Final Environmental Impact Statement for the Mona to Oquirrh Transmission Corridor Project and Proposed Pony Express Resource Management Plan Amendment

FES 10-11

UT-020-2008-009

April 2010

Volume I of II

BLM

West Desert District

BLM Mission

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Bureau of Land Management

FES 10-11

UT-020-2008-009

Final Environmental Impact Statement for the
Mona to Oquirrh Transmission Corridor Project and
Proposed Pony Express Resource Management Plan Amendment

Lead Agency:	U.S. Department of the Interior Bureau of Land Management (BLM) West Desert District - Salt Lake and Fillmore Field Offices	
Cooperating Agency:	Utah Governor's Public Lands Policy Coordination Office	
Type of Action:	Right-of-way grant; Resource Management Plan Amendment to allow for grant of a major right-of-way outside of an existing utility corridor designated by the BLM	
Project Location:	Juab, Salt Lake, Tooele, and Utah Counties, Utah	
For Further Information on this FEIS, Contact:	Bureau of Land Management Salt Lake Field Office Attention: Cindy Ledbetter 2370 South 2300 West Salt Lake City, Utah 84119 (801) 977-4300	Bureau of Land Management Fillmore Field Office Attention: Clara Stevens 35 East 500 North Fillmore, Utah 84631 (435) 743-3100
Protests:	Protests on the Amendment of the BLM Salt Lake Field Office Pony Express Resource Management Plan must be postmarked no later than 30 days after the publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register*	
Protests should be mailed to:	Regular Mail: Director (210) Attention: Brenda Williams Protest Coordinator P.O. Box 66538 Washington, D.C. 20035	Overnight Mail Director (210) Attention: Brenda Williams Project Coordinator 1620 L Street, N.W., Suite 1075 Washington, D.C. 20036

ABSTRACT

This Final Environmental Impact Statement (EIS) discloses impacts related to the development of Rocky Mountain Power's proposed Mona to Oquirrh Transmission Corridor Project in Juab, Salt Lake, Tooele, and Utah Counties. Rocky Mountain Power's Proposed Action includes the construction, operation, and maintenance of approximately 69 miles of single-circuit 500 kilovolt (kV) transmission line, 77 miles of double-circuit 345kV transmission line, and two new 500/345/138kV substations. An amendment of the BLM Salt Lake Field Office Pony Express Resource Management Plan is required by BLM to allow for grant of a major right-of-way for the proposed Project outside of an existing utility corridor designated by the BLM.

The Final EIS discloses impacts associated with several alternatives, including the BLM's Preferred Alternative on Federal Lands, Environmentally Preferred Alternative, Proponent's Proposed Action, and the No Action Alternative. Based on these analyses, the majority of the BLM's Preferred Alternative is anticipated to have low-to-moderate impacts on the environment, with significant long-term impacts in only localized areas.

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U.S. Department of the Interior
Bureau of Land Management

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UT-020-2008-009
Case File: UT-82829

Volume I of II

West Desert District

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Utah Governor's Public Lands Policy Coordination Office

April 2010

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LIST OF ACRONYMS

$\mu g/m^3$	Micrograms per cubic meter
μV/m	1 microvolt per meter
AC	Alternating current
ACEC	Area of Critical Environmental Concern
ACGIH	American Conference of Governmental Industrial Hygenists
ACSR	Aluminum conductor steel reinforced
AD	Anno Domini
AGRC	Utah Automated Geographic Reference Center
AM	Amplitude modulated
amsl	Above mean sea level
AO	Approval order
APE	Area of potential effect
APLIC	Avian Power Line Interaction Committee
ARPA	Archaeological Resources Protection Act
ATV	All-terrain vehicle
AUM	Animal unit months
BA	Biological Assessment
BCC/PIF	Birds of Conservation Concern/Partners in Flight
BEA	Bureau of Economics Analysis
BLM	Bureau of Land Management
BMP	Best management practice
BO	Biological Opinion
BP	Before present
BSFC	Brake-specific fuel consumption
C2	Middle Cambrian formations
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Compliance Inspection Contractor
CO	Carbon monoxide
CO_2	Carbon dioxide
CRPA	Cultural Resource Protection Act
CWA	Clean Water Act
CWG	Community Working Group
DC	Direct current
DCD	Deseret Chemical Depot
dB	decibel
dBa	decibels on the A-weighted scale
°F	degrees Fahrenheit
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DOD	Department of Defense
DOE	Department of Energy
DPG	Dugway Proving Grounds

D&RGW	Denver and Rio Grande Western Railroad
DSM	Demand-side management
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental justice
ELF	Extremely low frequency
EMF	Electric and magnetic fields
ENBB	Environmental Notification Bulletin Board
EPA	Environmental Protection Agency
EPG	Environmental Planning Group
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFO	Fillmore Field Office
FLPMA	Federal Land Policy and Management Act
FM	Frequency modulated
FPPA	Farmland Protection Policy Act
GAP	Gap Analysis Project
GIS	Geographic Information Systems
GOPB	Utah Governor's Office of Planning and Budget
GSLA	Great Salt Lake Audubon
HAPS	Hazardous Air Pollutants
HC	Hydrocarbon
HMA	Herd Management Areas
hp	Horsepower
Hz	Hertz
HVTL	High voltage transmission line
I-	Interstate-
ICES	International Committee for Electromagnetic Safety
ICNIRP	International Commission for Non-ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISSR	Inland Sea Shorebird Reserve
ka	Kiloyears
Kcmil	Thousand circular mil
kHz	Kilohertz
kV	Kilovolt
kV/cm	Kilovolts per centimeter
kV/m	Kilovolts per meter
kW	Kilowatt
kWh	Kilowatt hour

m	Meter
M2	Great Blue and Humbug formation
MBTA	Migratory Bird Treaty Act
mg	Milligram
mG	Milligaus
MHz	Megahertz
MGS	Magnum Gas Storage (Project)
MIS	Management Indicator Species
MW	Megawatt
MWh	Megawatt hour
NAGPRA	Native American Graves Protection and Repatriation Act
NAICS	North American Industry Classification System
NAIP	National Agriculture Imagery Program
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NESC	National Electric Safety Code
NFMA	National Forest Management Act
NPDES	National Pollutant Discharge Elimination System
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NMHC	Non-methane hydrocarbon
NOA	Notice of Availability
NOI	Notice of Intent
NOMA	North Oquirrh Management Area
NO_x	Nitrogen dioxide
NO_2	Nitrogen oxides
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	No surface occupancy
NWI	National Wetlands Inventory
OHV	Off-highway vehicle
OPLMA-PRP	Omnibus Public Lands Management Act - Paleontological Resources Preservation
OPGW	Fiber optic ground wire
OSHA	Occupational Safety and Health Act
PA	Programmatic Agreement
PEIS	Programmatic EIS
PFYC	Potential Fossil Yield Classification
PLPCO	Utah Governor’s Public Lands Policy Coordination Office
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PM_{10}	Particulate matter less than 10 microns in diameter
POD	Plan of Development
PPA	Pollution Prevention Act
Project	Mona to Oquirrh Transmission Corridor Project
Proponent	Rocky Mountain Power
PRMMP	Paleontological Resources Monitoring and Mitigation Plan

PRMPA	Proposed Resource Management Plan Amendment
PSC	Public Service Commission
Qa	Surficial alluvium
Qao	Older alluvium/colluviums
Ql	Lake Bonneville deposits
Qm	Surficial marsh deposits
Qs	Surficial mud and salt falts
Qt	Alluvial deposits
RCRA	Resource Conservation Recovery Act
RINS	Raptor Inventory Nest Survey
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SF_6	Sulfur hexafluoride
SHPO	State Historic Preservation Office
SITLA	School and Institutional Trust Lands Administration
SLFO	Salt Lake Field Office
SO	Sulfur oxides
SO_2	Sulfur dioxide
SQO	Scenic quality objectives
SQRU	Scenic quality rating units
SPCC	Spill Prevention Control and Countermeasure
SR	State Route
SVP	The Society of Vertebrate Paleontology
SWRGAP	Southwest Regional Gap Analysis Project
T4	Salt Lake Formation
TCP	Traditional Cultural Properties
Ti	Intrusive rocks
Tov	Volanic rocks
UAC	Utah Administrative Code
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
UHF	Ultra-high frequency
UFFSL	Utah Forestry, Fire, and State Lands
UNHP	Utah Natural Heritage Program
UNPS	Utah Native Plant Study
UREZ	Utah Renewable Energy Zone
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
USHS	Utah State Historical Society
USU	Utah State University
VHF	Very high frequency
VOC	Volatile organic compounds
VQO	Visual Quality Objective
VRM	Visual Resource Management
WIA	Wilderness Inventory Area
WMA	Wildlife Management Area
WSA	Wilderness Study Area
WECC	Western Electricity Coordinating Council
WRAP	Western Regional Air Partnership
WRCC	Western Regional Climate Center
WWEC	West-wide Energy Corridor

Summary

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SUMMARY

Introduction

The Bureau of Land Management (BLM) received an application from PacifiCorp (dba Rocky Mountain Power) (Proponent) for a major right-of-way across federal land to construct, operate, and maintain high-voltage transmission lines and associated facilities in Juab, Salt Lake, Utah, and Tooele counties in Utah. BLM determined that the project is a major federal action requiring the preparation of an environmental impact statement (EIS) in accordance with the National Environmental Policy Act (NEPA). Portions of the proposed project, known as the Mona to Oquirrh Transmission Corridor Project (Project), would cross lands administered by the BLM West Desert District Salt Lake Field Office (SLFO) and Fillmore Field Office (FFO). In order to allow for a grant of a major right-of-way outside a utility corridor already designated by BLM in the area managed by the SLFO, an amendment to the Pony Express Resource Management Plan (RMP) would be required in accordance with the Federal Land Policy and Management Act (FLPMA).

Proponent’s Purpose and Need

Northern Utah represents the fastest growing area within the State of Utah and constitutes one of the major growth areas within the region. Demand for electrical power is increasing at an approximate rate of 200 to 250 megawatts (MW) each year, due to rapid growth and additional electricity use by existing customers. The Proponent’s need for the project is based on its obligations as a publicly regulated electric utility to provide safe, reliable, and cost-effective electric transmission service to its retail customers and other users of the transmission system. In order to meet this need, the Proponent is obligated, per the Federal Energy Regulatory Commission (FERC) requirements (Orders 888 and 889), to expand or upgrade its transmission system pursuant to the Open Access Transmission Tariff to accommodate requests (internal and external) for transmission services.

Through the course of meeting its business and regulatory obligations, the Proponent has substantiated the need for the proposed Project based on the following factors:

- The current and projected electrical demands in northern Utah and the projected electrical shortfall based on population growth
- Existing generation resources and the capacity of existing transmission infrastructure to meet these demands
- Projected generation and the capacity of the existing transmission system to accommodate the increased capacity for facilities planned or under construction
- System reliability and flexibility issues associated with the operation of the existing transmission system
- Allowance for economical power sales, transfers, and purchases
- Integration with short-term and long-range planning

Proponent’s Proposed Action

The Proponent proposes to construct, operate, and maintain a 69-mile long, single-circuit 500-kilovolt (kV) transmission line (which would be operated initially at 345kV) from the existing Mona Substation near the community of Mona in Juab County, Utah, to a proposed Mona Annex Substation (to be located south of the existing Mona Substation) that would be designed to accommodate 500, 345, and 138kV transmission lines, then on to a proposed future Limber Substation (to be located in the Tooele Valley in Utah), also designed to accommodate 500, 345, and 138kV transmission lines. Two double-circuit 345kV lines are proposed from the Limber Substation. One line would extend 31 miles to the existing Oquirrh Substation in West Jordan, Utah, and the second line would extend 45 miles to the existing Terminal Substation in Salt Lake City, Utah.

Permanent facilities would include:

- A proposed 500/345/138kV substation (Mona Annex) near the existing Mona Substation
- A future 500/345/138kV substation (Limber) southwest of the Tooele Army Depot
- A single-circuit 500kV transmission line (initially operated at 345kV) that connects the existing Mona Substation to the proposed Mona Annex Substation, then on to the future Limber Substation, which would require a 250-foot-wide right-of-way
- A double-circuit 345kV transmission line from the future Limber Substation to the existing Oquirrh Substation, which would require a 150-foot-wide right-of-way
- A double-circuit 345kV transmission line from the future Limber Substation to the existing Terminal Substation, which would require a 150-foot-wide right-of-way
- Communication regeneration facilities associated with the transmission lines and substations
- New access roads to all transmission line structures where there is no existing access

Alternatives

Fourteen transmission line route alternatives are included in the Final EIS, including the BLM's Preferred Alternative on federal lands and the Proponent's Proposed Action. The Project alternatives have been organized into three major areas: (1) from the existing Mona Substation to the future Limber Substation, (2) from the future Limber Substation to the existing Oquirrh Substation, and (3) from the future Limber Substation to the existing Terminal Substation. This summary is limited to a discussion of the BLM's Preferred Alternative on federal lands. The No Action Alternative is also considered in the EIS, but not discussed further in this summary.

Mona to Limber

Six transmission line route alternatives connect the existing Mona Substation to the future Limber Substation with a single-circuit 500kV transmission line, ranging from 67.1 to 71.5 miles in length. The routes, listed below, cross portions of Juab, Utah, and Tooele counties.

- Alternative A1 – North Long Ridge Mountains, 67.9 miles
- Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action, 69.4 miles
- Alternative B1 – East Rush Valley, 70.0 miles
- Alternative B2 – East Rush Valley, 71.5 miles
- Alternative C1 – Tintic Junction, 67.1 miles
- Alternative C2 – Tintic Junction, 68.4 miles

Limber to Oquirrh

Six transmission line route alternatives connect the future Limber Substation to the existing Oquirrh Substation with a double-circuit 345kV transmission line, ranging from 29.3 to 49.0 miles in length. The routes, listed below, cross portions of Tooele and Salt Lake counties.

- Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative, 31.1 miles
- Alternative E1 – Pass Canyon, 31.1 miles
- Alternative E2 – Proponent's Proposed Action, 31.1 miles
- Alternative F1 – Middle/Butterfield Canyon, 29.3 miles
- Alternative F2 – Middle/Butterfield Canyon, 29.6 miles
- Alternative G – Lake Point, 49.0 miles

Limber to Terminal

Two alternative transmission line routes connect the future Limber Substation to the existing Terminal Substation with a double-circuit 345kV transmission line, ranging from 40.4 to 45.4 miles in length. The routes, listed below, cross portions of Tooele and Salt Lake counties.

- Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action, 45.4 miles
- Alternative I – East Tooele Valley, 40.4 miles

A BLM Preferred Alternative is not identified from the future Limber Substation to the existing Terminal Substation because no BLM-administered lands occur along this segment.

Affected Resources

Air Resources

During construction, sources of air emissions would include particulate emissions (fugitive dust) from construction operations (grading, digging, drilling, etc.) and tailpipe emissions (nitrogen oxides, carbon monoxide, sulfur oxides, and hydrocarbons) from vehicles and gasoline or diesel-powered construction equipment. Emissions from construction activities would be confined to the daytime hours and would exist only during active construction periods.

The primary emission sources associated with the operational and maintenance phase of the transmission lines include windblown dust from ground disturbance, road dust, and vehicle emissions during periodic maintenance or emergency repair activity. Mitigation measures would be used to limit blowing dust during both the construction and operational phases. Following construction, disturbed areas would be reclaimed with native vegetation or seed mix prescribed by the land-management agency. After the implementation of the Proponent's Best Management Practices (BMPs), the impacts on air quality would be minimal, due to the short duration and limited extent of the impacts.

Earth Resources

The primary concern for earth resources is the potential for geologic hazards to adversely affect transmission line construction and maintenance, and the impact of transmission line construction and maintenance on soils. Geologic hazards include seismicity, liquefaction, landsliding, rock fall, flooding, and unstable soil. Geologic hazards may cause long-term problems for transmission tower stability. Impacts on soils include erosion and loss of farmland. Increased soil erosion may occur when vegetation is removed during construction or in areas where the surface is disturbed by heavy equipment. Increased water erosion often occurs during high-intensity or long-duration rain storms and may reduce the productivity of the soil as well as affect the water quality of streams by accelerating sediment loading. In addition, construction could cause loss of productivity of agricultural and grazing land because of soil compaction and/or increased erosion.

Temporary ground disturbance during construction would be associated with structure work areas, lay-down and staging areas, and wire splicing, pulling, and tensioning sites. Permanent ground disturbance would occur as a result of structure base areas, access roads, and substation sites. Mitigation measures would be implemented to minimize ground disturbance, vegetation removal, and soil compaction. The majority of impacts on soils would be temporary during construction. Long-term effects would be minimal due to the limited extent of permanent ground disturbance and potential for increased erosion rates. Overall, with the implementation of mitigation measures, impacts on soil resources are expected to be low.

Water Resources

The potential for accidental release of hazardous materials (i.e., gasoline and oil from trucks) used in the construction of the Project could result in impacts on groundwater resources. However, the implementation of BMPs as outlined in the Spill Prevention, Containment, and Countermeasures (SPCC) Plan in the Plan of Development (POD) would reduce impacts by minimizing the potential for accidental release of hazardous materials. If groundwater is reached during the foundation installation, excavations would be dewatered in accordance with the Utah Pollution Discharge Elimination System General Permit for Construction Dewatering/Hydrostatic Testing and the Project Stormwater Pollution Prevention Plan in the POD.

Ground-disturbing activities in the vicinity of surface water features could result in increased sedimentation, which could affect the aquatic ecology, the quality of domestic water supplies and irrigation systems, and the aesthetic quality of the stream or river. Mitigation measures would be implemented to (1) limit the construction of new access roads in the vicinity of streams to protect the integrity of the riparian areas, streambanks, and streambeds and avoid turbidity and sedimentation, (2) avoid or span sensitive features, including wetlands, riparian areas, springs, well sites, and water courses, and (3) mitigate the potential for the spillage of hazardous materials during construction, operation, and maintenance (including contamination associated with pesticides applied for weed management).

Overall, impacts on water resources would be low, since there would be limited disturbance in the vicinity of surface water resources and construction activities generally would not reach groundwater depths.

Biological Resources

Vegetation

The BLM's Preferred Alternative would result in the permanent loss of approximately 309 acres of vegetation associated with the construction of access roads, transmission structures, and substations. All vegetation exceeding 12 feet in height would be cleared within the transmission line rights-of-way (250 feet wide for the 500kV line and 150 feet wide for the 345kV line). Selective mitigation measures would be implemented to limit the amount of right-of-way clearing and to span or avoid sensitive vegetation communities, including riparian areas, wetlands, and hybrid oak stands in the Oquirrh Mountains. Significant long-term impacts are anticipated where wetlands and other sensitive communities cannot be avoided.

Construction activities would increase the potential for establishment and spread of noxious weeds and the initiation of human-caused wildfires. A Weed Management Plan and fire protection measures have been included in the POD. These plans identify specific mitigation measures and establish protocols that would minimize the potential for weed impacts and wildfire. The primary indirect effects on vegetation are associated with the construction of permanent access roads, which could be used by the general public and may facilitate the spread of noxious weeds and increase the risk of human-caused wildfire.

Wildlife

The construction, operation, and maintenance of the proposed transmission lines and substations would result in both direct and indirect adverse effects on wildlife. Direct effects associated with construction activities include: (1) behavioral disturbance and the displacement of wildlife (temporary); (2) habitat loss and fragmentation (permanent); (3) the long-term displacement of individual animals (permanent); and (4) the potential for mortality, primarily for wildlife species with limited mobility (temporary). Direct effects associated with the presence of new transmission lines include: (1) mortality due to collisions or electrocution; (2) increased predation by raptors and ravens using transmission line structures as perches (permanent); and (3) behavioral disturbance and/or abandonment of habitats adjacent to transmission line structures (permanent).

The primary indirect effects are associated with the creation of permanent access roads. These roads could facilitate public access into currently inaccessible habitats and result in behavioral disruption and displacement, habitat abandonment, and increased mortality via legal hunting and poaching wildlife. These indirect effects would all be permanent.

Significant wildlife habitats affected by the BLM's Preferred Alternative include raptor nesting areas, waterfowl migration/movement pathways, and crucial seasonal habitats for greater sage-grouse, mule deer, elk, and pronghorn. A number of mitigation measures would be implemented to minimize direct and indirect effects on these habitats and associated wildlife species. Construction and maintenance activities would be prohibited in specified areas to minimize disturbance of wildlife during sensitive periods. Spatial buffers and seasonal restrictions would be implemented around raptor nests and sage grouse leks. Portions of the transmission lines that cross waterfowl movement pathways would be marked with flight diverters or other BLM-approved devices to minimize the risk of avian collisions. Transmission lines would be designed in accordance with Avian Power Line Interaction Committee (APLIC) standards to minimize the potential for avian electrocution. Pre-construction surveys would be conducted for select biological resources, such as greater sage-grouse leks and migratory bird and raptor nests in the Project area. Access roads that traverse sensitive habitats (i.e., crucial winter range) would be gated or otherwise blocked to limit public access. Potential impacts on wildlife, such as disturbance, displacement, and increased mortality, would be unavoidable and long-term. However, the BLM's Preferred Alternative would not result in any significant population-level effects on any wildlife species.

Special Status Species

No species listed under the Endangered Species Act (ESA) occur within the Project area. Several BLM sensitive species are known or likely to occur in this area, including one plant and a number of birds, mammals, and invertebrates. Pre-construction surveys would be conducted for special status species, including the nests of special status avian species, in the project area. The results of these surveys would be incorporated into final project design to minimize adverse effects on these species. Spatial buffers and seasonal restrictions would be implemented as necessary and public access would be restricted on access roads that traverse sensitive habitats. Potential impacts on special status species would be unavoidable and long-term but would not result in any significant or population-level effects.

Wildland Fire Ecology and Management

The BLM's Preferred Alternative is not anticipated to have significant impacts on the wildland fire ecology and management within the Project area. The alternatives do not conflict with the SLFO and FFO Fire Management Plans. There are potential short-term impacts during construction when there is an increased risk of ignitions due to construction activities. Fire-safety measures and protocols have been addressed in detail in the fire protection portion of the POD. Indirect effects include the potential for increased fire frequency, due to increased traffic on access roads. Mitigation measures would be implemented in areas of concern to limit the construction of new access roads. Also, vehicle travel overland can result in the ignition of vegetation. To help prevent these ignitions, vehicles would be parked in areas free of vegetation.

Wildland fires can affect the operation of transmission lines and, consequently, the operation of regional transmission systems. Fire can damage the facilities and smoke, particularly particles, can interfere with transmission and cause outages. If multiple transmission lines in a common corridor are affected, a resulting outage can affect a large area or region. In the case of this Project, a wildland fire in the Long Ridge Mountains (Juab Valley) could result in the outage of three existing 345kV transmission lines in a single corridor as well as the proposed 500kV transmission line. Such an outage would likely result in the loss of power serving the Wasatch Front and cause rotating blackouts (Rocky Mountain Power 2008).

Cultural Resources

Although little of the Project area has been intensively inventoried, the Class I record search and the Class II pedestrian inventory indicate that archaeological and historical sites are common throughout the region. The Project area encompasses the traditional territories of several American Indian tribes who continue to reside in the region. No traditional cultural properties (TCP) have been identified in the vicinity of the proposed Project corridors to date. If such resources are identified, studies would be prepared in consultation with the pertinent American Indian tribe(s) and ethnographic specialists.

Impacts on cultural resources generally are rated as low to moderate throughout the Project area. This is primarily a result of the ability to mitigate these impacts through detailed cultural resource surveys of the selected route and data recovery, where appropriate. There are no known impacts on special status cultural resources along the BLM's Preferred Alternative and no known impacts on traditional cultural places. If special status cultural resources or TCPs are identified along the route during American Indian tribal consultation or the Class III pedestrian inventory, these areas would likely be avoided using realignment, relocation of temporary workspaces, or changes in the construction and/or operational design. In the event that unavoidable adverse impacts on significant cultural resource sites or TCPs are identified, a Historic Property Treatment Plan would be prepared detailing how impacts would be reduced or mitigated.

Paleontological Resources

A review of the scientific literature and record searches indicates that there are 23 known paleontological localities within the Project area. These paleontological localities are found in seven geological units that consist of a number of formations of Paleozoic age, Lake Bonneville deposits of Quaternary age, and surficial alluvium/colluvium of Quaternary age. The Paleozoic formations have mostly produced fossils of marine invertebrates. Only the Lake Bonneville deposits and surficial alluvium/colluvium have produced vertebrate fossils. Lake Bonneville deposits contain fossils of fish, cormorant, mountain sheep, fox, cat, horse, musk ox, and bison. Surficial alluvium/colluvium contains fossils of camel, horse, pronghorn, pack rat, vole, rabbit, and reptiles.

Impacts on paleontological resources are generally rated as low to moderate or undetermined along the study corridor centerline. Low impact areas are comprised of Paleozoic formations, Tertiary alluvial deposits, Tertiary igneous rocks, and Quaternary alluvial deposits. Moderate impact areas are comprised of Lake Bonneville deposits. Undetermined impact areas are primarily comprised of the Salt Lake Formation. Moderate or undetermined impact areas may contain fossil land mammals or other vertebrates that are scientifically significant. The results of the inventory and impact assessment demonstrate that some deposits within the Project area have a moderate or undetermined potential to contain paleontological resources. In those cases, mitigation measures would be implemented to reduce potential adverse impacts on significant paleontological resources. Implementation of mitigation measures would effectively reduce potential impacts on paleontological resources to a negligible level by allowing for the collection of fossils and their corresponding geological and paleoenvironmental data that otherwise might be lost to earth-moving activities.

Visual Resources

Impacts on visual resources would occur as a result of the presence of construction vehicles and equipment, the construction of new roads and the upgrading of existing roads for access, ground disturbance, and vegetation clearing at transmission line structures and substation sites, and the assembly and erection of transmission line structures and substations. Visual impacts evaluated in the EIS include the effects on views from residences, parks, recreation areas (including historic sites), preservation areas, and travel routes; effects on scenic resources; effects on developed landscapes; and compliance with agency visual management objectives.

Mitigation measures would be applied where the transmission lines cross overstory vegetation to reduce the amount of vegetation clearing within the right-of-way. Where the transmission lines cross a sensitive feature, mitigation measures would place towers at the maximum distance feasible to avoid sensitive areas. In areas of strong or moderate landscape contrast, mitigation would align any new access roads in designated areas to follow the existing landscape contours. Where the transmission lines cross slopes greater than 10 percent, grading techniques such as slope rounding and recontouring would be utilized to blend road and pad cuts into the landscape.

In general, impacts on visual resources would vary from low to moderate where contrasts are minimal (i.e., paralleling existing transmission lines), where scenery is common, or where the transmission lines are in character with the existing development (i.e., industrial areas). Moderate-to-high impacts would occur where contrasts are strong, in areas of high scenic quality, or where the Project facilities are not in character with the existing development (i.e., residential areas or recreational landscapes). Overall, the BLM's Preferred Alternative would result in moderate-to-high, long-term impacts on visual resources based on the modification of Class B scenic quality crossed on agricultural lands, the crossing of residential and recreation areas, and proximity to major travel corridors.

Land Use and Recreation Resources

Short-term impacts on grazing would result from construction disturbance at tower sites, substation sites, staging areas, and in areas where new temporary access is required. Long-term impacts would result from those areas being permanently displaced by project facilities and access roads. However, long-term impacts on grazing are not expected to be significant because of the minimal extent of disturbance on rangelands. The only areas permanently removed from use for the life of the Project include new access roads, the structure base areas (approximately 0.02 acre per mile for the 345kV single-pole structure and 0.3 acre per mile for the 500kV structure), and the areas of the two substation footprints (a total of approximately 358 acres).

Short-term impacts on primitive or dispersed recreation opportunities would likely occur as a result of the BLM's Preferred Alternative. Access would be limited to certain areas during construction, and construction noise and activities may discourage people from recreating in the surrounding area. However, long-term impacts on primitive recreation activities such as hunting, hiking, and off-highway vehicle (OHV) use are expected to be minimal.

The BLM's Preferred Alternative would require construction of new temporary and permanent access roads. The construction of new access roads potentially would increase OHV use and traffic in areas where access was previously limited or non-existent. Increased access may result in indirect impacts on other resources, particularly biological and cultural resources. Mitigation measures would be implemented in some areas to limit the construction of, or access to, new permanent access roads. Temporary construction access roads would be reclaimed to their original condition.

Hazardous Materials

All construction, operation, and maintenance activities would comply with all applicable federal, state, and local regulations regarding the use of hazardous substances. Hazardous materials would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. Portable toilets would be located at designated construction sites. All construction waste including trash, litter, garbage, other solid waste, petroleum products, human waste, and other potentially hazardous materials would be removed and transported to a disposal facility authorized to accept such materials.

Sulfur hexafluoride (SF_6) is used as an electrical insulator in high-voltage equipment to transmit electricity between generation centers and customer load centers. SF_6 is considered a greenhouse gas and has the ability to trap heat in the earth's atmosphere 23,900 times more than carbon dioxide (CO_2) (Environmental Protection Agency 2007). SF_6 can have numerous climatic and human and wildlife health effects if it leaks from electrical equipment. The Proponent has committed to numerous BMPs to reduce or eliminate the risk of leaks. With these measures in place, SF_6 leaks are not anticipated, and thus the potential impacts of using SF_6 equipment are minimal.

Electric and Magnetic Fields

The proposed transmission lines and substations would produce electric and magnetic fields (EMF). EMF at intensity levels that would be produced at the edge of the right-of-way also can be found in the ordinary environment. EMF exposure would be well below exposure limits, in keeping with recommendations from the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Several public health and scientific organizations have reviewed the research on EMF and health impacts, and considered the strengths and limitations of the epidemiologic and laboratory studies. These reviewers have concluded that the overall body of research does not indicate any disease or adverse health effects caused by EMF exposure at levels below the guideline limits.

Noise

Some level of noise would result from the construction, operation, and maintenance of the BLM's Preferred Alternative. The proposed substations are located in rural unpopulated areas, with the majority of the transmission lines traversing vacant/unpopulated land. Where construction would occur near more populated areas, the noise from construction (and subsequent maintenance) might be audible; however, such noise would be temporary and possibly considered only as a nuisance. Wildlife most likely would avoid the temporary construction disturbance.

The audible noise levels of the transmission lines are much higher during rain and other foul weather conditions than during fair weather. Even in foul weather, however, the calculated audible noise levels of the line when operated at 500kV are less than 50 dBA (decibels on the A-weighted scale) at the edge of the right-of-way, and thus comply with both day and evening limits published by the Environmental Protection Agency (EPA 1974). Moreover, corona noise is typically much less noticeable during foul weather conditions because of the competing noise of rain and wind.

Socioeconomics and Environmental Justice

During the 24-month construction period, it is expected that the number of direct employees would not exceed 284 persons. Based on the percentage of workers who would be hired from outside the local workforce and the timing of crews along the length of the transmission lines, construction is expected to have negligible to minor impacts on housing, public services, and employment in the Project area.

No minority or low-income populations reside less than 3.5 miles from the BLM's Preferred Alternative; therefore, no disproportionately high and adverse human health or environmental effects from the Project on minority and low-income populations are expected.

Cumulative Effects

The cumulative effects associated with the impacts of current and future projects, including the Project, would be most significant on biological and visual resources and on future adjacent land uses.

Past and present actions that have most significantly affected vegetation and wildlife resources within and adjacent to the alternative transmission line routes and substation sites include (1) agricultural land uses in the Cedar, Goshen, Tooele, and Rush valleys, (2) water diversions, (3) mining activities in the Oquirrh and East Tintic mountains, (4) urban development in Tooele and Salt Lake valleys, (5) military facilities in Rush and Salt Lake valleys, and (6) the development of roads and utility corridors throughout the Project area. Adverse effects associated with these activities include: (1) the permanent loss of vegetation and wildlife habitat, (2) reduced habitat quality due to fragmentation of native communities and the introduction/spread of non-native vegetation and noxious weeds, (3) decreased habitat security due to increased access by on- and off-road vehicles, and (4) increased risk of avian and waterfowl mortality associated with legal and illegal hunting, vehicle collisions, and collision with transmission lines.

The loss and degradation of native habitats has been most significant in the valleys and the eastern foothills of the Oquirrh Mountains. Sagebrush habitats, in particular, have been significantly reduced and fragmented by agricultural activities, urban development and military facilities, roads and utility corridors, and the establishment of non-native plant species. These factors have affected the habitat quality for greater sage-grouse, pronghorn, and other sagebrush-dependent species. Industrial development in the northern Salt Lake Valley and along the Great Salt Lake has eliminated many wetlands and associated waterfowl habitats. Urban development and mining in the western Salt Lake Valley have eliminated and fragmented habitats, particularly crucial mule deer and elk seasonal ranges. Finally, existing transmission lines along the I-80 corridor pose a risk of collision-related mortality for migratory waterfowl and shorebirds.

Current and future projects, including the Project, would result in the additional loss and fragmentation of wildlife habitats. The actual effects of these cumulative impacts would depend on the specific amounts, types, and locations of the habitat. Current and future projects, including the Project, also could result in temporary disturbance, behavioral disruption, and long-term displacement of wildlife, and would cumulatively increase the potential for wildlife mortality. The cumulative effects of such disturbances would depend on the nature, timing, and duration of the development activities.

The Project, in conjunction with other current and future projects, would likely increase the potential for the establishment and spread of non-native plants and noxious weeds, as well as the risk of unintentional, human-caused wildfire. The cumulative effects of these projects would depend on project-specific monitoring and eradication efforts.

Cumulative visual impacts may occur as a result of the construction, operations, and maintenance of the Project in conjunction with other current and future projects, if they are either seen in the same field of view and/or are in the same landscape setting as the Project. The cumulative effect of the Project depends on the nature of change in form, line, color, and texture resulting from the introduction of additional facilities or landscape modifications. A large portion of the regional landscape in the study area remains undeveloped. Past and present activities have changed the visual landscape primarily through urbanization, industrial development, and natural resource extraction. In the recent past, less developed areas of Salt Lake County and Tooele County have changed in visual character from naturally or agriculturally dominated landscapes to residential and commercial landscapes, and this trend will likely continue as these areas become more developed. The introduction of new transmission lines in the unaltered landscape would produce the first incremental change into the viewshed.

Additional utility and infrastructure projects planned in the Project area would require the construction of some new access roads throughout the Project area, that could increase OHV use and traffic in areas where access was previously limited or non-existent. Increased access also may result in indirect impacts on other resources, particularly biological and cultural resources. In the southern portion of the study area, most cumulative impacts on land uses are expected to be minimal with the addition of the Project. A portion of the Project would be located in a proposed utility corridor in Rush Valley, where a pipeline may be sited in the future. In the northern portion of the Project area, cumulative impacts may occur in areas where multiple projects are planned in proximity to one another, creating land use conflicts. These areas include the areas of Tooele, Butterfield Canyon, North Oquirrh Management Area, and the Lake Point.

Environmentally Preferred Alternative

The Environmentally Preferred Alternative is Alternative A2 from the existing Mona Substation to the future Limber Substation (also BLM's Preferred Alternative on Federal Lands and the Proponent's Proposed Action); Alternative D from the future Limber Substation to the existing Oquirrh Substation (also BLM's Preferred Alternative on Federal Lands); and Alternative H from the future Limber Substation to the existing Terminal Substation (also the Proponent's Proposed Action). This route is environmentally preferred because it exhibits, on balance, lower overall environmental impacts than the other alternatives. After the implementation of BMPs and selective mitigation measures, significant long-term impacts resulting from implementation of the Environmentally Preferred Alternative are anticipated in only localized areas, such as the Carr Fork Reclamation and Wildlife Management Area, the wetlands along the southern portion of the Great Salt Lake, and areas of high scenic quality or in areas of proximity to sensitive viewers. The majority of the Environmentally Preferred Alternative is anticipated to have only low-to-moderate impacts on the environment.

Scoping, Consultation, and Coordination

Scoping, a process open to the public and conducted early in the Project, served to identify the range or scope of issues to be addressed during the environmental studies and in the EIS. Activities associated with scoping included (1) agency, interagency, and stakeholder meetings; (2) three public scoping meetings; (3) newsletter mailings, media releases, and legal notices to inform the public of the Project, EIS preparation, and public scoping meetings; and (4) establishing a Project website (http://www.blm.gov/ut/st/en/fo/salt_lake/planning/mona_to_oquirrh_transmission.html) and posting Project information to the BLM Environmental Notification Bulletin Board (ENBB) (https://www.blm.gov/ut/enbb). In general, comments from both the public and agencies were related to Project need, benefits, and impacts on environmental resources. These comments and the entire agency coordination and public involvement program are discussed in Chapter 5.

The BLM invited federal, state, and local agencies potentially affected by the Project to cooperate in preparing the EIS. The Utah Governor's Public Lands Policy Coordination Office (PLPCO) accepted the BLM's invitation and has been participating as a cooperating agency.

Early in the environmental process, the BLM initiated contact with several American Indian tribes, in accordance with various environmental laws and Executive Orders. While no American Indian reservations or lands owned in fee are within the Project area, the BLM identified several American Indian tribes whose traditional territories are within the Project area. The tribes were asked to determine the need for further study related to the identification of traditional cultural places in the Project area that might be affected by the Project. Of these tribes, the Paiute Indian Tribe of Utah requested to participate in a field visit to view the approved Project right-of-way.

In addition, the Proponent convened a Community Working Group (CWG) representing diverse interests within the northern portion of the Project area, including representatives from Tooele County, Tooele City, Kennecott Land, Kennecott Utah Copper, Town of Stockton, Salt Lake County, Salt Lake City, South Jordan City, and West Jordan City. The CWG was asked to provide input to the Project team (i.e., issues, concerns, data) as the siting process and environmental studies progressed. The CWG met on four occasions at key points during the planning process.

Public Review Process

The BLM and EPA each published a Notice of Availability of the Draft EIS/Draft Pony Express RMP Amendment for public review and comment in the *Federal Register* on May 15, 2009, which initiated a 90-day public comment period. More than 52 hard copies and 200 electronic copies of the Draft EIS were distributed in May 2009 to federal agencies; tribal, state, and local governments; organizations; and individuals. The availability of the Draft EIS/Draft Pony Express RMP Amendment, deadline for public comments, and locations, dates, and times of public meetings on the Draft EIS were announced in paid newspaper legal notices, paid newspaper advertisements, and project newsletters that were mailed out to potentially affected property owners, agencies, and stakeholders. BLM held three public meetings, one each in Tooele, Magna, and Nephi, Utah, to provide information and solicit public comments on the proposed Project and the Draft EIS/Draft Pony Express RMP Amendment.

The comment period ended on August 12, 2009. BLM received 235 submittals containing comments from federal agencies, state, and local governments; public and private organizations; and individuals. The comments in each submittal were identified, recorded, and analyzed. Responses were prepared for all substantive comments. A description of the comment analysis, the comments received, and the responses to those comments are provided in Appendix H.

Decisions to be Made

The Final EIS/Proposed Pony Express RMP Amendment is not a decision document. Rather, its purpose is to inform the public and interested parties of impacts associated with implementing the Proponent's proposal as associated with granting a major right-of-way on federal lands to construct, operate, maintain, and decommission transmission facilities across federal lands. This Final EIS also provides information to other regulatory agencies for use in their decision making process for other permits required for implementation of the project.

Publication of the Notice of Availability of the Final EIS/Proposed RMP Amendment initiated a 30-day review period of the Proposed Action and the Final EIS, and a 30-day protest period and a concurrent 60-day Governor's Consistency Review of the Proposed Pony Express RMP Amendment. Following protest resolution and the Governor's concurrence, a Record of Decision (ROD) will be issued by the BLM Utah State Director. The ROD will (1) state what the decision is (i.e., identify the selected alternative and accompanying mitigation measures), (2) identify all alternatives considered in reaching the decision, and (3) state whether all practical means to avoid or minimize harm from the alternative selected have been adopted and, if not, why they were not. The BLM West Desert District Manager is responsible for ensuring that the decision is executed as stipulated.

Chapter 1 – Purpose and Need

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CHAPTER 1 – PURPOSE AND NEED

1.1 Introduction

This Environmental Impact Statement (EIS) was prepared in response to an Application for Transportation and Utility Systems and Facilities on federal lands, submitted by the Proponent and received by the Bureau of Land Management (BLM) on January 25, 2007 (UT-020-2008-009; Case File #UTU-82829). The purpose of this EIS is (1) for the BLM to evaluate and disclose potential environmental impacts of the proposed Project and alternatives; and (2) to amend the Pony Express Resource Management Plan (RMP) to allow for a grant of a major right-of-way for this proposed transmission line outside an existing designated utility corridor.

The BLM serves as the lead federal agency for preparing the EIS and published a Notice of Intent (NOI) to prepare the EIS in the *Federal Register* on October 16, 2007. Serving as a cooperating agency in preparing the EIS is the Utah Governor's Public Lands Policy Coordination Office (PLPCO), which is representing all the Utah state agencies, including, among others, the School and Institutional Trust Lands Administration (SITLA), Utah Division of Wildlife Resources (UDWR), State Historic Preservation Office (SHPO), and the Department of Environmental Quality (DEQ).

The BLM and Environmental Protection Agency (EPA) each published a Notice of Availability (NOA) of the Draft EIS/Draft Pony Express RMP Amendment for public review and comment in the *Federal Register* on May 15, 2009, which initiated a 90-day public comment period. The comment period ended on August 12, 2009. The BLM received 235 submittals containing comments from federal agencies, state and local governments; public and private organizations; and individuals. The comments in each submittal were identified, analyzed, and addressed in this Final EIS.

1.1.1 Summary of Changes from the Draft EIS

Since the Draft EIS was published in May 2009, the Proponent's purpose and need for the Project has been modified. The Proponent is an essential service provider and develops its long-range plans to meet customer demands and service requirements. As part of their long-range planning process, large-scale backbone transmission projects are developed in 1,500 megawatts (MW) increments to achieve maximum system capacity, to provide reasonable economy of scale, and to reduce the overall number of right-of-way corridors required in the future. As originally proposed, the Project included an ultimate transfer capacity of 3,000 MW. Of the 3,000 MW capacity, a portion (1,500 MW) is required to meet the forecasted demand of the Proponent's customers, with the additional 1,500 MW of capacity to be made available to meet requests for third-party transmission service. Over the course of the EIS process, numerous third-party requests were withdrawn, which negated the need for an additional 1,500 MW of transmission capacity.

The Proponent now proposes a 1,500 MW design configuration to meet the needs of their customers. The revised design configuration includes a single-circuit 500kV transmission line (initially operated at 345kV) from the existing Mona Substation to the future Limber Substation within a 250-foot right-of-way. The double-circuit 345kV transmission lines proposed between the future Limber Substation and the existing Oquirrh Substation and between the future Limber Substation and the existing Terminal Substation are still necessary to meet the Proponent's transmission service obligations and remain as originally proposed.

In addition, the Proponent has rescinded their request for designation of a 1-mile-wide utility corridor on BLM-administered lands for a future 500kV transmission line connecting Mona to Limber. The wider utility corridor and future 500kV transmission line are no longer needed due to the reduction in third-party requests for transmission service.

In terms of timing for construction, the segment connecting the existing Mona to Oquirrh substations (via the future Limber Substation site) is now needed by June 2013 because of its primary role in serving the electrical demand for customers in the Wasatch Front of Utah. The Mona Annex Substation was previously identified as a future need in the Draft EIS. The substation is now needed in-service by June 2012 to serve local loads in Juab County. The Proponent would initiate construction of the Limber to Terminal segment at a future date to provide added reliability. The Proponent's revised purpose and need is described in more detail in Appendix A.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

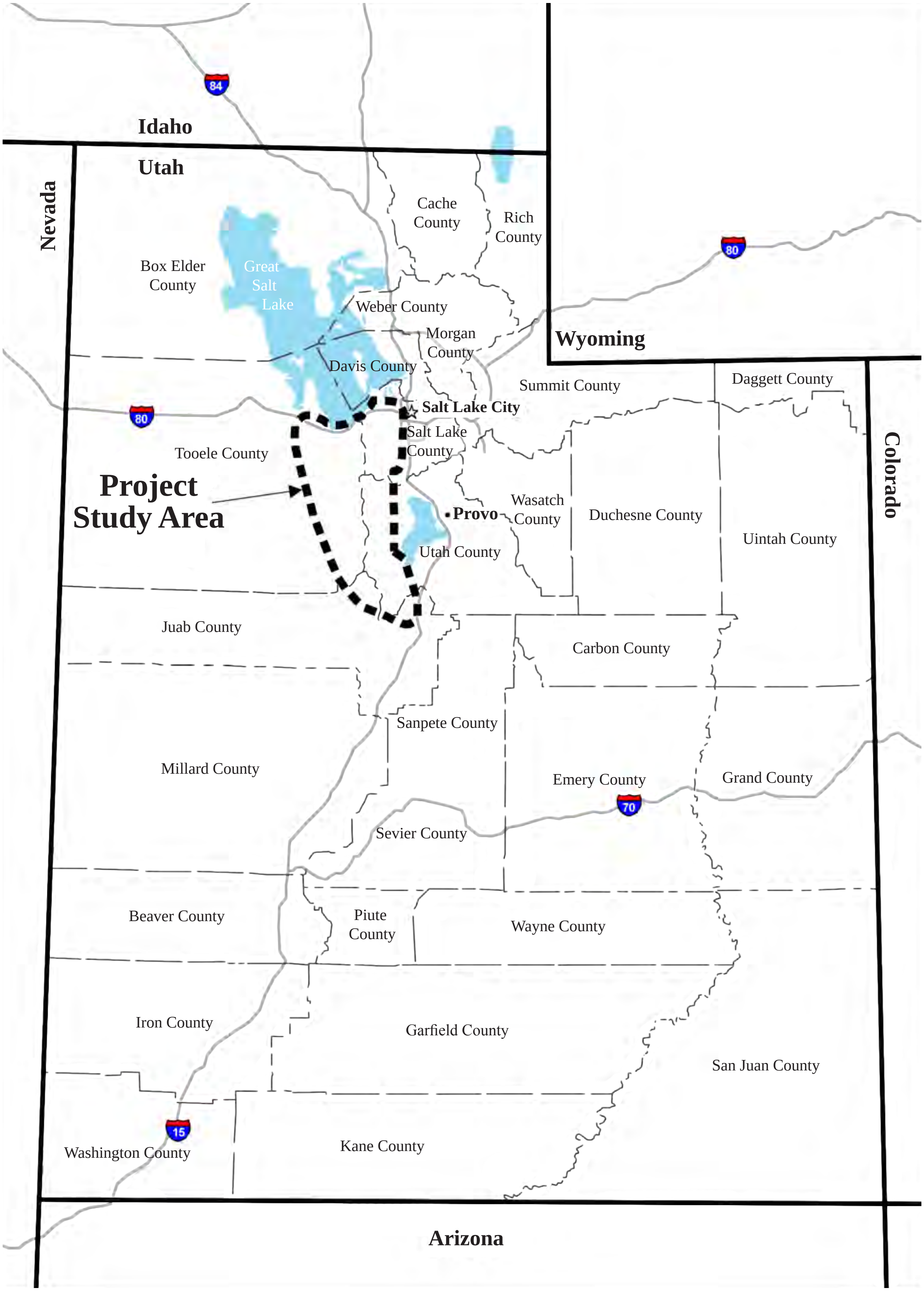
1.1.2 Proponent's Proposed Action

The Proponent has determined a need for and proposes to construct, operate, and maintain a single-circuit 500kV (initially operated at 345kV) and double-circuit 345kV transmission lines from the existing Mona Substation located in Juab County, to the existing Oquirrh Substation, and the existing Terminal Substation, both of which are located in Salt Lake County, Utah (Figures 1-1 and 1-2). The Project also includes siting two new substations and associated facilities.

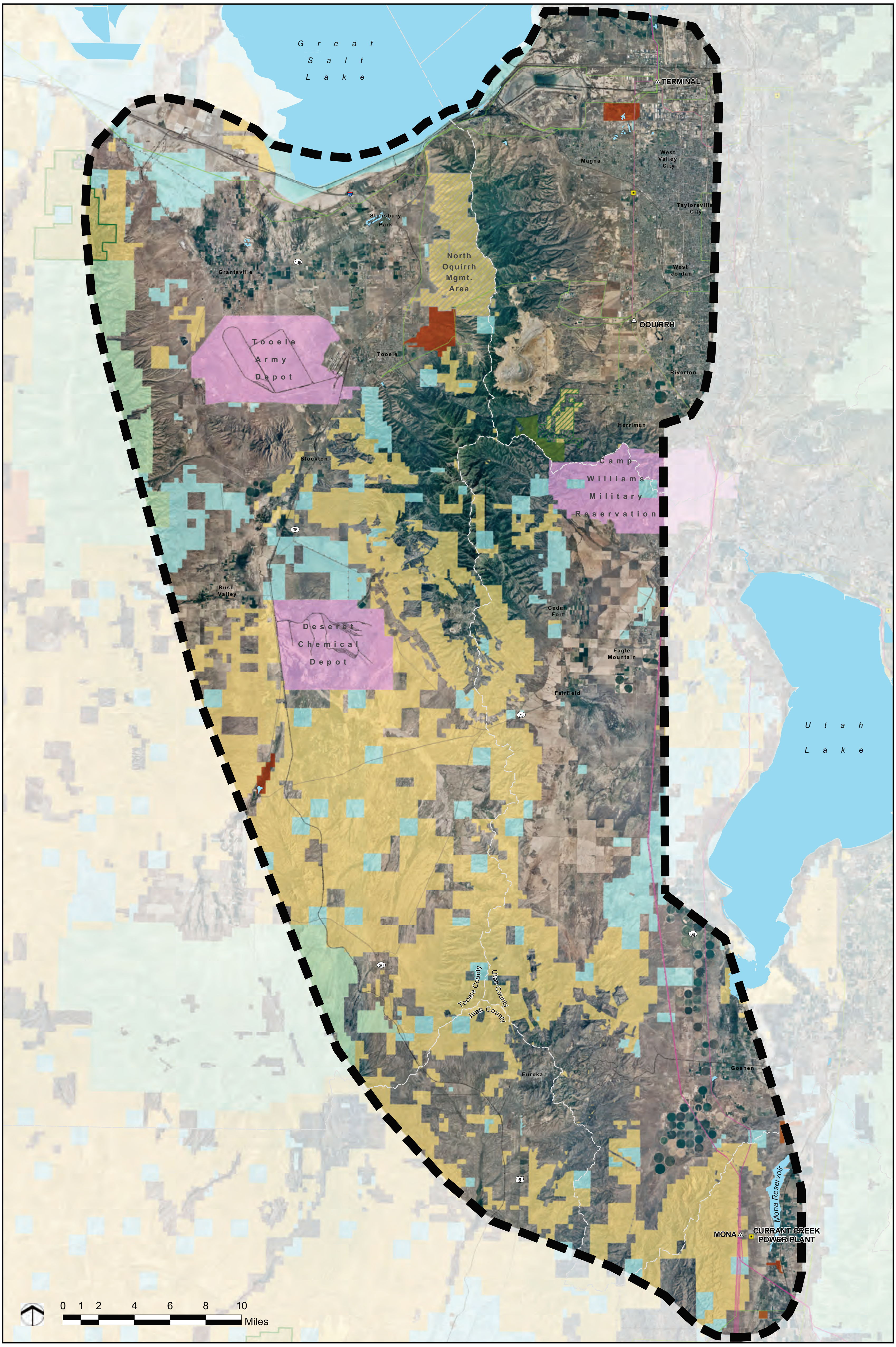
Portions of the proposed transmission lines and substations cross land administered by the BLM; specifically, land administered by the BLM West Desert District Salt Lake Field Office (SLFO) and Fillmore Field Office (FFO). The Proponent submitted an application to the BLM for a grant of a major right-of-way for the proposed Project.

After reviewing the scope of the Project, the BLM determined that granting a major right-of-way for constructing, operating, and maintaining the proposed transmission lines and associated facilities is a major federal action and would require an EIS in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA) as amended (U.S. Code [U.S.C.]: Title 42, Chapter 55, § 4321 et seq. [42 U.S.C. 4321 et seq.]), and the Council on Environmental Quality (CEQ) regulations for implementing the NEPA (Code of Federal Regulations [CFR]: Title 40, Parts 1500–1508).

Additionally, in order to grant a major right-of-way outside of a designated utility corridor in the SLFO, the BLM would have to amend its current RMP. The BLM's land use planning regulations at 43 CFR 1610.5-5 state, "An amendment shall be initiated by the need to consider a Proposed Action that may result in a change in the scope of resource uses or a change in the terms, conditions and decisions of the approved plan." In accordance with the SLFO's Pony Express RMP, the SLFO would have to amend its current Pony Express RMP (BLM 1990) to allow a major right-of-way for the proposed Project. However, an amendment to the FFO's House Range Resource Area RMP (BLM 1987) would not be required. The House Range Resource Area RMP does not require a plan amendment in order to grant a major right-of-way.



Project Vicinity
Figure 1-1



Legend

Project Features
- Project Study Area

Land Jurisdiction
- Bureau of Land Management
- U.S. Forest Service
- Department of Defense
- State Trust Land
- Private Land

Special Management Areas
- UDWR Wildlife Management Area
- Yellow Fork Canyon Regional Park
- Rose Canyon Ranch Open Space
- North Oquirrh Management Area
- Wilderness Study Area

Public Land Survey System
- Township and Range Line

Utility Features
- 345kV Transmission Line
- 138kV Transmission Line
- Power Plant
- Substation
- Natural Gas Pipeline

Transportation Features
- Railroad
- Major Road

Administrative Boundary
- County Boundary

Figure 1-2

SOURCES: Land Ownership, UT BLM 2008 ; County Boundary, Utah AGRC 2004 ; Transmission Lines and Substations, PacifiCorp
Mona_Oquirrh_FEIS_Study_Area_Figure_1-2.mxd

April 2010

NATIONAL SYSTEM OF PUBLIC LANDS

Project Study Area

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS

1.2 Project Need

1.2.1 Bureau of Land Management's Purpose and Need

The Federal Land Policy and Management Act of 1976 (FLPMA), the basic authority for the BLM's activities, provides the BLM with authority to grant rights-of-way on public land. Additionally, the Energy Policy Act of 2005 and the President's Energy Policy recognize and encourage the use of public land for energy-related facilities; in this case, electrical transmission lines and substation facilities. The BLM's action is to decide (1) whether or not to grant the Proponent a major right-of-way to construct, operate and maintain the proposed facilities on BLM-administered land and under what terms and conditions, and (2) whether or not to amend the Pony Express RMP to allow for a grant of a major right-of-way for this proposed transmission line outside of a designated utility corridor in the SLFO. In so doing, the BLM will analyze, through the EIS, the Proponent's plan for and effects of constructing, operating, maintaining, and eventually decommissioning the proposed Project.

As previously mentioned, the FFO's 1987 House Range Resource Area RMP does not require a plan amendment to grant a major right-of-way.

1.2.2 Project Proponent's Purpose and Need

The Proponent's need for the Project is based on its obligations as a publicly regulated electric utility to provide safe, reliable, and cost-effective electric transmission service to its retail customers and other users of the transmission system. In order to meet this need, the Proponent is obligated per the Federal Energy Regulatory Commission (FERC) requirements (Orders 888 [FERC 1996a] and 889 [FERC 1996b]) to expand or upgrade its transmission system pursuant to the Open Access Transmission Tariff to accommodate requests (internal and external) for transmission services. As a result of a reduction in third-party requests, the Proponent has selected a 1,500 MW configuration for the transmission system.

Through the course of meeting its business and regulatory obligations, the Proponent has substantiated the need for the Project based on the following factors:

- The current and projected increase in electrical demands in northern Utah and the projected electrical shortfall, based on population growth
- Existing generation resources and the capacity of existing transmission infrastructure to meet these demands
- Projected generation and the capacity of the existing transmission system to accommodate the increased capacity for facilities planned or under construction
- System reliability and flexibility issues associated with the operation of the existing transmission system
- Allowance for economical power sales, transfers, and purchases
- Integration with short-term and long-range planning

These factors and the Project benefits and costs are described in greater detail in Appendix A.

1.3 Scoping and Public Involvement

1.3.1 Process Summary

Publication of the NOI in the *Federal Register* on October 16, 2007, marked the beginning of the 30-day scoping period. The intent of scoping was to solicit comments on the Project from federal, state, and local agencies and the public early in the preparation of the EIS. In addition, a comprehensive public involvement effort for the Project, designed to incorporate comments on the Project at key milestones, was ongoing.

The range of issues summarized in this section was based on an ongoing public involvement and scoping process. The activities listed below assisted in identifying the issues and concerns related to the Project.

- Agency, interagency, and stakeholder meetings (listed in Appendix B) were held to discuss the Project and solicit comments.
- Announcements were made to inform the public of the Project, EIS preparation, and public scoping meetings included the *Federal Register* NOI, media releases to local newspapers and radio stations, and legal notices.
- A newsletter was distributed to interested parties on the Project mailing list that included federal, state, and local government agencies, special interest groups, and individuals. The newsletter introduced the Project, solicited input for the environmental analysis, and announced upcoming public scoping meetings.
- A telephone voice message information line (801-573-6814) was established to provide an opportunity for the public to learn about the Project status and/or request information.
- A Project website was established. The website contains a brief description of the Project, the need for the Project, and a Project timeline. The website is available at: http://www.blm.gov/ut/st/en/fo/salt_lake/planning/mona_to_oquirrh_transmission.html. An email link was also provided for the public to submit comments (UT_M2OTL_EIS@blm.gov).
- The Project was posted on the BLM Environmental Notification Bulletin Board website (https://www.blm.gov/ut/enbb), NEPA UT-020-2008-009.
- Three formal public scoping meetings were held in November 2007 in West Jordan, Tooele, and Nephi, Utah, to introduce the Project, explain the purpose and need for the Project, describe the Project, explain the planning and permitting process, and solicit comments useful for the environmental analysis.

In addition, the Proponent convened a Community Working Group (CWG) that represents diverse interests within the northern portion of the Project area, including representatives from Tooele County, Tooele City, Kennecott Land, Kennecott Utah Copper, Town of Stockton, Salt Lake County, Salt Lake City, South Jordan City, and West Jordan City. The CWG was asked to provide input to the Project team (i.e., issues, concerns, data) as the siting process and environmental studies progressed. The CWG met on four occasions at key points during the planning process.

Verbal comments received during the scoping meetings were documented in meeting summaries. Written comments were accepted by the BLM at the scoping meetings, by email, and by U.S. mail. All comments received to date were analyzed and assisted in defining the issues to be analyzed for the EIS. A more detailed description of the scoping process and results is presented in the *Mona to Oquirrh Transmission Corridor Project EIS Scoping Report* (BLM 2008a), which is available on the BLM project website. A more detailed description of the public involvement efforts is presented in Chapter 5 – Consultation and Coordination.

The BLM and EPA each published a NOA of the Draft EIS/Draft Pony Express RMP Amendment for public review and comment in the *Federal Register* on May 15, 2009, which initiated a 90-day public comment period. More than 52 hard copies and 200 electronic copies of the Draft EIS/Draft Pony Express RMP Amendment were distributed in May 2009 to federal agencies; tribal, state, and local governments; organizations; and individuals. The availability of the Draft EIS/Draft Pony Express RMP Amendment, deadline for public comments, and locations, dates, and times of public meetings on the Draft EIS/Draft Pony Express RMP Amendment were announced in paid newspaper legal notices, paid newspaper advertisements, and project newsletters that were mailed out to affected property owners, agencies, and stakeholders. The BLM held three public open house meetings, one each in Tooele, Magna, and Nephi, Utah, to provide information and solicit public comments on the Proposed Action and the Draft EIS/Draft Pony Express RMP Amendment.

The comment period ended on August 12, 2009. The BLM received 235 submittals containing comments from federal agencies, state, and local governments; public and private organizations; and individuals. The comments in each submittal were identified, recorded, and analyzed. Responses were prepared for all substantive comments. A description of the comment analysis, the comments received, and the responses to those comments are provided in Appendix H.

1.3.2 Issues Addressed

1.3.2.1 Issues Used to Develop and Review Alternatives

During scoping, issues and concerns related to land use and recreation resources, biological resources, visual resources, cultural resources, earth and water resources, and socioeconomics were identified and used to identify, refine, and evaluate alternative routes and substation sites. These issues are summarized below by topic. Table 1-1 summarizes the public and agency comments that were received during scoping, and indicates where these issues are addressed within the Final EIS.

TABLE 1-1
SUMMARY OF ISSUES FROM SCOPING

Issues	Where Addressed in EIS
Earth Resources ▪ Issues with engineering and construction constraints, including liquefaction soils, slope restrictions, and potentially active faults and geological structures ▪ Disturbance of soil resources, including areas prone to slope failure or instability, high erosion potential, or areas of prime and unique soils ▪ Ground disturbance in hazardous waste sites ▪ Disturbance of active mining sites	▪ Chapter 3, Section 3.2.2 ▪ Chapter 4, Section 4.2.2
Water Resources ▪ Ground disturbance and erosion in watersheds and riparian areas	▪ Chapter 3, Section 3.2.2 ▪ Chapter 4, Section 4.2.2

TABLE 1-1
SUMMARY OF ISSUES FROM SCOPING

Issues	Where Addressed in EIS
Biological Resources ▪ Impacts on wildlife habitat, particularly on raptor nesting habitat and crucial big game seasonal habitats ▪ Impacts on migratory birds and waterfowl ▪ Impacts on native plant communities ▪ Invasive and noxious weed species ▪ Habitat loss and fragmentation ▪ Wildlife mortality associated with construction activities and vehicle traffic ▪ Creation of avian collision hazards ▪ Increased public access on access roads	▪ Chapter 3, Section 3.2.3 ▪ Chapter 4, Section 4.2.3
Cultural Resources ▪ Potential impacts on cultural resources, including prehistoric and historic sites, historic structures and trails, cemeteries, and state parks	▪ Chapter 3, Section 3.2.5 ▪ Chapter 4, Section 4.2.5
Native American Concerns ▪ Tribal values, traditional cultural places	▪ Chapter 3.2.5.5 ▪ Chapter 4.2.5.4
Visual Resources ▪ Impacts on sensitive viewing areas, including travel routes, recreation areas, residences, and the aesthetic values in Tooele Valley ▪ Areas of scenic quality, including BLM Visual Resource Management (VRM) Class II and III areas	▪ Chapter 3, Section 3.2.7 ▪ Chapter 4, Section 4.2.7
Land Use and Recreation ▪ Conflicts with current land use ▪ Conflicts with planned future developments in Tooele and Salt Lake counties ▪ Impacts on future transportation plans ▪ Impacts on North Oquirrh Management Area (NOMA) management objectives ▪ Impacts on recreation areas ▪ Conflicts with increased off-highway vehicle (OHV) use along construction access roads ▪ Conformance with municipal/county general plans and master plans ▪ Impacts on livestock grazing ▪ Impacts on rangeland infrastructure ▪ Impacts on military training, testing, and the operation readiness of the Utah Test and Training Range (UTTR)	▪ Chapter 3, Section 3.2.9 ▪ Chapter 4, Section 4.2.9
Hazardous Materials ▪ Use of sulfur hexafluoride (SF_6) equipment during construction and at substation sites ▪ Use of hazardous materials during construction	▪ Chapter 2, Section 2.7.3 ▪ Chapter 4, Section 4.4.1.1

TABLE 1-1 SUMMARY OF ISSUES FROM SCOPING	
Issues	**Where Addressed in EIS**
Socioeconomics ▪ Potential adverse impacts on planned future developments and property values ▪ Potential impact on low-income and minority communities	▪ Chapter 3, Section 3.4 ▪ Chapter 4, Section 4.4

Earth Resources

Issues associated with earth resources were identified by the BLM and include the following:

- Engineering/construction constraints:
  - Potential for liquefaction in soils surrounding the Great Salt Lake
  - Slope restrictions
  - Potentially active faults and geological structures
- Disturbance and erosion of soils due to construction activities and presence of temporary construction and/or permanent access roads:
  - Areas prone to slope failure or instability, or with high erosion potential
  - Areas of prime farmland and unique soils
- Ground disturbance and erosion in hazardous waste sites:
  - Superfund sites – Jacobs Smelter, Eureka Mills, International Smelting and Refining, and the Tooele Army Depot
  - Manning Canyon, Mercur Canyon Outwash, Sunshine Tailings Outwash, and Kennecott North and South Zone hazardous waste sites
- Disturbance of earth resources and the disturbance or preclusion of mineral extraction

Water Resources

Issues associated with water resources were identified by the BLM and include the following:

- Ground disturbance and erosion in watersheds and riparian areas:
  - West of the North Oquirrh Mountains, which is a municipal watershed
  - Riparian areas and wetlands – East Tintic Mountains (including Kimball and Tanner creeks), North Oquirrh Mountains, Rush Lake, and Great Salt Lake

Biological Resources

Biological resource issues identified by the BLM, U.S. Fish and Wildlife Service (USFWS), and UDWR include the following:

- Wildlife species:
  - Raptors, (including golden eagle, bald eagle, ferruginous hawk, and Swainson's hawk) and raptor nesting concentration areas
  - Migratory birds and associated habitats, particularly Birds of Conservation Concern and Partners in Flight species
  - Crucial big game seasonal habitats, including mule deer and elk winter ranges

  - BLM-sensitive species such as the kit fox, pygmy rabbit, and greater sage-grouse
  - Waterfowl and shorebirds and associated habitats
- Permanent habitat loss and fragmentation associated with clearing and grading for access roads, tensioning and pulling sites, work areas, transmission line structures, and substations
- Mortality of ground-nesting and burrowing animals during clearing and grading of work areas and the operation of construction equipment and vehicles
- Short-term disturbance during construction activities and long-term displacement associated with increased public use of access roads
- Creation of potential avian collision hazards not currently present in the environment (transmission structures and conductors)
- Native plants/communities of concern:
  - Ute-ladies'-tresses
  - BLM-sensitive species
  - Hybrid oak community in North Oquirrh Mountains
  - Wetlands
- Potential for proliferation of invasive and noxious weeds

Cultural Resources and Native American Concerns

Issues associated with cultural resources and Native American concerns were identified by the BLM and participants of the interagency cultural resources meeting (Appendix B) and include the following:

- Prehistoric and historic sites
- Historic structures
- Cemeteries
- Donner, Clymen, Stansbury, and Pony Express National Historic trails
- Camp Floyd/Stage Coach Inn State Park
- Tribal values – traditional cultural properties
- National Register Historic Mining District in Tintic Mountains

Visual Resources

Areas of concern for visual resources identified by the BLM, local agencies, and the public include the following:

- Sensitive viewing areas:
  - Views from travel routes (highways and roads, designated scenic or historic byways, and recreation roads)
  - Views from recreation areas (existing recreation sites used for picnics, camping, hiking, scenic overlooks, rest areas, parks, or other recreational areas)
  - Views from residences in Tooele Valley, particularly on the east side of the valley
- Areas of scenic quality:
  - BLM VRM Class II and III

Land Use and Recreation Resources

Issues associated with land use and recreation resources identified by the BLM, state agencies, local municipalities, and the public include:

- Conflicts with existing land use, including residential, commercial, industrial, parks, agriculture, rights-of-way, and other authorized land use
- Conflicts with planned developments, particularly in the Tooele Valley, the West Bench of the Oquirrh Mountains in Salt Lake County, and west of Stockton
- Impacts on future transportation plans and road expansions
- Impacts on BLM management objectives in the NOMA
- Impacts on recreation areas, particularly the Fivemile Pass Recreation Area and the Larry Miller Motorsports Park and Deseret Peak Complex in Tooele County
- Increase in recreational use (particularly OHV use) along temporary construction and/or permanent access roads, potentially resulting in adverse impacts on biological and earth resources and an increase in the frequency of fire
- Conformance with municipal and/or county general plans and master plans
- Impacts on livestock grazing due to the removal of vegetation
- Disturbance of active mining sites in the Oquirrh and East Tintic mountains
- Impacts on military training, testing, and the operation readiness of the UTTR

Socioeconomics

Issues associated with social and economic conditions were identified by the BLM and local agencies and include:

- Potential adverse impacts on planned developments and property values and the cumulative effects of the Project, in conjunction with other major future projects
- The potential to disproportionately affect low-income and minority communities in the Project area

1.3.2.2 Issues Addressed in Other Parts of the Environmental Impact Statement

A limited number of issues were identified during scoping that did not influence the development of transmission line route and substation site alternatives.

In a letter dated December 12, 2007, the EPA suggested that the EIS evaluate the proposed use of SF_6 equipment and develop an option that eliminates the need for using SF_6 equipment. As stated by the EPA, the United States electric power industry has used SF_6 as an insulator in high-voltage equipment (e.g., circuit breakers, switchgear) since the 1950s. The EPA states that SF_6 has been identified by the Intergovernmental Panel on Climate Change (IPCC) as a highly potent greenhouse gas that contributes to climate change if emitted into the atmosphere. The EPA's concern regards the potential environmental impact, should SF_6 inadvertently leak from the equipment. This issue is addressed in Chapter 2 (Section 2.7.3) and Chapter 4 (Section 4.4.1.1).

Concerns were also raised regarding potential damage to private property and to rangeland infrastructure (e.g., fences, stock tanks) on federal land during construction. As described in Chapter 2 (Section 2.8.3), the Proponent has committed to replacing or repairing fences, gates, and walls as required by the landowner or the land managing agency if they are removed or damaged by construction activities. In addition, the Proponent would coordinate with the BLM to install cattle guards where needed on permanent access roads.

1.3.3 Issues Considered but Not Further Analyzed

1.3.3.1 Issues Beyond the Scope of the Plan

The Utah PLPCO and DEQ expressed concerns about how long-term energy planning, thermal generation sources, induced development and population growth, cumulative impacts, and Utah air quality relate to the Project. The Mona to Oquirrh transmission line is part of the Proponent's short-term and long-range energy planning. (Refer to Appendix A for an explanation of [1] existing generation resources and the capacity of existing transmission infrastructure to meet these demands, [2] projected generation and the capacity of the existing transmission system to accommodate the increased capacity for facilities planned or under construction, and [3] improvement and enhancement of reliability and operational flexibility.) The proposed transmission lines would be growth-accommodating, rather than growth-inducing. Transmission system planners employ growth trends and projections to forecast the amount of power that will be needed in the future. (Refer to Appendix A for additional explanation of population growth and projected electrical demand.)

Regarding PLPCO's concern about thermal generation and Utah air quality, operation of the proposed transmission lines and substations would not be tied to a specific generation source; rather, the lines would transport power generated by a mix of sources (including renewable sources). Furthermore, the Proponent continues to (1) make investments in generation emission-reduction technology, (2) further its efforts in demand-side management (DSM) and energy-efficiency programs, and (3) develop and acquire renewable energy to meet CO_2 reduction policies and maintain consistency with its Integrated Resource Plan (PacifiCorp 2007a) and Renewable Energy Action Plan (PacifiCorp 2007b).

PLPCO also expressed concern about the proximity of the Project to the UTTR, a military training area managed by the U.S. Air Force. The proposed transmission line project would not interfere with military operations. Further, the BLM coordinated with Hill Air Force Base, who administers the UTTR, and considered their input in preparation of the EIS.

1.4 Planning and Legislative Criteria

An interdisciplinary approach was used to develop the EIS, in order to consider a variety of resource issues and concerns. The amendment to the governing Pony Express RMP would be based on the following planning criteria, which were published in the NOI:

- The amendment would be completed in compliance with the FLPMA, NEPA, and all other relevant federal laws, executive orders, and BLM management policies.
- Where existing planning decisions are still valid, those decisions may remain unchanged and would be incorporated into the new amendment.
- The amendment would recognize valid existing rights.

1.5 Planning Process

1.5.1 Relationship to BLM Policies, Plans, and Programs

The BLM land use planning guidelines and management objectives for federal lands within the Project area are contained in the following documents:

- Pony Express RMP – SLFO (BLM 1990)
- Pony Express RMP Amendment– North Oquirrh Mountains, SLFO (BLM 1997)
- House Range Resource Area RMP and Record of Decision (ROD) Rangeland Program Summary, Richfield District Office (BLM 1987)

The majority of the Project area is within the jurisdiction of the SLFO and is subject to the management prescriptions of the Pony Express RMP. The Pony Express RMP states that future proposals for rights-of-way, such as large transmission lines, must be sited within designated utility corridors or a plan amendment would be required. Since the Proposed Action and alternatives would not be in conformance with Transportation and Utility Corridor Decision 1 of the RMP and would need to be sited outside of existing utility corridors, a land use plan amendment would be required.

In addition, the Pony Express RMP was amended in 1997 for the NOMA to include additional guidance on proposed right-of-way within the NOMA. Right-of-way applications within the NOMA would be considered on a case-by-case basis; however, rights-of-way would avoid the following areas:

- Lands within VRM Class II areas
- Lands above 5,200 feet in elevation
- Lands with slopes greater than 30 percent
- Lands within 0.25 mile of live water sources, except water-development projects where underground placement and wildlife mitigation would reduce impacts to acceptable levels

Rights-of-way proposed for areas above the 5,200-foot elevation mark must be constructed underground and must be completely rehabilitated.

The southern portion of the study area in Juab County and the FFO is subject to the management prescriptions of the House Range Resource Area RMP. The House Range Resource Area RMP states that existing utility corridors would be used whenever possible for new rights-of-way. However, a plan amendment is not required if a major right-of-way is located outside existing corridors. Except for the Pony Express RMP, the Proposed Action would be in conformance with the land use plan's terms and conditions and as required by 43 CFR 1610.5.

1.5.2 Collaboration

The BLM promoted an open planning and EIS process by collaborating with other agencies, stakeholders, and the public. Throughout the preparation of the EIS, formal and informal efforts were made by the BLM to involve federal, state, and local governments, tribes, and the public. These interactions are important to (1) ensure that the most appropriate data have been gathered and employed for analysis and (2) ensure that agency and public sentiment and values are considered and incorporated into decision making. The relationships established are described in Sections 1.5.3 and 1.5.4.

1.5.3 Intergovernmental, Interagency, and Tribal Relationships

1.5.3.1 Cooperating Agencies

A cooperating agency is defined as any federal, state, or local government agency or American Indian tribe that has jurisdiction by law or special expertise regarding environmental impacts of a proposal or a reasonable alternative for a major federal action affecting the quality of the human environment. The benefits of cooperating agency participation in the preparation of an EIS include (1) disclosing relevant information early in the analytical process; (2) applying available technical expertise and staff support; (3) avoiding duplication of other federal, state, local, and tribal procedures; and (4) establishing a mechanism for addressing intergovernmental issues.

In a letter dated November 2, 2007, the BLM invited a number of organizations to participate in the preparation of the EIS. These organizations include the following:

- **U.S. Department of Defense (DOD) Tooele Army Depot and Utah National Guard's Camp Williams Military Reservation:** Jurisdiction of these military installations is within the Project area and alternatives are located in the vicinity of Tooele Army Depot. Although these entities declined the BLM's invitation, they participated in various Project meetings and provided data for the environmental analysis.
- **Utah Governor's PLPCO:** On behalf of all state agencies, PLPCO coordinates the state's interest on public and land issues and acts to ensure that state and local interests are considered in the management of public land. In cooperation with the Division of State History, PLPCO is also responsible for ensuring that surveys and excavations of the state's archaeological and anthropological resources are undertaken in a coordinated, professional, and organized manner. PLPCO accepted the BLM's invitation and has been participating as a cooperating agency.
- **Juab, Tooele, Salt Lake, and Utah Counties:** Jurisdiction of each of the counties is within the Project area. Although all counties declined the BLM's invitation, they participated in various Project meetings and provided data for the environmental analysis.

The BLM received no requests from other entities to participate as cooperating agencies.

1.5.3.2 Consultation

The BLM is required to prepare EISs in coordination with any studies or analyses required by the Fish and Wildlife Conservation Act (16 U.S.C. 661 et seq.), Endangered Species Act (ESA) of 1973 (16 U.S.C 1531 et seq.), and the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.).

Biological Resources

In accordance with Section 7 of the ESA, formal consultation with USFWS is required when the action agency determines that the Project may affect a listed species or designated Critical Habitat. The consultation process is initiated with a written request submitted to USFWS. A Biological Assessment (BA) is prepared to evaluate the potential for the Project to adversely affect federally listed species or designated Critical Habitat. If the BA concludes the Project is likely to result in an adverse effect, it is submitted to the USFWS and that agency prepares a Biological Opinion (BO).

USFWS, BLM and DWR biologists were involved in a working group to identify biological issues associated with the Project. Based upon the working group meetings and a detailed analysis of species listed under the ESA (see Biological Report in Appendix E), it was concluded that no federally protected species or Critical Habitats would be adversely affected by the proposed Project. This determination concludes the consultation process with the USFWS for the ESA.

The USFWS also administers the Migratory Bird Treaty Act (MBTA). In accordance with the MBTA, the Proponent has agreed to conduct pre-construction surveys on the selected alternatives to minimize potential adverse impacts by avoiding disturbance of nests associated with raptors and other migratory bird species on the Partners in Flight and Birds of Conservation Concern lists.

Cultural Resources and Tribal Relationships

Section 106 of the NHPA requires the BLM to consider the effects of the agencies' undertakings on properties listed in or eligible for the National Register of Historic Places (NRHP), which can include a diversity of archaeological, historical, and traditional cultural properties. Regulations for Protection of Historic Properties (36 CFR 800) implement Section 106, and define a process for federal agencies to use in consulting the SHPO and other interested parties as they assess the effects of their undertakings. Pursuant to these regulations, the BLM initiated Section 106 consultation with the Utah SHPO in 2007. A Programmatic Agreement (PA) among the Utah SHPO, DOD Tooele Army Depot, SITLA, and Utah Department of Transportation (UDOT) was executed. The BLM invited the Advisory Council on Historic Preservation to participate in the Project and to be a signatory to the PA; however, it declined to do so at this time.

A cultural resource study involving the collection of Class I data and a Class II field reconnaissance was conducted to identify and assess potential impacts the Project may have on cultural resources, and to support the evaluation of project alternatives for the EIS. Once a Preferred Alternative has been identified, an intensive Class III inventory survey would be conducted to specifically identify those cultural resources that occur within the Project's area of potential effect (APE). The results of this study will be documented in a report to support the BLM's on-going consultations with the Utah SHPO.

While no American Indian reservations or tribal lands owned in fee are within the Project area, the BLM identified tribes whose traditional territories are within the Project area. As part of scoping, the BLM mailed Project notification letters on October 25, 2007, to seven tribes and two Native American individuals (Northwestern Band of Shoshone Nation, Eastern Shoshone of Wind River Reservation, Te-Moak Tribe and affiliated Bands, Confederated Tribes of Goshute Nation, Skull Valley Band of Goshute Tribe, Uintah and Ouray Ute Indian Tribe, and Paiute Indian Tribe of Utah; Art Caamasee and Elwood Mose) to inform them about the Project and EIS, and to determine their interest in the Project. Tribes were also asked to determine the need for further work related to the identification of TCPs in the Project area that might be impacted by the Project. Of these tribes, the Paiute Indian Tribe of Utah requested to participate in a field visit to view the Project right-of-way. Upon completion of the Class III cultural resource survey and report, the BLM will host a field visit for the Paiute Indian Tribe of Utah and other interested tribes. Results of the consultation effort will be recorded in a separate report.

1.5.4 Other Stakeholder Relationships

Aside from the relationships with jurisdictional authorities (e.g., federal, state, county, and local entities), relationships were established with several key stakeholders and large landholders in the Project area to keep them informed of the Project status and apprised of potential issues. These stakeholders included Kennecott Utah Copper, Kennecott Land, The Ensign Group, Larry Miller Group, and Inland Sea Shorebirds Reserve (ISSR) and Farmland Reserve. A list of the stakeholder meetings that were held is provided in Appendix B.

1.6 Related Plans

The BLM reviewed the land use plans of the State of Utah, Tooele County, Juab County, Utah County, and Salt Lake County to ensure that the Project is consistent with the land management objectives and policies established in the plans.

There are no comprehensive State of Utah plans for the Project area. The SITLA manages the majority of state land within the Project area, and their mandate is to produce funding for the state's school system. SITLA makes surface lands available for easements for roads, pipelines, power, and transmission lines. Easements generate funds for SITLA; therefore, construction and operation of the Project in an easement across state land is not inconsistent with its objectives.

The *Tooele County General Plan* (2006a) recognizes the value of BLM land within the county, which is used for livestock grazing, recreation, and mineral extraction. The plan emphasizes the importance of allowing county residents continued access to public lands. The Project is in conformance with the *Tooele County General Plan* since it would have minimal impacts on livestock grazing, recreation, and mineral extraction, and would not limit access to public lands.

The *Juab County General Plan* (1996) supports federal land management plans that allow multiple uses of public land, including activities related to agriculture, mining, livestock grazing, recreation, water resources, and wildlife. The *Juab County General Plan* also encourages cooperation with federal agencies in decisions affecting the management and use of public land. The Project is in conformance with the *Juab County General Plan*.

Since much of the federal land within Utah County is located at higher elevations, the *Utah County General Plan* (2007) emphasizes the importance of preserving water and water features, wildlife, and forest vegetation. The plan also states the importance of recreation and access on federally administered lands. An amendment to the *Utah County General Plan* in March 2009 approved the *Goshen Valley Specific Area Plan*. The *Goshen Valley Specific Area Plan* is a long-range plan for the Goshen Valley area to provide for mixed-use communities and other uses. The Project is in conformance with the *Utah County General Plan* or the *Goshen Valley Specific Area Plan*.

The land use plans for the west side of Salt Lake County include: *Draft West Side Master Plan* (2006), *Draft Southwest Community Plan* (2007), *Copperton Township Community General Plan* (2003a), *Shorelands Plan* (2003b), *Magna Revitalization Implementation Plan* (2005), and *Salt Lake County Planning Goals and Policies* (2003c). The plans emphasize the importance of conserving natural features and resources; maintaining the visual integrity of hillsides, ridgelines, and steep slopes; and developing recreational opportunities. Salt Lake County recognizes the need for utilities and recommends co-locating recreational facilities with utilities where possible. The Project is in conformance with Salt Lake County land use plans.

This EIS also incorporates the relevant decisions or practices contained in other applicable federal, state, and local plans listed in, but not limited to, the reference section of the EIS.

1.7 Major Authorizing Laws and Regulations

This EIS and RMP amendment is being prepared by the BLM in compliance with federal regulations and guidelines (Table 1-2), principally NEPA, CEQ regulations for implementing the procedural provisions of NEPA, and other applicable regulations.

TABLE 1-2
MAJOR FEDERAL AUTHORIZING LAWS, REGULATIONS, AND GUIDELINES

Law and Regulation	Reference
American Indian Religious Freedom Act of 1978	42 U.S.C. 1996
Antiquities Act of 1906	16 U.S.C. 431 et seq.
Archaeological Resources Protection Act (ARPA), as amended	16 U.S.C. 470aa et seq.
BLM right-of-way regulations	43 CFR 2800
BLM Planning Handbook H-1601-1 (2005)	BLM Manual Rel. 1-1693
BLM planning regulations	43 CFR 1600 et seq.
BLM NEPA Handbook H-1790-1 (2008)	BLM Manual Rel. 1-1710
Clean Air Act	42 U.S.C. 7401 et seq.
Clean Water Act (CWA)	33 U.S.C. 1251 et seq.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	42 U.S.C. 9601-9675
Consultation and Coordination with Indian Tribal Governments	Executive Order 13084
Consultation and Coordination with Indian Tribal Governments	Executive Order 13175
CEQ regulations implementing NEPA	40 CFR Parts 1500-1508
USDI implementing procedures and proposed revisions	65 FR Parts 1500-1508
Departmental Responsibilities for Indian Trust Resources	512 DM 2.1
Endangered Species Act	16 U.S.C. 1531 et seq.
Environmental justice (EJ)	Executive Order 12898
Federal Compliance with Pollution Control Standards	Executive Order 12088
Federal Land Policy and Management Act of 1976	U.S.C. 1701 et seq.
Floodplain management	42 U.S.C. 4321 Executive Order11988
Indian sacred sites	Executive Order 13007
Memorandum for the Heads of Executive Departments and Agencies on Government-to-Government Relations with Native American Tribal Governments of 1994	Signed by President Clinton on April 29, 1994
Migratory Bird Treaty Act (MBTA)	16 U.S.C. 703-711; Executive Order 13186
National Environmental Policy Act of 1969	42 U.S.C. 4371 et seq.
National Historic Preservation	Executive Order 11593
National Historic Preservation Act and regulations implementing	16 U.S.C. 470 et seq.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)	25 U.S.C. 3001-30013 et seq.
National Environmental Policy Act, Protection and Enhancement of Environmental Quality	42 U.S.C. 4321, CEQ; 40 CFR 1500-1508
Noise Control Act of 1972, as amended (NCA)	42 U.S.C. 4901 et seq.
Noxious weeds and invasive species	Executive Order 13112
Occupational Safety and Health Act (OSHA)	29 U.S.C. 651 et seq. (1970)
Pollution Prevention Act of 1990 (PPA)	42 U.S.C. 13101 et seq.
Protection of wetlands	42 U.S.C. 4321 Executive Order No. 11990
Resource Conservation and Recovery Act (RCRA)	42 U.S.C. 6901-6992k
Responsibilities and the Endangered Species Act, Secretarial Order 3206	June 5, 1997
Safe Drinking Water Act of 1974 (SDWA)	42 U.S.C. s/s 300f et seq.

1.8 Decisions to be Made

1.8.1 Bureau of Land Management

The BLM will make the following decisions:

- Whether or not to amend the Pony Express RMP to allow for a grant of a major right-of-way outside of a designated utility corridor for this proposed transmission line and associated facilities
- Whether or not to grant the Proponent a major right-of-way to construct, operate, maintain, and decommission the proposed facilities on BLM-administered lands, and under what terms and conditions

The rights-of-way for segments of the proposed transmission lines located on BLM-administered lands in Tooele County would require an amendment to the Pony Express RMP. In order to amend the Pony Express RMP to allow for grant of a major right-of-way for the Project, the BLM must determine whether such action is consistent with provisions contained within the National Defense Authorization Act for Fiscal Year 2000 and the National Defense Authorization Act of Fiscal Year 2006 pertaining to impacts upon military training, testing, and the operational readiness of the UTTR.

The segment of the proposed major right-of-way applicable to the Pony Express RMP would be located east of the UTTR in the Tooele and Rush valleys. The location, establishment and use of the major right-of-way for the Project does not affect Utah national defense lands. Therefore, the amendment of the Pony Express RMP to allow for grant of a major right-of-way for the Project is not inconsistent with the provisions of the National Defense Authorization Act for Fiscal Year 2000 or the National Defense Authorization Act of Fiscal Year 2006.

The BLM requested concurrence with the BLM's "No Effect" finding to Utah national defense lands from the Department of Defense U.S. Air Force (Hill Air Force Base). On November 2, 2009, concurrence was received from Lieutenant Colonel C. S. Martin confirming that there would be no effect to military operations based on this Proposed Action.

In addition to the BLM, other federal, state, and local agencies may adopt the EIS to provide approvals or issue permits for all or part of the proposed Project. These approvals or permits are discussed in Section 1.9.

1.9 Federal, State, and Local Permits

Table 1-3 is a list of the major federal, state, and local permits and approvals that could be required for construction, operation, and maintenance of the Project.

