of the Bird and/or Nest, if possible.

RISK ASSESSMENT METHODOLOGY

Thousands of utility poles occur in areas of suitable habitat for migratory birds. Because remedial actions on all poles in such areas are neither economically justifiable nor biologically necessary, a method is needed to identify configurations or locations of greatest risk. Risk assessment studies and models can be implemented to more effectively allocate resources to protect migratory birds. While risk assessment procedures will vary among utilities based on geographic scale, available data, and funding resources, included below are examples of risk assessment methods employed by different utilities.

Example 9. Risk Assessment Methodology Employed by PacifiCorp.

Reactive, preventative, and proactive measures can be adopted to minimize avian electrocutions. Reactive measures can be conducted at a structure after a mortality has occurred; preventative measures can be taken by constructing new structures to avian-safe standards in avian use areas; proactive measures can incorporate protocols to assess electrocution risk in an effort to prevent avian mortality on existing structures. Such risk assessment procedures can be useful aids when deciding where to allocate limited dollars over large geographic areas. The risk assessment methodology described in this example is based upon field surveys of poles, however, similar procedures could be followed using comparable GIS (Geographic Information System) data.

Based on a need to identify and quantify raptor electrocution risks throughout its service area, PacifiCorp implemented a program to assess electrocution risk, develop a scoring system to prioritize structures and circuits for remedial action, and create a GIS to assist in managing and analyzing spatial information regarding line locations, pole configurations, electrocutions, outages, and raptor distributions. Trained observers, while walking rights-of-way, recorded data on structure configuration, evidence of avian activity, and presence of dead birds. They searched an area encompassing 15 ft. on each side of the central line and a 25-ft. radius around each pole for carcasses, prey remains, pellets, and whitewash. At each pole, data were recorded on the pole location, habitat type, pole configuration, avian mortalities, live

species observed, evidence of raptor use, and presence of avian nests (see Example 10 for data sheet). In addition, the surveyor assessed whether or not each structure was avian-safe (based on current *Suggested Practices* standards).

Existing GIS data layers containing information on habitat type and raptor nest locations were compiled. State wildlife resource agencies, Natural Heritage Programs, universities, USFWS, Bureau of Land Management, U.S. Forest Service, and U.S. Geological Survey may serve as clearinghouses for such data. Pole locations and configurations, raptor nest site locations, habitat, and other field survey data were compiled and analyzed in ArcView GIS.

To assess the risk of electrocution, each non-avian-safe structure was assigned a score based on abundance (>50% total area) of suitable raptor habitat within a 1-km radius, evidence of raptor use, presence of raptor nests within 1 km, and presence of avian mortalities. Structures were assigned one point each for presence of suitable habitat, raptor nests, or evidence of raptor use. Structures at which non-eagle avian mortalities were documented were assigned four points. Structures with eagle mortalities were assigned five points. All scores of five or greater were lumped together in a "very high risk" category.

Using the above scoring method, non-avian-safe poles were assigned the following risk assessment scores:

Score	**Risk Assessment**
0	N/A
1	LOW RISK
2	LOW/MODERATE RISK
3	MODERATE RISK
4	HIGH RISK
5+	VERY HIGH RISK

These risk assessment scores are then used to target remedial actions. While structures with mortalities (risk scores ≥4) receive immediate attention, structures or circuits without mortalities are prioritized for ongoing remedial efforts based on their relative risk and circuit reliability. In addition to selecting poles that pose a moderate risk, other structures are selected for remedial actions based on a "common sense" review of the data. This "common sense" review applies additional data layers (i.e. outages and historical mortalities) and best

Example 9 *(con't).*

Example 9 *(con't).*

professional judgment to identify structures that warrant proactive remedial action. Below is a list of criteria that may elevate the risk scores of structures:

- Poles adjacent to mortality poles
- Poles near mortality poles with a similar configuration
- Circuits, lines, or taps where multiple mortalities have occurred
- Deadend equipment poles in remote or rural areas
- Configurations that have been documented to have a heightened risk in a particular district
- Non-raptor-safe poles in otherwise raptor-safe lines
- Non-raptor-safe poles adjacent to poles with perch discouragers
- Incomplete or improper installation of existing avian protection devices
- Circuits or lines with a history of bird-caused or unknown-cause outages
- Poles that pose other safety or reliability risks

Once all poles are identified, a comprehensive remedial action plan is developed with the appropriate service district that identifies a course of action, timeline, and resources required. The location and number of poles retrofitted, and associated costs are documented. Future monitoring is conducted to document the effectiveness of these efforts and to identify other areas that may require action. In addition, this methodology can be used to research electrocution risks associated with particular configurations or species. This risk assessment database is updated and refined as new information becomes available. For additional information on this risk assessment methodology, contact Jim Burruss (jim.burruss.@pacificorp.com) or Sherry Liguori (sherry.liguori@pacificorp.com).

Example 10. PacifiCorp's Risk Assessment Data Sheet.

Avian Electrocution Risk Assessment
Data Sheet

Date_____

Observer(s) _____

Sheet _____ **of** _____

IF A MORTALITY WAS DOCUMENTED, CHECK HERE _____

Operations Area _____ **Circuit**_____ **Line**_____

HABITAT TYPE (Circle. If more than one apply, indicate percent of each.)

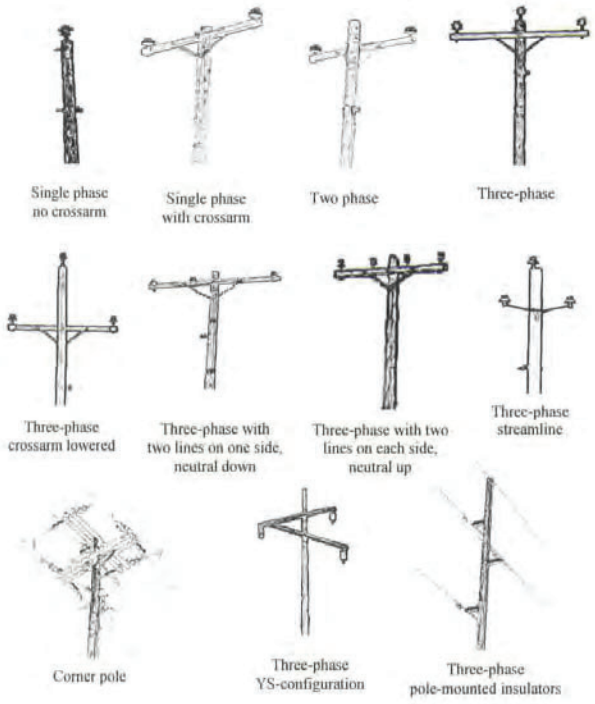
Grassland/ meadow Cropland/Pasture Scrub/shrub Barren Riparian Residential/developed Deciduous forest Coniferous forest
Wet meadow Mudflat Open water Other:_____

POLE LOCATION/IDENTIFICATION:

Structure Identification Number_____

GPS Coordinates: _____ Coordinate System: _____ Units: meters feet

POLE CONFIGURATION (Circle one. If pole does not match any shown, draw it on other side of sheet.)



Is structure raptor safe? Yes No

Total no. energized conductors_____

(if corner pole or underbuilt, indicate number phases in each direction, i.e. 3-3 or 3-2-1)

Number of transformers_____

Are there exposed parts? (circle all that apply)

transformers, capacitors, cutouts, arresters, jumper wires

Crossarm material: wood metal fiberglass

Crossarm brace material: wood metal fiberglass

Location of ground wire:

Below crossarm At or above crossarm

Circle all that are present: Hose Bushing cap
Arrester cap Cutout cover Insulator cover
Perch guard Perch Down-guy insulator

Other protective devices:_____

Circle if present: Pellets Whitewash Prey remains

Are there live raptors, mortalities, nests, or pole damage? No Yes* (*if yes, continue on other side)

Example 10 *(con't).*

POLE CONDITION (Circle all that apply)

Broken insulator Broken crossarm Leaking transformer Broken/burned/leaning pole Broken guywire

Other: _____

MORTALITIES/INJURIES

Status: dead injured **Number individuals** _____ **Distance to nearest pole (ft.)**_____

Species (circle one): Red-tailed Hawk Ferruginous Hawk Swainson's Hawk Broad-winged Hawk Harris's Hawk Red-shouldered Hawk Rough-legged Hawk Golden Eagle Bald Eagle Osprey Peregrine Falcon Prairie Falcon Merlin American Kestrel Great Horned Owl Barn Owl Common Raven American Crow Great Blue Heron

Other: _____

Cause of death/injury: Unknown Electrocution Collision Shot Roadkill Other: _____

Evidence of electrocution: Burnt feathers Burnt talons Burnt bill Exit wound Other: _____

Status of carcass/remains: Buried Collected Left on-site **Band number** (if applicable) _____

Directions _____

Photo number _____ **Camera number** _____

Recommended remedial action _____

_____

LIVE SPECIES OBSERVED

Species _____ **Number of individuals** _____ **Behavior** _____

Species _____ **Number of individuals** _____ **Behavior** _____

Species _____ **Number of individuals** _____ **Behavior** _____

Nest? _____ **Species** _____ **Is nest active?** Yes No

Nest location: Tree Cliff Ground Utility pole Other: _____

Pole Diagram:

NOTES _____

_____

_____

_____

Record Tracking:

USFWS Notification _____ Date _____

Bird Mortality Tracking System Entry _____ Date _____

Remedial Action Status _____ Date _____

MORTALITY REDUCTION MEASURES

A utility can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk to migratory birds. Therefore, as a general matter, mortality reduction plans should include a method for evaluating the risks posed to migratory birds in a manner that identifies areas and issues of particular concern. A risk assessment will often begin with an evaluation of available data addressing areas of high avian use, avian mortality, nesting problems, established flyways, adjacent wetlands, prey populations, perch availability, and other factors that can increase avian interactions with utility facilities. The assessment may also include outage and circuit reliability information. Mortality reduction plans should also utilize biological and electrical design information to prioritize poles most in need of repair and identify causes of avian mortality and benefits to utility customers. A successful APP and mortality reduction plan require management support as well as the following:

- assessment of facilities to identify risks;
- allocation of resources;
- standards for new or retrofit construction;
- budget for Operation and Maintenance (O&M) and Capital fixes;
- system for tracking remedial actions and associated costs;
- timely implementation of remedial measures;
- positive working relationship with agencies.

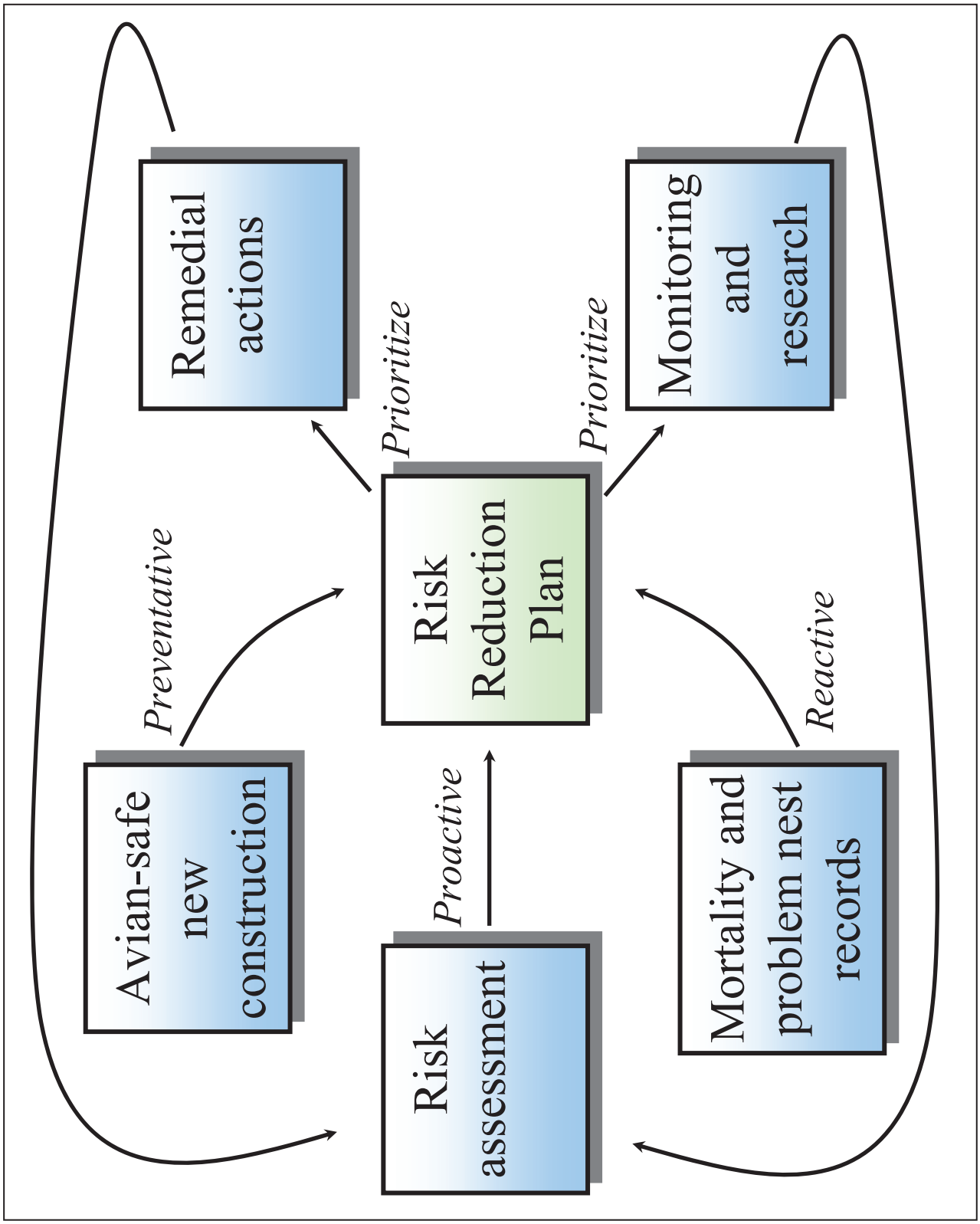
Mortality reduction plans may include a strategy that incorporates preventative, reactive and proactive measures that focus on issues, risks, and reliability commitments facing a utility (Figure 13). An example of how this multi-faceted approach might be used is as follows:

- **Preventative**: Construct all new or rebuilt lines in high avian use areas to Company avian-safe standards. Ensure APP is in compliance with applicable laws, regulations and permits.