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Federal				
NEPA Compliance	Federal action: to grant right-of-way across land under federal jurisdiction	Lead agency – BLM; cooperating agencies	EIS and ROD	NEPA (42 U.S.C. 4321); CEQ (40 CFR 1500-1508);
Right-of-way across land under federal management	Preconstruction surveys; construction, operation, maintenance, and abandonment	BLM	Right-of-way grant and temporary use permit	FLPMA of 1976 (PL 94-579); 43 U.S.C. 1761-1771; 43 CFR 2800
	Construction, operation, maintenance, and abandonment of transmission line across or within highway rights-of-way	Federal Highway Administration	Permits to cross Federal Aid Highway; 4(f) compliance	Department of Transportation Act (23 CFR 1.23 and 1.27; 23 U.S.C. 109 and 315); 23 CFR 645; 23 CFR 771
Biological resources	Grant right-of-way by federal land-management agency	USFWS	ESA compliance by federal land management agency	ESA of 1973, as amended (16 U.S.C. 1531 et seq)
	Protection of migratory birds	USFWS	Compliance	MBTA of 1918 (16 U.S.C. 703-712); 50 CFR 1
	Protection of bald and golden eagles	USFWS	Compliance	Bald and Golden Eagle Protection Act of 1972 (16 U.S.C. 668)
	Protection of Special Status Species	BLM	Compliance	BLM Policy Manual 6840
Ground disturbance and water quality degradation	Construction sites with greater than 5 acres of land disturbed	EPA	Section 402 National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities	CWA (33 U.S.C. 1342)
	Construction across a Superfund site	EPA	Agreement or order on consent with EPA	CERCLA (42 U.S.C. 9601-9675)
	Construction across water resources	U.S. Army Corps of Engineers (USACE)	General easement	10 U.S.C. 2668 to 2669
	Crossing 100-year floodplain, streams, and rivers	USACE	Floodplain use permits	40 U.S.C. 961
	Construction in or modification of floodplains	Federal lead agency	Compliance	42 U.S.C. 4321 Executive Order No. 11988 Floodplains
	Construction in or modification of wetlands	Federal lead agency	Compliance	42 U.S.C. 4321 Executive Order No. 11990 Wetlands

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Ground disturbance and water quality degradation	Potential discharge into waters of the state (including wetlands and washes)	USACE (and states)	Section 401 permit	CWA (33 U.S.C. 1344)
	Discharge of dredge or fill material to a watercourse	USACE	404 Permit (individual or nationwide)	CWA (33 U.S.C. 1344)
	Placement of structures and construction work in navigable waters of the United States	USACE	Section 10 permit	Rivers and Harbors Act of 1899 (33 U.S.C. 403)
	Potential pollutant discharge during construction, operation, and maintenance	EPA	Spill Prevention Control and Countermeasure Plan for substations	Oil Pollution Act of 1990 (40 CFR 112)
Cultural resources	Disturbance of historic properties	Federal lead agency, SHPO, Advisory Council on Historic Preservation	Section 106 consultation	NHPA of 1966 (16 U.S.C. 470) (36 CFR 800)
	Excavation of archaeological resources	Federal land-management agency	Permits to excavate	Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470aa to 470ee)
	Potential conflicts with freedom to practice traditional American Indian religions	Federal lead agency, federal land-management agency	Consultation with affected American Indians	American Indian Religious Freedom Act (42 U.S.C. 1996)
	Disturbance of graves, associated funerary objects, sacred objects, and items of cultural patrimony	Federal land-management agency	Consultation with affected Native American groups regarding treatment of remains and objects	NAGPRA of 1990 (25 U.S.C. 3001-3002)
	Investigation of cultural resources	Affected land-management agency	Permit for study of historical and archaeological resources	American Antiquities Act of 1906 (16 U.S.C. 432-433)
	Investigation of cultural resources	Affected land-management agency	Permits to excavate and remove archaeological resources on federal lands; American Indian tribes with interests in resources must be consulted prior to issuance of permits	ARPA of 1979 (16 U.S.C. 470aa to 470ee) (43 CFR 7)
	Protection of segments, sites, and features related to national trails	Affected land-management agency	National Trails System Act compliance	National Trails System Act (PL 90-543) (16 U.S.C. 1241 to 1249)

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Paleontological resources	Ground disturbance on federal land or federal aid project	BLM	Compliance with BLM mitigation and planning standards for Paleontological resources of public lands	FLPMA (43 U.S.C. 1701-1771); Antiquities Act of 1906 (16 U.S.C. 431-433)
	Collection of paleontological resources from federal land	BLM	Permit to collect paleontological resources from federal land	Omnibus Public Lands Management Act – Paleontological Resources Preservation. Public Law (P.L.) 111-11, Title VI, Subtitle D, Sections 6301-6312, 123 Stat. 1172, 16 U.S.C. 470aaa.
Air traffic	Location of towers in regards to airport facilities and airspace	Federal Aviation Administration (FAA)	A "No-hazard Declaration" required if structure is more than 200 feet in height	FAA Act of 1958 (P.L. 85-726) (14 CFR 77)
			Section 1101 Air Space Permit for air space construction clearance	FAA Act of 1958 (PL 85-726) (14 CFR 77)
Rate regulation	Sales for resale and transmission services	FERC	Federal Power Act compliance by power seller	Federal Power Act (16 U.S.C. 792)
State of Utah				
Permitting process	Proposed transmission line facility	Resource Development Coordinating Committee	Expedites review of permitting process for all state agencies	Utah Administrative Code (UAC) Sections 63J-4-501 and 63J-4-504
Right-of-way encroachment	Encroachment on, through, or over state lands	Division of Forestry, Fire, and State Lands, and SITLA	Application approval	UAC Title 65A
Project need	Project construction	Public Service Commission (PSC)	Certificate of Public Convenience and Necessity	UAC Sections 54-4-25 and R 746-401
Ground surface disturbance	Crossing state lands	Division of Forestry, Fire, and State Lands and SITLA	Easement onto state lands. Bond may be required	UAC Sections 65A-7-8 and 652-40
Cultural, paleontological, and biological resources	Crossing state lands	Division of Forestry, Fire, and State Lands and SITLA	Provide a cultural and/or paleontological and/or biological survey and submit procedures for reasonable mitigation actions	UAC Section R 652-40-500

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Paleontological resources	Excavation and collection of paleontological resources from state land	Utah Geological Survey (UGS), Utah Museum of Natural History, SITLA	Permit to excavate and collect paleontological resources from state land	U.S.C. 63-73-11 through 63-73-19
Historical and cultural review	Impact on historical sites	Division of State History	Notification of planning stage and before Construction	UAC Section 9-8-306
Archaeological resources	Survey or excavation of archaeological resources on lands owned or controlled by the state	Governor's PLPCO	Permit to survey or excavate	UAC Sections 9-8-305 and R 694-1
Encroachment on state park lands	Utility easement on state park lands	Division of Parks and Recreation	Agreement for granting and maintenance of easements or rights-of-way across park lands	UAC Section 63-11-10.3
Air quality	Construction and operation	Air Quality Board	Notice of Construction	UAC Section 19-2-108
Water resources	Construction and operation	Water Quality Board	Discharge permit, spills	UAC Section 19-5-101 et. seq.
Wildlife	Modification of habitat	UDWR	Easement for use of state wildlife resource lands	UAC Title 23
Local				
Land use	Construction and operation of transmission lines	Juab County	Application approval	County Rules and Regulations
	Construction and operation of transmission lines	Salt Lake County	Compliance with underground ordinance	County Rules and Regulations
	Construction and operation of transmission lines	Tooele County	Conditional Use Permit	County Rules and Regulations
	Construction and operation of transmission lines	Tooele City	Conditional Use Permit	City Rules and Regulations
	Construction and operation of transmission lines	Utah County	Conditional Use Permit	County Rules and Regulations
	Construction and operation of transmission lines	South Jordan City	Conditional Use Permit	City Rules and Regulations
	Construction and operation of transmission lines	West Jordan City	Conditional Use Permit	City Rules and Regulations

Chapter 2 – Proposed Action and Alternatives

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CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

Chapter 2 presents the Proposed Action and alternatives to the Proposed Action, including taking no action. Also described are alternatives considered but not analyzed in detail. Included in this chapter are the following sections:

- 2.2 – General Description of Alternatives: presents a general overview of the process used to identify, evaluate, and compare the Project alternatives and a general description of the transmission line and substation alternatives considered in detail.

- 2.3 – Proposed Action: describes the Proponent's Proposed Action, including the location of the transmission line route and substation sites.

- 2.4 – Alternatives to the Proposed Action: describes the alternatives to the Proposed Action, including the location of the alternative transmission line routes and the BLM's Preferred Alternative.

- 2.5 – No Action Alternative: describes the implications of taking no action.

- 2.6 – Alternatives Considered but Not Analyzed in Detail: discusses the alternatives to a new transmission line that were considered and eliminated, and substation sites and transmission line routes that were considered and eliminated.

- 2.7 – Transmission Lines and Substation Facilities: describes the typical characteristics of the transmission lines and substations.

- 2.8 – Construction Specifications: presents construction-related information, including construction seasons, right-of-way acquisition process, construction activities, standard and selective mitigation measures, as well as the operation, maintenance, and decommissioning of Project facilities.

- 2.9 – Comparison of Alternatives: summarizes the alternatives comparison process and results, identifies the BLM's Preferred Alternative on Federal Lands, Environmentally Preferred Alternative, and the Proponent's Proposed Action.

2.1.1 Summary of Changes from the Draft EIS

Chapter 2 has been updated to include corrections, modifications, and additional information made in response to agency and public comments received on the Draft EIS. As a result of agency and public comments received on the Draft EIS, approximately 80 miles of alternative routes were shifted or adjusted to minimize potential land use conflicts or to increase the use of existing roads for construction purposes. The BLM also revised the BLM's Preferred Alternative on Federal Lands from the existing Mona Substation to the future Limber Substation (changed from Route A1 to A2) and revised the route alignment on Alternative D in the foothills south of Tooele City (Link 190A) to address concerns regarding public health and safety, fire management operations, and visual resources. Table H-3 outlines the links that were adjusted and the reasons for the alignment shift and Figure H-1 illustrates the route adjustments from the alignments presented in the Draft EIS. The alternative route comparison information presented in Tables 2-1, 2-9, and 2-10 has been updated to reflect these changes.

In addition, in September 2009, the Proponent informed the BLM of changes to the Project purpose and need and project description, primarily related to reducing the 500kV line to a single-circuit configuration to support a need of 1,500 MW of transfer capacity instead of a 3,000 MW scenario as originally proposed. The typical characteristics of the revised Project facilities are presented in Tables 2-2 and 2-3 and have been updated to reflect changes in the Proponent's project description. Clarifying information on construction activities and typical best management practices have also been added.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

2.2 General Description of Alternatives

A number of alternative transmission line routes and substation sites for the Project were identified, studied, assessed, and compared. This section summarizes the process used to identify the alternatives, and provides a general description of the alternatives.

2.2.1 Process

Each step of the environmental study process, as shown in Figure 2-1, is briefly summarized below.

2.2.1.1 Proponent's Regional Environmental Feasibility Study

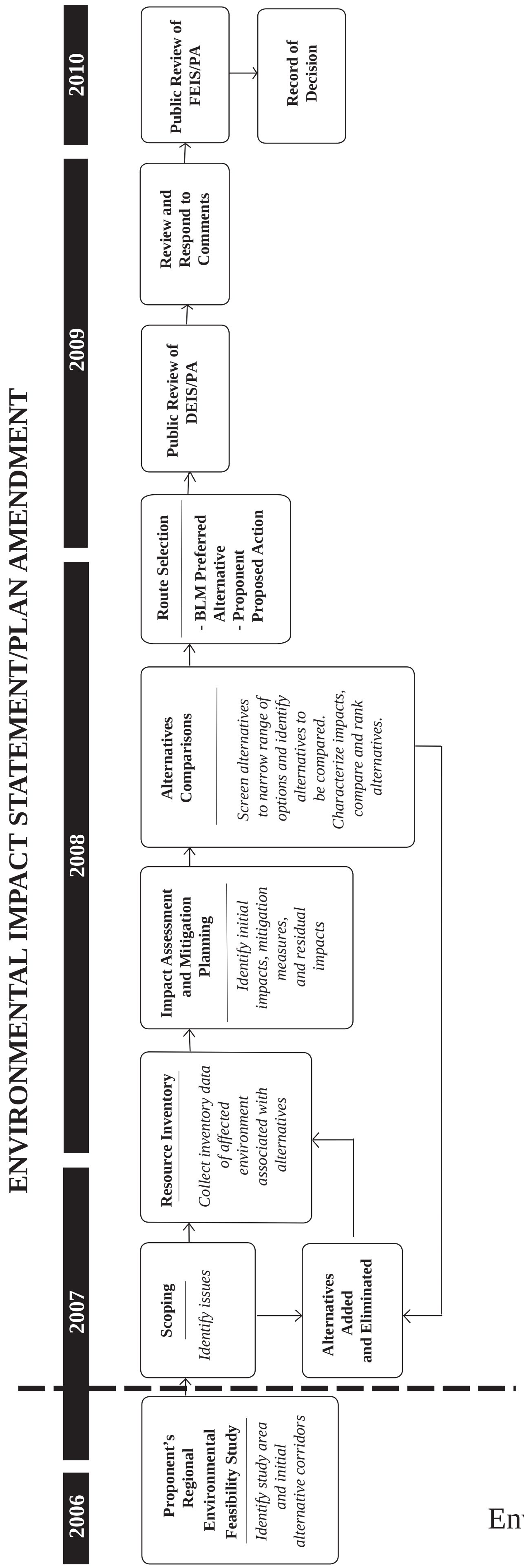
The environmental studies for the Project were initiated with the Proponent preparing a regional environmental feasibility study to identify general corridors within which transmission lines could be sited and constructed. The results of the study were documented in the *Mona to Oquirrh Transmission Corridor Project Feasibility Study* (Rocky Mountain Power 2006).

2.2.1.2 Scoping

The Project purpose and need, description, and general corridors were reviewed by the public and the agencies through scoping (Chapter 5), which initiated the NEPA process. The scoping process and results are documented in the *Mona to Oquirrh Transmission Corridor Project EIS Scoping Report* (BLM 2008a). As a result of scoping, the general corridors were refined to establish the network of alternative transmission line routes and substation sites to be studied.

2.2.1.3 Resource Inventory

Each alternative route and substation site was inventoried to establish a baseline of existing environmental conditions and data. Through scoping and resource inventory, a number of environmental issues were identified (Chapter 1). These environmental issues helped to determine the level of the analyses and were considered in developing criteria for assessing impacts of the Project facilities.



Environmental Study Process
Figure 2-1

2.2.1.4 Impact Assessment and Mitigation Planning

The alternative routes and substation sites were assessed to identify the potential effects (initial impacts) on the environment that would result from the construction, operation, maintenance, and decommissioning of the Project alternatives. Where warranted, measures beyond standard mitigation were recommended to mitigate impacts. Table 2-6 provides a list of the selective mitigation measures, a general description of each measure's effectiveness, and the resources for which each measure was employed. The impacts remaining after mitigation was applied are referred to as residual impacts.

2.2.1.5 Screening and Comparison

Through a systematic analysis, all of the alternative routes and substation sites studied were screened (Section 2.6.2) and compared in order to narrow the number of alternatives addressed in the EIS (Sections 2.3 and 2.4) and to select a Preferred Alternative(s) as described below.

2.2.1.6 Selection of the BLM's Preferred Alternative

The remaining alternatives were ranked for preference. The alternatives with the lowest overall impact on the environment were selected as the Environmentally Preferred Alternative and the BLM's Preferred Alternative on Federal Lands (Section 2.9.1).

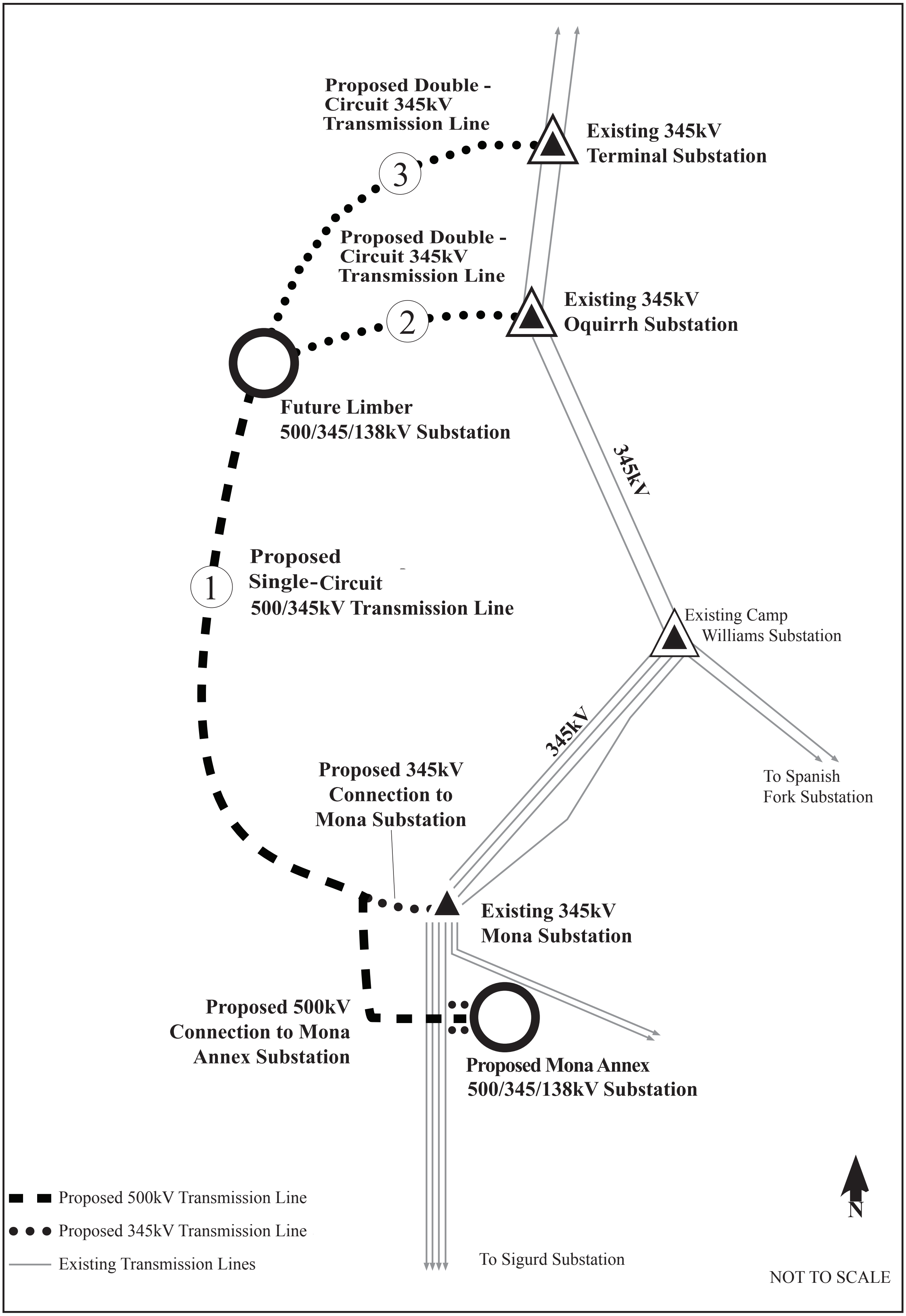
2.2.2 General Description of Alternatives

The Project consists of three major components, including: (1) a 500kV transmission line from the existing Mona Substation to the future Limber Substation (includes an interconnection with the proposed Mona Annex Substation), (2) a 345kV transmission line from the future Limber Substation to the existing Oquirrh Substation, and (3) a 345kV transmission line from the future Limber Substation to the existing Terminal Substation. These components are described below and illustrated in Figure 2-2.

1. A single-circuit 500kV overhead transmission line is proposed from the existing Mona Substation, near the community of Mona in Juab County, Utah, to a proposed future 500/345/138kV Limber Substation, to be located in the Tooele Valley (Figure 2-2) in Utah. Initially, the 500kV line would be energized at 345kV voltage originating at the Mona Substation. At some time in the future, the line would be upgraded to 500kV, as necessary, to meet energy demands. When the 500kV line conversion occurs, a transmission line interconnection to the proposed 500/345/138kV Mona Annex Substation in Juab County would be constructed. In addition, the proposed Mona Annex Substation would potentially be connected to the existing Mona Substation by looping in two existing 345kV lines (Sigurd to Mona lines) and adding a new 345kV tie line at some point in the future. If warranted, the future 345kV tie line would be analyzed under separate NEPA analysis.

2. From the future Limber Substation, a double-circuit 345kV line is proposed to connect with the existing Oquirrh Substation located in West Jordan, Utah (Figure 2-2).

3. From the future Limber Substation, a double-circuit 345kV line is proposed to connect with the existing Terminal Substation located in Salt Lake City, Utah (Figure 2-2).



Schematic Diagram of the Project
Figure 2-2

The information in this section focuses only on the alternative substation sites and transmission line routes that are addressed and compared in the EIS and does not address any of the alternatives that were considered but eliminated from detailed analysis (Section 2.6). An extensive alternative screening process was conducted and is summarized in Section 2.6.2.

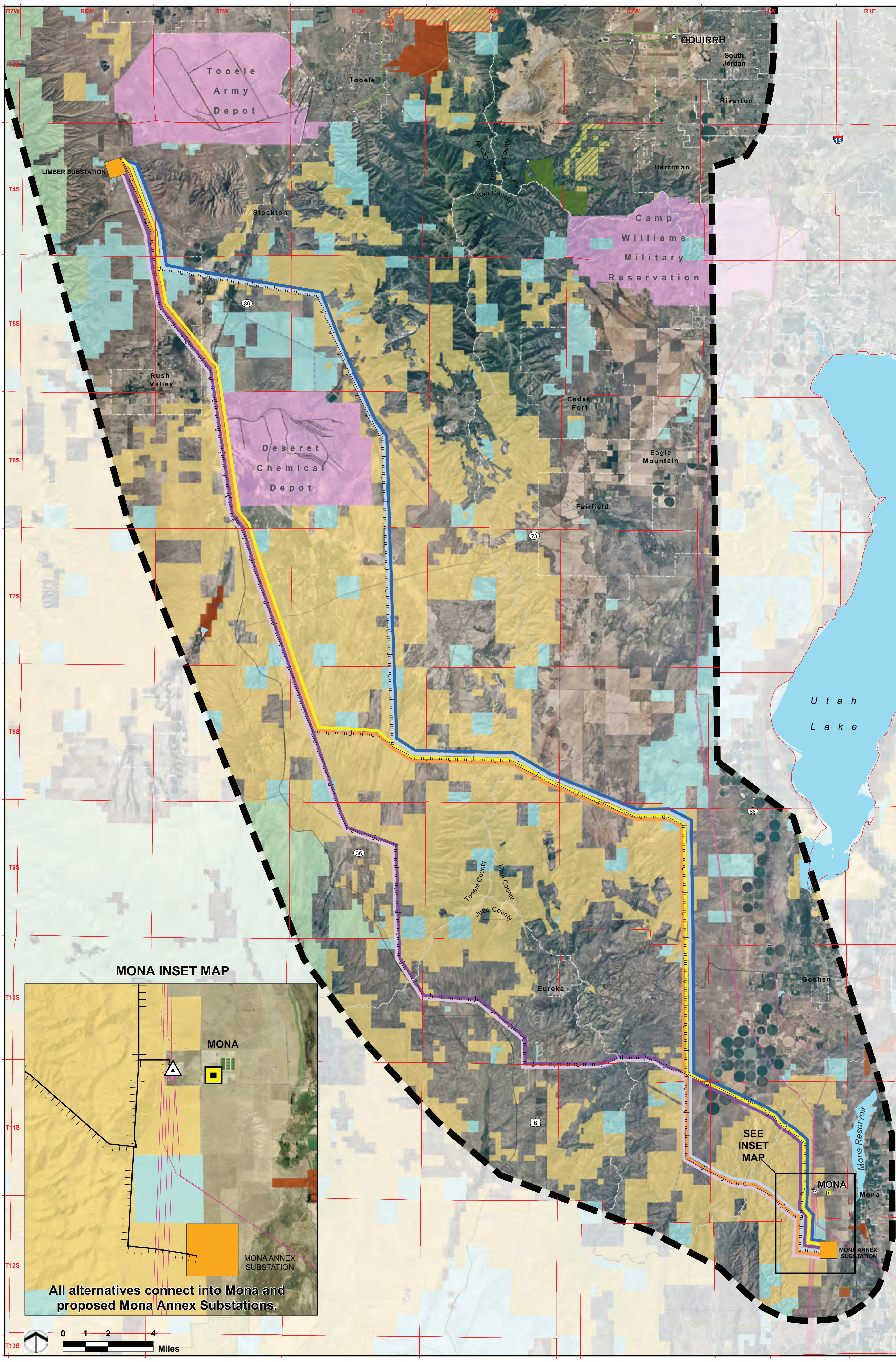
In order to address localized issues and for ease of characterizing the affected environment (Chapter 3) and presenting the results of the impact assessment (Chapter 4), the Project area has been divided into the three major components described above.

The transmission line alternatives consist of interconnecting links that form entire routes for each of the Project alternatives. These alternatives, including the BLM's Preferred Alternative on Federal Lands, the Environmentally Preferred Alternative, and the Proponent's Proposed Action, are listed in Table 2-1 (by link) and are illustrated in Figures 2-3 through 2-7 (Figure 2-3 is a large fold-out map depicting each alternative's links by number and is located in a map pocket inside the back cover of this EIS). A detailed description of each alternative is presented in Sections 2.3 and 2.4.

TABLE 2-1
ALTERNATIVE ROUTES COMPARED

Alternative Route	Length (miles)	Links
Mona to Limber (500kV line)		
Alternative A1 North Long Ridge Mountains	67.9	1, 2, 3, 5, 20, 50, 55, 60, 40, 90, 105, 150
Alternative A2 BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	69.4	1, 2, 3, 10, 15, 50, 55, 60, 40, 90, 105, 150
Alternative B1 East Rush Valley	70.0	1, 2, 3, 5, 20, 50, 55, 60, 85, 95, 120, 135, 140, 150
Alternative B2 East Rush Valley	71.5	1, 2, 3, 10, 15, 50, 55, 60, 85, 95, 120, 135, 140, 150
Alternative C1 Tintic Junction	67.1	1, 2, 3, 5, 20, 24, 26, 30, 32, 35, 90, 105, 150
Alternative C2 Tintic Junction	68.4	1, 2, 3, 10, 15, 24, 26, 30, 32, 35, 90, 105, 150
Limber to Oquirrh (345kV line)		
Alternative D BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	31.1	160, 166, 185, 190A, 220, 230, 239, 240, 241, 255, 265
Alternative E1 Pass Canyon	31.1	160, 166, 185, 190, 220, 225, 235, 239, 240, 242, 244, 285
Alternative E2 Proponent's Proposed Action	31.1	160, 166, 185, 190, 220, 225, 235, 239, 240, 241, 255, 265
Alternative F1 Middle/Butterfield Canyon	29.3	160, 166, 185, 190, 215, 210, 290, 310, 306, 285
Alternative F2 Middle/Butterfield Canyon	29.6	160, 166, 185, 190, 215, 210, 290, 310, 306, 315, 265
Alternative G Lake Point	49.0	335, 350, 352, 353, 354, 356, 365, 366, 370, 374, 376, 241, 255, 265
Limber to Terminal (345kV line)		
Alternative H Environmentally Preferred Alternative/Proponent's Proposed Action	45.4	335, 350, 352, 353, 354, 356, 365, 366, 370, 374, 375, 386
Alternative I East Tooele Valley	40.4	160, 166, 180, 330, 325, 326, 360, 370, 385, 386

NOTE: A link is a segment of the route between two nodes as shown in Figure 2-3 (located in a map pocket inside the back cover of this EIS).



Legend

Project Features
- Alternative A1
- Alternative A2 - BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action
- Alternative B1
- Alternative B2
- Alternative C1
- Alternative C2
- Proposed Substation Site
- Project Study Area

Land Jurisdiction
- Bureau of Land Management
- U.S. Forest Service
- Department of Defense
- State Trust Land
- Private Land

Administrative Features
- County Boundary

Special Managment Areas
- UDWR Wildlife Management Area
- Yellow Fork Canyon Regional Park
- Rose Canyon Ranch Open Space
- North Oquirrh Management Area
- Wilderness Study Area

Public Land Survey System
- Township and Range Line

Utility Features
- 345kV Transmission Line
- 138kV Transmission Line
- Power Plant
- Substation
- Natural Gas Pipeline

Transportation Features
- Railroad
- Major Road

SOURCES: Land Ownership, Utah AGRC 2007; Aerial Imagery, NAIP 2009; Aerial Photography Captured June - August, 2009; DigitalGlobe Satellite Image – Collection date: May 21, 2009 © DigitalGlobe, Inc. All Rights Reserved; County Boundaries, Utah AGRC 2004; Transmission Lines & Substation Locations, PacifiCorp
FEIS\Alternative_Routes_Mona_Limber_FEIS_portrait_Figure_2-4.mxd

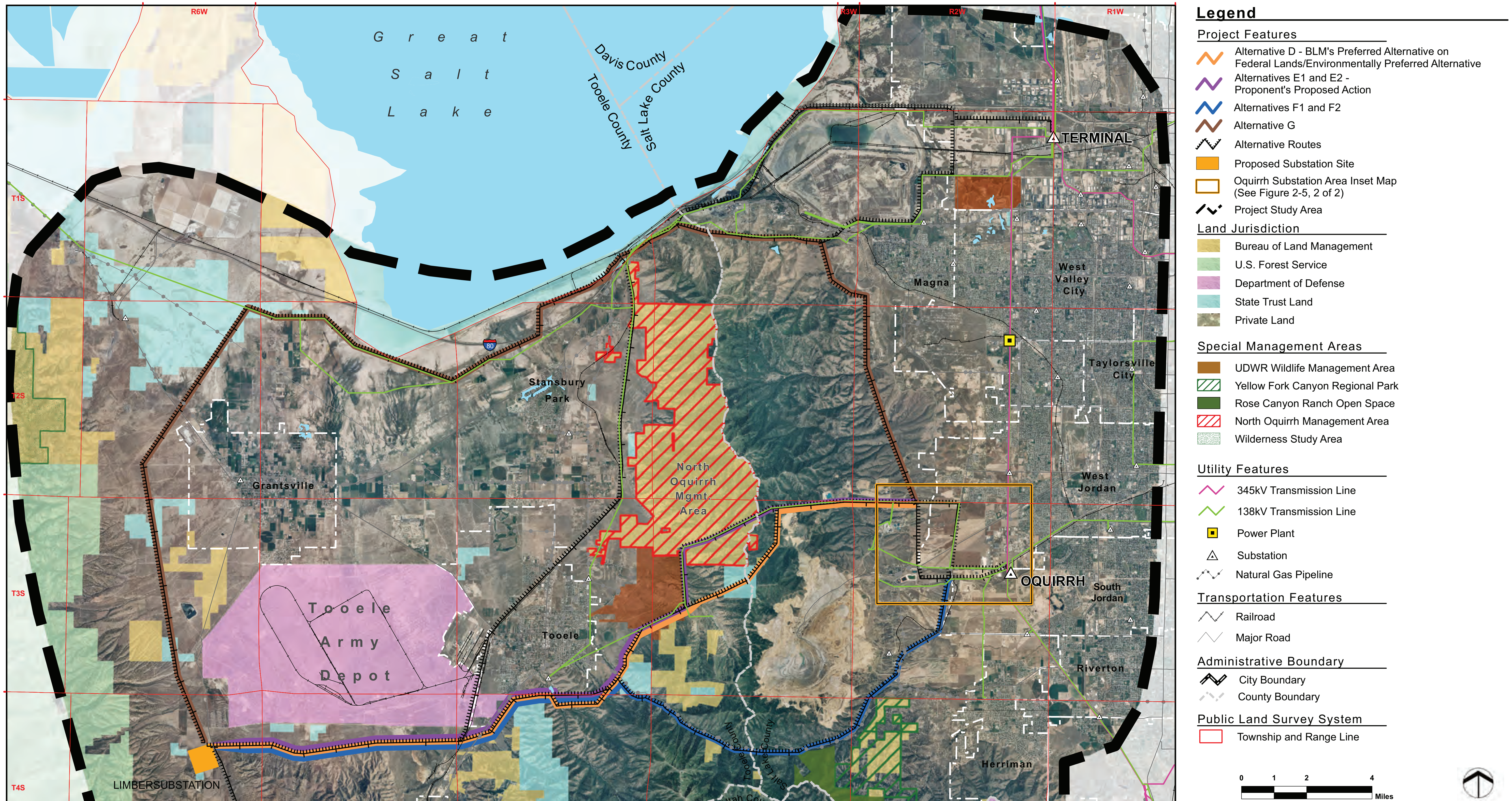
Figure 2-4

April 2010

NATIONAL SYSTEM OF PUBLIC LANDS

Alternative Routes - Mona to Limber

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS



SOURCES: Land Ownership, Utah AGRC 2006; Aerial Imagery, NAIP 2009;
Aerial Photography - Captured June - August 2009
DigitalGlobe Satellite Image – Collection date: May 21, 2009
© DigitalGlobe, Inc. All Rights Reserved
County Boundaries, Utah AGRC 2004;
Transmission Lines & Substation Locations, PacifiCorp

Alternative_Routes_Limber_Oquirrh_FEIS_landscape.mxd

Figure 2-5

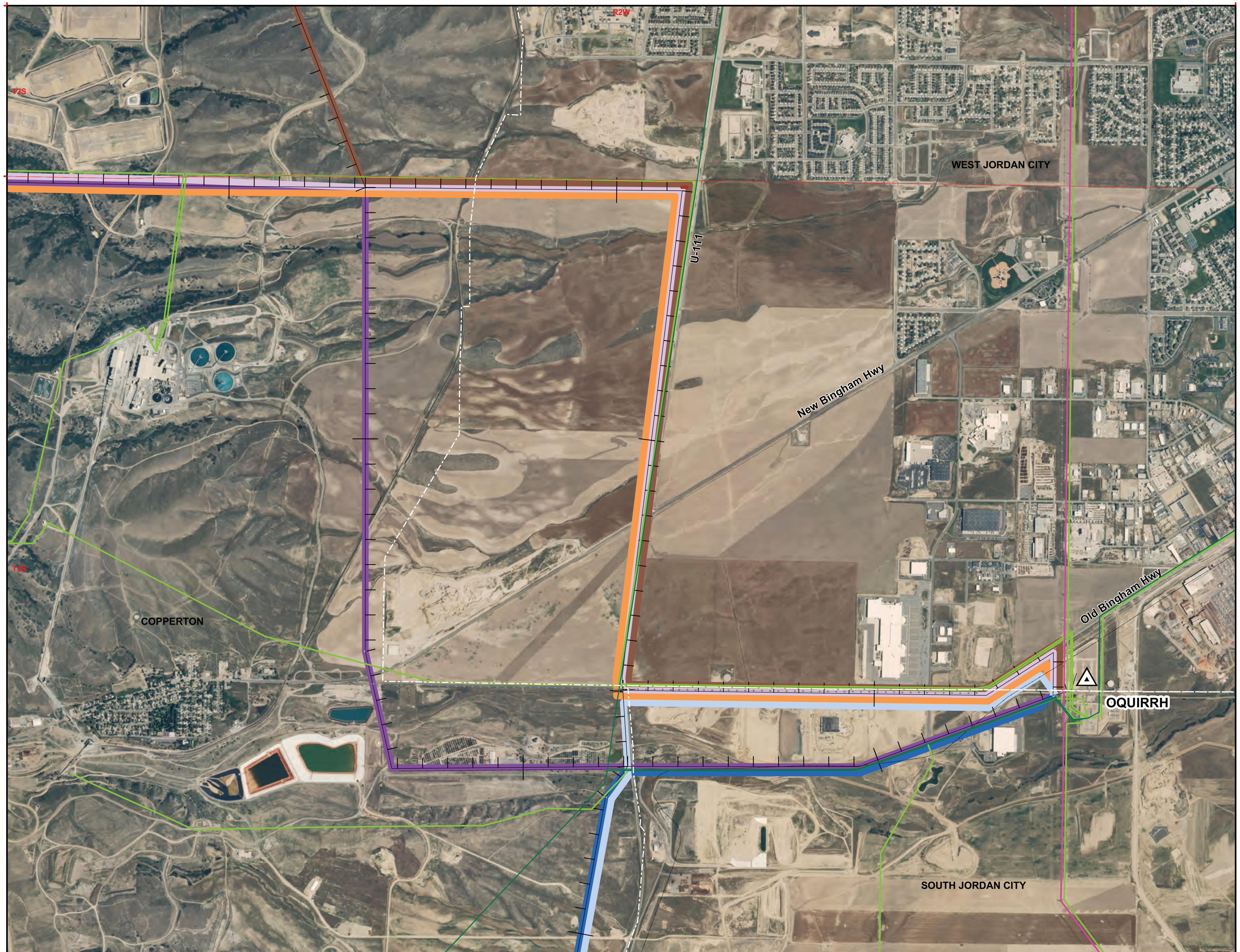
1 of 2

April 2010

NATIONAL SYSTEM OF PUBLIC LANDS

Alternative Routes - Limber to Oquirrh

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS



Legend

Project Features

- Alternative D - BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative
- Alternative E1
- Alternative E2 - Proponent's Proposed Action
- Alternative F1
- Alternative F2
- Alternative G
- Alternative Routes
- Project Study Area

Land Jurisdiction

- Private Land

Utility Features

- 345kV Transmission Line
- 138kV Transmission Line
- Power Plant
- Substation
- Natural Gas Pipeline

Transportation Features

- Railroad
- Major Road

Administrative Boundary

- City Boundary
- County Boundary

Public Land Survey System

- Township and Range Line

0 0.25 0.5 1 Miles

SOURCES: Land Ownership, Utah AGRC 2007;
Aerial Imagery, NAIP 2009;
Aerial Photography Captured June - August, 2009;
County Boundaries, Utah AGRC 2004;
Transmission Lines & Substation Locations, PacifiCorp

Alternative_Routes_Oquirrh_Inset_FEIS_landscape.mxd

Figure 2-5

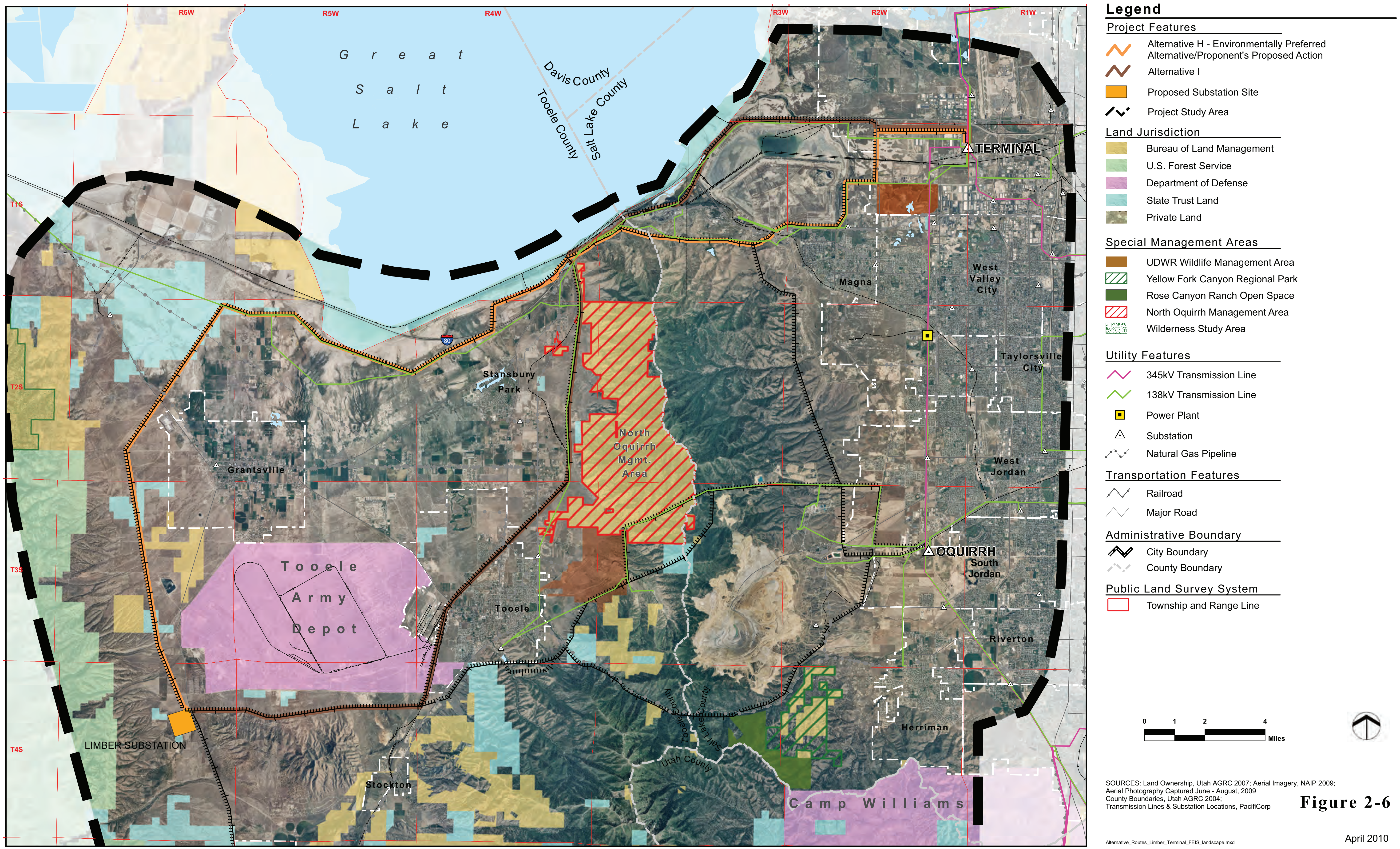
2 of 2

April 2010

NATIONAL SYSTEM OF PUBLIC LANDS

Alternative Routes - Limber to Oquirrh

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS



SOURCES: Land Ownership, Utah AGRC 2007; Aerial Imagery, NAIP 2009; Aerial Photography Captured June - August, 2009
County Boundaries, Utah AGRC 2004;
Transmission Lines & Substation Locations, PacifiCorp

Figure 2-6

Alternative_Routes_Limber_Terminal_FEIS_landscape.mxd

April 2010

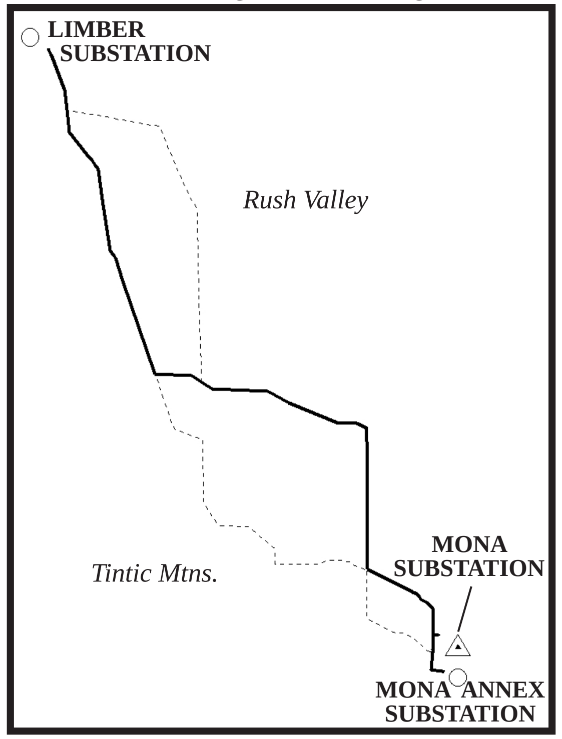
NATIONAL SYSTEM OF PUBLIC LANDS

Alternative Routes - Limber to Terminal

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS

Alternative A1

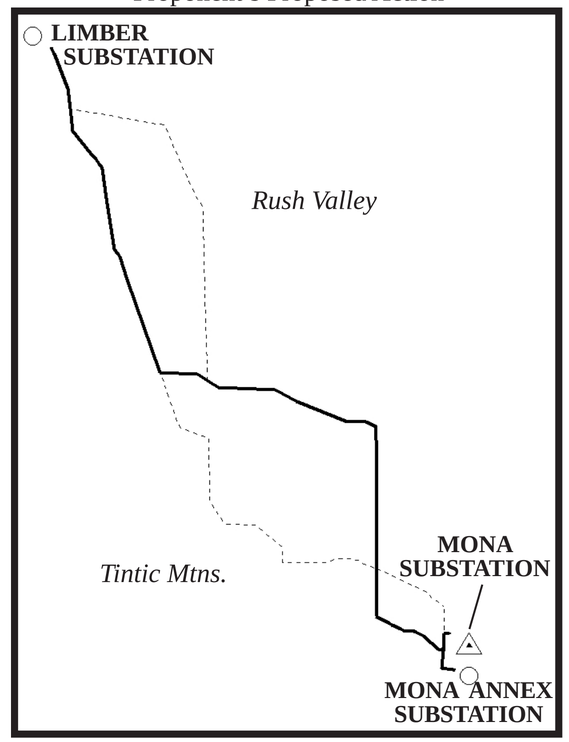
North Long Mountains Ridge



Total Length: 67.9 miles

Alternative A2

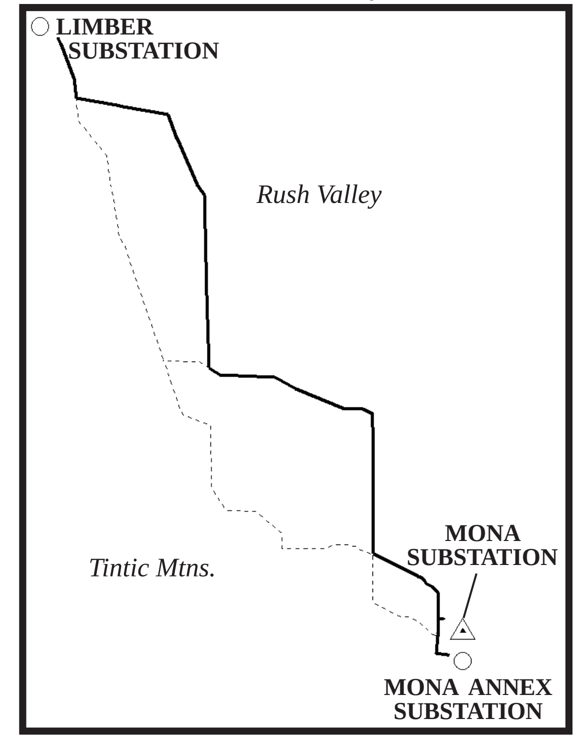
BLM's Preferred Alternative on Federal Lands/
Environmentally Preferred Alternative/
Proponent's Proposed Action



Total Length: 69.4 miles

Alternative B1

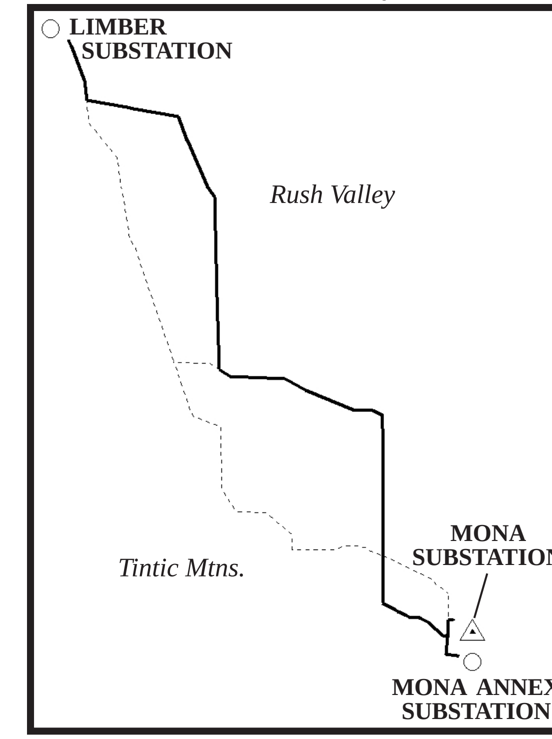
East Rush Valley



Total Length: 70.0 miles

Alternative B2

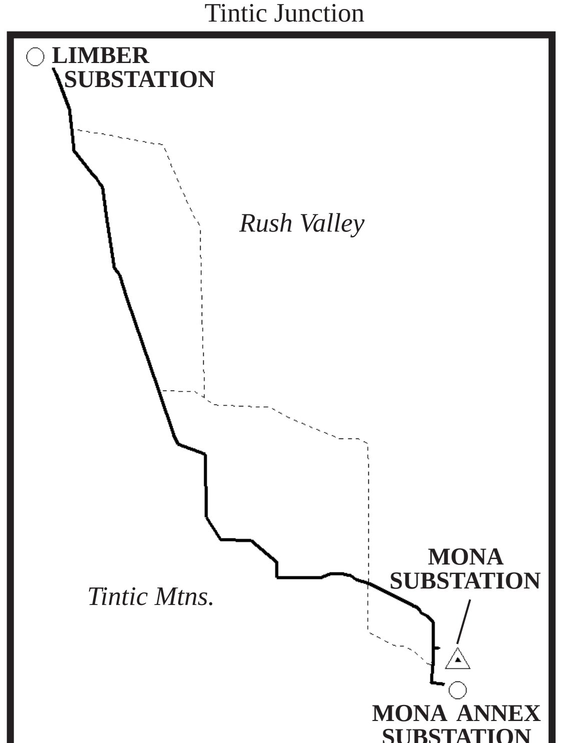
East Rush Valley



Total Length: 71.5 miles

Alternative C1

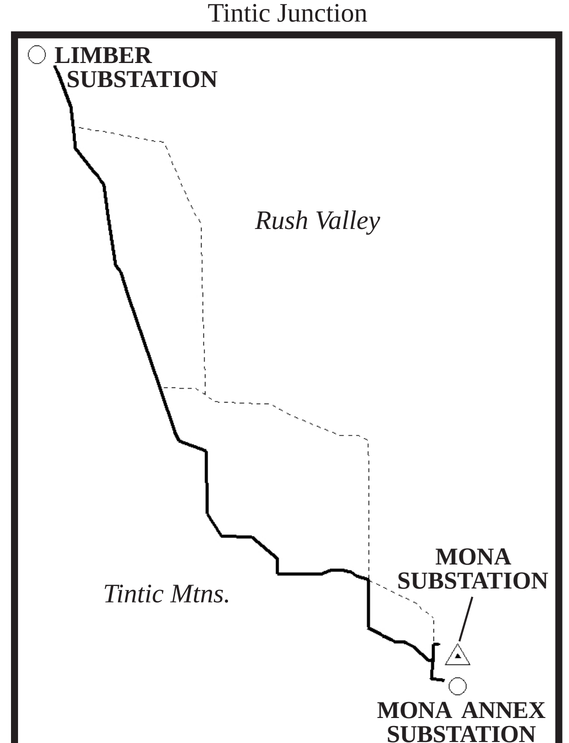
Tintic Junction



Total Length: 67.1 miles

Alternative C2

Tintic Junction

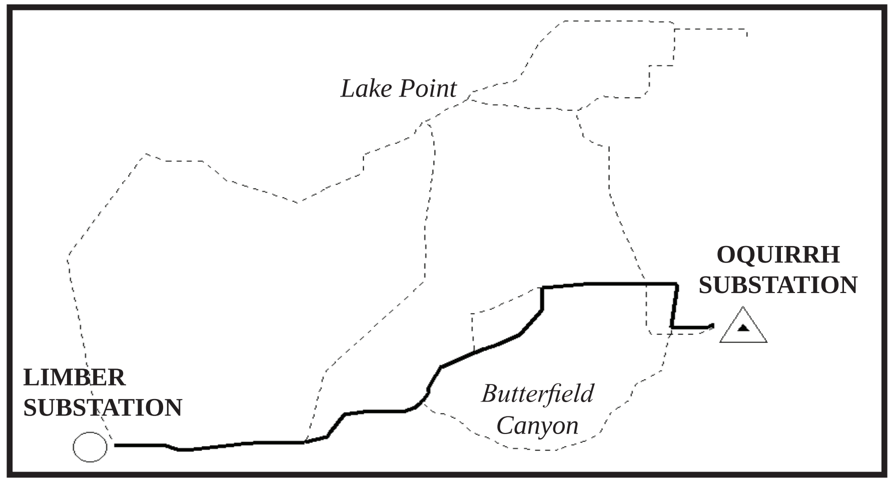


Total Length: 68.4 miles

Mona Annex To Limber
Alternative Route Schematics
Figure 2-7 (1 of 3)

Alternative D

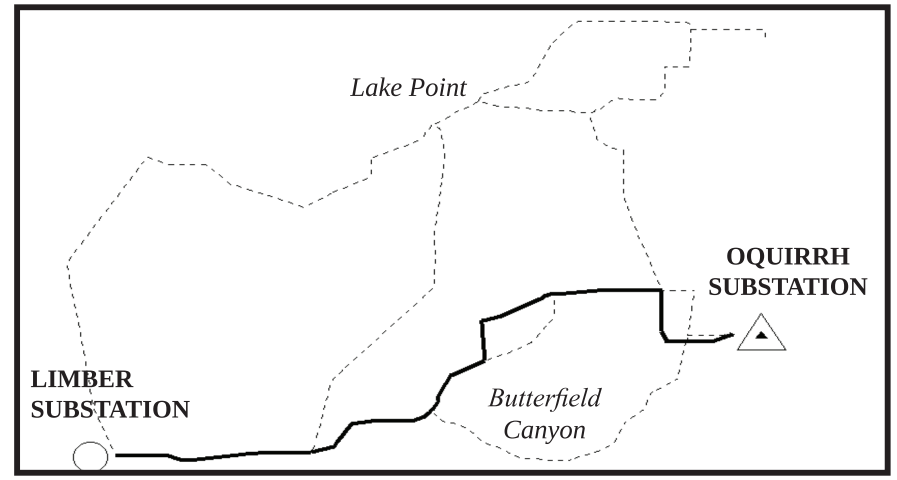
BLM's Preferred Alternative on Federal Lands/
Environmentally Preferred Alternative



Total Length: 31.1 miles

Alternative E1

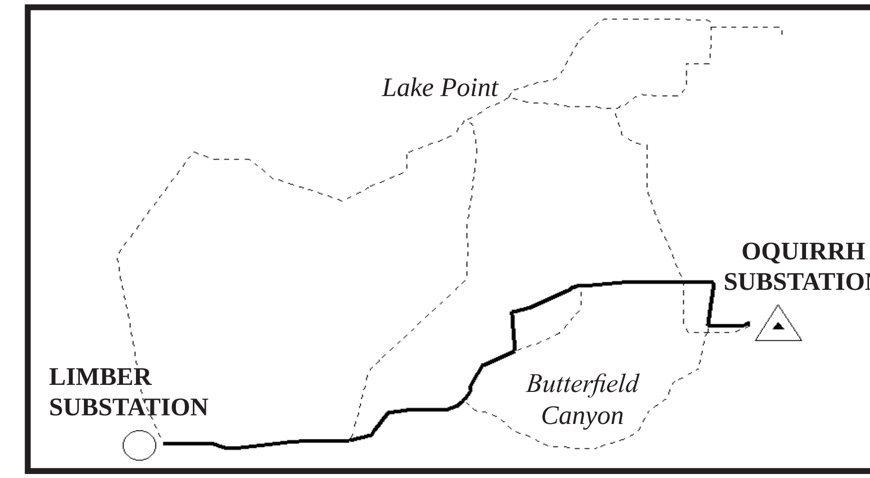
Pass Canyon



Total Length: 31.1 miles

Alternative E2

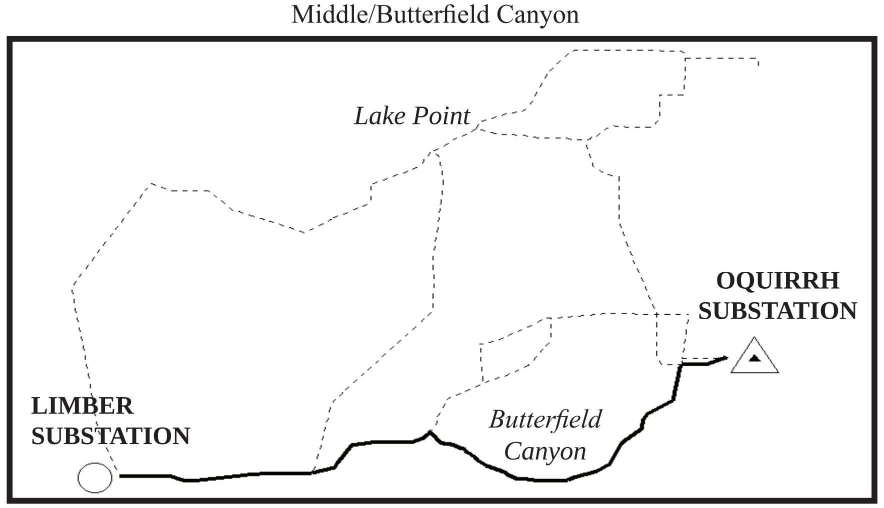
Proponent's Proposed Action



Total Length: 31.1 miles

Alternative F1

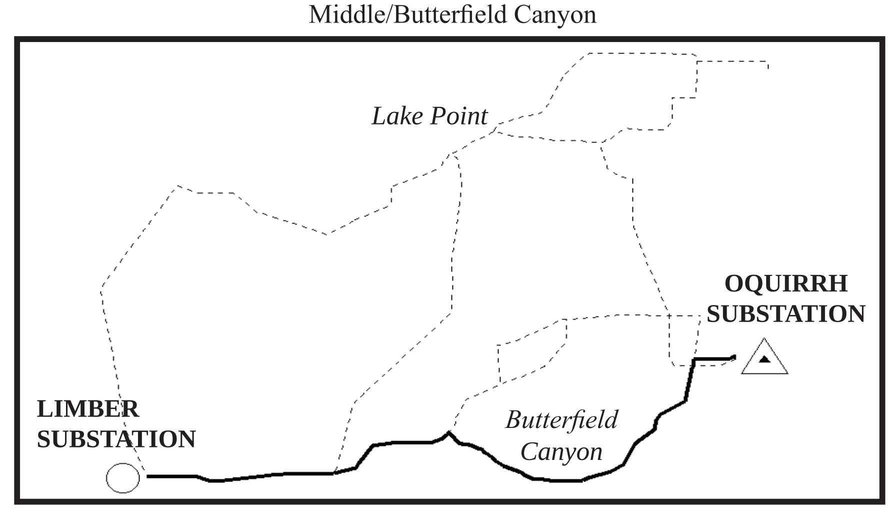
Middle/Butterfield Canyon



Total Length: 29.3 miles

Alternative F2

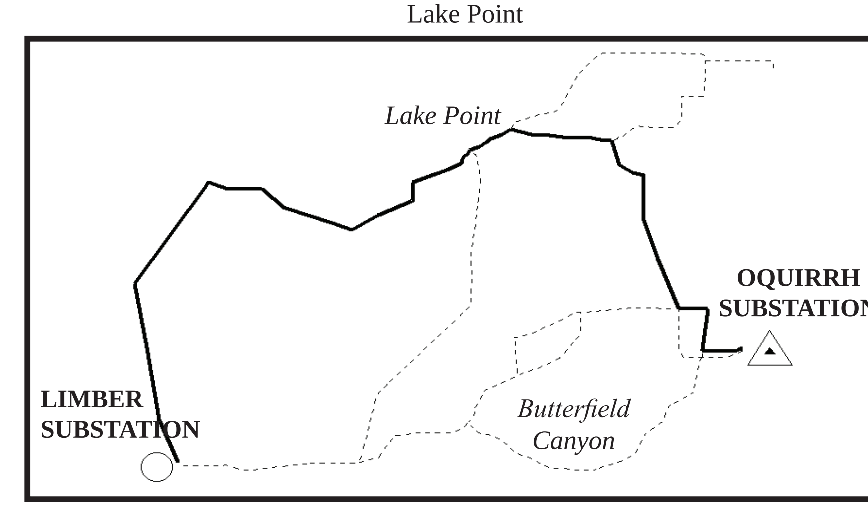
Middle/Butterfield Canyon



Total Length: 29.6 miles

Alternative G

Lake Point

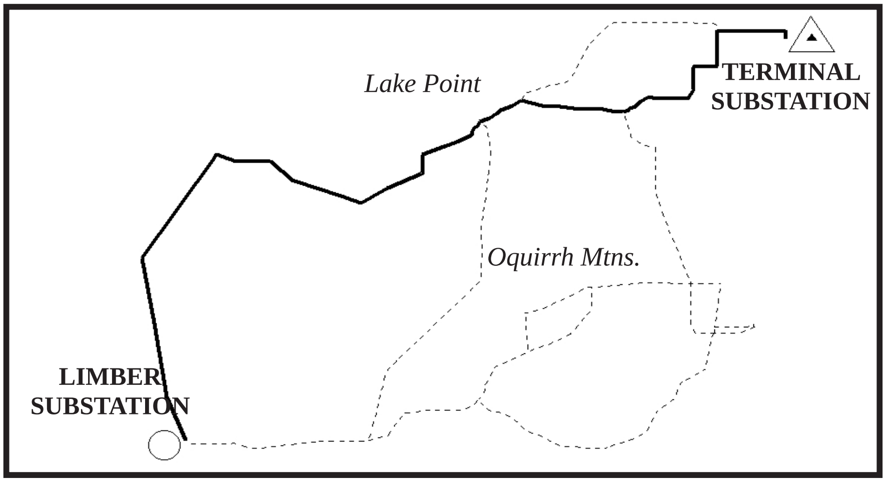


Total Length: 49.0 miles

Limber To Oquirrh
Alternative Route Schematics
Figure 2-7 (2 of 3)

Alternative H

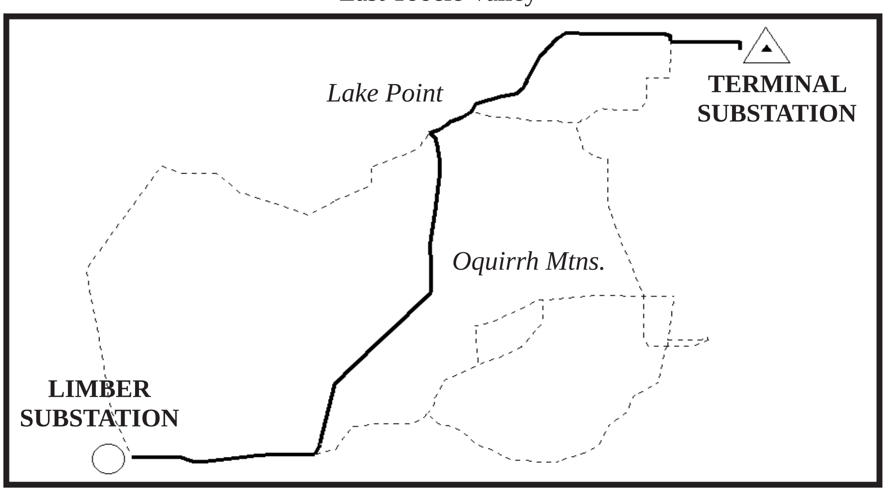
Proponent's Proposed Action/Environmentally Preferred Alternative



Total Length: 45.4 miles

Alternative I

East Tooele Valley



Total Length: 40.4 miles

Limber To Terminal
Alternative Route Schematics
Figure 2-7 (3 of 3)

2.3 Proposed Action

The BLM's Proposed Action is to issue a major right-of-way grant on federal lands to the Proponent for construction, operation, and maintenance of a single-circuit 500kV transmission line from the existing Mona Substation to a proposed 500/345/138kV Mona Annex Substation near the community of Mona in Juab County, Utah, on to a proposed future 500/345/138kV Limber Substation, to be located in the Tooele Valley in Utah. Initially, the 500kV line would be energized at 345kV voltage originating at the Mona Substation. At some time in the future, the line would be upgraded to 500kV, as necessary, to meet the Proponent's customer energy demands (see Figure 2-2).

From the future Limber Substation, two double-circuit 345kV lines are proposed: one line would connect to the existing Oquirrh Substation in West Jordan, Utah, and the second line would connect to the existing Terminal Substation in Salt Lake City, Utah.

In order to grant a major right-of-way outside of an existing utility corridor designated by BLM in the SLFO, the Pony Express RMP (BLM 1990) would need to be amended. The width of the proposed major right-of-way on BLM-administered lands would be 250 feet for all portions with the exception of Link 230, which would be 150 feet in width.

2.3.1 Mona Annex and Limber Substations

A substation site was identified for the proposed Mona Annex Substation in Juab County, and a substation site was identified for the future Limber Substation in the Tooele Valley. Each of the two substation properties would be approximately 370 acres in size, which would include the substation footprint (203 acres for Mona Annex and 155 acres for Limber), and a buffer to account for transmission line facilities entering and exiting the substation. These substations are described below.

The proposed Mona Annex Substation would be a 500/345/138kV substation with a footprint of approximately 203 acres. The Mona Annex site would be located on private land (77 percent) and BLM land (23 percent) in Juab County, approximately 3 miles southwest of the Town of Mona. Construction of the proposed Mona Annex Substation would begin in October 2010 and would be in service by June 2012. The Mona to Limber 500kV transmission line would be connected to the Mona Annex Substation when the transmission line from Mona to Limber is converted from 345kV to 500kV. This activity would be common to all action alternatives.

In addition, the proposed Mona Annex Substation would be connected to the existing Mona Substation by looping in two existing 345kV lines (Sigurd to Mona lines) and adding a new 345kV tie line at some point in the future. If warranted, the future 345kV tie line would be analyzed under separate NEPA analysis.

The future Limber Substation would be a 500/345/138kV substation with a footprint of approximately 155 acres. The Limber Substation site would be located on private land in Tooele County, approximately 1 mile southwest of the Tooele Army Depot boundary, on the west side of the Mormon Trail Road.

2.3.2 Mona to Limber

2.3.2.1 Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action

The selection of this alternative as the BLM's Preferred Alternative only applies to federal lands occurring along the route.

Alternative A2 is approximately 69.4 miles in length. Alternative A2 exits the existing Mona Substation to the west, crossing the existing 345kV utility corridor. It then extends south for approximately 1.4 miles along the foothills of the Long Ridge Mountains, and no less than 1,500 feet west of the western-most 345kV line in the existing utility corridor. It then turns northwest for approximately 5.5 miles over the Long Ridge Mountains, entering the south end of the Goshen Valley. The route continues north through the Goshen Valley, along the foothills of the Tintic Mountains, for approximately 14.8 miles. It then extends northwest, crossing the Tintic Mountains through Chimney Rock Pass, continuing northwest through the southern portion of Cedar Valley, and enters Rush Valley through Twelvemile Pass.

From Twelvemile Pass, the route continues to the west side of Rush Valley and turns north, towards the Deseret Chemical Depot. It then runs along the west side of the Deseret Chemical Depot, paralleling State Route (SR) 36 and the railroad for approximately 5.7 miles. From this point, the route continues north, crossing over to and then paralleling Mormon Trail Road/North Main Street for 6.8 miles to the future Limber Substation site.

A short segment of 500kV transmission line would be constructed at the same time the Mona to Limber transmission line is converted from 345kV to 500kV. This line would exit the proposed Mona Annex Substation to the west and cross the existing 345kV utility corridor. It would then extend north for 1.5 miles along the foothills, no less than 1,500 feet west of the western-most existing 345kV line, at which point it would intersect the Mona to Limber 500kV line.

Alternative A2 is located within corridors identified in the West-wide Energy Corridor (WWEC) Programmatic EIS (PEIS) (Department of Energy [DOE] 2009) and supported by the BLM (2009) for a total of 13.6 miles: 3.6 miles along the existing 345kV utility corridor adjacent to the proposed Mona Annex Substation site and 10 miles on the west side of Rush Valley. There are approximately 27.5 miles of existing access roads within 500 feet of the route.

2.3.3 Limber to Oquirrh

2.3.3.1 Alternative E2 – Proponent's Proposed Action

Alternative E2 is approximately 31.1 miles in length. The route runs east across the foothills of South Mountain, crossing the railroad, SR 36, and three 46kV transmission lines. The route then turns northeast, paralleling the 46kV lines for approximately 1.2 miles. It then crosses the foothills south of Tooele City. The route continues northeast in the foothills, paralleling an existing 138kV line for approximately 2.4 miles through the Carr Fork Reclamation and Wildlife Management Area (WMA). It then heads east, following the existing 138kV line for 7.4 miles and crossing the BLM NOMA for 2.6 miles before heading over the Oquirrh Mountains. The route continues to the east through Barneys Canyon to SR 111, paralleling an existing 138kV line for 1.3 miles. The route turns south at SR 111, paralleling existing 46kV and 138kV lines for approximately 2.0 miles, then the alternative turns east at Old Bingham

Highway and parallels the south side of the highway for 2.0 miles to the existing Oquirrh Substation. There are approximately 17.0 miles of existing access roads within 500 feet of the route.

2.3.4 Limber to Terminal

2.3.4.1 Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Alternative H connects the future Limber Substation to the existing Terminal Substation and is approximately 45.4 miles in length. The route extends north from Limber, along the foothills of the Stansbury Mountains. Northwest of Grantsville, the route turns northeast until it intersects with an existing 138kV line. It then parallels the existing 138kV transmission line east for 9.8 miles, south of Interstate 80 (I-80). Near Stansbury Park, the route crosses to the north side of I-80 and continues east. At Lake Point, the route crosses back to the east side of I-80 and follows an existing 138kV line for 1.6 miles along the bench of the North Oquirrh Mountains. The route continues east on the bench, uphill from the Kennecott smelter, at times paralleling an existing 138kV line for approximately 2.9 miles. After reaching the east side of the Oquirrh Mountains, the route crosses SR 201 to the northeast and follows the southern edge of the Kennecott tailing pond and an existing 138kV line. The route then turns north at the edge of the tailing pond along 8000 West (in Salt Lake City), turns east along 1300 South and north along 7200 West. At 150 South, the route heads east, paralleling the road for approximately 1.3 mile to the existing Terminal Substation. There are approximately 19.4 miles of existing access roads within 500 feet of the route.

2.4 Alternatives to the Proposed Action

This section describes in detail the transmission line route alternatives to the Proponent's Proposed Action. The proposed Mona Annex and Limber Substation sites would remain common to all of the alternatives described below.

2.4.1 Mona to Limber

In addition to the Proponent's Proposed Action, Alternative A2, five route options for the 500kV transmission line extend from the existing Mona Substation to the future Limber Substation. These alternatives cross portions of Juab, Utah, and Tooele counties and are described in detail below.

2.4.1.1 Alternative A1 – North Long Ridge Mountains

Alternative A1 connects the existing Mona Substation to the future Limber Substation, including an interconnection with the proposed Mona Annex Substation, and is approximately 67.9 miles in length. The route crosses portions of Juab, Utah, and Tooele counties. The proposed transmission line route exits the existing Mona Substation to the west, crossing an existing 345kV utility corridor. It then extends north for 2.6 miles along the foothills of the Long Ridge Mountains, no less than 1,500 feet west of the western-most 345kV line in the existing utility corridor. The route then separates from the utility corridor and heads northwest through the southern portion of the Goshen Valley. On the west side of Goshen Valley, the route continues north along the foothills of the Tintic Mountains and extends northwest, crossing the Tintic Mountains through Chimney Rock Pass. This route then continues northwest through the southern portion of Cedar Valley, and enters Rush Valley through Twelvemile Pass.

The route continues to the west side of Rush Valley and turns north, towards the Deseret Chemical Depot. It then runs along the west side of the Deseret Chemical Depot, paralleling SR 36 and the railroad for approximately 5.7 miles. From this point, the route continues north, crossing over to and then paralleling the Mormon Trail Road for 6.8 miles to the future Limber Substation site.

A short segment of 500kV transmission line would be constructed at the same time the Mona to Limber transmission line is converted from 345kV to 500kV. This line would exit the proposed Mona Annex Substation to the west and cross the existing 345kV utility corridor. It would then extend north for 2.6 miles along the foothills, no less than 1,500 feet west of the western-most existing 345kV line, at which point it would intersect the Mona to Limber 500kV line.

Alternative A1 is located within corridors identified in the WWEC PEIS (DOE 2009) and supported by the BLM (2009) for 5.8 miles along the existing 345kV utility corridor adjacent to the proposed Mona Annex Substation site, and 10 miles on the west side of Rush Valley. There are approximately 23.5 miles of existing access roads within 500 feet of the route.

2.4.1.2 Alternative B1 – East Rush Valley

Alternative B1 is approximately 70.0 miles in length. The route follows the same alignment as Alternative A1 until it reaches Rush Valley. On the east side of Rush Valley, the route turns north along the east side of the Deseret Chemical Depot, crossing a portion of the Fivemile Pass Recreation Area which is managed by the BLM. The route crosses SR 73 and continues north, following an existing 46kV line, near the foothills of the Oquirrh Mountains. Approximately 3 miles north of Ophir Canyon, the route turns west and crosses Rush Valley. On the west side of Rush Valley, the route turns north, paralleling the Mormon Trail Road for 5.0 miles to the future Limber Substation.

Similar to Alternative A1, a short segment of 500kV transmission line would be constructed to connect to the proposed Mona Annex Substation at the same time the Mona to Limber transmission line is converted from 345kV to 500kV.

Alternative B1 is located within corridors identified in the WWEC PEIS (DOE 2009) and supported by the BLM (2009) for a total of 5.8 miles along the existing 345kV utility corridor adjacent to the proposed Mona Annex Substation site. There are approximately 17.8 miles of existing access roads within 500 feet of the route.

2.4.1.3 Alternative B2 – East Rush Valley

Alternative B2 is approximately 71.5 miles in length. The route follows the same alignment as Alternative A2, from the proposed Mona Annex Substation site to the west side of Goshen Valley. From Goshen Valley, the route shares the same alignment as Alternative B1 to the future Limber Substation site.

Similar to Alternative A2, a short segment of 500kV transmission line would be constructed to connect to the proposed Mona Annex Substation at the same time the Mona to Limber transmission line is converted from 345kV to 500kV.

Alternative B2 is located within corridors identified in the WWEC PEIS (DOE 2009) and supported by the BLM (2009) for a total of 3.6 miles along the existing 345kV utility corridor adjacent to the proposed Mona Annex Substation site. There are approximately 21.8 miles of existing access roads within 500 feet of the route.

2.4.1.4 Alternative C1 – Tintic Junction

Alternative C1 is approximately 67.1 miles in length. The route follows the same alignment as Alternatives A1 and B1, from the proposed Mona Annex Substation to the west side of Goshen Valley. From Goshen Valley, the route continues west over the Tintic Mountains towards Silver City. The route then continues northwest through Tintic Junction, paralleling SR 36 and the Union Pacific Railroad for approximately 5.1 miles. The route deviates from SR 36 shortly after entering Tooele County and turns north. On the west side of Rush Valley, the route shares the same alignment as Alternatives A1 and A2 as it continues north to the future Limber Substation site.

Similar to Alternatives A1 and B1, a short segment of 500kV transmission line would be constructed to connect to the proposed Mona Annex Substation at the same time the Mona to Limber transmission line is converted from 345kV to 500kV.

Alternative C1 is located within corridors identified in the WWEC PEIS (2009) and supported by the BLM (2009) for approximately 22.8 miles: 17.0 miles along SR 36 and the west side of Rush Valley, and 5.8 miles along the existing 345kV utility corridor adjacent to the Mona Annex site. There are approximately 10.5 miles of existing access roads within 500 feet of the route.

2.4.1.5 Alternative C2 – Tintic Junction

Alternative C2 is approximately 68.4 miles in length. The route follows the same alignment as Alternatives A2 and B2 to Goshen Valley. From Goshen Valley, the route is similar to Alternative C1 as it extends north to Limber.

Similar to Alternatives A2 and B2, a short segment of 500kV transmission line would be constructed to connect to the proposed Mona Annex Substation at the same time the Mona to Limber transmission line is converted from 345kV to 500kV.

Alternative C2 is located within corridors identified in the WWEC PEIS (DOE 2009) and supported by the BLM (2009) for approximately 20.6 miles: 17.0 miles along SR 36 and the west side of Rush Valley and 3.6 miles along the existing 345kV utility corridor adjacent to the proposed Mona Annex Substation site. There are approximately 14.5 miles of existing access roads route within 500 feet of the route.

2.4.2 Limber to Oquirrh

In addition to the Proponent's Proposed Action, Alternative E1, there are five route options for the 345kV transmission line from the future Limber Substation in Tooele County to the existing Oquirrh Substation in West Jordan City. The alternatives cross portions of Tooele and Salt Lake counties.

2.4.2.1 Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

The selection of this alternative as BLM's Preferred Alternative only applies to federal lands occurring along the route.

Alternative D connects the future Limber Substation to the existing Oquirrh Substation and is approximately 31.1 miles in length. The route runs east from Limber in the foothills of South Mountain, crossing the railroad, SR 36, and three 46kV lines. The route turns northeast, paralleling the 46kV lines for approximately 1.2 miles. It then extends east in the foothills south of Tooele City. In order to mitigate impacts to residential viewsheds and health and safety issues associated with fire management operations in Settlement Canyon Reservoir, the alternative would use Link 190A instead of Link 190 south of Tooele City. The route continues northeast in the foothills, paralleling an existing 138kV line for approximately 1.4 miles through the Carr Fork Reclamation and WMA. The route heads northeast over the Oquirrh Mountains in Pole Canyon, south of the NOMA. From the ridgeline, the route runs northeast in Dry Fork Canyon and into Barneys Canyon until it intersects with an existing 138kV line in Barneys Canyon. It follows the 138kV line east until it reaches SR 111 where it turns south, paralleling existing 46kV and 138kV lines for approximately 2.0 miles. The route then turns east and follows the south side of Old Bingham Highway for approximately 2.0 miles to the existing Oquirrh Substation. There are approximately 15.1 miles of existing access roads within 500 feet of the route.

2.4.2.2 Alternative E1 – Pass Canyon

Alternative E1 is approximately 31.1 miles in length. From Limber, the route runs east across the foothills of South Mountain, crossing the railroad, SR 36, and three 46kV transmission lines. The route then turns northeast, paralleling the 46kV lines for approximately 1.2 miles. It then crosses the foothills south of Tooele City. The route continues northeast in the foothills of the Oquirrh Mountains, paralleling an existing 138kV line for approximately 2.4 miles through the Carr Fork Reclamation and WMA. It then heads east, following the existing 138kV line for 7.4 miles and crossing the BLM NOMA for 2.6 miles before heading over the Oquirrh Mountains. The route continues east through Barneys Canyon, and turns south in the foothills of the Oquirrhs. The route then turns east in Bingham Creek and continues east, crossing SR 111 and paralleling existing 46kV and 138kV lines for 1.9 miles to the existing Oquirrh Substation. There are approximately 16.1 miles of existing access roads within 500 feet of the route.

2.4.2.3 Alternative F1 – Middle/Butterfield Canyon

Alternative F1 is approximately 29.3 miles in length. The route follows the same alignment as Alternative E1, until it reaches the mouth of Middle Canyon. At this location, the route heads east along the bottom of Middle Canyon, adjacent to the road at times and at the toe of the slope in other locations. The route then extends through Butterfield Canyon on the north side of the Butterfield Canyon Road. After exiting Butterfield Canyon, the route continues northeast, paralleling SR 111 for approximately 2.2 miles. The route then turns north, west of SR 111. At Bingham Creek, the route extends east, paralleling existing 46kV and 138kV lines for 1.9 miles to the existing Oquirrh Substation. There are approximately 10.2 miles of existing access roads within 500 feet of the route.

2.4.2.4 Alternative F2 – Middle/Butterfield Canyon

Alternative F2 is approximately 29.6 miles in length. The route follows the same alignment as Alternative F1, until it reaches Bingham Creek. From this location, the route continues north past Bingham Creek, paralleling SR 111 for 0.4 mile. It then turns east and parallels the south side of Old Bingham Highway for 2.0 miles to the existing Oquirrh Substation. There are approximately 11.0 miles of existing access roads within 500 feet of the route.

2.4.2.5 Alternative G – Lake Point

Alternative G is approximately 49.0 miles in length. The route has the same alignment as Alternative H from the proposed Limber Substation to the east side of the Oquirrh Mountains. On the east side of the Oquirrh Mountains, the route turns south, along the foothills of the Oquirrh Mountains for approximately 9 miles. The route then continues into the existing Oquirrh Substation in a location similar to Alternative D. There are approximately 16.6 miles of existing access roads within 500 feet of the route.

Alternative G does not appear to meet the Western Electricity Coordinating Council (WECC) guidelines for reliability (Appendix A) and does not meet the Proponent’s purpose and need for the Project. Alternative G would parallel either of the alternatives from Limber to Terminal (Alternative H or I) around the Lake Point area for a minimum of 5 miles. Due to topography and existing transportation and utility infrastructure around Lake Point, it would not be possible to maintain a 1,500-foot separation between the two transmission lines in compliance with the WECC guidelines. Project facilities that are not in compliance with the WECC guidelines for reliability do not meet part of the Proponent’s purpose and need for the Project to increase the reliability and capacity of the transmission system.

2.4.3 Limber to Terminal

In addition to the Proponent’s Proposed Action, Alternative H, there is one alternative route option from the future Limber Substation in Tooele County to the existing Terminal Substation in Salt Lake City. The alternative crosses portions of Tooele and Salt Lake counties, and is described below.

2.4.3.1 Alternative I – East Tooele Valley

Alternative I is approximately 40.4 miles in length. From Limber, the route extends east across the foothills of South Mountain, until it intersects with the railroad. Paralleling the railroad for approximately 12.2 miles, the route extends northeast through Tooele City. At the base of the Oquirrh Mountain foothills, the route separates from the railroad in order to parallel an existing 138kV line, and reconnects with the railroad again in the Lake Point area. The route then extends east, following the existing 138kV line for 1.6 miles along the bench of the North Oquirrh Mountains. The route continues northeast along I-80, paralleling an existing 138kV line and railroad for approximately 8.5 miles on the north side of the Kennecott tailings pond. It then turns south at 7200 West (in Salt Lake City) and east at 150 South paralleling the road for 1.3 miles to the existing Terminal Substation. There are approximately 23.7 miles of existing access roads within 500 feet of the route. Alternative I is located within a corridor identified in the WWEC PEIS (DOE 2009) and supported by BLM (2009) for a total of 1.2 miles along Link 360.

2.5 No Action Alternative

If no action is taken, the major right-of-way for the Project would not be granted and the substations and transmission lines would not be constructed. The environment would remain as it presently exists. The BLM's Pony Express RMP (1990) would not be amended, and management direction from the current BLM resource management plans would continue to be carried forward. Advantages of the no-action alternative would include saving on the construction costs of new facilities and the preclusion of associated environmental impacts.

However, as presented in Chapter 1 and Appendix A, the Proponent's ability to serve projected electrical demands in northern Utah would be constrained. The capacity of the existing transmission infrastructure would not accommodate the demands of future generation resources; operational flexibility and reliability of the system would not be improved; opportunities for economical power transfers, sales, and purchases in the area would not increase; and the objectives for short-term and long-term infrastructure planning would not be met.

2.6 Alternatives Considered but not Analyzed in Detail

2.6.1 Alternatives to a Transmission Option

Alternatives to constructing new transmission lines and substations, which would reduce the electrical load requirements of the system or provide additional power to the system, were considered but did not meet the purpose and need of the Project, as explained below. The alternatives that were considered, but eliminated included: (1) electrical load and DSM and energy conservation, (2) development of new generation facilities, (3) use of existing transmission systems, and (4) alternative transmission technologies.

2.6.1.1 Electrical Load and Demand-Side Management and Energy Conservation

Load management programs are designed to achieve load reductions, primarily at the time of peak load. For example, by agreement with their customers, utilities can have direct control over loads that can be interrupted by the utility system operator during periods of peak demand by directly interrupting power supply to individual appliances or equipment. This method usually involves consumers who allow the utility to periodically interrupt service to water or space heating units during the hours of peak load.

Another type of load management program makes use of interruptible loads. An interruptible load is a load that can be separated from the system during periods of peak load or system disturbances, either by direct control of the utility system operator, or by action of the consumer at the direct request of the system operator. For example, large commercial and industrial consumers are candidates for interruptible load management, depending on the type of business.

Other load management programs that limit peak loads shift peak load from on-peak to off-peak hours or encourage consumers to respond to changes in the utility's cost of providing power. This includes technologies that primarily shift all or part of a load from one time of day to another and may affect overall energy consumption. Examples include space heating and water heating storage systems, cool storage systems, and load-limiting devices in energy management systems.

Demand-side management consists of electric utilities planning, implementing, and monitoring activities designed to encourage consumers to modify their levels and patterns of energy consumption. While DSM affects only a small percentage of the system load, utilities implement DSM programs to achieve two basic objectives: energy efficiency and load management.

Energy efficiency (or energy conservation) is achieved primarily through programs that reduce overall energy consumption of specific end-user devices and systems by promoting high-efficiency equipment and building design. Energy efficiency programs typically reduce energy consumption over many hours during the year. Examples include energy-saving appliances and lighting, high-efficiency heating, ventilating and air conditioning systems or control modification, efficient building design, advanced electric motors and drive systems, and heat recovery systems.

The Proponent has implemented the following energy-efficiency and load-management programs:

- Since 2003, the Proponent has offered a residential/small commercial air conditioning load control program along the Wasatch Front. Currently, the initiative has approximately 80,000 participating customers. The system is dispatched during summer peak periods and yields approximately 70 MW of peak load relief. There are no energy savings associated with this initiative.

- Additionally, since 2003, the Proponent has offered an irrigation load control program in southeast Idaho. The system is dispatched during peak periods (2 p.m. to 8 p.m.), and the Proponent currently has 208 MW of participating load. The Proponent also offers an irrigation load control program in Utah, although agriculture is much smaller in Utah. Currently, the Proponent realizes 5 MW of irrigation load control benefit in Utah on a scheduled-forward initiative. This is expected to grow in 2009, as the Proponent will offer an initiative beginning in 2009. It is anticipated that the program will grow to approximately 30 MW of avoided peak demand in Utah.

Energy-efficiency and load-management programs are valuable tools that the Proponent is using and will continue to use to manage the demand for and consumption of energy. However, these programs do not address any of the need categories of the Project. These DSM programs focus on managing a very small part of the load on the system, whereas the Project need is for improvements to allow more transmission capacity (up to 3,000 MW) and better operational management of the existing interconnected system. Since energy-efficiency and load-management programs do not address the purpose and need for the Project, DSM was eliminated from further consideration as an alternative to the proposed Project.

2.6.1.2 New Generation Facilities

Currently, the Proponent is evaluating various options for adding new generation facilities in Juab, Utah, and Salt Lake counties. As stated in the purpose and need for the Project, this planned generation would use the proposed Mona to Oquirrh transmission facilities to transmit power into the Wasatch Front and help meet the projected load demand. The new generation typically would be used to meet the system load peak conditions; its use could possibly be limited by environmental, water supply, or fuel restrictions.

Any new centralized generation facilities built would not meet the projected future electrical demands for Northern Utah in the Wasatch Front area, and new transmission lines would be needed to accommodate new power generated. Also, construction of any new generation facility would not be able to lend itself to seasonal or regional energy exchanges because there would still be a lack of adequate transmission capacity. For this reason, this alternative was not considered further.

Distributed Generation

Other types of generation, including distributed generation resources, were also considered. Distributed generation resources can be differentiated from centralized generation resources, primarily in terms of size and because they are usually installed at or near where the generated power is used. Distributed generation ranges from about 5 kilowatts (kW) to 10 MW, in contrast to centralized generation resources that come in sizes from 10 MW to more than 1,000 MW per site. Distributed generation resource technologies include photovoltaic, energy storage devices, microturbines, solar, wind, and fuel cells.

Distributed generation has been considered in recent years; however, the economics of adding solar collectors, fuel cells, and small wind turbines to individual homes has been prohibitively expensive. While distributed generation may be wide-spread in certain areas of the United States, the effectiveness of adding distributed generation to the Wasatch Front is limited due to elevation, average temperature, weather (snow conditions, length of days, etc.), and geographic latitude. Therefore, new and distributed generation resources were eliminated from further consideration for this Project.

2.6.1.3 Existing Transmission Systems

The existing transmission into the Wasatch Front is characterized by a 345kV backbone, which feeds a 138kV and 46kV distribution system. From the south, multiple 345kV lines provide a transmission path to Arizona and southern Nevada, as well as generation resources in central Utah. From the north, 345kV and 230kV lines provide a transmission path to Idaho and Wyoming. Transmission capacity on each of the transmission paths within the Project area is fully allocated to meet native load obligations or point-to-point transmission service. Therefore, the use of the existing transmission system was eliminated from further consideration for this Project.

2.6.1.4 Alternative Transmission Technologies

Alternative Voltage Levels

The major backbone of the Project has been designed for 500kV. Initially, the line would be energized at 345kV and would be upgraded to 500kV when necessary to meet increasing energy demands. It is possible that the stated purposes and needs for the Project could be met by designing for voltage levels other than 500kV. However, adjusting the voltage level would result in either increased costs for construction (at higher voltage levels) or compromising capacity (at lower voltage levels).

If the Project were to be constructed at a higher voltage, such as 765kV, the estimated cost of construction would be up to 1.75 times the cost of constructing the Project at 500kV. A 765kV line would require taller structures, larger conductors, increased insulation of equipment, a wider right-of-way, and larger equipment. In addition, transmission system studies have shown that voltage levels higher than 500kV do not result in higher capacities without significant facility additions to the existing systems. Constructing the Project at less than 500kV may meet the immediate needs of the Project, but would result in less transmission capacity than the amount projected to be needed in the long-term. For these reasons, the Project has been designed as a 500kV transmission line with 345kV interconnections to the existing Mona, Oquirrh, and Terminal substations.

Direct or Alternating Current Transmission

The main benefit of a direct current (DC) system is better control of power flows over very long distances (i.e., over 400 miles or more); whereas, line construction cost savings may be able to offset the high costs of DC terminal substations. To interconnect with an alternating current (AC) system, the DC must be converted to AC. Converter substations require more land than a typical AC substation, and costs for one 500kV DC converter station can cost up to $350 million (a potential total of $700 million for the two new substations) (Rocky Mountain Power 2008). The AC system selected allows for multiple substation interconnections necessary for load centers and for generation resources, while being more economical than DC. A DC system also has limited ability for future expansion, where additional future transmission capacity is needed and therefore requires a higher upfront cost. For these reasons, the AC design was chosen for the Project over a DC design.

Underground Transmission

Extra high-voltage underground lines (345kV and 500kV) have been constructed in some parts of the United States, but only for short distances, and usually where circumstances dictated that overhead lines were not feasible (e.g., in the vicinity of airports and urban centers).

High-voltage underground transmission lines have markedly different technological requirements than lower-voltage underground distribution lines. Underground high-voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk energy. Cooling systems are complex and expensive. The extremely high cost of large cooling systems and other special design requirements are prohibitive for long-distance underground transmission, and are estimated to be 10 to 12 times greater than the cost of constructing a 500kV overhead transmission line (Rocky Mountain Power 2008).

Operational problems are greater and the duration of outages is normally longer for underground transmission lines. When an outage to an underground line occurs, determining the cause and location of the damage, the replacement parts needed to repair the line, and actually repairing the line takes much more time than for an overhead line. Repairs to an underground line are also more expensive. If an underground line is damaged during the winter at a high elevation, the presence of snow would increase the length of time required and the degree of difficulty to repair the facility. The potential long-term outages associated with the 500kV transmission line would be unacceptable for a circuit carrying bulk power.

The environmental impacts from construction of an underground transmission line would be similar to those for major pipeline construction. Typical construction would require a continuous trench between endpoints, resulting in ground disturbance along an entire right-of-way. By comparison, overhead transmission line construction typically results in partial disturbances of the right-of-way primarily at individual tower sites, pulling and tensioning sites, staging areas, and in areas providing access to the right-of-way.

In summary, because of the cost, environmental impacts, and potential operation issues, an underground system was not considered a viable alternative and was eliminated from further consideration.

New Transmission Technologies

Other technologies considered as alternatives for economical bulk-power transmission of electric energy to load centers included microwave, laser, and superconductors. Current research and development indicate that some of these technologies may eventually become viable alternatives to overhead transmission systems; however, none of them are currently available for commercial use. Therefore, new transmission technologies were eliminated from further consideration for this Project.

2.6.2 Substation and Transmission Line Alternatives Considered and Eliminated

A number of alternative substation sites and transmission line routes for the Project were identified, analyzed, and compared. The process used to evaluate and screen alternatives as well as the alternatives that have been considered and eliminated are summarized below.

2.6.2.1 Substation Site Screening and Comparison Process

Ten sites were initially identified in the southern portion of the Project area for the proposed Mona Annex Substation, and 12 sites were identified in the northern portion of the Project area for the future Limber Substation. Originally, the size requirements for the substation property, including proposed and future facilities and interconnections, were anticipated to be approximately 140 to 160 acres. As a result of detailed engineering and system studies conducted during the preparation of the EIS, it was determined that additional equipment for the substations would be required, expanding the substation property size requirements to approximately 370 acres. The substations were compared against each other based on the Proponent's engineering and design criteria summarized below:

- Topography and slope
- Property size
- System planning and reliability
- Cost
- Access
- Engineering and operations
- Transmission interconnections (500, 345, 138kV)
- Zoning
- Existing and planned land use
- Known environmental constraints

Site visits occurred in 2007, 2008, and 2009 by the Proponent's engineering staff to review each location. The results of the comparison process resulted in the Proponent's identification of a proposed site for both the proposed Mona Annex and Limber substations. The selection of these proposed sites best met the needs of the Proponent to provide safe, reliable, adequate, and efficient electrical service to customers.

2.6.2.2 Substation Sites Considered and Eliminated

The substation sites that were considered and eliminated are illustrated on Figure 2-8 and briefly described below.

Mona Annex Substation Alternatives

Of the ten alternative substation sites initially identified in the southern portion of the study area, nine have been eliminated (S1, S2, S3, S4, S5, S6, S7, S8, and S9). Several substation sites initially considered for the Mona Annex were eliminated due to size constraints, interconnection issues with long-term plans for additional 500 kV or 345kV transmission lines, not meeting the need to interconnect with the Juab Valley 138kV system, or the potential for excessive ground disturbance based on physical characteristics (topography) and grading requirements or access. Alternative sites that have been eliminated are presented below.

- S1 – This location would quickly become congested with existing and planned facilities, due to its proximity to the existing Mona Substation, Currant Creek Power Plant, and 345kV utility corridor. Due to this congestion, crossing the existing utility corridor with the proposed 500kV line or siting future transmission lines in the area would be extremely difficult. In addition, this site does not support local area load needs with an interconnection into the existing 138kV system.

- S2 – This site does not meet the size requirements.

- S3 – This location is constrained by an existing utility corridor to the west and the existing Mona Substation and Currant Creek Power Plant to the north. A potential future Currant Creek Power Plant expansion would limit the opportunities to interconnect transmission lines north out of this substation site. In addition, this site does not support local area needs with an interconnection into the existing 138kV system.

- S4 – Similar to S2, this site does not meet the size requirements.

- S5 – This site requires major ground disturbance and site grading, due to topography and limited access. The site would potentially require modification to a large dry wash, construction of approximately 3 miles of new road, and improving 4 miles of existing road.

- S6 – This site would require a major amount of ground disturbance and site grading due to topography and would potentially require cutting into the side of the foothills and rerouting a small wash. Furthermore, cathodic protection measures would be required to minimize corrosion of the Kern River pipeline, which is adjacent to the substation site. In addition, it would not be possible to integrate the existing 138kV transmission system in Juab Valley with the new Mona Annex Substation in this location.

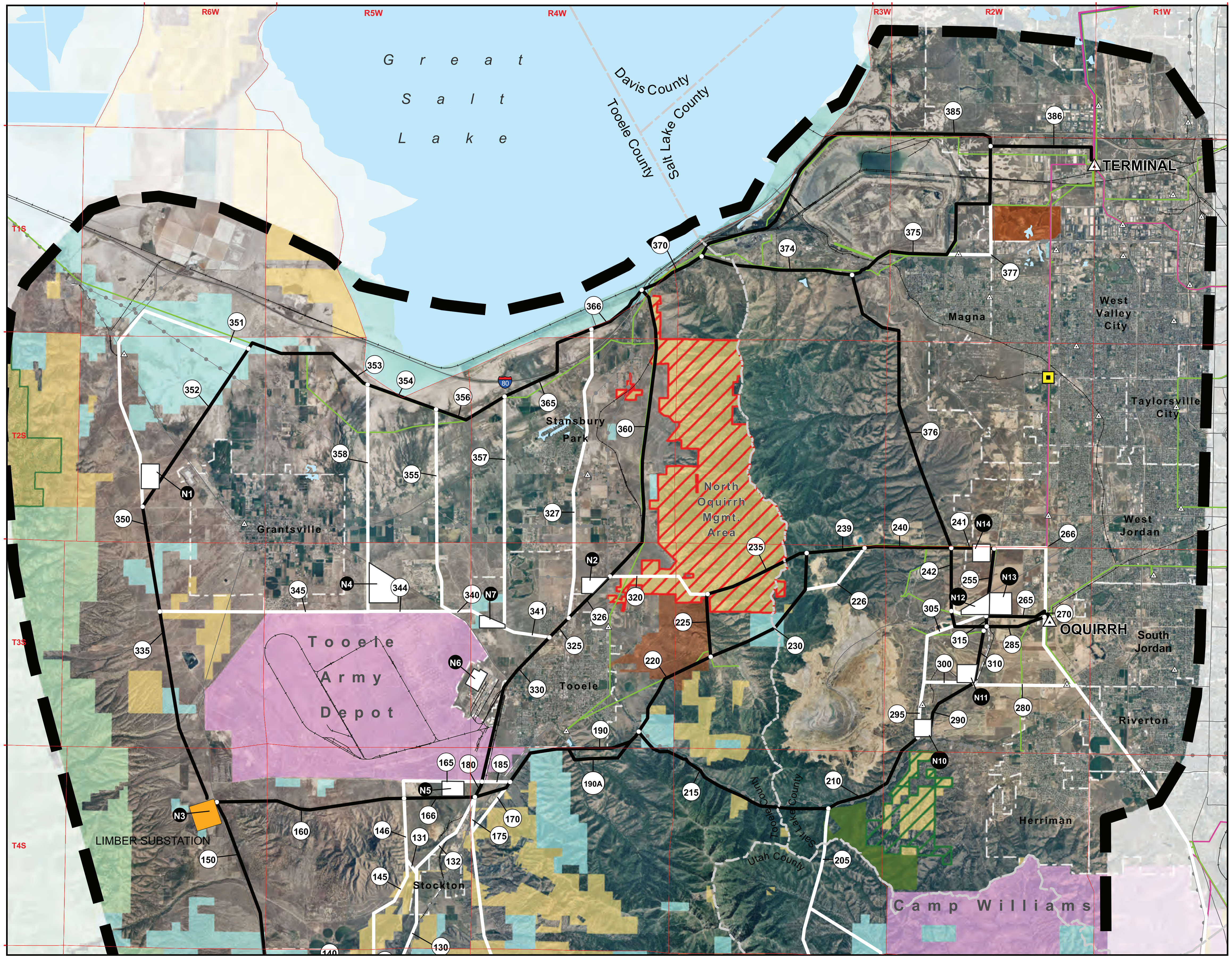
- S7 – Similar to S2, this site does not meet the size requirements.

- S8 – This site would require rerouting a BLM road and a small wash. In addition, orchards adjacent to the site may be impacted by transmission lines entering and exiting the substation. In addition, it would not be possible to integrate the existing 138kV transmission system in Juab Valley with the new Mona Annex Substation in this location.

- S9 – This site is located approximately 20 miles from the existing Mona Substation, making it difficult to integrate the 500kV transmission system with the 345kV system. In addition, it would not be possible to integrate the existing 138kV transmission system in Juab Valley with the new Mona Annex Substation in this location.

Limber Substation Alternatives

Of the 12 substation sites initially identified in the northern portion of the study area, 11 have been eliminated from further consideration (N1, N2, N4, N5, N6, N7, N10, N11, N12, N13, and N14). Several



Legend

Project Features

- Alternatives Considered and Eliminated
- Substation Sites Considered and Eliminated
- Alternative Routes
- Proposed Substation Site
- Project Study Area
- Link Node
- 95 Link Tag / Substation Tag

Land Jurisdiction

- Bureau of Land Management
- U.S. Forest Service
- Department of Defense
- State Trust Land
- Private Land

Special Management Areas

- UDWR Wildlife Management Area
- Yellow Fork Canyon Regional Park
- Rose Canyon Ranch Open Space
- North Oquirrh Management Area
- Wilderness Study Area

Utility Features

- 345kV Transmission Line
- 138kV Transmission Line
- Power Plant
- Substation
- Natural Gas Pipeline

Transportation Features

- Railroad
- Major Road

Administrative Boundary

- City Boundary
- County Boundary

Public Land Survey System

- Township and Range Line

0 1 2 4 Miles

SOURCES: Land Ownership, Utah AGRC 2007; Aerial Imagery, NAIP 2009;
Aerial Photography Captured June - August, 2009
County Boundaries, Utah AGRC 2004;
Transmission Lines & Substation Locations, PacifiCorp

Figure 2-8

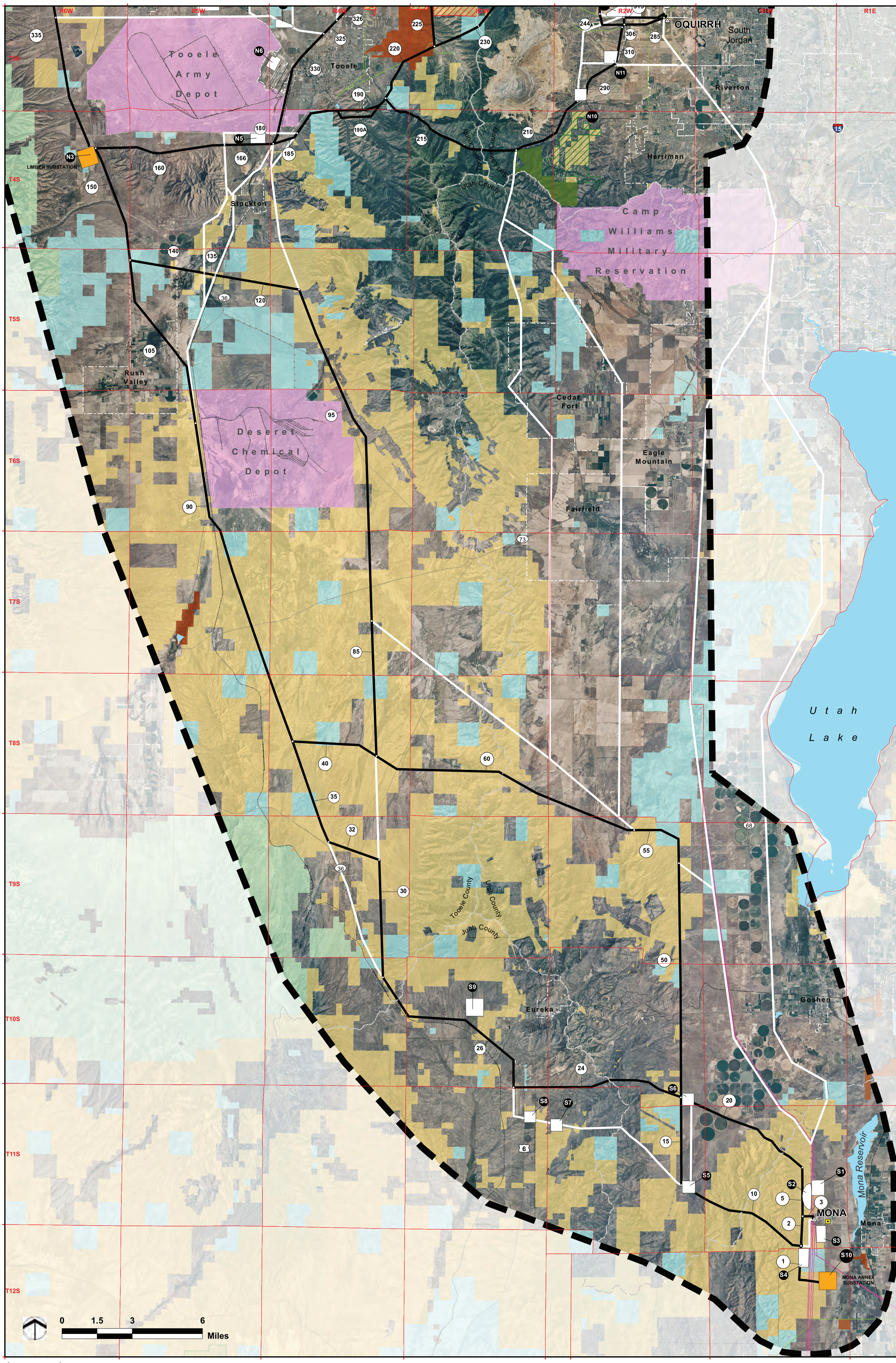
1 of 2

April 2010

Alternative_Eliminated_FEIS_landscape_Figure_2-8_1of2.mxd

Alternative Routes and Substation Sites Considered and Eliminated

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS



Legend

Project Features
- Alternatives Considered and Eliminated
- Substation Sites Considered and Eliminated
- Alternative Routes
- Proposed Substation Site
- 95 Link Tag / Substation Tag
- Link Node
- Project Study Area

Land Jurisdiction
- Bureau of Land Management
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- Department of Defense
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- Private Land

Administrative Features
- County Boundary

Special Managment Areas
- UDWR Wildlife Management Area
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- North Oquirrh Management Area
- Wilderness Study Area

Public Land Survey System
- Township and Range Line

Utility Features
- 345kV Transmission Line
- 138kV Transmission Line
- Power Plant
- Substation
- Natural Gas Pipeline

Transportation Features
- Railroad
- Major Road

SOURCES: Land Ownership, Utah AGRC 2007; Aerial Imagery, NAIP 2009; Aerial Photography Captured June - August, 2009; DigitalGlobe Satellite Image – Collection date: May 21, 2009 © DigitalGlobe, Inc. All Rights Reserved; County Boundaries, Utah AGRC 2004; Transmission Lines & Substation Locations, PacifiCorp

Figure 2-8
2 of 2
April 2010

NATIONAL SYSTEM OF PUBLIC LANDS

Alternative Routes and Substation Sites Considered and Eliminated

MONA TO OQUIRRH TRANSMISSION CORRIDOR PROJECT EIS

substations sites that were initially considered were eliminated due to size constraints, or because they posed potential conflicts with existing and planned land use, including the potential for displacement of existing and planned residences. Alternative sites that have been eliminated are presented below.

- N1 – This site would require a major amount of ground disturbance and site grading due to topography and potentially would require terracing and rerouting a small wash. This site would also require additional distance for the 500kV line interconnection to Mona, and would present a reliability risk if the 500kV line to Mona and the 345kV line to Oquirrh were located adjacent to each other west of Grantsville.

- N2 – This site does not meet the size requirements.

- N4 – This location would have potential visual and zoning conflicts around the Miller Motorsports Park, and the site does not allow for future transmission interconnections, based on local land use constraints.

- N5 – This site is located in a slight depression, with the potential for drainage problems. Additionally, a gravel pit operation is located near the site, the dust from which may pose contaminant problems for the operation and maintenance of the substation. Airport issues also were identified.

- N6 – Similar to site N2, this site does not meet the size requirements.

- N7 – Similar to site N2, this site does not meet the size requirements. Airport issues (e.g., approach/take-off zone interference) also were identified.

- N10 – This location, on the east side of the Oquirrh Mountains, while potentially accommodating a 500kV line, does not allow for up to three to four future transmission interconnections, due to local and physical land use constraints such as existing and planned developments. It would also not provide future bulk transmission electrical service to Tooele Valley.

- N11 – Similar to site N10, this site does not allow for up to three to four future transmission interconnections, based on local and physical land use constraints such as existing and planned developments.

- N12 – Similar to site N10, this site does not allow for up to three to four future transmission interconnections, based on local and physical land use constraints such as existing and planned developments.

- N13 – Similar to site N10, this site does not allow for up to three to four future transmission interconnections, based on local and physical land use constraints such as existing and planned developments.

- N14 – Similar to site N10, this site does not allow for up to three to four future transmission interconnections, based on local and physical land use constraints such as existing and planned developments.

2.6.2.3 Transmission Line Route Screening and Comparison Process

More than 450 miles of alternative routes were studied and analyzed as part of the Project. All of the alternative routes studied are shown on Figure 2-8. These alternatives were inventoried and assessed to determine the environmental resources present and to identify potential impacts. The alternatives were then systematically screened and compared in order to identify the most preferable environmental and engineering alternative routes, thereby narrowing the number of alternative routes to a reasonable range to be compared and addressed in the EIS.

To facilitate screening and comparison of routes, the Project area was divided into two segments: the southern area (Mona to Limber) and northern (Limber to Oquirrh and Terminal) area. The alternatives in each area were then screened at two levels: local (Level 1) and regional (Level 2). Through the screening process, alternatives routes defined by individual links or combinations of different links were compared against each other based on siting criteria. The Proponent evaluated routes based on siting criteria as summarized below:

- Meeting purpose and need for project
- System planning and reliability
- Meeting national and regional planning standards
- Cost
- Access
- Route length
- Right-of-way limitations and restrictions
- Miles parallel to other linear facilities (i.e., 138kV line, pipeline, railroad, etc.)
- Engineering and operations
- Interconnections with future substations
- Existing and planned land use
- Known environmental resource constraints
- Safety
- Project scheduling – in-service date

The comparison of alternatives at these two screening levels resulted in the identification of preferred pathways between two common endpoints for each level of screening. Links that were unique to less desirable alternatives were eliminated, as shown schematically on Figure 2-9. The comparison process resulted in the identification of a Proponent's Proposed Action for each segment of the project and a range of alternative routes. The selection of the Proposed Action route segments best met the needs of the Proponent to provide safe, reliable, adequate, and efficient electrical service to customers.

2.6.2.4 Transmission Line Routes Considered and Eliminated

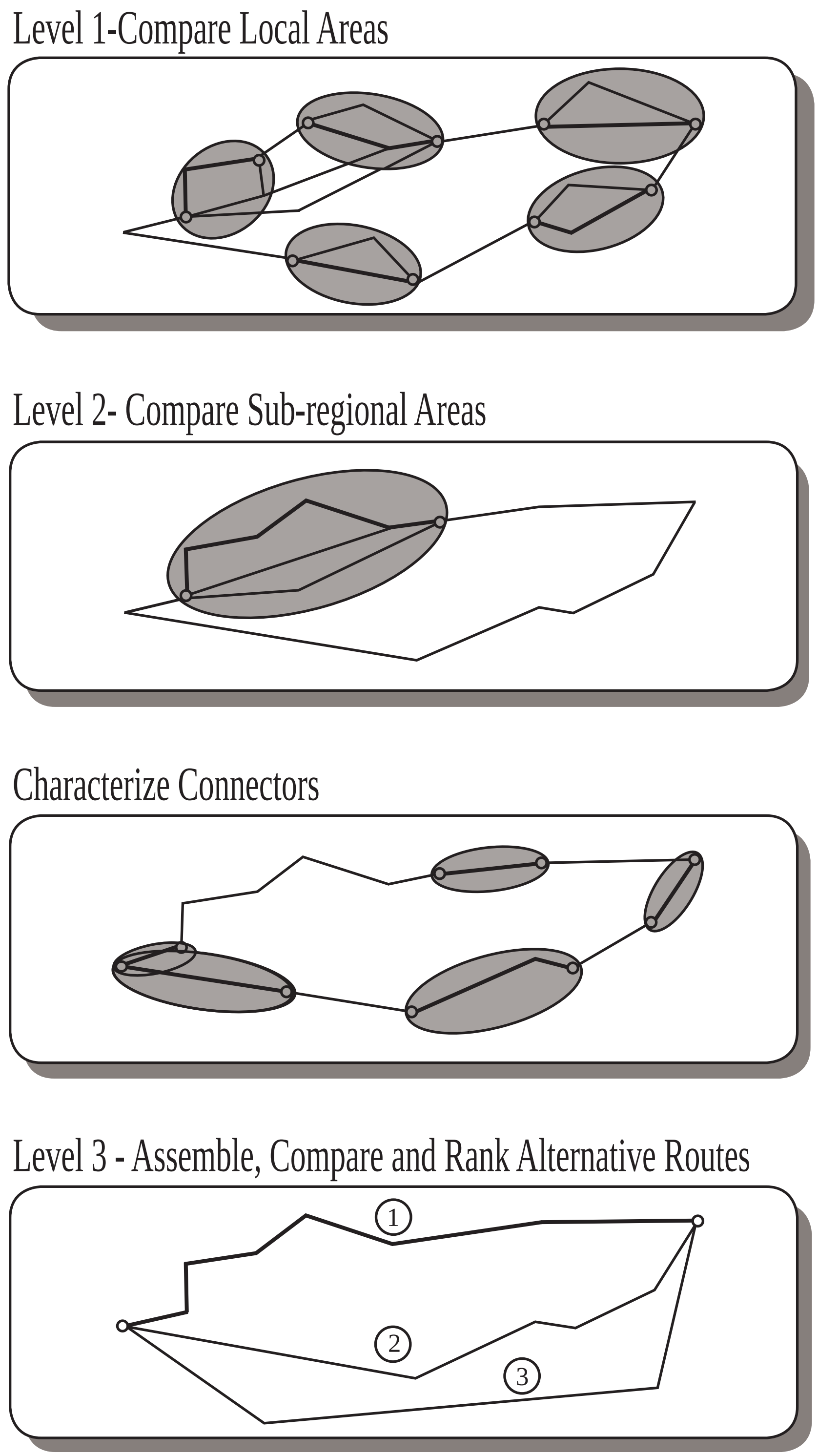
Transmission line routes and segments that were considered and eliminated based on Level 1 and Level 2 screening are shown in Figure 2-8 and briefly described below.

Southern Area – Mona to Limber

<u>Level 1 Screening</u>

Mona to Oquirrh via Camp Williams

Route options along the two existing 345kV transmission line corridors from Mona to Oquirrh via the Camp Williams Substation were considered and eliminated. The routes would parallel the existing 345kV transmission lines for the entire length of the route, which poses system reliability issues in accordance with WECC guidelines for reliability (Appendix A). In addition, the routes would have potential significant impacts on existing and planned land uses in northern Utah and southern Salt Lake counties. Development has encompassed the existing transmission line rights-of-way, which would require displacing residents in order to maintain an adjacent parallel route.



Screening and Comparison Approach
Figure 2-9

In addition, this alternative would not connect to a future substation in Tooele Valley, which was identified as part of the Project need.

Mona to Goshen Valley

- *Links 5, 45, 55* – This route segment parallels the existing 345kV utility corridor for approximately 16.1 miles, which poses system reliability issues in accordance with WECC guidelines (Appendix A). In addition, the segment would have potentially significant impacts on center-pivot agriculture fields in the Goshen Valley as a result of bisecting the fields.

Mona to Tintic Junction

- *Links 10, 25* – This route segment would have potentially significant impacts on cultural resources and sensitive wildlife habitat in the Tintic Mountains. Steep terrain in this area would also make construction more difficult compared to other alternative routes.

Cedar Valley to East Rush Valley

- *Links 65, 80* – This route segment crosses through approximately 2.9 miles of steep terrain, making construction difficult. Also, there are potential conflicts with a planned gravel pit in the area.

Cedar Valley

- *Link 70, 205* – This route segment has poor interconnection potential with the future Limber Substation site in the Tooele Valley. Route options in the Cedar Valley would require crossing the Oquirrh Mountains, once to reach the future Limber Substation and then crossing the mountains a second time to reach the existing Oquirrh Substation.

- *Links 65, 75, 205* – Similar to the other Cedar Valley segment, this route segment has poor interconnection potential with the future Limber Substation site in the Tooele Valley.

Tintic Junction to West Rush Valley

- *Links 30, 35* – A variation of the two route options from Tintic Junction to West Rush Valley was created in order to take advantage of a corridor identified in the WWEC PEIS (DOE 2009) and avoid impacts on residences along SR 36. A portion of Link 35 was eliminated, due to potential direct impacts on existing and planned residences along SR 36. A portion of Link 30 was also eliminated, due to its location outside of a corridor identified in the WWEC PEIS (DOE 2009).

Stockton Area

- *Link 165* – This route segment initially was identified to connect with Link 160. After Link 160 was shifted south into the foothills to avoid dust and debris from the Tooele Army Depot, Link 165 was no longer relevant.

- *Links 100, 110, 145, 146* – This route segment crosses through a portion of Rush Lake. In high water years, the transmission lines would be located in standing water, potentially impacting recreation on the lake and presenting maintenance concerns. The route is also located within the Jacob Smelter superfund site, which would require extensive efforts beyond standard construction practices to ensure public and worker safety.

- *Links 100, 115, 130, 132, 180* – Similar to the route segment above, this route segment also crosses the Jacob Smelter superfund site, which would require extensive efforts beyond standard construction practices to ensure public and worker safety.

- *Links 100, 115, 130, 131, 146* – Similar to the route segments above, this segment crosses through the Jacob Smelter superfund site, which would require extensive efforts beyond standard construction practices to ensure public and worker safety.

Level 2 Screening

Mona to Limber

- *Links 5, 20, 50, 55, 60, 85, 95, 125, 175, 166, 160* – This route alternative limits the opportunity to run a 345kV line from the future Limber Substation to the Oquirrh or Terminal Substation along Links 160 and 166. Siting both a 500kV and a 345kV adjacent to one another along Links 160 and 166 creates system reliability issues as described in Appendix A.

Northern Area – Limber to Oquirrh and Terminal Substations

Level 1 Screening

Northwest Corner

- *Link 351* – This route segment is approximately 4 miles longer than Link 352, and would increase the amount of ground disturbance and impacts on wetlands.

Tooele Valley from the West

- *Links 344, 355, 356* – This route segment was eliminated, due to the potential visual impacts on the Miller Motorsports Park and the residences along Sheep Lane.

- *Links 344, 340, 357* – This route segment would likely displace two houses along 1200 West.

- *Link 341* – This link was no longer needed after Links 344 and 340 were eliminated from further consideration.

- *Link 320* – This link was no longer needed after Links 344 and 340 were eliminated from further consideration.

Tooele Bench

- *Links 327, 366* – This route segment would likely displace three industrial structures and eight homes along SR 36.

Oquirrh Substation from Butterfield Canyon

- *Links 295, 300, 310, 315* – This route segment was eliminated, due to the potential impacts on planned land use and ongoing Kennecott Mining operations.
- *Links 290, 280* – Similar to the route segment above (Links 295, 300, 310, 315), this segment was eliminated due to the potential impacts on planned land use.
- *Links 295, 300, 280* – Similar to the route segment above, this segment was eliminated due to the potential impacts on planned land use.
- *Links 295, 305* – This route segment would conflict with the current and planned Bingham Canyon Mine operations.

Kennecott Tailings Pond

- *Link 377* – This route segment was eliminated in comparison to Link 375, as it conflicted with existing land uses.

West Jordan/Oquirrh Substation Area

- *Link 266* – This route segment was eliminated as a result of conflicts with existing and planned land use.

Level 2 Screening

Limber to Terminal

- *Links 335, 345, 358, 354, 356, 365, 366, 370, 374, 375* – This route option was eliminated, due to the potential visual impacts on residences on the north side of the Tooele Army Depot and along Link 358, as well as the limited space for right-of-way.

2.6.2.5 Alternative Routes Suggested During Public Comments on Draft EIS

Several commenters on the Draft EIS submitted alternative routes for BLM consideration and analysis. Provided below is an overview of the suggested alternative routes and reasons for their elimination from further consideration.

New Route South of Tooele – Silcox Canyon

The Tooele Citizens Committee submitted an alternative route that would connect the Limber and Oquirrh substations. The suggested alternative route was located 1.8 miles south of the Proponent's Proposed Action, Alternative E1, and moved the route away from residential areas in Tooele. The route alignment would traverse Silcox Canyon (south of Tooele City), connect into Butterfield Pass, and align with the alternative routes in Butterfield Canyon. A route map and digital file were provided to the BLM for review and consideration.

This alternative route was considered and eliminated from further analysis as a result of engineering, terrain, and construction difficulties; increase in road construction and overall construction costs; and long term operation and maintenance of the transmission lines at elevations over 9,000 feet msl. Winter snow loading at this elevation would make maintenance or emergency access to the line extremely difficult.

Parallel 345kV lines from Limber Substation to Lake Point

Several commenters on the Draft EIS requested that both 345kV transmission lines from Limber to Oquirrh and Limber to Terminal be co-located adjacent to each other from the Limber Substation to the Lake Point area along the I-80 highway corridor. This alternative route was suggested to avoid land use and visual impacts of routes that crossed through or south of Tooele City. Alternative H and Alternative G would be located adjacent to each other in this situation.

This alternative route was considered and eliminated from further analysis because of unacceptable system reliability risk and loss of redundancy in the case of a simultaneous outage. Other issues include potential constructability and long-term operation issues associated with being located in the Great Salt Lake in order to maintain line separation distances, additional federal and state permitting requirements, potential impacts to aquatic and wetland resources, and an increase in overall construction and maintenance costs.

SITLA Recommended Route Adjustment

SITLA suggested realignments of the proposed and alternative routes in the Draft EIS. Specifically, it was requested to realign the routes in a north-south or east-west orientation to minimize negative impacts to future land use plans or avoid chopping some SITLA lands into unusable small parcels. SITLA was particularly concerned about impacts to future residential development potential and future mineral development potential of certain properties.

These proposed and alternative route adjustments were reviewed and considered. Where feasible, the Project Proponent will make adjustments to minimize impacts. However, the majority of the route realignments were eliminated from further analysis because of engineering design difficulties, increased construction costs, and conflicts with other existing land uses.

2.7 Transmission Lines and Substation Facilities

This section describes the typical characteristics of the Project facilities, including the overhead 500kV and 345kV transmission lines and the 500/345/138kV substations.

2.7.1 Overhead Transmission Lines

Approximately 69 miles of single-circuit 500kV overhead transmission line and 77 miles of 345kV overhead transmission line would be constructed for the Project. The typical design characteristics of the 500kV and 345kV transmission lines are presented in Table 2-2. The components of the transmission lines are described below, including the tower structures, foundations, conductors, insulators and associated hardware, overhead ground wire, and regeneration facilities.

TABLE 2-2
TYPICAL DESIGN CHARACTERISTICS OF THE 500/345KV TRANSMISSION LINES

Feature	Description		
	500kV Lattice	**345kV Lattice**	**345kV Single-pole**
Line length (approximate miles)	69	77	
Type of structure	Self-supporting steel lattice tower	Self-supporting steel lattice tower	Self-supporting single-pole tubular steel
Structure height (feet)	170 to 200	125 to 150	
Span length (feet)	1,000 to 1,300	650 to 750	
Number of structures per mile	4 to 5	7 to 8	
Right-of-way width (feet)	250	150	
Land Temporarily Disturbed			
Structure work area	250 x 200 feet per structure (1.15 acres per structure)	150 x 200 feet per structure (0.68 acre per structure)	
Wire-pulling sites	300 x 700 feet per 2 miles (4.82 acres)	150 x 700 feet per 2 miles (2.41 acres)	
Wire-tensioning sites	300 x 700 feet per 2 miles (4.82 acres)	150 x 700 feet per 2 miles (2.41 acres)	
Wire-splicing sites	100 x 100 feet per 2 miles (0.23 acre)	100 x 100 feet per 2 miles (0.23 acre)	
Construction yards	Approximately one 12-acre site every 30 miles on private land (location to be determined)		
Concrete batch plant	One 2-acre batch plant between Mona and Limber substations	None required along the 345kV lines	
Land Permanently Required			
Structure base (width)	40 to 60 feet (tangent) 50 to 80 feet (dead end)	25 to 30 feet (tangent) 40 to 50 feet (dead end)	6 feet (tangent) 12 feet (dead end)
Communication Regenerator station	• 50 x 50 feet with a fenced area • One regenerator site required between the Mona and Limber substations • 12.5kV distribution line connection and right-of-way • Permanent all-weather access road, 12 feet wide		
Access Roads			
New roads required*	Minimum 14 feet wide (maximum 27 feet, depending on slope) – Approximately 1.1 to 2.5 miles (depending on slope) of new road per mile of transmission line where new roads are required. Existing roads would be used wherever possible.		
New spur roads required*	Minimum 14 feet wide (maximum 27 feet, depending on slope) – approximately 0.2 to 0.3 mile of new spur roads per mile of transmission line (4 to 5 structures per mile) where new spur roads are needed.	Minimum 14 feet wide (maximum 27 feet, depending on slope) – approximately 0.3 to 0.5 mile of new spur roads per mile of transmission line (7 to 8 structures per mile) where new spur roads are needed.	
Improve existing roads*	Existing roads would be improved to a minimum of 14 feet wide.		
Electrical Properties			
Nominal voltage	500kV AC line-to-line	345kV AC line-to-line	
Capacity	1,500 MW	750 MW per circuit	

TABLE 2-2
TYPICAL DESIGN CHARACTERISTICS OF THE 500/345KV TRANSMISSION LINES

Feature	Description		
	500kV Lattice	**345kV Lattice**	**345kV Single-pole**
Circuit configuration	Single-circuit with three phases per structure, three subconductors per phase	Double-circuit with six phases per structure, two subconductors per phase	
Conductor size	1,949.6 kcmil aluminum conductor steel reinforced	1,272 kcmil ACSR	
Minimum ground clearance of conductor	35 feet minimum per Rocky Mountain Power standard practice	30 feet minimum per Rocky Mountain Power standard practice	

NOTES:
*Maximum road widths will be specified in the POD, and will be dependent upon terrain and construction specifications.
Kcmil = Thousand circular mil ACSR = Aluminum conductor steel reinforced
SOURCE: Rocky Mountain Power, 2009

2.7.1.1 Tower Structures

The proposed tower structures for the Project include 500kV self-supporting dull galvanized steel lattice structures and a 345kV self-supporting single-pole tubular steel structure (Figures 2-10, 2-11, and 2-12). Following is a more detailed description of the structure types.

500kV Self-Supporting Lattice Structure – The proposed tower structure for the 500kV transmission line is a single-circuit self-supporting steel-lattice structure made of dull galvanized steel. This structure type was selected primarily because (1) maintenance activities are safer than other tower design options due to the configuration of the circuits and (2) the tower family does not exceed 200 feet in height. The average tower height would be approximately 170 feet, with a maximum height of 200 feet. The average span between towers would be approximately 1,000 to 1,300 feet.

345kV Self-Supporting Single-Pole Structure – The proposed tower structure for the 345kV transmission line is a double-circuit single-pole tubular steel structure made of dulled galvanized or self-weathering steel. The average tower height ranges from approximately 125 to 150 feet, and the towers would span an average of 650 to 750 feet.

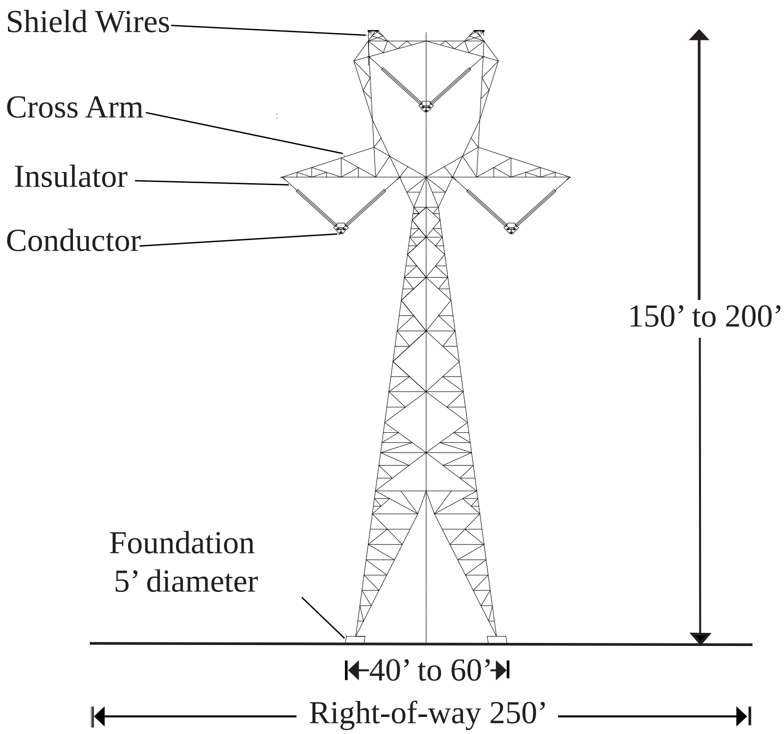
345kV Self-Supporting Lattice Structure – Double-circuit self-supporting steel lattice towers made of dulled galvanized steel may be used selectively as mitigation in areas of mountainous terrain or visual sensitivity, such as the Oquirrh Mountains. The average tower height would be approximately 125 to 150 feet, and the towers would span an average of 650 to 750 feet.

2.7.1.2 Foundations

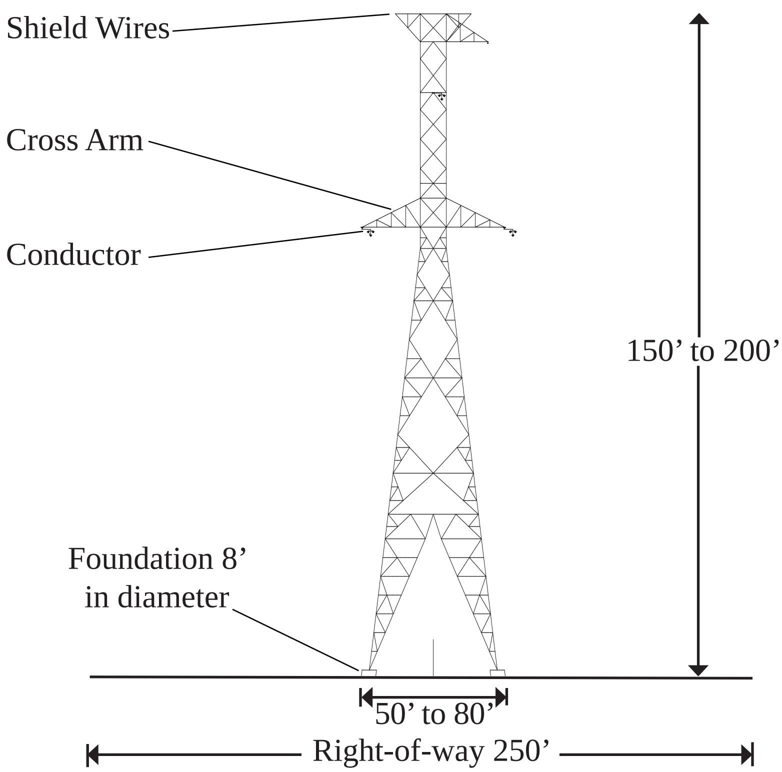
The 345kV and 500kV self-supporting steel-lattice towers require four footings. The foundations for the steel-lattice towers would be cast-in-place concrete. The foundations would range from 5 to 10 feet in diameter for the 345kV structures, and 8 to 14 feet in diameter for the 500kV structures. The foundation depth ranges from 20 to 50 feet for the 345kV structure, and 40 to 60 feet for 500kV structures.

The 345kV self-supporting tubular steel structures would be installed on drilled pier foundations or directly imbedded. Foundations typically would be 6 to 12 feet in diameter and 20 to 50 feet deep.

Tangent Structure



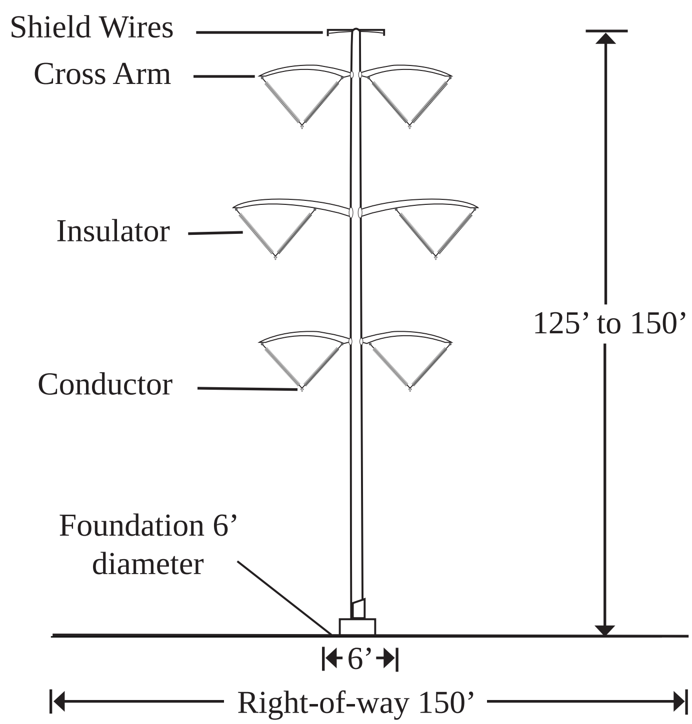
Deadend Structure



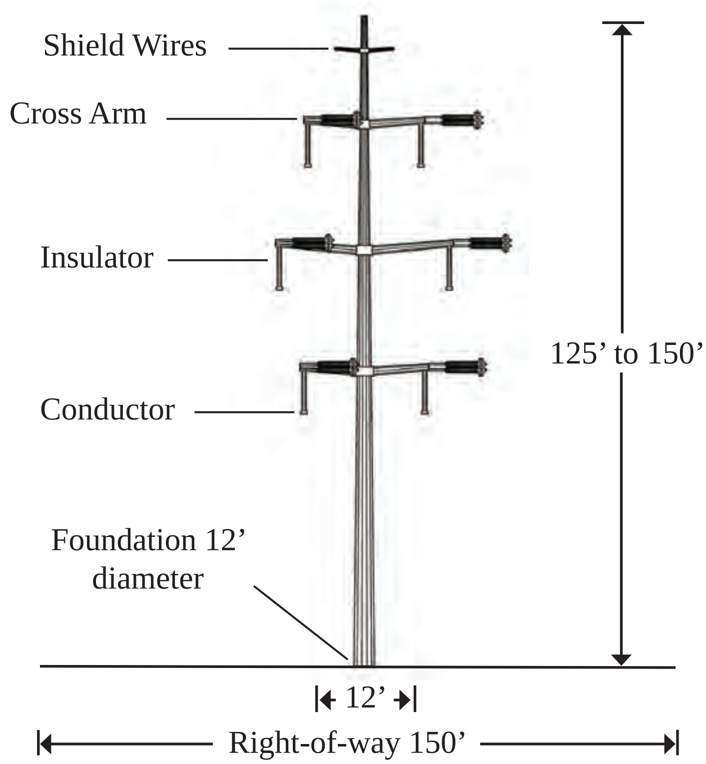
Not to Scale

Typical 500kV Self-Supporting Lattice Structures
Figure 2-10

Tangent Structure

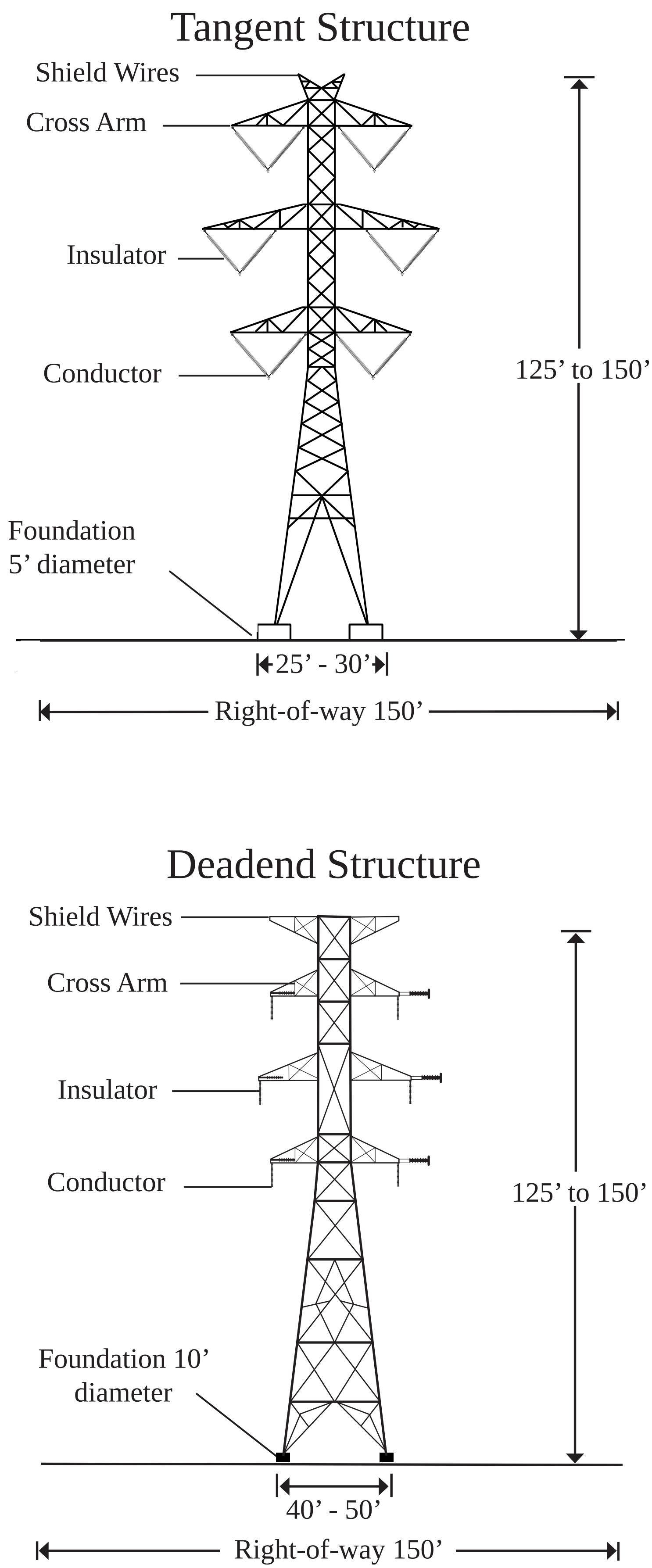


Deadend Structure



Not to Scale

Typical 345kV Self-Supporting Single Pole Structures
Figure 2-11



Not to Scale

Typical 345kV Self-Supporting Lattice Structures
Figure 2-12

2.7.1.3 Conductors

The conductor (the wire cable strung between transmission line towers through which the electric current flows) would be aluminum with a steel reinforced core. The aluminum carries most of the electric current and the steel provides tensile strength to support the aluminum strands. The 500kV line would consist of three phases for the single-circuit, with a three-conductor bundle (i.e., three subconductors) per phase. The 345kV lines would consist of six phases for the double-circuit, with a two-conductor bundle (i.e., two subconductors) per phase.

Minimum conductor height above the ground for the 500/345kV line would be 30 to 35 feet, at 212 degrees Fahrenheit (°F), based on National Electric Safety Code (NESC) and the Proponent's own design standards. The exact height of each tower would be governed by topography and safety requirements for conductor clearance.

Initially, the 500kV transmission line would be energized at 345kV. However, the line would be constructed to 500kV standards, eliminating the need to reconductor the line in the future. The conversion from 345kV to 500kV would require only some substation modifications within the yard.

2.7.1.4 Insulators and Associated Hardware

Insulators, which are made of an extremely low conducting material such as porcelain, glass, or polymer, are used to suspend the conductors from each tower. Insulators inhibit the flow of electrical current from the conductor to the ground or another conductor. A permanent assembly of insulators, ranging from 14 to 20 feet long, would be used to position and support each of the three-conductor bundles to the 500kV and 345kV towers. Insulator assemblies are "V" shaped for the tangent and angle towers, and "I" shaped for the dead-end towers. Dead-end insulators would be oriented parallel to the conductors. The assemblies of insulators are designed to maintain electrical clearances between the conductors, tower, and ground. Figures 2-10, 2-11, and 2-12 illustrate the conductor spacing for the proposed structure types.

2.7.1.5 Overhead Ground Wire

To protect conductors from lightning strikes, two overhead ground wires, 0.5-inch in diameter, would be installed on the top of the structures. Current from lightning strikes would be transferred through the ground wires and structures into the ground. One of the two overhead ground wires would be a fiber optic ground wire (OPGW) for communication purposes.

2.7.1.6 Regenerator Facility

Regenerator stations are required to amplify the system control and monitoring signals carried over the fiber optic cable attached to the transmission towers. Regenerator sites would be located within the proposed Mona Annex and Limber substations and at one other remote site, located along the transmission line route approximately half-way between the Mona and Oquirrh substations; the specific location for the remote site would be identified in the POD. The remote regenerator site would be adjacent to the proposed transmission line major right-of-way, in a location near existing low-voltage electric distribution lines and easily accessible by vehicle. A permanent 12-foot-wide access road would be required for maintenance purposes. A 1.5-mile extension of a 12.5kV distribution line would be needed to service the facility.

The remote regenerator site would be 50 by 50 feet with a fenced area. Typical building dimensions within the fenced area are 12 feet wide by 32 feet long by 9 feet tall. The OPGW cable supported on the transmission structures would be routed in and out of the regenerator site building from the nearest transmission structure, either underground or overhead, along two independent diverse paths. Electronic equipment that is required to support the fiber optic cable installation would be located inside the building. At the remote site, an emergency diesel generator would be installed to provide backup power during an outage of the local electric distribution supply system.

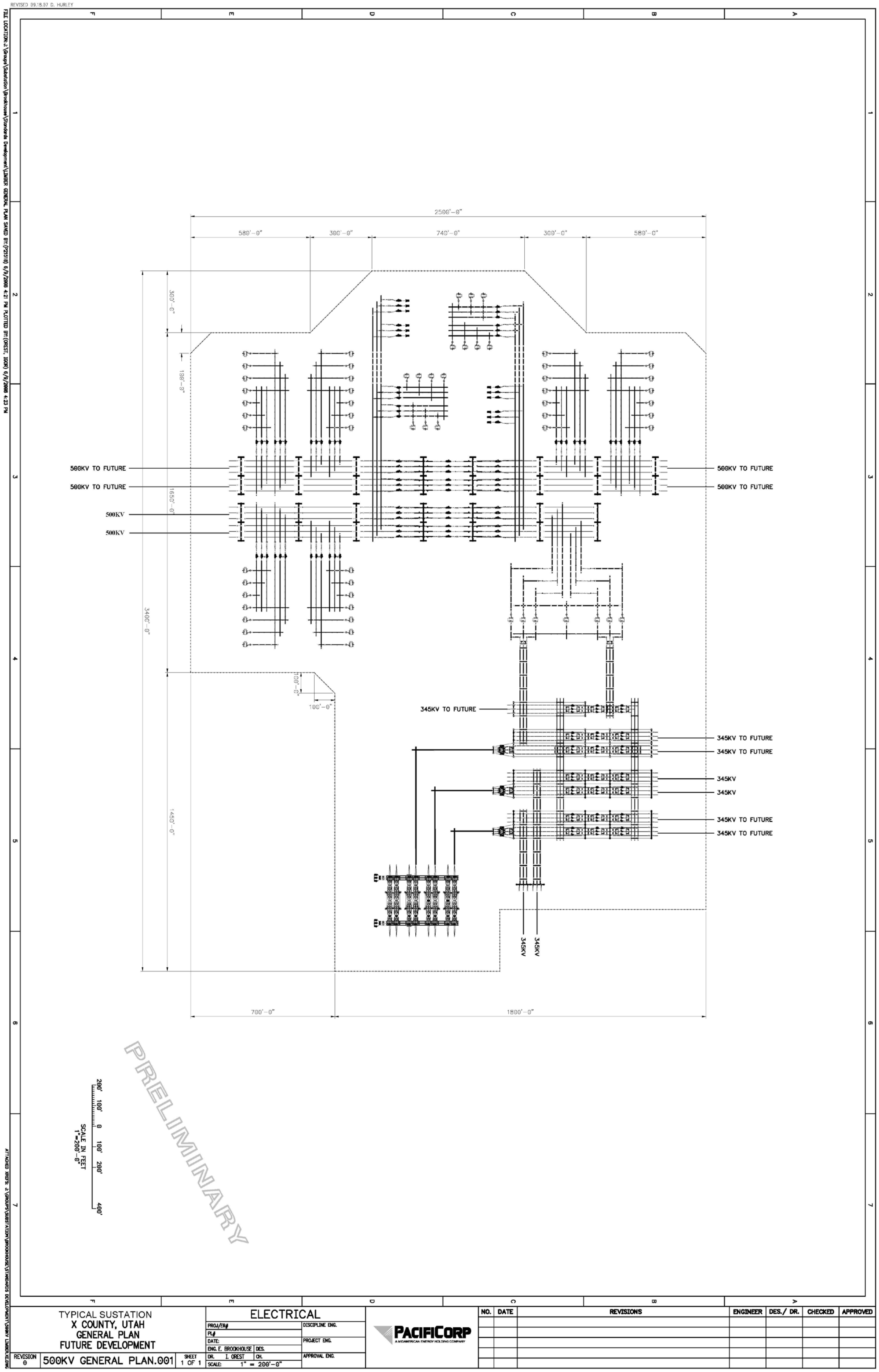
2.7.2 Substations

Two substations would be associated with the Project, one in the northern portion of the Project area (Limber Substation) and one in the southern portion of the Project area (Mona Annex Substation). The amount of land required for the substation property would be approximately 370 acres. Of this total property area, approximately 203 acres would be required for the Mona Annex Substation footprint and 155 acres for the Limber Substation footprint. The remaining acreage within the substation properties would be used as a buffer for the location of transmission structures, both entering and exiting the substation.

Preparation for construction at the substation sites would require the following:

- Cut-and-fill grading
- Placement and compaction of structural fill to serve as a foundation for equipment
- Subsurface grounding grids
- Grading to maintain drainage patterns
- Oil spill containment facilities
- Gravel-surfaced yard
- Gravel-covered parking areas approximately 100 by 100 feet
- Gravel-based roads a minimum of 20 feet wide, based on site specific conditions
- Fencing and gate
- Revegetation with native plants, where practicable

Layout of new substations for the Project would be similar to the illustration in Figure 2-13. The maximum height of structures in the substation would be approximately 170 feet. The substation yards would be open air and would include transformers, circuit breakers, disconnect switches, lightning/surge arresters, reactors, capacitors, bus (conductor) structures, and a microwave antenna. The substation yards would be surrounded by an 8-foot high chain-link fence topped with barbed-wire. The typical design characteristics for the substations are listed in Table 2-3.



Typical 500/345/138kV Substation Layout
Figure 2-13

TABLE 2-3
TYPICAL DESIGN CHARACTERISTICS OF A 500/345/138kV SUBSTATION

Property size (approximate)	▪ 370 acres
Equipment	▪ Transmission line takeoff structures ▪ Power circuit breakers ▪ Power transformers ▪ Switches equipment ▪ Buswork or bus conductor ▪ Control house ▪ Microwave antenna ▪ Current limiting reactor
Access road ▪ Width ▪ Road surface ▪ Grading	▪ A minimum of 20 feet wide based on site specific conditions (a maximum of 27 feet with ditches on each side included) ▪ Gravel ▪ Heavy road base to support larger equipment
Fire protection facilities	▪ Fire-wall barriers for protection from transformers
Substation/Series compensation grounding	▪ Use copper wire for personnel safety and grounding
Land temporarily disturbed	▪ Approximately 40 acres (in addition to the permanent disturbance)
Land permanently disturbed	▪ Site specific – 155 to 203 acres
Voltage	▪ Multiple voltages, can change voltage from 500kV to 345kV to 138kV
SOURCE: Rocky Mountain Power 2008	

2.7.3 Use of Sulfur Hexafluoride in Electrical Equipment

As mentioned in Chapter 1 (Section 1.3.2), the EPA suggested that the EIS evaluate the proposed use of SF_6 equipment and develop an option that eliminates the need for using SF_6 equipment. The EPA's concern regards potential impacts, should SF_6 inadvertently leak from the transmission equipment. This section summarizes what SF_6 is and the use of SF_6 in electrical equipment, the Proponent's coordination with the EPA, mitigation measures to reduce SF_6 emissions, and alternatives to the use of SF_6.

SF_6 is a fluorinated compound with a stable structure that has performance characteristics superior to other oils in its insulation properties and dielectric strength (EPA 2007). Utility companies, including the Proponent, use SF_6 as an electrical insulator in high-voltage projects. SF_6 is considered a greenhouse gas and has the ability to trap heat in the earth's atmosphere 23,900 times more than carbon dioxide (CO_2) (EPA 2007).

For this Project, SF_6 would be used to insulate substation equipment such as circuit breakers and circuit switchers, as well as transformers. SF_6 might also be used to insulate loadbreak switches, which would be located in intervals along each conductor.

The Proponent, in conjunction with other utility companies across the country, has reduced SF_6 emissions from 692,652 pounds in 1999 to 377,140 pounds in 2007 – a reduction rate of 57 percent (EPA 2007). This reduction in SF_6 emissions is the result of methods used by participating utility companies to reduce emissions of SF_6 gas, which include the following:

- Detect and repair equipment leaks
- Upgrade and replace old equipment with new equipment
- Train employees to carefully handle, manage, and monitor SF_6

- Track operations systematically, including managing cylinder usage and SF_6 gas-recycling carts usage (EPA 2007)

The Proponent has integrated the aforementioned mitigation measures into their maintenance program. The Proponent has strict specifications on the purchasing of new circuit breakers, and only purchases SF_6 breakers that have been designed, manufactured, and tested to have zero SF_6 leaks. In addition, the Proponent ensures that each circuit breaker is routinely inspected in order to detect possible leaks. The Proponent also tracks the usage of SF_6 gas as a further precaution to identify possible leaks. Once leaks are identified, systematic processes are followed regarding the repair or replacement of leaky equipment, depending on the severity of the leak.

2.7.3.1 Shipping and Handling Guidelines for Sulfur Hexafluoride (SF_6)

In accordance with this commitment to reduce SF_6 gas, the Proponent is required to do the following (Rocky Mountain Power 2009):

1. Report (quarterly and annually) to the EPA and PacifiCorp management on the following items:
   a. Quantity of existing and newly installed SF_6
   b. List of and locations of leaking equipment
   c. SF_6 gas usage (maintenance) due to leaking equipment
2. Properly ship, label, and track SF_6 gas, which includes:
   a. Proper shipping name (hazardous material name, hazard class, identification number)
   b. Proper labeling (internal racking number, non-flammable label)
   c. Strict adherence to the proper shipping and labeling guidelines
3. Notify authority if SF_6 gas is discovered in any other specification cylinder
4. Properly transport SF_6 gas, which includes:
   a. Upright or horizontal position in boxes or crates
   b. Placards placed on four sides of transport vehicle
5. Remove SF_6 cylinders that are not currently in service and do not have an assigned identification number
6. Account for all unused SF_6 gas by weighing all cylinders returned to Logistics for credit to facilities work orders.
7. Maintain minimal, but reasonable inventory levels, at each location to reduce unnecessary use or releases.

Currently, there are no viable alternatives to replace the use of SF_6 in high-voltage transmission systems (Rocky Mountain Power 2008). In the past, mineral oil and vacuum systems have been used as an insulating medium. However, these alternatives are only reliable in lower voltage systems (e.g., 12.5kV or 50kV) and are not viable alternatives for this Project. In addition, oil-insulated systems are no longer available and are slowly being replaced, due to their potential environmental consequences when spills or accidents occur (Rocky Mountain Power 2008).

2.8 Construction Specifications

This section describes the typical construction specifications for the Project, including construction seasons, the right-of-way acquisition process, major construction activities, and the operation, maintenance, and decommissioning of the Project facilities. These specifications could be refined during detailed engineering, and changes would be reflected in the final POD for the Project as necessary.

However, any refinements reflected in the POD would not change the outcomes of the impact analysis contained in this document.

The design, construction, operation, and maintenance of the Project would meet or exceed the requirements of the NESC, U.S. Department of Labor, OSHA Standards, and the Proponent's requirements for safety and protection of landowners and their property. Typical design characteristics of the transmission lines and substations are summarized above in Section 2.7.

2.8.1 Construction Seasons

Construction would take place year-round. The cost and sometimes the quality of construction can be affected by the construction season. While construction during the summer season may be preferred, there are issues that may require winter construction. Weather conditions typically prohibit high elevation construction during winter months. Project schedule, financing, design, and/or material delivery may not fit within the summer season; outages associated with interconnecting facilities cannot necessarily be taken at times which are convenient for construction (e.g., outages must be coordinated with peak demand periods, outages scheduled for other projects). Environmental issues and soil conditions may also dictate construction of portions of the line during certain times of the year, and seasonal restrictions on construction activities may be implemented in certain areas to mitigate impacts on wildlife. The potential seasonal restrictions vary by species and are described in Table 2-4. Avoidance buffers and seasonal restrictions for nesting raptors are in accordance with the *Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances* (USFWS 1999). Biological surveys would be conducted for greater sage-grouse leks and raptor nests prior to the initiation of construction activities. Data obtained through these surveys would be utilized to determine the specific geographic locations where buffers and seasonal restrictions would be implemented.

TABLE 2-4
CONSTRUCTION SEASON RESTRICTIONS

Common Name	Scientific Name	Buffer (mile)/Habitat	Seasonal Restriction
Big Game			
Rocky Mountain elk	*Cervus canadensis*	Winter range	December 1 to April 30
Mule deer	*Odocoileus hemionus*	Winter range Summer/fall range	December 1 to April 30 May 1 to June 30
Small Game			
Greater sage-grouse	*Centrocercus urophasianus*	All areas within 0.5 mile of an occupied lek	No surface occupancy (NSO)
		All areas within 0.5 mile of an occupied lek	No construction and maintenance activities from March 1 to May 15
		All sage grouse habitat within 2 miles of an occupied lek	No construction and maintenance activities from March 1 to July 15
Greater sage-grouse		All sage-grouse nesting and early brooding-rearing habitat within 4 miles of an occupied lek	No construction and maintenance activities from March 1 to July 15
		Winter concentration areas	No construction and maintenance activities from December 1 to March 1

TABLE 2-4
CONSTRUCTION SEASON RESTRICTIONS

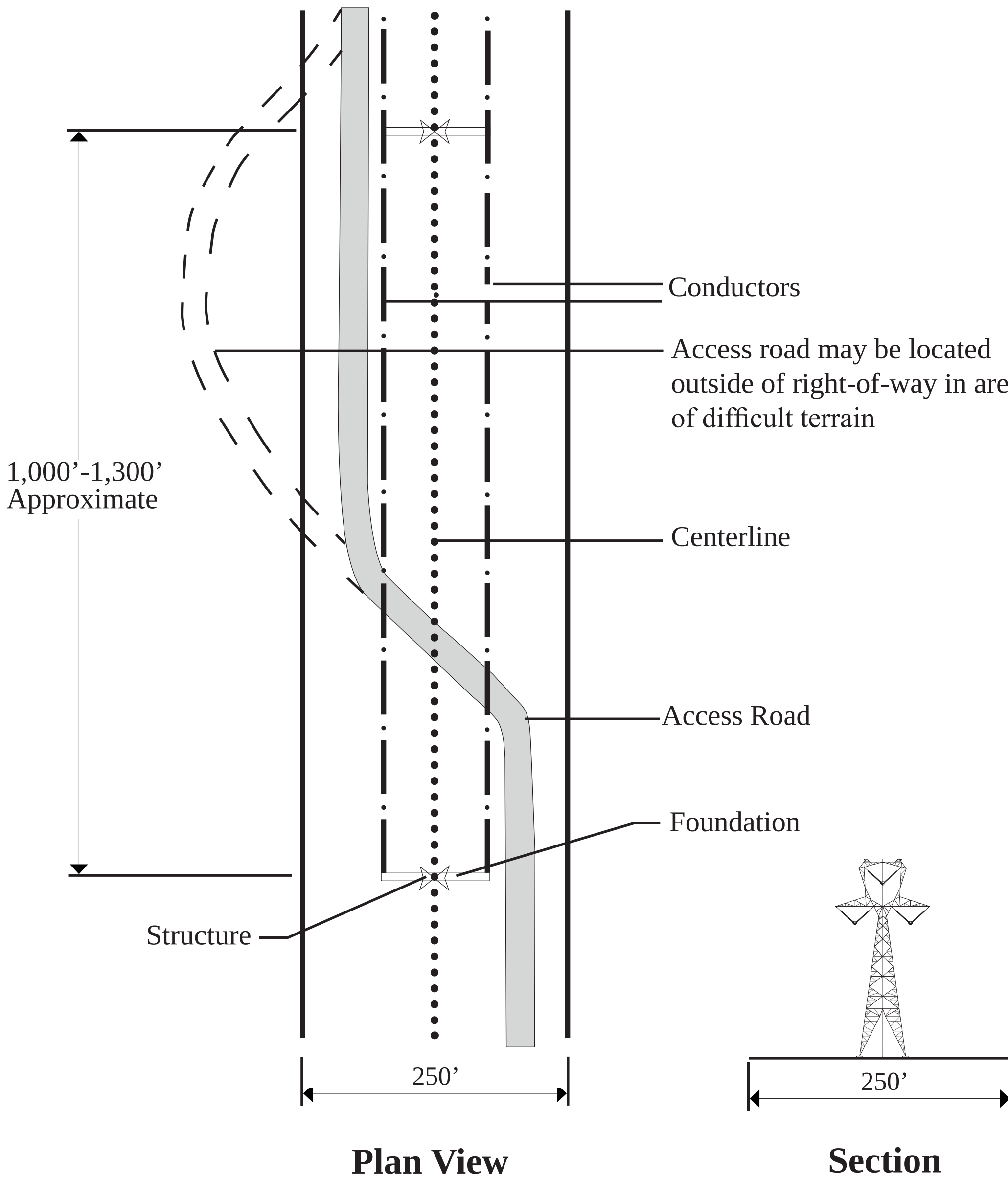
Common Name	Scientific Name	Buffer (mile)/Habitat	Seasonal Restriction
Raptors			
Golden eagle	*Aquila chrysaetos*	0.5	January 1 to August 31
Northern harrier	*Circus cyaneus*	0.5	April 1 to August 15
Cooper's hawk	*Accipiter cooperii*	0.5	March 15 to August 31
Ferruginous hawk	*Buteo regalis*	0.5	March 1 to August 1
Red-tailed hawk	*Buteo jamaicensis*	0.5	March 15 to August 15
Sharp-shinned hawk	*Accipiter striatus*	0.5	March 15 to August 31
Swainson's hawk	*Buteo swainsoni*	0.5	March 1 to August 31
Turkey vulture	*Cathartes aura*	0.5	May 1 to August 15
Peregrine falcon	*Falco peregrinus*	1.0	February 1 to August 31
Prairie falcon	*Falco mexicanus*	0.25	April 1 to August 31
Osprey	*Pandion haliaetus*	0.5	April 1 to August 31
Burrowing owl	*Athene cunicularia*	0.25	March 1 to August 31
Great horned owl	*Bubo virginianus*	0.25	December 1 to September 31
Long-eared owl	*Asio otus*	0.25	February 1 to August 15
Northern saw-whet owl	*Aegolius acadicus*	0.25	March 15 to August 31
Short-eared owl	*Asio flammeus*	0.25	March 1 to August 1
Northern pygmy owl	*Glaucidium californicum*	0.25	April 1 to August 15
Western screech owl	*Megascops kennicottii*	0.25	March 1 to August 15

2.8.2 Right-of-Way Acquisition Process

New permanent and temporary land rights are required for the transmission line facilities, such as the transmission line corridor, access roads, and temporary work sites (e.g., right-of-way grant, easements, license agreement, and fee simple) (Figure 2-14). Where the proposed transmission line would parallel an existing 46kV and 138kV transmission line, the right-of-way would be adjacent to or overlap the existing right-of-way. The right-of-way width must be sufficient to accommodate "conductor blowout" due to wind (which is the swinging of the conductor midway between tower structures) and maintenance clearances at the tower sites.

The Proponent filed a preliminary right-of-way application with the BLM in January 2007 for a major right-of-way duration of 50 years. A major right-of-way for a width of 250 feet for the 500kV transmission line and 150 feet for the 345kV line has been requested. Once a ROD has been issued, the application would be finalized with Project design details.

Additional right-of-way may be required in areas where the proposed transmission lines would turn at a sharp angle. Access roads may be located outside of the transmission line right-of-way in areas of difficult terrain. Access roads would be identified in the POD and approved by the BLM before construction and the Notice to Proceed. Also, areas used temporarily (e.g., roads, staging areas, batch plants) may require temporary use permits. The BLM receives right-of-way rental payments for those portions of the transmission lines located on federal lands.



NOTE: Dimensions are approximate
and drawings are not to scale.

Typical Right-of-Way Diagram
Figure 2-14

2.8.3 Construction Activities

Preconstruction conferences with each of the affected agencies would be conducted in order to introduce the contractors and their field representatives, discuss mitigation measures and schedules, and introduce each agency's point of contact prior to commencement of construction. As construction proceeds, the construction engineer or inspector would continue to monitor activities and right-of-way authorizations to ensure compliance or to initiate modifications, where necessary. In environmentally sensitive areas, an environmental specialist with appropriate qualifications (i.e., biologist, archaeologist) would monitor construction activities to ensure compliance with specific protections and/or mitigation, as required. Any modifications to the POD would be approved by the BLM before being undertaken. The protocol for variances would be described in the POD. Following completion of the construction, the line would be mapped as built, and separate packages would be submitted to each of the various agencies to close the construction process. Post-construction meetings with each of the agencies may be necessary to review the construction process.

Construction of the transmission lines is described in the following section according to the sequence of activities as listed below:

- Geotechnical investigations
- Surveying the centerline
- Access roads
- Tower/site clearing
- Foundation installation
- Tower assembly and erection
- Equipment staging
- Conductor installation
- Ground rod installation
- Cleaning up and reclaiming affected land areas

The Proponent has committed to undertake certain mitigation measures associated with the construction, operation, maintenance, and decommissioning of the Project, in order to protect the environment. Two types of mitigation measures would be developed during the NEPA process and would be included as conditions in the decision document approving the Project. These include standard mitigation and selective mitigation measures, as described below.

Standard mitigation measures, referred to in this document as BMPs, are those that apply to the Project as a whole. These measures typically address specific environmental policies and regulatory requirements. Where warranted, on a case-by-case basis, mitigation beyond these BMPs would be recommended to reduce potential impacts, often in specific impact locations. These are called selective mitigation measures. Tables 2-5 and 2-6 provide a preliminary list of standard mitigation measures/BMPs and selective mitigation measures identified to reduce impacts on environmental resources. These measures would be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources), and would be included in the POD.

The construction contractor(s) would adhere to the measures identified during the engineering/design phase, as well as those measures that address construction and reclamation activities. The Compliance Inspection Contractor (CIC) would be responsible for the oversight of the implementation of these measures to ensure that the Proponent and the construction contractor(s) meet the 'intent' of the mitigation measures (identified below).

Table 2-5
STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

		Mitigation Application Phase		
	Mitigation Measure	**Design & Engineering**	**Construction**	**Operation & Maintenance**
1.	All construction vehicle movement outside the right-of-way would be restricted to pre-designated access, contractor acquired access, or public roads.		●	●
2.	The spatial limits of construction activities would be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc.		●	
3.	In construction areas where re-contouring is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for re-sprouting in accordance with the Reclamation Plan. Vegetation that is not consistent with line safety and operation would be removed according to PacifiCorp Vegetation Management Standards.	●	●	
4.	In construction areas (e.g., marshalling yards, tower site work areas, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface reclamation would occur as required by the landowner or land management agency. The method of reclamation would normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. All areas on BLM lands that are disturbed as a part of the construction and/or maintenance of the proposed power line would be drill seeded where practicable with a seed mixture appropriate for those areas unless an alternative method (e.g., broadcast seeding) is required due to slope or terrain. The BLM would prescribe a seed mixture that fits each range site. Drill seeding would be done in September or October to maximize the chance of success. The BLM may recommend broadcast seeding as an alternative method in some cases. In these cases,		●	

Table 2-5
STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

	Mitigation Measure	Mitigation Application Phase: Design & Engineering	Construction	Operation & Maintenance
	seed would be applied at 1.5 to 2 times the rate when broadcasted and the seed would be covered by a method such as harrowing or raking. A Reclamation, Revegetation and Monitoring Framework Plan identifying reclamation stipulations has been developed and incorporated in the Final Plan of Development (POD), which will be approved by the BLM prior to the issuance of a right-of-way grant.			
5.	Towers and/or conductors and/or shield wires would be marked with high-visibility devices (i.e., marker balls or other marking devices) where required by governmental agencies with jurisdiction (i.e., Federal Aviation Administration [FAA]). Tower heights would be less than 200 feet to avoid the need for aircraft obstruction lighting.	●	●	●
6.	On agricultural land, the right-of-way would be aligned, insofar as is practical, to reduce the impact to farm operations and agricultural production.	●		
7.	Prior to construction, the Compliance Inspection Contractor (CIC) would instruct all personnel on the protection of cultural, ecological, and other natural resources including: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources; and (c) the purpose and necessity of protecting them.		●	
8.	In consultation with appropriate land-management agencies and state historic preservation officers and in accordance with the Programmatic Agreement (PA), specific mitigation measures for cultural resources would be developed and implemented to mitigate any identified adverse impacts. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.	●	●	

Table 2-5
STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

	Mitigation Measure	Design & Engineering	Construction	Operation & Maintenance
9.	Special status species or other species of particular concern would be considered in accordance with management policies set forth by appropriate land management agencies (e.g. BLM, UDWR, etc.). This would entail conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (e.g., access and spur roads, staging areas, etc.) as agreed upon by the agencies. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and may include altering the placement of roads or towers, where practical as approved by the landowner and CIC, and monitoring activities.	●	●	
10.	The Proponent would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures where possible. The transmission lines would be patrolled by air or inspected on the ground on a periodic basis, in compliance with company standards, so that damaged insulators or other line materials that could cause interference are repaired or replaced.			●
11.	The Proponent would continue to follow studies performed on electromagnetic fields (EMF) research. The Proponent relies on the findings of public health specialists and international scientific organizations for guidelines regarding EMF.			●
12.	Transmission line materials that have been designed and tested to minimize corona would be used. A bundle configuration and larger conductors would be used to limit the audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking. Caution shall be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.	●	●	

Table 2-5 STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
		Mitigation Application Phase		
Mitigation Measure		**Design & Engineering**	**Construction**	**Operation & Maintenance**
13.	The Proponent would apply grounding or other methods where possible to eliminate problems of induced currents and voltages onto conductive objects sharing the same right-of-way, to meet the appropriate codes.	●		●
14.	All requirements of those entities having jurisdiction over air quality matters would be adhered to. Any necessary dust control plans would be developed, and permits for construction activities would be obtained. Open burning of construction trash would not be allowed, unless permitted by appropriate authorities.		●	
15.	Fences, gates, and walls would be replaced, repaired, or reclaimed to their original condition as required by the landowner or the land-management agency in the event that they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures would be installed only with the permission of the landowner or the land-management agency and would be removed/reclaimed following construction. Cattle guards would be installed where new permanent access roads cut through fences on BLM-administered lands.		●	●
16.	During construction of the transmission lines, the right-of-way would be free of non-biodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.		●	●
17.	Hazardous material shall not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials.		●	●
18.	Dull-galvanized steel for lattice towers and either dull-galvanized steel or self-weathering steel for monopoles, along with non-specular conductors would be used to reduce visual impacts.	●	●	●

Table 2-5
STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

		Mitigation Application Phase		
	Mitigation Measure	**Design & Engineering**	**Construction**	**Operation & Maintenance**
19.	Refueling and storing potentially hazardous materials shall not occur within a 100-foot radius of a waterbody, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water supply wells. Spill preventative and containment measures or practices would be incorporated as needed.		●	
20.	In cultivated agricultural areas, soil compacted by construction activities would be de-compacted. Construction activities would occur as practical to minimize impacts on agricultural operations.		●	
21.	The Proponent designs and constructs all new or rebuilt transmission facilities to its raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines; The State of the Art in 2006* (Edison Electric Institute and Avian Power Line Interaction Committee 2006); PacifiCorp's Bird Management Program Guidelines, updated June 2006; and PacifiCorp's substation guidelines. New substations or modified portions of existing substations must incorporate animal protections in accordance with PacifiCorp standards.	●	●	
22.	To eliminate the spread of noxious/invasive weeds throughout the BLM field office area, a Noxious Weed Management Plan has been developed and incorporated into the final POD, which will be approved by the BLM prior to the issuance of a right-of-way grant.		●	●
23.	A Fire Protection Plan has been developed and incorporated into the POD, which will be approved by the BLM prior to the issuance of a right-of-way grant. The holder or its contractors would notify the BLM of any fires and comply with all rules and regulations administered by the BLM concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The holder or its contractors may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety would be the first priority of the holder or its contractors.		●	●

Table 2-5 STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES			
	Mitigation Application Phase		
Mitigation Measure	**Design & Engineering**	**Construction**	**Operation & Maintenance**
The holder or its contractors would: ■ Operate all other internal and external combustion engines (including off-highway vehicles, chainsaws, generators, heavy equipment, etc.) with a qualified spark arrester. Qualified spark arresters will be in a maintained and non-modified condition and meet U.S. Department of Agriculture (USDA) Forest Service Standard 5100-1a, or the Society of Automotive Engineers (SAE) Recommended Practices J335 or J350. Refer to 43 CFR §8343.1. ■ Carry shovels, water, and fire extinguishers on all equipment and vehicles. Equipment will carry extinguishers rated ABC-10 pound minimum and vehicles will carry ABC-2.5 pound minimum. If a fire spreads beyond the suppression capability of workers with these tools, all will cease fire suppression action and leave the area immediately via pre-identified escape routes. ■ Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable to exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area. ■ Notify the Northern Utah Interagency Fire Center (801) 908-1901 (or 911) immediately of the location and status of any escaped fire. ■ Prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means, weather forecasts and potential fire danger will be reviewed. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration for additional mitigation or discontinuing the operation must be given in periods of extreme wind and dryness. ■ Operate all vehicles on designated roads, or park in areas where vegetation is less than 8			

Table 2-5 **STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES**				
		Mitigation Application Phase		
	Mitigation Measure	**Design & Engineering**	**Construction**	**Operation & Maintenance**
	inches tall. Vehicles, including the undercarriages, will be thoroughly washed prior to entering the site. ■ Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spark shield adequate for the sparks may be used to prevent sparks from carrying. A spotter equipped with a round-nose shovel and an ABC-rated 20 pound fire extinguisher is required to watch for ignitions during and one hour after the activity. Water may be used to wet down surrounding vegetation but does not take the place of an adequate cleared area and spark shield.			
24.	Where work would occur on Superfund sites listed in the National Priorities List (NPL), the Proponent must seek approval from the Environmental Protection Agency (EPA). Work on contaminated sites must avoid remedial structures (i.e., capped areas, treatment, or monitoring wells, etc.) and workers must use adequate worker protection measures for working in contaminated areas.	●	●	
25.	In newly disturbed temporary work areas, the soil would be salvaged and would be distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface would be left rough to help reduce potential wind erosion.		●	
26.	Grading would be minimized by driving overland within pre-designated work areas whenever possible.		●	
27.	Avoid activities during the migratory bird nesting season, typically between April 15 and July 15 however, dates may vary depending upon the species and current environmental conditions based on results of survey and biological monitor clearance. *Responsibilities of Federal Agencies to Protect Migratory Birds.* (Migratory Bird Executive Order 13186, January 10, 2001)	●	●	

Table 2-5
STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

		Mitigation Application Phase		
	Mitigation Measure	**Design & Engineering**	**Construction**	**Operation & Maintenance**
28.	When nesting bird surveys are required, focus on BLM Sensitive Species, and the 2002 U.S. Fish and Wildlife Services list of Birds of Cosnervation Concern/Partners in Flight (BCC/PIF) list. Available for downloading at the web address below. http://www.fws.gov/ migratorybirds/reports/BCC2002.pdf; R*esponsibibities of Federal Agencies to Protect Migratory Birds.* (Migratory Bird Executive Order 13186, January 10, 2001)	●	●	●
29.	Based on the results of pre-construction surveys, federal and state designated sensitive plants and/or habitat would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design.	●	●	
30.	The transmission line would be regularly patrolled and properly maintained in compliance with applicable safety codes.			●

2.8.3.1 Geotechnical Investigation

The purpose of the geotechnical investigation is to collect information regarding subsurface stability, which would be used in the final design of each transmission tower structure and foundation. This necessary activity helps to ensure the system is designed and constructed to be safe, reliable, cost efficient, and can reduce the overall environmental disturbance during initial build and over the life of the project. The geotechnical investigation would consist of the drilling and sampling of soils to a typical depth of 40-50 feet below the existing ground; however, borehole depth may exceed 50 feet depending on soil conditions. The boreholes would have a diameter of approximately 8 inches and would be backfilled with auger cuttings and on-site soils. No new road construction or blading would be required. Surface disturbance would be limited to the actual tracks left by the drill rig and support vehicles within the work areas and overland access routes.

Helicopter-transported drill rigs may be used for geotechnical exploration in areas where existing roads do not provide adequate access or where overland travel is expressly prohibited. Geophysical exploration techniques may be employed in areas where drilling is impractical to assist in subsurface characterization. Geophysical exploration techniques use instrumentation combined with surficial actuation to identify subsurface soil and rock stratification.

A separate *Application for Transportation and Utility Systems and Facilities on Federal Land (Standard Form 299)* was submitted by the Proponent to the BLM in December 2008 to conduct the geotechnical investigations for the Project. The BLM reviewed and processed the application in accordance with all applicable federal laws and regulations.

A temporary use permit to conduct geotechnical investigations was granted on August 11, 2009, by the BLM. Boreholes were tested for geotechnical data using three conventional drilling methods. The three conventional drilling methods included mud rotary, auger, and air rotary ODEX. The geotechnical investigation concluded on October 2, 2009. Additional geotechnical drilling may be required as part of the final engineering design.

2.8.3.2 Surveying the Centerline

The engineering survey would involve verifying and staking the centerline of the transmission line route, tower center hubs, right-of-way boundaries, access roads (where needed), spur roads to tower sites, and temporary work areas. Some engineering survey activities may begin as early as 2 years prior to the start of construction. Required cultural, paleontological, botanical, and biological resource surveys may begin once certain survey information is available. Depending on the route approved in the ROD, the centerline may be adjusted to accommodate engineering requirements and local modifications.

2.8.3.3 Access Roads

Roads enable access to the right-of-way and tower sites for both construction and long-term maintenance of the transmission lines. Access roads must be sufficient to bear the weight and endure heavy construction vehicle use. All roads would be upgraded or constructed in accordance with the Proponent's published standards for road construction, or according to the BLM's requirements for road construction (BLM 1985), as outlined in the POD. However, existing paved and unpaved highways and roads would be used, where possible, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line right-of-way.

Private landowners and affected agencies or land users would be consulted before road construction begins. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the general locations of access roads, would be documented in the POD. These plans would incorporate the relevant criteria of the affected agencies and landowners.

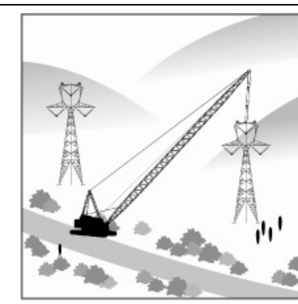
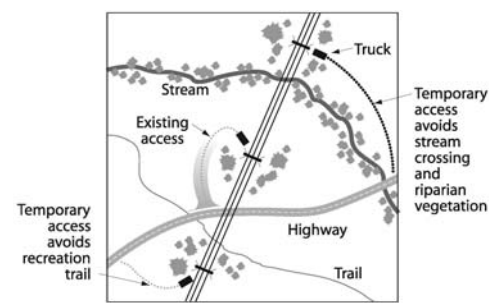
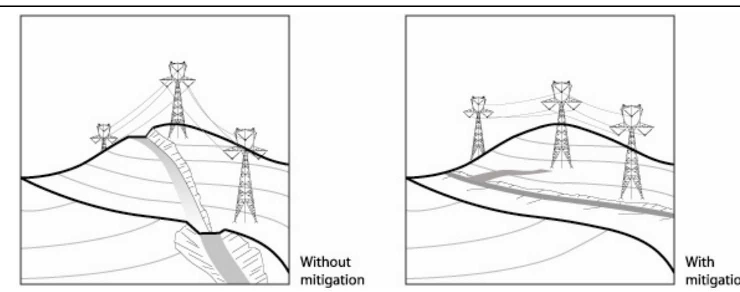
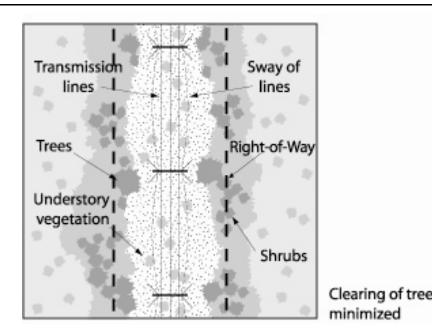
Where the proposed transmission lines would parallel existing transmission lines or other linear utilities, the access roads along the existing utilities would be used where possible to minimize the amount of new road construction. However, these roads could require upgrading. All existing roads would be left in a condition equal to or better than their condition prior to construction, in accordance with BLM road standards. Where existing roads are to be used, only spur roads to tower sites may be needed.

In some areas, only temporary roads would be needed. Typically, these temporary roads would be graded to a travel-surface width of approximately 14 feet minimum (up to 27 feet maximum, depending on slope), depending on site specific conditions and as specified in the POD. Turnout areas and curves in the road would require a wider surface. Normally, a ditch drainage system would not be constructed for temporary roads. Temporary roads would be reclaimed after construction and would be identified in the final BLM-approved POD.

In some locations, helicopters may be used for construction (tower placement) in areas where there are environmental constraints, terrain restrictions, or in areas where it is economically practical.

Permanent access roads would be constructed where needed for construction or long-term maintenance, or where landowners or land-managing agencies require. Permanent roads would be graded to a travel-surface width of approximately 14 feet minimum (up to 27 feet maximum, depending on slope), except

TABLE 2-6
SELECTIVE MITIGATION MEASURES

MITIGATION MEASURE	MITIGATION EXAMPLES	MITIGATION APPLICATION PHASE: Design & Engineering	Construction	Operation & Maintenance	MITIGATION EFFECTIVENESS: WATER RESOURCES: Streams/Washes	Wetlands/Springs	EARTH RESOURCES: Geology/Soils	Paleontology	BIOLOGICAL RESOURCES: Sensitive Wildlife Species	Sensitive Plant species	LAND USE	VISUAL RESOURCES	CULTURAL RESOURCES
1. In areas determined by the land management agency, where soils and vegetation are particularly sensitive to disturbance, existing access roads/trails would not be widened or otherwise upgraded for construction and maintenance, except in areas where repairs are necessary to make existing roads/trails passable.		●			●	●	●			●	●	●	●
					Avoiding unnecessary access road upgrades would limit the amount of habitat disturbed or removed. In addition, the avoidance of road upgrades would not allow for vehicular traffic to increase significantly, thereby reducing the potential for indirect effects such as damage or loss of vegetation, harassment of wildlife, vandalism of cultural resources, and disturbance to sensitive land uses (e.g., parks, preservation, recreation areas).								
2. To avoid disturbance to sensitive resources (i.e., streams, riparian areas, trails, etc.) as determined by the land managing agency, access roads would not be constructed in those areas where practicable. Rather, construction and maintenance traffic would use existing roads or cross-country access routes (including the right-of-way). To minimize ground disturbance, construction traffic routes must be clearly marked with temporary markers such as easily visible flagging. The construction routes or other means of avoidance would be negotiated with landowners and land managing agency in advance of use.		●	●		●	●	●		●	●		●	
					Mitigation 2 is effective for the same reasons as Mitigation 1. Minimizing ground-disturbing construction activities in the same vicinity as streams or riparian areas would limit disturbance to streambeds, therefore avoiding turbidity and sedimentation. In addition, it would limit land use conflicts and/or disruption of sensitive views from trails.								
3. To minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, the alignment of any new access roads or cross-country routes in designated areas would follow the landform contours where practicable, providing that such alignment does not impact other resource values.		●					●			●		●	
					Following the existing land contours and terrain, particularly in steep terrain, minimizes the cutting and filling of slopes, and ensures that the form and line of the landscape is not visually interrupted. This results in reducing visual contrast between the exposed ground of the road and the surrounding environment. Also, water runoff is less likely to accelerate soil erosion (minimizing potential damage from rutting, rilling), which in turn protects adjacent vegetation.								
4. To minimize disturbance to timber resources and reduce visual contrast, clearing of trees in and adjacent to the right-of-way would be minimized to the extent practicable to satisfy conductor-clearance requirements (i.e., North American Electric Reliability Corporation/Department of Energy guidelines). Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. Trees would be selectively removed in riparian habitats and in the Great Basin Desert to protect biological resources.			●							●	●	●	
					Selectively removing vegetation (i.e., trees) within and along the edges of the right-of-way reduces disruption of habitat, minimizes removal of timber resources, and reduces the visual contrast between the right-of-way and the surrounding environment. Furthermore, "feathering" the edges of the right-of-way instead of cutting trees and vegetation in a straight line results in a more gradual modification to the environment.								