- **Reactive**: Document bird mortalities and problem nests; conduct assessment of problems and apply remedial measures where appropriate. Notify resource agencies in accordance with Company's permits and policy.
- **Proactive**: Provide resources and training to improve employee's knowledge and awareness. Partner with organizations that conduct research on effects of bird interactions with power lines. Evaluate electrocution and collision risks of existing lines in high avian use areas and modify structures where appropriate.
- **Collaborative**: Collaboration with USFWS and State agencies on electrocutions reported and remedial actions undertaken. Annually review the APP in the context of risk assessment and electrocution and collision incidents and modify as appropriate, ideally with agency input.

Modification of existing facilities may be deemed necessary when dead and/or injured birds are found, high-risk lines are identified, or concerns of legal compliance are at issue. "Problem poles" or high-risk lines may be identified through bird mortality records, field surveys, or notifications from agency representatives or concerned customers. System reliability concerns due to bird interactions may also result in requests from field operations staff. Retrofitting to prevent electrocutions could include: 1) covering jumper wires, conductors and equipment; 2) discouraging perching in unsafe areas; 3) reframing; or 4) replacing a structure. Retrofitting to prevent collisions may include: 1) installing markers to enhance the visibility of lines; 2) managing habitats to reduce the likelihood of birds crossing lines during daily flights; or 3) managing human activity near collision risk areas to prevent flushing. Implementing preventative, reactive, and proactive measures to reduce avian mortality can benefit a utility through reduced long-term costs, improved reliability, positive public and agency relations, and conservation of migratory birds.

Figure 13. Roles of preventative, proactive, and reactive measures in a mortality risk reduction plan.



AVIAN ENHANCEMENT OPTIONS

While an APP will include measures to reduce avian mortality associated with electrical operations, it can also include opportunities to enhance avian populations through the creation of nest platforms, habitat improvements for migratory birds, or cooperative efforts with agencies or organizations. USFWS and State wildlife resources agencies, as well as other experts, can be consulted for recommendations on habitat enhancement projects. Nest platforms can be erected on poles for birds such as osprey, eagles, hawks, owls, herons, and cormorants, etc. (Figure 14). In addition, nest boxes can be erected for cavity-nesting species such as bluebirds, swallows, chickadees, wrens, and others. Such boxes may also benefit bats and flying squirrels. Construction designs for bird boxes can be found at http://50birds.com. Commercially-made nest boxes and platforms may also be available from local nature centers or specialty stores. The construction, maintenance, and monitoring of nest boxes can be done in conjunction with volunteers, such as scouts, or avian conservation organizations (see Key Resources for a list of bird conservation organizations/centers). Such collaborative efforts are excellent opportunities to educate the public about the company's avian protection plan and its partnerships with wildlife conservation agencies and organizations.

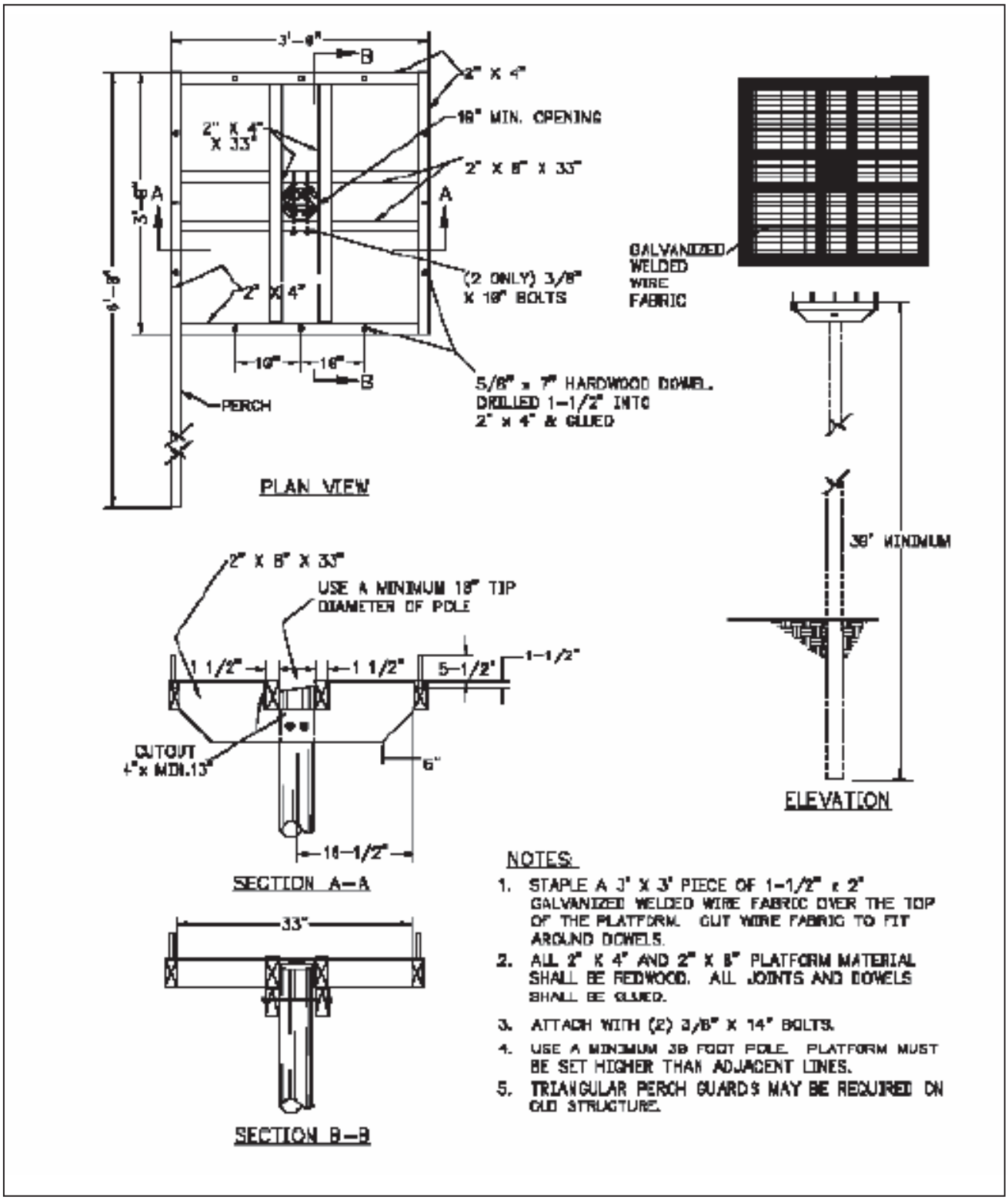


Figure 14. Raptor nest platform, pole mounted.

QUALITY CONTROL

A quality control mechanism can and should be incorporated into an APP to evaluate the effectiveness of a company's avian protection procedures. Some examples of quality control assessments include:

- assessing remedial action techniques through follow-up surveys to evaluate their effectiveness in reducing avian mortality;
- assessing avian protection devices to identify products preferred for avian protection as well as ease of application and durability;
- assessing mortality reporting procedures to ensure that discoveries of avian mortalities are properly documented;
- assessing response to avian mortalities to ensure that appropriate actions are taken in a timely manner;
- assessing compliance with company procedures to ensure that personnel are consistently following company methods for avian-safe construction, mortality reporting, nest management, etc.;
- assessing public and agency opinions on system reliability and avian protection.

The quality control component of an APP is an ongoing process. Information gathered during assessments of existing practices should be used to improve the effectiveness and timeliness of avian protection efforts, which, in turn, can help to reduce costs associated with such efforts.

PUBLIC AWARENESS

A public awareness program can be an integral part of an APP. This program can be used to enhance general public awareness and support for an electric utility's APP. It allows stakeholders such as government agencies, Tribes, non-profit organizations, wildlife rehabilitators and other interested parties an opportunity to provide input to the decision-making process, enabling all parties to work openly and collaboratively towards recommendations that can be effectively implemented. This collaboration often leads to improved relationships within the community and to more efficient and positive projects. The relationships developed through this process may also encourage the public to report bird mortalities and encourage them to seek assistance for birds that have been injured in power line related accidents.

Effectively communicating the components involved in an APP can be done through a variety of public outreach tools including fact sheets, newsletters, brochures, videos, websites and speaker bureau presentations. These tools can also be used to record the successes of an APP, thereby documenting the utility and electric industry's efforts to reduce avian mortalities. The goal of these outreach efforts is to convey to the public that electric utilities are responsible stewards of the environment working cooperatively with wildlife agencies towards reducing avian mortalities while continuing to provide safe, reliable, affordable electricity to their customers.

Many utilities have specific examples of their environmental stewardship and innovative ways they have taken into consideration reducing environmental impacts in their business decisions. A company’s cooperative and innovative efforts to minimize avian mortalities should be shared with the public and resource agencies.

KEY RESOURCES

U.S. Fish and Wildlife Service Migratory Bird Permit Regional Offices

Region 1: (California, Hawaii, Idaho, Nevada, Oregon, Washington, Guam, CNMI, American Samoa)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
911 N.E. 11th Avenue
Portland, OR 97232-4181
Tel. (503) 872-2715. Fax (503) 231-2019.
Email: permitsR1MB@fws.gov

Region 2: (Arizona, New Mexico, Oklahoma, Texas)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 709
Albuquerque, NM 87103
Tel. (505) 248-7882. Fax (505) 248-7885.
Email: permitsR2MB@fws.gov

Region 3: (Iowa, Illinois, Indiana, Minnesota, Missouri, Michigan, Ohio, Wisconsin)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
One Federal Drive
Fort Snelling, MN 55111
Tel. (612) 713-5436. Fax (612) 713-5393
Email: permitsR3MB@fws.gov

Region 4: (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virgin Islands, Puerto Rico)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 49208
Atlanta, GA 30359
Tel. (404) 679-7070. Fax (404) 679-4180
Email: permitsR4MB@fws.gov

Region 5: (Connecticut, District of Columbia, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, Vermont, West Virginia)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 779
Hadley, MA 01035-0779
Tel. (413) 253-8643. Fax (413) 253-8424
Email: permitsR5MB@fws.gov

Region 6: (Colorado, Kansas, Montana, North Dakota, Nebraska, South Dakota, Utah, Wyoming)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 25486 DFC (60154)
Denver, CO 80225-0486
Tel. (303) 236-8171. Fax (303) 236-8017
Email: permitsR6MB@fws.gov

Region 7: (Alaska)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
1011 E. Tudor Road
Anchorage, AK 99503
Tel. (907) 786-3693. Fax (907) 786-3641
Email permits: R7MB@fws.gov

U.S. Fish and Wildlife Service Office of Law Enforcement

National Headquarters:
Office of Law Enforcement
U. S. Fish and Wildlife Service
4401 North Fairfax Drive,
MS-LE-3000
Arlington, Virginia, USA 22203
Telephone: 703-358-1949
Fax: 703-358-2271

Regional Offices:

Pacific Region (1): California, Hawaii, Idaho, Nevada, Oregon, Washington, Guam, CNMI, American Samoa)
U. S. Fish & Wildlife Service
Office of Law Enforcement
911 N. E. 11th Avenue
Portland, Oregon, USA 97232-4171
Phone: (503) 231-6125 Fax: (503) 231-6197

Southwest Region (2): Arizona, New Mexico, Oklahoma, Texas
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 329
Albuquerque, New Mexico, USA 87103
Phone: (505) 248-7889 Fax: (505) 248-7899

Great Lakes - Big Rivers Region (3): Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin
U. S. Fish & Wildlife Service
Office of Law Enforcement
One Federal Drive
Fort Snelling, Minnesota, USA 55111-0045
Phone: (612) 713-5320 Fax: (612) 713-5283

Southeast Region (4): Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 49226
Atlanta, Georgia, USA 30359
Phone: (404) 679-7057 Fax: (404) 679-7065

Northeast Region (5): Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia,
U. S. Fish & Wildlife Service
Office of Law Enforcement
300 Westgate Center Drive
Hadley, Massachusetts, USA 01035
Phone: (413) 253-8274 Fax: (413) 253-8459

Mountain-Prairie Region (6): Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, Wyoming
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 25486 - DFC
Denver, Colorado, USA 80225
Phone: (303) 236-7540 Fax: (303) 236-7901

Alaska Region (7): Alaska
U. S. Fish & Wildlife Service
Office of Law Enforcement
1011 E. Tudor Road, Mail Stop 151
Anchorage, Alaska, USA 99503-6199
Phone: (907)786-3311 Fax: (907)786-3313

Other Resource Agency Contacts

BLM Snake River Birds of Prey National Conservation Area

- The Snake River Birds of Prey NCA is home to the largest concentration of nesting raptors in North America.
- http://id.blm.gov/bopnca/index.html

Canadian Wildlife Service

- http://cws-scf.ec.gc.ca/index_e.cfm

Code of Federal Regulations (CFR) websites

- Main CFR webpage
  - http://gpoaccess.gov/cfr/
- List of migratory birds, 50CFR10.13
  - http://a257.g.akamaitech.net/7/257/2422/01dec20031500/edocket.access.gpo.gov/cfr_2003/octqtr/50cfr10.13.htm
- General permit procedures, 50CFR13
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr13_03.html
- Endangered and threatened wildlife and plants, 50CFR17
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfrv2_03.html
- Migratory bird permits, 50CFR21
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr21_03.html
- Eagle permits, 50CFR22
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr22_03.html

International Association of Fish and Wildlife Agencies

- The International Association of Fish and Wildlife Agencies (IAFWA) was founded in 1902 as a quasi-governmental organization of public agencies charged with the protection and management of North America's fish and wildlife resources. The Association has been a key organization in promoting sound resource management and strengthening federal, state, and private cooperation in protecting and managing fish and wildlife and their habitats in the public interest. The Association's governmental members include the fish and wildlife agencies of the states, provinces, and federal governments of the U.S. and Canada. All 50 states are members.
- http://iafwa.org

National Biological Information Infrastructure

- The National Biological Information Infrastructure (NBII) is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find,

integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.