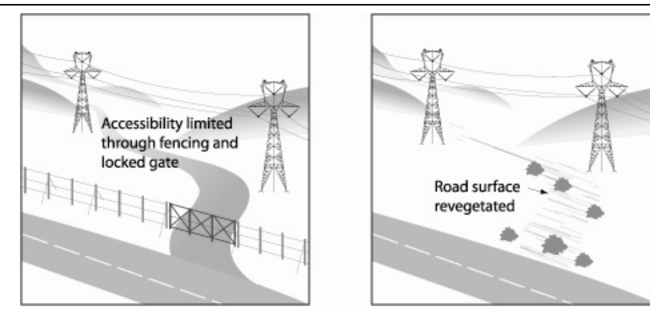
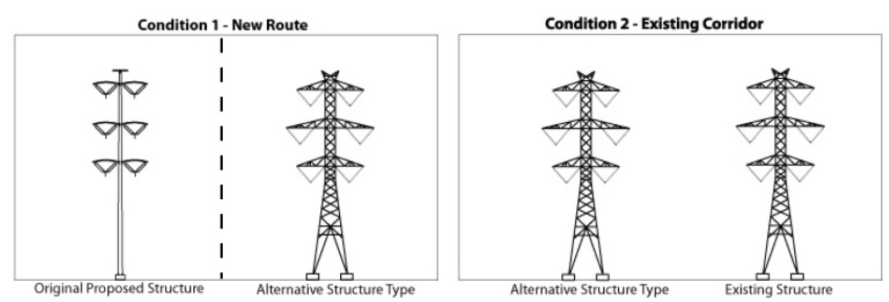
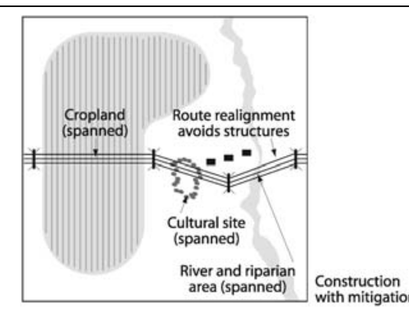
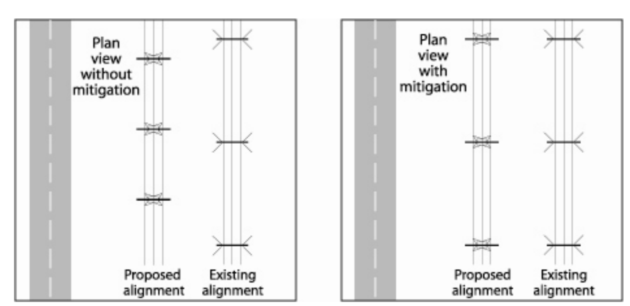
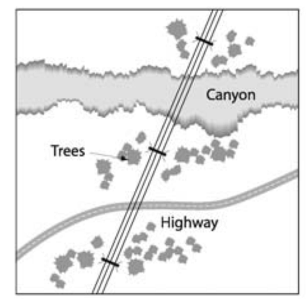
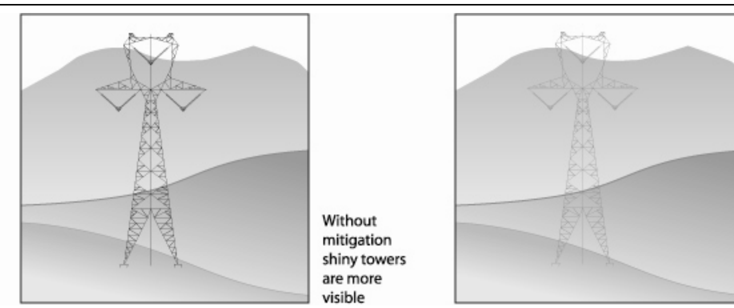
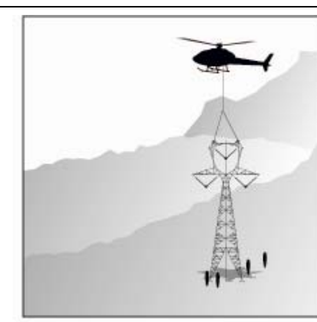
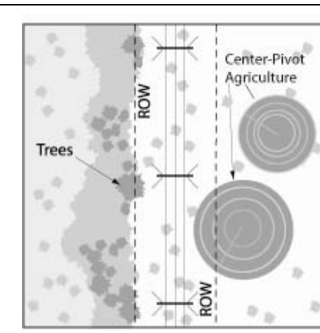
<table>
<tr><th colspan="14">TABLE 2-6
SELECTIVE MITIGATION MEASURES</th></tr>
<tr><th rowspan="3">MITIGATION MEASURE</th><th rowspan="3">MITIGATION EXAMPLES</th><th colspan="3">MITIGATION APPLICATION PHASE</th><th colspan="9">MITIGATION EFFECTIVENESS</th></tr>
<tr><th rowspan="2">Design & Engineering</th><th rowspan="2">Construction</th><th rowspan="2">Operation & Maintenance</th><th colspan="2">WATER RESOURCES</th><th colspan="2">EARTH RESOURCES</th><th colspan="2">BIOLOGICAL RESOURCES</th><th rowspan="2">LAND USE</th><th rowspan="2">VISUAL RESOURCES</th><th rowspan="2">CULTURAL RESOURCES</th></tr>
<tr><th>Streams/Washes</th><th>Wetlands/Springs</th><th>Geology/Soils</th><th>Paleontology</th><th>Sensitive Wildlife Species</th><th>Sensitive Plant species</th></tr>
<tr><td rowspan="2">5. To limit new or improved accessibility into the area, all access that is not required for maintenance would be closed using the most effective and least environmentally damaging methods appropriate to that area and developed with the landowner or land manager. Methods for road closure or management include installing and locking gates, obstructing the path (e.g., earthen berms, boulders), revegetating the surface of the roadbed to make it less apparent, or restoring the road to its natural contour and vegetation. As feasible, the selection of the most appropriate of these methods will be done in consultation with the landowner or land manager.</td><td rowspan="2">
</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">●</td><td></td><td></td><td></td><td></td><td>●</td><td>●</td><td>●</td><td></td><td></td></tr>
<tr><td colspan="9">Closing access roads where they are not needed after construction protects the resources in that area from further disturbance for the reasons as described in Mitigation 1.</td></tr>
<tr><td rowspan="2">6. To minimize visual contrast, the tower design may be modified or an alternative tower type may be used.</td><td rowspan="2">
</td><td rowspan="2">●</td><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>●</td><td></td></tr>
<tr><td colspan="9">Flexibility in designing the tower or use of different tower types would allow tower structures to be more adapted to specific site situations (i.e., Condition 1 – New Route, Condition 2 – Existing Corridor). For example, in areas where there are sensitive views and an existing corridor, the proposed line would parallel an existing line and match the type of tower used along the existing line and therefore minimize visual contrast.</td></tr>
<tr><td rowspan="2">7. Within the limits of standard tower design, structures would be located as to allow conductors to clearly span identified sensitive features. Structures and access roads would be placed so as to avoid sensitive features including, but not limited to, wetlands, riparian areas, water courses, hazardous substance remediation and cultural sites. Avoidance measures may include selective tower placement, spanning sensitive features, or realigning access routes.</td><td rowspan="2">
</td><td rowspan="2">●</td><td rowspan="2"></td><td rowspan="2"></td><td>●</td><td>●</td><td></td><td></td><td>●</td><td>●</td><td>●</td><td></td><td>●</td></tr>
<tr><td colspan="9">Flexibility in the placement of towers allows for sensitive features to be avoided. Realigning the towers along a route or realigning the route can result in avoiding or minimizing direct impacts on resources such as cultural and biological resources, and land uses such as agriculture, parks, preservation, hazardous substance remediation and recreation areas.</td></tr>
<tr><td rowspan="2">8. To reduce visual contrast and/or potential operational conflicts, standard tower design would be modified to correspond with spacing of existing transmission line structures of the same voltage where feasible and within limits of standard tower design. The normal span would be modified to correspond with existing towers, but not necessarily at every location.</td><td rowspan="2">
</td><td rowspan="2">●</td><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td>●</td><td>●</td><td></td></tr>
<tr><td colspan="9">Matching tower spacing with existing parallel lines reduces the visual space occupied by the towers and minimizes the amount of contrast between the man-made structures and the landscape.</td></tr>
</table>

TABLE 2-6
SELECTIVE MITIGATION MEASURES

MITIGATION MEASURE	MITIGATION EXAMPLES	MITIGATION APPLICATION PHASE: Design & Engineering	Construction	Operation & Maintenance	MITIGATION EFFECTIVENESS: WATER RESOURCES: Streams/Washes	WATER RESOURCES: Wetlands/Springs	EARTH RESOURCES: Geology/Soils	EARTH RESOURCES: Paleontology	BIOLOGICAL RESOURCES: Sensitive Wildlife Species	BIOLOGICAL RESOURCES: Sensitive Plant species	LAND USE	VISUAL RESOURCES	CULTURAL RESOURCES
9. To reduce visual impacts, potential impacts on recreation values, and safety at highways and trail crossings, towers are to be placed at the maximum feasible distance from the crossing within limits of standard tower design.	 Towers placed maximum distance from canyon and highway crossings	●									●	●	
					Placing towers at a maximum distance from major or sensitive crossings (i.e., roads and trails) would reduce visual impacts and potential safety hazards (i.e., vehicle collision with tower).								
10. Dulled galvanized steel finish on lattice towers and dulled galvanized or self-weathering steel on monopoles, and non-specular conductors, would be used to reduce visual impacts. Note: The Project Proponent has committed this selective mitigation measure to a standard mitigation/best management practice across the entire project (see Table 5-1, Standard Mitigation Measures/Best Management Practices, #18).	 Without mitigation shiny towers are more visible With mitigation dulled towers blend into background	●										●	
					Use of specially treated or coated tower components to dull the surfaces of the towers decreases reflection, minimizes the contrast of the transmission line in the landscape, and reduces impacts on views.								
11. Helicopter placement of towers during construction and helicopter patrol and maintenance may be used where practicable to reduce surface impacts in environmental constraint areas or steep terrain locations.			●				●	●	●	●	●	●	●
					Using helicopters to place towers in steep terrain or otherwise sensitive areas reduces land use and natural resource impacts as a result of construction activities. The decrease of ground disturbances would reduce the loss of vegetation, accelerated soil erosion, potential damage to cultural resources, and visual impacts.								
12. To reduce visual contrast and avoid sensitive features (including, but not limited to, land uses, biological resources, and cultural sites), clearing of the right-of-way would be minimized. In limited instances, the right-of-way width may be modified (within the limits of conductor-clearance requirements and standard tower design) to protect sensitive resources, but current land uses would be allowed to continue unabated, provided the use meets applicable standards.	 Right-of-way may be modified to avoid sensitive uses and reduce vegetation clearing	●	●						●	●	●	●	
					Limiting the width of the area cleared in the right-of-way reduces the amount of vegetation (i.e., trees) removed at the edges of and within the right-of-way, minimizing the loss of habitat and reducing visual contrast between the cleared areas and the surrounding environment. In limited circumstances, the width of the right-of way may be reduced to accommodate a land use (i.e., residential).								

<table>
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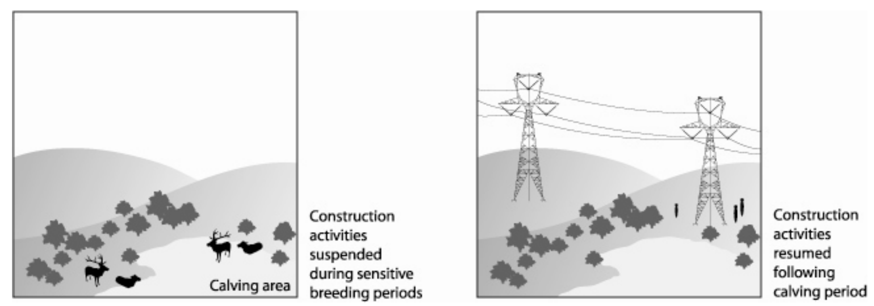
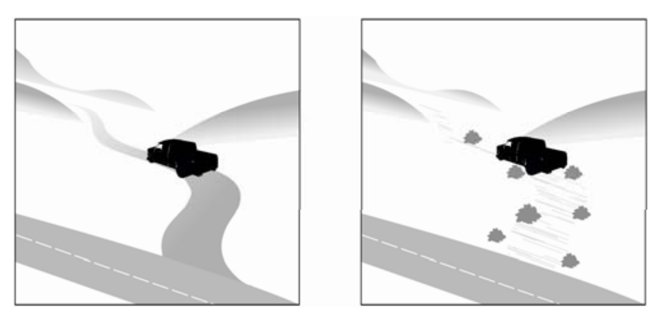
<tr><td rowspan="2">13. Construction and maintenance activities would be restricted in designated areas after receiving clearance from a biological monitor to minimize disturbance of wildlife during sensitive periods as follows:
▪ No construction or maintenance activities on mule deer and elk winter ranges from December 1 to April 30
▪ No construction or maintenance activities on mule deer summer/fall ranges from May 1 to June 30
▪ Spatial buffers and seasonal restrictions for nesting raptors in accordance with U.S. Fish and Wildlife Service – Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances (construction restrictions range from December 1 to September 30, depending on the species)
Sage Grouse
▪ No surface occupancy within 0.5 mile of an occupied greater sage-grouse lek
▪ No construction or maintenance activities within 0.5 mile of an occupied greater sage-grouse lek from March 1 to May 15
▪ In all greater sage-grouse habitats, no construction and maintenance activities within 1 mile of an occupied lek from March 1 to July 15
▪ In greater sage-grouse nesting and early brood-rearing habitats, no construction and maintenance activities within 4 miles of an occupied lek from March 1 to July 15
▪ No construction and maintenance activities in greater sage-grouse winter concentration areas from December 1 to March 17</td><td rowspan="2">
</td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td></td><td></td><td></td><td></td><td>●</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="9">Restricting construction activities or maintenance during breeding or nesting periods eliminates potential disturbance of wildlife during these critical periods of their life cycles.</td></tr>
<tr><td rowspan="2">14. In areas where no grading would be needed to access work areas, the Construction Contractor would use overland access to the greatest extent possible. Overland access would consist of “drive and crush” and/or “clear and cut” travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted, but no surface soil is removed. Clear and cut is considered as brushing off (removal) of all vegetation in order to improve or provide suitable access for equipment. All vegetation is removed using above ground cutting methods that leave the root crown intact. Prior to work beginning, overland access routes would be staked to a minimum width of 14-feet-wide and as specified in the POD.</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td></td><td></td><td>●</td><td></td><td></td><td>●</td><td></td><td></td><td></td></tr>
<tr><td colspan="9">Overland access would avoid or minimize the removal of surface soil and vegetation, reducing the potential for erosion and loss of habitat. In addition, avoiding the construction of a new road would reduce the potential for increased traffic and the associated indirect effects described in Mitigation 1.</td></tr>
</table>

<table>
<tr><th colspan="14">TABLE 2-6
SELECTIVE MITIGATION MEASURES</th></tr>
<tr><th rowspan="3">MITIGATION MEASURE</th><th rowspan="3">MITIGATION EXAMPLES</th><th colspan="3">MITIGATION APPLICATION PHASE</th><th colspan="9">MITIGATION EFFECTIVENESS</th></tr>
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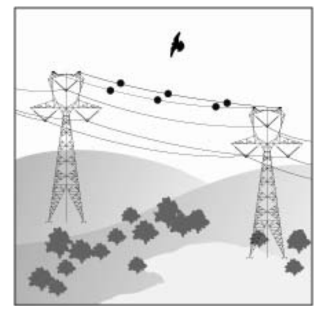
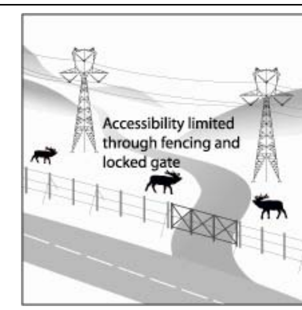
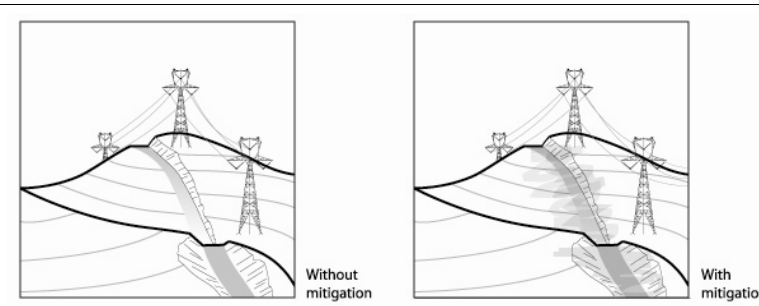
<tr><th>Streams/Washes</th><th>Wetlands/Springs</th><th>Geology/Soils</th><th>Paleontology</th><th>Sensitive Wildlife Species</th><th>Sensitive Plant species</th></tr>
<tr><td rowspan="2">15. Shield wires and fiber optic ground wire along portions of the transmission line that have a high potential for avian collisions would be marked with flight diverters or other BLM-approved devices per agency requirements. Portions of the transmission lines that cross through or are adjacent to waterfowl and shorebird habitats and general migratory pathways associated with the Great Salt Lake may be marked to reduce the risk of avian collisions. The specific segments to be marked would be determined in consultation with the appropriate agencies.</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td></td><td></td><td></td><td></td><td>●</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="9">Conductor markings on segments of the transmission lines that cross through or are adjacent to waterfowl and shorebird habitat would minimize the risk of avian collision.</td></tr>
<tr><td rowspan="2">16. Where feasible, access roads that traverse sensitive habitats (i.e., crucial winter range) would be gated or otherwise blocked to limit public access.</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td></td><td></td><td></td><td></td><td>●</td><td></td><td>●</td><td></td><td></td></tr>
<tr><td colspan="9">Mitigation 16 is effective for the same reasons as Mitigation 1. Limiting access to sensitive areas would reduce the potential for indirect effects associated with increased traffic.</td></tr>
<tr><td rowspan="2">17. In areas of steep terrain where grading is necessary, in rocky areas, or where soil color would create strong landscape contrasts, soil amendments, mineral emulsions, or asphalt emulsions (i.e., Permeon™ or approved equal) would be applied, or grading techniques such as slope rounding and slope scarification would be used to blend road and pad cuts into the landscape.</td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td rowspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>●</td><td></td></tr>
<tr><td colspan="9">Similar to Mitigation 3, the implementation of grading techniques (i.e., slope rounding and slope scarification) would reduce the visual contrast between exposed ground and the surrounding environment. The application of this mitigation would be determined in the field, during or after construction, by the CIC and BLM Authorized Officer.</td></tr>
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where turnout areas and curves or specifications of the land-management agency require a wider surface. Turnout areas would be approximately 100 feet long and 10 feet wide and would be located about every 1,000 feet along the road. Curves in the road would be up to 20 feet wide at sharp turns. The roads usually would follow the natural grade; the maximum slope would typically be 10 percent. Slopes up to 20 percent would only be used where unavoidable and for distances less than 1,000 feet. Typically, 1-foot wide ditches on either side or both sides of the road would serve as drainage. Vegetation, with the exception of low growing brush, would be cleared approximately 5 feet beyond the edge of the roadway. Additional clearing, up to 10 feet or more beyond the roadway may be necessary on steep slopes.

Overland access will occur in areas where no grading will be needed and will be used to the greatest extent possible. Overland travel will consist of “drive and crush” and/or “clear and cut” travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted but no surface soil is removed. Clear and cut is the removal of all vegetation in order to improve or provide suitable access for equipment. All vegetation is removed using above ground cutting methods that leave the root crown intact. Soil is compacted but no surface soil is removed.

In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land-management agency. Methods for road closure or management may include installing locking gates or obstructing the path with earthen berms or boulders. Blocked access routes would have to be reopened, when necessary, where right-of-access is impeded.

For the EIS studies, three levels of access were identified and the associated amount of ground disturbance from upgrading or constructing access was estimated. Three levels of access/ground disturbance are defined and summarized in Table 2-7. Existing roads suitable for access and the general condition for each has been mapped (Map C-11, Volume II). This information was combined with slope to provide an estimate of the potential ground disturbance that could result from upgrading existing roads or constructing new roads.

TABLE 2-7
GROUND DISTURBANCE/ACCESS LEVELS

Level 1	***Existing Paved and Unpaved Roads*** Roads are generally in good condition, but may need to be improved selectively. An average of 200 to 300 feet of spur road would be required to access each tower site. Spur roads would disturb approximately 0.3 acre per mile of 500kV transmission line and about 0.6 acre per mile of 345kV line.
Level 2	***Construct New Road in Flat to Sloping Terrain (0 to 10 percent grade)*** Approximately 1.1 to 1.3 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2 acres per mile of transmission line.
Level 3	***Construct New Road in Steep to Very Steep Terrain (greater than 10 percent grade)*** Approximately 1.8 to 2.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 3.6 acres per mile of transmission line.

2.8.3.4 Tower/Site Clearing

Clearing of natural vegetation would be required for construction purposes (access, spur roads, and tower sites), land surveying activities, clearances for electrical safety, long-term maintenance, and reliability of the transmission lines. Within or adjacent to the right-of-way, mature vegetation would be removed under or near the conductors to provide adequate electrical clearance, as required by the NESC and DOE. Typically, only large trees or fast growing vegetation approximately 12 feet or higher would be topped or removed. In sensitive areas determined by the BLM or other agencies, clearing of natural vegetation would occur by hand.

Typical Tower Site and Work Area

At each tower site, work areas are required to facilitate the safe operation of equipment and construction operations. Within typical work areas in flat terrain, an area 250 feet by 200 feet for 500kV lines and 150 feet by 200 feet for 345kV lines of temporary disturbance would be required for equipment and construction tasks. Within that work area, the permanent disturbance associated with the tower footings would be up to 60 feet by 60 feet for the 500kV structures. The 345kV single-pole footings would typically occupy up to a 6-foot by 6-foot area, while the 345kV lattice structure would typically occupy up to a 30- foot by 30-foot area (all dimensions are approximate for tangent structures). The work area would be cleared of vegetation only to the extent necessary. Access within the work area would be overland travel with grading as required in the work site. After line construction, all work areas identified as temporary disturbance would be restored in accordance with the Reclamation Plan.

Specific tower sites and work areas would be identified in the POD once a final route has been determined.

Tower Site and Work Area in Steep/Rough Terrain

At tower sites in rough and steep terrain, the size of work areas may vary, depending on the site conditions. Work areas may be expanded to 250 feet by 300 feet for 500kV structures and 150 feet by 250 feet for 345kV structures (pole or lattice structures), and permanent tower sites may require two-thirds of that area to be cleared and graded to accommodate crane pads used for both construction and maintenance crews. The remaining one-third of that area would be graded for temporary use during construction and restored in compliance with the Reclamation Plan.

At tower sites in areas of rough and steep terrain, where economically practicable or a result of sensitive resource issues, helicopters may be used for construction purposes. This would involve ferrying work crews, supplies, and tower materials to the tower sites.

2.8.3.5 Foundation Installation

Excavations for foundations would be made with power equipment. Where the soil permits, a vehicle mounted power auger or backhoe would be used. In rocky areas, the foundation holes may be excavated by drilling and blasting, or special rock anchors may be installed. In extremely sandy areas, soil stabilization by water or a gelling agent may be used during excavation. The BLM would be notified in advance of any required blasting so that the area can be cleared and sensitive resources can be protected. A Blasting Plan has been developed and incorporated into the POD, which would be approved by the BLM prior to the issuance of a right-of-way grant.

After excavations are completed, cast-in-place footings would be installed. The cast-in-place footing for lattice towers would be installed by placing reinforcing steel and a tower stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material would be used for fill where suitable. The excavation and installation of the foundation would require access to the site by a power auger or drill, a crane, material trucks, and concrete trucks using the access roads. In environmentally sensitive areas or areas of steep terrain, excavation and installation of the foundation may use a power auger or drill brought in by helicopter or all-terrain vehicle (ATV).

Foundation holes left open or unguarded would be covered to protect the public and wildlife. If practical, fencing may be used. Soil removed from foundation holes would be stockpiled on the work area. The first 6 inches of topsoil would be placed on one side of the hole and the remainder of the soil on the other side. The chute would be washed into the hole, and then the soil would be replaced in the same order it was removed, thereby salvaging the seed bank. Concrete chutes would be washed into the foundation holes or into the stockpiles of soil. The stockpiles would be used to backfill the foundation holes and the remaining soil would be spread on the access road. This would ensure that the best possible topsoil for reseeding is not covered by auger cuttings during the rehabilitation of the site. Some large rocks may be left on-site to help blend the area in with the surrounding landscape.

2.8.3.6 Tower Assembly and Erection

Bundles of steel members and associated hardware would be shipped to each tower site by truck. Steel members would be preassembled at the tower sites or the construction yards into subsections of convenient size and weight. The assembled subsections would be hoisted into place by a large crane and then fastened together to form a complete tower (Figure 2-15).

As described previously, helicopters may also be used to assemble and erect towers in rough or steep terrain or areas of environmental constraints.

2.8.3.7 Equipment Staging

Staging of equipment would be located at pulling and tensioning sites or work areas previously described to receive temporary disturbance. These areas would be used to temporarily lay out equipment to be used for work on specific Project activities at nearby locations.

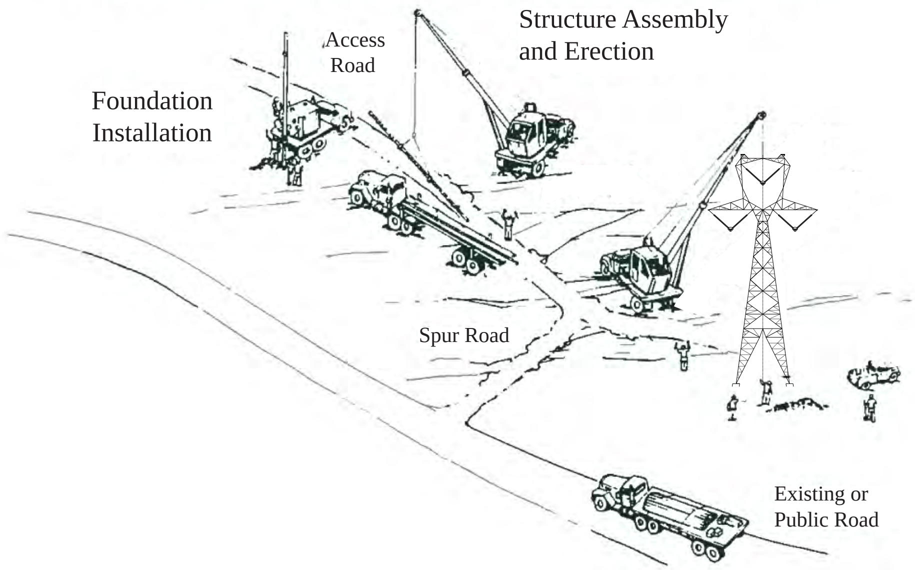
2.8.3.8 Conductor Installation

Conductors, insulators, hardware, and stringing sheaves would be delivered to each tower site for installation. The towers and poles would then be rigged with insulator strings and stringing sheaves at each ground wire and conductor position (Figure 2-15). For public protection during wire installation, guard structures would be erected over highways, railroads, power lines, structures, and other obstacles. Guard structures consist of H-frame poles and nets placed on either side of an obstacle. These structures prevent ground wire, conductors, or equipment from falling on an obstacle.

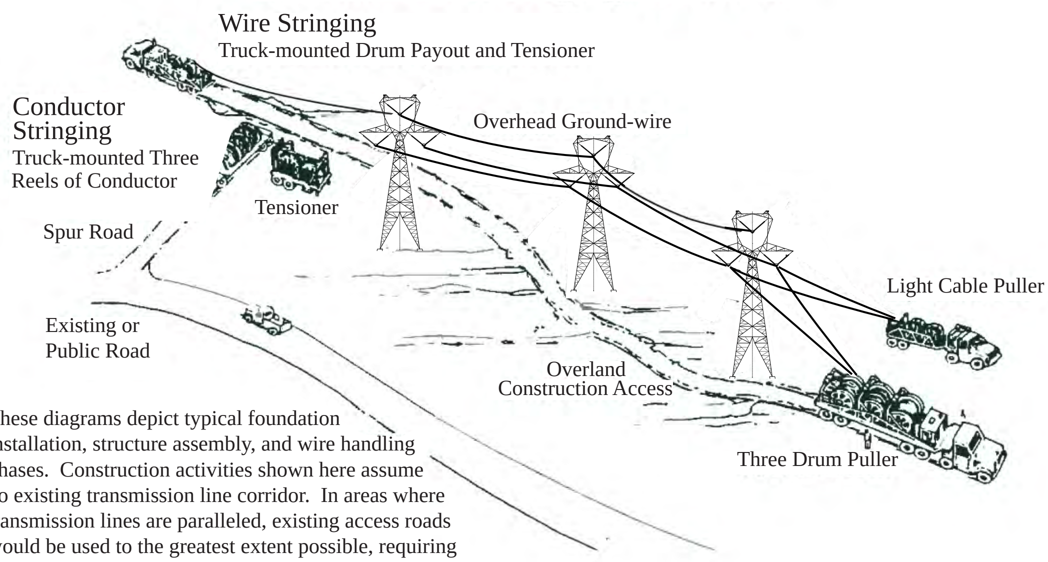
Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads or may be accommodated by line trucks. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

A pilot line would be pulled (strung) from tower to tower (or pole to pole) by helicopter, truck, or ATV and threaded through the stringing sheaves at each structure. A stronger line that is larger in diameter would then be attached to the pilot line and strung. This is called the pulling line. This process is repeated until the ground wire and conductor are pulled through all sheaves. Ground wire and conductor would be

Foundation and Structure Construction Activities



Conductor and Ground-wire Stringing Activities



These diagrams depict typical foundation installation, structure assembly, and wire handling phases. Construction activities shown here assume no existing transmission line corridor. In areas where transmission lines are paralleled, existing access roads would be used to the greatest extent possible, requiring only new spur roads to tower sites and temporary overland access.

Typical Construction Activities
Figure 2-15

strung, using powered pulling equipment at one end, and powered braking or tensioning equipment at the other end.

Sites for tensioning equipment and pulling equipment are typically areas approximately 300 feet by 700 feet. However, when construction occurs in the steep and rough terrain, these sites may require larger, less symmetrical pulling and tensioning areas. Once a final route has been determined, pulling and tensioning sites would be identified in the POD.

2.8.3.9 Ground Rod Installation

As a part of standard construction practices, prior to wire installation, tower footing resistance along the route would be measured. Where the resistance to remote earth for each transmission tower would be greater than 25 ohms, counterpoise (grounds) would be installed to lower the resistance to 25 ohms or less. Counterpoise consists of a bare copper clad or galvanized steel cable buried a minimum of 12 inches deep, extending from one or more tower legs for approximately 200 feet within the right-of-way.

2.8.3.10 Cleaning Up and Reclaiming Affected Land Areas

Construction sites, material storage yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of in an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be facilitated. No open burning of construction trash would occur without appropriate approval.

Reclaiming Affected Land Areas

The right-of-way would be reclaimed to its original condition as practicable, through methods described in the Reclamation Plan, presented in the POD. In areas of temporary disturbance, all practical means would be made to reclaim the land to its original contour, natural drainage patterns, and vegetation (i.e., use of native plants or seed mix) along the right-of-way, as required by the BLM.

2.8.4 Operation, Maintenance, and Decommissioning

As previously described in Section 2.8, the design, construction, operation, and maintenance of the Project would meet or exceed the requirements of the NESC, U.S. Department of Labor, OSHA Standards, and the Proponent's requirements for safety and protection of landowners and their property. The transmission lines would be protected with power circuit breakers and line relay protection equipment. If a conductor fails, power would be automatically removed from the line. Lightning protection would be provided through overhead ground wires.

All buildings, fences, and other structures with metal surfaces located within 200 feet from the centerline of the right-of-way would be grounded as needed. Typically, residential buildings located 200 feet from the centerline would not require grounding. Other structures beyond 200 feet would be determined by the NESC to be grounded. All metal irrigation systems that parallel transmission lines for a distance of 1,000 feet or more and within 100 feet from centerline would be grounded. If grounding were required outside the right-of-way, a temporary use permit would be obtained as needed.

2.8.4.1 Plan of Development

Following the final route and substation site selection, the BLM would require a final POD for the development and implementation of the Project. The POD details the methods and procedures that would be used in construction the Project and is hereby incorporated by reference into the Final EIS/Proposed RMP Amendment. The POD includes instructions to contractors, construction crews, agency personnel, resource inspectors, and monitors for construction, operation, and maintenance of the Project. The POD also contains a project description, resource protection, best management practices and mitigation measures; specifies environmental compliance field activities; provides a description of construction and operation activities; specifies land use and access requirements; and provides mapping of sensitive resources. In addition, the following documents would be appendices to the POD and describe the mitigation measures and environmental protection measures that the Proponent and its construction contractor(s) will follow during construction, operation, and maintenance of the Project:

- *Traffic and Transportation Management Plan* – This plan addresses regulatory compliance, traffic management practices, levels of right-of-way access, and mitigation measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Project.
- *Stormwater Pollution Prevention Plan Framework* – This plan framework provides an overview of proposed construction activities and includes procedures that will be implemented during construction activities to prevent or reduce pollutants in stormwater discharges.
- *Spill Prevention, Containment, and Countermeasures Plan Framework* – This plan framework provides mitigation and preventative measures to minimize the environmental impact associated with spills or releases of fuel, lubricant, or hazardous materials, during construction and refueling activities and during special refueling activities within 100 feet of waterbodies, wetland boundaries, or within municipal watersheds.
- *Historic Property Treatment Plan* – This plan is a confidential appendix that contains the Historic Properties Treatment Plan, which outlines the treatment of cultural resources during operation and maintenance of the Project.
- *Blasting Plan Framework* – This plan framework outlines methods to mitigate risks and potential impacts associated with blasting procedures that may be required for construction of the Project.
- *Plant and Wildlife Species Conservation Measures Plan* – This plan includes information on regulatory requirements related to biology resources and concerns and mitigation, including priority concerns and measures to specifically address key biological resources to support the design, construction, and operation of the Project.
- *Erosion, Dust Control, and Air Quality Plan* – This plan addresses regulatory compliance, environmental concerns, mitigation recommendations, and monitoring.
- *Hazardous Materials Management Plan Framework* – This plan framework addresses spill prevention, response, and clean-up procedures for the Project, and provide a template for the development of a more detailed Hazardous Materials Management Plan and Spill Prevention Control and Countermeasures Plan to be developed prior to project construction.
- *Emergency Preparedness and Response Plan Framework* – This plan framework provides an overview of methods to be implemented if the need for emergency management is required.
- *Noxious Weed Management Plan* – This plan includes noxious weed management practices, monitoring, and the use of pesticides/herbicides.
- *Fire Protection Plan* – This plan details measures that should be implemented to reduce the risk of starting a fire, and to suppress a fire in the event one does occur within the construction area during project construction, operation, and maintenance.
- *Stream, Wetland, Well, and Spring Protection Plan* – This plan provides guidelines to protect these resources from potential impacts during construction, operation, and maintenance activities, and incorporates mitigation measures contained in this Final EIS. This plan is intended for use as

a guide to determine the appropriate site-specific measures to be implemented during construction activities.

- *Reclamation, Revegetation, and Monitoring Framework Plan* – This plan provides a framework for reclamation treatments to be applied to the Project upon identification of construction-related disturbance, prevent unnecessary degradation of the environment during construction, rehabilitate temporary use areas, and reclaim disturbed areas

The POD and supporting plans would be finalized and incorporated into the major right-of-way grant for the Project, if approved. The final POD and other supporting documents contain details of project construction and operation may be found in the BLM's project administrative record, which is housed at the BLM SLFO.

Tables 2-8a and 2-8b show the estimated number of workers and types of equipment required to construct the proposed transmission lines. The Project would consist of several phases of construction at various locations. Regular field meetings would be held with the CIC and environmental monitors to review the process and its implementation.

TABLE 2-8a
ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINES

		Mona to Limber		Limber to Oquirrh		Limber to Terminal	
Activity	**Equipment Type**	**Quantity of Equipment**	**# of People**	**Quantity of Equipment**	**# of People**	**Quantity of Equipment**	**# of People**
Material/Yard/ Receiving/ Distribution	F-250 Pickup	9	15	6	15	6	15
	10,000# RT Forklift	6		4		4	
	50t Crane	3		2		2	
	Tractor Trailer (flatbed)	6		9		9	
	30t Boom Truck	3		2		2	
	100t Crane	0		1		1	
Survey (Construction Staking)	F-150 Pickup	6	18	4	12	4	12
	ATVs	6		6		6	
Soil Borings	F-250 Pickup	4	12	4	16	4	16
	Drill Rig	4		4		4	
Right-of-Way Clearing	F-250 Pickup	3	9	3	15	3	12
	Chainsaw	12		12		12	
	Hydro Axe	1		1		1	
Roads and Access	F-350 Pickup	3	10	3	12	3	10
	Cat D-6	2		2		2	
	Grader	2		2		2	
	Semi w/Dump Trailer	2		2		2	
	Water Truck	3		3		3	
Foundations	F-150 Pickup	4	36	4	52	4	52
	F-350 Pickup	12		12		12	
	Drill Rig	4		4		4	
	Loader/Backhoe	4		4		4	
	Boom Truck	4		4		4	
	Concrete Truck	6		12		12	
	Generator	4		4		4	
	Cat D-6	4		4		4	

TABLE 2-8a ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINES							
		Mona to Limber		**Limber to Oquirrh**		**Limber to Terminal**	
Activity	**Equipment Type**	**Quantity of Equipment**	**# of People**	**Quantity of Equipment**	**# of People**	**Quantity of Equipment**	**# of People**
Structure Assembly	F-150 Pickup	5	65	0	0	0	0
	F-350 Line Truck	15		0		0	
	30t Boom Truck	5		0		0	
	Air Compressor	5		0		0	
	10,000# RT Forklift	5		0		0	
Structure Erection	F-150 Pickup	2	34	2	34	2	36
	F-350 Line Truck	8		8		8	
	200t Crane	2		2		2	
	30t Boom Truck	2		2		2	
	Air Compressor	0		2		2	
Conductor Installation	F-150 Pickup	2	32	2	32	2	32
	F-350 Line Truck	6		6		6	
	Tractor/Flatbed	6		6		6	
	30t Boom Truck	2		2		2	
	Cat D-8	3		3		3	
	Puller	1		1		1	
	Tensioner	1		1		1	
Conductor Clipping and Deadending	F-150 Pickup	2	26	2	29	2	29
	F-350 Line Truck	6		6		6	
	Bucket Truck/ Boom w/Basket	3		3		3	
Restoration	F-150 Pickup	2	8	2	9	2	6
	Tractor with Disc	1		1		1	
	Cat D-4	1		1		1	
	Hydro Seed Truck	1		1		1	
Contractor Management	F-150 Pickup	23	23	23	23	23	23
Total # of People*			288		249		243

* Maximum total personnel required during the 24-month construction period, considering all tasks (actual personnel at any one time would be less). Depending on schedule requirements, multiple crews may be required.
SOURCE: Rocky Mountain Power 2009

TABLE 2-8b ESTIMATED PERSONNEL AND EQUIPMENT FOR SUBSTATIONS					
		Mona Annex		**Limber**	
Activity	**Equipment Type**	**Quantity of Equipment**	**# of People**	**Quantity of Equipment**	**# of People**
Material Yard/ Receiving/Distribution	F-250 Pickup	3	10	3	10
	10,000# RT Forklift	4		4	
	50t Crane	1		1	
	Tractor Trailer (flatbed)	4		4	
	30t Boom Truck	2		2	
Survey (Construction Staking)	F-150 Pickup	4	8	4	8
Soil Borings	F-250 Pickup	2	8	2	8
	Drill Rig	2		2	

TABLE 2-8b
ESTIMATED PERSONNEL AND EQUIPMENT FOR SUBSTATIONS

Activity	Equipment Type	Mona Annex Quantity of Equipment	Mona Annex # of People	Limber Quantity of Equipment	Limber # of People
Site Clearing and Grading	F-250 Pickup	3	26	3	26
	F-350 Pickup	6		6	
	Cat D-6	4		4	
	Grader	2		2	
	Semi with Dump Trailer	6		6	
	Water Truck	3		3	
	Scrapers	4		4	
	Roller Compactors	6		6	
Foundations	F-150 Pickup	4	36	4	36
	F-350 Pickup	8		8	
	Drill Rig	4		4	
	Loader/Backhoe	8		8	
	Boom Truck	4		4	
	Concrete Truck	8		8	
	Generator	10		10	
	Excavator	2		2	
	Dump Truck	4		4	
	10,000# RT Forklift	4		4	
Raceway and Grounding	F-150 Pickup	3	15	3	15
	F-350 Pickup	3		3	
	Mini Excavator	6		6	
	Air Compressor	2		2	
	10,000# RT Forklift	2		2	
	Trencher	2		2	
	Loader/Backhoe	2		2	
	Roller Compactor	2		2	
	Compactor	10		10	
	Dump Truck	2		2	
Structure and Equipment Installation	F-150 Pickup	4	25	4	25
	F-350 Line Truck	8		8	
	200t Crane	1		1	
	30t Boom Truck	4		4	
	Air Compressor	2		2	
	Man Lifts	10		10	
	50t Crane	1		1	
	Generator	4		4	
	10,000# RT Forklift	4		4	
Wiring	F-150 Pickup	2	12	2	12
	F-350 Line Truck	4		4	
	Generator	4		4	
	10,000# RT Forklift	4		4	
Testing	F-150 Pickup	8	8	8	8
	Bucket Truck/Boom w/Basket	3		3	
Contractor Management	F-150 Pickup	6	6	6	6
	Total number of people		154		154

∗ Maximum total personnel required during the 24-month construction period, considering all tasks (actual personnel at any one time would be less). Depending on schedule requirements, multiple crews may be required.

SOURCE: Rocky Mountain Power 2009

2.8.4.2 Maintenance

The transmission lines would be patrolled three times per year for maintenance, twice by helicopter and once by driving patrol. Overflight line maintenance by helicopter is critical during the spring and the fall of each year based on weather conditions, helicopter availability, and statutory requirements of the states served by the Proponent. The spring and fall overflight maintenance activities are conducted to identify conditions that pose an immediate hazard to the public or employees, or that risk immediate loss of supply or damage to the electrical system, in order to get those conditions resolved prior to peak demand in the summer and winter months. The Proponent's employees are trained and adhere to Bird Management and Avian Protection Plans for all maintenance activities. Avian monitors routinely identify nest locations and check these structures for activity. Overflight maintenance activities are conducted at a distance and speed that would not result in disturbance to avian species or nests.

Monitoring and maintenance would be done from approved or existing access roads. When access into the tower/pole locations needs improvement, a tracked bulldozer or other heavy equipment would be used after notifying the BLM Authorized Officer. As necessary, maintenance crews would be required to re-scarify and reclaim newly disturbed areas to pre-existing conditions. Any berms or boulders that were in place to limit access would also be restored after completion of the maintenance work.

Lands within rights-of-way would not be chemically treated with pesticides or herbicides unless needed and only upon prior approval of the land manager or owner. The project Proponent would comply with requirements of the land-managing agencies regarding management of noxious weeds along access roads, within the right-of-way, and at temporary use areas (e.g., cleaning equipment to prevent spread of noxious weeds). Chemical treatment within or adjacent to the right-of-way generally would be limited only to areas with noxious weeds. Woody vegetation would be treated using mechanical or hand-cutting methods only. Periodic (every 2 to 5 years) mechanical treatment of trees and woody vegetation in the right-of-way would occur. Vegetation management generally occurs in the summer and fall seasons.

Inspection and maintenance of the communication regenerator site, including the building, communication facilities, and other physical equipment, would occur periodically. Maintenance of the communication facilities would consist of testing, repairing, and replacing electronic equipment located within the building at the regenerator site.

The substation yards would be maintained and inspected according to BMPs and the Proponent's standards.

2.8.4.3 Emergency Maintenance

The implementation of routine operation and maintenance activities on power lines would minimize the need for most emergency repairs; however, emergency maintenance activities are often necessary to repair natural hazard, fire, or man-caused damages to a line. In the event of an emergency, the Proponent would notify the BLM's Authorized Officer and respond as quickly as possible to restore power. The necessary equipment required for emergency repairs is similar to that needed for regular maintenance. However, on occasion, additional equipment may be required. Although restoration of the line would have priority, an effort would be made to protect crops, plants, wildlife, and resources of importance. Reclamation procedures following completion of repair work would be similar to those prescribed for construction and would be provided in the POD.

2.8.4.4 Decommissioning

At the end of the useful life of the Project (projected to be at least 50-75 years), if the facilities were no longer required, the transmission lines and associated facilities would be decommissioned. Subsequently, conductors, insulators, concrete pads, and hardware would be dismantled and removed from the right-of-way. Tower and pole structures would be removed and foundations broken off at least 2 feet below ground surface. All permanent disturbances would be restored in accordance with a Termination and Reclamation Plan approved by the BLM Authorized Officer.

2.9 Comparison of Alternatives

This section of the document summarizes the alternatives comparison process and results, including the identification of the BLM's Preferred Alternative on Federal Lands, the Environmentally Preferred Alternative, and the Proponent's Proposed Action. As presented in Table 2-1, for ease of comparison and presenting results, the Project alternatives have been divided into three categories:

- Mona to Limber
- Limber to Oquirrh
- Limber to Terminal

Table 2-9 provides a detailed comparative analysis of the resources for each alternative. For each resource, the table identifies key resource elements and associated impacts. A determination of potential significant impacts remaining after mitigation and cumulative effects (if present) are also identified. The basis for the information summarized for each resource in Table 2-9 (located at the end of this chapter) is contained in Chapters 3 and 4.

Table 2-9 also presents a numerical ranking by preference for each resource and the rationale for the ranking and Table 2-10 presents a summary of this information. This preference ranks the alternatives for that resource only and compares only that group of alternatives. If more than one alternative has the same preference number, it indicates that those routes share a similar preference. This comparison process aided the BLM's identification of a Preferred Alternative, which is presented in Section 2.9.1. A description of the Proponent's Proposed Action is presented in Section 2.9.2.

2.9.1 BLM's Preferred Alternative on Federal Lands

The BLM's Preferred Alternative on Federal Lands includes Alternatives A2 and D. BLM's Preferred Alternative from the future Limber Substation to the existing Terminal Substation is not identified because no BLM-administered lands occur along this segment.

Based on the alternative selected, an amendment to the Pony Express RMP Transportation and Utility Corridor, Decision 1 (BLM 1990 as amended), would include allowing grant of a major right-of-way that is approximately 35 miles in length and up to 250 feet in width (depending on location) outside of the designated utility corridor. The goal and objective of the BLM would be to make public lands available for a variety of rights-of-way and permits where consistent with resource needs. To the maximum extent possible, rights-of-way would avoid sage-grouse leks, riparian/wetland habitats, VRM Class II and III areas, Wilderness Study Areas (WSA), obvious visual or physical intrusions, steep slopes, and lands containing hazardous materials. Establishing a major right-of-way does not extend to other facilities, highways, or county road systems.

2.9.2 Environmentally Preferred Alternative

Section 1505.2(b) of NEPA requires that "the alternative or alternatives which were considered to be environmentally preferable" be specified. The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Generally, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

The Environmentally Preferred Alternative is Alternative A2 from the existing Mona Substation to the future Limber Substation (also BLM's Preferred Alternative on Federal Lands); Alternative D from the future Limber Substation to the existing Oquirrh Substation (also BLM's Preferred Alternative on Federal Lands); and Alternative H from the future Limber Substation to the existing Terminal Substation (also the Proponent's Proposed Action). After the implementation of BMPs and selective mitigation measures, significant long-term impacts as a result of the Environmentally Preferred Alternative are anticipated in only localized areas, such as the Carr Fork Reclamation and WMA, the wetlands along the southern portion of the Great Salt Lake, and areas of high scenic quality or in areas of proximity to sensitive viewers. The majority of the Environmentally Preferred Alternative is anticipated to have only low-to-moderate impacts on the environment.

2.9.3 Proponent's Proposed Action

The Proponent's Proposed Action includes Alternatives A2, E2, and H. The Proponent's primary objective is to select a route for the Project that meets their purpose and need and represents the best overall combination of criteria that includes system reliability, constructability, economics, and environmental and community concerns. In selecting these route segments as the Proponent's proposed action, the Proponent determined that these route segments best met their requirements as a publicly regulated electric utility to provide safe, reliable, adequate, and efficient electrical services to customers.

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
WATER, GEOLOGY AND SOILS, PALEONTOLOGY, BIOLOGY

Route Segment	Route Alternative	Length (miles)	Water	Geology and Soils	Paleontology	Air Quality	Biology	
							Wildlife	Vegetation
MONA TO LIMBER	**Alternative A1** North Long Ridge Mountains	67.9	▪ Potential for temporary erosion during construction ▪ No permanent adverse impact	▪ Crosses South Oquirrh Fault Zone ▪ Small landslides are likely in the event of an earthquake ▪ Potential for liquefaction is low ▪ No significant adverse impacts anticipated	**Inventory** ▪ No localities found in project area **Impacts** ▪ 24.4 miles of moderate/unknown impact **Preference Ranking: 4** ▪ Based on amount of miles of moderate/unknown impact	▪ Emissions of PM10, PM2.5, CO, NOx, SO2, and VOCs would be short-term (during construction) and localized to the general area of activity ▪ Project emissions are not expected to cause or contribute to an exceedance of the NAAQS ▪ No permanent adverse impact	**Inventory/Issues** ▪ 18.4 miles core raptor nesting habitat ▪ Crucial habitats: o 33.9 miles sage-grouse o 37.2 miles pronghorn o 24.8 miles mule deer **Impacts** ▪ 18.4 miles of moderate impact **Preference Ranking: 3** ▪ No elk habitat or waterfowl pathway; second-least amount of moderate impact, sage-grouse habitat, and mule deer habitats	**Inventory/Issues** ▪ 29.0 miles of potential Pohl's milkvetch habitat ▪ 0.6 miles riparian shrub habitat **Impacts** ▪ 151 acres of permanent ground disturbance and 236 acres of clearing; 1.0 miles of high and 48.7 miles of moderate **Preference Ranking: 2** ▪ Least moderate impact, permanent disturbance, and clearing
	Alternative A2 BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	69.4	▪ Similar issues and impacts as Alternative A1	▪ Similar issues and impacts as Alternative A1	**Inventory** ▪ No localities found in project area **Impacts** ▪ 24.2 miles of moderate/unknown impact **Preference Ranking: 3** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative A1	**Preference Ranking: 4** ▪ Similar to Alternative A1, but contains more mule deer habitat	**Preference Ranking: 1** ▪ Similar to Alternative A1, but with 136 acres of permanent ground disturbance, 51.0 miles moderate impact and 303 acres clearing
	Alternative B1 East Rush Valley	70.0	▪ Similar issues and impacts as Alternative A1	▪ Similar issues and impacts as Alternative A1	**Inventory** ▪ No localities found in project area **Impacts** ▪ 11.7 miles of moderate/unknown impact **Preference Ranking: 2** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative A1	**Inventory/Issues** ▪ 14.0 miles core raptor nesting habitat; 2.0 miles waterfowl pathway ▪ **Crucial habitats**: o 33.1 miles sage-grouse o 28.1 miles pronghorn o 34.0 miles mule deer o 4.6 miles elk **Impacts** ▪ 24.5 miles of **moderate** impact **Preference Ranking: 5** ▪ Most moderate impact; only alternative that crosses elk habitat and waterfowl pathway; second-most mule deer habitat	**Inventory/Issues** ▪ 13.0 miles of potential Pohl's milkvetch habitat ▪ 0.6 mile riparian forest habitat **Impacts** ▪ 173 acres of permanent ground disturbance and 310 acres clearing; no high impact and 53.7 miles of moderate **Preference Ranking: 3** ▪ Second-most permanent disturbance; third-most clearing; less moderate impact than C1 and C2
	Alternative B2 East Rush Valley	71.5	▪ Similar issues and impacts as Alternative A1	▪ Similar issues and impacts as Alternative A1	**Inventory** ▪ No localities found in project area **Impacts** ▪ 11.5 miles of moderate/unknown impact **Preference Ranking: 1** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative A1	**Preference Ranking: 6** ▪ Similar to Alternative B1, but contains more mule deer habitat	**Preference Ranking: 4** ▪ Similar to Alternative B1 except 157 acres of permanent ground disturbance. 56.0 miles moderate impact and 376 acres clearing
	Alternative C1 Tintic Junction	67.1	▪ Similar issues and impacts as Alternative A1	▪ Similar issues and impacts as Alternative A1	**Inventory** ▪ No localities found in project area **Impacts** ▪ 30.0 miles of moderate/unknown impact **Preference Ranking: 6** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative A1	**Inventory/Issues** ▪ 13.7 miles core raptor nesting habitat ▪ Crucial habitats: o 40.8 miles sage-grouse o 28.0 miles pronghorn o 19.3 miles mule deer **Impacts** ▪ 13.7 miles of moderate impact **Preference Ranking: 1** ▪ Most sage-grouse habitat; least core raptor nesting area, mule deer habitat, and moderate impact; no elk habitat or waterfowl pathway	**Inventory/Issues** ▪ 32.0 miles of potential Pohl's milkvetch habitat ▪ 0.1 miles riparian shrub habitat **Impacts** ▪ 174 acres of permanent ground disturbance and 578 acres of clearing; 1.0 miles of high and 53.9 miles of moderate **Preference Ranking: 5** ▪ Most permanent disturbance, second-most moderate impact and clearing

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
WATER, GEOLOGY AND SOILS, PALEONTOLOGY, BIOLOGY

Route Segment	Route Alternative	Length (miles)	Water	Geology and Soils	Paleontology	Air Quality	Biology: Wildlife	Biology: Vegetation
MONA TO LIMBER	**Alternative C2** Tintic Junction	68.4	▪ Similar issues and impacts as Alternative A1	▪ Similar issues and impacts as Alternative A1	**Inventory** ▪ No localities found in project area **Impacts** ▪ 29.8 miles of moderate/unknown impact **Preference Ranking: 5** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative A1	**Preference Ranking: 2** ▪ Similar to Alternative C1, but with more mule deer habitat	**Preference Ranking: 6** ▪ Similar to Alternative C1, but with 158 acres of permanent ground disturbance, 56.2 miles moderate impact and 642 acres clearing
LIMBER TO OQUIRRH	**Alternative D** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	31.1	▪ Potential for temporary erosion during construction ▪ No permanent adverse impact	▪ Crosses small sub-faults of the Oquirrh Fault Zone ▪ Potential for liquefaction is low ▪ Rock fall danger due to slope degradation and additional erosion activities ▪ No significant adverse impacts anticipated	**Inventory** ▪ One locality found in project area **Impacts** ▪ 10.1 miles of moderate/unknown impact **Preference Ranking: 4** ▪ Based on amount of miles of moderate/unknown impact	▪ Emissions of PM10, PM2.5, CO, NOx, SO2, and VOCs would be short-term (during construction) and localized to the general area of activity ▪ Project emissions are not expected to cause or contribute to an exceedance of the NAAQS ▪ No permanent adverse impact	**Inventory/Issues** ▪ Crucial habitats: o 6.2 miles sage-grouse o 19.0 miles mule deer (8.6 miles winter range) o 9.9 miles elk (7.0 miles winter range) **Impacts** ▪ 13.4 miles of moderate impact **Preference Ranking: 3** ▪ Second-least mule deer habitat and elk habitat; third least moderate impact	**Inventory/Issues** ▪ 0.7 miles riparian and associated wetlands **Impacts** ▪ 61 acres of permanent ground disturbance and 227 acres of clearing; 0.7 mile of high and 19.0 miles of moderate **Preference Ranking: 1** ▪ Second least high impact and clearing; least amount of permanent disturbance
	Alternative E1 Pass Canyon	31.1	▪ Similar issues and impacts as Alternative D	▪ Similar issues and impacts as Alternative D	**Inventory** ▪ Two localities found in project area **Impacts** ▪ 7.8 miles of moderate/unknown impact **Preference Ranking: 1** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative D	**Inventory/Issues** ▪ Crucial habitats: o 6.2 miles sage-grouse o 22.1 miles mule deer (11.2 miles winter range) o 11.2 miles elk (9.9 miles winter range) **Impacts** ▪ 16.3 miles of moderate impact **Preference Ranking: 5** ▪ Most mule deer habitat; second most elk habitat and moderate impact	**Inventory/Issues** ▪ 8.0 miles of Pohl's milkvetch habitat ▪ 1.1 miles riparian and associated wetlands; 0.4 mile hybrid oak **Impacts** ▪ 69 acres of permanent ground disturbance and 232 acres clearing; 1.5 miles of high and 19.8 miles of moderate **Preference Ranking: 3** ▪ Second-most high impact; third least moderate impact, permanent disturbance, and clearing
	Alternative E2 Proponent's Proposed Action	31.1	▪ Similar issues and impacts as Alternative D	▪ Similar issues and impacts as Alternative D	**Inventory** ▪ One locality found in project area **Impacts** ▪ 10.3 miles of moderate/unknown impact **Preference Ranking: 5** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative D	**Preference Ranking: 4** ▪ Similar to Alternative E1, but has less mule deer habitat, elk habitat, and moderate impact	**Preference Ranking: 2** ▪ Similar to Alternative E1 except 1.0 mile less moderate impact, 1 acre less ground disturbance, and 5 acres less clearing
	Alternative F1 Middle/Butterfield Canyon	29.3	▪ Similar issues and impacts as Alternative D	▪ Rock fall danger due to slope degradation and additional erosion activities ▪ Potential for liquefaction is low ▪ No significant adverse impacts anticipated	**Inventory** ▪ Six localities found in project area **Impacts** ▪ 8.1 miles of moderate/unknown impact **Preference Ranking: 2** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative D	**Inventory/Issues** ▪ Crucial habitats: o 6.2 miles sage-grouse o 12.1 miles mule deer (4.5 miles winter range) o 2.1 miles elk winter range **Impacts** ▪ 5.4 miles of moderate impact **Preference Ranking: 1** ▪ Least moderate impact, mule deer habitat, and elk habitat	**Inventory/Issues** ▪ 1.4 miles riparian and wetlands **Impacts** ▪ 79 acres of permanent ground disturbance and 261 acres of clearing; 0.4 miles of high and 19.6 miles of moderate **Preference Ranking: 4** ▪ Least high impact; second highest clearing

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
WATER, GEOLOGY AND SOILS, PALEONTOLOGY, BIOLOGY

Route Segment	Route Alternative	Length (miles)	Water	Geology and Soils	Paleontology	Air Quality	Biology: Wildlife	Biology: Vegetation
LIMBER TO OQUIRRH	**Alternative F2** Middle/Butterfield Canyon	29.6	▪ Similar issues and impacts as Alternative D	▪ Similar issues and impacts as Alternative F1	**Inventory** Six localities found in project area **Impacts** 8.5 miles of moderate/unknown impact **Preference Ranking: 3** Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative D	**Preference Ranking: 2** ▪ Similar to Alternative F1	**Preference Ranking: 5** ▪ Similar to Alternative F1 except 1 acre more permanent disturbance, 6 acres more clearing, and 0.3 miles more moderate impact
LIMBER TO OQUIRRH	**Alternative G** Lake Point	49.0	▪ Similar issues and impacts as Alternative D	▪ Crosses the Oquirrh Fault Zone ▪ Rock fall danger due to slope degradation and additional erosion activities ▪ Potential for soil liquefaction is high ▪ No significant adverse impacts anticipated	**Inventory** ▪ Twelve localities found in project area **Impacts** ▪ 19.3 miles of moderate/unknown impact **Preference Ranking: 6** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative D	**Inventory/Issues** ▪ Crucial habitats: o 5.9 miles sage-grouse o 15.6 miles mule deer (9.2 miles winter range) o 13.0 miles elk winter range o 23.3 miles of waterfowl pathway **Impacts** ▪ 39.3 miles of moderate impact **Preference Ranking: 6** ▪ Most core raptor nesting habitat, elk habitat, and moderate impact; second most mule deer habitat; only alternative that crosses waterfowl pathway	**Inventory/Issues** ▪ 11.7 miles wetland; 0.7 miles riparian shrub **Impacts** ▪ 115 acres of permanent ground disturbance and 96 acres clearing; 12.5 miles of high and 18.8 miles of moderate **Preference Ranking: 6** ▪ Most wetlands, permanent disturbance, high impact, and moderate impact.
LIMBER TO TERMINAL	**Alternative H** Environmentally Preferred Alternative/ Proponent's Proposed Action	45.4	▪ Potential for temporary erosion during construction ▪ No permanent adverse impact	▪ Crosses the Oquirrh Fault Zone ▪ Rock fall danger, due to slope degradation and additional erosion activities ▪ Potential for soil liquefaction is high ▪ No significant adverse impacts anticipated	**Inventory** ▪ Ten localities found in project area **Impacts** ▪ 16.5 miles of moderate/unknown impact **Preference Ranking: 1** ▪ Based on amount of miles of moderate/unknown impact	▪ Emissions of PM10, PM2.5, CO, NOx, SO2, and VOCs would be short-term (during construction) and localized to the general area of activity ▪ Project emissions are not expected to cause or contribute to an exceedance of the NAAQS ▪ No permanent adverse impact	**Inventory/Issues** ▪ Crucial habitats: o 5.8 miles sage-grouse o 6.1 miles mule deer (1.1 miles winter range) o 4.0 miles elk winter range o 26.9 miles of waterfowl pathway o 5.9 miles core raptor nesting habitat **Impacts** ▪ 33.3 miles of moderate impact **Preference Ranking: 2** ▪ Most moderate impact; most core raptor nesting habitat, waterfowl pathway, and least elk winter range	**Inventory/Issues** ▪ 13.7 miles wetland; 0.6 mile riparian shrub **Impacts** ▪ 88 acres of permanent ground disturbance and 41 acres clearing; 14.5 miles of high and 10.7 miles of moderate **Preference Ranking: 2** ▪ Most wetlands, high and moderate impact, and permanent disturbance
LIMBER TO TERMINAL	**Alternative I** East Tooele Valley	40.4	▪ Similar issues and impacts as Alternative H	▪ Similar issues and impacts as Alternative H	**Inventory** ▪ Five localities found in project area **Impacts** ▪ 27.2 miles of moderate/unknown impact **Preference Ranking: 2** ▪ Based on amount of miles of moderate/unknown impact	▪ Similar issues and impacts as Alternative H	**Inventory/Issues** Crucial habitats: o 6.2 miles sage-grouse o 7.0 miles mule deer (1.2 miles winter range) o 5.0 miles elk winter range o 16.0 miles of waterfowl pathway **Impacts** ▪ 21.6 miles of moderate impact **Preference Ranking: 1** ▪ Least moderate impact; least raptor nesting habitat, waterfowl pathway, and mule deer habitat	**Inventory/Issues** ▪ 8.0 miles wetland; 0.5 mile riparian shrub **Impacts** ▪ 72 acres of permanent ground disturbance and 41 acres clearing; 8.6 miles of high and 10.1 miles of moderate **Preference Ranking: 1** ▪ Least high impact, moderate impact, and permanent disturbance

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL, AND VISUAL

Route Segment	Route Alternative	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources: Landscape Scenery (miles crossed)	Visual Resources: Residential Viewers (miles crossed)	Visual Resources: Recreation and Travel Corridor Views (miles crossed)	Visual Resources: Visual Resource Management	Visual Resources: Summary of Residual Impacts
MONA TO LIMBER	**Alternative A1** North Long Ridge Mountains	67.9	▪ Impacts on employment, population, housing, government provided services, and property values are minimal	**Inventory/Issues** ▪ 86 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.7 miles of moderate impact **Preference Ranking: 2** ▪ More moderate impact than A2, does not cross a historic mining district	**Class B Scenery** - 0.4	**Immediate Foreground Views** - 0.7 **Foreground Views** - 4.1	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.5 ▪ Foreground - 3.2 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 20.2 ▪ Foreground - 6.8	▪ In compliance with Class III Visual Resource Management (VRM)	**Residential Views** ▪ 2 residences west of South Mountain; Southern Goshen Valley residential views, Southern Cedar Valley residential views **Recreation/Travel Corridor Views** ▪ Mormon Trail Road views, US 6 crossing, State Route (SR) 199 Crossing, Nutty Putty /Little Moab Destination Route, Pony Express National Historic Trail (NHT), Railroad Bed Scenic Byway. **Scenery** ▪ Moderate impacts in Class B agricultural landscape **Impacts** ▪ 21.7 miles of high impact **Preference Ranking: 2** ▪ High impacts derived primarily from recreational/travel viewpoints, fewer high residual impacts to residences than other alternatives
	Alternative A2 BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	69.4	▪ Same impacts as Alternative A1	**Inventory/Issues** ▪ 52 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.4 mile of moderate impact **Preference Ranking: 1** ▪ Fewest number of sites and does not cross a historic mining district	**Class B Scenery** - 0.4	**Immediate Foreground Views** - 1.7 **Foreground Views** - 5.1	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.5 ▪ Foreground - 3.2 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 20.2 ▪ Foreground - 6.8	▪ In compliance with Class III VRM	**Residential, Recreation and Travel Corridor Views** ▪ Impacts on viewers identical to A1, except in the southern Goshen Valley and northern Juab Valley. Higher visibility to one residence in southern Goshen Valley, lower visibility from eastern valley residences. Lower overall impacts and visibility in Goshen Valley than Alternative A1, B1, or C1. Lower visibility from Mona area (Goshen Valley Road and adjacent residences, western Mona community) than Alternatives A1, B1, or C1. **Scenery** ▪ Moderate impacts in Class B agricultural landscapes identical to Alternative A1 in northern Rush Valley, but avoids Class B agricultural landscapes in southern Goshen Valley **Impacts** ▪ 22.7 miles of high impact **Preference Ranking: 1** ▪ High impacts derived primarily from recreational/travel viewpoints, fewer high residual impacts on residences than other alternatives. Lower visibility overall from residences in southern Goshen Valley and avoids Class B agricultural landscapes there.
	Alternative B1 East Rush Valley	70.0	▪ Same impacts as Alternative A1	**Inventory/Issues** ▪ 95 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.5 miles of moderate impact **Preference Ranking: 3** ▪ Crosses a small portion of the historic Mercur Mining District	**Class B Scenery** - 7.0	**Immediate Foreground Views** - 1.7 **Foreground Views** - 4.6	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.5 ▪ Foreground - 3.2 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 17.6 ▪ Foreground - 7.1	▪ In compliance with Class III VRM	**Residential Views** ▪ Identical to Alternative A1 in southern Goshen Valley, northern Juab Valley, and Rush Valley (South Mountain) and high impacts on one residence on Ophir Canyon Road **Recreation/Travel Corridor Views** ▪ Identical to Alternative A along Mormon Road, Nutty Putty/K13Little Moab Destination Route, Pony Express NHT, Railroad Bed Scenic Byway, and US 6 crossing in southern Utah County and SR 73 high impacts near Fivemile OHV Area. **Scenery** ▪ Moderate impacts in Class B agricultural landscapes; moderate impacts on Class B landscapes in the Oquirrh Mountains; increased visibility of conductors near Rush Lake as a result of mark ball (bird) diverters. **Impacts** ▪ 18.4 miles of high impact **Preference Ranking: 4**

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL, AND VISUAL

Route Segment	Route Alternative	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources: Landscape Scenery (miles crossed)	Visual Resources: Residential Viewers (miles crossed)	Visual Resources: Recreation and Travel Corridor Views (miles crossed)	Visual Resources: Visual Resource Management	Visual Resources: Summary of Residual Impacts
MONA TO LIMBER	**Alternative B2** East Rush Valley	71.5	▪ Same impacts as Alternative A1	**Inventory/Issues** ▪ 61archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.3 mile of moderate impact **Preference Ranking: 3** ▪ Crosses a small portion of the historic Mercur Mining District	**Class B Scenery** - 7.0	**Immediate Foreground Views** - 2.7 **Foreground Views** - 5.6	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.5 ▪ Foreground - 3.2 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 17.6 ▪ Foreground - 7.1	▪ In compliance with Class III VRM	**Residential, Recreation and Travel Corridor Views** ▪ Impacts on viewers identical to B2, except in the southern Goshen Valley and northern Juab Valley (see Alternative A1) **Impacts** ▪ 11.5 miles of high impact **Preference Ranking: 3**
	Alternative C1 Tintic Junction	67.1	▪ Same impacts as Alternative A1	**Inventory/Issues** ▪ 103 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.9 miles of moderate impact **Preference Ranking: 4** ▪ Bisects the historic Tintic Mining District	**Class B Scenery** - 2.9	**Immediate Foreground Views** - 2.3 **Foreground Views** - 5.9	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 6.1 ▪ Foreground - 4.6 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 30.1 ▪ Foreground - 7.4	▪ In compliance with Class III VRM	**Residential Views** ▪ Identical to Alternative A1 near South Mountain, Juab Valley, and a portion of southern Goshen Valley. Less visible in Goshen Valley overall than Alternatives A1, A2, B1, or B2; high impacts on residence at Tintic Junction. High impacts on one residence near SR 36-Railroad Bed Road intersection. **Recreation/Travel Corridor Views** ▪ Mormon Trail Road views; US 6 crossing in northern Juab County; parallels US 6 in northern Juab County, SR 36; Pony Express NHT; Railroad Bed Scenic Byway **Scenery** ▪ Moderate impacts in Class B agricultural landscapes in southern Goshen Valley and northern Rush Valley, and moderate impacts on Class B landscapes in the East Tintic Mountains **Impacts** ▪ 28.8 miles of high impact **Preference Ranking: 6**
	Alternative C2 Tintic Junction	68.4	▪ Same impacts as Alternative A1	**Inventory/Issues** ▪ 68 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.5 mile of moderate impact **Preference Ranking: 4** ▪ Bisects the historic Tintic Mining District	**Class B Scenery** - 2.9	**Immediate Foreground Views** - 3.2 **Foreground Views** - 6.9	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 6.1 ▪ Foreground - 4.6 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 30.1 ▪ Foreground - 7.4	▪ In compliance with Class III VRM	**Residential, Recreation and Travel Corridor Views** ▪ Impacts on viewers identical to C1, except in the southern Goshen Valley and northern Juab Valley. Impacts identical to Alternative A1 in southern Goshen Valley and northern Juab Valley. ▪ Scenery ▪ Impacts on scenic quality identical to Alternative C1, except in southern Goshen Valley; moderate impacts in Class B agricultural landscapes in northern Rush Valley; moderate impacts on Class B landscapes in the East Tintic Mountains **Scenery** ▪ Avoids Class B agricultural landscapes in southern Goshen Valley **Impacts** ▪ 29.7 miles of high impact **Preference Ranking: 5**
LIMBER TO OQUIRRH	**Alternative D** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	31.1	▪ Impacts on employment, population, housing, government provided services, and property values are minimal.	**Inventory/Issues** ▪ 3 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.2 mile of moderate impact **Preference Ranking: 3** ▪ more sites than E2	**Class A Scenery** - 0.1 **Class B Scenery** - 8.7	**Immediate Foreground Views** - 1.0 **Foreground Views** - 3.9	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 1.2 ▪ Foreground - 1.3 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 6.4 ▪ Foreground - 4.5	▪ No VRM Class II or III crossed.	**Residential Views** ▪ High impact on views from Grimm Hill Road and Cassity Drive, and high impact on views from west of SR 36 on the south side of Tooele City. **Recreation/Travel Corridor Views** ▪ Crosses Mormon Trail Road, causing high impacts. Crosses Settlement Canyon Recreation Destination Route, and recreation area causing high impacts; crosses SR 36, causing high impacts; crosses Middle Canyon Road State Scenic Backway, causing high impacts. **Scenery** ▪ Class B moderate scenic quality impacts **Impacts** ▪ 3.2 miles of high impact **Preference Ranking: 1** ▪ Avoids Class A and VRM Class II and Class III areas

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL, AND VISUAL

Route Segment	Route Alternative	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources: Landscape Scenery (miles crossed)	Visual Resources: Residential Viewers (miles crossed)	Visual Resources: Recreation and Travel Corridor Views (miles crossed)	Visual Resources: Visual Resource Management	Visual Resources: Summary of Residual Impacts
LIMBER TO OQUIRRH	**Alternative E1** Pass Canyon	31.1	▪ Same impacts as Alternative D	**Inventory/Issues** ▪ 2 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.1 mile of moderate impact **Preference Ranking: 1** ▪ fewest miles of moderate impact	**Class A Scenery** - 2.5 **Class B Scenery** - 6.0	**Immediate Foreground Views** - 1.0 **Foreground Views** - 3.5	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 1.2 ▪ Foreground - 1.3 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.1 ▪ Foreground - 5.3	▪ Not in compliance with Class II VRM (Link 235)	**Residential, Recreation and Travel Corridor** ▪ Impacts identical to Alternative D south of Pine Canyon and near Oquirrh Substation **Residential Views** ▪ Higher visibility from residences located in and around Lincoln (low impacts); lower visibility and impacts from SR 111 on West Bench, compared to Alternative D; lower visibility from Old Bingham Highway, compared to Alternative D **Recreation/Travel Corridor Views** ▪ Middle Canyon Scenic Backway, Butterfield Pass Viewing Area **Scenic Quality** ▪ High impacts on NOMA scenic values (Class A Scenic Quality) **Impacts** ▪ 5.6 miles of high impact **Preference Ranking: 2**
	Alternative E2 Proponent's Proposed Action	31.1	▪ Same impacts as Alternative D	**Inventory/Issues** ▪ 2 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.2 miles of moderate impact **Preference Ranking: 2** ▪ second fewest miles of moderate impact with the fewest sites	**Class A Scenery** - 2.5 **Class B Scenery** - 6.0	**Immediate Foreground Views** - 1.0 **Foreground Views** - 3.9	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 1.2 ▪ Foreground - 1.3 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 6.4 ▪ Foreground - 4.5	▪ Not in compliance with Class II VRM (Link 235)	**Impacts identical to Alternative E1** ▪ Greater visibility from residences southeast of West 8200 South, Old Bingham Highway, and SR 111 **Impacts** ▪ 5.6 miles of high impact **Preference Ranking: 3**
	Alternative F1 Middle/Butterfield Canyon	29.3	▪ Same impacts as Alternative D	**Inventory/Issues** ▪ 4 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.2 miles of moderate impact **Preference Ranking: 4** ▪ more sites than E2	**Class A Scenery** - 5.3 **Class B Scenery** - 6.3	**Immediate Foreground Views** - 1.0 **Foreground Views** - 3.8	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 10.4 ▪ Foreground - 1.9 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 17.3 ▪ Foreground - 3.5	No VRM Class II or III crossed.	**Residential Views** ▪ Identical to Alternative E1 south of Middle Canyon (Grimm Hill Road and Haylie Lane); lower visibility from residences southeast of West 8200 South. **Recreation/Travel Corridor Views** ▪ High impacts on Middle Canyon Scenic Backway, Butterfield Pass Viewing; lower visibility from residences southeast of West 8200 South and Old Bingham Highway **Scenery** ▪ Class A Impacts in Oquirrh Mountains **Impacts** ▪ 12.8 miles of high impact **Preference Ranking: 5**
	Alternative F2 Middle/Butterfield Canyon	29.6	▪ Same impacts as Alternative D	**Inventory/Issues** ▪ 4 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.2 miles of moderate impact **Preference Ranking: 4** ▪ more sites than E2	**Class A Scenery** - 5.3 **Class B Scenery** - 6.3	**Immediate Foreground Views** - 1.0 **Foreground Views** - 3.8	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 10.4 ▪ Foreground - 1.9 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 17.6 ▪ Foreground - 3.5	▪ No VRM Class II or III crossed.	**Residential Views** ▪ Identical to Alternative F1 **Recreation/Travel Corridor Views** ▪ Identical to Alternative F1; Middle Canyon Scenic Backway, Butterfield Pass Viewing Area; higher visibility from Old Bingham Road. **Scenery** ▪ Identical to Alternative F1 **Impacts** ▪ 12.8 miles of high impact **Preference Ranking: 5**

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL, AND VISUAL

Route Segment	Route Alternative	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources: Landscape Scenery (miles crossed)	Visual Resources: Residential Viewers (miles crossed)	Visual Resources: Recreation and Travel Corridor Views (miles crossed)	Visual Resources: Visual Resource Management	Visual Resources: Summary of Residual Impacts
LIMBER TO OQUIRRH	**Alternative G** Lake Point	49.0	▪ Same impacts as Alternative D	**Inventory/Issues** ▪ 22 archaeological sites identified by the Class I and Class II **Impacts** ▪ 0.6 miles of moderate impact **Preference Ranking: 5** ▪ most moderate impact	**Class A Scenery** - 1.4 **Class B Scenery** - 4.7	**Immediate Foreground Views** - 0.9 **Foreground Views** - 1.9	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.2 ▪ Foreground - 4.4 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 6.8 ▪ Foreground - 5.8	▪ No VRM Class II or III crossed.	**Residential Views** ▪ High impacts on residential views near Old Lincoln Highway and SR 138 northwest of Grantsville and Clinton Landing Road at Lake Point. Moderate impacts on residences located in northern Tooele Valley (Higley Road). Potential viewer impacts on West Bench future planned development. **Recreation/Travel Corridor Views** ▪ Moderate impacts from Grantsville Reservoir Camping Area. High impacts on views from Davenport Canyon/North Willow Canyon Scenic Byway, South Willow Canyon Scenic Byway, and Box Canyon destination route. High impacts on views from Mormon Trail for a short distance; high impacts at SR 138 crossing and Great Salt Lake views from Interstate 80 (I-80)/California Trail NHT. Moderate-to-low impacts on Great Salt Lake Marina State Park, I-80 viewing area, and I-80 at Lake Point. Views in background generally across West Bench from travel corridors. Impacts identical to Alternative E1 west of Oquirrh Substation (SR 111, Old Bingham Canyon Road). **Scenery** ▪ High Class A scenery impacts for a short distance at Lake Point and moderate impacts on Class B agricultural landscapes in northern Tooele Valley. ▪ Increased visibility of conductors along the south end of the Great Salt Lake, as a result of marker ball (bird) diverters **Impacts** ▪ 3.0 miles of high impact **Preference Ranking: 4**
LIMBER TO TERMINAL	**Alternative H** Environmentally Preferred Alternative/ Proponent's Proposed Action	45.4	▪ Impacts on employment, population, housing, government provided services, and property values are minimal.	▪ Inventory/Issues ▪ 18 archaeological sites identified by the Class I and Class II ▪ Impacts ▪ 0.7 miles of moderate impact ▪ Preference Ranking: 1 ▪ Fewest miles of moderate impact	**Class A Scenery** - 1.4 **Class B Scenery** - 7	**Immediate Foreground Views** - 1.2 **Foreground Views** - 3.3	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 5.2 ▪ Foreground - 7.6 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 8.1 ▪ Foreground - 8.6	▪ No VRM Class II or III crossed.	**Residential Views** ▪ Identical impacts on residences as Alternative G **Recreation/Travel Corridor Views** ▪ Identical impacts on residences as Alternative G at Lake Point and in northern Tooele Valley; low impacts from I-80 north of Kennecott tails pond **Scenery** ▪ Identical impacts on scenery as Alternative G ▪ Increased visibility of conductors along the south end of the Great Salt Lake, as a result of marker ball (bird) diverters **Impacts** ▪ 3.0 miles of high impact **Preference Ranking: 1** ▪ High impacts derived primarily from recreational/travel viewpoints, fewer high residual impacts on residences in Tooele and on east side of valley than Alternative I
	Alternative I East Tooele Valley	40.4	▪ Same impacts as Alternative I	▪ Inventory/Issues ▪ 25 archaeological sites identified by the Class I and Class II ▪ Impacts ▪ 4.0 miles of moderate impact ▪ Preference Ranking: 2 ▪ Most miles of moderate impact	**Class A Scenery** - 0.6	**Immediate Foreground Views** - 6.4 **Foreground Views** - 6.3	**High Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 8.4 ▪ Foreground - 6.8 **Moderate Sensitivity Road and Recreation Views** ▪ Immediate Foreground - 12.9 ▪ Foreground - 7.7	▪ In compliance with Class III VRM.	**Residential Views** ▪ Many residences in and around Tooele City near: Union Pacific Railroad crossing, SR 112, North 100 West, West 600 North, west of SR 36, Droubay Road, and Lincoln area; high impacts on some Tooele City residences. **Recreational/Travel Corridor** ▪ Low impacts from I-80/California NHT, SR 172, SR 201, SR 202, SR 36, and SR 112, and low residual impacts on Mid Valley Trail, Tooele County planned trails **Impacts** ▪ 2.2 miles of high impact **Preference Ranking: 2**

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Route Segment	Route Alternative	Length (miles)	Linear Features (miles)					Jurisdiction (miles crossed)				Land Use	
			UNEV Pipeline Parallel (Proposed)	Existing Transmission Line Parallel (345/138kV)	Railroad Parallel	Within DOE West-wide Energy Corridor	Major Roads and Highways Parallel	Private	State	Bureau of Land Management	Tooele Army Depot	Land Use and Recreation Resources	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
MONA TO LIMBER	**Alternative A1** North Long Ridge Mountains	67.9	15.5	5.8	4.6	15.8	6.8	26.6	6.9	34.4	0.0	**Inventory/Issues** ▪ 6.1 miles dryland and irrigated agriculture; 3.5 miles of Agriculture Protection Area; 1.7 miles of center-pivot agriculture; crosses the Pony Express Scenic Byway **Impacts/Mitigation** ▪ No high impacts ▪ 1.7 miles of moderate impacts ▪ **Preference Ranking: 3** ▪ Impacts on center-pivot agriculture	N/A
	Alternative A2 BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	69.4	15.5	3.6	4.6	13.6	6.8	26.0	8.1	35.3	0.0	**Inventory/Issues** ▪ 5.4 miles dryland and irrigated agriculture; 1.5 miles of Agriculture Protection Area; crosses the Pony Express Scenic Byway **Impacts/Mitigation** ▪ No moderate or high impacts **Preference Ranking: 1** ▪ Least amount of moderate impacts	N/A
	Alternative B1 East Rush Valley	70.0	0.4	5.8	—	5.8	5.0	28.6	5.0	36.4	0.0	**Inventory/Issues** ▪ 5.8 miles dryland and irrigated agriculture; 1.7 miles of center-pivot agriculture; 3.5 miles of Agriculture Protection Area; 4.1 miles Fivemile Pass Recreation Area; 0.1 mile Mercur Canyon Outwash hazardous waste site; crosses the Pony Express Scenic Byway; 1 residence within 0.25 mile **Impacts** ▪ 0.1 miles of moderate impact ▪ Spans center-pivot fields and hazardous waste site **Preference Ranking: 3** ▪ Impacts on Fivemile Pass Recreation Area, center pivot agriculture and proximity to a hazardous waste site	**Tooele County** ▪ Concerned about visual impacts on residents in Stockton and south of South Mountain
	Alternative B2 East Rush Valley	71.5	0.4	3.6	—	3.6	5.0	28.1	6.1	37.3	0.0	**Inventory/Issues** ▪ 5.1 miles dryland, irrigated, and center-pivot agriculture; 1.5 miles of Agriculture Protection Area; 4.1 miles Fivemile Pass Recreation Area; 0.1 mile Mercur Canyon Outwash hazardous waste site; crosses the Pony Express Scenic Byway; 1 residence within 0.25 mile **Impacts** ▪ 1.8 miles of moderate impact ▪ Spans center-pivot fields and hazardous waste site **Preference Ranking: 2** ▪ Impacts on Fivemile Pass Recreation Area and proximity to a hazardous waste site	**Tooele County** ▪ Concerned about visual impacts on residents in Stockton and south of South Mountain
	Alternative C1 Tintic Junction	67.1	27.2	5.8	5.2	22.8	6.8	27.8	5.5	33.8	0.0	**Inventory/Issues** ▪ 2.0 miles dryland and irrigated agriculture; 1.7 miles of center-pivot agriculture; 0.7 mile Railroad Bed Road Scenic Byway; 1 residence within 0.25 mile **Impacts** ▪ No high impacts ▪ 1.7 miles of moderate impacts **Preference Ranking: 3** ▪ Impacts on the Railroad Bed Road Scenic Byway and center-pivot agriculture	N/A

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Route Segment	Route Alternative	Length (miles)	Linear Features (miles)					Jurisdiction (miles crossed)				Land Use	
			UNEV Pipeline Parallel (Proposed)	Existing Transmission Line Parallel (345/138kV)	Railroad Parallel	Within DOE West-wide Energy Corridor	Major Roads and Highways Parallel	Private	State	Bureau of Land Management	Tooele Army Depot	Land Use and Recreation Resources	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
MONA TO LIMBER	**Alternative C2** Tintic Junction	68.4	27.2	3.6	5.2	20.6	6.8	27.2	6.5	34.7	0.0	**Inventory/Issues** ▪ 1.3 miles dryland and irrigated agriculture; 2.0 miles of Agriculture Protection Area; 0.7 mile Railroad Bed Road Scenic Byway; 1 residence within 0.25 mile **Impacts** ▪ No moderate or high impacts **Preference Ranking: 1** ▪ Impacts on the Railroad Bed Road Scenic Byway	N/A
LIMBER TO OQUIRRH	**Alternative D** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	31.1	0.5	12.3	—	—	3.8	27.7	2.7	0.3	0.0	**Inventory/Issues** ▪ 1.4 miles Carr Fork Wildlife Management Area (WMA) and International Smelting and Refining superfund site; crosses the Middle Canyon Scenic Backway; 4.1 miles planned Kennecott West Bench Master Plan and Daybreak developments; 13 residences within 0.25 mile **Impacts** ▪ 1.4 miles of high impact **Preference Ranking: 3** ▪ Fewer high impacts than Alternative E1 and E2 and more high impacts than F1, F2, and G	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Impacts on planned development and potential conflicts with mining operations (Links 230 and 240) **Salt Lake County** ▪ Prefer alternative through Pass Canyon **South Jordan** ▪ Avoids impacts on planned park in Bingham Creek **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition. **West Jordan** ▪ Avoids impacts on future development along SR 111
LIMBER TO OQUIRRH	**Alternative E1** Pass Canyon	31.1	0.5	14.5	—	—	—	27.1	1.5	2.6	0.0	**Inventory/Issues** ▪ 2.4 miles Carr Fork WMA and Pine Canyon Conservation Area superfund site; 2.6 miles North Oquirrh Management Area (NOMA); crosses the Middle Canyon Scenic Backway; 13 residences within 0.25 mile; 6.9 miles planned Kennecott West Bench Master Plan and Daybreak developments **Impacts** ▪ 5.7 miles of high impact **Preference Ranking: 4** ▪ Most amount of high impacts, along with Alternative E2, and more impacts on planned development than Alternative E2	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Impacts on planned development and potential conflicts with mining operations (Links 242 and 244) **Salt Lake County** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon and impacts on planned development (Links 242 and 244) **South Jordan** ▪ Impact on planned park in Bingham Creek (Link 285) **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition **West Jordan** ▪ Preferred over Alternative E2 to avoid impacts on future development along SR 111
LIMBER TO OQUIRRH	**Alternative E2** Proponent's Proposed Action	31.1	0.5	16.8	—	—	3.8	27.1	1.5	2.6	0.0	**Inventory/Issues** ▪ 2.4 miles Carr Fork WMA and International Smelting and Refining superfund site; 2.6 miles NOMA; Crosses the Middle Canyon Scenic Backway; 13 residences within 0.25 mile; 4.1 miles planned Kennecott West Bench Master Plan and Daybreak developments **Impacts** ▪ 5.7 miles of high impact **Preference Ranking: 4** ▪ Most amount of high impacts, along with Alternative E1, but fewer impacts on planned development than Alternative E1.	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Prefer over E1 to avoid potential conflicts with mining operations and impacts on planned development in foothills and the planned Bingham Creek Park **Salt Lake County** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon, and prefer over Alternative E1 to avoid impacts on planned development in foothills **South Jordan** ▪ Preferred over Alternative E1 to avoid impacts on planned park in Bingham Creek **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Route Segment	Route Alternative	Length (miles)	Linear Features (miles)					Jurisdiction (miles crossed)				Land Use	
			UNEV Pipeline Parallel (Proposed)	Existing Transmission Line Parallel (345/138kV)	Railroad Parallel	Within DOE West-wide Energy Corridor	Major Roads and Highways Parallel	Private	State	Bureau of Land Management	Tooele Army Depot	Land Use and Recreation Resources	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
LIMBER TO OQUIRRH	**Alternative F1** Middle/Butterfield Canyon	29.3	0.5	2.1	—	—	10.7	27.1	1.6	0.6	0.0	**Inventory/Issues** ▪ Parallels the Middle Canyon Scenic Byway; 0.1 mile dryland and irrigated agriculture; 6.8 miles planned Kennecott West Bench Master Plan and Daybreak developments; and 13 residences within 0.25 mile **Impacts** ▪ 6.9 miles of moderate impact **Preference Ranking: 1** ▪ More impacts on planned development than Alternative F2	**Kennecott Land and Copper** ▪ Impacts on development plans and potential conflicts with future mining operations **Salt Lake County** ▪ Acceptable, but not preferred, if located on the north side of the road and the road is improved **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition
	Alternative F2 Middle/Butterfield Canyon	29.6	0.5	2.2	—	—	10.7	27.4	1.6	0.6	0.0	**Inventory/Issues** ▪ Parallels the Middle Canyon Scenic Byway; 0.2 miles open space; 13 residences within 0.25 mile; 6.8 miles planned Kennecott West Bench Master Plan and Daybreak developments **Impacts** ▪ 6.9 miles of moderate impact **Preference Ranking: 1** Fewer impacts on planned development than Alternative F1	**Kennecott Land and Copper** ▪ Impacts on development plans and the planned Bingham Creek Park ▪ Potential conflicts with future mining operations **Salt Lake County** ▪ Acceptable, but not preferred, if located on the north side of the road and the road is improved **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition
	Alternative G Lake Point	49.0	1.9	22.1	—	—	3.8	42.5	6.5	0.0	0.0	**Inventory/Issues** ▪ 4.1 miles dry land and irrigated agriculture; 17.5 miles Tooele Special Area Management Plan (SAMP); 8 residences within 0.25 mile; 11.0 miles planned Kennecott West Bench Master Plan and Daybreak developments **Impacts** ▪ 29.2 miles of moderate impact **Preference Ranking: 2** ▪ Fewer impacts on planned development than Alternative F1	**Kennecott Land** ▪ Impacts on planned developments (West Bench Master Plan) **Tooele City and County** ▪ Preferred Alternative because it avoids the developed area on the east side of the Valley
LIMBER TO TERMINAL	**Alternative H** Environmentally Preferred Alternative/ Proponent's Proposed Action	45.4	1.9	26.1	—	—	2.3	39.0	6.4	0.0	0.0	**Inventory/Issues** ▪ 4.8 miles dryland and irrigated agriculture; crosses Davenport/North Willow Canyon and South Willow Canyon Scenic Byways; 5.1 miles planned Kennecott West Bench Master Plan; 17.5 miles Tooele SAMP; 9 residences within 0.25 mile **Impacts** ▪ 24.3 miles of moderate impact **Preference Ranking: 1**	**Inland Sea Shorebird Reserve (ISSR), Kennecott Land and Copper** ▪ Prefer route option on south side of tailings pond (Link 375) to avoid impacts on ISSR and potential conflicts with future tailings pond expansion **Salt Lake County** ▪ Visual impacts on residents in Magna and potential impacts on future expansion of landfill **Salt Lake City** ▪ Preferred route option on the south side of the tailings pond (Link 375) to avoid impacts to the Northwest Quadrant Plan **Tooele City and County** ▪ Preferred over Alternative I to avoid land use and visual impacts on the east side of the valley
	Alternative I East Tooele Valley	40.4	23.1	25.1	17.5	1.2	7.0	35.0	0.8	2.0	2.6	**Inventory/Issues** ▪ 0.3 mile residential; 1.7 miles Tooele Army Depot; 2.0 miles NOMA; 2.1 miles Green Ravine Conservation Easement; 7.5 miles planned developments; 487 residences within 0.25 mile **Impacts** ▪ 2.3 miles of high impacts **Preference Ranking: 2**	**ISSR, Kennecott Land and Copper** ▪ Impacts on ISSR, due to increased predation (Link 385) ▪ Potential conflicts with future expansion of tailings pond (Link 385) ▪ Preferred route options on north side of tailings pond (Link 385) of Kennecott Copper **Ensign Group** ▪ Impacts on planned Saddleback development **Salt Lake County** ▪ Preferred route option on the north side of the tailings pond (Link 385) to avoid impacts on the residents of Magna and the County landfill **Salt Lake City** ▪ Impacts on Northwest Quadrant Plan **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition

TABLE 2-9
ALTERNATIVE ROUTE COMPARISON
ENGINEERING ISSUES AND GROUND DISTURBANCE

Route Segment	Route Alternative	Length (miles)	System Reliability	Topography	Construction Access and Design Issues	Ground Disturbance: Temporary (acres)[1]	Ground Disturbance: Permanent (acres)[2]	Ground Disturbance: Right-of-Way Clearing (acres)[3]
MONA TO LIMBER	**Alternative A1** North Long Ridge Mountains	67.9	▪ 5.8 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 3 miles of moderate terrain over Long Ridge Mountains	▪ 23.5 miles of existing access ▪ 44.4 miles of new access	748	151	236
	Alternative A2 BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	69.4	▪ 3.6 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 4.5 miles of moderate terrain over Long Ridge Mountains	▪ 27.5 miles of existing access ▪ 38.3 miles of new access	750	136	303
	Alternative B1 East Rush Valley	70.0	▪ 5.8 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 3 miles of moderate terrain over Long Ridge Mountains	▪ 17.8 miles of existing access ▪ 52.2 miles of new access	770	173	310
	Alternative B2 East Rush Valley	71.5	▪ 3.6 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 4.5 miles of moderate terrain over Long Ridge Mountains	▪ 21.8 miles of existing access ▪ 46.1 miles of new access	773	157	376
	Alternative C1 Tintic Junction	67.1	▪ 5.8 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 3 miles of moderate terrain over Long Ridge Mountains ▪ Approximately 6.5 miles of steep terrain over Tintic Mountains	▪ 10.5 miles of existing access ▪ 56.6 miles of new access	739	174	578
	Alternative C2 Tintic Junction	68.4	▪ 3.6 miles parallel to 345kV utility corridor; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing corridor in an area susceptible to outages due to potential for wildfires	▪ Approximately 4.5 miles of moderate terrain over Long Ridge Mountains ▪ Approximately 6.5 miles of steep terrain over Tintic Mountains	▪ 14.5 miles of existing access ▪ 50.3 miles of new access	740	158	642
LIMBER TO OQUIRRH	**Alternative D** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	31.1	▪ No major reliability issues	▪ Approximately 7.5 miles of steep terrain over Oquirrh Mountains	▪ 15.1 miles of existing access ▪ 13.4 miles of new access	248	61	227
	Alternative E1 Pass Canyon	31.1	▪ No major reliability issues	▪ Approximately 8.5 miles of steep terrain over Oquirrh Mountains	▪ 16.1 miles of existing access ▪ 15.0 miles of new access	261	69	232
	Alternative E2 Proponent's Proposed Action	31.1	▪ No major reliability issues	▪ Approximately 8.5 miles of steep terrain over Oquirrh Mountains	▪ 17.0 miles of existing access ▪ 14.1 miles of new access	261	68	227
	Alternative F1 Middle/Butterfield Canyon	29.3	▪ No major reliability issues	▪ Approximately 9.5 miles of steep terrain through Middle and Butterfield Canyons	▪ 10.2 miles of existing access ▪ 19.1 miles of new access	245	79	261
	Alternative F2 Middle/Butterfield Canyon	29.6	▪ No major reliability issues	▪ Approximately 9.5 miles of steep terrain through Middle and Butterfield Canyons	▪ 11.0 miles of existing access ▪ 18.6 miles of new access	250	80	267
	Alternative G Lake Point	49.0	▪ Would parallel Alternatives H and I around Lake Point for approximately 4 to 5 miles with a separation of less than 1,500 feet ▪ Would not meet the WECC planning criteria guidelines or the Proponent's purpose and need for the Project	▪ Approximately 6 miles of steep terrain over North Oquirrh Mountains by Lake Point ▪ Approximately 9 miles of steep terrain crossing the foothills of the Oquirrh Mountains	▪ 16.6 miles of existing access ▪ 32.4 miles of new access	414	115	96
LIMBER TO TERMINAL	**Alternative H** Environmentally Preferred Alternative/ Proponent's Proposed Action	45.4	▪ No major reliability issues	▪ Approximately 2 miles of steep terrain over North Oquirrhs by Lake Point	▪ 19.4 miles of existing access ▪ 26.0 miles of new access	383	88	41
	Alternative I East Tooele Valley	40.4	▪ No major reliability issues	▪ Approximately 2 miles of steep terrain over North Oquirrhs by Lake Point	▪ 23.7 miles of existing access ▪ 16.7 miles of new access	342	72	41

NOTES: [1] Temporary disturbance = the area disturbed due to structure work areas, wire splicing sites, wire pulling sites, wire tensioning sites, construction yards, and one concrete batch plant (refer to Table 2-2).
[2] Permanent disturbance = the area disturbed due to structure base areas and access roads (refer to Tables 2-2 and 2-7).
[3] Right-of-way clearing = the estimated area that would require vegetation clearing within the right-of-way (calculations include vegetation types with the potential to grow 12 feet tall: mountain shrub, pinyon-juniper, riparian, deciduous forest, mixed conifer forest, spruce-fir, and hybrid oak).