- http://birdcon.nbii.gov

NOAA Photo Library

- Public domain images for download
- http://photolib.noaa.gov/index.html

U.S. Fish and Wildlife Service

- http://fws.gov

U.S. Fish and Wildlife Service National Eagle Repository

- http://mountain-prairie.fws.gov/law/eagle
  U. S. Fish and Wildlife Service
  National Eagle Repository
  Rocky Mountain Arsenal, Building 619
  Commerce City, Colorado 80022
  phone: (303) 287-2110
  fax: (303) 287-1570

U.S. Fish and Wildlife Service National Image Library

- Public domain images for download
- http://images.fws.gov

USGS Bird Banding Laboratory

- http://pwrc.usgs.gov/bbl/

USGS Patuxent Bird Identification InfoCenter

- Presents photographs, songs, videos, identification tips, maps, and life history information for North American birds.
- http://mbr-pwrc.usgs.gov/id/framlst/framlst.html

USGS Patuxent Wildlife Research Center

- Patuxent's mission is to excel in wildlife and natural resource science, providing the information needed to better manage the nation's biological resources
- http://pwrc.usgs.gov

USGS Raptor Information System

- The Raptor Information System (RIS) is a computerized literature retrieval system. It deals with raptor management, human impacts on raptors, the mitigation of adverse impacts, and basic raptor biology (with an emphasis on population dynamics and predation). The RIS may be the largest collection of literature on birds of prey found anywhere in the world, with approximately

30,000 references on raptor biology and management. RIS staff members regularly update the files and accompanying data base with recently published and/or newly acquired references on raptors. The collection includes reprints of published papers as well as a significant amount of "gray literature" in the form of popular articles, theses, dissertations, unpublished government reports, and progress reports.
http://ris.wr.usgs.gov

State Agencies

Alabama Division of Wildlife and Freshwater Fisheries
- http://dcnr.state.al.us/agfd/index.html

Alaska Department of Fish and Game
- http://adfg.state.ak.us

Arkansas Game and Fish Commission
- http://agfc.com

Arizona Game and Fish Department
- http://gf.state.az.us

California Department of Fish and Game
- http://dfg.ca.gov

Colorado Division of Wildlife
- http://wildlife.state.co.us

Connecticut Bureau of National Resources, Wildlife Division
- http://dep.state.ct.us/burnatr/wildlife/wdhome.htm

Delaware Division of Fish and Wildlife
- http://dnrec.state.de.us/fw

Florida Fish and Wildlife Conservation Commission
- http://floridaconservation.org

Georgia Division of Wildlife Resources
- http://georgiawildlife.dnr.state.ga.us

Hawaii Department of Land and Natural Resources
- http://state.hi.us/dlnr

Iowa Department of Natural Resources
- http://iowadnr.com

Idaho Fish and Game
- http://state.id.us/fishgame

Illinois Department of Natural Resources
- http://dnr.state.il.us

Indiana Department of Natural Resources
- http://in.gov/dnr

Kansas Department of Wildlife and Parks
- http://kdwp.state.ks.us

Kentucky Department of Fish and Wildlife
- http://kdfwr.state.ky.us

Louisiana Department of Wildlife and Fisheries
- http://wlf.state.la.us/apps/netgear/page1.asp

Massachusetts Division of Fisheries and Wildlife
- http://state.ma.us/dfwele/dfw/dfw_toc.htm

Maryland Department of Natural Resources
- http://dnr.state.md.us

Maine Department of Inland Fisheries and Wildlife
- http://state.me.us/ifw

Michigan Department of Natural Resources
- http://michigan.gov/dnr

Minnesota Department of Natural Resources
- http://dnr.state.mn.us/index.html

Missouri Department of Conservation
- http://conservation.state.mo.us

Mississippi Department of Wildlife, Fisheries and Parks
- http://mdwfp.com

Montana Department of Fish, Wildlife and Parks
- http://fwp.state.mt.us

Nebraska Game and Parks Commission
- http://ngpc.state.ne.us/homepage.html

Nevada Department of Wildlife
- http://ndow.org

New Hampshire Fish and Game Department
- http://wildlife.state.nh.us

New Jersey Division of Fish and Wildlife
- http://state.nj.us/dep/fgw

New Mexico Game and Fish Department
- http://gmfsh.state.nm.us

New York Division of Fish, Wildlife and Marine Resources
- http://dec.state.ny.us/website/dfwmr/index.html

North Carolina Wildlife Resources
- http://ncwildlife.org

North Dakota Game and Fish Department
- http://state.nd.us/gnf

Ohio Division of Wildlife
- http://ohiodnr.com/wildlife/default.htm

Oklahoma Department of Wildlife Conservation
- http://wildlifedepartment.com

Oregon Department of Fish and Wildlife
- http://dfw.state.or.us

Pennsylvania Fish and Boat Commission
- http://pgc.state.pa.us

Rhode Island Division of Fish and Wildlife
- http://state.ri.us/dem/programs/bnatres/fishwild/index.htm

South Carolina Department of Natural Resources
- http://water.dnr.state.sc.us

South Dakota Department of Game, Fish and Parks
- http://state.sd.us/gfp

Tennessee Wildlife Resources Agency
- http://state.tn.us/twra/index.html

Texas Parks and Wildlife Department
- http://tpwd.state.tx.us

Utah Division of Wildlife Resources
- http://wildlife.utah.gov

Virginia Department of Game and Inland Fisheries
- http://dgif.state.va.us

Vermont Department of Fish and Wildlife
- http://vtfishandwildlife.com

Washington Department of Fish and Wildlife
- http://wdfw.wa.gov

Wisconsin Department of Natural Resources
- http://dnr.state.wi.us

West Virginia Division of Natural Resources
- http://wvdnr.gov

Wyoming Game and Fish Department
- http://gf.state.wy.us

Bird Conservation Organizations/Centers/Resources
(Includes organization's mission statement/description followed by website)

Alaska Bird Observatory
- The Alaska Bird Observatory is an Alaska nonprofit corporation. The mission of ABO is to advance the appreciation, understanding, and conservation of birds and their habitats through research and education.
- http://alaskabird.org

American Bird Conservancy
- American Bird Conservancy (ABC) is a 501(c)3 not-for-profit organization, whose mission is to conserve wild birds and their habitats throughout the Americas. It is the only U.S.-based, group dedicated solely to overcoming the greatest threats facing birds in the Western Hemisphere.
- http://abcbirds.org

Cornell Lab of Ornithology
- The Lab is a nonprofit membership institution whose mission is to interpret and conserve the earth's biological diversity through research, education, and citizen science focused on birds. Our programs work with citizen scientists, government and nongovernment agencies across North America and beyond.
- http://birds.cornell.edu

50 Birds
- Wood bird house designs for more than 50 North American birds
- http://50birds.com/Default.htm

Gulf Coast Bird Observatory
- The mission of the Gulf Coast Bird Observatory is the study and conservation of birds and their habitat in and around the Gulf of Mexico. Our purpose is to be a catalyst for bird conservation through individual and community partnerships and the sharing of expertise and knowledge.
- http://gcbo.org

Hawk Mountain Sanctuary Association
- Hawk Mountain's mission is to foster the conservation of birds of prey worldwide and to create a better understanding of, and further the conservation of, the natural environment, particularly the Central Appalachian region.
- http://hawkmountain.org

Hawks Aloft, Inc.
- Hawks Aloft, Inc. (HAI) was founded in February of 1994 in Albuquerque, New Mexico. Our mission is to conserve indigenous wild birds and their habitats through research and public education. HAI projects take place almost entirely within the state of New Mexico. We have become a leader in providing quality

education programs and field research. Using live raptors as educational aids, our naturalists reach more than 30,000 students annually. Our long-term research projects monitor raptor and songbird populations, as they relate to land management practices.
- http://hawksaloft.org

HawkWatch International
- Mission: To monitor and protect hawks, eagles, and other birds of prey and their environment through research, education, and conservation.
- http://hawkwatch.org