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TABLE 2-10
ALTERNATIVE ROUTE COMPARISON SUMMARY

Route Segment	Route Alternative	Overall Length (miles)	Parallel to Existing Transmission Line (miles/percent)	New Transmission Line Route (miles/percent)	Located within Proposed DOE West-Wide Corridor (miles)	Jurisdiction (miles crossed)			Environmental Preference Ranking*								Estimated Ground Disturbance			Access Roads	Overall Environmental Preference	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
									Natural Resources					Human Resources								
									Water/Geology		Biology											
						BLM	SITLA	Private	Water	Geology/Soils	Wildlife	Vegetation/ Wetlands	Paleontology	Cultural	Visual	Land Use	Temporary (acres)	Permanent (acres)	Right-of-Way Clearing (acres)			
MONA TO LIMBER	**Alternative A1** North Long Ridge Mountains	67.9	5.8 (8.5%)	62.1 (68.2%)	15.8	34.4	6.9	26.6	1	1	3	2	4	2	2	3	748	151	236	▪ 23.5 miles of existing access ▪ 44.4 miles of new access	2	**Farmland Reserve** ▪ Avoid impacts to Goshen Valley Area Plan
MONA TO LIMBER	**Alternative A2** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	69.4	2.6 (3.7%)	66.8 (91.5%)	13.6	35.3	8.1	26.0	1	1	4	1	3	1	1	1	750	136	303	▪ 27.5 miles of existing access ▪ 38.3 miles of new access	1	**Farmland Reserve** ▪ Avoid impacts to Goshen Valley Area Plan
MONA TO LIMBER	**Alternative B1** East Rush Valley	70.0	5.8 (8.3%)	64.2 (91.7%)	5.8	36.4	5.0	28.6	1	1	5	3	2	3	4	3	770	173	310	▪ 17.8 miles of existing access ▪ 52.2 miles of new access	4	**Tooele County** ▪ Concerned about visual impacts on residents in Stockton and south of South Mountain **Farmland Reserve** ▪ Avoid impacts to Goshen Valley Area plan
MONA TO LIMBER	**Alternative B2** East Rush Valley	71.5	2.6 (3.7%)	68.9 (96.3%)	2.6	37.3	6.1	28.1	1	1	6	4	1	3	3	2	773	157	376	▪ 21.8 miles of existing access ▪ 46.1miles of new access	3	**Tooele County** ▪ Concerned about visual impacts on residents in Stockton and south of South Mountain **Farmland Reserve** ▪ Avoid impacts to Goshen Valley Area plan
MONA TO LIMBER	**Alternative C1** Tintic Junction	67.1	5.8 (8.6%)	61.3 (91.4%)	22.8	33.8	5.5	27.8	1	1	1	5	6	4	6	3	739	174	578	▪ 10.5 miles of existing access ▪ 56.6 miles of new access	6	N/A
MONA TO LIMBER	**Alternative C2** Tintic Junction	68.4	2.6 (4.0%)	65.8 (96.0%)	20.6	34.7	6.5	27.2	1	1	2	6	5	4	5	1	740	158	642	▪ 14.5 miles of existing access ▪ 50.3 miles of new access	5	N/A
LIMBER TO OQUIRRH	**Alternative D** BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	31.1	12.3 (40.0%)	18.8 (60%)	–	0.3	2.7	27.7	1	1	3	1	4	3	1	3	248	61	227	▪ 15.1 miles of existing access ▪ 13.4 miles of new access	1	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Impacts on planned development and potential conflicts with mining operations (Links 230 and 240) **Salt Lake County** ▪ Prefer alternative through Pass Canyon **South Jordan** ▪ Avoids impacts on planned park in Bingham Creek **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition. **West Jordan** ▪ Avoids impacts on future development along SR 111

TABLE 2-10
ALTERNATIVE ROUTE COMPARISON SUMMARY

Route Segment	Route Alternative	Overall Length (miles)	Parallel to Existing Transmission Line (miles/percent)	New Transmission Line Route (miles/percent)	Located within Proposed DOE West-Wide Corridor (miles)	Jurisdiction (miles crossed)			Environmental Preference Ranking*								Estimated Ground Disturbance			Access Roads	Overall Environmental Preference	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
									Natural Resources					Human Resources								
									Water/Geology		Biology											
						BLM	SITLA	Private	Water	Geology/Soils	Wildlife	Vegetation/ Wetlands	Paleontology	Cultural	Visual	Land Use	Temporary (acres)	Permanent (acres)	Right-of-Way Clearing (acres)			
LIMBER TO OQUIRRH	**Alternative E1** Pass Canyon	31.1	14.5 (46.6%)	16.6 (53.4%)	–	2.6	1.5	27.1	2	1	5	3	1	1	2	4	261	69	232	▪ 16.1 miles of existing access ▪ 15.0 miles of new access	**2**	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Impacts on planned development and potential conflicts with mining operations (Links 242 and 244) **Salt Lake County** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon and impacts on planned development (Links 242 and 244) **South Jordan** ▪ Impact on planned park in Bingham Creek (Link 285) **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition **West Jordan** ▪ Preferred over Alternative E2 to avoid impacts on future development along SR 111
	Alternative E2 Proponent's Proposed Action	31.1	16.8 (54.0%)	14.3 (46%)	–	2.6	1.5	27.1	2	1	4	2	5	2	3	4	261	68	227	▪ 17.0 miles of existing access ▪ 14.1 miles of new access	**4**	**Kennecott Land and Copper** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon ▪ Prefer over E1 to avoid potential conflicts with mining operations and impacts on planned development in foothills and the planned Bingham Creek Park **Salt Lake County** ▪ Prefer alternative through Pass Canyon to avoid impacts on Butterfield Canyon, and prefer over Alternative E1 to avoid impacts on planned development in foothills **South Jordan** ▪ Preferred over Alternative E1 to avoid impacts on planned park in Bingham Creek **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition
	Alternative F1 Middle/Butterfield Canyon	29.3	2.1 (7.2%)	27.2 (92.8%)	–	0.6	1.6	27.1	1	1	1	4	2	4	5	1	245	79	261	▪ 10.2 miles of existing access ▪ 19.1 miles of new access	**2**	**Kennecott Land and Copper** ▪ Impacts on development plans and potential conflicts with future mining operations **Salt Lake County** ▪ Acceptable, but not preferred, if located on the north side of the road and the road is improved **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition

TABLE 2-10
ALTERNATIVE ROUTE COMPARISON SUMMARY

Route Segment	Route Alternative	Overall Length (miles)	Parallel to Existing Transmission Line (miles/percent)	New Transmission Line Route (miles/percent)	Located within Proposed DOE West-Wide Corridor (miles)	Jurisdiction (miles crossed): BLM	Jurisdiction (miles crossed): SITLA	Jurisdiction (miles crossed): Private	Environmental Preference Ranking* – Natural Resources – Water/Geology: Water	Environmental Preference Ranking* – Natural Resources – Water/Geology: Geology/Soils	Environmental Preference Ranking* – Natural Resources – Biology: Wildlife	Environmental Preference Ranking* – Natural Resources – Biology: Vegetation/ Wetlands	Environmental Preference Ranking* – Natural Resources: Paleontology	Environmental Preference Ranking* – Human Resources: Cultural	Environmental Preference Ranking* – Human Resources: Visual	Environmental Preference Ranking* – Human Resources: Land Use	Estimated Ground Disturbance: Temporary (acres)	Estimated Ground Disturbance: Permanent (acres)	Estimated Ground Disturbance: Right-of-Way Clearing (acres)	Access Roads	Overall Environmental Preference	Summary of Community Working Group, Stakeholder Issues, and Agency Comments
LIMBER TO OQUIRRH	**Alternative F2** Middle/Butterfield Canyon	29.6	2.2 (7.4%)	27.4 (92.6%)	–	0.6	1.6	27.4	1	1	2	5	3	4	5	1	250	80	267	▪ 11.0 miles of existing access ▪ 18.6 miles of new access	**3**	**Kennecott Land and Copper** ▪ Impacts on development plans and the planned Bingham Creek Park ▪ Potential conflicts with future mining operations **Salt Lake County** ▪ Acceptable, but not preferred, if located on the north side of the road and the road is improved **Tooele City and County** ▪ Opposes route on southeast bench due to impacts on residences, views, wildlife, and citizen opposition
	Alternative G Lake Point	49.0	22.1 (45.1%)	26.9 (54.9%)	–	0.0	6.5	42.5	1	2	6	6	6	5	4	2	414	115	96	▪ 16.6 miles of existing access ▪ 32.4 miles of new access	**5**	**Kennecott Land** ▪ Impacts on planned developments (West Bench Master Plan) **Tooele City and County** ▪ Preferred Alternative because it avoids the developed area on the east side of the Valley
LIMBER TO TERMINAL	**Alternative H** Environmentally Preferred Alternative/Proponent's Proposed Action	45.4	26.1 (57.5%)	19.3 (42.5%)	–	0.0	6.4	39.0	1	2	2	2	1	1	1	1	383	88	41	▪ 19.4 miles of existing access ▪ 26.0 miles of new access	**1**	**Inland Sea Shorebird Reserve (ISSR), Kennecott Land and Copper** ▪ Prefer route option on south side of tailings pond (Link 375) to avoid impacts on ISSR and potential conflicts with future tailings pond expansion **Salt Lake County** ▪ Visual impacts on residents in Magna and potential impacts on future expansion of landfill **Salt Lake City** ▪ Preferred route option on the south side of the tailings pond (Link 375) to avoid impacts to the Northwest Quadrant Plan **Tooele City and County** ▪ Preferred over Alternative I to avoid land use and visual impacts on the east side of the valley

TABLE 2-10
ALTERNATIVE ROUTE COMPARISON SUMMARY

							Jurisdiction (miles crossed)			Environmental Preference Ranking* – Natural Resources: Water/Geology		Natural Resources: Biology		Natural Resources	Human Resources			Estimated Ground Disturbance					
Route Segment	**Route Alternative**		**Overall Length (miles)**	**Parallel to Existing Transmission Line (miles/percent)**	**New Transmission Line Route (miles/percent)**	**Located within Proposed DOE West-Wide Corridor (miles)**	**BLM**	**SITLA**	**Private**	**Water**	**Geology/Soils**	**Wildlife**	**Vegetation/ Wetlands**	**Paleontology**	**Cultural**	**Visual**	**Land Use**	**Temporary (acres)**	**Permanent (acres)**	**Right-of-Way Clearing (acres)**	**Access Roads**	**Overall Environmental Preference**	**Summary of Community Working Group, Stakeholder Issues, and Agency Comments**
LIMBER TO TERMINAL	**Alternative I** East Tooele Valley		40.4	25.1 (62.1%)	15.3 (37.9%)	1.2	2.0	0.8	35.0	1	1	1	1	2	2	2	2	342	72	41	▪ 23.7 miles of existing access ▪ 16.7 miles of new access	**2**	**ISSR, Kennecott Land and Copper** ▪ Impacts on ISSR, due to increased predation (Link 385) ▪ Potential conflicts with future expansion of tailings pond (Link 385) ▪ Preferred route options on north side of tailings pond (Link 385) of Kennecott Copper **Ensign Group** ▪ Impacts on planned Saddleback development **Salt Lake County** ▪ Preferred route option on the north side of the tailings pond (Link 385) to avoid impacts on the residents of Magna and the County landfill **Salt Lake City** ▪ Impacts on Northwest Quadrant Plan **Tooele City and County** ▪ Opposes route through Tooele City along railroad due to impacts on residences, views, and citizen opposition

Ranking: 1 = Most Preferred Ranking, 6 = Least Preferred Ranking

* Impacts for resources including Climate and Air Quality, Socioeconomics, Public Health and Safety are generally the same across all alternatives – no ranking was assigned

Chapter 3 – Affected Environment

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CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the environment and resources that the alternatives described in Chapter 2 may potentially affect. Chapter 3 describes the current condition of each resource and relevant characteristics that may be subject to impacts from the Project. Environmental resource baseline information is presented for comparing potential impacts from the Proponent's Proposed Action, alternatives, and the No Action Alternative, which are analyzed in Chapter 4.

Identified resources that may be affected by the Project have been carried forward for analysis in this planning effort and are discussed in Chapters 3 and 4. These resources include:

- Climate and Air Quality
- Earth and Water Resources
  - Geology
  - Soil Resources
  - Water Resources
- Biological Resources
  - Vegetation
  - Wildlife
  - Wild Horse and Burros
  - Special Status Species
- Wildland Fire Ecology and Management
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Wilderness Characteristics
- Land Use and Recreation Resources
- Special Designations
- Social and Economic Conditions
- Environmental Justice

Resource inventories were developed for the area within the study corridors in sufficient detail to assess the potential impacts that could result from the proposed Project. The width of the study corridor along each alternative route differs for each of the resource disciplines, depending on the area that potentially could be affected. The precise location of the centerline would be determined through engineering surveys of the selected route prior to construction. In the interim and for the purpose of the environmental studies, a centerline was mapped for reference. Earth, water, cultural, and paleontological resources were inventoried within a 1-mile-wide corridor (0.5 mile on either side of the reference centerline). Biological resources were inventoried within a 2-mile-wide corridor (1.0 mile on either side of the reference centerline), and visual and land use resources were inventoried within a 6-mile-wide corridor (3 miles on either side of the reference centerline). Data and information for social and economic conditions in the Project area are based on county- and state-wide data and cannot be tailored specifically to the study corridors.

Maps illustrating resource data within the Project area and study corridors are located in Appendix C (Volume II). Resource data was documented along route segments, called Links. The resource discussions in this chapter reference the Links shown on the resource maps (Appendix C), providing a geographic reference to the resource data.

3.1.1 Summary of Changes from the Draft EIS

Chapter 3 was updated to include additional environmental baseline information suggested or provided in substantive agency and public comments received on the Draft EIS and additional data collected to address alternative route adjustments made since the publication of the Draft EIS. Sections 3.2.1, *Climate* *and Air Quality*, and 3.2.6, *Paleontological Resources*, have been substantially revised to support an expanded analysis of impacts to air quality and paleontological resources in Chapter 4.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

3.1.2 Resources Not Affected

Based on BLM Interdisciplinary Team meetings and review matrix (Appendix D – Volume II) and agency scoping, the following resources are not present in the Project area and were not carried forward for analysis:

- Areas of Critical Environmental Concern (ACEC)
- Wild and Scenic Rivers
- Cave and Karst Resources
- Wilderness

3.2 Resources

3.2.1 Climate and Air Quality

3.2.1.1 Climate

The Project area is located in the Great Basin, which comprises the western third of the state of Utah. The Great Basin is cast in the rain shadow of the Sierra Nevada and Cascade mountain ranges, creating an arid climate with hot summers and cold winters (Pope and Brough 1998). Climate data were obtained from two Western Regional Climate Center (WRCC) monitoring stations, Fairfield and Tooele, to represent varying climatic conditions in the northern and southern portions of the Project area.

The Fairfield monitoring station is located in the southern portion of the Project area, southwest of Eagle Mountain in Utah County. The southern portion of the Project area averages 11.9 inches of precipitation annually. Summer temperatures average a high of 86.3 degrees Fahrenheit and a low of 48.0°F. Average winter snowfall is 24.0 inches, with an average high temperature of 40.5°F and an average low of 14.0°F. The highest and lowest temperatures on record are 102.7°F and -36.0°F, respectively (WRCC 2008).

The Tooele monitoring station is located in the northern portion of the Project area, near Tooele City. The northern portion of the Project area averages 17.6 inches of precipitation annually. Summer temperatures average a high of 85.0°F and a low of 59.1°F. Average winter snowfall is 37.0 inches, with an average high temperature of 40.2°F and an average low of 21.7°F. The highest and lowest temperatures on record are 106.7°F and 16.0°F, respectively (WRCC 2006).

3.2.1.2 Air Quality

The EPA set the National Ambient Air Quality Standards (NAAQS) for air pollutants considered harmful to public health and the environment. Standards have been set for six primary pollutants, which are referred to as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, lead, and particulate matter (PM_{10} and $PM_{2.5}$). There are two types of standards, primary standards set to protect public health and secondary standards set to protect public welfare, including damage to buildings, animals, and vegetation. The NAAQS are shown in Table 3-1.

TABLE 3-1
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Primary Standards: parts per million (ppm)	Primary Standards: Micrograms per cubic meter (μg/m³)	Primary Standards: Averaging Time	Secondary Standards: parts per million (ppm)	Secondary Standards: Micrograms per cubic meter (μg/m³)	Secondary Standards: Averaging Time
Carbon Monoxide	9	10,000	8-hour	None		
	35	40,000	1-hour			
Nitrogen Dioxide	0.053	100	Annual Arithmetic Mean	0.053	100	Annual Arithmetic Mean
Sulfur Dioxide	0.03		Annual Arithmetic Mean	0.5	1300	3-hour
	0.14		24-hour			
Ozone	0.075 (2008 standard)		8-hour	0.075		8-hour
	0.08 (1997 standard)		8-hour			
	0.12		1-hour	0.12		1-hour
Lead		0.15	Rolling 3-Month Average		0.15	Rolling 3-Month Average
		1.5	Quarterly Average		1.5	Quarterly Average
Particulate Matter (PM_{10})		150	24-hour		150	24-hour
Particulate Matter ($PM_{2.5}$)		15.0	Annual Arithmetic Mean		15.0	Annual Arithmetic Mean
		35	24-hour		35	24-hour

Notes: μg/m³ = micrograms per cubic meter
Source: EPA NAAQS, 2009

Areas that do not meet the NAAQS are referred to as nonattainment areas. Areas that previously were non-attainment but have reached attainment are referred to as attainment/maintenance areas. More stringent emission regulations apply in these areas. The Project area contains or is adjacent to the following nonattainment and attainment maintenance areas:

- CO
  - Salt Lake City (attainment/maintenance)
  - Provo/Orem (attainment/maintenance)
  - Ogden City (attainment/maintenance)
- SO_2
  - Salt Lake County and east Tooele County above 5,600 feet (nonattainment, re-designation pending)
  - Ozone
  - Salt Lake County (attainment/maintenance)
  - Davis County (attainment/maintenance)

- PM_{10}
  - Salt Lake County (nonattainment, re-designation pending)
  - Utah County (nonattainment, re-designation pending)
  - Ogden City (nonattainment, re-designation pending)

In 1997, EPA established standards for $PM_{2.5}$ and in 2005 attainment designations were made. All of Utah was determined to be in attainment with the $PM_{2.5}$ 24-hour and annual NAAQS. In 2006, EPA strengthened the 24-hour $PM_{2.5}$ standard by lowering the NAAQS concentrations. On October 8, 2009, the EPA issued final area designations for the strengthened 2006 24-hour NAAQS for $PM_{2.5}$. There are two nonattainment areas within and adjacent to the Project area:

- $PM_{2.5}$
  - Salt Lake City: Salt Lake County, Davis County, a Portion of Tooele County, a portion of Box Elder County, and a portion of Weber County (nonattainment)
  - Provo: Portion of Utah County (nonattainment)

For all other criteria pollutants, the Project area is classified as unclassified/attainment.

Monitors are used to measure the concentration of criteria pollutants in the ambient air. Monitoring data from EPA's AirData website for 2008 for monitors in and near the Project area are shown in Table 3-2.

Sensitive areas, such as National Parks and certain wilderness areas, have been designated under the federal Clean Air Act as areas where only a small amount of air quality deterioration is allowed. These areas are referred to as Class I areas. There are no Class I areas in the vicinity of the Project area. The nearest Class I area is Capitol Reef National Park located more than 124 miles from the Project area.

In addition to the criteria pollutants, other pollutants referred to as hazardous air pollutants (HAPs) are regulated. NAAQS have not been established for HAPs. Instead, HAPs are regulated on an emission basis using National Emission Standards for Hazardous Air Pollutants (NESHAPs). NESHAPs regulate emissions from specified emission units and source types. The Project is not expected to include any emission units subject to NESHAPs.

3.2.1.3 Global Climate Change

On-going scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "greenhouse gases" and include carbon dioxide; methane; nitrous oxide; water vapor; and several trace gas emissions. Through complex interactions on a regional and global scale, these emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although climate changing pollutant levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species.

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006 (Goddard Institute for Space Studies 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Figure 3-1 demonstrates that northern latitudes (above 24° North) have exhibited temperature increases of nearly 2.1°F since 1900,

TABLE 3-2
AIR MONITORING DATA FOR 2008

Station Address	County	Carbon Monoxide (ppm)		Nitrogen Dioxide (ppm)	Sulfur Dioxide (ppm)			Ozone (ppm)		Particulate Matter (PM_{10}) ($\mu g/m^3$)	Particulate Matter ($PM_{2.5}$) ($\mu g/m^3$)	
Averaging Period		1-hour 2nd Max	8-hour 2nd Max	Annual Mean	3-hour 2nd Max	24-hour 2nd Max	Annual Mean	1-hour 2nd Max	8-hour 4th Max	24-hour 2nd Max	24-hour 98th Percentile	Annual Mean
5715 S. 1400 E. Salt Lake City	Salt Lake	2.9	2.1	0.018				0.099	0.080	62	46.8	10.47
1675 S. 600 E. Salt Lake City	Salt Lake	3.6	2.3	0.020				0.099	0.075	166	37.4	10.2
1795 N Warm Springs Rd. Salt Lake City	Salt Lake				0.042	0.007	0.002			Monitor #2: 181 Monitor #3: 123		
1250 N. 1400 W. Salt Lake City	Salt Lake										Monitor #1:37.5 Monitor #2: 33.3	Monitor #1: 11.15 Monitor # 2: 9.57
3275 W. 3100 S. West Valley City	Salt Lake	3.3	1.8								Monitor #1: 46.0 Monitor #2: 47.6	Monitor #1: 11.09 Monitor # 2: 10.81
1355 N. 200 W. Provo	Utah	3.9	1.5	0.017				0.105	0.074	Monitor # 2: 90 Monitor #3: 47	45.9	9.63
2935 S. 8560 W. Magna	Salt Lake				0.021	0.005	0.002			65	27.4	8.01
12100 W. 1200 S. Lakepoint	Salt Lake				0.021	0.007	0.003	0.085	0.074			
434 N. 50 W. Tooele	Tooele							0.087	0.070		36.0	6.47
10865 N. 6000 W. Highland	Utah							0.095	0.071		24.6	7.69
312 W. 2050 N. Spanish Fork	Utah							0.105	0.071		26.2	8.20
30 North Main Street Lindon	Utah								29	177	Monitor #1: 35.5 Monitor #2: 28.9	Monitor #1: 9.79 Monitor # 2:9.29
12950 S. 5600 W. Herriman	Salt Lake										42.3	7.74

Notes: ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
Source: EPA Air Data website, 2008

with nearly a 1.8°F) increase since 1970. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of these "greenhouse gases" are likely to accelerate the rate of climate change.

The IPCC has recently completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts, and options for adaptation and mitigation. At the printing of this Final EIS, this assessment is available on the IPCC web site at http://www.ipcc.ch/. According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall patterns, with major implications to agricultural and coastal communities. The IPCC has suggested that the average global surface temperature could rise 1 to 4.5°F in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally, but are likely to be accentuated at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average (BLM 2007). Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

BLM recognizes the importance of climate change and the potential effects it may have on the natural environment. Several activities occur within the Project study area that may generate emissions of climate changing pollutants. For example, urban development, agriculture, large fires, and recreation using combustion engines, can potentially generate CO_2 and methane. Wind erosion from disturbed areas and fugitive dust from roads along with entrained atmospheric dust has the potential to darken glacial surfaces and snow packs resulting in faster snowmelt. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as "carbon sinks".

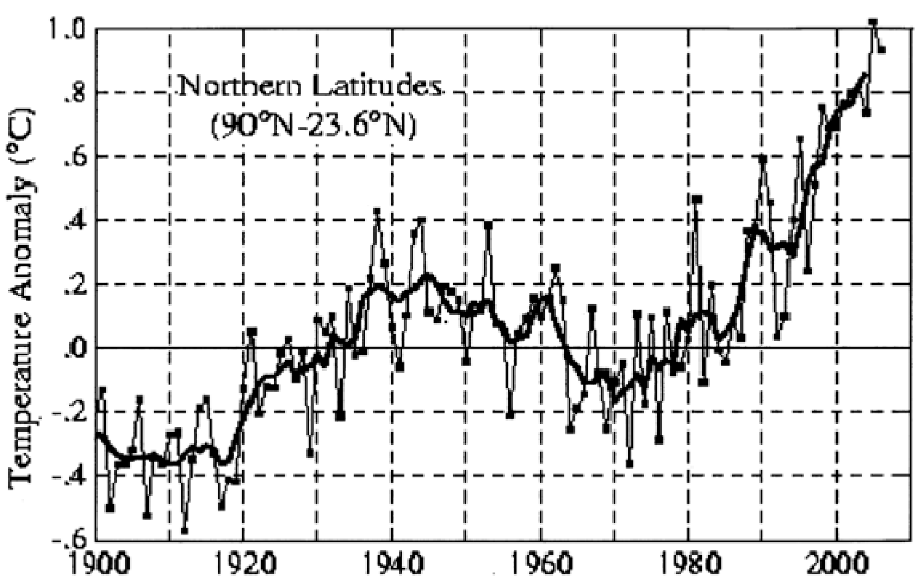


Figure 3-1. Annual Mean Temperature Change for Northern Latitudes (24-90° N)

3.2.2 Earth and Water Resources

3.2.2.1 Geology and Seismicity

Geology

The geology of the Project area is a mix of deposits and represents various ages. The valleys of the Project area are composed of Quaternary alluvium and Lake Bonneville deposits (70 percent of the Project area), and the Oak City Formation, which is tertiary in age (Hintze 1997). The Project area includes the edges (terraces) of the western flank of the Oquirrh Mountains, which consist of the Pennsylvanian Oquirrh Formation and the Bridal Veil Member of the Oquirrh Formation. In the Tintics and Utah Lake region, Early Mississippian Joana Formation occurs at several points, as well as several areas of unidentified volcanic rocks, latite welded tuff, basalt, and rhyolite that range in age from 12 to 34 million years (Hintze 1997). Map C-1 illustrates natural hazards related to earth resources that could potentially affect Project facilities such as fault lines, floodplains, liquefaction potential, and landslide areas.

Seismicity

The central portion of Utah, south of the Great Salt Lake, is located within a seismic zone 3 area. The designation of a zone 3 means that the area has a 1 in 10 chance that an earthquake with an active peak acceleration level of 0.03 g (3/100 the acceleration of gravity) will occur within the next 50 years, which translates to 5.5 to 5.9 on the Richter scale.

Numerous faults are present along the edges of the Utah Valley. The most recent strong earthquakes with an epicenter within the Project area were recorded in 1943 and 1962. Both events measured between 5.0 and 5.4 on the Richter scale. The strongest earthquake noted within the Project area occurred in 1900 and measured 5.5 to 5.9 on the Richter scale, with an epicenter along the southern shore of Utah Lake.

Located along the western edges of the Oquirrh Mountains is an area known as the Oquirrh fault zone. This is a Holocene range-front normal fault along the western base of the northern Oquirrh Mountains in the eastern portion of the Tooele Valley. This fault area is generally north-trending along the western base of the Oquirrh Mountains. Several buried faults do not cut surficial deposits postulated to be in the vicinity of the Oquirrh fault zone. These postulated faults may be older than the Oquirrh fault zone and not related to the zone directly. One such fault, the Occidental Fault, may have been reactivated by the Oquirrh fault zone activity (Solomon 1996). The most recent earthquake event of the primary Oquirrh fault zone occurred during the Late Quaternary (greater than 15,000 years ago or 15 kiloyears [ka]).

The fault zone is observable and is expressed as Quaternary fault scarps on basin-fill sediments; a southern section is expressed as a prominent break in slope at the base of the range front. Profiles of the scarp heights at Big Canyon in the northern fault section yield scarp heights ranging from 12 to 18 meters, maximum slope angles of 24 to 32 degrees, and surface offsets of 4.0 to 6.8 meters; this fault zone is capable of large fissures, with the largest measured rupture estimated to be greater than 12 kilometers (Olig et al. 1996). Current measurements suggest that the slip rate is between 0.1 and 0.2 millimeter/per year, approximately 3 ka, based on data from test trenches within Big and Pole canyons (Olig et al. 1996). These studies also suggest that major activity within the fault zone occur approximately every 13.3 to 22.1 ka.

The southern Oquirrh fault zone was defined by Olig et al. (1999) and includes the Mercur, West Eagle Hill, Soldier Canyon, and Lakes of Kilarney faults. The Southern Oquirrh fault zone is defined as Late Quaternary normal faults bounding the western flake of the southern Oquirrh Mountains.

Test trenching within this area revealed evidence for five to seven surface-rupture events since about 92 ka (Olig et al. 2000, 2001). The most recent event occurred in the Late Quaternary (greater than 15 ka). The average vertical slip rate across the entire fault for the past four to six complete seismic cycles is 0.09 to 0.14 millimeters per year (Olig et al. 2001).

Rock falls are the most common type of slope instability initiated by earthquakes. Case (1987) estimated that a major Wasatch Front earthquake (magnitude 6.0+ on the Richter scale) could produce thousands of rock falls along the Wasatch Front and the Oquirrh Mountains. Keefer (1984) indicated that rock falls may occur in earthquakes as small as a magnitude 4.0 on the Richter scale.

Liquefaction

Liquefaction, the conversion of soil into a fluid-like mass during an earthquake or other seismic event, may occur when water-saturated sandy soils are subjected to earthquake ground shaking. When soil liquefies, it loses strength and behaves as a viscous liquid rather than as a solid. This can cause above- or below-ground structures to tilt, sink, or shift, as well as causing slope failures, surface subsidence, ground cracking, and sand blows.

Two conditions must exist for liquefaction to occur: (1) the soil must be susceptible to liquefaction and (2) ground shaking must be strong enough to cause susceptible soils to liquefy. In Tooele County, the most susceptible soils are along the shorelines of the Great Salt Lake and Rush Lake. The towns of Grantsville and Marshall are located on the shore of the greatest extent of the Great Salt Lake. While the area where these towns are located is stable, the areas immediately to the north are rated high liquefaction zones due to water depths of less than 10 feet, caused by the location of the Great Salt Lake.

Within Utah County in the southern portion of the Project area, the region immediately around Utah Lake, particularly to the south and southeast, is within a highly susceptible zone for liquefaction.

Rock Fall

Rock fall is a natural erosional process in the mountainous areas of Tooele, Salt Lake, Juab, and Utah counties. As urban development advances towards the mountains, the risk from falling rocks increases. Rock falls can damage structures, roadways, and vehicles, and may pose a significant safety hazard. The potential for rock-fall hazards is greatest along the western slope of the Oquirrh Mountains, with a lesser rock-fall hazard along South Mountain and the Stansbury and Tintic mountains.

Rock fall originates when weathering and erosion from supporting rock and sediment destabilize and eventually dislodge rocks from slopes. The most susceptible slopes are those with outcrops broken by bedding surfaces, joints, and other discontinuities into abundant, loose, individual rock fragments.

3.2.2.2 Soils

The soils of the Project area are variable due to the parent materials, topography, and other factors that would affect the distribution and formation of the soils. The soils are susceptible to moderate to high erosion (water, snow, wind), because of the scarcity of vegetation and soil composition as major factors. Results from a soil survey of the Tooele area (Trickler 2000) and the Web Soil Survey (Natural Resources Conservation Service [NRCS] 2007) provide more specific information on various soil characteristics such as texture, depth, slope, and salinity. Map C-2 illustrates soil types in the Project area.

The soils on plateaus, mesas, hillsides, and fan terraces range from very shallow to deep and are generally well drained. In these areas, the water erosion potential is typically slight to moderate, while wind erosion potential is often moderate to severe. On the valley floors, the soils range from very shallow to deep and are typically gravelly, sandy, or loamy with caliche in the subsurface. The erosion potential is slight to moderate and typically increases with greater slope.

3.2.2.3 Summary of Earth Resources Inventory Results

The earth resources inventory results are summarized below.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Alternative A1 crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 1, 2, 3, 5, 50, 60, 40, 90, and 105, as well as the southern half of Link 150. The northern half of Link 150 crosses a deposit of the Miocene Salt Lake Formation, indicated by a low rise in the valley floor. This formation is a result of extensions in the Basin and Range Province. Link 20 crosses the Tertiary-age Moroni Volcanics that make up northern portions of the Tintic Mountains, and consists of a mixture of rhyolitic and ferric basalts. Link 55 crosses the grey limestone of the Mississippian-age Humbug Formation.

Two areas of Alternative A1 either cross or are located within 0.5 mile of known local seismic zones. Link 105 is located 0.25 mile east of the St. Johns Stations Fault Zone near the center of the link. Link 60 crosses the South Oquirrh Fault Zone at an angle, resulting in a 0.25-mile crossing of the zone.

As a result of the types of soil that are located within the area of Mona Lake and the seismic potential in that area, portions of Links 1, 2, 3, 5, and 20 are considered to be moderately susceptible for liquefaction.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Alternative A2 shares the same alignment with Alternative A1, with the exception that Alternative A2 follows Links 10 and 15, instead of Links 5 and 20. The earth resources are similar to those described for Alternative A1.

<u>Alternative B1 – East Rush Valley</u>

Alternative B1 crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 1, 2, 3, 5, 20, 50, 60, 85, and 135, as well as the southern half of Link 150. Links 95, 120, 140, and the southern half of Link 150 are located on the Miocene Salt Lake Formation. Links 55 and 95 are located in grey limestone of the Mississippian-age Humbug Formation.

The South Oquirrh Fault Zone is paralleled by the entire length of Link 95. This area is the most unstable area within the entire study area, due to the combination of slope and the presence of the fault zone.

As a result of the types of soil that are located within the area of Mona Lake and the seismic potential within that area, portions of Links 1, 2, 3, 5, and 20 are considered to be moderately susceptible to liquefaction.

<u>Alternative B2 – East Rush Valley</u>

Alternative B2 shares the same alignment with Alternative B1, with the exception that Alternative B2 follows Links 10 and 15, instead of Links 5 and 20. The earth resources are similar to those described for Alternative B1.

<u>Alternative C1 – Tintic Junction</u>

Alternative C1 crosses the Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 5, 20, 32, 35, 90, 105, and the southern half of 150. Link 24 is located on exposed deposits of the Tertiary-age Moroni Volcanics. As the alternative crosses the Tintic Mountains, the geology becomes more complicated than in other places of the study area. Portions of Links 24 and 30 are located on deposits of grey limestone of the Mississippian-age Humbug Formation. Portions of Links 26, 30, and the northern half of Link 150 are located on the Miocene Salt Lake Formation. The center portions of Links 24 and 26 cross the Cambrian-aged Tintic Quartzite, as well as Ordovician-age Juab Limestone.

As a result of the types of soil that are located within the area of Mona Lake and the seismic potential within that area, portions of Links 1, 2, 3, 5, and 20 are considered to be moderately susceptible to liquefaction.

<u>Alternative C2 – Tintic Junction</u>

Alternative C2 shares the same alignment with Alternative C1, with the exception that Alternative C2 follows Links 10 and 15 instead of Links 5 and 20. The earth resources are similar to those described for Alternative C1.

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

Alternative D crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 166, 255, and 265. The Tertiary-age Moroni Volcanics are crossed by a small portion (500 feet) of Link 160. Links 160, 185, 190A, 220, 230, 240, and 241 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the line crosses the spine of the Oquirrh Mountains.

Links 220 and 230 cross into an area of numerous small normal faults (Mercur Fault) associated with the Oquirrh Fault Zone for almost their entire lengths. Due to the slope and soils along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Alternative E1 – Pass Canyon

Alternative E1 crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 166 and 285. Links 160, 242, and 244 are located on the Miocene Salt Lake Formation. The largest portion of the alternative (Links 160, 185, 190, 220, 225, 235, 239, and 240) crosses the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the line crosses the spine of the Oquirrh Mountains.

Links 220 and 225 cross into an area of numerous small normal faults associated with the Oquirrh Fault Zone for almost their entire lengths. Due to the slope along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Alternative E2 – Proponent's Proposed Action

Alternative E2 crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 166, 255, the eastern half of 241, and 265. The Tertiary-age Moroni Volcanics are crossed by a small portion (500 feet) of Link 160. Links 160, 185, 190, 220, 225, 235, 239, 240, and the western half of 241 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the alternative crosses the spine of the Oquirrh Mountains.

Links 220 and 225 cross into an area of numerous small normal faults (Mercur Fault) associated with the Oquirrh Fault Zone for almost their entire lengths. Due to the slope along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Alternative F1 – Middle/Butterfield Canyon

Alternative F1 crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 166 and 285, as well as the northern halves of Links 290, 306, and 310. The Tertiary-age Moroni Volcanics are crossed by Alternative F1 by a small portion (500 feet) of the center Link 160, and the eastern half of 210. Links 160, 185, 190, 210, 215, and the southern half of 290 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the alternative crosses the spine of the Oquirrh Mountains.

Alternative F2 – Middle/Butterfield Canyon

Alternative F2 crosses Quaternary-age gravelly silt deposits of the Lake Bonneville deposits on Links 166, 265, the northern half of 290, 306, 310, and 315. The Tertiary-age Moroni Volcanics are crossed by a small portion (500 feet) of Link 160, and the eastern half of 210. Links 160, 185, 190, 210, 215, and the southern half of 290 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the alternative crosses the spine of the Oquirrh Mountains.

Alternative G – Lake Point

Alternative G crosses Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 335, 350, 352, 353, 354, 356, 365, and 366, as well as the eastern halves of Links 241, 255, and 265. The southern half of Link 335 and the southern two-thirds of Link 376 are located on the Miocene Salt Lake Formation. Links 370, 374, and the northern third of Link 376 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the alternative crosses the northern toe of the Oquirrh Mountains. Link 350 crosses deposits of grey limestone of the Mississippian-age Humbug Formation.

Problem soils are identified along Links 354, 356, and 365 as swelling clay soils with possible gypsum inclusions. These soils are capable of causing tilting of surface structures (i.e., buildings), as well as unstable foundations.

Due to the combination of the silty deposits of the Lake Bonneville deposits and the shallowness of the water table, as well as nearby seismic faults, Links 352, 353, 354, 356, 365, and 366, are located within soils that are highly susceptible to liquefaction.

Link 370 crosses the Oquirrh Fault Zone at the northern toe of the Oquirrh Mountains. Due to the slope along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Alternative H crosses over Quaternary-age gravelly silt of the Lake Bonneville deposits on Links 335, 350, 352, 353, 354, 356, 365, 366, 374, 375, and 386. The southern half of Link 335 is located on the Miocene Salt Lake Formation. Links 370 and 374 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the line crosses the northern toe of the Oquirrh Mountains. Link 350 crosses deposits of grey limestone of the Mississippian-age Humbug Formation.

Problem soils are identified along Links 354, 356, and 365 as swelling clay soils with possible gypsum inclusions. These soils are capable of causing tilting of surface structures (i.e., buildings), as well as unstable foundations.

Due to the combination of the silty deposits of the Lake Bonneville deposits and the shallowness of the water table as well as nearby seismic faults, Links 352, 353, 354, 356, 365, and 366, are located within soils that are highly susceptible to liquefaction.

Link 370 crosses the Oquirrh Fault Zone at the northern toe of the Oquirrh Mountains. Due to the slope along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Alternative I – East Tooele Valley

Alternative I crosses Quaternary-age unconsolidated soils of the Lake Bonneville deposits on Links 166, 180, 325, 326, 330, 360, 385, and 386, whereas Links 160 and 360 are located on the Miocene Salt Lake Formation. Links 160, 360, and 370 cross the Pennsylvanian Bridal Veil Member of the Oquirrh Formation as the alternative crosses the northern toe of the Oquirrh Mountains.

Due to the combination of the silty deposits of the Lake Bonneville deposits and the shallowness of the water table as well as nearby seismic faults, Links 166, and 385 are located within soils that are moderately to highly susceptible to liquefaction.

Link 370 crosses the Oquirrh Fault Zone at the northern toe of the Oquirrh Mountains. Due to the slope along the western side of the Oquirrh Mountains, along with the Fault Zone, this area is susceptible to land slumping and slides.

Substation Sites

Mona Annex Substation

The proposed Mona Annex Substation site would be located in Tertiary-age Moroni Volcanics and Quaternary-age gravelly silt of the Lake Bonneville deposits. Portions of South Oquirrh Fault Zone are located within 2 miles to the west of the planned substation. Due to the nature of Lake Bonneville deposits and the shallowness of the water table within the vicinity, liquefaction is considered moderate in this area.

Limber Substation

The future Limber Substation would be located on an outcropping of the Pennsylvanian Bridal Veil Member of the Oquirrh Formation. There are no known seismic zones near the area of the proposed substation. Liquefaction potential is considered low at the site.

3.2.2.4 Water Resources

Water within the Project area is scarce and unevenly distributed. Most surface flow and groundwater recharge result from winter precipitation in the area's mountain ranges. Summer thunderstorms can produce intense rainfall of short duration, but little precipitation escapes rapid evapotranspiration in the dry, desert climate. Surface water and groundwater are estimated to be of good quality on mountain flanks and foothills, but are often hard and/or brackish on valley floors, particularly within the Project area near the Great Salt Lake and Tooele Valley.

Methods

Information for this inventory was obtained primarily from publications and discussions with agency specialists of the BLM, U.S. Forest Service (USFS), NRCS, USDA, U.S. Geological Survey (USGS), Bureau of Mines, Federal Emergency Management Agency (FEMA), Utah Bureau of Mines and Geology, Utah Department of Water Resources, Utah Museum of Natural History, Utah Geological and Mineral Survey, Brigham Young University, and the University of Utah.

Specific resource features that were identified include:

- Intermittent and perennial streams and lakes
- Springs/wells
- Shallow groundwater
- Flood-prone areas

Recent aerial imagery also was used to inventory data and verify locations of sensitive features. Data were identified within 0.5 mile of the assumed centerline for each routing alternative (study corridor). Springs and wells were identified within 600 feet of the assumed centerline for each routing alternative. Map C-3 illustrates surface water resources in the Project area.

Drainage Basins and Streams

Existing Major Drainage Patterns

Within the eastern portion of the Project area, the primary drainages flow from the Oquirrh Mountains to the Jordan River. Because of the semi-arid climate in the area, most of these drainage channels convey little or no streamflow for long periods of time during the year. Much of the natural drainage within the eastern drainage basins have been interrupted or eliminated due to agricultural development. There are two perennial streams on the east side of the Oquirrh Mountains: Bingham Creek and Butterfield Canyon Creek. Butterfield Canyon Creek flows east through Butterfield Canyon, south of the Bingham Canyon Mine.

Bingham Creek is the largest remaining natural-flow drainage on the eastern flanks of the Oquirrh Mountains. In order to control water quality from storm water and other runoff from the predominant mining operations in Bingham Canyon, Kennecott Copper Corporation has constructed several retention ponds near the mouth of Bingham Canyon and south of Copperton. These retention ponds effectively retain all runoff from the mountain portion of the Bingham Creek watershed. Consequently, the area that contributes to Bingham Creek storm water runoff, as it pertains to this study, begins at the downstream end of the Kennecott retention ponds. The drainage runs east until discharging into the Jordan River.

Natural drainage along the western flanks of the Oquirrh Mountains, in the undeveloped areas of the Project area, collects in several canyon creeks, which generally flow from east to west. In other areas, the natural drainage is primarily overland runoff that generally flows from east to west, and ultimately discharges to the Great Salt Lake. Much of the natural drainage within the western drainage basins has been modified or eliminated through human intervention. There are two perennial streams on the west side of the Oquirrh Mountains: Ophir Creek and Settlement Canyon Creek.

Watersheds

The Project is located within two major watersheds: the Great Salt Lake/Columbia River (529,338 acres) and Utah Lake/Jordan River (560,283 acres). The combined acreage of the two major watersheds is 1,089,621. The area between the Wasatch Front and the Sierra Nevada is stretching and collapsing, leaving the area topographically lower than the mountains to the east and west forming the Basin and Range Province.

The Basin and Range area is generally rather flat, with alluvial slopes approaching various small mountain ranges jutting about it; the Oquirrh, Stansbury, West Mountain, and Tintic mountains are classic ranges within the Project area.

A single major river system, the Jordan River, drains into the Great Salt Lake near the Project area. The Jordan River originates at Utah Lake and drains north into the Great Salt Lake.

A substantial part of the Great Salt Lake basin drainage area is the desert to the west and the south. There are no perennial streams in this area, which is separated from the lake by a low, topographic divide. This area does not contribute flow to the lake, except from springs in extremely wet years (Lall and Mann 1995). The disposal of precipitation that falls in the Oquirrh Mountains is approximately 30 to 40 percent runoff, 40 to 60 percent evapotranspiration and sublimation, and 5 to 20 percent regional groundwater recharge (Manning 2002).

Utah Lake is one of the largest natural freshwater lakes in the western United States. It occupies much of the Utah Valley, and is used by the Salt Lake Valley as a water source. The Provo, Spanish Fork, and American Fork rivers are primary inflows, and the Jordan River drains the lake north to the Great Salt Lake. While it is large in surface area, the average depth is only about 10 feet. This allows winds to constantly stir up bottom sediments, resulting in turbid water.

The principal inflows of the lake are from the east, through various drainages that originate in the Wasatch Range. Primary drainages from within the Project area that affect Utah Lake originate primarily in the Tintic Mountains, the largest being Currant Creek, which is diverted for agricultural purposes during much of the year. Many other tributaries once flowed into the lake during the spring floods, but have since been diverted for agricultural uses. Most tributaries are controlled to divert water onto agricultural land, or to regulate the flow of water into the lake.

Floodplains

The only substantial floodplains within the Project area are that of the Great Salt Lake, Rush Lake, and Utah Lake. These lakes can overflow their shores if the area receives a significant amount of precipitation resulting in soil saturation. The majority of the Project area is located on slopes that are not susceptible to large-scale flooding.

The most well known historical flooding events occurred during the wet years of 1983 and 1984. During that time, there was a significant amount of snowpack in the Oquirrh Mountains. Temperatures rose quickly in May of 1983, and caused the snow to melt quickly, producing runoff. The flooding from the runoff lasted for approximately 3 to 4 days in the Lake Point area.

Groundwater

Due to the complicated stratigraphic relationship between coarse-grained and fine-grained facies, the basin-fill aquifer consists of a complex multiple-aquifer system under both unconfined and confined conditions (Gates 1965). The confined aquifer exists in the north-central portion of the Tooele Valley (Razem and Steiger 1981) and is surrounded by a deep, unconfined aquifer system between the base of the Oquirrh Mountains and the confined aquifer, south and east of Tooele City and south and west of Grantsville (Steiger and Lowe 1997). The confined aquifer is created by a low-permeability confining layer, deposited in an offshore lacustrine environment, overlaying more permeable aquifer sediments. The confined aquifer is typically overlain by a shallow unconfined aquifer with more permeable sediments (Razem and Steiger 1981). The thickness of the basin fill material in the Tooele Valley varies from a few feet to 250 feet near the basin margins (Steiger and Lowe 1997), to as much as 8,000 feet in the northern part of the valley near the Great Salt Lake (Everitt and Kaliser 1980).

Depth of the groundwater ranges from about 700 feet at the mouth of Pine Canyon in the Oquirrh Mountains, to near the ground surface proximal to the Great Salt Lake (Bishop 1997). In the Erda area along the eastern margin of the Tooele Valley, water levels in wells declined from 1963 to 1967 and then rose until 1976 (Razem and Steiger 1981).

Groundwater flow in the Tooele Valley is generally northwestward from the Oquirrh Mountains, northeastward from the Stansbury Mountains, and northward from South Mountain toward the valley center, and then north toward Great Salt Lake. The groundwater flow in the Goshen Valley is generally southeastward from the southern Oquirrh Mountains and eastward from the Tintic Mountains toward Utah Lake.

Recharge in the basins to the basin-fill aquifers (Gates and Keller 1970; Razem and Steiger 1981) is due to the following:

- Infiltration of precipitation and surface water, mostly in the mountains and along valley margins
- Underflow from consolidated rock along the margins of the valleys
- Subsurface inflow from the Rush Valley
- Discharge from mines and tunnels
- Seepage from irrigated lands

Discharge from the basin-fill aquifer (Gates and Keller 1970; Razem and Steiger 1981) is due to the following:

- Evapotranspiration
- Well-water withdrawal
- Springs
- Subsurface flow to the Great Salt Lake and Utah Lake

Springs/Wells

The BLM has identified 135 springs and seeps within the Project area (BLM 1988). Most of these springs are located within the alluvial fans of the Oquirrh, Tintic, and Stansbury mountains. Fifty-eight of the springs are located within the floor of the Tooele Valley, and have suitable flow and location to be used by livestock (BLM 1988). Only nine of these springs occur within 600 feet of the reference centerline. Five wells have been identified within 600 feet of the reference centerline.

Secondary data sources (USGS, UDWR) were used to inventory data and verify locations of springs and wells in the Project area. Data were identified within 600 feet of the reference centerline, which is compliant with distance limits (100 meters) identified in the BLM Riparian Policy (BLM 2005).

3.2.2.5 Summary of Water Resources Inventory Results

The water resources inventory results summarized below include a description of perennial streams, floodplains, and springs/wells.

Mona to Limber

Alternative A1 – North Long Ridge Mountains

Alternative A1 crosses several intermittent streams, including Currant Creek Canal (Link 20), Kimball Creek (Link 20), Sabie Creek (Link 40), Pinyon Creek (Link 50), Boulter Creek (Link 60), Faust Creek (Link 90), Clover Creek (Link 105), Hickman Creek (Link 90), and an additional 92 other unnamed drainages, which are all areas of potential flooding. The Elberta East Crop Unit Well (Link 20) and an unnamed spring (Link 40) are located 310 feet and 550 feet, respectively, from the centerline.

Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action

Alternative A2 shares the same alignment with Alternative A1, with the exception that Alternative A2 follows Links 10 and 15, instead of Links 5 and 20. The water resources are the same as described above for Alternative A1, with the exception that the Elberta East Crop Unit Well (Link 20) is not affected and Link 10 crosses Kimball Creek, at which point it is considered to be a perennial stream. An additional 123 unnamed intermittent drainages are crossed by Alternative A2. One spring in Cottonwood Canyon (Link 10) is located approximately 440 feet from the reference centerline for this alternative.

Alternative B1 – East Rush Valley

Alternative B1 crosses several intermittent streams, including Currant Creek Canal (Link 20), Kimball Creek (Link 20), Pinyon Creek (Link 50), Boulter Creek (Link 85), Sabit Creek (Link 85), Mercur Creek (Link 95), Ophir Creek (Link 95), Clover Creek (Link 135), Hickman Creek (Link 150), and an additional 146 unnamed drainages that are areas of potential flooding. An unnamed spring located along Link 85 is approximately 580 feet from the reference centerline for this alternative, as well as the Elberta East Crop Unit Well (Link 40) that is described under Alternative A1.

Alternative B2 – East Rush Valley

Alternative B2 shares the same alignment with Alternative B1 except that Alternative B2 follows Links 10 and 15, instead of Links 5 and 20. The water resources are the same as described above for Alternative B1, with the exception that the Elberta East Crop Unit Well (Link 20) is not affected and Link 10 crosses Kimball Creek, at which point it is considered to be a perennial stream. An additional 148 unnamed intermittent drainages are crossed by Alternative B2. One spring in Cottonwood Canyon is located along Link 10, as described in Alternative A2.

Alternative C1 – Tintic Junction

Alternative C1 crosses several intermittent streams, including Currant Creek Canal (Link 20), Kimball Creek (Link 20), Eureka Creek (Link 26), Boulter Creek (Link 32), Brush Creek (Link 32), Sabie Creek (Link 35), Faust Creek (Link 90), Clover Creek (Link 105), Hickman Creek (Link 150), and 108 other unnamed drainages. The Elberta East Crop Unit Well (Link 20) is located within 310 feet of the reference centerline for this alternative.

Alternative C2 – Tintic Junction

Alternative C2 shares the same alignment with Alternative C1 except that Alternative C2 follows Links 10 and 15, instead of Links 5 and 20. The water resources are the same as described for Alternative C1 except that Link 15 crosses Kimball Creek, at which point it is considered to be a perennial stream. An additional 100 other unnamed intermittent drainages are crossed by Alternative C2. One spring in Cottonwood Canyon is located along Link 10, as described in Alternative A2, and occurs within 600 feet of the reference centerline for this alternative.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Alternative D crosses three perennial streams, Settlement Canyon Creek and Middle Canyon (Link 190A) and Barney's Creek (Link 239, 240, 241, and 255). Several intermittent creeks are crossed by Alternative D, including Pine Creek (Link 230), Barney's Wash (Link 255), and 55 other unnamed drainages. Link 190A also crosses through the City of Tooele municipal watershed property along the western side of the Oquirrh Mountains for approximately 4,900 feet. Rench Spring, located along Link 190A, is located approximately 515 feet from the reference centerline for this alternative. Additionally, along Link 190A, four underground water wells are located within 600 feet of the reference centerline in Middle Canyon, the closest being 300 feet away. The route would cross through Zone 2 of the Drinking Water Source Protection Zone for Tooele City.

Alternative E1 – Pass Canyon

The water resources on Alternative E1 are the same as described for Alternative D, except that Alternative E1 crosses an additional perennial stream along Link 244 and 306, Bingham Creek, and 56 unnamed intermittent drainages. Pass Canyon is within the Drinking Water Protection Zone for the Lincoln Water Users Association Tunnel Spring.

Alternative E2 – Proponent's Proposed Action

The water resources on Alternative E2 are the same as described for Alternative E1.

Alternative F1 – Middle/Butterfield Canyon

Alternative F1 crosses five perennial streams, Settlement Canyon Creek and Middle Canyon Creek (Link 190), Butterfield Canyon Creek (Link 210), Barney's Creek (Link 239, 240, 241, and 255), and Bingham Creek (Link 306). Several intermittent creeks are crossed by Alternative F1, including Copper Creek (Link 290), Midas Creek (Link 230), and 75 other unnamed drainages. Link 190 also crosses through the City of Tooele municipal watershed property along the western side of the Oquirrh Mountains for approximately 1,400 feet. Three springs occur within 600 feet of the reference centerline, including Rench Spring described above and two unnamed springs located 490 feet (Link 210) and 360 feet (Link 215), respectively.

Alternative F2 – Middle/Butterfield Canyon

Alternative F2 shares the same alignment with Alternative F1 except that Alternative F2 follows Links 315 and 265 instead of Link 285. The water resources are the same as described for Alternative F1.

Alternative G – Lake Point

Alternative G crosses several small floodplain areas associated with intermittent drainages originating from the Stansbury Mountains (e.g., North and South Willow washes). Several intermittent drainages crossed by Alternative G, including Warm Springs Slough (Link 352), Sixmile Creek (Link 356), and 90 other unnamed drainages, are susceptible to flooding episodes during high water cycles of the Great Salt Lake. This area is also drained by several man-made drainages with controlled floodplains, and is not susceptible to flooding episodes except in times of unusually high precipitation. Additionally, Link 376 crosses Coon Creek, a perennial stream, and Link 255 crosses Barney's Creek and Barney's Wash near the existing Oquirrh Substation. One unnamed spring is located along Link 365 approximately 85 feet from the reference centerline for this alternative.

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Alternative H crosses several small floodplain areas associated with intermittent drainages originating from the Stansbury Mountains (e.g., North and South Willow washes). Several intermittent drainages are crossed by Alternative H, including Warm Springs Slough (Link 352), Sixmile Creek (Link 356), and 59 other unnamed drainages that are susceptible to flooding episodes during high water cycles of the Great Salt Lake. This area is also drained by several man-made drainages with controlled floodplains, and is not susceptible to flooding episodes except in times of unusually high precipitation. Additionally, Link 375 crosses a perennial stream, Leek Creek. Salt Spring is located along Link 386 approximately 590 feet from the reference centerline. An unnamed well is located less than 50 feet from the reference centerline along Link 386.

<u>Alternative I – East Tooele Valley</u>

Alternative I crosses 39 unnamed intermittent drainages. The ASARCO Well is located approximately 200 feet from the reference centerline along Link 385. Salt Spring and an unnamed well (Link 386) are located less than 590 feet from the reference centerline along Link 386.

Substation Sites

<u>Mona Annex Substation</u>

The immediate area of the proposed substation site has no known drainages affecting the placement of the substation; however, the area may be subject to sheet washing during high precipitation periods.

<u>Limber Substation</u>

The immediate area of the future Limber Substation has numerous small drainages originating from Black Mountain. These drainages are usually dry most of the year, but can be subject to flash floods during high precipitation periods.

3.2.3 Biological Resources

3.2.3.1 Introduction

Ecological Overview

The Project is located within the Basin and Range ecoregion, which is characterized by broad desert valleys bordered by narrow, north-south trending mountain ranges (Woods et al. 2001). The study corridors contain characteristic Basin and Range physiography, including low elevation desert valleys (i.e., Rush Valley) and adjacent mountains (i.e., Oquirrh Mountains). The Great Salt Lake, located along the northern edge of the Project area, represents the other significant landscape feature that occurs within the study corridors. Elevations along the corridors vary from approximately 4,200 feet above mean sea level (amsl) in the valleys adjacent to the Great Salt Lake, to over 10,600 feet amsl in the Oquirrh Mountains.

The study corridors support a diversity of biotic communities as a result of the elevation and precipitation gradients, the Great Salt Lake and associated wetlands communities, and alkaline soils in lower elevation valleys. General habitat types in the study corridors include desert shrub, grassland, and sagebrush in valleys and lower elevations; pinyon-juniper on mid-elevation valley slopes; and mountain shrub and forest communities at higher elevations. Halophytic desert shrub communities occur in alkaline basins throughout the study corridors. Wetlands occur in northern valleys and along the southern edge of the Great Salt Lake, while riparian communities occur along a few small streams and a few small springs. Perennial waters in the study corridors include the Great Salt Lake, small ponds and reservoirs, and a few small creeks.

Regulatory Framework

Federal legislation applicable to biological resources in the Project area includes the ESA of 1973, as amended (16 U.S.C. 460 et seq.), the MBTA (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. 668), the BLM Policy 6840, Section 2670 of the USFS Manual, Executive Order 13112, and Section 404 of the Clean Water Act. These are briefly summarized below. In addition, NEPA (42 U.S.C. Section 4321), FLPMA (43 U.S.C. 1701), and National Forest Management Act (16 U.S.C. 1604) require federal agencies to consider biological resources in project planning and land management activities.

- The ESA authorizes the USFWS to protect plant and wildlife species and the habitats on which these species depend. The ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of a listed species, or affect habitat thereof.

- The MBTA and Executive Order 13186 protect more than 800 migratory bird species by making it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird, or the parts, nests, or eggs of such a bird.

- The Bald and Golden Eagle Protection Act prohibits any form of possession or take of bald and golden eagles.

- BLM Manual 6840 – Special Status Species Management authorizes each BLM State Director to designate and protect sensitive species on lands managed by the BLM. The Utah BLM has adopted the list of wildlife species classified as sensitive by the UDWR, but has developed an independent list of sensitive plant species.

- Section 2670 of the USFS Manual directs each Regional Forester to designate sensitive species on lands managed by the USFS. A sensitive species is defined as: a "plant or animal species identified by a Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution."

- The National Forest Management Act requires the USFS to identify certain vertebrate and/or invertebrate species as Management Indicator Species (MIS). MIS are used to establish forest plan objectives for important wildlife and fish habitats, and to estimate the effects of forest plans and projects on fish and wildlife populations.

- Executive Order 13112 (Invasive Species) requires that federal agencies prevent the introduction and spread of invasive species and that they "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species."

- Executive Order 11988 (Floodplain Management) requires that federal agencies 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.

- Executive Order 11990 (Wetlands) requires federal agencies to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.

- Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into waters of the United States, including wetlands.

State statutes include Section 23-14-1 of the Utah Code, which directs the UDWR to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state. This statute also authorizes UDWR to identify and delineate crucial seasonal wildlife habitats. Administrative Rule R657-48 directs UDWR to maintain the Utah Sensitive Species List. This list is comprised of species (1) that are listed or candidates for listing pursuant to the ESA, (2) for which a conservation agreement is in place, or (3) whose population viability is threatened in Utah ("wildlife species of concern").

Biological Resource Issues

Several sensitive biological resources were identified within the study corridors through the resource inventory process and discussions with biologists from the BLM, USFWS, and UDWR. The primary biological resources issues in the study corridors include the following:

- Crucial greater sage-grouse habitat in the Rush and Tooele valleys. Primary agency concerns include habitat loss and fragmentation from the development of public access roads and the potential for increased predation.

- Crucial seasonal habitats for pronghorn, mule deer, and elk throughout the study corridors. Primary agency concerns include habitat loss and potential effects associated with increased public access into important seasonal habitats.
- Important raptor nesting habitats. Primary agency concerns include habitat loss and the effects of increased public access on nesting raptors (disturbance, nest destruction, and illegal mortality).
- Special status species and migratory birds.
- Wetlands along the southern edge of the Great Salt Lake. Primary agency concerns include habitat loss and the potential for waterfowl mortality because of collisions with the transmission lines.
- Noxious weeds, particularly spotted knapweed (*Centaurea maculosa*). Primary agency concerns include the introduction and spread of noxious weeds.

Inventory Methodology

Preliminary biological resource data were collected for the general Project area. For the purposes of evaluating Project-related impacts on biological resources, detailed information was collected within a 2-mile-wide study corridor (1 mile on either side of the assumed centerline) for each alternative transmission line route. While data inventory was focused on the study corridors and substation sites, adjacent habitats were also evaluated along specific links to assess potential impacts associated with animal movement and migration patterns. General data categories included land cover and vegetation, general wildlife, special status plant and wildlife species, and important habitats and communities.

The classification of vegetation communities in the study corridors was based on geographic information system (GIS) data obtained from the Southwest Regional Gap Analysis Project (GAP) (Lowry et al. 2005). The GAP data were supplemented with high-resolution aerial photography and refined through field investigations. Data from the National Wetlands Inventory (NWI) were merged with the GAP to identify wetlands in the study corridors. The NWI data may somewhat overestimate the extent of wetlands in the corridors due to the complex mosaic of wetlands-upland habitats in the northern Tooele Valley (Links 352, 353, 354, 356, 365, 366, and 370) and industrial development in the Salt Lake Valley (Links 375, 385, and 386). However, the NWI data appear to be somewhat more accurate than the GAP wetlands data, and facilitate a conservative assessment of wetlands impacts. The GAP data also includes a "water" category. For the purposes of this inventory, Rush Lake is classified as perennial water, although it has been ephemeral in recent years.

Information on general wildlife and special status species was obtained from a variety of sources, including: UDWR (UDWR 2007a, 2007b, 2007c), federal land management plans (BLM 1988, 1990; USFS 2001a), USFWS endangered species information (USFWS 2007a), federal agency species lists (BLM 2002; USFS 2007), and the Utah Sensitive Species List (UDWR 2007d). Locality data for special status plant and wildlife species were obtained from the Utah Natural Heritage Program (Utah Natural Heritage Program [UNHP] 2008). Lists of bird species observed in the Project area were obtained from several sources, including: UDWR (UDWR 2007e), Great Salt Lake Audubon (GSLA) (2007), Utah Birds (2007), and the Breeding Bird Survey (USGS 2007). Information was also obtained through a literature review, including: a feasibility study prepared by EPG, Inc., technical reports, peer-reviewed publications, and species recovery plans. Biologists from the BLM, USFWS, and UDWR provided valuable information on biological resources within the study corridors. Reconnaissance-level field investigations were conducted in October 2007 and August 2008 to verify vegetation classifications and identify sensitive biological resources within the study corridors. No species-specific surveys were conducted for the purposes of this inventory.

3.2.3.2 Biological Resources

Vegetation

The GAP data identified 30 land cover categories that occur within the study corridors. For the purposes of this EIS, these categories were consolidated into 16 vegetation types. These vegetation types are illustrated in Map C-4 and are briefly described below.

Wetlands/Riparian

Wetlands in the study corridors are generally associated with the Great Salt Lake and adjacent valleys (Links 352, 353, 354, 356, 365, 366, 370, 375, and 385), including the areas within the Draft Tooele Valley Special Area Management Plan (Tooele County 2006b). The primary wetlands communities include vegetated and non-vegetated mineral flats, wet meadows, and emergent marsh, with the location and extent of these communities being determined by local soil and hydrological conditions. Primary species in the vegetated mineral flats include: black greasewood (*Sarcobatus vermiculatus*), pickleweed (*Allenrolfea occidentalis*), inland saltgrass (*Distichlis spicata*), Utah samphire (*Sarcocornia utahensis*), and creeping wild rye (*Leymus triticoides*). Wet meadows are dominated by hydrophytic species such as inland saltgrass (*Distichlis spicata*), Baltic rush *(Juncus balticus*), and foxtail barley (*Hordeum jubatum).* Typical species in emergent marsh wetlands include bulrush (*Scirpus* spp. and *Schoenoplectus* spp.), cattail (*Typha* spp.), rushes (*Juncus* spp.), and canarygrass (*Phalaris* spp.).

Riparian communities occur along small creeks and small springs, with the specific community type and species composition dependent on elevation and hydrological characteristics. Typical species in lower elevation shrub riparian habitats include: tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), willow (*Salix* spp.), and red osier dogwood (*Cornus stolonifera*). Tamarisk and Russian olive riparian communities occur along Faust Creek (Links 90 and 105), and willow-dominated riparian communities occur along Hickman Creek (Link 150) and Pine Creek (Link 220). Typical species in higher elevation, forest riparian communities include: box elder (*Acer negundo*), bigtooth maple (*Acer grandidentatum*), water birch (*Betula occidentalis*), narrowleaf cottonwood (*Populus angustifolia*), and Engelmann spruce (*Picea engelmannii*). Box elder-dominated communities occur along Ophir Creek (Link 95), Settlement Creek (Links 190 and 190A), and Midas Creek (Link 295). Bigtooth maple-cottonwood-spruce riparian habitats occur along Butterfield and Middle creeks (Links 210 and 215).

Agriculture/Disturbed

Irrigated and non-irrigated agricultural lands occur throughout the Goshen, Cedar, Rush, Tooele, and Salt Lake valleys. Disturbed lands, where native vegetation communities have been eliminated or significantly deteriorated, are associated with urban areas, mining operations, and the Tooele Army Depot.

Invasive Grassland

Invasive grasslands include communities dominated by non-native species, including: cheatgrass (*Bromus tectorum*), smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), halogeton (*Halogeton* *glomeratus*), forage kochia (*Kochia prostrata*), and Russian thistle (*Salsola* spp.). Invasive grasslands primarily occur in the valleys along Links 60, 90, 95, 105, 150, 160, 350, and 360.

Barren

Barren lands (less than 15 percent vegetation cover) include cliffs, talus slopes, and rock outcrops, as well as sparsely vegetated playas that support halophytic species such as: inland saltgrass, sickle saltbush (*Atriplex falcata*), pickleweed, spiny hopsage (*Grayia spinosa*), alkali grasses (*Puccinellia distans and P. nuttalliana*), and basin wildrye (*Leymus cinereus*). Playas occur in the lowest elevations along Links 353, 374, and 385.

Salt Desert Shrub/Greasewood

Salt desert shrub includes open-canopied shrub lands dominated by saltbush. This community occurs on alkaline desert basins in valley bottoms (i.e., Links 60, 90, 95, 105, 140, and 350). Greasewood occurs on flood-prone alkaline soils, along stream terraces and playa margins, and is often ecotonal with salt desert shrub. The community is dominated by black greasewood (*Sarcobatus vermiculatus*) with co-dominant species including Gardner saltbush (*Atriplex gardneri*), shadscale saltbush (*Atriplex confertifolia*), winterfat (*Krascheninnikovia lanata*), rubber rabbitbrush (*Ericameria nauseosa*), bottlebrush squirreltail (*Elymus elymoides*), seepweed (*Suaeda torreyana*), and gray molly (*Kochia americana*). Greasewood also occurs in the valleys along Links 50, 55, 85, 90, 95, 105, 120, 140, 150, 335, 353, 375, and 385.

Native Grassland

Native grasslands occur in both valley and montane environments. Typical species in valley grassland communities, which occur throughout the study corridors, include Indian ricegrass (*Achnatherum hymenoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), slender wheatgrass (*Elymus trachycaulus*), western wheatgrass (*Pascopyrum smithii*), Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Elymus elymoides*), and needle and thread (*Hesperostipa comata*). Primary species in montane grassland communities include oatgrass (*Danthonia* spp.) and slimstem muhly (*Muhlenbergia filiculmis*). This native grassland occurs along Links 20, 24, 60, 95, 190, 190A, 215, and 240.

Big Sagebrush/Mixed Sagebrush

Big sagebrush is the dominant community in the intermountain valleys throughout the study corridors. This habitat type occurs on deep, well-drained, non-alkaline soils, and is dominated by basin big sagebrush (*Artemisia tridentata ssp. tridentata*) and Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*). Mixed sagebrush occurs on shallow, rocky, non-saline soils at low and middle elevations along Links 5, 24, 35, 50, 55, 140, 160, 190, 190A, 210, 215, 240, 350, 370, and 374. Dominant species include: black sagebrush (*Artemisia nova*), low rabbitbrush (*Chrysothamnus viscidflorus*), rubber rabbitbrush, mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), and horsebrush (*Tetradymia* spp.).

Pinyon-Juniper

Pinyon-juniper occurs on xeric hills and valley slopes along Links 5, 20, 24, 26, 30, 50, 55, 60, 95, 120, 150, 160, 190, 190A, 210, 240, 241, 242, 290, 295, 335, 370, 374, and 376. The habitat type is dominated by Utah juniper (*Juniperus osteosperma*) with little or no pinyon *(Pinus monophyllus*). Primary understory species include mountain big sagebrush, antelope bitterbrush (*Purshia tridentata*), cliffrose (*Purshia mexicana*), rubber rabbitbrush, wax-leaf currant (*Ribes* spp.), and mountain mahogany (*Cercocarpus* spp.).

Mountain Shrub

Mountain shrub occurs on dry foothills and mountain slopes in the Oquirhh Mountains (Links 190, 190A, 210, 215, 220, 235, 240, 290, 295, 360, 370, and 376). Dominant species include: Gambel oak (*Quercus gambelii*), serviceberry (*Amelanchier alnifolia* and *A. utahensis*), antelope bitterbrush, cliffrose, chokecherry (*Prunus virginiana*), mountain big sagebrush, and mountain mahogany.

Mixed Conifer Forest/Spruce-Fir Forest

Mixed conifer forest occurs on xeric sites at higher elevations in the Oquirrh Mountains. Dominant species include douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and mountain lover (*Paxistima myrsinites*). This community occurs along Links 210, 215, 220, 235, and 240. Spruce-fir forest occurs on mesic sites at higher elevations in the Oquirrh Mountains (Link 215). Engelmann spruce and subalpine fir (*Abies lasiocarpa*) are the dominant tree species.

Deciduous Forest

Deciduous forest occurs at higher elevations in the Oquirrh Mountains (Links 210, 215, 220, 235, and 240). Aspen (*Populus tremuloides*) is the dominant tree species with understory species, including mountain snowberry (*Symphoricarpos oreophilus*), ninebark (*Physocarpus alternans*), and hawthorn (*Crataegus rivularis*).

Noxious Weeds

Noxious weeds are invasive, non-native plants that adversely affect native plant populations. Noxious plant species occur throughout the study corridors. Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix* spp.) have become established along stream corridors and the edges of lakes. The BLM has identified the following species in the general Project area:

- Spotted knapweed (*Centaurea stoebe*)
- Russian knapweed (*Centaurea repens*)
- Squarrose knapweed (*Centaurea squarrosa*)
- Scotch thistle (*Onopordum acanthium*)
- Hoary cress (*Cardaria draba*)
- Dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*)
- Musk thistle (*Carduus natans*)

Wildlife

Fish

Perennial aquatic habitats within the study corridors are limited to the Great Salt Lake, a few small reservoirs and lakes, and several small creeks. Due to extremely high salinity levels, the only aquatic organisms that inhabit the Great Salt Lake are brine shrimp (*Artemia franciscana*), brine flies (*Ephydra cinerea*), and algae. Grantsville Reservoir (Link 355) is stocked annually with rainbow trout (*Oncorhynchus mykiss*), but has limited value as aquatic habitat (UDWR 2007f). Settlement Canyon Reservoir (Links 190 and 190A) supports rainbow trout, brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). Rush Lake (Links 120, 135, and 140) has been ephemeral in recent years, and does not currently support fish.

Numerous small creeks in the study area originate in the mountain ranges and flow towards the adjacent valley floors. Most of these creeks have been diverted for agricultural uses or other purposes and are ephemeral/dry where crossed by the proposed transmission lines. Only four creeks are perennial where crossed by the alternative transmission line routes. Table 3-3 summarizes these creeks and associated fisheries.

TABLE 3-3
SUMMARY OF CREEKS CROSSED BY THE STUDY CORRIDORS

Stream Name	Links	Status at Crossing	Fisheries at Crossing[1]
Barneys Creek	230, 235, 255	Intermittent	No fisheries data available
Barneys Wash	255	Intermittent	No fisheries data available
Bingham Creek	285, 315	Perennial	No fisheries data available
Boulter Creek	32, 40, 85	Intermittent	No fisheries data available
Brush Creek	32	Intermittent	No fisheries data available
Butterfield Creek	210, 215	Perennial	No fish observed in limited surveys
Clover Creek	105	Intermittent	Does not support fish at crossing
Coon Creek	376	Intermittent	No fisheries data available
Copper Creek	290	Intermittent	No fisheries data available
Eureka Creek	26	Intermittent	No fisheries data available
Faust Creek	90	Intermittent	Does not support fish at crossing
Hickman Creek	150	Intermittent	Does not support fish at crossing
Kimball Creek	20	Intermittent	No fisheries data available
Lee Creek	375	Perennial	No fisheries data available
Mercur Creek	95	Intermittent	No fisheries data available
Midas Creek	290	Intermittent	No fisheries data available
North Willow Creek	335	Intermittent	Does not support fish at crossing
Ophir Creek	95	Perennial	Stocked with rainbow trout in 1990s, but current fishery status unknown
Pine Creek	230, 255	Intermittent	No fisheries data available
Pinyon Creek	50	Intermittent	No fisheries data available
Sabie Creek	35, 40	Intermittent	No fisheries data available
Settlement Canyon Creek	190, 190A	Perennial	Supports rainbow trout and Utah chub
Sixmile Creek	356	Intermittent	No fisheries data available
South Willow Creek	335	Intermittent	Does not support fish at crossing
Warm Springs Slough	352, 353	Intermittent	No fisheries data available

NOTES: [1]Fisheries information based upon data received from UDWR-Central Region (2008a).

Amphibians and Reptiles

A total of eight amphibian and 17 reptile species (Table E-1 in Appendix E) are known or likely to occur in the study corridors based on reported sightings, literature review, and UDWR habitat models (UDWR 2007g, 2007h). Reptile species inhabit a variety of terrestrial communities, including grasslands, desert shrub, sagebrush, pinyon-juniper, and barren habitat types. While amphibian species require aquatic and semi-aquatic habitats for breeding, most utilize adjacent terrestrial habitats during non-breeding periods. The Columbia spotted frog is discussed in the Special Status Species section.

Birds

The habitats within the study corridors support a diverse assemblage of avian species (Table E-2 in Appendix E). These species are briefly described by general taxonomic group below. Most bird species are protected under the MBTA. Species that are listed or candidates for listing under the ESA, or that are designated as sensitive by the BLM, USFS, or UDWR are discussed in the Special Status Species section.

Waterfowl and Shorebirds

The Great Salt Lake and associated wetlands represent an important habitat for breeding and migratory waterfowl and shorebirds (Shuford et al. 1994). The Great Salt Lake ecosystem provides regionally-important breeding habitat for a number of species, including: gadwall, cinnamon teal, mallard, redhead, snowy plover, American avocet, black-necked stilt, white-faced ibis (world’s largest breeding population), California gull (world’s largest breeding population), and American white pelican (one of the three largest colonies in western North America). The ecosystem also provides critical resting and staging habitats for migratory birds, and more than 5.7 million waterfowl and 1.9 million shorebirds have been counted on the Great Salt Lake in a single year (McElrone and Messmer 2001). This ecosystem is a particularly important stopover habitat for the following species:

- Wilson’s phalarope – largest staging concentration in the world (fewer than 800,000)
- Snowy plover – largest staging concentration in the world (10,000)
- Eared grebe – second largest staging population in North America (single-day estimate of 1.4 million)
- American avocet – largest concentration in Pacific Flyway (fewer than 250,000)
- Black-necked stilt – largest concentration in Pacific Flyway (fewer than 65,000)
- Marbled godwit – only staging area in the interior United States (30,000)
- Red-necked phalarope – single day estimate of 280,000
- Pintail – fewer than 1,000,000
- Green-winged teal – fewer than 600,000
- Mallard – fewer than 500,000
- Tundra swan – fewer than 60,000

The importance of the Great Salt Lake ecosystem is evidenced by its inclusion in the Western Hemisphere Shorebird Reserve Network (USFWS 2007b), and its designation as an Important Bird Area (National Audubon Society 2007), Important Waterbird Site (Ivey and Herziger 2006), and Key Shorebird Area (Oring et al. 2007). Several areas have been established along the southern shore of the Great Salt Lake for the conservation and management of waterfowl and shorebird habitat (i.e., Inland Sea Shorebird Reserve).

Portions of the study corridors (Links 352, 353, 354, 356, 366, 370, and 385) contain, or are immediately adjacent to, wetlands associated with the Great Salt Lake ecosystem. These wetlands provide important nesting and foraging habitat for resident and migratory waterfowl and shorebirds. Although no detailed information exists on the specific flight pathways for seasonal migrations or daily foraging, it is likely that relatively large numbers of waterfowl and shorebirds fly in a north-south direction through the corridors within these links. For the purposes of analyzing potential effects of the alternative transmission line routes, the area traversed by these links is designated as a "waterfowl movement pathway." Several transmission lines exist along these links. When it contains water, Rush Lake is also an important stopover habitat for waterfowl and shorebirds during seasonal migrations. The area traversed by Link 135 and a portion of Link 140 (southern edge of Rush Lake) is also designated as a waterfowl movement pathway.

Raptors

Twenty-one raptor species are known to occur throughout the study corridors (Table E-2). All raptor species are protected under the MBTA. The bald eagle, burrowing owl, and ferruginous hawk are designated as sensitive by the BLM and state of Utah and are discussed in the Special Status Species section. The turkey vulture, northern harrier, Swainson's hawk, ferruginous hawk, red-tailed hawk, American kestrel, prairie falcon, burrowing owl, and northern pygmy owl are commonly observed in the general Project area (GSLA 2007; UDWR 2007e; USGS 2007; Utah Birds 2007). All raptors identified in Table E-2 are likely to forage in the study corridors. Species likely to nest in the study corridors include: the burrowing owl, northern harrier, short-eared owl, Swainson's hawk, red-tailed hawk, ferruginous hawk, great-horned owl, northern pygmy owl, kestrel turkey vulture, golden eagle, and prairie falcon.

The BLM SLFO and Raptor Inventory Nest Survey (RINS) have conducted annual surveys of raptor nests in the general Project area since 2001. These surveys have inventoried and monitored nests associated with 13 species of raptors. The targeted species are the ferruginous hawk, Swainson's hawk, burrowing owl, red-tailed hawk, and golden eagle. A GIS-based spatial analysis of the RINS data was conducted to identify areas supporting relatively high concentrations of raptor nests ("core raptor nesting areas"). Core raptor nesting areas occur in several study corridors along Links 30, 32, 35, 40, 50, 90, 95, 120, 150, 335, 350, and 352 (Map C-6).

Upland Game Birds

Upland game bird species that occur in the study corridors include: chukar, California quail, ring-necked pheasant, Rio Grande turkey, and greater sage-grouse (UDWR 2007i, 2007j, 2007k, 2007l, 2007m). Sagebrush habitats in the Rush Valley, the southeast corner of Tooele Valley, and Tintic Valley southwest of Eureka are classified as crucial brood and winter habitat for the greater sage-grouse (UDWR 2007m). This species is classified as sensitive by the BLM and the state of Utah, and is a MIS for the Uinta National Forest. A detailed discussion of the greater sage-grouse is presented in the Special Status Species section.

Songbirds and Others

A wide variety of songbirds and other passerines occur in the study corridors (Table E-2). While many of these species are habitat generalists, some such as sage sparrow have relatively specific habitat requirements. These species are found in appropriate habitats throughout the study corridors.

Mammals

The communities in the study corridors support a diversity of mammal species (UDWR 2007n*;* Table E-3 in Appendix E). Twelve bat species are likely to forage in the open and forested habitats throughout the study corridors (Table E-3). The Townsend's big-eared bat, designated as sensitive by the BLM and state of Utah, is discussed in the Special Status Species section. While most species utilize caves, abandoned mines, rock crevices, and buildings as roosting habitat, the hoary bat, long-legged myotis, and silver-haired bat roost in trees, and the spotted bat roosts on cliffs (Oliver 2000). Several Townsend's big-eared bat roosts and hibernacula have been identified in the southern Oquirrh Mountains (Lengas 1997). A "core bat area" was delineated, based on known locations of these roosts and hibernacula along Link 95 (Map C-6).

A number of carnivore species occur throughout the study corridors (Table E-3). Although carnivores tend to be habitat generalists, the bobcat, mountain lion, and ringtail generally prefer more rugged terrain, while the black bear typically occurs in the Oquirrh Mountains (Links 210, 215, 220, 225, 235, and 240). The kit fox is a BLM/Utah sensitive species and is discussed in the Special Status Species section.

Big Game

Mule deer, Rocky Mountain elk, and pronghorn occur in the study corridors and are managed as big game species by UDWR (UDWR 2007o). The corridors contain UDWR-designated crucial seasonal habitats for mule deer, Rocky Mountain elk, and pronghorn (UDWR 2007p, 2007q, 2007r). The BLM has also delineated important elk and mule deer habitats in the general Project area, which overlaps extensively with the UDWR crucial habitat areas (BLM 1988, 1990). After consulting with biologists from the UDWR and BLM, it was decided that the UDWR data provided the most accurate and current information on seasonal big game habitats, and that these data would be used for analyses in this EIS (Map C-5). The UDWR Carr Fork Reclamation and WMA and BLM NOMA occur within the Project area and were established to protect important mule deer and elk winter ranges. The following is a summary of big game species in the study corridors.

Mule Deer

Mule deer inhabit open foothill and montane habitats throughout the study corridors. The local mule deer population (UDWR Management Unit 18) has been generally increasing and currently exceeds population objectives (Hersey and Auode 2007, Hersey and McLaughlin 2006). Crucial mule deer habitats in the study corridors include:

- Crucial winter habitat in the Oquirrh Mountains foothills (Links 95, 120, 190, 190A, 210, 215, 220, 225, 235, 240, 241, 242, 243, 244, 290, 295, 305, 360, 366, 374, 375, and 376)
- Crucial winter/spring habitat in the lower foothills of the East Tintic and Stansbury mountains, as well as mid-elevation slopes in the Oquirrh Mountains (Links 1, 2, 3, 5, 20, 24, 26, 30, 60, 95, 150, 160, 190, 190A, 215, 220, 235, 240, 335, 350, 370, 374, and 376)
- Crucial summer/fall habitat at higher elevations in the Oquirrh Mountains (Links 235 and 240)
- Crucial spring/fall habitat in the East Tintic Mountain foothills (Links 20, 24, 50, and 55)

Rocky Mountain Elk

Elk occupy montane and foothill habitats in the Stansbury and Oquirrh mountains. The local elk population (UDWR Management Unit 18) has been relatively stable, with a slight decline noted in 2006 (Hersey and Auode 2007). This population is currently below population objectives. Crucial elk habitats in the study corridors include:

- Crucial winter habitat along the Oquirrh Mountain foothills (Links 220, 235, 240, 241, 242, 360, 370, 374, 375, and 376)
- Crucial summer/fall habitat at higher elevations in the Oquirrh Mountains (Links 235 and 240)

Pronghorn

Pronghorn inhabit sagebrush, desert shrub, grasslands, and agricultural lands throughout the study corridors. The local population appears to be increasing, although there are no published population objectives for this area (Hersey and McLaughlin 2006). Crucial yearlong pronghorn habitat is located throughout the Rush and Cedar valleys (Links 30, 32, 35, 40, 55, 60, 85, 90, 95, and 105).

Wild Horses and Burros

The BLM protects and manages wild horses and burros, pursuant to the Wild Free-Roaming Horses and Burros Act of 1971, which requires the BLM to ensure that herds thrive on healthy rangelands. The BLM has established Herd Management Areas (HMA) throughout Utah to facilitate the management of wild horses and burros. There are no HMAs within or adjacent to the study corridors. The Onaqui HMA, located west of Vernon between Johnson Pass and Look Out Pass, is the nearest HMA to the study corridors. The Salt Lake Wild Horse and Burro Center is located at the mouth of Butterfield Canyon. The facility, which temporarily houses wild horses and burros, is located near Links 210 and 290.

Special Status Species

Special status species include plants, animals, and fish species that are listed as (1) endangered, threatened, proposed, or candidates for listing, pursuant to the ESA or (2) listed as sensitive by the BLM, USFS, or the state of Utah. A list of special status species that potentially occur within the study corridors was compiled from several sources, including: (1) county-level lists (Juab, Tooele, Salt Lake, and Utah counties) of federally threatened, endangered, proposed, and candidate species (USFWS 2007a); (2) county-level lists (Juab, Tooele, Salt Lake, and Utah counties) of state sensitive species (UDWR 2006); (3) the BLM state-wide list of sensitive plant species (BLM 2002); (4) the USFS–Region 4 list of sensitive species (USFS 2001b); and (5) the Uinta National Forest forest-wide list of MIS (USFS 2001a).

The special status species list includes a total of 66 plants and animals that are known to occur within Juab, Tooele, Salt Lake, and Utah counties, as well as Region 4 of the National Forest Service and the Uinta National Forest (Table E-4 in Appendix E). Two of the eight federally listed species identified by the USFWS (slender moonwort and bald eagle) have been delisted and no longer receive protection under the ESA. The northern goshawk is also a USFWS Conservation Agreement Species.

A total of seven federally listed and candidate species were evaluated in the analysis area (Table E-4). These species were eliminated from further discussion due to the lack of suitable habitat within the study corridors (Appendix E).

Species accounts, including a summary of the habitat requirements, known distribution, recent and historical locations, and likelihood of occurrence in the Project area have been prepared for all 66 special status species (Appendix E). A total of 27 species are either known to occur or are likely to occur in the study corridors (Table 3-4).

TABLE 3-4
SPECIAL STATUS SPECIES THAT POTENTIALLY OCCUR IN THE STUDY CORRIDORS

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence[2]
Plants			
Pohl's milkvetch	*Astragalus lentiginosus* var *pohlii*	BLM	Known to occur
Invertebrates			
Eureka mountainsnail	*Oreohelix eurekensis*	UT/BLM	Known to occur
Lyrate mountainsnail	*Oreohelix haydeni*	UT/BLM	May occur
Southern tightcoil	*Ogaridiscus subrupicola*	UT/BLM	May occur
Amphibians			
Western toad	*Bufo boreas*	UT/BLM	May occur
Birds			
American white pelican	*Pelecanus erythrorhynchos*	UT/BLM	Known to occur
Bald eagle	*Haliaeetus leucocephalus*	FD, UT/BLM	Known to occur
Black swift	*Cypseloides niger*	UT/BLM	Not likely to occur
Bobolink	*Dolichonyx oryzivorus*	UT/BLM	Transients may occur
Burrowing owl	*Athene cunicularia*	UT/BLM	Known to occur
Ferruginous hawk	*Buteo regalis*	UT/BLM	Known to occur
Flammulated owl	*Outs flammeolus*	S	Likely to occur
Grasshopper sparrow	*Ammodramus savannarum*	UT/BLM	May occur
Greater sage-grouse	*Centrocercus urophasianus*	UT/BLM, S	Known to occur
Lewis's woodpecker	*Melanerpes lewis*	UT/BLM	May occur
Long-billed curlew	*Numenius americanus*	UT/BLM	Known to occur
Northern goshawk	*Accipiter gentilis*	UT/BLM, S, MIS	Known to occur
Peregrine falcon	*Falco peregrinus*	S	Known to occur
Short-eared owl	*Asio flammeus*	UT/BLM	Known to occur
Yellow-billed cuckoo	*Coccyzus americanus*	FC	Transients may occur
Mammals			
Fringed myotis	*Myotis thysanodes*	UT/BLM	Likely to occur
Kit fox	*Vulpes macrotis*	UT/BLM	Known to occur
Preble's shrew	*Sorex preblei*	UT/BLM	May occur
Pygmy rabbit	*Brachylagus idahoensis*	UT/BLM	Likely to occur
Spotted bat	*Euderma maculatum*	UT/BLM, S	May occur
Townsend's big-eared bat	*Corynorhinus townsendii*	UT/BLM, S	Known to occur
Western red bat	*Lasiurus blossevillii*	UT/BLM	May occur

NOTES:
[1]FC = Federal Candidate; FD = de-listed; UT/BLM = designated as sensitive by the state of Utah and Utah BLM; BLM = sensitive plant as designated by Utah BLM; S = designated as sensitive by USFS Intermountain Region; MIS = designated as a Management Indicator Species by the Uinta National Forest
[2]Probability of species occurrence within the Project area based upon species habitat requirements, current known distribution, and documented occurrences.

3.2.3.3 Summary of Biological Resources Inventory Results

The biological resources inventory results are summarized below.

Mona to Limber

Alternative A1 – North Long Ridge Mountains

The primary vegetation communities crossed by Alternative A1 include approximately 36 miles of big sagebrush (53 percent), 10 miles of invasive grassland (15 percent), 7 miles of juniper (11 percent), 6 miles of desert shrub/greasewood (9 percent), and 4 miles of agricultural lands (6 percent). The route also crosses a small patch of tamarisk/Russian olive riparian habitat along Link 105 and chokecherry/willow in Spring Canyon along Link 5. Noxious weeds may occur throughout this corridor.

Alternative A1 contains core raptor nesting habitats along Links 40, 50, 55, 60, 90, and 150, and crucial greater sage-grouse habitat along Links 40, 60, 90, 105, and 150. Crucial mule deer seasonal habitats in this corridor include spring/fall range (Links 20, 50, 55, and 60) and winter/spring range (Links 1, 2, 3, 5, 20, 60, and 150). Crucial yearlong pronghorn habitat occurs throughout the Cedar and Rush valleys (Links 40, 55, 60, 90, and 105).

Several special status wildlife species are known or likely to occur along Alternative A1. Pohl's milkvetch may occur where a vegetation association of Wyoming big sagebrush/black greasewood/ ottlebrush squirreltail occurs, along Links 40, 90, 105, and 150. Several wildlife species, including the kit fox, bats, bald eagle, and peregrine falcon are likely to forage in grassland, sagebrush, and desert shrub habitats throughout the corridor. Suitable nesting habitat for the burrowing owl, short-eared owl, and ferruginous hawk occur along all links. Habitat for the greater sage-grouse and pygmy rabbit occurs along Links 40, 60, 90, 105, and 150, with the highest quality sagebrush habitats in the western Rush Valley (Links 40, 90, and 150). The Long Ridge area has also been identified as potential sage-grouse habitat. Long-billed curlew habitat occurs along Links 1, 2, 3, 5, 20, 50, 90, and 105.

Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action

The Alternative A2 corridor is similar to Alternative A1, with Links 5 and 20 replaced by Links 10 and 15. Vegetation communities are similar with Alternative A2, crossing slightly less agriculture and slightly more big sagebrush and pinyon-juniper. Crucial seasonal habitats and special status species are the same as described for Alternative A1. Link 10 crosses crucial mule deer winter/spring and spring/fall ranges and Link 15 crosses spring/fall range. Along Link 10, the transmission line corridor intersects riparian vegetation around Slate Jack Spring.

Alternative B1 – East Rush Valley

The primary vegetation communities crossed by Alternative B1 include approximately 36 miles of big sagebrush (51 percent), 10 miles of pinyon-juniper (14 percent), 8 miles each of invasive grassland and desert shrub/greasewood (13 percent), and 4 miles of agricultural land (6 percent). The route also crosses a small patch of forested riparian habitat along Ophir Creek (Link 95). Noxious weeds may occur throughout this corridor.

The Alternative B1 corridor contains core raptor nesting habitat along Links 50, 55, 60, 85, 95, 120, and 150, and crucial greater sage-grouse habitat along Links 60, 85, 95, 120, 135, 140, and 150. Link 95 contains the western edge of core bat habitat. Link 135 and a portion of Link 140 traverse a waterfowl movement pathway along the southern end of Rush Lake. Crucial mule deer habitats in this corridor include winter range along the Oquirrh Mountain foothills (Links 95 and 120); spring/fall range along the Goshen Valley (Links 20, 50, 55, and 60), and winter/spring range in the vicinity of the existing Mona Substation (Links 1, 2, 3, 5, and 20), Twelvemile Pass (Link 60); and South Mountain (Link 150). Alternative B1 contains crucial elk winter range along Links 95 and 120, and crucial pronghorn yearlong habitat along Links 40, 60, 85, and 95.

Several special status wildlife species are known or likely to occur along Alternative B1. Pohl's milkvetch may occur where a vegetation association of Wyoming big sagebrush/black greasewood/bottlebrush squirreltail occurs along Links 85, 120, and 150. Several wildlife species, including the kit fox, bats, bald eagle, and peregrine falcon are likely to forage in grassland, sagebrush, and desert shrub habitats throughout the corridor. Suitable nesting habitat for the burrowing owl and ferruginous hawk occur along all links. Potential habitat for the greater sage-grouse and pygmy rabbit occurs along Links 60, 85, 95, 120, 135, 140, and 150, with the highest quality habitats along Link 150. Long-billed curlew habitat occurs along Links 1, 5, 20, 50, 90, and 105. The riparian forest community along Ophir Creek represents potential habitat for Lewis's woodpecker and the western red bat.

Alternative B2 – East Rush Valley

The Alternative B2 corridor is similar to Alternative B1, with Links 5 and 20 replaced by Links 10 and 15. Vegetation communities are similar, with Alternative B2 crossing slightly more big sagebrush and pinyon-juniper. Crucial seasonal habitats and special status species are the same as described for Alternative B1. Link 10 crosses crucial mule deer winter/spring and spring/fall ranges, and Link 15 crosses spring/fall range.

Alternative C1 – Tintic Junction

The primary vegetation communities crossed by Alternative C1 include approximately 30 miles of big sagebrush (45 percent), 18 miles of pinyon-juniper (27 percent), 7 miles of invasive grassland (10 percent), 6 miles of desert shrub/greasewood (9 percent), and 2 miles of agricultural lands (3 percent). The route also crosses a small patch of riparian habitat (tamarisk/Russian olive) along Link 105. Noxious weeds may occur throughout this corridor.

The Alternative C1 corridor contains core raptor nesting habitat along Links 30, 32, 35, 90, and 150, and crucial greater sage-grouse habitat occurs along Links 24, 26, 30, 32, 35, 90, 105, and 150. Crucial mule deer habitats in this corridor include spring/fall range (Links 20 and 24) and winter/spring range (Links 1, 2, 3, 5, 20, 24, 26, and 30). Crucial pronghorn habitat occurs along Links 30, 32, 35, 90, and 105.

Several special status wildlife species are known or likely to occur along Alternative C1. Pohl's milkvetch may occur where a vegetation association of Wyoming big sagebrush/black greasewood/bottlebrush squirreltail occurs, along Links 35, 90, 105, and 150. Several wildlife species, including the kit fox, bats, bald eagle, and peregrine falcon are likely to forage in grassland, sagebrush, and desert shrub habitats throughout the corridor. Suitable nesting habitat for the burrowing owl and ferruginous hawk occur along all links. Habitat for the greater sage-grouse and pygmy rabbit occurs along Links 24, 26, 30, 32, 35, 90, 105, and 150, with the highest quality sagebrush habitats along Links 35, 90, 105, and 150. Long-billed curlew habitat occurs along Links 1, 2, 3, 5, 20, 35, 90, 105, and 150.

Alternative C2 – Tintic Junction

The Alternative C2 corridor is similar to Alternative C1, with Links 5 and 20 replaced by Links 10 and 15. Vegetation communities are similar, with Alternative C2 crossing slightly less agriculture and slightly more big sagebrush. Crucial seasonal habitats and special status species are the same as described for Alternative C1. Link 10 crosses crucial mule deer winter/spring and spring/fall ranges, and Link 15 crosses spring/fall range.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

The primary vegetation communities crossed by Alternative D include approximately 6 miles of mountain shrub (20 percent); 5 miles of big sagebrush (16 percent); 4 miles each of agricultural lands, disturbed lands, and pinyon-juniper (13 percent); 3 miles of invasive grassland (10 percent). The corridor also crosses approximately 0.7 mile of riparian forest and less than 0.1 mile of wetlands associated with Settlement Creek (Links 190 and 190A) and Pine Creek (Link 220). Noxious weeds may occur throughout this corridor.

The Alternative D corridor contains core raptor nesting habitat along Link 160 and crucial greater sage-grouse habitat along Links 160 and 166. Crucial mule deer habitats in this corridor include winter range (Links 185, 190A, 220, 230, 240, and 241), winter/spring range (Links 160, 190A, 220, 230, and 240), and summer/fall range (Link 230). Crucial elk habitats include winter range along Links 190A, 220, 230, 240, and 241, and summer/fall range along Link 230.

Special status wildlife species are known or likely to occur along the Alternative D corridor. The burrowing owl, ferruginous hawk, long-billed curlew, greater sage-grouse, pygmy rabbit, kit fox, bats, bald eagle, and peregrine falcon are likely to inhabit or forage along Links 160, 166, 185, 190A, and 220. Species that may occur in montane habitats include the western toad (Links 220, 230, and 240), lyrate mountainsnail (Links 230 and 240), and northern goshawk (Links 230 and 240).

Alternative E1 – Pass Canyon

The primary vegetation communities crossed by Alternative E1 include approximately 6 miles of mountain shrub (21 percent); 6 miles of big sagebrush (19 percent); 4 miles each of disturbed lands, invasive grassland, and pinyon-juniper (13 percent); and 2 miles each of agricultural lands and native grassland (5 percent). The corridor crosses approximately 1 mile of riparian forest habitat and 0.2 mile of wetlands associated with Settlement Creek (Link 190), Pine Creek (Links 220 and 225), and Pass Creek (Links 225 and 235) and approximately eight miles of Pohl's milkvetch along Links 160 and 166. Alternative E1 also traverses approximately 0.4 mile of hybrid oak community along Link 235. Noxious weeds may occur throughout this corridor.

The Alternative E1 corridor contains core raptor nesting habitat along Link 160, and crucial greater sage-grouse habitat along Links 160 and 166. Crucial mule deer habitats in this corridor include winter range (Links 185, 190, 220, 225, 235, 240, 242, and 244), winter/spring range (Links 160, 190, 220, 225, 235, and 240), and summer/fall range (Links 235 and 240). This alternative also traverses crucial elk winter range along Links 185, 190, 220, 225, 235, 240, and 242, and summer/fall range along Links 235 and 240. Special status species known or likely to inhabit or forage within this corridor are the same as described for Alternative D.

Alternative E2 – Proponent's Proposed Action

The primary vegetation communities crossed by Alternative E2 are similar to E1, with the exception of slightly less agricultural lands and deciduous forest and slightly more big sagebrush, disturbed lands, invasive grassland, and pinyon-juniper.

The corridor crosses approximately 1 mile of riparian forest and 0.2 mile of wetlands associated with Settlement Creek (Link 190), Pine Creek (Links 220 and 225), and Pass Creek (Links 225 and 235). Alternative E2 also traverses approximately 0.4 mile of hybrid oak community along Link 235. Noxious weeds may occur throughout this corridor.

The Alternative E2 corridor contains core raptor nesting habitat along Link 160, and crucial greater sage-grouse habitat along Links 160 and 166. Crucial mule deer habitats in this corridor include winter range (Links 185, 190, 220, 225, 235, 240, 241, and 255), winter/spring range (Links 160, 190, 220, 225, 235, and 240), and summer/fall range (Links 235 and 240). Crucial elk habitats include winter range along Links 185, 190, 220, 225, 235, 240, and 241, and summer/fall range along Links 235 and 240. Special status species known or likely to inhabit or forage within this corridor are the same as described for Alternative D.

Alternative F1 – Middle/Butterfield Canyon

The primary vegetation communities crossed by Alternative F1 include approximately: 4 miles each of big sagebrush, disturbed lands, mountain shrub, mixed conifer forest, and pinyon-juniper (14 percent); 3 miles of invasive grassland (9 percent); and 2 miles each of agricultural lands and deciduous forest (7 percent). Mixed conifer and deciduous forest communities occur in Middle and Butterfield canyons (Links 210 and 215). The corridor also crosses approximately 0.4 mile of riparian forest and less than 0.1 mile of wetlands. Noxious weeds may occur throughout this corridor.

The Alternative F1 corridor contains core raptor nesting habitat along Link 160, and crucial greater sage-grouse habitat along Links 160 and 166. Crucial mule deer habitats in this corridor include winter range along Links 185, 190, 210, 290, and 310, and winter/spring range along Links 160, 166, 190, and 215. Crucial elk winter range occurs along Links 185, 190, and 215.

Special status species known or likely to inhabit or forage within the Alternative F1 corridor are similar to those described for Alternative D. Wildlife species that utilize desert shrub and sagebrush habitats are likely to occur along Links 160, 166, 185, and 190. The western toad, lyrate mountainsnail, and northern goshawk may occur along Links 210 and 215. Forested riparian habitats along Links 210 and 215 represent potential habitat for Lewis's woodpecker and the western red bat.

Alternative F2 – Middle/Butterfield Canyon

The Alternative F2 corridor is nearly identical to Alternative F1, with the exception that Links 265 and 315 replace Link 285 in the vicinity of the existing Oquirrh Substation. Vegetation communities are similar, with Alternative F2 crossing slightly more agriculture and pinyon-juniper and slightly less disturbed lands. Crucial seasonal habitats and special status species described along this corridor are the same as described for Alternative F1.

Alternative G – Lake Point

The vegetative communities crossed by Alternative G include approximately 11 miles of wetlands (25 percent), 11 miles of big sagebrush (22 percent), 6 miles each of disturbed lands and invasive grassland (12 percent), 5 miles of agricultural lands (10 percent), and 3 miles each of native grassland and pinyon-juniper (6 percent). The corridor contains wetlands and surface waters associated with the Great Salt Lake and approximately 0.7 mile of riparian forest. Noxious weeds may occur throughout this corridor.

The Alternative G corridor contains core raptor nesting habitat along Links 335, 350, 352. Crucial mule deer habitats in this corridor include winter range along Links 366, 370, 374, 376, 241, and 255, and winter/spring range along Links 335, 370, 374, and 376. This alternative also traverses crucial elk winter range along Links 366, 370, 374, 376, and 241. Crucial greater sage-grouse habitat occurs along Links 335 and 350. Links 352, 353, 354, 356, 365, and 366 are located in a general waterfowl movement pathway and contain important waterfowl and shorebird habitats.

Several special status species are known or likely to inhabit or forage within the Alternative G corridor. Suitable habitats for grassland and sagebrush species, including burrowing owl, ferruginous hawk, long-billed curlew, greater sage-grouse, pygmy rabbit, kit fox, and bats, occur along the entire route. Wetlands along Links 352, 353, 354, 356, 365, and 366 provide nesting habitat for the burrowing owl, short-eared owl, and ferruginous hawk, and foraging habitat for the bald eagle and peregrine falcon. These wetlands areas also represent suitable habitat for the Preble's shrew. The lyrate mountainsnail and southern tightcoil may occur along Links 370 and 374. The bald eagle, peregrine falcon, and various bat species are likely to forage throughout the Alternative G corridor.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

The primary vegetation communities crossed by Alternative H include approximately 14 miles of wetlands (30 percent), 11 miles of disturbed land (25 percent), 7 miles of big sagebrush (15 percent), 5 miles of invasive grassland (10 percent), 3 miles of agricultural lands (6 percent), and 2 miles each of greasewood and grassland (5 percent). The corridor contains wetlands and surface waters associated with the Great Salt Lake and 0.6 mile of riparian habitats. Noxious weeds may occur throughout this corridor.

The Alternative H corridor contains core raptor nesting habitat along Links 335, 350, and 352, and crucial greater sage-grouse habitat along Links 335 and 350. Links 352, 353, 354, 356, 365, 366, and 370 are located in a general waterfowl movement pathway. Crucial mule deer habitats in this corridor include winter range along Links 366, 370, 374, and 375, and winter/spring range along Links 350, 370, and 374. Crucial elk winter range occurs along Links 370, 374, and 375.

Several special status species are known or likely to inhabit or forage within the corridor. Suitable habitats for grassland and sagebrush species, including burrowing owl, short-eared owl, ferruginous hawk, long-billed curlew, greater sage-grouse, pygmy rabbit, kit fox, and bats, occur along Links 335 and 350. Wetlands provide nesting habitat for the burrowing owl, short-eared owl, and ferruginous hawk, and may support the Preble's shrew. The bald eagle and peregrine falcon may forage throughout the corridor. Two invertebrate species, the lyrate mountainsnail and southern tightcoil, have the potential to occur in the northern end of the Oquirrh Mountains along Links 370 and 374.

Alternative I – East Tooele Valley

The primary vegetation communities crossed by Alternative I include approximately: 9 miles of disturbed lands (22 percent), 8 miles each of invasive grassland and wetlands (20 percent); 6 miles of big sagebrush (14 percent); 4 miles of agricultural lands (9 percent); and 2 miles of native grassland (5 percent). The corridor contains wetlands surface waters associated with the Great Salt Lake. The corridor also traverses 0.6 mile of riparian habitats along Links 360, 370, and 385. Noxious weeds may occur throughout this corridor.

The Alternative I corridor contains core raptor nesting habitat along Link 160, and crucial greater sage-grouse habitat along Links 160 and 166. Crucial mule deer habitats in this corridor include winter range along Links 360, 370, and 385, and winter/spring range along Links 160, 360, and 370. Crucial elk winter range occurs along Links 360, 370, and 385. Links 360, 370, and 385 are located in a general waterfowl movement pathway and contain wetlands that represent important waterfowl and shorebird habitats. Special status species known or likely to inhabit or forage within the Alternative I corridor are the same as described for Alternative H.

Substation Sites

Mona Annex Substation

The vegetation communities on the proposed Mona Annex substation site include agriculture (49 percent), big sagebrush (45 percent), and invasive grassland (6 percent). The site is located in crucial mule deer winter/spring range. However, the predominance of non-native vegetation and wildfires has reduced the habitat quality for wildlife, including mule deer. There are no known greater sage-grouse leks or raptor nests within this site. Although no federally listed plant or animal species or designated critical habitats occur within or adjacent to this substation site, several special status wildlife species may inhabit or forage on the site, including the kit fox, greater sage-grouse, long-billed curlew, burrowing owl, ferruginous hawk, bald eagle, peregrine falcon, and several bat species.

Limber Substation

Vegetation communities on the future Limber substation site include non-native grassland (90 percent) and big sagebrush (10 percent). The site is located in a core raptor nesting area. The predominance of non-native grassland habitat reduces the habitat quality of the site. There are no known greater sage-grouse leks or raptor nests within this site. Although no federally listed plant or animal species or designated critical habitats occur within or adjacent to this substation site, several special status wildlife species may inhabit or forage on the site, including the kit fox, greater sage-grouse, long-billed curlew, burrowing owl, ferruginous hawk, bald eagle, peregrine falcon, and bat species.

3.2.4 Wildland Fire Ecology and Management

Wildland fire ecology and management data was collected for the entire Project area from the SLFO Fire Management Plan (BLM 2005a), the Central Utah Interagency Fire Management Annual Operating Plan (Utah Forestry, Fire, and State Lands [UFFSL] et al. 2007), and the Central Utah Regional Wildfire Protection Plan (UFFSL 2007).

Ecosystems have evolved with, and adapted to, specific fire regimes. A range of natural fire regimes exist within the study area, which are largely determined by vegetation type. These fire regimes have been altered by human activities such as fire suppression and grazing, resulting in changes to the historical distribution, composition, and structure of rangeland vegetation. The alteration of natural fire regimes has also facilitated the invasion of exotic annuals such as cheatgrass (*Bromus tectorum)*.

Many areas have had the fire return interval lengthened due to fire suppression and livestock grazing. Grazing removes fine fuels and inhibits fire from traveling across the landscape. Longer fire return intervals have had several effects on the landscape, including: (1) conifers expanding into non-forested areas; (2) tree densities increasing in stands of juniper and aspen; (3) junipers encroaching into upland shrub areas; (4) shrub densities increasing; and (5) herbaceous vegetation decreasing due to increased tree and shrub densities.

In other areas, where fire return intervals are decreasing, it actually increases the fire frequency on the landscape. The most prevalent changes are occurring in more arid sites, where the introduction of exotic annuals, such as cheatgrass, has increased the fire frequency in areas where fire historically played a minimal role in the natural disturbance regime. The increased fire frequency is advantageous to exotic annuals and harmful to native vegetation, facilitating further invasion of exotics and causing monocultures in some landscapes.

The BLM has identified fire management and suppression objectives that comply with Federal Wildland Fire Management Policy and current land use plans. The fire management objectives that apply to the study area include the following:

- Safely reintroducing fire into ecosystems to meet desired resource management objectives by using the best science
- Using wildland fire control and suppression strategies and tactics that emphasize resource management objectives while minimizing total fire management costs
- Using a fire suppression strategy that balances resource management objectives and goals for protecting values at risk while minimizing fire management costs
- Keeping fire size as small as possible and fire intensity as low as possible in the salt desert shrub ecotype to minimize loss of this sensitive vegetation type
- Stopping or reducing as much as possible the conversion of healthy ecosystems to cheatgrass
- Maintaining or improving the health of the sagebrush steppe ecotype
- Reducing, as much as possible, the juniper encroachment from its historic habitat into adjacent ecosystems

The BLM has similar fire management strategies for all of the fire management units within the study area. Fires should be suppressed using the appropriate management response to minimize the number of acres burned. Wildland fire use, or unplanned wildland fire, is not allowed as a fire management strategy within the study area. Prescribed fire or planned wildland fire is allowed in certain areas, where needed.

3.2.5 Cultural Resources and Native American Concerns

3.2.5.1 Introduction

Cultural resources include archaeological, historic, or architectural sites, districts, buildings, structures, places, and objects. They also include areas of traditional use, referred to as traditional cultural properties (TCPs). The significance of a cultural resource depends on whether or not it is listed, or eligible for listing, on the NRHP. Properties eligible for listing on the NRHP must demonstrate importance in American history, architecture, archaeology, engineering, or culture. A property is considered significant in these categories if it meets one or more of the following criteria:

> *(a) are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) are associated with the lives of persons significant in our past; or*
>
> *(c) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) have yielded, or may be likely to yield, information important in prehistory or history.* (36 CFR 60.4)

In addition to demonstrating significance in one or more of the categories listed above, a property must demonstrate integrity. The historic property must be a "preservable entity" that demonstrates the qualities that make it significant. Integrity is judged most often on location, setting, design, materials, workmanship, feeling, and association.

A PA was executed between the various agencies involved with authorizing the Project. The BLM SLFO is serving as the lead federal agency for Section 106 compliance. Other agencies participating in the PA include the Utah SHPO, Rocky Mountain Power, DOD (Tooele Army Depot), Utah SITLA, PLPCO, and UDOT.

The PA outlines a phased approach to the identification, assessment, and treatment of cultural resources for the Project, which includes a combination of Class I, Class II, and Class III cultural resource data collection to be conducted at specific stages of the Project. A Class I cultural resource inventory (literature search) was conducted during preparation of the Draft EIS to identify previously documented cultural resource sites within a distance specified by the BLM (as lead agency) of each proposed alternative route. Class I data were utilized to identify cultural resource sensitivity zones and areas where existing data were lacking along proposed routes. Where Class I data were lacking, a Class II cultural resource inventory (reconnaissance) was performed. Class I and Class II cultural resource data collected for the Project were used to identify and assess potential impacts the Project may have on cultural resources and to support the evaluation of the route alternatives for the EIS. The data also will be included in a stand-alone Cultural Report developed to facilitate consultation, as required by Section 106 of the NHPA.

Cultural resources also would be considered during the post-EIS phase of the Project. Consultation with appropriate land management agencies, tribal governments, and the SHPO would continue and Class III intensive pedestrian surveys of the selected route, associated access roads, substations, and similar ancillary facilities would be conducted. The results of the Class III inventory would be presented in a separate Technical Report. The final Class III Technical Report would enable BLM, in consultation with the SHPO, to identify NRHP-eligible properties and to make determinations on eligibility of, and potential effects on, those properties. Following completion of the Class III cultural resource inventory, a comprehensive Treatment Plan addressing the effects of the proposed undertaking on identified historic properties would be prepared and implemented in consultation with the BLM, SHPO, and other involved agencies.

This section presents a cultural history of the study area, identifies the methods used in the study, presents the results, and compares each alternative route as it relates to cultural resource inventory data.

3.2.5.2 Cultural History

Prehistory

The prehistory of the current Project area parallels that of Utah and the Great Basin in general, and begins near the end of the Pleistocene epoch. The series of cultural changes in the Great Basin are classified into four general time-frames or phases: Paleoindian, Archaic, Formative, and Protohistoric. Each of these major phases is marked by a distinct lifeway.

<u>Paleoindian Period (12000 BP to 8300 BP)</u>

The Paleoindian Period is the earliest known period of demonstrated human occupation in the region. Also known as the Clovis Period, the Paleoindian Period is poorly understood in the eastern Great Basin. What is known about this period comes from very few surface sites and isolated finds of Clovis, Folsom, and Lake Mojave projectile points (Zier 1984:21). Paleoindian social organization consisted of small groups practicing a highly mobile subsistence strategy, with an emphasis on large game mammals such as giant bison, mammoth, camel, and ground sloth (Grayson 1993:71-72). However, associations of large faunal remains with Paleoindian artifacts, like those commonly found in the Great Plains, are absent in the eastern Great Basin. Sites and isolates attributed to Paleoindian occupation of the area are typically found along the edges of extinct Pleistocene or early Holocene beaches, suggesting a possible lake-edge marsh adaptation (Madsen 1982:213; Heizer and Baumhoff 1970). The absence of specialized tools for processing plant resources reinforces existing models of late Pleistocene subsistence strategies (Black and Metcalf 1986; Schroedl 1991). The characteristic artifacts associated with this period include Clovis, Folsom, Lake Mojave, and Great Basin stemmed projectile points (Justice 2002).

<u>Archaic Period (8300 BP to 1500 BP)</u>

The Archaic Period represents a significant span of time distinguished by a steady transition of lifeways and technologies (Jennings 1978:29). This period is characterized by an increased focus on smaller game and the exploitation of plant resources. The Archaic toolset exhibits a significant diversification in projectile point types and an increased presence of ground stone artifacts (Jennings 1978). Despite these marked differences, the transition between the Paleoindian and Archaic periods is poorly defined in many areas. Archaic cultures expanded across the Great Basin, resulting in a multitude of projectile point forms, sites, and lifeways. Several periods of the Archaic have been defined in order to illustrate these cultural shifts.

The Wendover Period ranges from approximately 8,300 before present (BP) to 6,000 BP, as defined by Aikens and Madsen (1986:154), and roughly corresponds to the Early Archaic Period described for other regions. Sites are found at many different elevations and in a wide variety of environments. Excavation of dry caves in western Utah recovered basketry, cloth, cordage, digging tools, snares, buckskin, and fire drills (Jennings 1978:41, 49). Grinding implements for plant processing and implements such as atlatls and traps for hunting small game are common. These artifact assemblages are indicative of the wide variety of activities engaged in by prehistoric inhabitants, who most likely followed a seasonal round of hunting and gathering. Projectile points common to the Wendover Period are the Elko Series, Pinto Series, Bitterroot side-notched, and Humboldt concave-base (Aikens and Madsen 1986; Jennings 1978).

The Black Rock Period ranges from 6000 BP to 1500 BP (Aikens and Madsen 1986:154). This range spans the Middle to Late Archaic, as described in other Great Basin regions. It is initially characterized by a drier environment that resulted in diminishing lake margin resources. Increasing pressure from population expansion and a decrease in available food resources prompted a shift to greater mobility and movement into upland areas in order to take advantage of resources at higher elevations. Expansion into upland pinyon-juniper communities for the exploitation of mountain sheep, deer, and other animals became more necessary (Aikens and Madsen 1986:157-158). The beginning of the Black Rock Period is distinguished technologically by the appearance of new Elko and Gypsum projectile point forms (Aikens and Madsen 1986:158). At around 4000 BP, Neoglacial climatic shifts resulted in increased rainfall, flooding springs, and increased marshlands. Subsistence activities shifted to an emphasis on upland areas due to the decrease in available plants and waterfowl from flooded areas (Aikens and Madsen 1986:158). The end of the Black Rock Period is distinguished by the introduction of the bow and arrow. This technology rapidly replaced the atlatl and diminished the importance of the spear. While projectile point form remained constant in terms of basic form, overall size decreased (Aikens and Madsen 1986:160).

Also emergent at the end of the Black Rock Period were several characteristics of horticultural subsistence. The manufacture of pottery and the introduction of domesticated maize variants accompanied increased sedentism for the multiple horticultural communities that appeared throughout much of Utah, eastern Nevada, western Colorado, and southern Idaho. Designated the Fremont, this cultural tradition flourished between 1600 BP and 700 BP (Marwitt 1986:161).

Formative Period (1600 BP to 700 BP)

During the Formative Period, peoples of the Fremont culture introduced a new, moderately sedentary lifeway to the Great Basin. This period is characterized by a shift away from complete dependence on hunting and gathering as a means of subsistence, toward a strategy based on supplementing that lifeway with maize horticulture and the appearance of small villages (Marwitt 1986:161). These villages often consist of clusters of semi-subterranean pit houses, slab or clay lined storage pits, and occasional masonry structures such as surface dwellings and granaries. Satellite sites, or temporary encampments, are also common in the archaeological record of the Formative Period. Sites such as these are generally found in relatively close proximity to the centrally located village sites (Madsen 1982:217). The tool technology of the Formative Period reflects the semi-sedentary horticultural lifestyle. Sites from these groups may contain large amounts of earthenware ceramics. Relatively large amounts of basketry and other woven artifacts, such as sandals, are also common in the archaeological record of the Formative Period. Lithic technology changed as well, resulting in the appearance of new projectile point types such as the Uinta side-notched, Nawthis side-notched, Eastgate expanding-stem, Bull Creek, cottonwood triangular, and Parowan basal-notched series points (Holmer and Weder 1980; Jennings 1978).

The Fremont Culture is a label applied to groups exhibiting this different lifestyle who occupied the Utah area from Anno Domini (AD) 400 to AD 1300 (Marwitt 1986:161). Although initially characterized as a "culture" with a number of "variants," the Fremont has recently been reconceived as a "complex" (Madsen and Simms 1998). Material culture appears to suggest that what archaeologists define as "Fremont" is more of a complex of traits and activities that varied over the entire region. In the eastern Great Basin, the aboriginal people of the Formative Period have typically been separated into five different regional groups or variants (Marwitt 1970). The current Project corridor spans the identified areas of two of these variants: the Great Salt Lake and the Sevier.

Great Salt Lake Variant

The Great Salt Lake Fremont occupied the Great Salt Lake Basin and surrounding area, including much of present-day northern Utah, with possible extensions into southern Idaho and the Snake River Plain (Marwitt 1986:169). The Great Salt Lake Fremont region extends south to the boundary between the Salt Lake Basin and the Utah Lake Basin (Madsen 1989:22). The Great Salt Lake Variant is characterized by the occurrence of Great Salt Lake grey ceramics, clay figurines, and Rose Spring, Eastgate, and Bear River Side-notched projectile points (Madsen and Simms 1998:300-303). Great Salt Lake Fremont sites are generally small with little substantial architecture, though some do exhibit circular pithouses. Subsistence exhibits a greater emphasis on wetlands flora and fauna and a low reliance on maize (Marwitt 1986:168). Rockshelters around the margins of the Great Salt Lake exhibit evidence of short Fremont occupations, exploiting local marsh resources (Madsen 1989:57).

Sevier Variant

The Sevier Variant extends from the plateau highlands of southern Utah, northward to the northern end of the Provo Valley (Marwitt 1970). Between the boundary of the Parowan Variant to the south and the Great Salt Lake Variant to the north, the western limits of the Sevier Variant remain largely undefined, terminating somewhere in eastern Nevada. To the east, the Sevier Variant extends to the eastern edge of the Wasatch Plateau. The Sevier Variant is characterized by the occurrence of Sevier Grey pottery and limited quantities of Ivie Creek black-on-grey pottery, circular to sub-rectangular pithouse architecture, adobe storage granaries, clay figurines, and groundstone (Marwitt 1970). Cultivated corn, supplemented by wild game and collected plants, comprised the typical diet. Typically, Sevier Fremont sites consist of small villages situated on alluvial fans near canyon mouths and permanent water sources (Marwitt 1970).

<u>Protohistoric Period (AD 1000 to AD 1826)</u>

The Protohistoric Period, commonly referred to as the "Numic Expansion," began around AD 1000 as Numic/Shoshonean speaking groups and then migrated into northern Utah (Bassett et al. 1994:3-11). Beginning around AD 1200 throughout the Great Basin, small triangular arrow points become more common, along with a distinctive pottery called "Intermountain Brownware" or "Shoshonean Ware" (Janetski 1986:158; Jennings 1986). The appearance of these ceramics and other aspects of material culture have been taken as evidence of an expansion of Numic speaking peoples into the region from the Mojave Desert area (Bettinger and Baumhoff 1982; Madsen 1975; Rhode and Madsen 1994). It is not clear what happened to the Fremont people at this time; whether the changes noted in material culture represent replacement of local populations, absorption into new linguistic and cultural groups, or simply cultural change by indigenous populations remains an open debate (Aikens and Witherspoon 1986; Lyneis 1982).

Ethnographically, subsistence activities of Shoshonean groups (bands) involved seasonal movements to specific geographic localities as particular food resources became available throughout the year. The size and structure of a band fluctuated with changes in the types and availability of resources, but generally included small, family-sized bands through the spring and summer and large, multi-family groups during the fall and winter months (Steward 1938).

Numic cultures remained in the Project area into the Historic Period. The Ute descendants of the Numic expansion continued to reside in the Project area until shortly after the arrival of the Mormon settlers in 1847. The Timpanogots, a subgroup of the Western Ute, were forced from their primary village sites in Utah Valley and at the mouth of Spanish Fork Canyon and onto a reservation established in 1855 at the south end of Utah Lake. In the early 1860s, the Timpanogots abandoned the reservation at Utah Lake in favor of the larger reservation established in the Uinta Basin. However, they returned annually to the Utah Valley and the Spanish Fork River until the early 1900s to fish during spawning season (Janetski 1991:32).

History

General Historical Overview

The history of west-central Utah can be divided into five major time periods associated with significant events and activities. The first period presented in this discussion is the Exploration Period, ranging from approximately 1776 to 1849, and characterized by the earliest exploration of the area by Euroamericans, Spaniards, and the newly arrived Mormon pioneers. The second time period represents the Settlement Period, ranging from 1847 to 1869. The third time period, the Industrial Era, encompasses the time between 1869 and 1928, and includes the development of a vast railroad network and the mining/industrial boom associated with World War I. The fourth period is the Depression Era, which ranges between 1929 and 1940, and is characterized by the bust of the local mining and agricultural industries as a result of the stock market crash. The fifth period, World War II and the Post-War Era, ranges from 1941 to the present and includes the economic recovery resulting from the war overseas, the rise of defense-related industries in Utah, and the increase in urbanization.

Exploration Period (1776 to 1847)

The earliest known exploration of the Great Basin by non-Indians was the Dominguez-Escalante expedition of 1776-77 in search of a route from Santa Fe, New Mexico, to the California coast (Black and Metcalf 1986:18; Velez de Escalante 1995:xii). The route followed by the Spanish friars is located slightly east of the Project corridor, near the community of Mona in Juab County (Velez de Escalante 1995:75). The expedition party spent several days in mid-September 1776 exploring the vicinity and encamped with a small band of Utes (Velez de Escalante 1995:67-75).

In addition to the Spanish, other Europeans and Euroamericans undertook early explorations of the region that would later become Utah. Many of these adventurers came in the form of fur trappers, while others came as part of government-sponsored expeditions. Among the first of these explorers was Jedediah Smith, who led expeditions through the Salt Lake and Utah valleys in search of good trapping territory in 1826 and 1827 (Morgan 1953:195-196; 237). Almost two decades later, John C. Fremont spearheaded government expeditions through the area in 1843-44, 1845, and 1853-54 (Miller 1978:73-78). Fremont, a captain in the Army Corps of Topographical Engineers, was charged with exploring, mapping, and describing the interior West.

Settlement Period (1847 to 1869)

In 1847, the main group of Mormon pioneers arrived in the Salt Lake Valley. Shortly after, their religious leader (Brigham Young) sent a number of families to explore and settle portions of the territory. Settlements were established at Payson Lake and Spring Lake in 1850, at Santaquin and Nephi in 1851, and throughout the Cedar Valley just west of Utah Lake in 1852 (Van Cott 1990:73, 290, 331, 351). The communities of Grantsville and Tooele were settled in 1849 (Blanthorn 1994a, 1994b). These settlements began as agricultural and ranching communities, focusing on growing a wide variety of fruit, sugar beets, and raising cattle and sheep (Roper 1994:585).

The population of central Utah increased dramatically during the Utah War of 1857 and 1858. During this conflict, between Mormon settlers in the Utah Territory and the U.S. Government over a misunderstanding concerning the issue of territorial governance, approximately 30,000 residents from northern Utah were ordered south, into central Utah, by Brigham Young (Hull and Avery 1980:50). Many of the refugees remained in the area following the resolution of the conflict.

The U.S. Government was not the only adversary to confront early Mormon settlers. Many minor skirmishes occurred between the settlers and the indigenous Ute Indians. The tension between Mormons and Utes culminated in the Black Hawk War (1865-68). This 3-year-long war began in Manti in early August 1865, when a meeting between Mormon and Ute leaders over the slaying of several cattle ended in a young Ute chief being pulled from his horse by an angry Mormon (Peterson 1994:43-44). During the course of the war, Mormon settlers banded together in a series of forts established throughout the area. Under the leadership of Black Hawk, the Ute Indians united with the Paiute and Navajo tribes to raid Mormon settlements. During the course of the war, several hundred cattle were stolen and as many as 70 settlers were killed (Peterson 1994:44). The war ended with the signing of a peace treaty in 1868. At that time, most of the area's Ute population migrated to the Uintah reservation in eastern Utah (Peterson 1994:44).

<u>Industrial Era (1869 to 1928)</u>

The beginnings of the industrial era in west-central Utah can be traced to the discovery of silver in the East Tintic Mountains, west of Utah Lake, in 1869. The discovery was critical to the development of communities throughout central and western Utah County. The Tintic Mining District was organized in 1869 (Notarianni 1994). Between the establishment of the district and the end of World War I (1918), the mines generated an estimated $180 million in revenue (Notarianni 1994).

Farther north, mining districts were established at Camp Floyd (sometimes referred to as Mercur) and Ophir. Both districts, located on the western slopes of the Oquirrh Mountains, produced significant amounts of gold, silver, and lead (May 1978:222). The Camp Floyd district was organized in 1870 (Cundiff 2002a:1). During the 1870s, approximately $56,000 worth of silver was extracted, but by the end of the decade, the silver deposits were played out. Gold was found in the district in 1883, which brought an economic resurgence to the area; but by 1913 the ores were exhausted, forcing the mines and mills to close (Cundiff 2002a:1). The Ophir Mining District was originally part of Utah's first mining district, the West Mountain District, which was organized in 1863 (Cundiff 2002b:1). The West Mountain District was divided in 1864 and again in 1870, when the Ophir District was created (Cundiff 2002b:1). The Ophir District produced primarily silver; but lead, zinc, and gold were also extracted. The district's boom period was in the 1870s, during which time millions of dollars worth of ore was extracted. By the end of the century, the major mines of the Ophir District had closed (Cundiff 2002c:1).

One of the most productive mining areas during this period was the Bingham Canyon area, on the eastern slopes of the Oquirrh Mountains. Mining in the district began in 1863, as individual prospectors and small operations extracted mostly silver, lead, and gold using manual techniques. After 1900, copper became the primary mineral extracted, commercial mining interests replaced individual prospectors, and mechanization increased drastically. The Utah Copper Company was formed in 1903, and in 1915 Kennecott Copper Corporation acquired a 25 percent interest (Cononelos and Notarianni 1994). In 1905, the value of copper extracted at the Bingham mine was $8.9 million; by 1917 the value exceeded $67 million (Notarianni 1990:18-20). Although it had a modest beginning, the Bingham Copper Mine is now the world's largest open-pit copper mine, producing 250,000 tons of copper, 350,000 ounces of gold, 2.5 million ounces of silver, and 8 million pounds of molybdenum (Notarianni 1990).

Transportation of ores from these various mining districts to smelter and processing facilities, in particular those located in the Salt Lake area, was an important issue faced by individual and commercial mining interests. The boom in mining spurred the construction of numerous railways that serviced the mining districts. Among the railways that served the Tintic District were the Mammoth Mills and Eureka branch lines of the Salt Lake and Western Railroad, the Tintic Range Railway, the Eureka Hill Railway, the Goshen Valley Railway, and the New East Tintic Railway (Strack 1994). The Ophir District was serviced by the St. John and Ophir Railroad, and the Camp Floyd District by the Salt Lake and Mercur Railroad (Strack 1994). The mines in Bingham Canyon were served by the Rio Grande Western's Bingham line, the Copper Belt Railway, and the Bingham and Garfield Railway (Strack 1994).

The period from 1910 to 1920 was a prosperous one for residents of Utah. The increased use of industrial ores during World War I created an economic mini-boom in mining towns. While miners and mining companies were the obvious beneficiaries of this war-time demand, area ranchers also enjoyed economic prosperity by selling larger quantities of beef to feed the hungry mine workers. Many Utah towns reached the height of their social and economic growth during this boom period.

Depression Era (1929 to 1940)

The crash of the stock market in late 1929 heralded the onset of the Great Depression. Like much of the West, with its economy firmly established on resource exploitation, extractive industries, and agriculture, Utah was struck a severe financial blow by the Great Depression (McCormick 1994:136). Many of Utah's mining companies neared collapse as production levels and profitability each fell when the national and international markets dried up (Notarianni 1994). The agricultural industry was also hit hard by the Great Depression. As income decreased, farmers and ranchers could not afford to purchase seed and equipment and maintain livestock. Beef and wool prices reached unprecedented lows. The Taylor Grazing Act, which passed in 1934, was intended to stabilize the economically volatile livestock industry and to stop the misuse of public lands through regulatory control of those lands by the Grazing Service. However, many ranchers could not afford the permit fees to graze their livestock on public lands, which forced many to sell off their herds (Hull and Avery 1980:56).

As the nation continued to languish, the United States Government established programs of institutional relief. As part of President Franklin Roosevelt's New Deal, various forms of federal aid poured into struggling communities. In general, western states received more financial support than eastern states, with Utah ranking ninth overall in federal aid per capita (Holzapfel 1999:215). In addition to social welfare programs, including both federally run programs as well as those operated by the Mormon Church for the benefit of its members, a wide variety of work relief programs benefitted local residents.

World War II and the Post-War Era (1941 to Present)

World War II brought new economic vigor to Utah. The mining industry rebounded as demand levels soared. A strong military-industrial complex developed in the state during the World War II era. Among the government installations established in the Tooele Valley area during World War II were the Tooele Army Depot, the Deseret Chemical Depot, and Dugway Proving Grounds. Functions at these installations ranged from biological and chemical warfare testing and bomber training, to more mundane activities such as supply storage and equipment repair (Utah State Historical Society [USHS] 1988:26) By the end of the war, these facilities employed thousands of civilians and military personnel (USHS 1988:26).

Since the 1980s, areas along the Wasatch Front and Oquirrh Mountains have grown at an incredible pace. The economic bases broadened in most sectors, including significant increases in manufacturing, government sectors, retail, tourism, and housing-related industries. The central Utah region has continued to be predominantly agriculturally based, yet small-scale development has increased. The populations of Juab, Utah, Tooele, and Salt Lake counties have grown steadily. The 2000 census data reports approximately 1.3 million of the state's 2.2 million residents live in those four counties (U.S. Census 2000).

3.2.5.3 Methods

The methods for the cultural resource study conducted for the EIS were set forth in the PA. This included both a Class I inventory and Class II (reconnaissance level) field survey. Class I data was collected from the Utah SHPO and included those previously recorded sites located within 0.5 mile of each alternative. The Class II survey was conducted for those alternatives where there was little or no previous research conducted.

In addition to the Class I and Class II inventories, a visual analysis of cultural resources was conducted. This analysis involved identifying previously recorded cultural resources, located within a 6-mile-wide corridor for each alternative, that have been determined or recommended eligible for the NRHP under criteria A, B, or C. The specific methods and results of these studies are documented in a separate technical report (Huffman et al. 2009).

In order to assess the relative impact each alternative could potentially have on cultural resources, each site was assigned a sensitivity level. The sensitivity of cultural resources within the study area was defined based on the following criteria:

- Eligibility for listing on the NRHP
- Site type and complexity
- Potential for avoidance

Based on these criteria, a level of sensitivity was assigned as follows:

Low (1) – Sites not eligible for listing on the NRHP

Moderate (2) – Sites of which NRHP eligibility is unknown, sites eligible for NRHP listing that include lithic scatters, lithic/ceramic scatters, prehistoric open camp site, caches, prehistoric and historic trash scatter, historic structures, historic log structures, railroad camps, house mounds, NRHP linear sites that can be avoided

High (3) – Sites eligible for NRHP for listing that include habitation, caves (even if unevaluated), rock shelters, rock art sites (including petroglyph sites)

Very High (4) – National trails, national historic landmarks, cemeteries, habitation sites with documented human remains, village sites

The GIS was then used to calculate the number of low, moderate, and high cultural resources sensitivity for each alternative.

3.2.5.4 Summary of Cultural Resources Inventory Results

The cultural resources inventory results are summarized below.

Class I and Class II

The Class I inventory resulted in the identification of 186 previously recorded cultural resources. These included prehistoric sites such as artifact scatters, cave sites, rock art sites, and habitation sites. Historic sites included artifact scatters, habitation sites, military installations, trails and roads, railroads, canals, utilities, cemeteries, parks, mines, and industrial features. A total of 98 sites are low sensitivity, 74 are moderate sensitivity, 6 are high sensitivity, and 8 are very high sensitivity.

The Class II survey identified 12 additional sites (Christensen et al. 2008). These included a prehistoric lithic scatter, historic railroad, historic waterline, historic trash scatter, historic fence with an earthen berm, a pack trail, and historic roads. All 12 of the sites are low sensitivity.

Table 3-5 summarizes the Class I and Class II inventory data for each alternative.

TABLE 3-5
SUMMARY OF CULTURAL RESOURCE INVENTORY DATA

Alternative Route	Number of Low Sensitivity Sites	Number of Moderate Sensitivity Sites	Number of High Sensitivity Sites	Number of Very High Sensitivity Sites	Total Number of Sites
Mona to Limber					
Alternative A1	49	35	2	0	86
Alternative A2 – BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative/ Proponent's Proposed Action	34	17	1	0	45
Alternative B1	57	36	2	0	95
Alternative B2	13	17	1	0	61
Alternative C1	63	38	2	0	103
Alternative C2	47	20	1	0	68
Limber to Oquirrh					
Alternative D BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	1	2	0	0	3
Alternative E1	0	2	0	0	2
Alternative E2 Proponent's Proposed Action	0	2	0	0	2
Alternative F1	3	1	0	0	4
Alternative F2	3	1	0	0	4
Alternative G	4	8	2	8	22
Limber to Terminal					
Alternative H Environmentally Preferred Alternative/ Proponent's Proposed Action	7	7	2	2	18
Alternative I	5	15	3	2	25

Cultural Visual Resources

The visual resource study identified 92 previously recorded cultural resource sites that are eligible for NRHP listing under criteria A, B, or C within the 6-mile-wide corridors for each alternative. These include historic railroads and associated features, historic mines and associated features, canals, roads, cemeteries, cave complexes and rockshelters, dams, a prisoner-of-war camp, historic homesteads and habitation sites, utility lines, and historic artifact scatters. The inventory results for the cultural visual resource study are summarized below for each alternative.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Mona Pioneer Cemetery, Atherly Dam, Clover Reservoir Dam, Transcontinental Telephone Line, Topliff Mine, a World War II prisoner-of-war camp, Stookey Homestead, and several railroad grades and lines.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Atherly Dam, Clover Reservoir Dam, Transcontinental Telephone Line, Topliff Mine, World War II prisoner-of-war camp, Stookey Homestead, and several railroad grades and lines.

<u>Alternative B1 – East Rush Valley</u>

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project consist mostly of historic mines and mining camps associated with the Mercur and Ophir mining districts. Named mines include: Chloride Point Key Stone mining complex, Topliff Mine and Spur, West Mercur Daily Number 1 Claim Mine and Mill, Antelope, Buck Horn, Mountain Green Gem, Grey Rock Extension, Battle Ax, Grey Amended, Montana No. 1, and Teller. Other cultural resources identified include the Mona Pioneer Cemetery, the Johnson Homestead, and several railroad grades and lines.

<u>Alternative B2 – East Rush Valley</u>

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project consist mostly of historic mines and mining camps associated with the Mercur and Ophir mining districts. Named mines include Chloride Point Key Stone mining complex, Topliff Mine and Spur, West Mercur Daily Number 1 Claim Mine and Mill, Antelope, Buck Horn, Mountain Green Gem, Grey Rock Extension, Battle Ax, Grey Amended, Montana No. 1 and Teller. Other cultural resources identified include the Johnson Homestead and several railroad grades and lines.

Alternative C1 – Tintic Junction

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project consist mostly of historic mines and mining camps associated with the Tintic Mining District. Named mines include Bullion-Beck Mine and Mill, Eagle-Bluebell, Eureka Hill, and Gemini (Keystone). Other cultural resources identified include Buckeye Town, Stookey Homestead, Transcontinental Telephone Line, Mona Pioneer Cemetery, Atherly Dam, a World War II prisoner-of-war camp, and the Clover Reservoir Dam.

Alternative C2 – Tintic Junction

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project consist mostly of historic mines and mining camps associated with the Tintic Mining District. Named mines include Bullion-Beck Mine and Mill, Eagle-Bluebell, Eureka Hill, and Gemini (Keystone). Other cultural resources identified include Buckeye Town, Stookey Homestead, Transcontinental Telephone Line, Atherly Dam, a World War II prisoner-of-war camp and Clover Reservoir Dam.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Old Tooele Cemetery, the Honorine and Stockton Tip Top Mine Complex, Argent Mine, Calumet Mine, and Galena King Mine. The Kennecott Railroad and Tooele Valley Railroad are also associated with this alternative.

Alternative E1 – Pass Canyon

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Old Tooele Cemetery, the Honorine and Stockton Tip Top Mine Complex, Argent Mine, Calumet Mine, Galena King Mine, and Bingham City Cemetery. The Kennecott Railroad and Tooele Valley Railroad are also associated with this alternative.

Alternative E2 – Proponent's Proposed Action

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Old Tooele Cemetery, the Honorine and Stockton Tip Top Mine Complex, Argent Mine, Calumet Mine, and Galena King Mine. The Kennecott Railroad and Tooele Valley Railroad are also associated with this alternative.

Alternatives F1 and F2 – Middle/Butterfield Canyon

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include Old Tooele Cemetery, the Honorine and Stockton Tip Top Mine Complex, Argent Mine, Calumet Mine, and Galena King Mine.

Alternative G – Lake Point

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include the Lincoln Highway, Western Pacific Railroad, Bingham and Garfield Railway Dike Spur, Adobe Rock, Lakeview Railroad Siding, Kennecott Railroad, and the Blackrock Caves complex.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include the Lincoln Highway, the Western Pacific Railroad, the Bingham and Garfield Railway Dike Spur, Adobe Rock, Lakeview Railroad Siding, Kennecott Railroad, and the Blackrock Caves complex.

Alternative I – East Tooele Valley

Cultural resource sites located near this alternative that could potentially be adversely affected by the Project include the Lincoln Highway, Adobe Rock, Lakeview Railroad Siding, Tooele Valley Railroad, Western Pacific Railroad Warner Branch, Union Pacific Railroad Lynndyl Cutoff, Denver and Rio Grande Western Railroad Garfield Branch, a petroglyph site, and the Blackrock Caves complex.

Substation Sites

No cultural resource sites are associated with the Mona Annex or Limber substations.

3.2.5.5 Native American Concerns

Area of Analysis

While no American Indian reservations or lands owned in fee are within the Project area, the BLM identified tribes whose traditional territories are within the Project area. As part of scoping, on October 25, 2007, the BLM mailed Project notification letters to seven tribes and two Native American individuals to inform them about the Project, the EIS, and to determine their interest in the Project. Tribes also were asked to determine the need for further work related to the identification of TCPs that might be impacted by the Project. The following were notified:

- Northwestern Band of Shoshone Nation
- Eastern Shoshone of Wind River Reservation
- Te-Moak Tribe and affiliated Bands
- Confederated Tribes of Goshute Nation
- Skull Valley Band of Goshute Tribe
- Uintah and Ouray Ute Indian Tribe
- Paiute Indian Tribe of Utah
- Art Caamasee
- Elwood Mose

Current Status

Of these tribes and individuals notified, the Paiute Indian Tribe of Utah requested to participate in a field visit to view the Project corridor.

Upon completion of the Class III cultural resource survey and report, the BLM will host a field visit for the Paiute Indian Tribe of Utah and other interested tribes. Results of the consultation effort will be recorded in a separate report.

3.2.6 Paleontological Resources

3.2.6.1 Introduction

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and are of paleontological interest and provide information about the history of life on Earth (Omnibus Public Lands Management Act – Paleontological Resources Preservation [OPLMA-PRP] 2009). Fossil remains may include bones, teeth, shells, leaves, and wood. They are found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils.

This section presents an overview of the paleontological resources, the location of any known paleontological localities, and the possibility of discovery of fossil resources within the project area. This section also lists the pertinent laws, ordinances, regulations, and standards for paleontological resources; describes the methods used in the study; presents a summary of the inventory results; and compares each project alternative as it relates to the paleontological resource inventory data. The purpose of this inventory is to identify localities of known resources of paleontological interest and to infer where potential resources of paleontological interest may be present and potentially affected by construction-related activities.

3.2.6.2 Laws, Ordinances, Regulations, and Standards

Federal, state, and local governments have enacted legislation providing for varying degrees of protection for fossil resources. The Society of Vertebrate Paleontology (SVP) regards paleontological resources as "nonrenewable scientific and educational resources that, along with their accompanying contextual data, constitute part of our natural heritage" (SVP 2009). This paleontological resource inventory was conducted in accordance with the laws, ordinances, regulations, and standards that are applicable to the paleontological resources within the project area.

Federal

The American Antiquities Act of 1906, NEPA, FLPMA, and OPLMA-PRP serve as the primary federal legislation that requires addressing potential impacts to paleontological resources on federally administered lands. Other laws may also apply in special circumstances. The American Antiquities Act of 1906 (16 U.S.C. 431 433) provides for protection of both historic and prehistoric items on federal lands. NEPA (42 U.S.C. 4321-4347) directs federal agencies, including the BLM and USFS, to fully assess and manage impacts (adverse or not) to the environment. FLPMA (P.L. 94-579) provides for management and mitigation of adverse impacts on federal lands by "protecting the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values." Paleontological resources are viewed as having scientific value and requiring protection under the auspices of FLPMA. OPLMA-PRP was enacted as part of the 2009 Omnibus Public Land Management Act (OPLMA-PRP 2009) and codified specific protection for vertebrate fossil resources and scientifically significant plant and invertebrate fossil resources on federal lands. OPLMA-PRP created criteria for the issuance of paleontological collection permits and directed the Secretary of the Interior to ensure that paleontological resources from federal lands are properly curated into the collections of approved repository institutions.

The BLM policy for addressing potential impacts to paleontological resources on federally administered lands also applies, including General Procedural Guidance for Paleontological Resource Management (H-8270-1), BLM Washington Office Instruction Memorandum (IM) No. 2008-009, Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands, and BLM Washington Office IM No. 2009-011, Assessment and Mitigation of Potential Impacts to Paleontological Resources.

State

Utah State Code (63-73-11 through 63-73-19) currently states that paleontological resources are important and requires the preservation of critical fossil resources on State lands. The Code mandates that those removing or excavating critical fossils on State lands be qualified and permitted under joint jurisdictional cooperation from: the UGS, Utah Museum of Natural History, and SITLA. State Code (53B-17-603) also requires that important extracted fossils be curated by an approved and qualified institution.

Local

No local protection of paleontological resources is known to pertain to the Project.

Professional Standards

SVP has established professional best practices for vertebrate paleontologists, along with more specific guidelines for the assessment and mitigation of adverse impacts to significant, nonrenewable, paleontological resources. These standards and best practices were developed by SVP in cooperation with federal and state agencies; both society and agency paleontologists follow these guidelines. SVP Bylaws Article 12: Code of Ethics, Sections 1 and 4 state:

> Section 1: It is the responsibility of vertebrate paleontologists to strive to ensure that vertebrate fossils are collected in a professional manner, which includes the detailed recording of pertinent contextual data, such as geographic, stratigraphic, sedimentologic, and taphonomic information.
>
> Section 4: Scientifically significant fossil vertebrate specimens, along with ancillary data, should be curated and accessioned in the collections of repositories charged in perpetuity with conserving fossil vertebrates for scientific study and education (e.g., accredited museums, universities, colleges, and other educational institutions).

These standards establish the protocol for the assessment and mitigation of impacts to paleontological resources. SVP (1995) summarizes its expectations for professional paleontologists operating on assessment and mitigation projects as:

> Vertebrate fossils are significant nonrenewable paleontological resources that are afforded protection by federal, state, and local environmental laws and guidelines. The potential for destruction or degradation by construction impacts to paleontological resources on public lands (federal, state, county, or municipal) and land selected for development under the jurisdiction of various governmental planning agencies is recognized. Protection of paleontological resources includes: (a) assessment of the potential property to contain significant nonrenewable paleontological resources that might be directly or indirectly impacted, damaged, or destroyed by development, and (b) formulation and implementation of measures to mitigate adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged materials in established institutions."

3.2.6.3 Methods

Information for the inventory was obtained from a review of the scientific literature and from record searches at paleontological institutions. No fieldwork was conducted during the inventory, a decision that was based on the BLM's guidelines for the assessment and mitigation of the potential impacts to paleontological resources.

A review was conducted of relevant published and unpublished geological and paleontological reports, and museum paleontological locality records. The office of the State Paleontologist at the UGS was contacted for a paleontological locality record search of any known paleontological localities within 1 mile of the centerline of the proposed transmission lines. A search for paleontological localities within the project area was also conducted using records from the Paleobiology Database, available at http://paleodb.org and operated by the University of California, Santa Barbara.

Paleontological Potential

Information about the geological units and known fossil localities in the region were used to identify the paleontological potential of areas within 1 mile of the centerline. Paleontological potential levels were assigned to each geological unit using the PFYC system that was adopted by the BLM in 2007 for assessing paleontological potential on federal land. The PFYC system is a five-tiered system that classifies geological units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate and plant fossils and their potential to be adversely impacted, with a higher class number indicating a higher potential. This classification system is applied to the geological formation, member, or other distinguishable map unit, preferably at the most detailed mappable level. This approach was followed in recognition of the direct relationship that exists between paleontological resources and the geological units within which fossils are entombed. By knowing the geology of a particular area and the fossil productivity of particular geological units that occur in the area, it is possible to predict where fossils will likely be found. Each class is defined below:

> *Class 1 (Very Low Potential)* – Geological units that are not likely to contain recognizable fossil remains. These units include igneous, metamorphic, and Precambrian rocks.

Class 2 (Low Potential) – Sedimentary geological units that are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. These units include aeolian, diagenetically altered, and Holocene sediments.

Class 3 (Moderate or Unknown Potential) – Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. Class 3 is divided into two parts:

Class 3a (*Moderate Potential)* – Units are known to contain vertebrate fossils or scientifically significant non-vertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area.

Class 3b (*Unknown Potential)* – Units exhibit geological features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or area is known. This may indicate the unit or area is poorly studied and field surveys may uncover significant fossils.

Class 4 (High Potential) – Geological units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability.

Class 5 (Very High Potential) – Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils.

3.2.6.4 Summary of Paleontological Resources Inventory Results

This section discusses the regional geological setting, the geology in the project area, the PFYC of geological units in the project area, and the paleontological localities in the project area by alternative route.

Regional Geological Setting

The Project lies near the eastern margin of the Basin and Range Physiographic Province. The Basin and Range province is characterized by mostly parallel, north-south trending mountain ranges separated by desert basins (Fenneman 1931). The Basin and Range Province, as defined, terminates on its eastern margin with the Wasatch Mountains and the Colorado Plateau Physiographic Province.

The mountain ranges in the project area consist mostly of Paleozoic quartzite, limestone, shale, sandstone, siltstone, dolomite, and shale; but lesser amounts of intrusive Tertiary rocks are present (Morris and Lovering 1961; Tooker and Roberts 1970; Armin and Moore 1981; Tooker 1999). The valleys contain Cenozoic limestone, tuff, silt, sand, and gravel (Morris and Lovering 1961; Morris 1964).

Geology in the Project Area

Paleozoic Sediments

The Paleozoic Era ranges from 543 to 250 million years ago, during which much of western Utah was a sea. Organisms that lived in this sea during the Paleozoic include corals, trilobites, ostracodes, brachiopods, pelecypods, gastropods, conodonts, and primitive fish (Utah Geology 2009).

The oldest geological formations crossed by the proposed transmission lines are Mississippian in age. The Oquirrh, Stansbury, and Tintic mountains all have exposures of Mississippian rocks, most of which are composed of the Oquirrh Group. The Oquirrh Group varies slightly in formations and members due to lithologic differences, but the type section in the Oquirrh Mountains includes the West Canyon Limestone, the Butterfield Peaks Formation, and the Bingham Mine Formation (Morris et al. 1977). The West Canyon Limestone consists of both cherty and clastic limestone that is fossiliferous and believed to be Early Pennsylvanian in age. The Butterfield Peaks Formation consists mostly of calcareous sandstone and limestone, which are fossiliferous. The Bingham Mine Formation includes two members: the Clipper Ridge Member (quartzite and limestone), and the Markham Peak Member (quartzite, sandstone, and siltstone). Both members are fossiliferous and are Late Pennsylvanian in age. Gordon and Duncan (1970) noted that in the Oquirrh Mountains, the Mississippian though Permian sedimentary rocks are highly fossiliferous, containing fossils of worms, bryozoans, brachiopods, trilobites, pelecypods, gastropods, cephalopods, and echinoderms.

In the East Tintic Mountains, the Oquirrh Group is also exposed, as well as older formations, such as the Ordovician Opohonga Limestone, Fish Haven Dolomite, and Bluebell Dolomite; all of which are fossiliferous (Morris and Lovering 1961). Included in the Tintic Mountains is the highly fossiliferous Humbug Formation of Mississippian age.

The Stansbury and southern Onaqui mountains consist mostly of the upper parts of the Oquirrh Group, the Great Blue Limestone, and Manning Canyon Shale. The Great Blue Limestone also includes some sandstone, and commonly contains fossils of corals, bryozoans, and other marine invertebrates (Armin and Moore 1981). The Great Blue Limestone is believed to be Late Mississippian in age. Overlying the Great Blue Limestone is the Manning Canyon Shale of Mississippian to Pennsylvanian age. The Manning Canyon Shale also includes siltstone, limestone, and sandstone. Overlying the Manning Canyon Shale is the Oquirrh Group.

Cenozoic Sediments

Uplift during the Mesozoic Era (between 250 and 65 million years ago) created mountains, highlands, and basins in western Utah. During the proceeding Cenozoic Era (between 66 million years ago and the present), igneous intrusions and extension created the basin and range terrain that we see today. Several depositional events occurred in the Tintic Valley from the late Miocene to late Pleistocene. The oldest event was deposition of the Salt Lake Formation of Miocene to Pliocene age. The Salt Lake Formation consists of limestone, tuff, and gravelly silt. Overlying the Salt Lake Formation are older Quaternary (pre-Lake Bonneville) alluvial deposits and Lake Bonneville deposits, which consist of silt, sand, and gravel (Bissell 1963; Morris 1964). During the late Pleistocene, Lake Bonneville was formed. Pliocene lake sediments and Lake Bonneville deposits are also found in the valleys surrounding the East Tintic Mountains. Morris and Lovering (1961) reported numerous fossil gastropods and ostracodes from the Salt Lake Formation and Lake Bonneville deposits. Ostracodes and mammoth fossils were found in Lake Bonneville deposits near Sandy (east of the project area) and Salt Lake City, Utah (Madsen et al. 1976). A summary of the geological units is provided in Table 3-6.

TABLE 3-6
GEOLOGICAL UNITS AND PFYC ALONG THE MONA TO OQUIRRH PROJECT CENTERLINE

Age	Geological Unit	Fossils	PFYC	Paleontological Potential
Quaternary Sediments				
Quaternary	Surficial alluvium and colluvium	*Camelops* sp., *Equus* sp., *Tetrameryx* sp., *Neotoma* sp., *Microtus* sp., lagomorphs, reptiles	2	Low
Quaternary	Lake Bonneville Deposits	*Ovis* sp., *Vulpes vulpes*, *Bootherium bombifrons*, *Equus* sp., *Bison* sp., fish, gastropods, brachiopods, bird, cat	3	Moderate
Quaternary	Surficial older alluvium and colluvium	--	2	Low
Quaternary	Alluvial deposits	--	2	Low
Tertiary Igneous Rocks				
Tertiary	Intrusive Rocks	--	1	Very low
Oligocene	Volcanic Rocks	--	2	Low
Tertiary Sediments				
Miocene-Pliocene	Salt Lake Formation	--	3	Undetermined
Miocene	Alluvial deposits	--	2	Low
Paleozoic Sediments				
Permian	Cedar Mesa, Diamond Creek, Arcturus, and other formations	Marine invertebrates	3	Undetermined
Pennsylvanian-Permian	Oquirrh Group, Wells, Weber, Ely, Calville, and other formations	Fusulinids, brachiopods, gastropods, cephalopods, crinoids, other echinoderms	2	Low
Mississippian	Chainman, Manning Canyon, Doughnut, and other formations	Corals	2	Low

Paleontological Localities in the Project Area

Record searches at the UGS and the Paleobiology Database indicate that a total of 23 paleontological localities lie within 1 mile of the project centerline (Table 3-7). These paleontological localities are found in seven geological units in the project area. These geological units range in age from the Mississippian (Paleozoic) to Quaternary (Late Cenozoic) Periods and consist of Paleozoic formations, Lake Bonneville deposits, and surficial alluvium and colluvium. Of these geological units, only two have produced vertebrate fossils: Lake Bonneville deposits and an unnamed debris flow (considered here as part of the surficial alluvium and colluvium geological unit), both of which are in Salt Lake County. Lake Bonneville deposits contain fossils of fish, comorant (*Phalacocorex* sp.), mountain sheep (*Ovis* sp.), fox (*Vulpes vulpes*), cat, horse (*Equus* sp.), musk ox (*Bootherium bombifrons*), and bison (*Bison* sp.). The unnamed debris flow contains fossils of camel (*Camelops* sp.), horse (*Equus* sp.), extinct pronghorn (*Tetrameryx* sp.), pack rat (*Neotoma* sp.), vole (*Microtus* sp.), lagomorphs, and reptiles. The five remaining geological units have produced fossil marine invertebrates. Four of these geological units are in Salt Lake County and one is in Tooele County.

TABLE 3-7
SUMMARY OF PALEONTOLOGICAL RESOURCE INVENTORY DATA

Alternative Route	Paleozoic Localities	Cenozoic Localities	Total Number Localities
Mona to Limber			
Alternative A1	0	0	0
Alternative A2 BLM's Preferred on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	0	0	0
Alternative B1	0	0	0
Alternative B2	0	0	0
Alternative C1	0	0	0
Alternative C2	0	0	0
Limber to Oquirrh			
Alternative D BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	0	1	1
Alternative E1	0	2	2
Alternative E2 Proponent's Proposed Action	0	1	1
Alternatives F1 and F2	3	3	6
Alternative G	8	4	12
Limber to Terminal			
Alternative H Environmentally Preferred Alternative/Proponent's Proposed Action	7	3	10
Alternative I	2	3	5

Potential Fossil Yield Classification of Geological Units in the Project Area

The geological units within the project area were determined to have a very low to moderate/undetermined PFYC (1 to 3) (Table 3-6). No geological units within the project area were determined to have a high or very high PFYC (4 or 5). The geological units, their inferred PFYC, and paleontological localities found in the project area are discussed for each alternative route below.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Alternative A1 crosses nine geological units that consist of surficial alluvium (Qa), Lake Bonneville deposits (Ql), Salt Lake Formation (T4), volcanic rocks (Tov), alluvial deposits (Qt), intrusive rocks (Ti), Middle Cambrian formations (C2), and the Great Blue and Humbug formations (M2). Of these geological units, Ti and C2 have a very low PFYC and Qa, Qt, Tov, and M2 have a low PFYC. The Salt Lake Formation (T4) has an undetermined PFYC. Lake Bonneville deposits have a moderate PFYC. For Alternative A1, there are approximately 22.6 miles that cross Lake Bonneville deposits and 2.6 miles that cross the Salt Lake Formation. There are no known paleontological localities located within 1 mile of the centerline.

Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action

Alternative A2 crosses eight geological units that consist of Qa, Ql, T4, Qt, Tov, Ti, and M2. Of these geological units, Ti has a very low PFYC and Qa, Qt, Tov, Ti, and M2 have a low PFYC. The T4 has an undetermined PFYC. Lake Bonneville deposits have a moderate PFYC. For Alternative A2, there are approximately 21.2 miles that cross Lake Bonneville deposits and 2.6 miles that cross the Salt Lake Formation. There are no known paleontological localities located within 1 mile of the centerline.

Alternative B1 – East Rush Valley

Alternative B1 crosses nine geological units that consist of surficial marsh deposits (Qm), Qa, Ql, Qt, Tov, C2, Ti, and M2. Of these geological units, Ti and C2 have a very low PFYC; Qm, Qa, Qt, Tov, and M2 have a low PFYC; and Ql has a moderate PFYC. Alternative B1 crosses approximately 11.7 miles of Lake Bonneville deposits (Ql). There are no known paleontological localities located within 1 mile of the centerline.

Alternative B2 – East Rush Valley

Alternative B2 crosses eight geological units that consist of Qm, Qa, Ql, Qt, Ti, Tov, and M2. Of these geological units, Ti has a very low PFYC; Qm, Qa, Qt, Tov, and M2 have a low PFYC; and Ql has a moderate PFYC. Alternative B2 crosses approximately 11.5 miles of Ql. There are no known paleontological localities located within 1 mile of the centerline.

Alternative C1 – Tintic Junction

Alternative C1 crosses seven geological units that consist of Qa, Ql, Qt, Tov, Ti, T4, and C2. Of these geological units, Ti has a very low PFYC; Qa, Qt, Tov, and C2 have a low PFYC; T4 has an undetermined PFYC; and Ql has a moderate PFYC. Alternative C1 crosses approximately 18.3 miles of Ql and 10.7 miles of T4. There are no known paleontological localities located within 1 mile of the centerline.

Alternative C2 – Tinctic Junction

Alternative C2 crosses seven geological units that consist of Qa, Ql, Qt, Tov, Ti, T4, and C2. Of these geological units, Ti has a very low PFYC; Qa, Qt, Tov, and C2 have a low PFYC; T4 has an undetermined PFYC; and Ql has a moderate PFYC. Alternative C2 crosses approximately 17.3 miles of Ql and 10.7 miles of T4. There are no known paleontological localities located within 1 mile of the centerline.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Alternative D crosses six geological units that consist of Qa, Ql, older alluvium/colluvium (Qao), Tov, Oquirrh Group (PP), and Cedar Mesa, Diamond Creek, Arcturus, and other formations (P1). Of these geological units, Qa, Qao, Tov, and PP have a low PFYC; P1 has an undetermined PFYC; and Ql has a moderate PFYC. Alternative D crosses approximately 7.8 miles of Ql and 0.5 mile of P1. One paleontological locality is located within 1 mile of the centerline near Link 265. This locality is located in Lake Bonneville deposits and contained fossil bison (*Bison* sp.).

<u>Alternative E1 – Pass Canyon</u>

Alternative E1 crosses six geological units that consist of Qa, Qao, Ql, Tov, PP, and P1. Of these geological units, Qa, Qao, Tov, and PP have a low PFYC; P1 has an undetermined PFYC; and Ql has a moderate PFYC. Alternative E1 crosses approximately 5.7 miles of Ql and 2.3 miles of P1. Two paleontological localities are located within 1 mile of the centerline near Link 2. The paleontological locality near Link 242 is found in older alluvium/colluvium and contained fossils of horse (*Equus* sp.).

<u>Alternative E2 – Proponent's Proposed Action</u>

Alternative E2 crosses six geological units that consist of Qa, Qao, Ql, Tov, PP, and P1. Of these geological units, Qa, Qao, Tov, and PP have a low PFYC; P1 has an undetermined PFYC; and Ql has a moderate PFYC. Alternative E2 crosses approximately 8.0 miles of Ql and 2.3 miles of P1. One paleontological locality is located within 1 mile of the centerline near Link 265. This locality is located in Lake Bonneville deposits and contained fossils of bison (*Bison* sp.).

<u>Alternatives F1 and F2 – Middle/Butterfield Canyon</u>

Alternatives F1 and F2 cross five geological units that consist of Qa, Ql, Tov, Qao, and PP. Of these geological units, Qa, Qao, Tov, and PP have a low PFYC and Ql has a moderate PFYC. Alternatives F1 and F2 cross approximately 8.1 miles of Ql. Six paleontological localities are located within 1 mile of the centerline near Links 210, 215, 290, and 265. The paleontological localities near Links 210 and 215 are within the Oquirrh Group and contain fossils of marine sponges. The paleontological locality near Link 290 is mapped within Oligocene volcanic rocks, but the paleontological locality is actually in a Pleistocene debris flow that overlies the volcanic rocks. This paleontological locality contains fossils of camel (*Camelops* sp.), horse (*Equus* sp.), extinct pronghorn (*Tetrameryx* sp.), rodent (*Neotoma* sp.), vole (*Microtus* sp.), lagomorphs, and reptiles. The paleontological locality near Link 265 is found in Lake Bonneville deposits and contained fossils of bison (*Bison* sp.).

<u>Alternative G – Lake Point</u>

Alternative G crosses five geological units that consist of Qa, Ql, Qao, surficial mud and salt flats (Qs), and PP. Of these geological units, Qa, Qao, Qs, and PP have a low PFYC and Ql has a moderate PFYC. Alternative G crosses approximately 19.3 miles of Ql. Twelve paleontological localities are located within one mile of the centerline near Links 370, 374, 376, and 265. The paleontological localities near Link 370 are located within Lake Bonneville deposits and the Oquirrh Group. The Lake Bonneville localities contained fossils of extinct mountain sheep (*Ovis* sp.), fish, gastropods, pelecypods, and ostracodes. The fossil locality within the Oquirrh Group contained fossils of fusulinids. The paleontological localities near Link 374 are found within the Oquirrh Group and Lake Bonneville deposits. The Oquirrh group localities contained fossils of fusulinids, crinoids, brachiopods, pelecypods, echinoderms, gastropods, and cephalopods. The Lake Bonneville locality contained fossils of bison (*Bison* sp.). The paleontological localities near Links 376 and 265 are found within Lake Bonneville deposits and contained fossils of fox (*Vulpes vulpes*), musk ox (*Bootherium bombifrons*), and bison (*Bison* sp.).

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Alternative H crosses four geological units that consist of Qa, Ql, Qs, and PP. Of these geological units, Qa, Qs, and PP have a low PFYC and Ql has a moderate PFYC. Alternative H crosses approximately 16.5 miles of Ql. Ten paleontological localities are located within 1 mile of the centerline near Links 370, 374, and 375. The paleontological localities near Link 370 are located within Lake Bonneville deposits and the Oquirrh Group. The Lake Bonneville localities contained fossils of extinct mountain sheep (*Ovis* sp.), fish, gastropods, pelecypods, and ostracodes. The paleontological locality within the Oquirrh Group contained fossils of fusulinids. The paleontological localities near Link 374 are found within the Oquirrh Group and Lake Bonneville deposits. The Oquirrh group localities contained fossils of fusulinids, crinoids, brachiopods, pelecypods, gastropods, cephalopods, and echinoderms. The Lake Bonneville locality contained fossils of bison (*Bison* sp.). The paleontological locality between Links 374 and 375 is located within Lake Bonneville deposits and contained a fossil cat.

<u>Alternative I – East Tooele Valley</u>

Alternative I crosses four geological units that consist of Qa, Ql, Qs, and PP. Of these geological units, Qa, Qs, and PP have a low PFYC and Ql has a moderate PFYC. Alternative I crosses approximately 27.2 miles of Ql. Five paleontological localities are located within one mile of the centerline near Links 370, 385, and 386. The paleontological localities near Link 370 are located within Lake Bonneville deposits and the Oquirrh Group. The Lake Bonneville localities contained fossils of extinct mountain sheep (*Ovis* sp.), fish, gastropods, pelecypods, and ostracodes. The paleontological locality within the Oquirrh Group contained fossils of fusulinids. The paleontological locality between Links 385 and 386 is located within Lake Bonneville deposits and contained fossils of ostracodes and mollusks.

Substation Sites

There are no paleontological resources associated with the proposed Mona Annex or Limber substations. Both areas are in Qa and have a low PFYC (2).

3.2.7 Visual Resources

3.2.7.1 Introduction

This section summarizes visual resource data gathered in the Project area. Existing visual resources have been documented within 3 miles of the reference centerlines and substation areas.

Areas of concern with regards to the potential impacts on visual resources were identified by the BLM and local agencies and include the following:

- Sensitive viewing areas
  - Travel routes – highways and roads used by travelers, designated scenic or historic byways, and recreation roads (OHVs, USFS roads, etc.)
  - Recreation areas – existing recreation sites used for picnicking, camping, hiking, scenic overlooks, rest areas, parks, or other recreational areas
  - Residences – single-family detached structures, apartments, and permanent mobile homes or mobile home parks
  - Aesthetic values in Tooele Valley, particularly on the east side of the valley
- Areas of scenic quality
  - BLM VRM Class II and III
  - USFS Visual Quality Objective (VQO) – Partial Retention

3.2.7.2 Overview of Study Methodology and Analysis Area

The visual resource inventory methodology is compliant and consistent with the BLM Manual policy (BLM Manual 8400 VRM Series 1986). Data was gathered in accordance with the BLM methodology, and modified to account for both developed and natural landscapes.

The following tasks were undertaken to inventory visual resources within the study area:

- Documentation of existing regional landform, vegetation, and water features (landscape character)
- Identify pertinent agency visual management objectives and scenic quality classifications, if available
- Identification of scenic quality within the study area (where not established by agency)
- Visual sensitivity analysis (where not established by agency; [i.e., BLM sensitivity levels])
- Visibility and distance zone mapping

Map C-8 illustrates the VRM, sensitive viewers, and scenic quality classifications in the Project area.

3.2.7.3 Regional Setting and Landscape Character

The Project is located within the Basin and Range physiographic province that includes the Great Basin Subdivision (Fennemen 1931; USGS 2008), often referred to as the Bonneville Basin. Major ecosystems in the study area include Salt Deserts, Shadscale-Dominated Saline Basins, Sagebrush Basins and Slopes, Woodland and Shrub-covered Low Mountains, and high elevation Carbonate Mountains (Woods et al. 2001). The region is characterized by the steep, north-south oriented mountain ranges bounding broad, flat, and arid plains. Mountain ranges in the Project area include the Oquirrh, Onaqui, Sheeprock, Tintic, and Stansbury mountains.

The regional landscapes have a range of developed and natural landscapes, from highly industrialized areas in the Salt Lake City area, to the relatively intact wilderness of the Stansbury Mountains. More intact and naturally appearing landscapes occur on the south end of the Project area. Large areas of sagebrush plains occupy much of southern Rush Valley, in southern Tooele County and northeastern Juab County. Juniper covered hills and mixed conifer-covered mountains located in the Tintics and lower Oquirrh slopes provide a greener and more topographically diverse landscape than the often stark, earth-tone sagebrush valleys.

Urban development is most dominant in and around the Salt Lake City metropolitan area. Some smaller urban development concentrations occur in and near Tooele, Grantsville, Stockton, Rush Valley, Goshen, and Mona. Industrial and extractive development dominates portions of the region, and includes the Tooele Army Depot, Camp Williams Military Reservation, Kennecott Bingham Canyon Mine, and Kennecott smelter and tailings area. Some mountain peaks have communication towers and other facilities, often contrasting with an otherwise naturalistic landscape.

Agricultural activities such as dryland farming, irrigated agriculture, and grazing lands dominate the valley landscapes of southern Salt Lake County, northern Tooele County, and western Utah County in the study area. Irrigated agriculture occurs in the Goshen Valley, Cedar Valley, Rush Valley, and Tooele Valley.

Vegetation outside of developed landscape areas are typically either dryland, irrigated croplands, or naturally appearing grazing land of sagebrush and desert shrub. Expansive blankets of big sage, rabbitbrush, wheatgrass, and cheatgrass occupy large areas of Cedar Valley, Tooele Valley, and Rush Valley, as well as the surrounding foothills. Pinyon-juniper forested landscapes occur primarily in the southern Oquirrh Mountains and the Tintic Mountains. Douglas-fir, lodgepole pine, and limber pine occur in other forested areas and are typically associated with the upper reaches of the mountains. Wetlands and riparian areas are typically limited to the Great Salt Lake area and the canyons of the Wasatch, Tintic, and Oquirrh mountains and other drainages. Salt deserts occur on the fringes of the Great Salt Lake and lower elevation lands in the Rush Valley.

3.2.7.4 Natural and Developed Settings

Scenic Quality – Natural Setting

Natural landscapes were evaluated for scenic quality in a total of 35 scenic quality rating units (SQRU) identified in the Project study corridors. A SQRU is a portion of the study area delineated on a basis of like physiographic characteristics, similar visual patterns (texture, color, variety, etc.), and areas that have similar impacts from man-made modifications. The size of SQRUs may vary from several thousand acres to one hundred or less acres, depending on the homogeneity of the landscape features and the detail desired in the inventory. Landscape features are rated on a numerical scale, and assigned a scenic quality rating. Class A landscapes typically have a wide variety of form color and texture in terms of landform, water, vegetation, etc. that harmoniously combine and have the highest numerical rating. Class B landscapes typically have less variation in form, line, color, and texture of landscapes features, but still have some diversity and visual interest. Class C landscapes typically do not have much diversity in terms of form, line, color, and texture of landscape features, and rate the lowest. For more on scenic quality classifications and rating criteria, see Appendix F (Section F.1, pages F-1 though F-12).

Landscapes across the study area were typically rated Class C scenic quality, with areas of Class B limited to more diverse landscapes of the Oquirrh, Tintic, and Stansbury mountains and foothills, as well as the Great Salt Lake Shoreline and irrigated agricultural areas of northern Rush Valley, northern Tooele Valley, and southern Goshen Valley. Units of Class A scenic quality were identified in the highly scenic canyons of the western Stansbury Mountains (South Willow Canyon and Hickman Canyon), and the rugged, mountainous areas of the Oquirrh and East Tintic mountains. Representative photos of the scenic quality classes are shown in Appendix F (Figures F-1 through F-8). A summary of SQRUs and their associated rating classes are presented in Table F-1b, with rating criteria shown in Table F-1a. Map C-8 illustrates scenic quality in the Project area.

The developed landscape includes the Tooele "T", located on the foothills of the east bench. The "T" is a locally significant visual and cultural feature of Tooele, and is visible throughout the eastern valley in and around Tooele.

Image Types – Developed Setting

The criteria used to evaluate developed landscapes depended largely on the intensity of changes occurring to natural landscapes. Highly modified landscapes, such as in urban areas, typically do not retain features inherent in natural landscapes. Such features may include dominance of vegetation, intact landforms, organic landscape structure and form, etc. Visual "districts" of similar developed character were evaluated in the Project area.

Image types were assessed and categorized based on:

- Evaluation of architectural elements, types, textures, colors, uses, and form. The size and scale of characteristic buildings were evaluated.
- Layout and massing of structures, as well as their height, length and width, setbacks, and general arrangement in visual districts.
- Evaluation of street networks for density, widths configuration, and streetscape configuration.

Five major image types were identified within the study corridors and are illustrated in Appendix F, Figures F-9 through F-20. Image types identified in the study area are as follows:

- Residential – These occur throughout the study area, but are concentrated in the Salt Lake Valley, Tooele, Stockton, Grantsville, and Mona. They typically include higher density neighborhoods, ranchettes, mobile home parks, multifamily units, and suburban subdivisions in the study area (see Appendix F, Figures F-9 through F-13).

- Commercial – This includes office parks, strip malls, big box retail, gas stations, and other retail or service areas (see Appendix F, Figures F-14 and F-15).

- Industrial/Military – This image type encompasses mining and other extractive areas, landfills, military areas, airports, utility and communication areas, and heavy and light industrial areas throughout the study corridors (see Appendix F, Figures F-16 through F-18).

- Institutional – These are typically schools, churches, hospitals, and public and quasi-public facilities (libraries, fire stations, community centers, etc.) (see Appendix F, Figure F-19).

- Developed Parks – This image type includes established parks and golf courses where turf grass, ball fields, playground, parking areas, racetracks, and other amenities dominate the landscape; it does not include undeveloped parks where natural vegetation and landforms dominate (see Appendix F, Figure F-20).

3.2.7.5 Sensitive Viewers

Following is a list of sensitive viewers in the Project area. Map C-8 illustrates the sensitive viewers in the Project area. The sensitivity of viewers was determined based on viewing duration, use volumes, and aesthetic concerns. (refer to Appendix F, Table F-2).

Residences

Residential areas are typically clustered in the study area and most heavily concentrated in the Salt Lake Valley and Tooele-Stockton areas. Lower residential densities occur in Rush Valley, northern Tooele Valley, Eureka, Mammoth, Goshen, and Mona. Scattered residences are located throughout the study area, typically in the Goshen Valley, Rush Valley, and Cedar Valley (refer to Appendix C, Map C-9 for Residential Image Types, and Map C-8 for residential viewpoints).

Future approved residential development was also identified in the Project area, as shown in Appendix C, Map C-8.

Travel Corridors, Destination Routes, and Designated Scenic Roads

Highways occur throughout the study area, but are concentrated on the north end, near metropolitan Salt Lake City. Highways include those in the interstate system, as well as federal, state, and county maintained roads. Interstate highways and United States highways in the study corridors include I-80, I-15, and U.S. 6 (refer to Appendix C, Map C-8 for travel routes, destination routes, and designated scenic roads). The following SRs are located in the Project area:

- SR 36
- SR 48 (New Bingham Highway)
- SR 54
- SR 67
- SR 68
- SR 71 (Herriman Highway)
- SR 73
- Mona Road
- SR 111
- SR 112
- SR 138
- SR 154
- SR 171
- SR 173
- SR 199
- SR 202
- SR 201

Existing designated national, state, and local scenic highways, backways, and byways were also inventoried in the study corridors. The following designated scenic routes were identified:

- Middle Canyon Road State Scenic Backway (Middle Canyon Overpass, Tooele County Scenic Byway) – This scenic road is located between Tooele and Herriman, south of the Bingham Canyon Mine. There are numerous picnicking, hiking, mountain biking, and other activities occurring along this route.

- Pony Express Trail Backcountry Byway/Tooele County Scenic Byway/State Scenic Backway (Pony Express National Historic Trail) – This corridor is nationally recognized and nationally designated as the route of the famous Pony Express relay mail system in operation between Missouri and California for 18 months between 1860 and 1861. It follows a small portion of SR 73 and the Pony Express Trail Road in the study area. A BLM interpretive site, two Pony Express National Historic Trail station monument sites, and numerous Pony Express National Historic Trail mile markers are located along the route within the project area. The section of the Pony Express National Historic Trail affected by the project is listed as a High Potential Route Segment in the Pony Express National Historic Trail Comprehensive Management and Use Plan (U.S. Department of the Interior [USDI] 1999). According to the National Trail Systems Act, a high potential segment means "those segments of a trail which would afford a high quality recreation experience in a portion of the route having greater than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route." All of the Pony Express National Historic Trail is a high potential segment in the project area.

- Railroad Bed Road Tooele County Scenic Byway – This county-designated route connects Fivemile Pass OHV Area to State Highway 36 to the southwest, along an abandoned railroad bed.

- Davenport Canyon/North Willow Canyon Tooele County Scenic Byway and South Willow Canyon Tooele County Scenic Byway (Deseret Peak Wilderness Recreation Destination Route) – These two scenic routes are located on the east side of the Wasatch-Cache National Forest in the Stansbury Mountains. The Deseret Peak Wilderness area, various trails, and Forest Service campgrounds are accessed via these roads.

Recreation Destination Routes connect major highways, travel corridors, or population centers to locally and regionally significant areas such as regional parks, camping areas, hiking and biking trail systems, and other recreation areas. Recreation Destination Routes identified in the study area include:

- Box Elder Canyon Recreation Destination Route – The White Pine Fork and Abbott's Fork trails are accessed by this route leading from the Mormon Trail Road.

- Rose Canyon/Yellow Fork Canyon Recreation Destination Route – This route accesses the Yellow Fork Canyon Regional Park and Rose Canyon Ranch Preservation Area recently acquired by the county. It consists of Rose Canyon Road and a portion of South 6400 West Avenue.

- Settlement Canyon Road Recreation Destination Route – Accesses the trail system of Settlement Canyon, Legion Park County Campground, Camp Wapiti, and the Oquirrh Mountains.

- Stansbury Island Recreation Destination Route – This route is located on the northwest side of the study area and provides access to the Stansbury Island recreation area, located northwest of the study corridor.

- Little Moab Recreation Destination Route – This is the main access route to the Little Moab OHV (SITLA) and follows South 9600 West, 9600 South Road, and Allen Ranch Road, west of SR 68, north of Goshen.

- Uinta National Forest Recreation Destination Route – Provides access to trails in Uinta National Forest (off SR 36).