Idaho Bird Observatory
- IBO's Mission: To contribute to the conservation of western migratory birds and their habitats through cooperative research and public education.
- http://boisestate.edu/biology/ibo

Klamath Bird Observatory
- A nonprofit research and educational organization
- http://klamathbird.org/kbohome.htlm

Massachusetts Audubon Society
- Massachusetts Audubon Society is the largest conservation organization in New England, concentrating its efforts on protecting the nature of Massachusetts for people and wildlife. Mass Audubon protects more than 30,000 acres of conservation land, conducts educational programs for 250,000 children and adults annually, and advocates for sound environmental policies at the local, state, and federal levels. Established in 1896 and supported by 68,000 member households, Mass Audubon maintains 42 wildlife sanctuaries that are open to the public and serve as the base for its conservation, education, and advocacy work across the state.
- http://massaudubon.org

Montana Raptor Conservation Center
- Mission: Montana Raptor Conservation Center was founded in response to the rapid development of southwest Montana and resulting negative conflicts between humans and birds of prey. Through education, habitat enhancement, research, and the rehabilitation and release of injured birds of prey, our mission is to conserve and restore raptors, as well as other avian species that are endangered, threatened or of special concern.
- http://montanaraptor.org

National Audubon Society
- Audubon's mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.

- http://audubon.org

National Fish and Wildlife Foundation

- The National Fish and Wildlife Foundation conserves healthy populations of fish, wildlife and plants, on land and in the sea, through creative and respectful partnerships, sustainable solutions, and better education. The Foundation meets these goals by awarding matching grants to projects benefiting conservation education, habitat protection and restoration, and natural resource management.
- http://nfwf.org

The Nature Conservancy

- Mission: To preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.
- http://nature.org

New Jersey Audubon Society

- The New Jersey Audubon Society fosters environmental awareness and a conservation ethic among New Jersey's citizens; protects New Jersey's birds, mammals, other animals, and plants, especially endangered and threatened species; and promotes preservation of New Jersey's valuable natural habitats.
- http://njaudubon.org

North American Bird Conservation Initiative (NABCI)

- US NABCI Vision: Populations and habitats of North America's birds are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management. US NABCI Goal: To deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.
- http://nabci-us.org

Partners in Flight

- Partners in Flight (PIF) is a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. PIF's goal is to focus resources on the improvement of monitoring and inventory, research, management, and education programs involving birds and their habitats.
- http://partnersinflight.org

Partners in Flight – Canada

- http://cws-scf.ec.gc.ca/birds/lb_ot_e.cfm

Partners in Flight – International

- http://partnersinflight.org/pubs/latangara.htm

The Peregrine Fund/World Center for Birds of Prey

- Established in 1970, The Peregrine Fund works nationally and internationally, working to conserve birds of prey in nature. We conserve nature by achieving results - results restoring species in jeopardy, conserving habitat, educating students, training conservationists, providing factual information to the public, and by accomplishing good science. The World Center for Birds of Prey in Boise, Idaho is The Peregrine Fund's world headquarters. At the World Center we propagate birds of prey for release to the wild. Research and educational programs are also conducted.
- http://peregrinefund.org

Point Reyes Bird Observatory

- PRBO Conservation Science is dedicated to conserving birds, other wildlife, and ecosystems through innovative scientific research and outreach. Founded in 1965 as Point Reyes Bird Observatory, our 120 staff and seasonal biologists study birds to protect and enhance biodiversity in marine, terrestrial and wetland systems in western North America.
- http://prbo.org

The Raptor Center

- The Raptor Center at the University of Minnesota College of Veterinary Medicine specializes in the medical care, rehabilitation, and conservation of birds of prey. Working with about 30 eagles, hawks, owls, and falcons that are permanent residents, we reach 250,000 people each year through educational programs and events. The essence of our mission is to strengthen the bond between humans and birds, to improve the quality of life for both, and to contribute to the preservation of the natural world.
- http://raptor.cvm.umn.edu

Rocky Mountain Bird Observatory (formerly Colorado Bird Observatory)

- RMBO was founded in 1988 to address a bird conservation and related public education need in the western U.S. Our mission is the conservation of Rocky Mountain and Great Plains birds through research and public education. We accomplish our mission through numerous research and public education programs which have dual goals: to conserve birds and bird habitat, and to increase people's understanding of birds--how they interact with humans, what habitats they use, and what factors threaten their survival.
- http://rmbo.org

Smithsonian Migratory Bird Center

- Dedicated to fostering greater understanding, appreciation, and protection of the grand phenomenon of bird migration.
- http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds

Southeast Arizona Bird Observatory

- The Southeastern Arizona Bird Observatory (SABO) is a non-profit organization dedicated to the conservation of the birds of southeastern Arizona, their habitats and the diversity of species that share those habitats through research, monitoring and public education.
- http://sabo.org

Vermont Institute of Natural Science

- Protecting Vermont's natural heritage through education and research designed to engage individuals and communities in the active care of their environment.
- http://vinsweb.org

Whitefish Point Bird Observatory

- WPBO is a non-profit membership organization established in 1978 to document and study the birds in the Great Lakes Region, with special emphasis on migration.
- http://wpbo.org

Wildlife Rehabilitation Resources

How to contact a wildlife rehabilitator

- http://tc.umn.edu/~devo0028/contact.htm

National Wildlife Rehabilitators Association

- http://nwrawildlife.org

Wildlife International

- http://wildlife-international.org

The Wildlife Rehabilitation Information Directory

- http://tc.umn.edu/~devo0028/

Utility Resources

Avian Power Line Interaction Committee (APLIC)
- http://aplic.org

Edison Electric Institute (EEI)
- http://eei.org

Electric Power Research Institute (EPRI)
- http://epri.com

Institute of Electrical and Electronics Engineers (IEEE)
- http://ieee.org

National Rural Electric Cooperative Association (NRECA)
- http://nreca.org

Rural Utilities Service (RUS)
- http://usda.gov/rus

V. LIST OF ACRONYMS

APLIC – Avian Power Line Interaction Committee

APP – Avian Protection Plan

BGEPA – Bald and Golden Eagle Protection Act

BMTS – Bird Mortality Tracking System

DMBM – Division of Migratory Bird Management

EEI – Edison Electric Institute

EPRI – Electric Power Research Institute

ESA – Endangered Species Act

GIS – Geographic Information System

HCP – Habitat Conservation Plan

MBTA – Migratory Bird Treaty Act

NESC – National Electric Safety Code

NMFS – National Marine Fisheries Service

NRECA – National Rural Electric Cooperative Association

REA – Rural Electricification Association (currently RUS)

RUS – Rural Utilities Service

USFWS – U.S. Fish and Wildlife Service

APPENDIX E: Intersected Drainages

Black Hills Corporation

Fort Carson Airburst Range 3-Phase Installation Wetland Delineation

Legend

- Crossing Location – No OHWM
- Project Centerline
- NHD Line - Feature Not Observed in the Field

N

0 240 480

Feet

1:4,000

Inspector:
Inspection Date: 2020

Site Characteristics

Legal Location: Sec 13, T18S R68W
County: Fremont

REVISED	BY	COMMENT
5/26/2020	BJB	Map Updates

APEX

Feature symbols not to scale

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\Ft_Carson_Airburst_Range_3_Phase_Installation_Fig6_20200520.mxd Modified by:beau.bergstrom@apexcos.com