- Vernon Reservoir – Provides access from SR 36 to Vernon Reservoir, the camping area, and the forest.

Recreation and Preservation Areas, Cemeteries, and Parks

There are many opportunities for recreation throughout the Project study area. Hunting, hiking, biking, camping, rock-hounding, picnicking, and off-road vehicle use are the primary activities (BLM 1990). State, county, and local parks occur within the study corridors. Recreation areas include trails of regional and local significance (refer to Appendix C, Map C-8 for Developed Park Image Types and recreation/preservation area, trail viewpoints). Trails inventoried in the study area include the following:

National

- California National Historic Trail – There was no trail centerline identified in the study area. The trail identified by the National Park Service is located on the northern end of the study area. The historic route of the trail is generally occupied by the I-80 corridor.

- Pony Express National Historic Trail – See description of the Pony Express State Scenic Backway and Tooele County Scenic Byway above.

BLM and U.S. Forest Service Recreation Sites

- North Oquirrh Management Area (BLM) – This area located in the North Oquirrh Mountains is managed by the BLM with an emphasis on non-motorized dispersed recreation, protection of wildlife habitat, watershed, and important visual and scenic resources.

- Fivemile Pass OHV Area/Fivemile Pass Large Group Camping Site (BLM) – This area is located in southeastern Tooele County, approximately 20 miles west of Lehi adjacent to the Pony Express National Historic Trail, and is used primarily as a motorized, off-road recreation area. The site has an extensive unimproved road network, but minimal developed facilities. Other activities occurring in the area include camping, mountain biking, and hiking. Two important rock crawling areas are located in the Fivemile Pass OHV area: Constrictor Canyon and Rattlesnake Canyon.

  - Constrictor Canyon – This site is located on the northwest side of Fivemile Pass, about 0.85 mile northeast of SR 73, and north of Sunshine Canyon Road.
  - Rattlesnake Canyon – This site is located about 1.5 miles southwest of the Manning Canyon Road and Lewiston Road intersection, on the north end of the recreation area.

- Twelvemile Pass Large Group Camping Site (BLM) – This unimproved, dispersed camping site occurs on the southeast side of Topliff Hill in the East Tintic Mountains. The site is accessed from Twelvemile Pass Road.

- Boy Scout Campground (USFS) – This developed camping facility is located on the east side of the Stansbury Mountains in South Willow Canyon. Administered by the Wasatch-Cache National Forest, the campground includes tent sites, fire circles, picnic tables, and a vault toilet.

- Intake Campground (USFS) – This small, developed campground is located approximately 0.4 mile northeast of Boy Scout Campground in South Willow Canyon, and has tent sites, fire circles, picnic tables, and a vault toilet.

- Cottonwood Campground (USFS) – This small camping area is also located in the Wasatch-Cache National Forest about 0.6 mile northeast of Intake Campground. The campground includes tent sites, fire circles, picnic tables, and a vault toilet.

State Recreation Sites

- Great Salt Lake State Park/Marina – This state park is located on the south shore of the Great Salt Lake, and is home to the Great Salt Lake Yacht Club.

- Little Moab OHV Area (SITLA) – This site is located west of Goshen Valley, near Chimney Rock Pass, and is used primarily by modified four-wheel drive vehicles. The site is accessed from Allen Ranch Road to the south and Chimney Pass Road off SR 68 from the east.

- Burraston Ponds/Nephi WMA – This area consists of two separate WMAs (180-acre Burraston Ponds and 152-acre Nephi) located in Juab County, about 1 mile south of Mona Reservoir. Burraston Ponds is a popular fishing, birding, picnicking, and camping area with a trail system looping the pond. Nephi WMA has a small parking area located north of County Road, 1.9 miles west of Mona Road.

Tooele County

Existing

- Copper Pit Overlook – This trails leads from the Middle Fork Canyon Road north, along the county line to the Bingham Canyon Mine.

- Dark Trail Loop – This trail is located on Settlement Canyon Road and begins at the Settlement Canyon Reservoir, passing Legion Park Campground and Sawmill Flats.

- Deseret Peak-Miller Motorsports Park – This complex consists of active recreational facilities, such as baseball/softball fields, soccer fields, archery ranges, motorcycle tracks, and performance and arena facilities.

- Left Hand Fork – This blue-ribbon single-track mountain bike trail is located off Settlement Canyon Road, passing Camp Wapiti to a saddle above Bear Trap Flat.

- Legion Park Campground (Settlement Canyon Recreation Area) – This county administered camping facility is located in Settlement Canyon, near Camp Wapiti.

- Mid Valley Trail – This improved trail connects the Deseret Peak-Miller Motorsports Park with northwest Tooele. There are parking lot trailheads on Sheep Lane and Rodgers Street.

- NOMA Pass Canyon Non-Motorized Trail – This trail is located at the north end of Churchwood Drive in Tooele, and provides access to BLM NOMA lands.

- Pine Canyon Conservation and WMA Trailhead – This trailhead provides public access to the Carr Fork Reclamation and WMA, and is located east of the Blue Peak Road-Ericson Road intersection.

- Settlement Canyon Recreation Area and Reservoir – Located south of Tooele, this county fee area provides access to Camp Wapiti, county trails, and Legion Park County Campground.

- Tooele Valley Overlook (Smelter Road Trail) – This hiking and biking trail begins at the Tooele County Museum, follows Bates Canyon/Smelter Road, and ascends to a gated area on Kennecott property. There are views to the city, Tooele Valley, and Deseret Peak Wilderness Area (Stansbury Mountains) to the west.

Planned Trails

The following trails have been identified in the Tooele County Trails Master Plan (2008), and from GIS data obtained from Tooele County. Located outside of BLM and USFS lands, these trails are planned to follow existing roadways or cross private and other public lands (state, county, city). Rights-of-way have not typically been acquired along the routes identified.

- Benson Grist Mill Loop – This multi-use trail is located in the developed area around Stansbury Park and Erda. The trail primarily follows SR 138, SR 36, and Erda Way Road.

- Carr Fork Trail – This trail is located on the northeast side of Tooele, north of Clipper Ridge and west of Bingham Canyon Mine.

- Jacob City Hike – This city-identified hiking and biking trail begins in Stockton, proceeds east and south on Silver Canyon Road towards Dry Canyon, and ends at old Jacob City "ghost town."

- Mormon Trail Loop – This hiking and biking trail follows a loop and runs west from Tooele to Grantsville, turns south to Rush Valley, heads east to Stockton, and returns to Tooele. The trail follows SR 36, SR 112, SR 138, Mormon Trail Road, and SR 199.

- Rush Valley Tour – This multi-use trail begins in Tooele and heads south to Stockton, splitting to the east from SR 73 towards Ophir and to the west toward Johnson Pass, along SR 199.

- Sheep Lane Trail – This trail is identified in the Tooele County Trails Master Plan as an existing trail that follows Sheep Lane, SR 138, SR 112, and the depot railroad. However, no improvements have been constructed along this alignment, and no rights-of-way have been acquired.

- Soldier Canyon Hike – Soldier Canyon hiking and biking trail follows the same route as the Jacob City Hike, but diverges to the east up the south fork of Soldier Creek.

- South Mountain Loop – This is a hiking and biking trail that loops around the South Mountain complex from Stockton, along Hogan Road and Mormon Trail Road.

- Stansbury Front Trail – This city-identified hiking and biking trail is mostly on Forest Service land in the Stansbury Mountains on the west side of the Deseret Peak Wilderness. Off of Forest Service lands, the trail connects SR 138 to the forest via West Canyon Road on the north, and Big Hollow Road to the forest on the south.

- Timpie Valley Trail – This trail is located on the north end of the Stansbury Mountains, south off of SR 138, near the I-80 interchange. The trail provides access to the North Stansbury WSA and surrounding public lands.

- Outer Rim Trail – This non-motorized planned trail is aligned with SR 138 from Stansbury Park southwest to the incorporated limits of Grantsville, and then north to Blue Lakes.

- NW Depot Boundary Trail – This non-motorized planned trail follows the Tooele Army Depot from Mormon Trail Road to the northeast.

- 10^{th} North Trail – This non-motorized planned trail follows 1000 North to Rogers Street in northern Tooele City.

- Droubay Road Trail – This non-motorized planned trail follows Droubay Road to the north side of the Union Pacific Railroad crossing.

- Ranches Pine Canyon Trail – This non-motorized planned trail follows the Union Pacific Railroad from Droubay Road east to Runoff Road at the base of Flood Canyon.

- Mills Junction Trail – This non-motorized planned trail connects the SR 138 and Lake Point Outer Rim Trail segments.

- Outer Rim Trail – This motorized planned trail follows the Union Pacific Railroad between Coyote Canyon Road and Bates Canyon Road, and follows Bates Canyon Road west to Droubay Road.

- Mormon Trail – This motorized planned trail follows Mormon Trail Road from Grantsville south past the Tooele Army Depot, then turns east on the south side of the Depot to the Union Pacific Railroad south of Tooele.

- Davenport Trail – This motorized planned trail follows the road up to the National Forest on North Willow Road.

<u>Salt Lake County Recreation Sites</u>

- Magna Fitness and Recreation Center and Pool – This Center is a Salt Lake County Parks and Recreation facility located in Magna, Utah. The facility includes a gymnasium; fitness room with cardio, circuit and weight lifting equipment; indoor running track; and aerobics studio.

- Yellow Fork Canyon Regional Park – This 800-acre regional park is located in southwestern Salt Lake County and is undeveloped, except for some trails and picnic tables at trailheads. The park includes hiking, biking, and equestrian trails. No motorized vehicles are allowed in the park. The park is made up of BLM and county lands, and current plans are for joint management of the area; however, these management plans are not detailed in the *Southwest Trails and Parks (Draft) Master Plan* (Salt Lake County 2008).

<u>Juab County and Utah County Recreation Sites</u>

There are no Juab or Utah County parks in the study area.

<u>Other Recreation Areas</u>

Other special use recreational areas included in the visual resource inventory include golf courses, overlooks, historical markers, WMAs, ecological preservation areas, and interpretive areas whose primary purpose is something other than recreation, but that have a recreational or visual quality preservation component to them. These include cemeteries, wildlife areas, historical markers, and other similar areas. The following special use areas were identified in the study area:

- W. Ajax Underground Store Roadside Marker – This unique, two-story underground building located on SR 36 was established in 1870. Shortly thereafter, a post office called "Centre" was added. The lower floor of the 80- by 100-foot building is 20 feet below ground in some places.

- Bonneville Seabase – This area of excavated salt-water ponds has been developed as a scuba training facility with introduced aquatic flora and fauna, and is located about 4 miles northwest of Grantsville.

- Burraston Ponds WMA – This is a small, 180-acre WMA located 1 mile south of Mona Reservoir in Juab County. The pond is a popular camping and fishing area, and is also used for wildlife viewing and hunting.

- Butterfield Pass Viewing Area – This is a pull-out area along the Middle Canyon Scenic Byway that provides views of the Salt Lake Valley to the east and the Tooele Valley to the west.

- Camp Wapiti (Settlement Canyon Recreation Area) – Camp Wapiti is located in Settlement Canyon, southeast of Tooele. It was established by the Elks Association of Utah to provide outdoor experiences for children with disabilities. Facilities include 17 cabins and a main building containing kitchen facilities, a dining area, and counselor quarters.

- Carr Fork Reclamation and WMA – This is a 3,599-acre WMA located at the former International Smelter Site on the western slope of the Oquirrh Mountains, just northeast of Tooele. The area is used primarily for upland and big game hunting, wildlife viewing, and hiking.

- Copper Club Golf Course – This course is located in Magna, next to Magna Park.

- Daughters of Utah Pioneers Roadside Historical Marker – This marker is located on SR 201, northwest of Magna.

- E. T. Benson Grist Mill National Historic Site – This historic site, located north of Stansbury Park on SR 138, is the site of a 150-year old mill. The mill was moved from Grantsville and rebuilt from the remaining original foundation in 1984.

- Early Settlers of Tooele County Marker – This memorial marker recognizes the early settlers of Tooele County. It is located in Settler's Park in Tooele.

- Glenmoor Golf Course – This course is located northeast of the existing Oquirrh Substation in South Jordan. It is surrounded primarily by residential development.

- "I-80 View Point" – This is a roadside rest area at Milepost 102 of I-80. The rest area provides no facilities. There are three markers summarizing the historical sites (Garfield, Lake Point Resorts, and Pioneer Black Rock Resort) and an early explorer (Jedediah Strong Smith).

- James Fitzgerald WMA – This 680-acre WMA is located west of Faust, and is used for waterfowl and pheasant hunting as well as wildlife viewing.

- Lee Creek Natural Area – This is also part of the South Shore Preserve complex, and is open for hiking and nature viewing. No biking, hunting, or fishing is allowed on this 305-acre Audubon Utah managed area.

- Lee Kay Center and Wildlife Conservation Area – This 1,280-acre reclaimed landfill is currently the site of indoor and outdoor classrooms, wildlife viewing area, shooting range, hiking, and picnicking facilities. There are viewing and picnicking areas located on the north side of the WMA. The WMA was acquired by the UDWR from the federal government for the protection and enhancement of upland game bird habitat.

- Mona Reservoir – There is a boat launch and parking lot located on the west side of the lake that provides access for fishing and other water sports.
- Overlake Golf Course – This course is located on the northwest side of Tooele.
- Oquirrh Golf Course – This course is located on the east side of Tooele at the end of East Vine Street.
- Various Pony Express Roadside Markers (Rush Valley Marker and Faust Marker) – Two Pony Express Stations were noted in the study area.
- Stansbury Park Golf Course – This course is part of the Stansbury Park Planned Unit Development on the north end of Tooele Valley on SR 36.
- Steptoe Military Camp/Godbe's Chicago Smelter Historical Marker – This roadside marker notes the site of an early military camp, historical stage coach, and smelter site.
- Wingpoint Golf Course – This course is located on the south end of Salt Lake City International Airport.

The following cemeteries and historic cemeteries are located in the study corridor:

- Eureka
- Lake Point
- Stockton
- Silver City
- Herriman
- Wasatch Lawn Memorial Park South
- Bingham City
- Grantsville City
- Pleasant Green
- St. John
- West Fort
- Valley View Memorial Park
- Mercur Cemetery/Roadside Marker

<u>Local Parks</u>

- Alex Baker Memorial Baseball Park (Stockton)
- Centennial Park and Recreation Complex (West Valley)
- Elton Park (Tooele)
- Highland Park (Tooele)

3.2.7.6 Distance Zones

Distance zones are subdivided areas of the landscape, based on the perception of the Project from viewing locations, as previously described. Detail in the landscape or objects being viewed, depends on the proximity to the viewers. The BLM utilizes three zones for the purposes of VRM. The three zones are foreground-middleground, background, and seldom seen. The foreground-middleground zone includes areas seen from highways, rivers, or other viewing locations that are less than 3 to 5 miles away. Areas seen beyond the foreground-middleground zone, but usually less than 15 miles away, are in the background zone. Areas not seen as foreground-middleground or background (i.e., hidden from view) are in the seldom seen zone.

For this Project, a review of previous studies in similar geographical, topographical, and environmental settings was performed, and relevant visibility thresholds were established (Jones and Jones 1976). Distance zones were determined for both of the project components (345kV and 500kV transmission lines). The scale and configuration of the tower structures and conductors for each of these components is somewhat different. Typical maximum height for the 345kV (monopole and lattice) towers is roughly 150 feet, and the maximum height for the 500kV (lattice) structures is approximately 200 feet.

Visibility thresholds for the purpose of this study are presented in Table 3-8.

TABLE 3-8
VISIBILITY THRESHOLDS

Visibility Threshold	345kV Transmission Line (miles)	500kV Transmission Line (miles)
Immediate Foreground	0 to 0.25	0 to 0.5
Foreground	0.25 to 0.5	0.5 to 1
Middleground	0.5 to 1	1 to 2
Background	1 to 2	2 to 3
Seldom Seen	Beyond 2	Beyond 3

3.2.7.7 Agency Management Objectives and Local Planning

Bureau of Land Management

As described in the BLM Manual Handbook 8410-1, Visual Resource Inventory, four VRM Class Objectives establish the amount of change acceptable within each management class. Visual resource classes are categories assigned to BLM-administered public lands that serve two purposes: (1) as an inventory tool that portrays the relative value of the visual resources, and (2) as a management tool that portrays the visual management objectives. The objectives for visual resource classes are as follows:

<u>Class I Objective</u>

The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

<u>Class II Objective</u>

The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

<u>Class III Objective</u>

The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV Objective

The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

BLM-administered land in the study area is managed under the Pony Express RMP (and Amendment) and the House Range Resource Area RMP (refer to Section 3.2.9). As established in the plans, the study area is typically managed under the Class IV Objective. The NOMA is managed under Class II and Class III Objective VRM. Scattered areas of Class II and Class III Objective lands are also located in the central Oquirrh Mountains and the northern East Tintic Mountains in the House Range Resource Area. Map C-8 illustrates VRM Class II and Class III Objective lands in the Project area. Current BLM best management mitigation practice is to apply VRM Class II management to National Historic Trail corridors (Pony Express National Historic Trail, California Trail National Historic Trail).

Forest Service

Forest Service-administered lands are not crossed by any of the alternatives, but are within the study corridors. The Uinta National Forest uses Visual Management System VQOs identified in the Uinta National Forest 2003 Land and Resource Management Plan (USFS 2003). Areas of retention, partial retention, and modification are located within the study corridor, but would not be affected by the Project.

The Wasatch-Cache National Forest uses Scenic Quality Objectives (SQOs) identified in the Wasatch-Cache Revised Forest Plan (USFS 2003). High SQO management levels are located in the study area in the Stansbury Management Area.

County

Utah and Juab counties do not have goals, policies, or objectives identified in the general plans. Counties in the study area typically do not have specific planning goals or objectives, laws, ordinances, or regulations regarding the management of visual resources. Specific policies regarding visual resources that may affect the construction, operation, and maintenance of the Project are detailed below.

Salt Lake County

Unincorporated areas of Salt Lake County in the study area are managed under the 2003 General Plan. No specific goals, policies, or objectives pertaining to VRM in regards to utility siting are stated in the plan. Draft plans, such as the *Draft West Side Master Plan and Draft Southwest Community Plan*, are not adopted (refer to summary below).

The Copperton Township Community General Plan (adopted in 2003) Policy 6 states:

- "Include the following components that address critical issues related to urban design and Community Character:
    - Screen service facilities from public and neighborhood view (76)"

Salt Lake County Parks and Recreation Division has developed a draft plan for parks and trails in the county. The *Southwest Trails and Parks (Draft) Master Plan* (Salt Lake County 2008) identifies several proposed facilities in the study area.

The Bonneville Shoreline Trail is located in the study area and is a primary element of the county's regional trail plan. The implementation of this trail on the east side of the valley has been a high priority and has received widespread support. As development expands to fill the western side of the valley, the same need exists to continue this trail around the southwestern corner of the valley and continue north along the Oquirrh Mountains. The county has completed an initial alignment study of the trail corridor from the Point of the Mountain along the southern foothills to Rose Canyon in Herriman. This proposed alignment was incorporated into the master plan, and an additional alignment from Rose Canyon extending north (below the Bingham Canyon Mine) would be proposed. It is anticipated that future development in the Daybreak and South Jordan areas would continue this alignment along the foothills to the north. While a reasonable alignment is possible, the biggest obstacle to constructing a trail through this area would be the acquisition of property or a trail easement below the slopes of the Kennecott Mine. The majority of this property is owned by Rio Tinto (Salt Lake County 2008).

Additional trailhead parking areas are proposed at two locations to provide access to the foothills and trails connecting to the Bonneville Shoreline Trail. These trailhead parking areas are proposed at the end of Summit Ridge Circle in Herriman and an additional trailhead at the end of Spring Canyon Road in Herriman.

Other proposed trails in the study area include: Midas Creek Trail, Butterfield Creek Trail, West Herriman Trail, Central Herriman Trail, East Herriman Trail, Rose Creek Trail, Utah Lake Distribution Canal Trail, and Welby-Jacob Canal Trail.

Miller Park is a proposed park at the confluence of Midas Creek and Copper Creek (approximately 12000 South along a proposed frontage road to the Mountain View Highway) that would serve both recreation and regional storm water retention needs. The park would include play fields, playgrounds, picnic facilities, and parking areas.

Also, a proposed Regional Park is noted in the plan in the vicinity of the northwest corner of SR 111 and 11800 South, and a proposed community park would potentially be located in the study area, in the general vicinity of the northeast intersection of Butterfield Canyon Road and 13090 South, west of Herriman.

Tooele County

Management goals and policies (Tooele County General Plan 2006a) regarding visual resources pertinent to transmission line and substation sitings are limited to the Mid-Valley Recreation and Technology Park areas, which guide the development in and around the Deseret Peak Complex and Miller Motorsport Complex. Goals and policies identified in the plan include the following:

- Telecommunications facilities and transmission lines should not be located within view of the Deseret Peak and Miller Motor Sports Park, unless they are sited and designed so as to be virtually invisible to the naked eye from the subject properties; or are designed to appear as a natural feature of the environment and do not block views or disrupt scenic vistas; or are so well architecturally integrated into an existing building as to effectively be unnoticeable.

- Within the viewshed corridor, utilities should be placed underground, where possible, and utility poles, located outside the right-of-way should be camouflaged with the planting of trees.

- An environmental assessment should evaluate whether the viewshed would be impacted and, if warranted, what mitigation measures should be developed.

- All equipment, electrical substations, and mechanical devices would be shielded from view from the main road (in the Technology and Industrial zone).

- 17A-2-3 – Development restrictions specific to RRS zoning districts. All uses would be free from objectionable noise, glare, vibration, hazards, or nuisances (Ordinance 2006-41, December 19, 2006, page 17A-2).

The county has adopted a Parks and Recreation Master Plan (additional citation Tooele County 2008, Tooele Valley Trails Master Plan, Transportation Plan Amendment, Adopted March 2008) that identifies existing and future trails. The Master Trails Plan identifies motorized, non-motorized, and multi-use trails, and focuses on interconnection between communities and the Desert Peak Complex.

City

Incorporated cities in the Project area typically do not have specific planning goals or objectives, laws, ordinances, or regulations regarding the management of visual resources. Specific policies that are implemented in the study area regarding visual resources that may affect the construction, operation, and maintenance of the Project are detailed in Table 3-9.

TABLE 3-9
LOCAL PLANNING GOALS AND POLICIES REGARDING VISUAL RESOURCES

Municipality	Document	Description
Stockton	2006 General Plan	Establishes a policy to "regulate the installation of utility lines (power, gas, cable, etc.) such that all new and upgraded utility lines are placed underground."
South Jordan	2006 General Plan	ER-3 seeks to "preserve and create vistas where possible."
West Jordan	2003 General Plan	Policy – Identify and preserve prominent view corridors and City vistas. Implementation measures – (1) preserve vistas to and from city parks, open space areas, and landmarks; (2) require building facades, street landscaping, and utility equipment along prominent streets and vista corridors to frame or enhance the vista (16). Policy – Develop West Jordan's gateways to provide a good first impression of the City. Implementation measures – (1) improve gateway vistas and the immediate environment of the major gateway roads; (2) remove overhead power transmission lines along streets in gateway and vista areas (20).
Salt Lake City	2007 Northwest Quadrant Vision	Recommends linking multipurpose green corridors and utility corridors to connect terrestrial habitat.

3.2.7.8 Summary of Visual Resources Inventory Results

Mona to Limber

Alternative A1 – North Long Ridge Mountains

Scenic Quality and Image Types

As detailed in Table F-1b, and in Appendix F (SQRUs), scenic quality along Alternative A1 is typically Class C. The bulk of the alternative crosses undeveloped landscapes. Isolated areas of Class B agricultural scenery, totaling 0.4 mile, occur in the upper Rush Valley (Link 105) (SQRU number 35) and the southern Goshen Valley (SQRU number 34) (Link 20), where the alternative crosses irrigated agricultural lands. This alternative is in the vicinity of the Tooele Army Depot industrial image, primarily along Link 90. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

High sensitivity residential areas are concentrated in the southern Goshen Valley, primarily along Tunnel Road and West 17600 South (Links 50 and 20), and around Onaqui, Clover, and Saint John (Link 105). Isolated residences occur south of Mona (Link 1) near Burraston Ponds WMA, in southern Goshen Valley (Link 20), in the southern Cedar Valley (Link 55), in north Rush Valley along Indian Mountain Road (Link 105), and west of Mormon Trail Road near South Mountain (Link 105). Other residences nearby this alternative include those located east of Faust, near the Faust Road (Pony Express National Historic Trail) and SR 36 intersection (Link 90). Immediate foreground and foreground views would occur to residences located along Link 150 (Mileposts 2.5-3.2). A total of 0.7 mile of this alternative is located in the potential immediate foreground view of residential viewpoints.

Alternative A1 is also located within view of the moderate sensitivity Mormon Trail Road (see Appendix G, Viewpoint 1) (Links 150 and 105), Faust Road (Link 90, Milepost 5.2), SR 36 in north Rush Valley, and crosses (within the immediate foreground) of U.S. Route (U.S.) 6 in the Goshen Valley (Link 50, Mileposts 3.1-4.1). The line would also be viewed from the Railroad Bed Scenic Byway in the immediate foreground (Link 60, Mileposts 10.1-11.2). Alternative A1 would be within the immediate foreground view of the high sensitivity Little Moab destination route (Link 55, Mileposts 0.5-3.0; Link 60, Mileposts 0.0-0.9) and moderate sensitivity recreation area on the south end of Goshen Valley. The 500kV line would cross in the immediate foreground of SR 199, west of the SR 36 intersection (Link 105, Milepost 1.7), and be within middleground view of the Burraston Ponds and the Nephi WMAs in northern Juab Valley (Link 1).

This alternative would be within immediate foreground view of the moderate sensitivity existing and planned trails in and around South Mountain (South Mountain Loop, Mormon Trail, Rush Valley Tour), and would cross the Pony Express National Historic Trail/National Backcountry Byway in Rush Valley. The route is also located in the immediate foreground view from the moderately sensitive Little Moab OHV area viewpoints located between north Goshen Valley and south Cedar Valley.

Cultural modifications along this alternative include railroad corridors north of U.S. 6 (Link 50) and east of SR 36 (northern Rush Valley, Link 90), the Desert Chemical Depot in northern Rush Valley, and an existing transmission corridor (offset 1,500 feet to the west) in northern Juab Valley. An existing power plant (Current Creek) and substation (Mona) is located adjacent to this alternative, also in Juab Valley. Irrigated and dryland agriculture and associated agricultural and residential structures occur in the northern Juab Valley, southern and western Goshen Valley, southern Cedar Valley, and throughout Rush Valley.

Visual Resource Management Classification

Management classes crossed for the Alternative A1 are typically VRM Class IV Objective. Areas of Class III Objective are limited to the Long Ridge area west of the proposed Mona Annex Substation, where the Project would cross approximately 6.8 miles of VRM Class III Objective in the House Range Resource Area (all of Links 1, 2, 3, 5 and portions of Link 20).

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Scenic Quality and Image Types

Scenic quality crossed by Alternative A2 is identical to Alternative A1, except in the southern Goshen Valley. Alternative A2 crosses less Class B agricultural scenery, avoiding the area in the lower Goshen Valley (SQRU #34) (Link 20). The Long Ridge scenic quality class (C) crossing is similar to Alternative A1, but located more to the south along the mountain. A total of 0.4 mile of Class B scenery (Link 105) is crossed for this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Viewpoints are identical to Alternative A1, except in the southern Goshen Valley. This alternative would be in the foreground of one residence, located in the extreme southern Goshen Valley along Link 15 (Mileposts 0.5-1.5). The alternative would be less visible and farther away (in the middleground) from Goshen Canyon Road and western Mona residences. Immediate foreground and foreground views would occur to residences located along Link 15 (Mileposts 0.5-1.5) and Link 150 (Mileposts 2.5-3.2). A total of 0.7 mile of this alternative would be in the immediate foreground from residential viewpoints.

Cultural modifications along this alternative are identical to Alternative A1, except this alternative parallels less of the existing transmission corridor in Juab Valley than Alternative A1, and is not adjacent to the Current Creek Power Plant and the existing Mona Substation.

Visual Resource Management Classification

Management classes crossed are predominately VRM Class IV Objective, and are identical to Alternative A1 along Links 1, 2, and 3. Sections of Class III lands also are crossed in northern Juab County at the Long Ridge crossing, and in Old Canyon located within the House Range Resource Area along Link 10. A total of 8.8 miles of VRM Class III Objective is crossed for this alternative.

Alternative B1 – East Rush Valley

Scenic Quality and Image Types

This alternative also crosses mostly Class C scenery and a small amount of irrigated agricultural lands of Class B scenic quality in areas identical to Alternative A1. In addition, Class B irrigated agricultural lands in the east Rush Valley would also be crossed (SQRU #35) (Links 120 and 140), and a small section of Class B scenic quality landscape would be crossed in the Oquirrh Mountain foothills east of SR 73 (SQRU #7) (Link 95). Class B scenery crossed for this alternative totals 7.0 miles. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Alternative B1 residential viewpoints are similar to the Alternative A1 in the Juab Valley, Goshen Valley, southern Cedar Valley, and west of South Maintain. In addition, potential immediate foreground views would occur to one residence located along Ophir Canyon Road at Link 95 (Mileposts 11.1-12.1). In northern Rush Valley, the Project would be viewed in the foreground from residences located near and along Indian Mountain Road and south of South Mountain (Link 140), and in the middleground from residences along SR 36 (Links 120 and 135). A total of 1.7 miles of this alternative would be in the immediate foreground from residential viewpoints.

Alternative B1 is also located within view of the Mormon Trail Road from the north end of the Project area in the identical area to Alternative A1 (see Appendix G, Viewpoint 1). It parallels and crosses in the immediate foreground a portion of SR 73 northwest of Fivemile Pass OHV Area (see Appendix G, Viewpoint 4) (Link 95, Mileposts 6.0-12.1), crosses Faust Road in north Rush Valley (Link 95, Milepost 1.4), and crosses U.S. 6 in the Goshen Valley in the identical location as Alternative A1. Railroad Bed Scenic Byway (Link 60, Milepost 9.5) and Goshen Canyon Road potential visibility is identical to Alternative A1. Alternative B1 would also cross the Little Moab Recreation Destination Route and recreation area on the south end of Goshen Valley in the identical area as Alternative A1.

This alternative would be within view of the existing and planned trails in and around South Mountain (South Mountain Loop, Mormon Trail, and Rush Valley Tour), and would cross the Pony Express National Historic Trail/National Backcountry Byway in Rush Valley at Link 95 (Milepost 1.4) (refer to Appendix G, Viewpoint 3).

Cultural modifications along this alternative are identical to Alternative A1 in the Juab Valley (existing power plant and substation), Goshen Valley, and Cedar Valley. However, this alternative is located in the eastern Rush Valley, and is adjacent to the Deseret Chemical Depot on its east side. Also, this Alternative parallels an existing transmission line corridor located on the west side of SR 73.

Visual Resource Management Classification

Class III Objective lands are crossed in the identical location as Alternative A1 (Links 1, 2, 3, 5 and portions of Link 20), a total of 6.8 miles.

<u>Alternative B2 – East Rush Valley</u>

Scenic Quality and Image Types

This alternative generally crosses similar Class C scenery and agricultural lands of Class B scenic quality as Alternative B1, north of southern Goshen Valley. South of Goshen Valley, this alternative crosses identical landscapes as Alternative A2 (Long Ridge, Old Canyon). A total of 7.0 miles of Class B scenery is crossed for this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Viewpoints near Alternative B2 are identical to the Alternative B1, except on the south end of the Project area in southern Goshen Valley and northern Juab Valley. In this area, the alternative is identical to Alternative A2. A total of 2.7 miles of this alternative would be in the immediate foreground from residential viewpoints.

Cultural modifications along this alternative are identical to Alternative B1 from the Goshen Valley to the north, and identical to Alternative A2 in the Juab Valley.

Visual Resource Management Classification

Class III Objective VRM lands are crossed in the same locations as Alternative B1, except where this alternative crosses the Long Ridge and Old Canyon, where it is identical to Alternative A2. A total of 8.8 miles of VRM Class III Objective are crossed along this alternative.

<u>Alternative C1 – Tintic Junction</u>

Scenic Quality and Image Types

Scenic quality is predominantly Class C for this alternative, and identical to Alternative A1 in southern Goshen Valley (Class B agricultural landscapes, Link 20) and north/east of Faust (Link 105). In the East Tintic Mountains, this alternative crosses Class B landscapes, totaling 2.9 miles along Link 24 (SQRU #15). A small area of industrial image type landscape is crossed at the U.S. 6 and SR 67 intersection (Link 26, near Milepost 1.0). Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Residential viewpoints near this alternative are identical to Alternative A2 in the Rush Valley, Goshen Valley, and Juab Valley. This alternative would also be in the immediate foreground to residential viewers, located near the intersection of Cherry Creek Road and SR 36 at Tintic Junction (Link 26, near Milepost 2.0), and would be visible in the foreground from residences located in Mammoth (Link 26, near Milepost 1.0). Also, this alternative would be viewed from residences located near the Railroad Bed Road intersection with SR 36 on the highway's east side (Links 30 and 32). In the south Goshen Valley, views from residences to the transmission lines would be farther away than Alternatives A1 or B1 for a short distance, because this alternative would be routed over the East Tintic Mountains instead of being located along the west side of the Goshen Valley, reducing visibility to southern Goshen Valley residents. Potential immediate foreground views from residences for this alternative would total 2.3 miles.

Other potential roadway and recreation viewpoints are also identical to Alternative A1 in northern Rush Valley (SR 36, Mormon Trail Road, SR 199), with the exception of where the alternative is near the Railroad Bed Scenic Backway. The alternative crosses the road and is parallel with the Railroad Bed Scenic Backway in the immediate foreground for a longer distance than Alternative A1. The line would also be viewed in the immediate foreground from the Silver City Historic Cemetery, located about 0.2 mile east of U.S. 6. The alternative would also be viewed in the middleground from the Eureka Historic Cemetery. This alternative is seen along a greater distance adjacent to SR 36 than Alternative A1, paralleling or within close view of the highway south of Vernon in the immediate foreground for approximately 17 miles.

In addition to the existing and planned trails and roadways shared with Alternative A1 in north Rush Valley, this alternative is within view of the existing Uinta National Forest trails and the Uinta National Forest recreation destination route (Link 26, Mileposts 6.5-8.2), and would also be viewed in the immediate foreground by the Vernon Reservoir destination route travelers (Link 26, near Milepost 1.7).

Cultural modifications along this alternative are identical to Alternative A1 in the southern Cedar Valley and Juab Valley, and in the northern Rush Valley (railroad and chemical depot). In the southern Rush Valley, this alternative also parallels an existing railroad (and SR 36).

Visual Resource Management Classification

Class III Objective lands crossed are in areas identical to Alternative A1 (Long Ridge between northern Juab Valley and southern Goshen Valley, Links 1, 2, 3, 5, and 20), a total of 6.8 miles.

<u>Alternative C2 – Tintic Junction</u>

Scenic Quality and Image Types

Scenic quality is typically Class C for this alternative, and identical to Alternative A2 near Faust and to the north, and in the Long Ridge (Old Canyon) crossing and the proposed Mona Annex Substation area. This alternative also crosses Class B scenery in the East Tintic Mountains in the same locations as Alternative C1, and crosses Class B scenic quality agricultural lands in the same areas as Alternative A2. A total of 2.9 miles of Class B scenery are crossed by this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Residential viewpoints near this alternative are identical to Alternative C1 between the southern Goshen Valley and south of Faust. In the northern Juab Valley and in Rush Valley, viewpoints are identical to Alternative A1. Potential immediate foreground views from residences for this alternative total 3.2 miles.

Other potential roadway and recreation viewpoints are also identical to Alternative A2 in northern Rush Valley (SR 36, Mormon Trail Road, SR 199) and in the northern Juab Valley (Burraston Ponds WMA, Nephi WMA). Otherwise, viewpoints are identical to Alternative C1 in the Tintic Valley and south Rush Valley.

Existing and planned trails affected by the project are identical to Alternative A2.

Cultural modifications along this alternative are identical to Alternative C1 in the southern Rush Valley, identical to Alternative A2 in the northern Rush Valley and Juab Valley.

Visual Resource Management Classification

Class III Objective lands crossed are identical to Alternative A2 (Long Ridge between northern Juab Valley and southern Goshen Valley) for a total of 8.8 miles.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Scenic Quality and Image Types

Alternative D crosses a diversity of landscape settings. In more natural settings in and around South Mountain, Class C scenery is typical (SQRU 9, Links 160 and 166). In the foothills of the Oquirrh Mountains east of SR 36 and Tooele City, Class B scenery is common, specifically, in the lower elevations of Settlement Canyon and Middle Canyon (SQRU #31, Link 190A). Also, Class B scenery is crossed along Link 230, across the high peaks of the Oquirrh Mountains. East of the Oquirrh Mountains, Alternative D crosses industrial image types of the Bingham Canyon Mine operations. Industrial landscapes are also located west of the existing Oquirrh Substation, along SR 111, and near the existing Oquirrh Substation, adjacent to the Project alignment. This alternative also is located approximately 650 feet to the northwest and 300 feet below the Tooele "T" (refer to Appendix G, Viewpoints 10a, 10b, and 10c). Some Class C scenic quality agricultural landscapes are also crossed west of SR 111. Class B scenery crossed totals 8.7 miles. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

High sensitivity residential areas along this alternative are clustered in an area around Tooele City, primarily west of SR 36 (Main Street), on Grimm Hill Drive, and at the south end of Haylie Drive (S1400E), where the line would be within the immediate foreground and foreground view along Links 185 and 190A (refer to Appendix G, Viewpoints 9a, 9b, and 9c). On the east side of the Oquirrh Mountains, residential viewers are located near Links 241 and 255 east of SR 111 southeast of the 8200 South intersection, and would view the alternative in the middleground and background. Alternative D would be in the immediate foreground from residences along 1.0 mile of the alignment.

Viewers using the moderately sensitive Mormon Trail Road (Link 160), SR 36 (near Tooele) (Link 185), high sensitivity Settlement Canyon destination route and recreation area (Link 190A), and high sensitivity Middle Canyon Road State Scenic Backway (Links 190A and 220) would view the line in the immediate foreground. Views to the Project from the Tooele Valley Overlook/Smelter Road Trail would be in the foreground for 1.2 miles along Link 220 in the Oquirrh Foothills. On the east side of the Oquirrh Mountains, this alternative would be in the immediate foreground view of SR 111 as the line parallels the highway on its west side (Link 255).

Planned trails would be affected around South Mountain (South Mountain Loop) (Link 160) and as the Project crosses the Oquirrh Mountains (Oquirrh Mountains Limited Use Trail) (Link 230). Views would be in the immediate foreground for a short distance as the line crosses the South Loop trail and Oquirrh Mountain Trail.

Cultural modifications along this alternative include the Tooele Army Depot in southern Tooele Valley, and existing transmission line corridors south of Stockton along SR 36 and on the west side of the Oquirrh Mountains between Middle Canyon and Pine Canyon. This alternative also crosses extractive mining/industrial features (Kennecott facility) within the east side of the Oquirrh Mountains, and parallels existing transmission lines along SR 111 and Old Bingham Highway in the South (Salt Lake) Valley. An existing railroad corridor is located just west of the existing Oquirrh Substation.

Visual Resource Management Classification

This alternative crosses BLM-administered lands on Link 230 with a Class IV objective for a distance of 0.3 miles.

Alternative E1 – Pass Canyon

Scenic Quality and Image Types

Scenic quality and image types crossed are identical to Alternative D south of Pine Canyon. North of Pine Canyon, Alternative E1 extends over the Oquirrh Mountains and through the NOMA, crossing Class A scenery west of the Bingham Canyon Mine and also crosses near the Tooele "T" in the same area as Alternative D. This alternative crosses the industrial image type of the mine along Links 239 and 240. On the east side of the Oquirrh Mountains, this alternative primarily crosses Class C scenery in the foothills east of Copperton and industrial areas south of Old Bingham Highway along the old railroad tracks (Link 265). A total of 2.5 miles of Class A scenery and 6.0 miles of Class B scenery are crossed along this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Residential viewpoints affected by this alternative are identical to Alternative D south of Pine Canyon (residences in southeastern Tooele, west of SR 36, Grimm Hill Drive, and at the south end of Haylie Drive; Links 185, 190, and 220). North of Pine Canyon, the Project follows the Oquirrh Mountain foothills north to the NOMA and crosses the mountain along the existing 138kV corridor. Residences located in and around Lincoln (Blue Peak Drive, Pine Canyon Road, Churchwood Drive) would view the Project in the background (Link 225) (refer to Appendix G, Viewpoint 7). On the east side of the Oquirrh Mountains, this alternative is located in the middleground for a short distance (Links 240 and 242), and typically in the background from residences located east of SR 111 southeast of the 8200 South intersection. A total of 1.0 mile of this alternative would be in the immediate foreground of residences.

Recreational and travel viewpoints are identical to Alternative D south and west of Pine Canyon. This alternative would be viewed in the background from NOMA Pass Canyon Trailhead (Link 225). On the east side of the Oquirrh Mountains, travelers using SR 111 and New Bingham Highway would view the 345kV line in the immediate foreground at the roadway crossings, but typically would be in the middleground or background. This alternative is also in the immediate foreground of the Bingham City Cemetery located southeast of the Old Bingham Highway/SR 111 intersection.

Cultural modifications along this alternative are identical to Alternative D south of Pine Canyon. North of Pine Canyon, this alternative continues to follow an existing transmission line on the west side of the Oquirrh Mountains across the NOMA to the east side of the mountains to the West Bench. East of Copperton, this alternative follows an existing railroad and transmission lines east of SR 111.

Visual Resource Management Classification

Management classes crossed for this alternative are primarily Class IV Objective. Class II Objective occurs in the NOMA, where a 138kV transmission line is currently located. A small section of VRM Class III Objective is crossed on the west side of the NOMA. A total of 2.4 miles of Class II Objective and 0.2 mile of Class III Objective are crossed for this alternative.

<u>Alternative E2 – Proponent's Proposed Action</u>

The affected environment for Alternative E2 is identical to that of Alternative E1, except on the east side of the Oquirrh Mountains, where the line deviates from Alternative E1 and is identical to Alternative D between the existing Oquirrh Substation and the Kennecott industrial image type (Bingham Canyon Mine). A total of 2.5 miles of Class A scenery and 6.0 miles of Class B scenery are crossed for this alternative. A total of 1.0 mile of this alternative is in the immediate foreground of this alternative from residential viewpoints. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Management class objectives (Class II and Class III) crossed are identical to Alternative E1.

<u>Alternative F1 – Middle/Butterfield Canyon</u>

Scenic Quality and Image Types

Alternative F1 is identical to Alternative E1 between Middle Fork Canyon and Mormon Trail Road. Scenic quality Class A (SQRU #4) and Class B (SQRU #6 and #7) landscapes are crossed along Middle Canyon and Butterfield Canyon (Links 215 and 210). Less developed landscapes are crossed on the east side of the Oquirrh Mountains northwest of Herriman along SR 111 north of Rose Canyon/Yellow Fork Canyon. More Class A scenery is crossed for this alternative than Alternative E1. Class A landscapes account for 5.3 miles and Class B landscapes account for 6.3 miles of this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Sensitive viewpoints are identical to Alternative E1 between Middle Fork Canyon and Mormon Trail Road. High sensitivity residential viewpoints with potential views of the line are located south of Tooele City and along Herriman Highway. A total of 1.0 mile of this alternative is in the immediate foreground of residential areas.

This alternative follows the high sensitivity Middle Canyon Road State Scenic Backway, crosses the Settlement Canyon destination route in the immediate foreground, and is within immediate foreground view of the Copper Canyon (planned) Overlook Trail and the Butterfield Pass Viewing Area. Views from the Rose Canyon/Yellow Fork Canyon destination route and Regional Park would be in the background or middleground of this alternative, and dispersed users may have closer views of the line in undetermined areas. Views from the high sensitivity scenic road would be substantially closer than the regional park. This alternative also is located within immediate foreground view of the SR 71 (Herriman Highway) and SR 111 moderate sensitivity highways for a short distance.

Cultural modifications along this alternative are identical to Alternative D west of Middle Canyon. On the east side of the Oquirrh Mountains, existing transmission lines are paralleled west of SR 111 and along the existing railroad and transmission lines located west of the existing Oquirrh Substation and south of the Old Bingham Highway.

Visual Resource Management Classification

A short segment of the alternative crosses VRM Class II Objective lands in the Oquirrh Mountains along Link 215 (Mileposts 3.4-3.9) for a total of 0.5 mile.

<u>Alternative F2 – Middle/Butterfield Canyon</u>

Scenic Quality and Image Types

Alternative F2 crosses scenery and developed landscape identical to Alternative F1, except in the vicinity of the existing Oquirrh Substation, where the line would be located in fewer industrial image type landscapes, and is identical to Alternative D (Link 265) except for the short segment south of the Old Bingham Highway (Link 315). This area along SR 111 is a mix of Class C scenery and developed (commercial/industrial) landscapes. Class A scenery crossed totals 5.3 miles and Class B scenery crossed totals 6.3 miles. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Nearby sensitive viewpoints are identical to Alternative F1, except near the existing Oquirrh Substation, where this alternative would be closer to the Old Bingham Highway and would parallel slightly more of SR 111 (Link 315). Potential immediate foreground views from residential areas are identical to F1.

Cultural modifications are identical to Alternative F1 between the future Limber Substation and the Old Bingham Highway. Between the highway and existing Oquirrh Substation, the alternative parallels existing transmission lines in identical areas as Alternative D (along Old Bingham Highway).

Visual Resource Management Classification

VRM classes crossed for this alternative are identical to Alternative F1.

<u>Alternative G – Lake Point</u>

Scenic Quality and Image Types

Alternative G typically crosses Class C scenery in undeveloped areas, primarily in the east Stansbury Mountain and east Oquirrh Mountain Foothills. This alternative crosses identical landscapes such as Alternative D northwest of the existing Oquirrh Substation along Link 241 and to the south (primarily undeveloped and Class C agricultural landscape west of SR 111 and industrial image types along Old Bingham Highway). A small area of Class A scenery is crossed near Lake Point at the north end of the Oquirrh Mountains (SQRU #4) (Link 370). Class B scenery is crossed in irrigated agricultural lands in the north Tooele Valley along Links 352, 353, and 356 (SQRU #35). Developed areas are dominated by industrial landscapes in and around the Kennecott complex smelter and refining area (Links 374 and 375), and on the east side of the Oquirrh Mountains along Link 376. Class A scenery accounts for 1.4 miles and Class B accounts for 4.7 miles of this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Alternative G would be visible in the immediate foreground and foreground from a high sensitivity residence located near the SR 138/Old Lincoln Highway crossing (Link 352, Mileposts 2.1-2.4), and on the northeast end of Tooele Valley along Clinton Landing Road and Lakeshore Drive (Link 366, Mileposts 1.6-1.9). Background views are typical from residences located on the extreme west side of Grantsville (Tyler Road and Mack Canyon Road). Typical existing views from western Grantsville residential areas are shown in Appendix G, Viewpoints 8a and 8b.This alternative is also in the middleground to residences located in southwest Magna and west of SR 111 at South 8200 West on the West Bench. Potential immediate foreground views to the line from residences for this alternative total 1.4 miles.

Moderate sensitivity viewers using the Mormon Trail Road (Link 335, see Appendix G, Viewpoint 1), SR 138 (Link 352 northeast of Grantsville and Link 365 north of Stansbury Park), and I-80 would also view the line in the immediate foreground or foreground for this alternative. Northwest of the existing Oquirrh Substation, potential visibility of this alternative for travel corridors would be identical to Alternative D (SR 111, New Bingham Highway, Old Bingham Highway).

High sensitivity viewers using the Davenport Canyon/North Willow Canyon Tooele County Scenic Byway, South Willow Canyon Scenic Byway (see Appendix G, Viewpoints 5a and 5b), and Box Canyon destination route on the east side of the Stansbury Mountains would view the Project. Additionally, the line would be viewed from the California National Historic Trail (I-80, assumed alignment) against the Great Salt Lake, along Link 366 for a short distance. Tooele County-planned trail users would view the line from the South Mountain area and from the Stansbury Front. Views would also occur in the background from the Bonneville Seabase.

Cultural modifications associated with this alternative include transmission line corridors; the I-80 corridor; industrial areas of the Kennecott Utah Copper Smelter, Refinery, and Tailings Pond; and the Union Pacific Railroad. Transmission line corridors are located on the north end of Tooele Valley south of I-80, which the Project would parallel, and along the north end of the Oquirrh Mountains at Lake Point (multiple lines of various capacities). Also, transmission lines are located south of the Kennecott Utah Copper Smelter and Refinery in the foothills of the Oquirrh Mountains (also paralleled by the Project). Near the existing Oquirrh Substation, cultural modifications are identical to Alternative D.

Visual Resource Management Classification

This alternative does not cross BLM-administered lands.

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Scenic Quality and Image Types

Alternative H typically crosses Class C scenery in undeveloped areas, and crosses identical Class B irrigated agricultural landscapes (Links 352, 353, and 356) and Class A scenery (Link 370) as Alternative G. Developed areas crossed are also identical to Alternative G around the Kennecott smelter and refining area (Links 374 and 375), and also include the complex tailings pond along Link 375. This alternative crosses more developed landscapes east of the Kennecott tailings pond between SR 201 and I-80 west of the existing Terminal Substation (Links 375 and 386). Class A scenery accounts for 1.4 miles and Class B accounts for 3.7 miles of this alternative. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

Sensitive viewpoints are identical to Alternative G in Tooele Valley, Lake Point, and the Oquirrh Mountain foothills west of Magna. This alternative would also be visible in the immediate foreground and foreground from high sensitivity residences near the SR 201-S8000W intersection north of Magna (Link 375, Mileposts 3.2-3.5). Potential immediate foreground views to the transmission lines from residential viewpoints for this alternative total 1.2 miles.

In addition to the travel corridor, viewpoints identical to Alternative G in Tooele Valley and Lake Point, SR 111 (Link 375) and SR 201 near Magna (Link 375), and 5600 West (Link 386) would also view the line in the immediate foreground or foreground for this alternative.

Cultural modifications associated with this alternative are identical to Alternative G between the future Limber Substation and the Kennecott Utah Copper Smelter and Refinery. Northwest of Magna, the project is in a predominantly industrial context, following existing transmission lines south and east of the Kennecott Tailings Pond to 7200 West, and an existing canal north of Magna along SR 201. Transmission lines are also paralleled between existing Terminal Substation and 7200 West.

Visual Resource Management Classification

This alternative does not cross BLM-administered lands.

<u>Alternative I – East Tooele Valley</u>

Scenic Quality and Image Types

Alternative I is identical to Alternative D near South Mountain and Mormon Trail Road and crosses a large proportion of developed industrial landscapes and Class C scenery. A small segment of this alternative crosses Class A scenery on the north end of NOMA (Link 370). Residential and commercial image types are adjacent to this alternative in the Tooele City and Lincoln area (Links 330, 325, and 360). Industrial image types include the Tooele Army Depot (Link 330), the Kennecott tailings pond (Link 385), and around the existing Terminal Substation (Link 386). For this alternative, 0.6 mile of Class A scenery is crossed, 0.2 mile of Class B scenery is crossed, and 0.2 mile of residential image type is crossed. In addition, 0.3 mile of commercial and 4.0 miles of industrial landscapes are crossed. Table F-1c shows a summary of scenic quality classes crossed by the alternative.

Viewpoints

This alternative would be visible from high sensitivity residential areas in and around Tooele City, Lincoln, and Lake Point. Residences located on 1000 West, 600 North, and subdivisions near the east and west of SR 36 in north Tooele near the Union Pacific Railroad crossing would view the line in the immediate foreground and the foreground. Other residences with potential views of the transmission lines are located east of Droubay Road and Center Street, and along Lake Shore Drive near Lake Point. A total of 6.4 miles of this alternative would be in the immediate foreground view of residential viewpoints.

A portion of this alternative would be visible from the high sensitivity California National Historic Trail (NHT) along I-80 (Link 366). Moderate sensitivity roads would be paralleled or crossed along this alternative at Mormon Trail Road (Link 160), SR 112 (Link 330), SR 36 (Links 325 and 326), SR 201 (Link 385), and SR 172 (South 5600 West, Link 386). The line would be viewed from the Great Salt Lake Marina and I-80 viewing area in the immediate foreground and foreground (Link 386).

Planned Tooele County Trails that would also be near this alternative include the South Mountain trails (Mormon to Baur Trail, South Mountain Loop), Sheep Creek Trail along the railroad east of the Tooele Army Depot, the 10th North Trail, the Droubay Road Trail, and the Ranches Pine Trail. This alternative would also be viewed from the existing Mid Valley Trail and Trailhead located in northwest Tooele City.

Cultural modifications along this alternative are identical to Alternative D (Tooele Army Depot). West of SR 36 and Tooele, the Project would follow the existing railroad to a point north of Lincoln and then follow existing transmission lines on the east bench of Tooele Valley west of the NOMA to Lake Point. The Project would also parallel existing transmission lines south of I-80 to just east of Saltair. Between 7200 West and the existing Terminal Substation, existing transmission lines are also paralleled identically to Alternative H.

Visual Resource Management Classification

This alternative crosses 2.0 miles of VRM Class III Objective crossed along on the west side of the NOMA (Link 360).

Substation Sites

<u>Mona Annex Substation</u>

This substation is located in a Class C landscape in the northern Juab Valley dominated by sagebrush and grassland. The closest views of the site are from residences located at more than 1 mile to the east along the Union Pacific Railroad west of Mona Road and south of Burraston Ponds WMA (refer to Appendix G, Viewpoint 2). Other residences in the study corridor are located on the south side of Mona, along Mona Road, and along Country Road north of Nephi Municipal Airport.

Nearby recreational viewpoints, viewing the site in the background, are located northeast (Burraston Ponds WMA) and south (Nephi WMA) of the substation.

A portion of the substation site is located on BLM-administered lands with VRM Class III objectives.

Limber Substation

This substation is located on private lands in a Class C agricultural landscape in the Stansbury foothills and would be viewed in the immediate foreground of Mormon Trail Road users (refer to Appendix G, Viewpoint 1). Background views from residences located to the south just north of Hickman Canyon would also occur.

3.2.8 Wilderness Characteristics

As part of the 1999 Utah Wilderness Inventory, a large portion of the NOMA (the Oquirrh Mountains Inventory Area) was inventoried for wilderness characteristics. It was determined that the entire 8,300-acre Oquirrh Mountains Inventory Area has wilderness characteristics (BLM 1999). The wilderness characteristics that were identified include:

- Naturalness: The area largely retains its natural conditions with little evidence of human impacts.
- Outstanding opportunities for solitude: Deep twisting canyons and dense vegetation provide screening and outstanding opportunities for solitude.
- Primitive and unconfined recreation: The proximity of the area to a large population and the wide variety of available primitive recreational activities provide for outstanding opportunities for primitive and unconfined recreation. Recreational activities include hiking, backpacking, wildlife viewing, hunting, horseback riding, photography, and nature study.
- Supplemental values: The inventory unit contains botanical and archaeological values. The area contains three representative life zones (Upper Sonoran, Transition, and Canadian), and a hybrid oak community. Historic mining activities add historic interest and archaeological value to the area.

There has been a Citizen’s Proposal to designate the area as wilderness. The Oquirrh Mountains Wilderness Inventory Area (WIA) has not been designated as Wilderness or as a WSA. The Oquirrh Mountains WIA is a part of a larger proposed legislative bill called America’s Red Rock Wilderness Act.

3.2.9 Land Use and Recreation Resources

3.2.9.1 Introduction

This section summarizes data gathered on land use and recreation resources within the Project area. Existing and planned uses have been documented for the entire study corridor, including land uses on federal, state, county, city, and private lands. Map C-9 illustrates the existing land use and Map C-10 illustrates zoning in the Project area.

Issues associated with the potential impacts on land use and recreation resources of the Project were identified by the BLM, state agencies, and local municipalities and include:

- Conflicts with current land uses, including residential, commercial, industrial, parks, agriculture, prior existing rights-of-way, and other authorized land uses

- Conflicts with planned future developments, particularly in the Tooele Valley, the west bench of the Oquirrh Mountains in Salt Lake County, and west of Stockton

- Impacts on future transportation plans and road expansions

- Impacts on management objectives in the NOMA

- Impacts on military training, testing, and the operation readiness of the UTTR

- Impacts on recreation areas: Fivemile Pass Recreation Area and the Larry Miller Motorsports Park and Deseret Peak Complex in Tooele County

- An increase in recreational use (particularly OHV use) along temporary or construction access roads, potentially resulting in negative impacts on biological and earth resources and an increase in fire frequency

- Conformance with municipal/county general plans and master plans

- Impacts on grazing due to the removal of vegetation

- Impacts on rangeland infrastructure, such as fences and cattle guards

3.2.9.2 Overview of Study Methodology and Analysis Area

Land and resource use data were collected within the 6-mile-wide study corridor, 3 miles on either side of the alternative routes. The inventory was conducted by reviewing, refining, and updating data accumulated from the previous *Mona to Oquirrh Transmission Corridor Project Feasibility Study* (Rocky Mountain Power 2006), and by collecting additional secondary data. Information for the inventory was obtained from and reviewed by various federal, state, and local agencies, including the following.

- BLM land and resource management plans and information concerning land use classifications, WMAs, special recreation management areas, active mining sites, prior existing rights-of-way, designated OHV areas, WSAs, and other authorized land uses
- DOD military uses
- Utah State Parks and State Trust Land
- City and county land use plans – existing and planned land use
- Private development plans
- 2009 DigitalGlobe Satellite Image
- 2008 Airborne Global Positioning System/Inertial Measurement Unit (GPS/IMU) aerial imagery
- Aerial photographs of the alternative routes (National Agriculture Imagery Program [NAIP] 2006 and 2009)

Field investigations were also conducted throughout the 6-mile-wide corridors for all of the alternative routes. Federal, state, regional, and local governmental agencies and organizations were contacted to obtain and discuss specific land use data.

3.2.9.3 BLM Facilities

The BLM has a number of facilities throughout the study area. BLM campgrounds are listed in Visual Resources, Section 3.2.7. There are proposed developments for the east side of the Fivemile Pass Recreation Area. The SLFO manages the Salt Lake Wild Horse and Burro Center at the mouth of Butterfield Canyon in the southwest corner of Salt Lake County. The facilities house wild horses and burros for adoption. The SLFO also has facilities for firefighting operations at the Tooele Valley Airport.

3.2.9.4 Forestry and Woodland Products

Most existing wood product use is for firewood, fence posts, and Christmas trees, with a minor component being used for lumber and associated products. Pinyon-juniper woodland is used for firewood, specialty lumber, and biomass. Efforts are being made to encourage non-commercial thinning of pinyon-juniper woodland for firewood use. Mixed conifer and aspen stands are isolated and generally occur in steep upland canyons with limited access. Due to the limited quantity and difficult access to the timber areas, it is not practical to harvest these stands (BLM 1987, 1990).

3.2.9.5 Agriculture and Grazing

Agriculture is a significant source of income in Tooele, Utah, and Juab counties and is a major land use in the Goshen, Cedar, Rush, and Tooele valleys. Agricultural lands include irrigated pasture and irrigated and dry croplands. Other forms of agriculture include stockyards and dairy and poultry farms.

National Resources Conservation Service prime farmlands have been identified within the study area, including prime farmland if irrigated and prime farmland if irrigated and drained. Prime farmland is designated with the purpose of protecting farmland from being converted to nonagricultural uses. Prime farmland is defined by the Farmland Protection Policy Act (FPPA) as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops; the land must also be available for these uses. Areas designated as prime farmland are concentrated in the Goshen and Cedar valleys.

Lands within the study area have also been classified by the FPPA as Farmland of Statewide Importance. These lands are defined as farmland, other than prime or unique farmland, that is of statewide importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate state. These lands are located primarily in the Tooele and Rush valleys.

Under the authority of the Utah Agricultural Protection Act (17 U.S.C. 41), Tooele County and Utah County have designated Agriculture Protection Areas. The purpose of this designation is to protect agricultural areas from encroaching development and land uses that conflict with agricultural operations. Agriculture Protection Areas are primarily located near the Tooele Valley Airport, the community of Erda, and the south end of the Goshen Valley.

Agricultural lands were determined and mapped using data from the NRCS, UDWR, 2009 DigitalGlobe Satellite Image, 2008 Airborne GPS/IMU aerial imagery, NAIP aerial imagery, and fieldwork. Data regarding Conservation Reserve Program land was not available for distribution from the USDA Farm Service Agency, and therefore was not included in the inventory.

Grazing allotments cover the majority of BLM land in the SLFO and FFO. Grazing is also a major land use outside of BLM land within Tooele, Utah, and Juab counties. There is limited agriculture and grazing in Salt Lake County.

3.2.9.6 Minerals

Leasable Minerals

The BLM has been experiencing an increase in energy-related work, including oil and gas leasing and exploration. Within the study area, there are authorized oil and gas leases in the Rush Valley and in Juab County near U.S. 6.

Locatable Minerals

Commercial mining in Utah began in the mid to late 1800s and is still prevalent today. Current mining activities within the study area include the following.

- Kennecott Utah Copper Bingham Canyon Mine – The mine is located in the southwest corner of Salt Lake County on the east side of the Oquirrh Mountains. The mine is 2.75 miles wide and 0.75 mile deep and primarily produces copper. Kennecott is currently exploring opportunities to expand its open pit and underground mining operations south of the existing mine.

- Kennecott Utah Copper Smelter, Refinery, and Tailings Pond – The smelter, refinery, and tailings pond associated with the Bingham Canyon Mine are located in Salt Lake County on the north end of the Oquirrh Mountains. The smelter and refinery are located in the foothills of the mountains, and the tailings pond extends from the foothills north to I-80 and east to 8000 West. Plans to expand the tailings pond are currently underway.

- Barrick Mineral Company Mercur Mine – The mine is located in Mercur Canyon on the west side of the Oquirrh Mountains, east of the Deseret Chemical Depot. The mine produced gold and other secondary minerals until 1998 and is currently undergoing reclamation.

- Active mining claims exist east of Stockton in the Oquirrh Mountains and in the southern portion of Tooele County.

- Historic and inactive mining sites are scattered throughout the Tintic and Oquirrh mountains.

Salable Minerals

Mineral materials within the study area are used for the construction of roads, highways, and commercial and residential development. The BLM has active contracts for private extraction of sand, gravel, and building stone and free use permits with entities of state and local government. Also, private individuals are allowed to remove quantities of landscape rock and building stone in certain areas. Within the study area, there are numerous sand and gravel pit operations in Utah, Tooele, Juab, and Salt Lake counties.

3.2.9.7 Parks and Recreation

There are many opportunities for dispersed recreation throughout the Project area. Hunting, hiking, biking, camping, rock-hounding, picnicking, and off-road vehicle use are the primary activities (BLM 1988). No baseline data for recreation user experience were available for use in the analysis. Recreation sites and federal, state, and local parks within the study corridors are described in detail in the visual resources, Section 3.2.7.

3.2.9.8 Renewable Energy

One proposed wind farm is within the study area. Edison Mission Energy has proposed building the Pioneer Ridge Wind Farm in Tooele County. The wind farm would be located on South Mountain and the Stockton Bar northwest of Stockton Town. The Project has been approved by Tooele County.

The state of Utah has initiated an effort to promote and identify Utah's utility-scale electrical renewable energy resources and to assess transmission to bring those resources to load centers in Utah. As part of this effort, the Utah Renewable Energy Zones (UREZ) Task Force, commissioned by Governor Huntsman, has completed a Phase I Report − Renewable Energy Zone Resource Identification (Berry et al. 2009) that identifies wind, solar, and geothermal zones with the theoretical potential for utility-scale development in Utah. The continuation of this effort (Phases II and III) may result in the development of wind, solar, and geothermal developments that feed into the existing Mona and proposed Mona Annex and Limber substations.

3.2.9.9 Transportation and Access

Highway and Roads

Major interstates and highways within the study area are listed in visual resources, Section 3.2.7. Existing access along each alternative route was determined using a combination of Street Map USA 2005, Tiger Data, Tooele County road data, and aerial imagery. Existing access roads include paved and improved dirt roads that parallel the alternative routes within 500 feet.

Aviation Facilities

FAA-registered airports within the study area include the following:

- Salt Lake International Airport – located in the northwest portion of Salt Lake City (Link 386)
- Tooele Valley Airport – located in the community of Erda in Tooele County (Link 356)
- Salt Lake City Municipal Airport No. 2 – located in West Jordan City (not in proximity to any routes)

Two private dirt landing strips are located within the study area at the following locations:

- South of Stockton Town on SR 36 (not in proximity to any routes)
- Approximately 3 miles northeast of Rush Valley City (Link 105)

Two heliports are located within the study area at the following locations:

- Southeast corner of the Tooele Army Depot (Links 130, 330)
- Tooele Valley Hospital in southern Tooele City (Link 325)

Linear Features and Utility Corridors

An important factor for siting the alternative routes was to use opportunities to parallel existing linear features in order to be compatible with existing land uses. Existing linear features within the study area include transmission lines, major highways, railroads, and pipelines.

Designated utility corridors and major rights-of-way within the SLFO and FFO are identified in the current RMPs. The following are the designated utility corridors and major rights-of-way within the Project area in the SLFO:

- A 345kV transmission line runs from the Camp Williams Substation in Herriman to the existing Terminal Substation in Salt Lake City via the existing Oquirrh Substation in West Jordan.
- A 138kV transmission line runs west to east, south of the I-80 corridor.
- A 138kV transmission line runs northeast from the Tooele Substation along the bench, and heads over the Oquirrh Mountains via Pass Canyon into the existing Oquirrh Substation.
- A 138kV transmission line runs north from the Tooele Substation, along the Tooele Valley east bench, around Lake Point, and south of the Kennecott tailings pond to the existing Terminal Substation.
- A 46kV transmission line runs across the Tooele Valley from the I-80 corridor to Tooele City via Grantsville.
- A 46kV transmission line runs south from the Tooele Substation, through the town of Stockton, and along the east side of Rush Valley.
- A 46kV transmission line runs southwest from the Tooele Substation to Rush Valley.

The following are the designated corridors and major rights-of-way within the Project area in the FFO:

- A 2,000-foot-wide corridor along U.S. 6 in Juab County. The corridor is available for all uses.
- A 1,500-foot-wide corridor from the Intermountain Power Plant near Delta to the existing Mona Substation in Juab County. The corridor is available for all utility uses.
- A 1,500-foot-wide corridor that runs north and south from the existing Mona Substation. The corridor is available for all utility uses.
- Two 345kV lines extend south from the existing Mona Substation to the Intermountain Power Plant in Millard County.
- Two 345kV lines extend south from the existing Mona Substation to the Sigurd Substation in Sevier County.

- Two 345kV lines extend southeast from the existing Mona Substation to the Huntington Substation in Emery County.

The following are the designated utility corridors and major rights-of-way within the Project area in both the SLFO and the FFO.

- Four 345kV transmission lines extend north from the existing Mona Substation, near Mona, to the Camp Williams Substation in Herriman. One runs along the east side of the Lake Mountain and the other three are located on the west side.

- A 3,500-foot-wide corridor identified in the DOE West-Wide Energy Corridor Programmatic EIS/ROD (DOE 2009) in Juab Valley, pending amendment of the House Range RMP. The corridor parallels the existing 345kV corridor, extending north and south from the existing Mona Substation in Juab Valley.

- A 3,500-foot-wide corridor identified in the DOE West-Wide Energy Corridor Programmatic EIS/ROD (DOE 2009) in Rush Valley, pending amendment of the Pony Express RMP. The corridor extends south along the west side of the Deseret Chemical Depot in Rush Valley to Tintic Junction, paralleling SR 36 at times, and continues south along U.S. 6.

- The Union Pacific Railroad runs south to north through the Rush Valley, Stockton Town, and Tooele City. Then it heads east around Lake Point and into Salt Lake City, north of the Kennecott tailing pond. The Denver and Rio Grande Western Railroad has three lines in the study area: one parallels the Old Bingham Highway, near the existing Oquirrh Substation in West Jordan; a second extends from West Jordan to Magna through Kearns and West Valley City; and a third extends west from Goshen in Utah County to Eureka in Juab County. The Western Pacific Railroad crosses the northern portion of the Project area along the I-80 corridor.

- Kern River Gas Transmission Company has two parallel mainline pipelines that traverse the study area. The pipelines run north to south within the existing 345kV transmission line utility corridor, near 5600 West in the Salt Lake Valley. The pipelines continue south through the Cedar and Goshen valleys, extending south beyond the Project area through Juab County. Questar has a 20-inch diameter natural gas lateral pipeline that supplies the Currant Creek Power Plant in Juab County. The pipeline extends 13.4 miles south from the end of Main Line 104, paralleling the existing utility corridor into the Currant Creek Power Plant.

3.2.9.10 Existing Land Use

Land Jurisdiction and Ownership

The study area contains portions of Salt Lake, Tooele, Utah, and Juab counties in Utah. The study area contains a variety of landscape types, urban and rural development, and a variety of federal, state, and local land management agencies. There are approximately 19 incorporated cities and towns within the study area, and five unincorporated communities. Federal, state, and local land-management agencies include the following.

- Federal
  - USDI
    - BLM – SLFO and FFO
  - DOD
    - Tooele Army Depot
    - Deseret Chemical Depot
  - USDA
    - Uinta National Forest – Spanish Fork Ranger District
    - Wasatch-Cache National Forest – Salt Lake Ranger District
- State
  - Utah State Parks
  - Utah SITLA
  - UDWR
  - Utah Department of Natural Resources – Division of Forestry, Fire, and State Lands
  - Utah National Guard
    - Camp Williams Military Reservation
- Counties
  - Salt Lake
  - Tooele
  - Utah
  - Juab

- Municipalities/Communities
  - Bluffdale
  - Cedar Fort
  - Eagle Mountain
  - Erda (unincorporated)
  - Eureka
  - Goshen
  - Grantsville
  - Herriman
  - Lake Point (unincorporated)
  - Magna (unincorporated)
  - Mona
  - Ophir
  - Pine Canyon (unincorporated)
  - Riverton
  - Rush Valley
  - Salt Lake City
  - Saratoga Springs
  - South Jordan
  - Stansbury Park (unincorporated)
  - Stockton
  - Taylorsville
  - Tooele
  - West Jordan
  - West Valley City

Residential

The northeastern portion of the study area in Salt Lake County can be characterized as urban. Several other communities, including Tooele City in Tooele County, are suburban communities. The remainder of the communities found throughout the study area are dispersed and rural in character.

Residential areas include single- and multi-family homes, townhouses, apartments, mobile home parks, and subdivisions under construction. Residential density in Salt Lake County is primarily moderate (2.1 to 15 dwelling units per acre), with low-density residential (0 to 2 dwelling units per acre) in the southwest corner of the county near Butterfield Canyon. Tooele County has mostly low and moderate-density residential areas, and Utah and Juab counties have low-density residential areas. Small developments of high-density residential are scattered throughout Salt Lake and Tooele counties. The majority of proposed residential developments are located in the southwest corner of Salt Lake County, Tooele Valley, and the West Bench of the Salt Lake Valley.

Commercial and Industrial

Commercial land uses are found primarily in town and city centers and include retail businesses, office buildings, resorts and hotels, and mixed-use developments. In addition to city centers, major commercial developments are located adjacent to the Salt Lake International Airport and in the Lake Point area of Tooele County.

Industrial land uses within the study area include light and general industrial areas, mining activities, landfills, salvage yards, and sewage and water treatment plants. Major general and light industrial areas exist in the following locations:

- Northwest portion of Salt Lake City
- Western portions of West Valley, West Jordan, and South Jordan
- Tooele City's Industrial Depot adjacent to the Tooele Army Depot
- The northwest portion of the Tooele Valley

Special Management Areas

- Lee Kay Center and Wildlife Conservation Area – The Conservation Area is approximately 1,280 acres and is located in the northwest portion of Salt Lake City. The Lee Kay Center includes a shooting range and facilities for the hunter education program.

- Carr Fork Reclamation and WMA – The Reclamation and WMA is approximately 3,599 acres and is located on the west side of the Oquirrh Mountains in Tooele County, just northeast of Tooele City. The Atlantic Richfield Company donated a conservation easement for the property to the UDWR. The UDWR manages the property for the benefit of wildlife. The property is also the site of the International Smelting and Refining superfund site (referred to as the Pine Canyon Conservation Area), which contains a capped waste repository and is subject to land use restrictions.

- James Walter Fitzgerald Waterfowl Management Area – The Waterfowl Management Area is approximately 680 acres and is located in the Rush Valley of Tooele County, just west of the town of Faust. The WMA is managed by the UDWR for upland game and waterfowl.

- Burraston Ponds WMA – The WMA is approximately 180 acres and is located in Juab County, 1 mile south of Mona. The WMA is managed by the UDWR for its fish and wildlife values and upland game habitat.

- BLM NOMA – The NOMA is approximately 15,378 acres and is located on the west side of the North Oquirrh Mountains, northeast of Tooele City. The majority of the NOMA has been identified as having wilderness characteristics. The NOMA is managed by the BLM to balance the needs for resource development and resource protection. The NOMA RMP (1997) states that "ROWs proposed for areas above 5,200-foot elevation line must be constructed underground and must be completely rehabilitated."

- Draft Tooele Valley Wetlands Special Area Management Plan – The Tooele Valley Wetlands Special Area is located in the northern portion of the Tooele Valley and encompasses portions of the communities of Grantsville, Erda, Stansbury Park, and Lake Point. The draft SAMP seeks to both protect wetlands and allow economic development in the area. The plan identifies an impact avoidance zone on the west side of the Tooele Valley, which includes highly functioning wetlands and a general permit zone where development should be concentrated on the east side of the valley.

- South Shore Ecological Reserve – The reserve is approximately 8,000 acres and is located on the southern shore of the Great Salt Lake, north of I-80, in Salt Lake County. It is comprised of the Lee Creek Natural Area, Inland Sea Shorebird Reserve, and Gillmor Wildlife Sanctuary. The reserve is managed for the conservation of waterbird habitat.

- Utah State University (USU) Tintic Research Station – The Research Station was established by USU and the BLM in 1945. The station is located in Juab County south of Tintic Junction and just west of U.S. 6. Currently, USU and the USDA Agricultural Research Service are conducting long-term vegetation experiments related to seeding, fire, and grazing.

Preservation Areas

- Green Ravine Conservation Easement – The property is located on the west side of the Oquirrh Mountains in the Lake Point area of Tooele County. The easement was granted to the Utah Open Lands Conservation Association, Inc., and is intended to preserve and protect the natural, ecological, riparian, historic, watershed, habitat, open space, scenic, and passive recreational values present on the property. The easement prohibits the construction of any type of structure on the property. After the easement was established in 2001, the property was obtained by the BLM, and it is now part of the NOMA.

- Rose Canyon Ranch Open Space – The property is approximately 1,681 acres and is located in the southwest portion of Salt Lake County, near the mouth of Butterfield Canyon. It is adjacent to the county's Yellow Fork Canyon Regional Park and 1,600 acres of BLM land. The entire area, including Rose Canyon Ranch, Yellow Fork Canyon Regional Park, and BLM land, would be managed cooperatively by the BLM and the county for wildlife, non-motorized recreation, and watershed values.

- Tooele City Conservation Easement – The property is approximately 101-acres and is located in the on the east bench of the Oquirrh Mountains on the hillsides of Tooele City's southern boundary. The easement was granted to the Tooele City Water Special Service District and is intended to assure that the property will be retained forever in its natural, scenic, open space, and undeveloped condition. The easement prohibits any activity or use of the property that is inconsistent with the purpose of the easement. The easement was established in 2009.

Superfund and Hazardous Waste Sites

Historic mining and military operations within the study area have resulted in numerous superfund and hazardous wastes sites. The EPA National Priorities List (NPL) identifies the national priorities among known releases or threatened releases of hazardous substances, pollutants, or contaminants. The NPL sites and other major hazardous waste sites within the study area are listed below.

EPA National Priorities List

- Jacob's Smelter – The superfund site is located in Tooele County and is approximately 8 square miles in size, encompassing the Town of Stockton and Rush Lake. Past smelting operations have resulted in elevated concentrations of heavy metals in the soils. Residential properties and the Union Pacific Railroad right-of-way within the Stockton Town limits have been cleaned up. Primarily undeveloped land outside the town limits still requires clean up.

- International Smelting and Refining (Pine Canyon Conservation Area) – The superfund site is located approximately 2 miles northeast of Tooele City and encompasses about 1,200 acres. Past copper smelting and lead-zinc recovery operations have resulted in the presence of arsenic, cadmium, copper, lead, mercury, and zinc in the soils, tailings, and slag. There is a capped waste repository on-site, which is subject to land use restrictions. Seventeen residential properties have been cleaned up, due to high levels of lead. The Superfund site is known as the Pine Canyon Conservation Area. The wildlife area is known as the Carr Fork Reclamation and WMA and is managed by the UDWR.

- Eureka Mills – The superfund site is located approximately 80 miles southwest of Salt Lake City in Juab County and encompasses the entire town of Eureka. Past silver, lead, gold, copper, and arsenic mining operations have resulted in high levels of lead and arsenic in area soils. In 2001 and 2002, 72 residential properties were cleaned up. In addition, clean-up operations for 15 mine waste areas and approximately 700 residential properties are expected to continue through 2009.

- Tooele Army Depot – The superfund site is located within the Tooele Army Depot in Tooele County and encompasses about 23,732 acres. For 50-plus years, the superfund site was used for equipment maintenance, munitions disposal, and other industrial activities. As a result, soils and groundwater have been contaminated by lead, cadmium, barium, pesticides, hydrocarbons, solvents, waste oils, and polychlorinated biphenyls. Several clean-up operations have been completed or are currently in process. Groundwater monitoring sites have been established on the north side of the Tooele Army Depot.

Other Hazardous Waste Sites

- Kennecott North Zone – This hazardous waste site is located south of the Great Salt Lake, near Magna, Utah. The site has been used to process copper, lead, zinc, molybdenum, arsenic, gold, and silver-bearing ores. Contaminants such as lead and arsenic can be found in surrounding sludge ponds, soils, slag piles, streams, ditches, ponds, wetlands, and groundwater. Removal of surface wastes was completed in 2001 by Kennecott, in addition to the excavation of contaminated sediments in surrounding wetlands.

- Kennecott South Zone – This hazardous waste site is located about 25 miles southwest of Salt Lake City. The area processed gold, silver, lead, zinc, and copper. As a result, high levels of lead and arsenic were found in Bingham Creek and Butterfield Creek. In addition, a plume of acidic heavy metals contaminated the surrounding groundwater. More than 25 million tons of mining wastes have been removed. Removal of surface wastes was completed in 1999. The site was removed from the EPA's proposed superfund site list in August 2008; however, efforts to clean-up the area's groundwater are expected to continue for decades.

- Sunshine Tailings Outwash – The site is located in the Fivemile Pass Recreation Area within Sunshine Canyon, near the Tooele/Utah County line. The site contains hazardous waste related to mining activities in the area.

- Mercur Canyon Outwash – The site is located at the mouth of Mercur Canyon in Tooele County and extends west into the Deseret Chemical Depot. The site contains hazardous waste related to the Mercur Mine operations.

Planned Land Use

There are numerous proposed developments within the study area (Tables 3-10 and 3-11), including residential, commercial, industrial, mixed use, parks, and schools. The proposed developments are listed below by county and include both approved and conceptual plans.

Salt Lake County

TABLE 3-10
PROPOSED DEVELOPMENTS IN SALT LAKE COUNTY

Jurisdiction	Type of Development	Project Description/Location
Salt Lake County	Mixed-use	▪ Kennecott West Bench Master Plan – 75,000 acres of residential, open space, and mixed-use centers along the west bench of the Salt Lake Valley Little Valley in Magna will be the first development of the Kennecott West Bench Master Plan.
	Industrial	▪ Kennecott Utah Copper tailings pond expansion near Magna
	Highway	▪ UDOT Mountain View Highway Corridor
South Jordan	Mixed-use	▪ Kennecott Daybreak – 4,200 acres in the western portion of South Jordan
	Highway	▪ UDOT Mountain View Highway Corridor
West Valley	Residential	▪ One development in the southwest corner of the city ▪ One development at the intersection of 5600 West and 5400 South
	Proposed school site	▪ Near 6200 South and 6000 West
	Highway	▪ UDOT Mountain View Highway Corridor
West Jordan	Residential	▪ Three developments west of SR 111 near 7800 South ▪ One development on the east side of SR 111 at 7800 South ▪ One development at 7800 South and 6540 West ▪ One development at 7800 South and 5490 West ▪ Three developments near 8600 South and 6400 West
	Commercial	▪ One on the east side of SR 111 at 7800 South
	High school site	▪ At SR 111 and 8600 South

TABLE 3-10 PROPOSED DEVELOPMENTS IN SALT LAKE COUNTY		
Jurisdiction	**Type of Development**	**Project Description/Location**
West Jordan	Park expansion	▪ Near 8600 South and 6000 West
	Highway	▪ UDOT Mountain View Highway Corridor
Salt Lake City	Industrial	▪ Westport Industrial Park near 300 South and 5600 West ▪ One development near 300 South and 5500 West ▪ One development near 300 South and 6000 West
Herriman	Herriman High School	▪ At 11800 South and 6000 West
	Mixed use	▪ Rosecrest and South Hills developments on the east side of Herriman
	Other	▪ Several other planned developments scattered throughout the city
	Highway	▪ UDOT Mountain View Highway Corridor

Tooele County

TABLE 3-11 PROPOSED DEVELOPMENTS IN TOOELE COUNTY		
Jurisdiction	**Type of Development**	**Location**
Tooele County	Residential	▪ Leo's Sweet Sage Acres – 10 miles northwest of Eureka on SR 36 ▪ The Benches at South Rim – in the southern foothills of South Mountain ▪ Baker Canyon – 4 miles southwest of Grantsville in the foothills of the Stansbury Mountains ▪ Saddleback – near Lake Point in the foothills of the North Oquirrh Mountains ▪ Pole Canyon – adjacent to the south to Saddleback, near Lake Point in the foothills of the North Oquirrh Mountains ▪ Two developments near Stansbury Park on the north side of SR 138 ▪ One development on the west side of Stansbury Park, on the south side of SR 138 ▪ One development in the southwest portion of the Lake Point area ▪ Six developments on the east side of Tooele City ▪ One development just north of Tooele City
	Commercial	▪ Salt Pointe Commerce Center – adjacent to the south of the Great Salt Lake salt ponds on the east side of Hwy 36
	Industrial	▪ Timpie Farms – 2 miles northeast of Grantsville
	Highway	▪ Tooele County Midvalley Highway – four lane arterial between SR 36 and SR 112 and a four lane freeway between SR 112 and I-80 ▪ 1000 North – five-lane roadway that will run between SR 112 and SR 36 ▪ 2000 North – limited access collector between SR 36 on the east to SR 112 near the Deseret Peak Recreational Complex ▪ 3400 North – future parkway planned to extend between SR 36 on the east to eastern Grantsville City limits on the west ▪ 1200 West – limited access collector extending between SR 112 on the south to SR 138 on the north
Grantsville	Residential	▪ Northstar – southwest portion of Grantsville
Tooele City	Mixed use	▪ Overlake Planned District – encompasses a large portion of the northern part of the city

TABLE 3-11 PROPOSED DEVELOPMENTS IN TOOELE COUNTY		
Jurisdiction	**Type of Development**	**Location**
Tooele City	Residential	▪ Overlake Estates – located directly north of SR 112 and west of SR 36 and will include over 8,100 housing units over approximately 2,700 acres; 615 of those acres are currently developed ▪ One development on the southeast side of the railroad near 650 North ▪ Two developments on the northwest side of the railroad near 1000 North ▪ Four developments on the south and southwest sides of the city in the foothills ▪ Others scattered throughout existing development within the city
	Utah State University	▪ Approved 50 acre development to include a USU Tooele Regional Campus
	Highway	▪ Tooele County Midvalley Highway – four lane arterial between SR 36 and SR 112 and a four lane freeway between SR 112 and I-80

<u>Juab County</u>

There are two proposed residential developments in Juab County; one is located just north of Mona Reservoir and one is located approximately 2 miles northeast of Eureka. There is a small commercial development planned for Tintic Junction near the intersection of SR 36 and U.S. 6. Juab County is working on a conceptual long-range transportation plan that includes a belt route on the west side of Juab Valley, which may conflict with the substation site.

<u>Utah County</u>

There is one proposed mixed-use development in Utah County within the study area, called the Elberta Planned Community. The development is comprised of 25,752 acres, is bisected by US-6, encompasses the Town of Elberta, and is west of the Town of Goshen.

3.2.9.11 Summary of Land Use and Recreation Resources Inventory Results

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Jurisdiction

Alternative A1 is 67.9 miles in length and crosses through Juab County for 7.4 miles, Utah County for 24.1 miles, and Tooele County for 36.4 miles. The route crosses 34.4 miles of BLM land (50.7 percent), 6.9 miles of state land (10.3 percent), and 26.6 miles of private land (39 percent), including 4.8 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Annex Substation (5.8 miles along Links 1, 2, 3, and 5)
- SR 36 and the railroad on the west side of the Deseret Chemical Depot (4.6 miles along Link 90)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (15.5 miles along Links 40, 90, and 105)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (15.8 miles along Links 1, 2, 3, 5, 20, 40, 90, and 105)

Existing Land and Resource Uses

The primary land uses along the route are grazing and agriculture, including 61.8 miles of vacant and grazing land and 6.1 miles of dryland and irrigated agriculture in Goshen Valley (Link 20), Cedar Valley (Links 55 and 60), and Rush Valley (Link 105). In addition, the alternative crosses the Pony Express National Historic Trail/National Backcountry Byway, Tooele County Scenic Byway, and State Scenic Backway along Link 90 and 3.5 miles of land with Agriculture Protection Area designation (Links 20 and 50). There are no residences within 0.25 mile of the route. Approximately 34.4 miles of prime farmland are located along the alternative.

Planned Land and Resource Uses

Similar to the existing land uses, the planned land uses along Alternative A1 are primarily agriculture and grazing. One planned development is along the alternative. The development is called the Elberta Planned Community and is a mixed-use development comprised of 25,752 acres.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Jurisdiction

Alternative A2 is 69.4 miles in length and crosses through Juab County for 7.3 miles, Utah County for 25.7 miles, and Tooele County for 36.4 miles. The route crosses 35.3 miles of BLM land (50.9 percent), 8.1 miles of state land (11.6 percent), and 26.0 miles of private land (37.5 percent), including 4.8 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Annex Substation (3.6 miles along Links 1, 2, and 3)
- SR 36 and the railroad on the west side of the Deseret Chemical Depot (4.6 miles along Link 90)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (15.5 miles along Links 40, 90, and 105)

- Proposed corridor identified in the WWEC PEIS and supported by the BLM (13.6 miles along Links 1, 2, 3, 10, 40, 90, and 105)

Existing Land and Resource Uses

The primary land uses along the route are similar to Alternative A1 and include 63.7 miles of vacant and grazing land, 5.4 miles of dryland and irrigated agriculture in Cedar Valley (Links 55 and 60) and Rush Valley (Link 105), 0.3 mile of industrial area in Goshen Valley (Link 15), and 1.5 miles of land with Agriculture Protection Area designation (Link 50). In addition, the alternative crosses the Pony Express Tooele County Scenic Byway and State Scenic Backway along Link 90. There are no residences within 0.25 mile of the route. Approximately 32.2 miles of prime farmland are located along the alternative.

Planned Land and Resource Uses

Similar to the existing land uses, the planned land uses along Alternative A2 are primarily agriculture and grazing. One planned development is along the alternative. The development is called the Elberta Planned Community and is a mixed-use development comprised of 25,752 acres.

<u>Alternative B1 – East Rush Valley</u>

Jurisdiction

Alternative B1 is 70.0 miles in length and crosses through Juab County for 7.4 miles, Utah County for 24.1 miles, and Tooele County for 38.5 miles. The route crosses 36.4 miles of BLM land (52.1 percent), 5.0 miles of state land (7.1 percent), and 28.6 miles of private land (40.8 percent), including 2.2 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Annex Substation (5.8 miles along Links 1, 2, 3, and 5)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (0.4 mile along Links 120 and 135)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (6.0 miles along Links 1, 2, 3, 5, and 20)

Existing Land and Resource Uses

The primary land uses along Alternative B1 are grazing and agriculture, including 60.0 miles of vacant and grazing land and 5.8 miles of dryland and irrigated agriculture in Goshen Valley (Link 20), Cedar Valley (Links 55 and 60), and Rush Valley (Link 140). The route crosses the Fivemile Pass Recreation Area for 4.1 miles (Links 85 and 95), the Pony Express National Historic Trail/National Backcountry Byway, Tooele County Scenic Byway, and State Scenic Backway (Link 90), 0.1 mile of the Mercur Canyon Outwash hazardous waste site (Link 95) and 3.5 miles of land with Agriculture Protection Area designation (Links 20 and 50). There is one residence within 0.25 mile of the route along Link 95 near the mouth of Ophir Canyon. Approximately 31.7 miles of prime farmland are located along Alternative B1.

Planned Land Use and Resource Uses

Similar to the existing land uses, the planned land uses along Alternative B1 are primarily agriculture and grazing. One planned development is along the alternative. The development is called the Elberta Planned Community and is a mixed-use development comprised of 25,752 acres.

<u>Alternative B2 – East Rush Valley</u>

Jurisdiction

Alternative B2 is 71.5 miles in length and crosses through Juab County for 7.3 miles, Utah County for 25.7 miles, and Tooele County for 38.5 miles. The route crosses 37.3 miles of BLM land (52.2 percent), 6.1 miles of State land (8.5 percent), and 28.1 miles of private land (39.3 percent), including 2.2 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Annex Substation 3.6 miles along Links 1 and 2)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (0.4 mile along Links 120 and 135)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (3.6 miles along Links 1, 2, 3, and 10)

Existing Land and Resource Uses

The primary land uses along Alternative B2 are grazing and agriculture, including 61.9 miles of vacant and grazing land and 5.1 miles of dryland and irrigated agriculture in Cedar Valley (Links 55 and 60) and Rush Valley (Link 140). The route crosses the Fivemile Pass Recreation Area for 4.1 miles (Links 85 and 95), the Pony Express National Historic Trail/National Backcountry Byway, Tooele County Scenic Byway, and State Scenic Backway (Link 95), 0.3 mile of industrial area in Goshen Valley (Link 15), 0.1 mile of the Mercur Canyon Outwash hazardous waste site (Link 95), and 1.5 miles of land with Agriculture Protection Area designation (Link 50). There is one residence within 0.25 mile of the route, along Link 95, near the mouth of Ophir Canyon. Approximately 29.5 miles of prime farmlands are located along Alternative B2.