Black Hills Corporation

Fort Carson Airburst Range 3-Phase Installation Wetland Delineation

Legend

- Project Centerline
- NHD Line - Confirmed During Delineation
- NHD Line - Feature Not Observed in the Field
- Delineated Streambed

N

0 240 480

Feet

1:4,000

Inspector:
Inspection Date: 2020

Site Characteristics

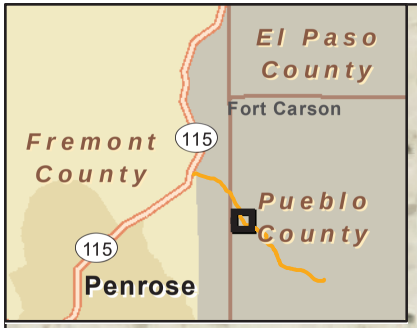
Legal Location: Sec 13, T18S R68W, Sec 18, 19, T18S R67W
County: Fremont, Pueblo

REVISED	BY	COMMENT
5/26/2020	BJB	Map Updates

APEX

Feature symbols not to scale

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\Ft_Carson_Airburst_Range_3_Phase_Installation_Fig5_20200520.mxd Modified by:beau.bergstrom@apexcos.com



C04

C05

C06

Black Hills Corporation

Fort Carson Airburst Range 3-Phase Installation Wetland Delineation

Legend

- Crossing Location – No OHWM
- Project Centerline
- NHD Line - Feature Not Observed in the Field

N

0 240 480

Feet

1:4,000

Inspector:
Inspection Date: 2020

Site Characteristics

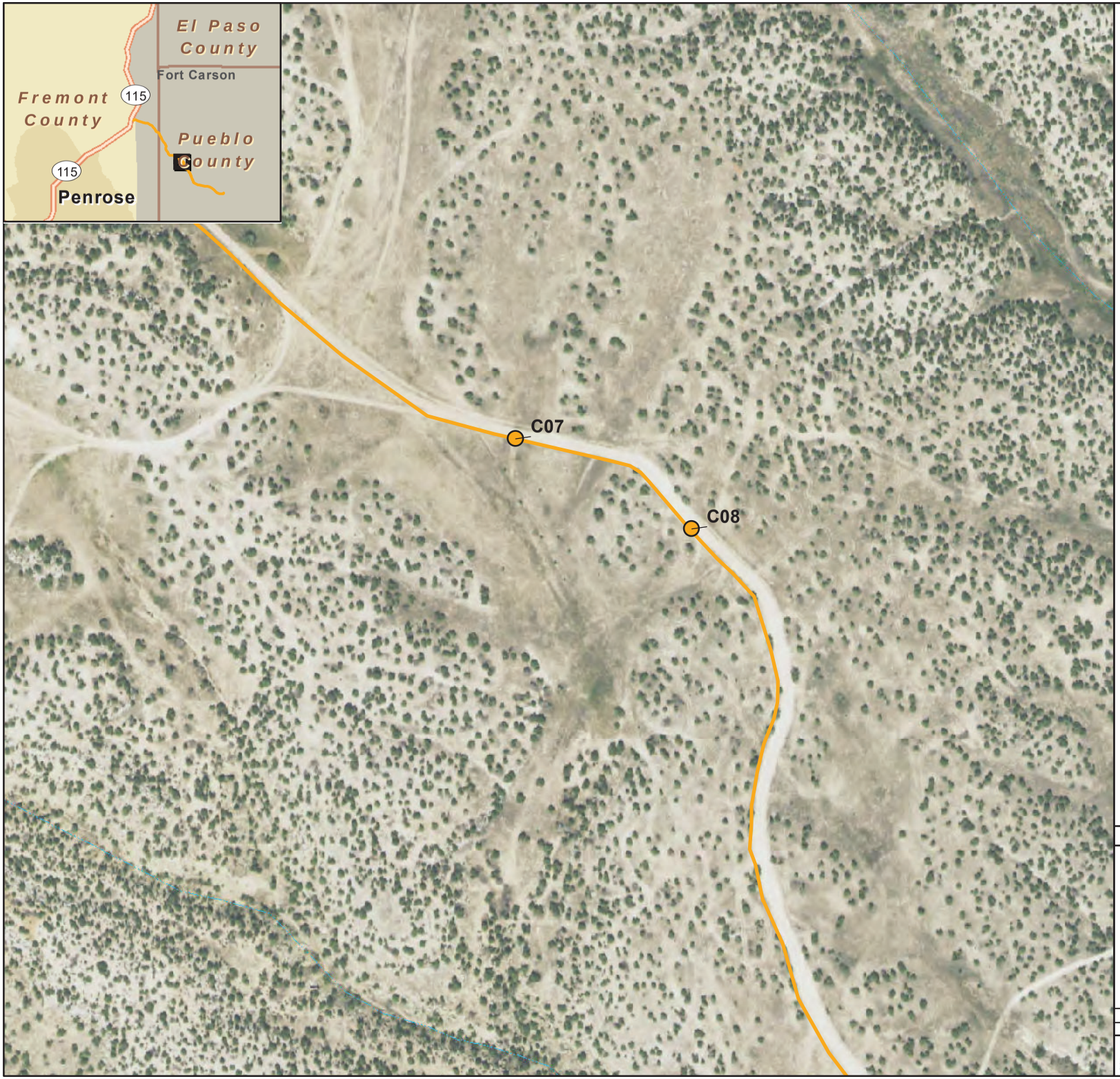
Legal Location: Sec 19, T18S R67W
County: Pueblo

REVISED	BY	COMMENT
5/26/2020	BJB	Map Updates

APEX

Feature symbols not to scale

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\Ft_Carson_Airburst_Range_3_Phase_Installation_Fig7_20200520.mxd Modified by:beau.bergstrom@apexcos.com



Black Hills Corporation

Fort Carson Airburst Range 3-Phase Installation Wetland Delineation

Legend

- Crossing Location - No OHWM
- Project Centerline
- NHD Line - Feature Not Observed in the Field

N

0 240 480

Feet

1:4,000

Inspector:
Inspection Date: 2020

Site Characteristics

Legal Location: Sec 19, 20, 29, T18S R67W
County: Pueblo

REVISED	BY	COMMENT
5/26/2020	BJB	Map Updates

APEX

Feature symbols not to scale

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\Ft_Carson_Airburst_Range_3_Phase_Installation_Fig8_20200520.mxd Modified by:beau.bergstrom@apexcos.com

Black Hills Corporation

Fort Carson Airburst Range 3-Phase Installation Wetland Delineation

Legend

- Crossing Location - No OHWM
- Project Centerline
- NHD Line - Feature Not Observed in the Field

N

0 240 480

Feet

1:4,000

Inspector:
Inspection Date: 2020

Site Characteristics

Legal Location: Sec 32, 33, T18S R67W
County: Pueblo

REVISED	BY	COMMENT
5/26/2020	BJB	Map Updates

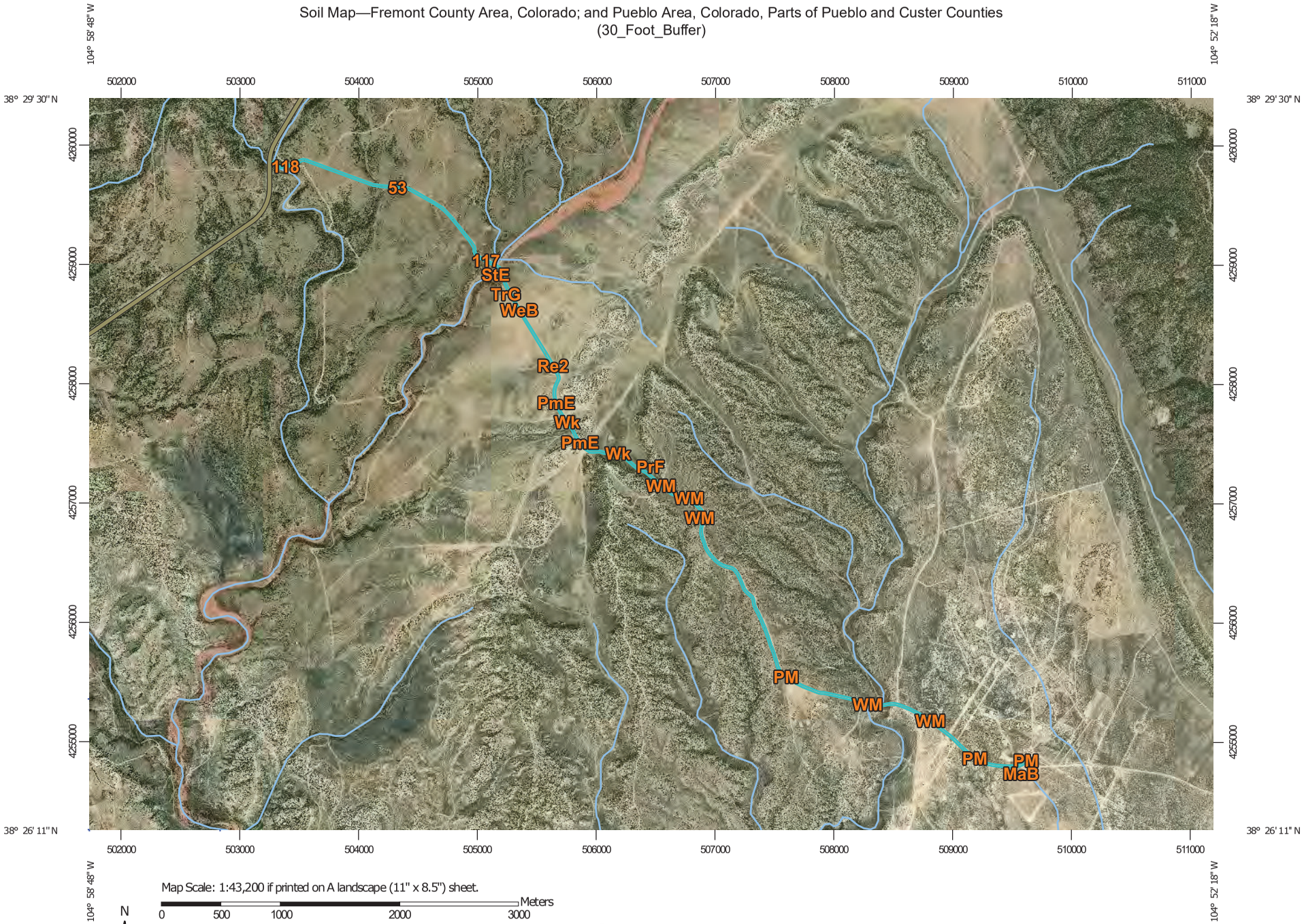
APEX

Feature symbols not to scale

M:\Projects\Black_Hills_Corp_BKH\Ft_Carson\Ft_Carson_Airburst_Range_3_Phase_Installation_Fig9_20200520.mxd Modified by:beau.bergstrom@apexcos.com

APPENDIX F: Soil Survey

Soil Map—Fremont County Area, Colorado; and Pueblo Area, Colorado, Parts of Pueblo and Custer Counties
(30_Foot_Buffer)



Map Scale: 1:43,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fremont County Area, Colorado
Survey Area Data: Version 17, Sep 13, 2019

Soil Survey Area: Pueblo Area, Colorado, Parts of Pueblo and Custer Counties
Survey Area Data: Version 18, Sep 13, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 19, 2013—Nov 15, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
53	Kim-Shingle complex, 3 to 20 percent slopes	8.2	20.0%
117	Travessilla channery loam, 5 to 20 percent slopes	0.5	1.3%
118	Travessilla-Rock outcrop complex, 5 to 50 percent slopes	1.2	2.9%
Subtotals for Soil Survey Area		**9.9**	**24.1%**
Totals for Area of Interest		**41.0**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Manvel silt loam, 2 to 6 percent slopes, dry	0.3	0.6%
PM	Penrose-Minnequa complex, 1 to 15 percent slopes, dry	17.8	43.3%
PmE	Penrose-Minnequa complex, 1 to 15 percent slopes	2.0	4.8%
PrF	Penrose-Midway-Rock outcrop complex, 10 to 45 percent slopes	0.3	0.6%
Re2	Razor clay, eroded	0.9	2.3%
StE	Stroupe extremely stony loam, 9 to 25 percent slopes	0.3	0.7%
TrG	Travessilla-Rock outcrop complex, 30 to 90 percent slopes	0.3	0.8%
WeB	Wilid silt loam, 0 to 3 percent slopes	3.4	8.3%
Wk	Wiley-Kim loams	3.9	9.4%
WM	Minnequa-Wilid silt loams, 1 to 6 percent slopes	2.0	4.9%
Subtotals for Soil Survey Area		**31.1**	**75.9%**
Totals for Area of Interest		**41.0**	**100.0%**

APPENDIX G: Section 106 Consultation

HISTORY COLORADO

Carlos Rivero-deAguilar
Chief, Environmental Division
US Army Installation Management Command
Directorate of Public Works
1626 Evans Street, BLDG 1219
Fort Carson, Colorado 80913-4143

Re: Conversion of Range 123 from Single-Phase Power to Three-Phase Power, Fort Carson (REC2019-163) (HC#75708)

Dear Mr. Rivero-deAguilar:

Thank you for your correspondence dated November 16, 2020 that we received on November 17, 2020 that requests additional consultation on historic property identification completed for the subject undertaking.

We find the report titled Class III Cultural Resource Inventory and Visual Impacts Analysis of the Fort Carson Airburst Range 123 Three Phase Electric Line Installation Project in Fremont County, Colorado satisfactory and we concur with your determinations and findings. Specifically, we concur that sites 5FN1073.6 and 5FN1073.7 support the National Register of Historic Places eligibility under Criterion A; we concur that site 5FN3201 and isolated find 5FN3202 are not eligible for listing to the National Register of Historic Places; and we concur that the undertaking will result in no adverse effect to historic properties. We likewise agree with your condition to complete archaeological monitoring during construction.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register eligibility criteria (36 CFR 60.4) in consultation with our office pursuant to 36 CFR 800.13. Also, should the consulted-upon scope of the work change, please contact our office for continued consultation under Section 106 of the National Historic Preservation Act.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings. Please note that our compliance letter does not end the 30-day review period provided to other consulting parties.

We thank you for the opportunity to comment. If we may be of further assistance, please contact Mark Tobias, Intergovernmental Services Manager, at (303) 866-4674 or mark.tobias@state.co.us.

Sincerely,

Steve Turner, AIA
State Historic Preservation Officer
ST/mt