Planned Land Use and Resource Uses

Similar to the existing land uses, the planned land uses along Alternative B2 are primarily agriculture and grazing. One planned development is along the alternative. The development is called the Elberta Planned Community and is a mixed-use development comprised of 25,752 acres.

Alternative C1 – Tintic Junction

Jurisdiction

Alternative C1 is 67.1 miles in length and crosses through Juab County for 18.6 miles, Utah County for 8.4 miles, and Tooele County for 40.1 miles. The route crosses 33.8 miles of BLM land (50.5 percent), 5.5 miles of state land (5.4 percent), and 27.8 miles of private land (41.4 percent), including 4.9 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Substation (5.8 miles along Links 1, 2, and 5)
- SR 36 and the railroad in the Tintic Junction area and on the west side of the Deseret Chemical Depot (5.2 miles along Links 26 and 90)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (27.2 miles along Links 24, 26, 30, 32, 35, 90, and 105)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (22.8 miles along Links 1, 2, 3, 5, 20, 26, 30, 32, 35, 90, and 105)

Existing Land and Resource Uses

The primary land uses along Alternative C1 are grazing and agriculture, including 64.7 miles of vacant and grazing land and 2 miles of dryland and irrigated agriculture in Rush Valley (Link 105). In addition, the route crosses 0.4 mile of industrial area in Tintic Junction (Link 26) and 0.7 mile of the Railroad Bed Road Tooele County Scenic Byway (Link 32). There is one residence within 0.25 mile of the route along Link 26 in Tintic Junction. Approximately 32.6 miles of prime farmland are located along Alternative C1.

Planned Land and Resource Uses

Similar to the existing land uses, the planned land uses along Alternative C1 are primarily agriculture and grazing. Two planned developments are located near, but not crossed by, the route: (1) a commercial development in Tintic Junction located on the east side of U.S. 6, approximately 0.1 mile east of Link 26 and (2) Leo's Sweet Sage Acres residential development located along SR 36, approximately 1 mile west of Link 30.

<u>Alternative C2 – Tintic Junction</u>

Jurisdiction

Alternative C2 is 68.4 miles in length and crosses through Juab County for 18.5 miles, Utah County for 9.8 miles, and Tooele County for 40.1 miles. The route crosses 34.7 miles of BLM land (50.7 percent), 6.5 miles of state land (9.5 percent), and 27.2 miles of private land (39.8 percent), including 4.8 miles in Rush Valley Town.

Linear Features

The route parallels the following linear features:

- Existing 345kV utility corridor running north and south from the proposed Mona Substation (3.6 miles along Links 1 and 2)
- SR 36 and the railroad in the Tintic Junction area and on the west side of the Deseret Chemical Depot (5.2 miles along Links 26 and 90)
- Mormon Trail Road south of the future Limber Substation (5.0 miles along Link 150)
- Proposed UNEV pipeline and utility corridor (27.2 miles along Links 24, 26, 30, 32, 35, 90, and 105)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (20.6 miles along Links 1, 2, 3, 10, 26, 30, 35, 90, and 105)

Existing Land and Resource Uses

The primary land uses along Alternative C2 are grazing and agriculture, including 66.5 miles of vacant and grazing land and 1.3 miles of dryland and irrigated agriculture in Rush Valley (Link 105). In addition, the route crosses 0.6 mile of industrial area in Tintic Junction (Link 26), 0.7 mile of the Railroad Bed Road Tooele County Scenic Byway (Link 32), and 2.0 miles of land with Agriculture Protection Area designation (Link 20). There is one residence within 0.25 mile of the route along Link 26 in Tintic Junction. Approximately 30.4 miles of prime farmland are located along Alternative C2.

Planned Land and Resource Uses

The planned land uses along Alternative C2 are the same as Alternative C1.

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

Jurisdiction

Alternative D is 31.1 miles in length and crosses through Tooele County for 19.1 miles and Salt Lake County for 12.0 miles. The route crosses 0.3 mile of BLM land (1 percent), 2.7 miles of state land (9 percent), and 28.1 miles of private land (about 90 percent), including 1.5 miles in South Jordan and 3.2 miles in West Jordan.

Linear Features

The route parallels 12.3 miles of 138kV transmission lines along Links 220, 240, 241, 255, and 265; SR 111 for 2.0 miles along Links 255; the proposed UNEV pipeline and utility corridor for 0.5 mile (Links 166 and 185); and Old Bingham Highway for 1.8 miles along Link 265.

Existing Land and Resource Uses

The primary land uses along Alternative D include 24.6 miles of vacant and grazing land, 5.0 miles of industrial areas (Links 166, 185, 230, and 240), 0.1 mile of open space (Links 241 and 265), and 1.4 miles through the Carr Fork Reclamation and WMA and Pine Canyon Conservation Area (Superfund site). The alternative route does not cross the capped waste repository located on the Superfund site. There are 13 residences within 0.25 mile of the route along Links 185 and 190A, south of Tooele City. Approximately 12.8 miles of prime farmland are located along Alternative D. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route. Additionally, Alternative D would be located in proximity to Legion Park Campground and Elks Association of Utah's Camp Wapiti along Link 190A.

Planned Land and Resource Uses

Alternative D crosses through 4.1 miles of planned developments, including Kennecott's conceptual West Bench Master Plan development (Links 240 and 241) and industrial developments on the south side of Old Bingham Highway (Link 265). The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh Substation.

<u>Alternative E1 – Pass Canyon</u>

Jurisdiction

Alternative E1 is 31.1 miles in length and crosses through Tooele County for 21.0 mile and Salt Lake County for 10.1 miles. The route crosses 2.6 miles of BLM land (8 percent), 1.5 miles of state land (5 percent), and 27.1 miles of private land (87 percent), including 1.8 miles in South Jordan and 0.7 mile in West Jordan.

Linear Features

The route parallels 14.5 miles of 138kV transmission lines along Links 220, 225, 235, 239, 240, and 265, and the proposed UNEV pipeline and utility corridor for 0.5 mile (Links 166 and 185).

Existing Land and Resource Uses

The primary land uses along Alternative E1 are grazing and industrial uses, including 24.3 miles of vacant and grazing land and 6.8 miles of industrial areas along Links 166, 185, 225, 239, 240, 244, and 265. The route crosses the Middle Canyon Road State Scenic Byway (Links 220 and 225) and follows an existing 138kV line for 2.4 miles through the Carr Fork Reclamation and WMA and Pine Canyon Conservation Area (a Superfund site). The alternative route does not cross the capped waste repository located on the Superfund site. The route runs through the BLM NOMA for 2.6 miles along Links 225 and 235. There are

13 residences within 0.25 mile of the route along Links 185 and 190, south of Tooele City. Approximately 9.3 miles of prime farmland are located along Alternative E1. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route.

Planned Land and Resource Uses

Alternative E1 crosses through 6.9 miles of conceptual planned mixed-use developments, including Kennecott's West Bench Master Plan (Links 240, 242, 244) and Daybreak Development (Link 265). Link 265 crosses a conceptual planned park along Bingham Creek, within the Daybreak property. The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh Substation.

<u>Alternative E2 – Proponent's Proposed Action</u>

Jurisdiction

Alternative E2 is 31.1 miles in length and crosses through Tooele County for 21.0 mile and Salt Lake County for 10.0 miles. The route crosses 2.5 miles of BLM land (8 percent), 1.5 miles of state land (5 percent), and 27.1 miles of private land (87 percent), including 1.5 miles in South Jordan, and 3.2 miles in West Jordan.

Linear Features

The route parallels 16.8 miles of 138kV transmission lines along Links 220, 225, 235, 239, 240, 241, 255, and 265; SR 111 for 2.0 miles along Link 255; the proposed UNEV pipeline and utility corridor for 0.5 mile (Links 166 and 185); and Old Bingham Highway for 1.8 miles along Link 265.

Existing Land and Resource Uses

Alternative E2 shares the majority of the same alignment as Alternative E1, but uses Links 241, 255, and 265 rather than Links 242, 244, and 265. The primary land uses along Alternative E2 are similar to Alterative E1 and include 24.9 miles of vacant and grazing land, 6.1 miles of industrial areas, 0.1 mile of open space (Links 241 and 265), 2.6 miles through the BLM NOMA (Links 225 and 235), and 2.4 miles through the Carr Fork Reclamation and WMA and Pine Canyon Conservation Area (a Superfund site). The alternative route does not cross the capped waste repository located on the Superfund site. There are 13 residences within 0.25 mile of the route along Links 185 and 190, south of Tooele City. Approximately 12.9 miles of prime farmland are located along Alternative E2. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route.

Planned Land and Resource Uses

Alternative E2 crosses through 4.1 miles of planned developments, including Kennecott's conceptual West Bench Master Plan development (Links 240 and 241) and industrial developments on the south side of Old Bingham Highway (Link 265). The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh substation.

Alternative F1 – Middle/Butterfield Canyon

Jurisdiction

Alternative F1 is 29.3 miles in length and crosses through Tooele County for 18.3 miles and Salt Lake County for 11.0 mile. The route crosses 0.6 mile of BLM land (2.2 percent), 1.6 miles of state land (5.3 percent), and 27.1 miles of private land (92.5 percent), including 1.8 miles in South Jordan.

Linear Features

The route parallels the Middle Canyon Road State Scenic Backway for 5.0 miles (Link 215), SR 111 for 3.8 miles (Links 290, 306, and 310), Old Bingham Highway 1.9 miles, the proposed UNEV pipeline and utility corridor for 0.5 mile (Links 166 and 185) and a 138kV transmission line for 2.1 miles (Links 306 and 265).

Existing Land and Resource Uses

The primary land uses along Alternative F1 are dispersed recreation and industrial, including 27.0 miles of vacant and grazing land, dispersed recreation in Middle and Butterfield canyons (Link 210 and 215), 2.3 miles of industrial areas (Link 166, 265, and 290). There are 13 residences within 0.25 mile of the route along Links 185 and 190, south of Tooele City. Approximately 9.1 miles of prime farmland are located along Alternative F1. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route.

Planned Land and Resource Uses

Alternative F1 crosses through 6.8 miles of conceptual planned mixed-use developments, including Kennecott's West Bench Master Plan (Links 210, 290, 310, and 306) and Daybreak Development (Link 265). Link 265 crosses a conceptual planned park along Bingham Creek within the Daybreak property. Additionally, Kennecott is exploring opportunities to expand its open pit and underground mining opportunities south of the Bingham Canyon Mine in the Butterfield Canyon area. The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh substation. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route.

Alternative F2 – Middle/Butterfield Canyon

Jurisdiction

Alternative F2 is 29.6 miles in length and crosses through Tooele County for 18.2 miles and Salt Lake County for 11.4 miles. The route crosses 0.6 mile of BLM land (2.1 percent), 1.6 miles of state land (5.3 percent), and 27.4 miles of private land (92.6 percent), including 1.5 miles in South Jordan and 0.4 mile in West Jordan.

Linear Features

The route parallels the Middle Canyon Road State Scenic Backway for 5.0 miles (Link 215), SR 111 for 2.4 miles (Link 290 and 315), Old Bingham Highway for 1.8 miles, the proposed UNEV pipeline and utility corridor for 0.5 mile (Links 166 and 185), and a 138kV transmission line for 2.2 miles (Links 306, 315, 265).

Existing Land and Resource Uses

Alternative F2 shares the majority of the same alignment as Alternative F1, but uses Links 315 and 265 rather than Link 265. The primary land uses along Alternative F2 are similar to F1 and include dispersed recreation and industrial, including 27.6 miles of vacant and grazing land, dispersed recreation in Middle and Butterfield canyons (Link 210 and 215), and 2.0 miles of industrial areas (Links 166, 265 and 290). There are 13 residences within 0.25 mile of the route along Links 185 and 190, south of Tooele City. Approximately 10.8 miles of prime farmland are located along Alternative F2. The helipad on the Tooele Army Depot is approximately 4,700 feet north of the route.

Planned Land and Resource Uses

Alternative F2 crosses through 6.8 miles of planned developments, including Kennecott's West Bench Master Plan (Links 210, 290, 310, 306, and 315) and industrial developments on the south side of Old Bingham Highway (Link 265). Additionally, Kennecott is exploring opportunities to expand its open pit and underground mining opportunities south of the Bingham Canyon Mine in the Butterfield Canyon area. The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh substation.

<u>Alternative G – Lake Point</u>

Jurisdiction

Alternative G is 49.0 miles in length and crosses through Tooele County for 31.3 miles and Salt Lake County for 17.7 miles. The route crosses 6.5 miles of state land (13.2 percent) and 42.5 miles of private land (86.8 percent), including 3.2 miles in West Jordan and 1.5 miles in South Jordan.

Linear Features

The route parallels 138kV transmission lines for 22.1 miles (Links 353, 354, 356, 365, 370, 374, 241, 255, and 265), the proposed UNEV pipeline and utility corridor for 1.9 mile (Link 370), SR 111 for 2.0 miles (Link 255), and Old Bingham Highway for 1.8 miles.

Existing Land and Resource Uses

The primary land uses along Alternative G include grazing, agriculture, and industrial, including 41.4 miles of vacant and grazing land, 4.1 miles of dryland and irrigated agriculture (Links 353, 354, 356, and 365), and 3.5 miles of industrial (Links 265, 365, 366, and 376). Link 335 crosses the Davenport Canyon/North Willow Canyon Tooele County Scenic Byway and the South Willow Canyon Tooele

County Scenic Byway. The route crosses 0.1 mile of open space along Links 241 and 265, and 17.5 miles of the Tooele Special Area Management Plan (Links 352, 353, 354, 356, 365, and 366). There are nine residences within 0.25 mile of the route along Links 352 and 366. Approximately 10.0 miles of prime farmland are located along Alternative G. The Tooele Valley Airport is located approximately 9,300 feet south of Link 356.

Planned Land and Resource Uses

Alternative G crosses 11.0 mile of planned developments, including the conceptual Kennecott West Bench Master Plan (Links 374, 376, and 241) and industrial developments on the south side of Old Bingham Highway (Link 265). The route would aerially span the future Mountain View Highway Corridor adjacent to the Oquirrh substation.

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Jurisdiction

Alternative H is 45.4 miles in length and crosses through Tooele County for 31.3 miles and Salt Lake County for 14.1 miles. The route crosses 6.4 miles of state land (14.2 percent) and 39.0 miles of private land (85.8 percent), including 5.2 miles in Salt Lake City.

Linear Features

The route parallels 138kV transmission lines for 26.1 miles (Links 353, 354, 356, 365, 370, 374, 375, and 386), the proposed UNEV pipeline and utility corridor 1.9 mile (Link 370), and SR 201 for 2.3 miles (Link 375).

Existing Land and Resource Uses

The primary land uses along Alternative H include grazing, agriculture, and industrial, including 36.5 miles of vacant and grazing land, 4.1 miles of dryland and irrigated agriculture (Links 352, 354, 356, and 365), and 4.8 miles of industrial (Links 365, 366, 370, 375, and 386). Link 335 crosses the Davenport Canyon/North Willow Canyon Tooele County Scenic Byway and the South Willow Canyon Tooele County Scenic Byway. The route runs through 17.5 miles of the Tooele SAMP (Links 352, 353, 354, 356, 365, and 366). Alternative H has nine residences within a 0.25 mile along Links 352 and 366. Approximately 7.5 miles of prime farmland are located along Alternative H. The Tooele Valley Airport is located approximately 9,300 feet south of Link 356. The Salt Lake International Airport is located approximately 4,000 feet from Link 386.

Planned Land and Resource Uses

Alternative H crosses 5.1 miles of Kennecott's conceptual West Bench Master Plan. In addition, Kennecott is planning on expanding the tailings pond to the east, abutting Link 375. There are two planned light industrial developments adjacent to Link 386, but they are not crossed by the route. The route would aerially span the future Mountain View Highway Corridor along 5600 West.

Alternative I – East Tooele Valley

Jurisdiction

Alternative I is 40.4 miles in length and crosses through Tooele County for 27.0 miles and Salt Lake County for 13.4 miles. The route crosses 2.0 miles of BLM land (5 percent), 2.6 miles of DOD land (6.5 percent), 0.8 mile of state land (1.9 percent), and 35.0 miles of private land (86.6 percent), including 3.0 miles in Tooele City and 5.4 miles in Salt Lake City.

Linear Features

The route parallels the following linear features:

- Existing 138kV lines along the east bench of the Tooele Valley, around Lake Point, and along I-80 (25.1 miles along Links 360, 370, 385, and 386)
- The railroad through Tooele City, along the bench and I-80 (17.5 miles along Links 365, 366, 370, and 385)
- I-80 on the north side of the Kennecott tailings pond (7.0 miles along Link 385)
- The proposed UNEV pipeline and utility corridor through the Tooele Valley, around Lake Point, and along I-80 (23.1 miles along Links 166, 180, 325, 326, 330, 370, and 385)
- Proposed corridor identified in the WWEC PEIS and supported by the BLM (1.2 miles along Link 360)

Existing Land and Resource Uses

The primary land uses along Alternative I are industrial and military and include 2.3 miles of industrial through Tooele City (Links 330 and 326), 0.4 mile of agricultural-related uses along Link 330, and 1.7 miles across the Tooele Army Depot, along Link 330. The route runs through Tooele City crossing 0.3 mile of residential (Link 330) and 0.1 mile of commercial (Link 325). The majority of the route along the railroad track and on the bench is vacant land (35.7 miles). The alternative crosses 2.0 miles of the BLM NOMA and 2.1 miles of the Green Ravine conservation easement along Link 360 in the Lake Point area. The route crosses only 0.3 mile of residential area, but there are 487 residences within 0.25 mile of the route, concentrated in Tooele City, along Links 180, 325, 326, 330, and 360. Approximately 14.8 miles of prime farmland are located along Alternative I. The helipad at the Tooele Valley Hospital is located approximately 1,000 feet north of Links 325 and 326.

Planned Land and Resource Uses

Alternative I crosses 7.5 miles of conceptual planned developments, including the Overlake Planned District along Links 330 and 325, Saddleback residential development along Link 360, and Kennecott West Bench Master Plan along Link 385. The route also runs along the edge of The Ranches residential development, which is under construction, for 0.1 mile along Link 326. There are two planned light industrial developments adjacent to Link 386, but they are not crossed by the route. The route would aerially span the future Mountain View Highway Corridor along 5600 West.

Substation Sites

Mona Annex Substation

The proposed Mona Annex Substation site would be located on approximately 282 acres of private land and 86 acres of BLM land in Juab County. The substation footprint would occupy 45 acres of BLM-administered land. The primary land use in the area is livestock grazing.

Limber Substation

The proposed Limber Substation site would be located on 370 acres of private land in Tooele County, approximately 2.0 miles southwest of the Tooele Army Depot on the west side of the Mormon Trail Road. The primary land use in the area is livestock grazing.

3.3 Special Designations

3.3.1 Areas of Critical Environmental Concern

There are no ACECs within the Project area.

3.3.2 Back Country Byways

The Pony Express Trail National Back Country Byway runs through the study area along SR 73. The byway follows SR 73 for 133 miles from the Stagecoach Inn State Park in Fairfield, Utah, to the Utah-Nevada State border (refer to visual resources, Section 3.2.7).

3.3.3 National Recreation Areas

There are no national recreation areas within the Project area.

3.3.4 National Trails

There are two National Trails within the Project area: the California NHT and Pony Express NHT (refer to visual resources, Section 3.2.7).

3.3.5 Wild and Scenic Rivers

There are no designated wild and scenic rivers within the study area.

3.3.6 Wilderness

There are no designated wilderness areas within the study area.

3.3.7 Wilderness Study Areas

The North Stansbury Mountains WSA is located in the northwest corner of the Project area in Tooele County and is approximately 10,480 acres in size. It is located approximately 3.1 miles from the centerline of the Proponent's Proposed Action, Alternative H.

3.4 Social and Economic Conditions

3.4.1 Affected Environment

This section provides a discussion of the socioeconomic characteristics of the study area, including the four counties that are potentially affected by the Project—Juab, Salt Lake, Tooele, and Utah.

3.4.1.1 Geographic Characteristics

The study area includes a wide spectrum of geographic characteristics, as summarized in Table 3-12. Juab and Tooele counties are the two largest counties in the Project area and are predominantly rural, resulting in a low number of persons per square mile. The exception is Tooele City, which is more suburban. Utah County is somewhat more densely populated and Salt Lake County is urbanized with a relatively high number of persons per square mile.

TABLE 3-12
GEOGRAPHIC CHARACTERISTICS OF STUDY AREA (2005)

Geographic Characteristics	Juab County	Salt Lake County	Tooele County	Utah County	Utah (Entire State)	Nation
Land area (millions of acres)	2.17	0.47	4.44	1.28	52.57	2,263.96
Land area (square miles)	3,391	737	6,930	1,998	82,143	3,537,438
Population (2000 census)	8,238	898,387	40,735	368,536	2,550,063	299,398,484
Persons per square mile (2000 census)	2.40	1,219	6.0	184	27	79

SOURCE: U.S. Census Bureau 2006

Land ownership patterns for each of the counties are summarized in Table 3-13. Both Juab and Tooele counties have a large percentage of federally owned lands within their boundaries. Conversely, Salt Lake and Utah counties, which are more densely populated, have a higher percentage of private/local government ownership and less land in federal ownership.

TABLE 3-13
LAND OWNERSHIP IN COUNTIES IN THE STUDY AREA (PERCENT)

Geographic Characteristics	Juab	Salt Lake	Tooele	Utah
Federal	73	21.4	81.3	46.7
Private/Local government	17	76.8	12.8	46.6
State	8.5	1.8	5.5	6.7
American Indian Reservation	2.1	NA	NA	NA

NOTE: NA = Not Applicable
SOURCE: Utah Governor's Office of Planning and Budget 2008

3.4.1.2 Population Centers

Table 3-14 identifies the largest population centers in the study area. Note that the largest community within Juab County is quite small compared to those in the other three counties. Most of these communities have experienced significant population growth over the last decade with some doubling or even tripling their populations between 2000 and 2005.

TABLE 3-14
POPULATION CENTERS

County	City	Census 1990	Census 2000	July 2005 Estimate	Percent Change July 2000 to July 2005
Juab	Eureka City	562	766	797	4
	Mona City	584	850	1,147	32
Salt Lake	Salt Lake City	159,936	181,743	182,046	0.2
	Herriman	NA	1,523	11,238	383
	Riverton	11,261	25,011	32,123	27
	South Jordan	12,220	29,437	40,209	35
	Taylorsville	52,351	57,439	58,072	-1
	West Jordan	42,892	68,336	91,543	15
	West Valley City	86,976	108,896	118,917	9
Tooele	Tooele City	13,887	22,502	29,062	29
	Grantsville	4,500	6,015	7,488	22
Tooele	Stockton	426	443	579[1]	31
Utah	Eagle Mountain	NA	2,157	11,234	298
	Cedar Fort	284	341	396[1]	16

NOTE: [1]Population estimates are for the year 2006.
SOURCE: U.S. Census Bureau, 1990, 2000, 2006

3.4.1.3 County Summaries

The information presented in this section is based on the "Written County Profiles" of the *Demographic and Economic Analysis* (Utah Governor's Office of Planning and Budget [GOPB] 2000*)*.

Juab County

Juab County was founded in 1852. Whereas the earliest economy of Juab County was agriculturally based, precious metals were discovered in 1869 and mining operations constituted a major component of its economy through the 1950s. Mining operations still continue, but on a much smaller scale. Currently construction, government services, farming, and manufacturing account for the bulk of Juab County's economy. The largest employer in the county is the Juab County School District, followed by the Central Valley Medical Center and Canyon Hills Health Care Center. The county seat is the city of Nephi, which does not fall within the Project area.

Salt Lake County

Salt Lake County was settled in 1847 by Mormon pioneers. Self-sufficiency was an important goal for these settlers and so they established a diverse economy early on with the goal of providing for all of the community's needs. Salt Lake County is now Utah's center of population and economic production. The

U.S. Census Bureau estimated that the population exceeded 1 million in 2007. Salt Lake City, the seat of the county, is also the state capital and the most populous city in the state, with an estimated population of 1,178,858 in 2007. Major employers are the state of Utah, the University of Utah, the Granite and Jordan School Districts, Delta Airlines, and various other private and government institutions.

Tooele County

Tooele County was one of the first counties in Utah to be established in the 1850s. Early inhabitants raised sheep, but mining and smelting soon came to dominate the economy from the 1860s to the 1940s. Currently, most of western Tooele County is reserved for military use. The county is renowned for its picturesque scenery and rich cultural history. The U.S. Census population estimate of Tooele County was 54,914 in 2007. The county seat and largest city is Tooele City, which had a population of 29,062 in 2006. The largest employers in the county are the DOD, Tooele County School District, EG&G Defense Materials, and several other industrial and commercial institutions.

Utah County

Utah County was settled by Mormon pioneers during the 1840s, with an economy based largely on fruit and vegetable farming. By 1873, it held the state's first large manufacturing plant, and by the 1940s it was a major center of steel production for the war effort. Brigham Young University, established in 1875, and Utah Valley University are major educational institutions located in this county. In 2007, the U.S. Census Bureau estimated the population of Utah County at 483,702. The county seat is Provo City, which had a population of 113,984 in 2006. The largest industries in the county are government services, trade, and manufacturing. Private education, agriculture, and tourism are also important employers.

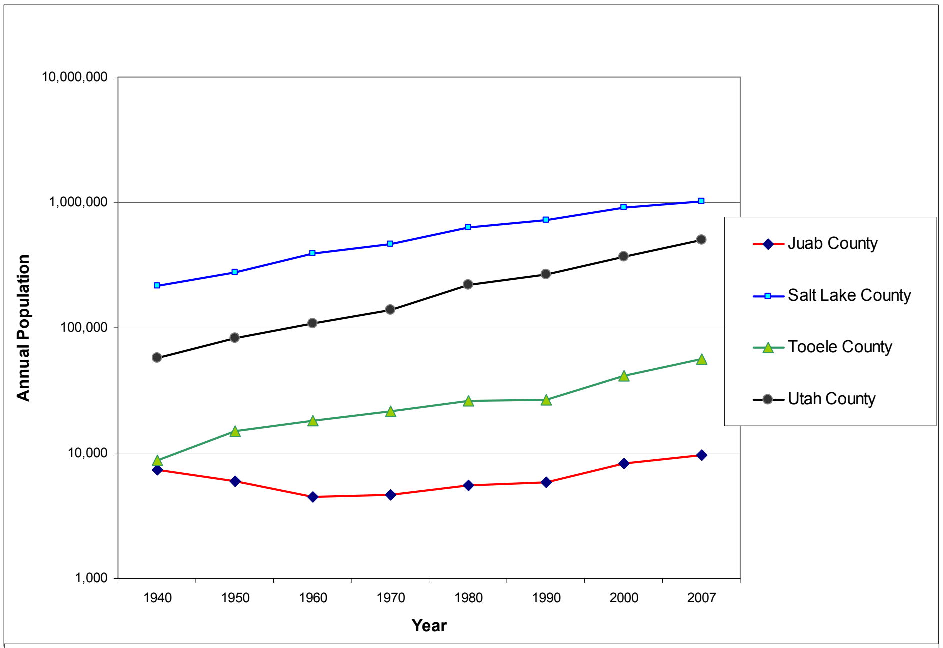
3.4.2 Demographics

3.4.2.1 Introduction

This section describes demographic characteristics for each of the counties within the study area. It includes population estimates and forecasts, age distribution of the population, race characteristics, and per capita income.

Population Trends

Population estimates for all of the study area counties were obtained from the Utah GOPB (2008), and are summarized in Figure 3-2 for years 1940 through 2007.



NOTE: [1] Population trends were plotted on a logarithmic scale.
SOURCE: Utah GOPB 2008

Figure 3-2. Historical Population Estimates for Juab, Salt Lake, Tooele, and Utah Counties, 1940-2007[1]

Salt Lake, Tooele, and Utah counties have all experienced significant growth for most of the last century, and this growth continues today. These three counties accounted for more than 60 percent of the population growth in the state between 1940 and 2007. During this period, population has increased by more than 800,000 in Salt Lake County and 440,000 in Utah County. Tooele County's population gain was most significant between 1990 and 2007 when the population more than doubled from 26,000 to 56,000.

Juab County was the only area that experienced a noticeable decline between 1940 and 2007. Between 1940 and 1970, population declined in the county due to a steady out migration. This trend reversed in the 1970s and the county has experienced steady growth into the early 2000s. Between 1970 and 2007, the county doubled its population and now exceeds 9,000 individuals, though the population remains quite small relative to the other counties in the study area.

The Utah GOPB also publishes population forecasts for counties and the state on their website. According to this analysis, all four counties in the study area are expected to realize population increases over the next several decades. The population of Juab County is expected to increase by over 100 percent between 2010 and 2040. This growth would result in an additional 12,000 individuals, which will more than double current population. The population of Salt Lake County is predicted to increase by 54 percent, adding nearly 600,000 additional residents. Population forecasts for Tooele County also show a continued steady increase in population from 63,000 in 2010 to 154,000 by 2040. For Utah County, the state of Utah's population forecasts predict that the population of that county will increase by 95 percent, adding 531,000 individuals between 2010 and 2040.

Age Distribution

Data were obtained from the U.S. Census Bureau 1990 and 2000 U.S Census regarding the age distribution of the population in all of the counties in the study area, the state of Utah, and in the United States. Juab County experienced the highest growth between 1990 to 2000 in the 18 to 39 age group (37 percent growth); this county also experienced a decline in the population of the 65+ age group (-1 percent). Salt Lake County's highest-growing age group was the 40-to-64 year old age group, which grew by 33 percent between 1990 and 2000. Tooele County's highest-growing age group was the 18- to 39-year-old age group, which grew by 42 percent between the two census surveys. In Utah County, the highest-growing age group was the 40- to 64-year-old age group, which grew by 37 percent.

There are several discrepancies between the growth of certain age groups in the four counties, the state of Utah and the United States**.** For instance, the United States has experienced a decline in the population of 18- to 39-year-old age group (-0.1 percent) from 1990-2000. In contrast, the population of this age group increased by more than 20 percent in each of the four counties in the study area. The changes in each age group for the four counties are, however, roughly commensurate to the changes experienced in the entire State of Utah, except for Juab County's 65+ age group, which decreased by 1 percent compared to the state's growth in this age group of 21 percent.

Race

Table 3-15 shows the race characteristics for the population within each of the four counties in the study area. The table shows that a great majority of the population is considered white, with each county reporting this group as over 90 percent of the population in 2006. This is very similar to the race characteristics in the state of Utah as a whole, which consistently reports very few minorities and the white population comprising more than 90 percent.

TABLE 3-15
RACE DISTRIBUTION FOR JUAB, SALT LAKE, TOOELE, AND UTAH COUNTIES (PERCENT)

Race	Juab County		Salt Lake County		Tooele County		Utah County	
	2000	2006	2000	2006	2000	2006	2000	2006
Total	**8,238**	**9,420**	**898,387**	**978,701**	**39,696**	**53,552**	**361,703**	**464,760**
White	96.56	97.50	86.34	91.60	91.52	94.20	94.11	95.50
Black	0.15	0.10	1.06	1.50	1.31	1.40	0.30	0.50
American Indian	1.02	1.20	0.88	1.00	1.75	1.60	0.61	0.60
Asian	0.34	0.40	2.56	3.00	0.61	0.90	1.08	1.40
Native Hawaiian or Pacific Islander	0.05	0.20	1.23	1.30	0.18	0.40	0.59	0.60
Hispanic or Latino	2.63	3.00	11.89	15.00	10.62	9.00	7.13	8.90
Some other race	0.86	0.00	5.36	N/A	4.62	N/A	3.31	N/A
Two or more races	1.02	0.60	2.57	1.60	2.62	1.50	1.89	1.40

NOTE: Percentages may not add up to 100 percent, as persons comprising the group "Hispanic or Latino" may fall into one or more racial categories. The U.S. Census Bureau's 2006 estimates did not include an estimate for the group "Some other race."
SOURCE: U.S. Census Bureau 2000, 2006

Personal Income

Per capita income for each of the counties in the study area, the state of Utah and the United States is summarized in Figure 3-3 for 2005 in inflation-adjusted dollars (2007). Juab, Tooele, and Utah counties all reported per capita income lower than either averages reported for Utah or the United States. In contrast, Salt Lake County reported a higher per capita income than any of the other counties in the study area and the state of Utah in 2005. However, in 2005 per capita income in the county was 7 percent lower than the average for the United States.

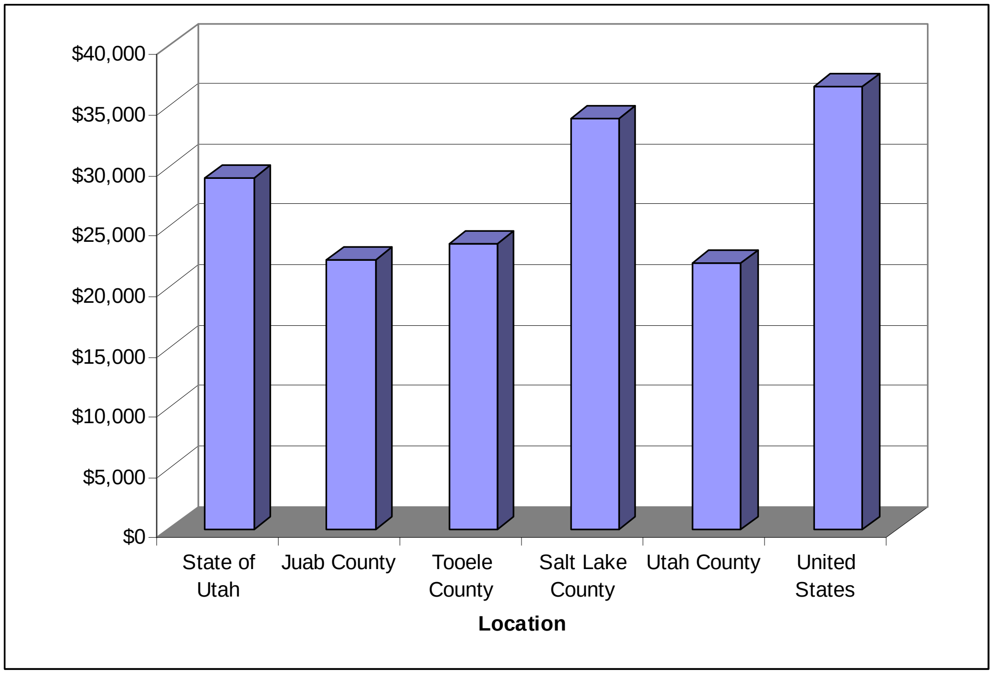


Figure 3-3. Per Capita Income for Study Area Counties, Utah, and the United States for 2005

3.4.2.2 Employment by Industry

Data were obtained from the Bureau of Economic Analysis (BEA) and the U.S. Census Bureau's County Business Patterns on total annual employment for each county within the study area, Utah, and the United States for 2001 to 2005, so that employment trends and 2005 snapshots by industry could be examined. BEA estimates annual employment for counties nationwide. However, the data can be incomplete in some counties (rural) due to disclosure problems associated in areas where few firms are operating. In these cases, data from the County Business Patterns were used to fill gaps in the data.

Total annual employment includes both part-time and full-time jobs. As such, individuals that have more than one job will be counted twice in the totals. The employment estimates include those individuals who are employed by businesses and public entities, as well as those who are self-employed. Since 2001, the BEA has employed the North American Industry Classification System (NAICS) to better capture new industries that did not exist under the old Standard Industrial Classification System.

Juab County

Annual employment for Juab County between 2001 and 2005 is summarized in Table 3-16. Total employment increased by 17 percent from 3,945 to 4,617 during this time. A significant proportion of the increase in employment occurred in the construction, manufacturing, and trade industries. Industries comprising the greatest percentage of jobs in Juab County during 2005 included construction, government services, farming, and manufacturing.

TABLE 3-16
ESTIMATED EMPLOYMENT BY INDUSTRY IN JUAB COUNTY
2001-2005

Industry	2001	2002	2003	2004	2005	Percent Change 2001 – 2005	Percent of Total Employment 2005
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total employment	3,945	4,045	4,057	4,291	4,617	17.03	
Farm	539	534	529	525	527	-2.23	11.41
Agriculture and forestry services	10	NA	NA	NA	0	-100.00	0.00
Mining	40	NA	NA	NA	10	-75.00	0.22
Utilities	1	NA	NA	NA	40	3900.00	0.87
Construction	324	452	405	587	671	107.10	14.53
Manufacturing	412	409	402	417	475	15.29	10.29
Wholesale trade	66	54	57	49	86	30.30	1.86
Retail trade	412	439	464	482	501	21.60	10.85
Transportation and warehousing	60	52	56	NA	40	-33.33	0.87
Information	10	NA	10	11	12	20.00	0.26
Finance and insurance	96	88	NA	NA	100	4.17	2.17
Real estate and rental and leasing	120	133	NA	NA	158	31.67	3.42
Professional and technical services	239	189	NA	NA	375	56.90	8.12
Management of companies and enterprises	37	NA	25	37	37	0.00	0.80
Administrative and waste services	60	NA	NA	NA	60	0.00	1.30
Educational services	16	15	20	21	10	-37.50	0.22
Health care and social assistance	289	435	483	NA	332	14.88	7.19
Arts, entertainment, and recreation	10	NA	NA	NA	10	0.00	0.22
Accommodation and food services	306	NA	NA	NA	246	-19.61	5.33
Other services, except public administration	191	225	215	194	194	1.57	4.20
Government and government enterprises	587	578	602	618	630	7.33	13.65

NOTE: NA = Data are not available
SOURCE: U.S. Department of Commerce 2008

Salt Lake County

Annual employment for Salt Lake County between 2001 and 2005 is summarized in Table 3-17. Total employment increased by over 30,000 jobs, or 4.6 percent, during this period. The four fastest growing industries in the county included health care, real estate, government services, and professional business services. Several industries showed a decline during this time period as well, including utilities, information, and mining. Industries with the greatest percentage of jobs in Salt Lake County during 2005 included government services, retail trade, and health care and social assistance.

TABLE 3-17
ESTIMATED EMPLOYMENT BY INDUSTRY IN SALT LAKE COUNTY
2001-2005

Industry	2001	2002	2003	2004	2005	Percent Change 2001 – 2005	Percent of Total Employment
Total employment	663,866	656,175	655,763	668,657	694,555	4.62	
Farm	1,394	1,374	1,370	1,355	1,360	-2.44	0.20
Agriculture and forestry services	322	387	359	408	376	16.77	0.05
Mining	2,779	2,372	2,317	2,190	2,543	-8.49	0.37
Utilities	1,965	1,735	1,604	1,601	1,613	-17.91	0.23
Construction	42,421	38,896	39,003	40,176	43,929	3.55	6.32
Manufacturing	55,575	52,124	51,283	52,533	53,623	-3.51	7.72
Wholesale trade	30,271	29,690	29,124	30,005	31,389	3.69	4.52
Retail trade	71,806	72,051	72,239	73,222	74,440	3.67	10.72
Transportation and warehousing	29,376	27,723	26,475	26,823	27,882	-5.09	4.01
Information	21,148	18,952	18,317	18,203	19,087	-9.75	2.75
Finance and insurance	49,726	50,187	50,320	50,098	51,692	3.95	7.44
Real estate and rental and leasing	24,880	25,489	27,182	27,973	30,259	21.62	4.36
Professional and technical services	43,987	42,964	43,996	45,122	48,377	9.98	6.97
Management of companies and enterprises	14,795	14,437	13,887	13,945	14,367	-2.89	2.07
Administrative and waste services	44,814	42,185	42,189	44,654	48,258	7.69	6.95
Educational services	10,681	11,232	11,558	12,402	13,075	22.41	1.88
Health care and social assistance	48,116	49,394	50,571	51,990	53,950	12.12	7.77
Arts, entertainment, and recreation	11,646	12,598	11,435	11,508	11,961	2.70	1.72
Accommodation and food services	39,167	40,547	39,957	40,247	40,698	3.91	5.86
Other services, except public administration	31,866	33,706	33,149	33,685	33,910	6.41	4.88
Government and government enterprises	87,754	88,757	90,038	91,125	92,376	5.27	13.30
SOURCE: U.S. Department of Commerce 2008							

Tooele County

Total employment by industry for Tooele County from 2001 to 2005 is summarized in Table 3-18. Employment grew by 19 percent during this period, increasing by over 3,000 jobs. Two-thirds of this increase came from growth in three industries, including transportation and warehousing, government services, and professional business services. Industries comprising the largest percentage of jobs include government, trade, and administrative and waste services.

TABLE 3-18
ESTIMATED EMPLOYMENT BY INDUSTRY FOR TOOELE COUNTY
2001-2005

Industry	2001	2002	2003	2004	2005	Percent Change 2001 – 2005	Percent of Total Employment
Total employment	16,171	16,542	17,155	17,539	19,300	19.35	
Farm	811	800	795	788	791	-2.47	4.10
Agriculture and forestry services	NA	NA	NA	NA	NA	NA	NA
Mining	73	73	62	57	57	-21.92	0.30
Utilities	60	NA	NA	NA	60	0.00	0.31
Construction	970	922	900	961	1,116	15.05	5.78
Manufacturing	1,538	1,486	1,455	1,469	1,585	3.06	8.21
Wholesale trade	30	NA	NA	NA	60	100.00	0.31
Retail trade	1,970	2,062	2,090	2,088	2,129	8.07	11.03
Transportation and warehousing	238	238	225	253	1,087	356.72	5.63
Information	225	239	226	244	268	19.11	1.39
Finance and insurance	456	591	580	566	565	23.90	2.93
Real estate and rental and leasing	539	537	588	619	676	25.42	3.50
Professional and technical services	400	NA	NA	866	917	129.25	4.75
Management of companies and enterprises	10	NA	NA	37	37	270.00	0.19
Administrative and waste services	1,654	1,635	1,789	1,858	1,977	19.53	10.24
Educational services	60	NA	NA	90	10	-83.33	0.05
Health care and social assistance	881	NA	NA	1,193	1,064	20.77	5.51
Arts, entertainment, and recreation	149	NA	161	175	213	42.95	1.10
Accommodation and food services	1,022	NA	1,212	1,122	1,210	18.40	6.27
Other services, except public administration	1,001	1,079	1,101	1,132	1,155	15.38	5.98
Government and government enterprises	3,671	3,742	4,048	4,183	4,296	17.03	22.26

NOTE: NA= Data are not available
SOURCE: U.S. Department of Commerce 2008

Utah County

Total employment by industry for Utah County is summarized in Table 3-19. Total employment increased by 11 percent during this period, adding more than 23,000 jobs. Industries showing the greatest increase in employment include real estate, administrative and waste services, and heath care. Industries with the greatest percentages of employment include government services, trade, and health care.

TABLE 3-19
TOTAL EMPLOYMENT BY INDUSTRY FOR UTAH COUNTY
2001-2005

Industry	2001	2002	2003	2004	2005	Percent Change 2001 – 2005	Percent of Total Employment
Total employment	202,957	203,507	206,245	215,820	226,209	11.46	
Farm	4,562	4,455	4,491	4,423	4,446	-2.54	1.97
Agriculture and forestry services	629	591	568	591	588	-6.52	0.26
Mining	211	192	226	200	246	16.59	0.11
Utilities	256	262	253	268	284	10.94	0.13
Construction	15,145	14,874	14,906	16,148	18,109	19.57	8.01
Manufacturing	20,748	18,273	17,645	18,348	18,779	-9.49	8.30
Wholesale trade	4,917	4,580	4,522	4,985	5,366	9.13	2.37
Retail trade	24,334	24,872	25,016	25,551	26,588	9.26	11.75
Transportation and warehousing	2,357	2,456	2,424	2,482	2,490	5.64	1.10
Information	8,268	7,475	8,104	8,657	9,748	17.90	4.31
Finance and insurance	8,529	9,172	9,413	9,768	9,631	12.92	4.26
Real estate and rental and leasing	7,478	7,473	8,132	8,470	9,356	25.11	4.14
Professional and technical services	14,406	14,428	15,032	15,782	16,728	16.12	7.39
Management of companies and enterprises	1,710	1,793	1,572	1,802	1,856	8.54	0.82
Administrative and waste services	10,595	10,574	10,633	12,060	12,842	21.21	5.68
Educational services	16,061	16,979	16,498	16,830	17,626	9.74	7.79
Health care and social assistance	15,663	16,314	17,064	17,924	18,704	19.42	8.27
Arts, entertainment, and recreation	4,319	3,811	3,959	4,175	4,291	-0.65	1.90
Accommodation and food services	10,431	10,952	11,051	11,425	11,871	13.81	5.25
Other services, except public administration	10,700	11,512	11,778	12,112	12,118	13.25	5.36
Government and government enterprises	23,554	24,391	24,836	25,689	26,422	12.18	11.68
SOURCE: U.S. Department of Commerce 2008							

3.4.2.3 Average Earnings Per Job

Data were obtained from the Utah Department of Workforce Services (2006) on the average monthly non-agricultural payroll wages for the state of Utah and for each of the counties in the study area. The data is summarized in Table 3-20.

TABLE 3-20
AVERAGE MONTHLY NON-AGRICULTURAL PAYROLL WAGES FOR THE STATE OF UTAH AND COUNTIES WITHIN THE STUDY AREA 2006 ($)

Industry	State of Utah	Juab County	Salt Lake County	Tooele County	Utah County
Total	2,883	2,530	3,212	2,998	2,572
Mining	5,240	3,034	6,342	3,360	2,796
Construction	2,959	3,695	3,303	2,515	2,673
Manufacturing	3,470	2,982	3,685	3,394	3,194
Trade, transportation, and utilities	2,739	2,056	3,118	2,351	2,288
Information	3,658	1,260	3,580	3,452	4,579
Financial activities	3,729	1,864	4,147	2,391	3,089
Professional business services	3,312	4,025	3,614	4,432	3,031
Education and health services	2,670	1,676	3,015	2,285	2,372
Leisure and hospitality	1,194	815	1,367	979	971
Other services	2,130	2,057	2,259	1,867	1,824
Government	2,962	2,222	3,210	3,550	2,454
SOURCE: Utah Department of Workforce Services 2006					

In 2006, average payroll wages in Juab and Utah counties were approximately 18 and 11 percent lower, respectively, than the state average. The highest-paying jobs in Juab County included professional business services, construction, and mining, while the highest paying jobs in Utah County included information, manufacturing, and financial activities. This varied from the industries reporting the highest paying wages in the state, which included mining, financial activities, and information industries.

During this same year, average payroll wages in Salt Lake and Tooele counties were approximately 11 and 4 percent higher than the state average respectively. The highest-paying jobs in Salt Lake County included mining, financial services, and professional business services. This varied just slightly from the industries reporting the highest paying wages in the state. The highest-paying jobs in Tooele County included professional business services, government services, and information.

3.4.2.4 Unemployment

Annual estimated unemployment rates for each of the four counties and the state of Utah are shown in Figure 3-4.

The average annual unemployment rate for Juab County between 1998 and 2007 ranged from 3.6 percent in 2006 to 7.4 percent in 2002. For most of this period, unemployment rates in the county were higher than those reported for the State of Utah.

Examination of unemployment rates for Salt Lake and Utah counties shows a strong correlation between unemployment rates in these counties with those reported in the state of Utah. This is a reasonable conclusion, given that these two counties include a large proportion of the state's population and economic activity. Another interesting observation is that for the late 1990s and early 2000s, Salt Lake and Utah counties had an unemployment rate lower than the rest of the state. This trend switched in 2002, with both counties consistently reporting higher unemployment rates than the state of Utah.

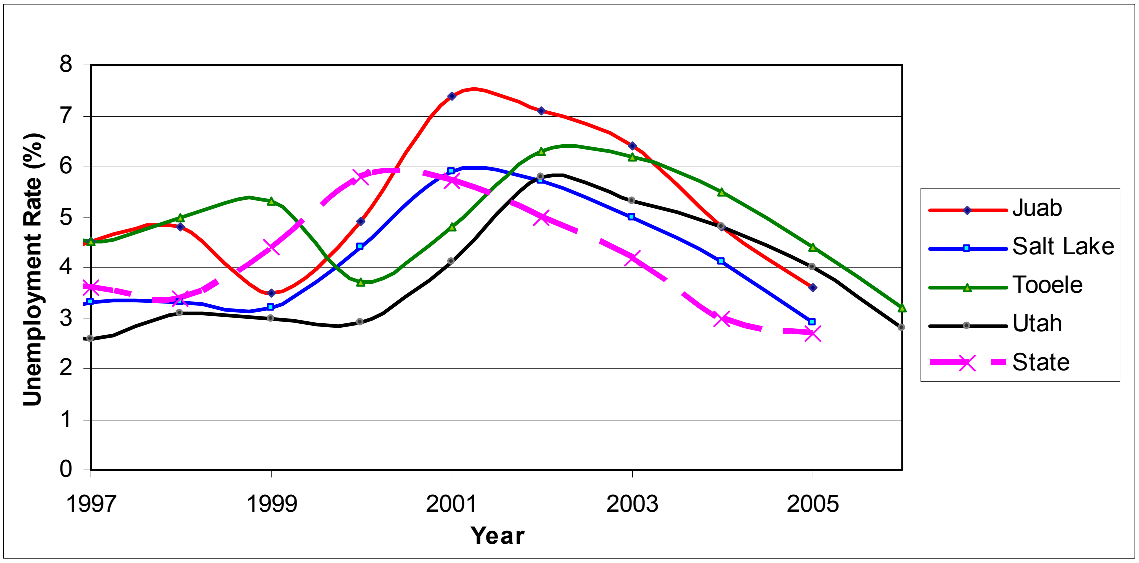


Figure 3-4. Unemployment in Juab, Salt Lake, Tooele, and Utah Counties, and in the State of Utah

For Tooele County, during the late 1990s, unemployment showed an opposite trend to the one reported by the state of Utah, with unemployment increasing and higher in the county than in other parts of the state. This trend changed in the early twenty-first century, where unemployment rates were made comparable with those reported in the state, only slightly lower. Towards the later part of this period, unemployment continued to follow trends throughout the state, but at a higher rate.

3.4.2.5 Economic Base Analysis

An area's economic base is comprised of industries that are primarily responsible for bringing outside income into the local economy. These industries typically export their goods and services outside the region and, in turn, support ancillary industries such as retail trade, housing construction, and personal services. The location of important industries in certain areas has traditionally been tied to such factors as natural resource base, cost factors (transportation and labor), and existing transportation infrastructure. However, technology has affected these location factors.

To assess the importance of major industries as a basic industry, location quotients were calculated on 20 industries as listed in Table 3-21. The location quotients were calculated for employment and compare each industry's share of total local employment to the industry's state or regional share. This quotient yields a value generally between 0 and 2.0, where 1.0 indicates an equal share percentage between the local and state or regional economies. Location quotients greater than 2.0 indicate a strong industry concentration, while those less than 0.50 indicate a weak concentration.

TABLE 3-21
LOCATION QUOTIENTS OF INDUSTRY CONCENTRATION

Industry	Juab County		Salt Lake County		Tooele County		Utah County	
	State of Utah	Rocky Mountain Region	State of Utah	Rocky Mountain Region	State of Utah	Rocky Mountain Region	State of Utah	Rocky Mountain Region
Farming	4.90	2.89	0.08	0.05	1.76	1.04	0.84	0.50
Forestry, fishing, and other related activities	0.00	0.00	0.26	0.08	NA	NA	1.24	0.40
Mining	0.33	0.19	0.55	0.32	0.44	0.26	0.16	0.09
Utilities	3.02	2.66	0.81	0.71	1.08	0.95	0.44	0.38
Construction	2.01	1.89	0.88	0.82	0.80	0.75	1.11	1.04
Manufacturing	1.23	1.69	0.92	1.27	0.98	1.35	0.99	1.36
Wholesale trade	0.57	0.56	1.38	1.37	0.09	0.09	0.72	0.72
Retail trade	0.96	0.99	0.95	0.98	0.97	1.01	1.04	1.07
Transportation and warehousing	0.26	0.30	1.23	1.39	1.72	1.95	0.34	0.38
Information	0.11	0.11	1.14	1.14	0.57	0.58	1.78	1.79
Finance and insurance	0.39	0.44	1.33	1.53	0.52	0.60	0.76	0.87
Real estate and rental and leasing	0.80	0.72	1.02	0.92	0.82	0.74	0.96	0.87
Professional and technical services	1.32	1.15	1.13	0.99	0.77	0.68	1.20	1.05
Management of companies and enterprises	0.61	0.90	1.58	2.32	0.15	0.21	0.63	0.92
Administrative and waste services	0.22	0.23	1.18	1.24	1.74	1.83	0.96	1.01
Educational services	0.09	0.13	0.76	1.12	0.02	0.03	3.16	4.65
Health care and social assistance	0.92	0.86	0.99	0.93	0.70	0.66	1.05	0.99
Arts, entertainment, and recreation	0.11	0.09	0.86	0.74	0.55	0.47	0.95	0.81
Accommodation and food services	0.86	0.74	0.94	0.82	1.01	0.88	0.84	0.73
Other services, except public administration	0.80	0.80	0.93	0.93	1.14	1.13	1.02	1.02
Government and government enterprises	0.93	0.95	0.91	0.93	1.52	1.56	0.80	0.82

The analysis shows that the economy of Salt Lake County is very similar to the economy of the State of Utah. This is a logical conclusion given the large percentage of economic activity for the state exists in the county. From a regional standpoint, one industry, management of companies and enterprises, stands out as an area of specialization for the county.

In the same way, Tooele County's economy is very similar to that of the state of Utah. Farming, administrative and waste services, and transportation and warehousing show higher measures of concentration, though none of these industries have a quotient greater than two. No industries measured as concentrated relative to regional industry measures.

Utah County's economy is also very similar to that of the state of Utah and also to the economy of the Rocky Mountain Region; the exception being educational service, which shows a high location quotient for both areas. In Juab County, farming, utilities, and construction show themselves to be important basic industries relative to the state of Utah and to the Rocky Mountain Region.

3.4.3 Local Resources

This section provides a discussion of the local resources of the study area, including information on housing, schools, emergency services, and transportation.

3.4.3.1 Property Valuation and Taxation

Local and state government entities generate a portion of their tax revenues by assessing and taxing certain categories of property. Property classified as real property includes land and buildings, while personal property refers to property that can be geographically moved (Utah State Tax Commission 2007). Local counties in Utah have the authority to assess and tax real and personal property located within the county boundaries. The state of Utah can assess and tax utilities and natural resources located anywhere within the state's boundary. The amount of taxes owed to either the county or the state is determined by applying an appropriate tax rate to the taxable value of a category of property. Taxable value is equal to the fair market value of the property, minus any tax exemptions.

Table 3-22 shows total taxable value of properties within each county and the state of Utah, and the tax revenue generated from this property for fiscal year 2006. Utah's total property tax revenue was $1.8 billion generated from a statewide tax base of $154 billion. Table 3-23 summarizes property tax revenues generated from each category of property for each of the counties within the study area. During 2006, Salt Lake County generated more tax revenue than any other county in the state ($834.04 million), while Utah County generated the second-highest tax revenues ($218.8 million). Tooele County was ranked ninth in tax revenues ($27.05 million) and Juab County was ranked twentieth ($7.88 million).

TABLE 3-22
TOTAL TAXABLE VALUE AND TOTAL TAX REVENUE
FOR JUAB, SALT LAKE, TOOELE, AND UTAH COUNTIES

County	Total Taxable Value ($)	Total Tax Revenue ($)
Juab	632,041,801	7,882,644
Salt Lake	62,686,175,028	834,038,869
Tooele	2,203,753,880	27,047,407
Utah	20,016,861,421	218,933,977
Statewide	154,663,248,988	1,846,094,793

SOURCE: Utah State Tax Commission 2007

TABLE 3-23 PROPERTY TAX DETAILS FOR JUAB, SALT LAKE, TOOELE, AND UTAH COUNTIES ($)				
Property Tax	**Juab**	**Salt Lake**	**Tooele**	**Utah**
Real	3,926,834	716,853,333	21,841,708	197,716,581
Personal	289,965	54,241,538	2,505,335	13,277,429
Total Locally Assessed	4,216,799	771,094,871	24,347,043	210,994,010
Utilities	3,423,551	42,018,559	1,833,380	7,560,619
Natural Resources	242,294	20,925,439	866,984	379,348
Total Taxed	7,882,644	834,038,869	27,047,407	218,933,977
SOURCE: Utah State Tax Commission 2007				

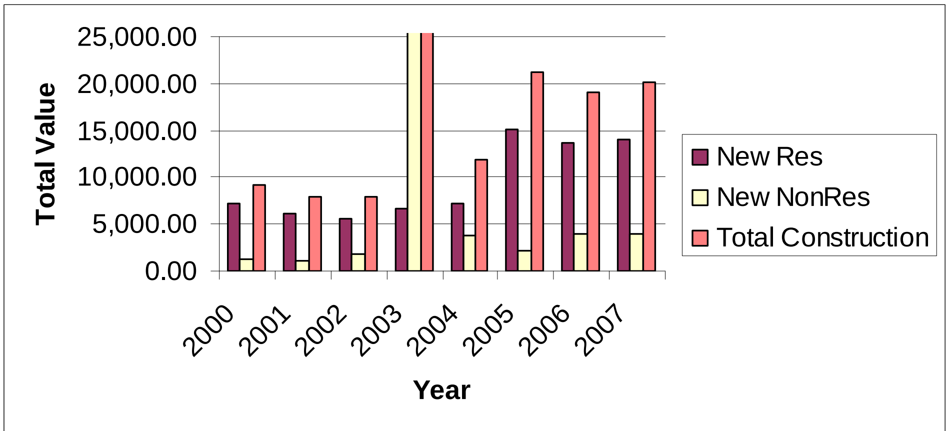
Juab County

<u>Housing and New Construction</u>

Information on housing in each of the counties was obtained from the U.S. Census Bureau and the Utah Construction Information Database of the University of Utah's Bureau of Economic and Business Research (2008). Table 3-24 summarizes the housing stock for Juab County, as reported by the 2000 Census. During 1999, the county reported less than 3,000 housing units, with approximately 13 percent reported as vacant. Property values, mortgages, and rental costs were an estimated 20 percent lower than averages reported for the state of Utah during the same time period. Total vacancy rates were higher for Juab County (13 percent) than throughout the state, which was reported at 10 percent.

Trends in new construction values in Juab County are summarized in Figure 3-5. Between 2000 and 2003, the value of new construction was fairly stable. However, in 2003 a spike in the value of new non-residential construction occurred. This new non-residential construction had a value of $217,000. In following years, the value of new construction in Juab County began to rise in 2004 and 2005, and then declined slightly, finally stabilizing in 2006 and 2007. In all years, except 2003, the value of residential construction in Juab County out-paced non-residential construction.

TABLE 3-24 HOUSING IN JUAB COUNTY	
Juab County	**1999**
Total housing units	2,810
Occupied housing units	2,456
Vacant housing units	354
Owner – occupied housing units	1,630
Median value – owner-occupied (2007–$)	$138,500
Median mortgage (2007–$)	$1,053
Renter – occupied housing units	486
Median rent (2007–$)	$598
SOURCE: U.S. Census Bureau 2000	



SOURCE: University of Utah, Bureau of Economic and Business Research 2008

Figure 3-5. Value of Construction in Juab County

Schools

There are two school districts within Juab County that are partially in the study area: Juab School District and Tintic School District. The Juab School District is located in the study area's southeast corner. The Tintic School District is located in the southwest corner of the study area.

The Juab School District serves approximately 2,000 students across its jurisdiction. Total enrollment has oscillated between 1,900 and 2,000 students for the past 5 years. The district contains 1 high school, 1 junior high school, and 3 elementary schools (Juab School District Office 2008).

The 2008 Economic Report to the Governor stated that the Tintic School District's 2007 enrollment for the entire district was 238 students. This includes three elementary schools and two high schools (junior high school classes are taught within those schools). Enrollment has declined since 2005, at which time there were 274 students enrolled.

Emergency Services

Juab County has several facilities for health and emergency medical care. Emergency services are provided on an independent, public, and volunteer basis. The county itself operates two emergency vehicles.

Residents of Mona must travel to Nephi in order to receive medical care. In Nephi, there is the Central Valley Medical Center and Nephi Medical Clinic, which is a public, extended-care facility with 31 beds and emergency room capabilities. Residents of Eureka are served by the Eureka Medical Clinic and the Juab County West Ambulance. Medical facilities in Eureka are currently adequate for the area's needs.

All of Juab County's fire-fighting services are volunteer-run. Nephi, Mona, Levan, and Eureka have their own volunteer Fire Departments. Mona is served not only by its own Fire Department, but by Nephi's Fire Department as well. Mona's fire-fighting services are currently adequate and are expected to continue to be adequate until its population exceeds 1,000. Eureka has a large volunteer fire department that includes one paid fire chief. Its fire services are more than adequate for its needs.

Note that the Juab County General Plan of 1996 stated that development north of the I-15 interchange, or east of I-15 on the bench areas, might interfere with fire response time. The proposed 345kV transmission lines would occur north of the I-15 interchange.

Eureka and Mona have their own sheriff's departments, which are expected to be adequate until their populations exceed 1,000. Juab County Sheriff's Office, located in Nephi, serves these areas as well.

Transportation

I-15 crosses through Juab County from the north and south, for approximately 50 miles. Both U.S6 and SR 132 enter Juab County from the east. Additionally, six other state routes run through Juab County. There are also approximately 1,600 miles of secondary roads, some of which are paved and improved, some of which are gravel or unimproved (Juab County 1996).

Salt Lake County

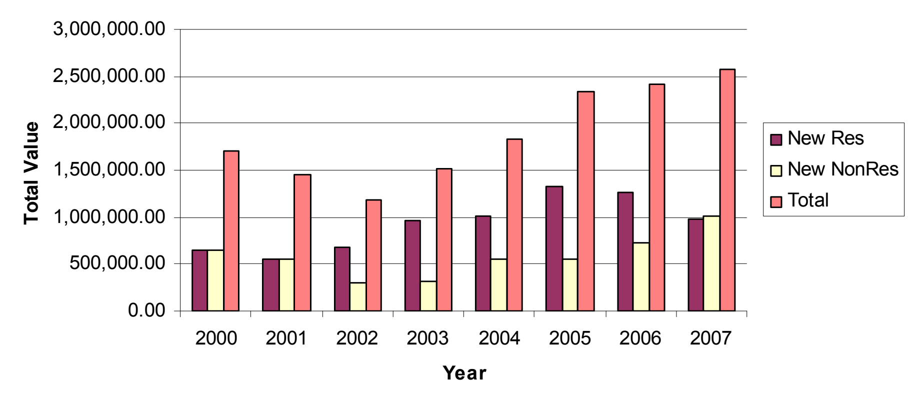
Housing

The total number of housing units in Salt Lake County was higher than in any of the other counties in the study area (Table 3-25). The number of units available increased by an additional 34,400 units between 2000 and 2006. Median home values increased by more than 50 percent during this time. Mortgage and rental costs also increased between 2000 and 2006, by at least 30 percent.

TABLE 3-25
HOUSING IN SALT LAKE COUNTY

Salt Lake County	2000	2006
Total housing units	310,988	345,484
Occupied housing units	295,141	323,827
Vacant housing units	15,847	21,657
Owner – occupied housing units	178,320	227,889
Median value – owner-occupied (2007–$)	$131,325	$199,264
Median mortgage (2007–$)	$971	$1,347
Renter – occupied housing units	91,389	95,938
Median rent (2007–$)	$534	$719
SOURCE: U.S. Census Bureau 2000, 2006		

As shown in Figure 3-6, the majority of the value of Salt Lake County's new construction came from residential structures, except in 2007 when the value of non-residential construction was slightly higher than that of residential construction.



SOURCE: University of Utah, Bureau of Economic and Business Research 2008

Figure 3-6. Value of Construction in Salt Lake County

Schools

Two school districts in Salt Lake County lie partially within the Project Study area, including the Granite School District and Jordan School District. The Granite School District of Salt Lake County has a total of 88 schools, including 60 elementary, 16 junior high, 9 high schools, and 3 special schools. Total enrollment for the 2007-08 school year was 68,075 students, counted on October 1, 2007. Over the past 10 years, enrollment in Granite School District schools has declined by 9.3 percent (Granite School District 2008).

The Jordan School District is partially located in the northeast portion of the study area and is the largest school district in the state. Currently, enrollment is 79,449, an increase from last year when enrollment was 77,230. This district has a total of 92 schools, including 10 high schools and several specialized schools. In the areas within this district that are east of the Jordan River, enrollment is declining. In communities west of the Jordan River, such as West Jordan, South Jordan, Bluffdale, Herriman, and Riverton, student enrollment is increasing (Jordan School District 2008).

Emergency Services

There are nine fire departments in Salt Lake County that provide both emergency medical and fire protection services. All of these fire departments are currently meeting their needs and are providing adequate emergency services. They are all career fire departments and there are no volunteer fire departments in this county.

Ambulance services are currently provided not only by the individual fire departments, but by a contractor, Gold Cross Ambulance. Some of the fire departments are considering, or are in the process of, purchasing their own ambulances and ceasing to use the services of this contractor.

There is also a Unified Fire Department that serves portions of the unincorporated county as well as several cities within Salt Lake County. The Unified Fire Department has 19 fire stations, 5 of which have ambulances.

Transportation

Salt Lake County contains three interstate highways (I-80, I-15, and I-215). I-80 runs along the Great Salt Lake, connecting with I-15 and I-215 in the center of the county.

Tooele County

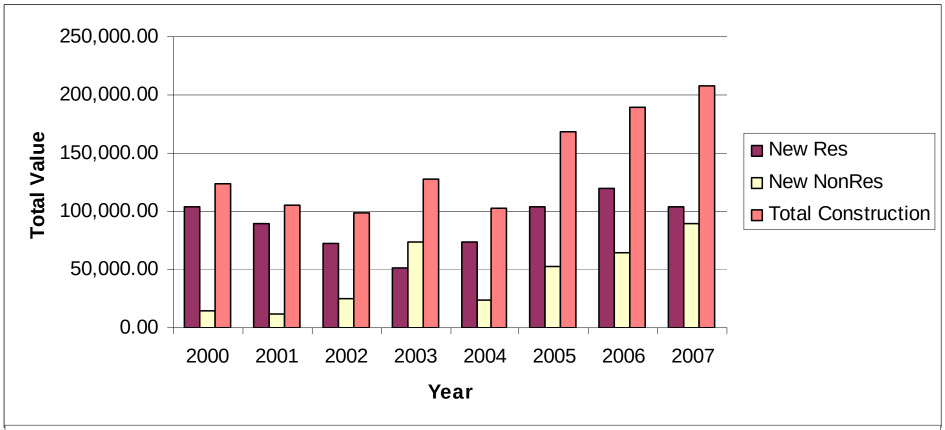
Housing

Information on housing stocks for Tooele County was taken from the 2000 U.S. Census, as summarized in Table 3-26. During 1999, Tooele County had more than 13,000 housing units, of which 8 percent were reported vacant. The vacancy rate was lower than the rate reported for the state (10 percent) during that year. Median value of owner-occupied homes was about 11 percent lower than averages reported for Utah. Mortgage and rental costs were 6 to 11 percent lower than rates for the state during the same year.

TABLE 3-26
HOUSING IN TOOELE COUNTY

Tooele County	2000
Total housing units	13,812
Occupied housing units	12,677
Vacant housing units	1,135
Owner-occupied housing units	8,374
Median value – owner-occupied (2007–$)	$152,784
Median mortgage (2007–$)	$1,228
Renter-occupied housing units	2,722
Median rent (2007–$)	$636
SOURCE: U.S. Census 2000	

The value of new construction in Tooele County (Figure 3-7) remained fairly steady until 2004, when it dropped; afterward, it rose by approximately $20,000 per year through 2007.



SOURCE: University of Utah, Bureau of Economic and Business Research 2008

Figure 3-7. Value of Construction in Tooele County

Schools

The Tooele School District falls within the western portion of the study area. During the 2007-08 school year, total enrollment reached 12,988 students. This is an increase from previous years when enrollment was 12,507 in 2006-07 and 11,793 in 2005-06 (Tooele School District 2008).

Emergency Services

The North Tooele County Fire District is a completely volunteer-run fire department responding to fire and other emergencies throughout Tooele County. Population growth is expected to make additional emergency service expenditures necessary.

The Tooele Valley Health Care System provides health care and emergency services not only to its immediate area, but to residents from elsewhere in the county, as there are few health or emergency services available in most of the county.

Law enforcement in Tooele County is currently overseen by the Tooele County Sheriff's Department. The personnel and facilities are stretched to their capacity and their numbers are not adequate to meet the area's needs. The jail is full and patrol officers are unable to cover a single complete 24-hour patrol shift. There are also City Police Departments in Tooele, Grantsville, Stockton, and Wendover.

Transportation

The most heavily used road in Tooele County is I-80, which runs east to west across the county. I-80 sees heavy truck traffic, as it is a major route between the Midwest and the West Coast. Additionally, it is Tooele County's link to the Salt Lake City metropolitan area, and so local usage of the road is also heavy. The eastern section of I-80, from the junction with SR 201 to the Salt Lake County line, often sees more than 22,000 trips per day.

There are two other roads within Tooele County that provide direct access for statewide travel, including SR 36 and SR 73. Other important roads in Tooele County include SR 112, SR 138, and SR 199. Areas not directly served by these roads are linked to them via approximately 200 miles of minor roads within the county.

There are also several important railroads within Tooele County. The Western Pacific Railroad runs the full east-west length of the county and serves interstate transportation needs. Another rail line runs from Lake Point to the Juab County line, continuing on to Los Angeles. There are also a number of smaller railroads that link various industries within the county to other parts of the state and of the nation.

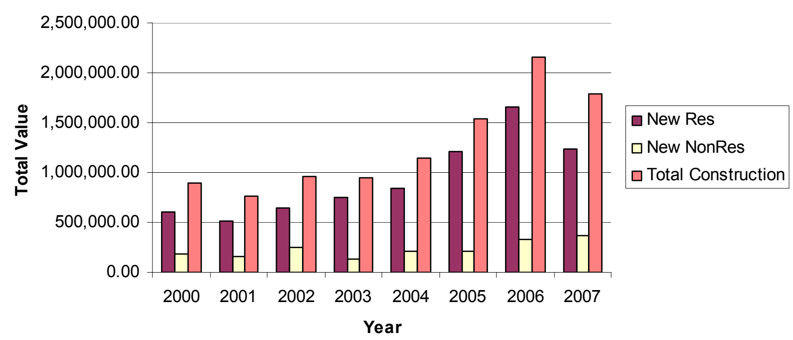
Utah County

Housing

Housing stocks have continued to increase between 2000 and 2006 for Utah County, adding nearly 30,000 additional units (Table 3-27). The value of owner occupied units has appreciated by 14 percent during this time, as measured by median values in inflation-adjusted dollars. While housing values have increased during this time, mortgage and rental costs have not increased at the same rate in real terms.

TABLE 3-27 HOUSING IN UTAH COUNTY		
Salt Lake County	**2000**	**2006**
Total housing units	104,315	133,227
Occupied housing units	99,937	127,547
Vacant housing units	4,378	5,680
Owner-occupied housing units	56,995	86,784
Median value – owner-occupied (2007–$)	$186,976	$213,265
Median mortgage (2007–$)	$1,372	$1,371
Renter-occupied housing units	32,976	40,763
Median rent (2007–$)	$693	$691
SOURCE: U.S. Census Bureau 2000, 2006		

Figure 3-8 shows that the majority of the value of new construction in Utah County comes from residential structures, for each year from 2000-2007.



SOURCE: University of Utah, Bureau of Economic and Business Research 2008

Figure 3-8. Value of Construction in Utah County

Schools

There are two school districts in Utah County that fall partially within the study area. These include the Alpine School District located on the eastern portion of the study area and the Nebo School District located on the southeastern side of the study area.

The Alpine School District has a total enrollment of approximately 60,000 students. Enrollment has been increasing for several years in a row. The growth in enrollment is highest in the northern part of the district, where there is a large amount of development and new construction. Currently, the Alpine School District is building a new high school that will serve approximately 1,500 new students (Alpine School District 2008).

The Nebo School District serves approximately 26,000 students. The district has also been experiencing an increase in enrollment for several years and is expecting this trend to continue for some time into the future (Nebo School District Office 2008).

Emergency Services

Utah County has a total of 19 fire departments. Of these, Orem and Provo are the largest. Ten of these fire departments are full-time, while nine are volunteer. Five of the full-time departments have one paid full-time fire chief, and are otherwise staffed entirely by volunteers. Thirteen of the fire departments provide medical services as well as fire services, all of which have their own ambulances (Utah County 2008). According to the Utah County Fire Marshall, none of these fire departments are having problems providing adequate services and meeting their needs.

Transportation

In Utah County, I-15 runs north and south on the east side of Utah Lake, running into Juab County in the south and Salt Lake County in the north; it is Utah County's link to the metropolitan area of Salt Lake City. Utah County's other link to Salt Lake County and to the Salt Lake City metropolitan area is SR 68, which runs north and south on the west side of Utah Lake. SR 68 terminates at U.S. 6 in the southwest portion of Utah County.

Note that there are few arterial roads in the western portion of Utah County. The eastern side of the county, east of Utah Lake, contains several arterial roads. U.S. 89 connects the southeast with the cities of Provo and Orem, while U.S. 189 leads into those areas from the northeast. The southern portion of Utah County, east of Utah Lake, is connected by SR 51, SR 115, SR 141, SR 147, SR 156, SR 164, SR 178, and SR 198. The northern portion of Utah County, east of Lake Utah, is served by SR 68, SR 73, SR 74, SR 92, SR 146, and SR 197.

3.4.4 Environmental Justice

Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*, was published in February 1994 and requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

In their guidance document, the EPA defines a community with potential environmental justice indicators as one that has a significantly greater percentage of minority or low-income populations than an identified reference community (state or county). For this analysis, if the differences in percentages are greater than 20 percent, the difference is considered significant. In addition, if either minority or low income populations exceed 50 percent of the entire population, environmental justice issues must be considered in more detail.

EPA guidance states that minority status is defined as those individuals who are members of the following population groups: American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, African American (not of Hispanic or Latino origin), some other race, and Hispanic or Latino (of any race) (EPA 2004). In addition, individuals that identify themselves as white and any other race in the 2000 Census are to be considered minority. Race data were obtained from the U.S. Census American Fact Finder Website (2008*)* for census block groups located within the proposed study area. In addition, poverty threshold levels determined by the U.S. Census were used as a measure for low-income populations in the study area and in the reference communities. All data reflect minority populations and poverty levels as reported in the 2000 U.S. Census.

The study area identified for the environmental justice analysis includes the population of residents, as identified in the census block groups, within the study area. Relevant census data on the census block groups were used to determine whether populations residing within the study area constitute a potential "environmental justice population." This was done by comparing race and poverty statistics for the study area with those reported for the reference communities. These reference communities are identified as the counties where these census block groups are located, and the State of Utah as a whole.

Table 3-28 shows race and poverty statistics for the state of Utah while Table 3-29 shows race and poverty for the counties located within the study area. All data were obtained from the 2000 U.S. Census. Data on race and poverty statistics for each of the census blocks can be obtained upon request from the BLM.

TABLE 3-28
RACE AND POVERTY STATISTICS FOR UTAH

Race and Poverty	Utah	
	Population	**Percent of Population**
Total	2,233,169	100.00
White	1,992,975	89.20
Black or African American	17,657	0.80
American Indian and Alaska Native	29,684	1.30
Asian	37,108	1.70
Native Hawaiian and Other Pacific Islander	15,145	1.00
Some other race	93,405	4.20
Two or more races	47,195	2.10
Hispanic or Latino (of any race)	201,559	9.00
Poverty levels	206,328	9.40
SOURCE: U.S. Census Bureau 2000		

When comparing race and poverty statistics for each of the census block groups in the study area and the reference communities, it was found that none of census block groups in Juab or Utah counties showed signs of potential environmental justice populations. Salt Lake and Tooele counties did show the presence of potential environmental justice populations, as discussed below.

An evaluation of race data indicated that census tracts 100306 in Salt Lake County and 130600 in Tooele County have a significantly higher percentage of Hispanic or Latino populations of any race, compared to county and state averages. This includes the census block groups 2, 4, and 5 in census tract 100306, where 73, 57, and 33 percent of the population is Hispanic or Latino, respectively. Therefore, it was concluded that these three census block groups have characteristics of potential environmental justice populations. Census tract 130600 overlaps the study area's west edge, and census tract 1030600 overlaps its northeast edge.

Two census block groups, one in census tract 113305 and one in census tract 100306, were found to have a greater proportion of the population living below poverty levels than is normal for the state or for their respective counties. In census block group 3 of census tract 113305, 52 percent of the population was found to be living below the poverty level. In census block group 4 of census tract 100306, 32 percent of the population was found to be living below the poverty level. Both tracts are located on the northeast edge of the study area. Census tract 100306 also revealed the presence of potential environmental justice populations based on race.

TABLE 3-29
RACE AND POVERTY STATISTICS FOR UTAH COUNTIES WITHIN THE STUDY AREA

	Utah Counties Within the Study Area							
	Juab		Salt Lake		Tooele		Utah	
	Population	Percent of Population	Population	Percent of Population	Population	Percent of Population	Population	Percent of Population
Total	8,238	100.00	898,387	100.0	40,735	100.00	368,536	100.00
White	7,955	96.56	775,666	86.34	36,330	89.19	340,388	92.36
Black or African American	12	0.15	9,495	1.06	521	1.28	1,096	0.30
American Indian and Alaska Native	84	1.02	7,892	0.88	694	1.70	2,206	0.60
Asian	28	0.34	22,991	2.56	244	0.60	3,917	1.06
Native Hawaiian and Other Pacific Islander	4	0.05	11,075	1.23	72	0.18	2,122	0.58
Some other race	71	0.86	48,166	5.36	1,835	4.50	11,974	3.25
Two or more races	84	1.02	23,102	2.57	1,039	2.55	6,833	1.85
Hispanic or Latino (of any race)	221	2.68	106,240	11.83	4,205	10.32	25,134	6.82
Poverty levels	847	10.28	70,714	7.87	2,615	6.42	43,270	11.74
SOURCE: U.S. Census Bureau 2000								

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Chapter 4 – Environmental Consequences

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CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter describes the potential consequences, or impacts, on the environment that could result from the construction, operation, maintenance, and decommissioning of the proposed 500kV and 345kV transmission lines, substations, and associated facilities. Also described are the effects of taking no action (No Action Alternative). The last sections in this chapter include a summary of cumulative effects and irreversible and irretrievable commitment of resources.

4.1.1. Impact Assessment and Mitigation Planning

Potential environmental consequences from the Project were determined through a systematic analysis that included assessing the impacts of the project on the environment and how the impacts could be mitigated most effectively. Figure 4-1 illustrates and summarizes this impact assessment and mitigation planning process and an overview is provided below.

Impacts are defined as modifications to the existing condition of the environment that would be brought about by a Proposed Action. Impacts can be beneficial or adverse and can result from the Proposed Action directly or indirectly. Impacts can be permanent, long-term, or short-term. Long-term impacts are defined as those that would remain substantially for the life of the Project and beyond short-term impacts. The life of the Project is estimated to be a minimum of 50 years. Short-term impacts are defined as those changes to the environment during construction that generally would revert to preconstruction condition at or within a few years of the end of construction. Impacts can vary in significance from no change, or only slightly discernible change, to a full modification of the environment.

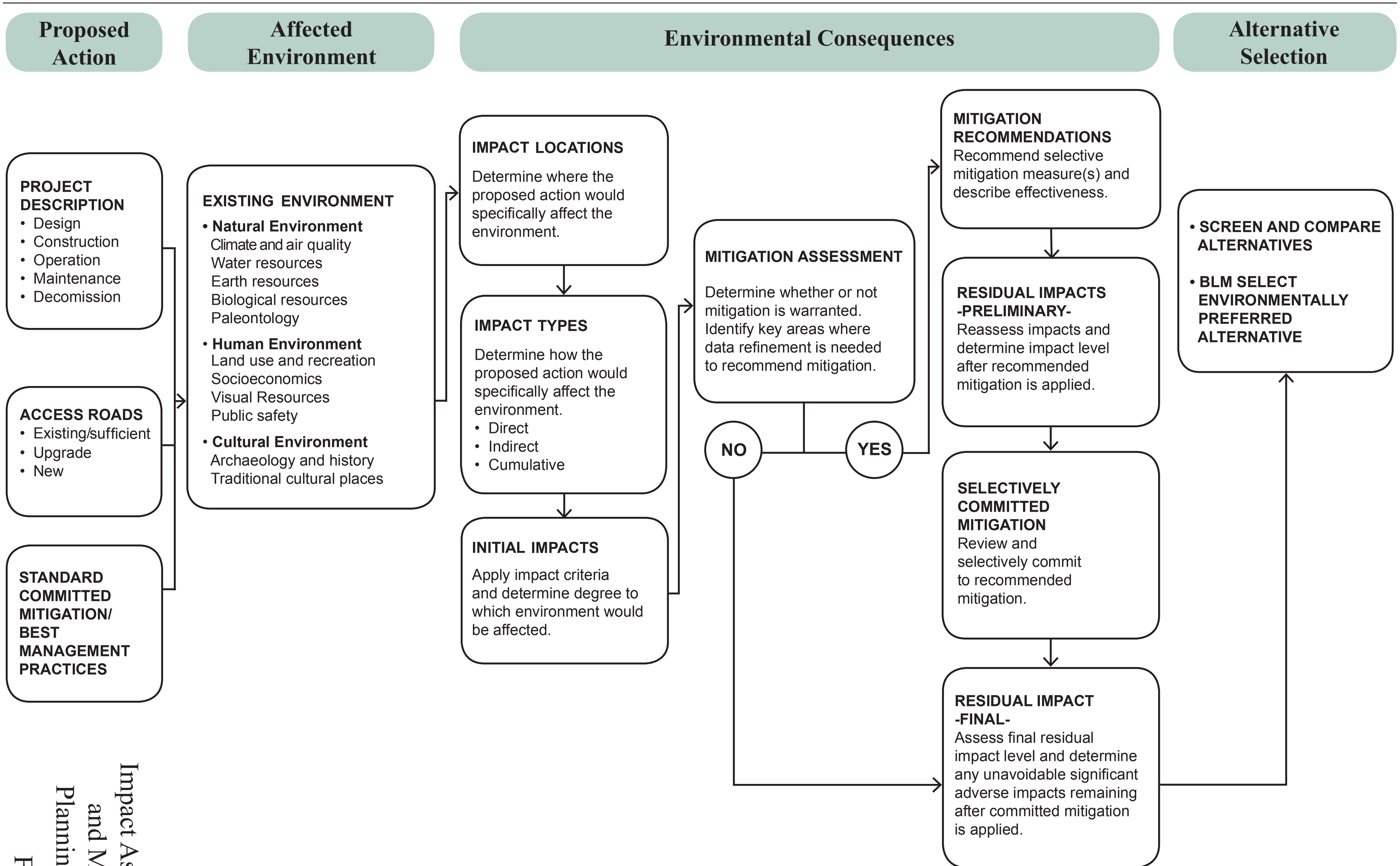
4.1.1.1 Proposed Action

The first step was to understand the proposed action and determine the types and amount of disturbance that could occur; that is the design and typical specifications of the proposed facilities, construction techniques and equipment used, extent of the construction, requirements for operation of the transmission lines and substations, activities associated with routine maintenance, and activities associated with decommissioning if or when the facilities are no longer needed. The majority of potential impacts that could occur would result from the activities associated with construction, which includes the following:

- Upgrading existing roads or constructing new roads for access where needed
- Preparing tower sites, staging areas, regen site, and batch plant site
- Assembling and erecting tower structures
- Stringing conductors (e.g., wire-pulling and splicing-sites)

In addition, following construction, impacts on some resources would result from the presence of the transmission lines and access roads. Also, periodic maintenance activities could cause temporary impacts.

As part of the project description, the Proponent committed to undertake certain measures to protect the environment as standard practice for the entire project. These measures are referred to as “standard mitigation” or BMPs and are summarized in Table 2-5.



Impact Assessment and Mitigation Planning Process

Figure 4-1

The amount of ground that could be disturbed as the result of project activities was estimated. Three levels of ground disturbance were identified based on the extent of access roads to be constructed or upgraded, as well as disturbance at tower sites, staging areas, batch plant site, etc. (see Table 2-7). Where the proposed transmission lines would parallel an existing linear facility and use existing access roads, new ground disturbance would be minimal resulting in less potential impacts. However, if the proposed transmission lines were sited in an area where there was no or little disturbance, new ground disturbance would be greater.

A preliminary location of the transmission lines within the alternative study corridors was established and verified through aerial and field reconnaissance. This location was used as a "reference" centerline for purposes of assessment.

4.1.1.2 Initial Impacts

Given an understanding of the project description (Chapter 2) and the inventoried information reflecting the existing environment (Chapter 3), each resource specialist determined the types and amounts of impacts that could occur on their respective resources. Computer-assisted models were developed to estimate the level of disturbance that could result from construction activities and for the project studies as a guideline and tailored the methods appropriately to the specific needs and requirements of each resource study. Qualitative and quantitative variables of resource sensitivity, resource quantity, and estimated ground disturbances were considered in predicting the magnitude of impacts, which are described generally in three levels—low, moderate, and high. A low impact results when the proposed action is expected to cause slight or insignificant adverse change to the resource. A moderate impact results when the proposed project action is expected to cause some adverse change that may be substantial and mitigation may be warranted. A high impact results when the proposed action is expected to result in substantial or significant change to the resource, and mitigation is warranted in most cases. These levels were defined for each resource.

4.1.1.3 Mitigation

Once "initial" impacts were identified for each resource along the reference centerline of the alternative routes, measures to mitigate moderate or high impacts to the extent practicable were recommended. In a limited number of instances, mitigation was recommended for low impacts. Also, this process identified a few key areas that needed further refinement and evaluation of data in order to recommend effective mitigation. "Selective" mitigation includes those measures or techniques to which the BLM recommends or requires (depending on land ownership) on a case-by-case, or selective, basis after impacts are identified and assessed. These measures provide a planning tool for minimizing potential adverse impacts. Table 2-6 shows selective mitigation measures.

Once a preferred route is selected for construction of the transmission lines, the Proponent would coordinate with the BLM and/or other land management agencies and landowners to discuss how the mitigation measures would be implemented on a site- or area-specific basis. For example, in a case where road closure is recommended, the Proponent would work with the BLM to refine the measure and determine the specific method of road closure most appropriate for the site or area (e.g., barricading with a locking gate, obstructing access on the road using an earthen berm or boulders, revegetating the roadbed, or obliterating the road and returning it to its natural contour and vegetation).

As the project progresses, the plan would be refined and finalized in coordination with the BLM and other agencies, and the detailed mitigation would be incorporated into the POD prior to construction.

4.1.1.4 Residual Impacts

The impacts remaining after mitigation has been applied are referred to as "residual." Potential residual impacts were reported on maps and tables that identify the locations and magnitudes of potential resource impacts along the reference centerline.

Because of the large volume of data, it is necessary to summarize the results to the extent appropriate for each resource. The descriptions of potential impacts focus on those resources that could be affected substantially, or those identified by the public and/or agencies as issues, regardless of the impact (e.g., biology, land use, visual, and cultural resources). Potential impacts on those resources that would not be affected substantially, or were not identified as major issues (e.g., air, paleontology), are presented in general summary. Impacts on these resources would be minimal with only slight differences between alternatives.

The description of impacts for each alternative should be reviewed in conjunction with the resource maps provided in Appendix C – Volume II. Several of the alternative routes are similar; many share common links with one another. Rather than repeating information, in most cases the descriptions of alternative routes have been abbreviated, as appropriate, to focus on the segment that is unique to each alternative. Resource data supporting this EIS is on file in the Project Record at the BLM SLFO.

4.1.2 Summary of Changes from the Draft EIS

Chapter 4 has been updated to reflect additional data suggested or provided in substantive agency and public comments on the Draft EIS and revised to address alternative route adjustments made since the publication of the Draft EIS.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

4.2 Resources

4.2.1 Climate and Air Quality

4.2.1.1 No Action Alternative

If the Project were not implemented (no action taken), the environment would remain as it presently exists.

4.2.1.2 Action Alternatives

If the Project were to be implemented, impacts on air quality would be short-term (during construction) and localized to the general area of activity. This applies regardless of which action alternative would be selected.

During construction, sources of air emissions would include particulate matter emissions (fugitive dust) from construction operations, and tailpipe emissions (nitrogen oxides [NO_x], CO, sulfur oxides [SO], and hydrocarbons [including volatile organic compounds {VOCs}) from vehicles and gasoline or diesel-powered construction equipment. Emissions from construction activities would be confined to the daytime hours and would occur only during active construction periods. Also, emissions would be transient as construction progresses, so emissions would not occur in one area for a long duration.

Sources of PM_{10} and $PM_{2.5}$ particulate matter would include grading and earth moving associated with developing access roads and work pad and substation areas; digging, drilling, and possible blasting where required to prepare for the tower foundations; constructing and operating the concrete batch plant and on-site diesel generator; and vehicular traffic. Emissions and impacts from the construction phase of the project have been quantified and are summarized below.

The concrete batch plant would require an air permit or Approval Order in compliance with UAC R307-401, *Permit: Notice of Intent and Approval Order*. The Approval Order would provide enforceable air pollution mitigation measures to reduce air emission impacts from operation of the batch plant. Activities associated with transmission line and road construction that would occur in Salt Lake and Utah counties would be required to have a fugitive dust control plan in accordance with UAC R307-309. Dust generating activities outside those areas are required to meet general dust control requirements as specified in UAC R307-205.

The primary emission sources associated with the operational and maintenance phase of the transmission lines include windblown dust from ground disturbance, road dust, and vehicle emissions during periodic maintenance or emergency repair activity. Mitigation measures (as described in Section 2.8.3) would be used to limit particulate emissions during both the construction and operational phases. Following construction, disturbed areas would be reclaimed with native vegetation or seed mix prescribed by the land-management agency. After the implementation of mitigation measures, impacts on air quality would be minimal due to the short duration and limited extent of the impacts. Because operation and maintenance emissions impacts would be much lower than construction phase emissions and impacts, they have not been quantified.

4.2.1.3 Project Emission Estimates

Emissions of PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, and VOCs have been estimated from the following source activities:

- Fugitive dust from earth moving activities such as grading and dozing roads, work pads, and substation areas
- Dust from traffic on paved and unpaved roads associated with construction
- Tailpipe and evaporative emissions from construction-phase traffic
- Tailpipe emissions from construction equipment such as dozers, graders, generators, ATVs, chainsaws, etc.
- Construction and operation of a concrete batch plant

The emissions associated with each activity are discussed below.

Fugitive Dust from Transmission lines and Substation Construction

Fugitive dust was estimated from construction of the Mona-Limber segment, Limber-Oquirrh segment, Limber-Terminal segment, Limber Substation, Mona Annex Substation, and the concrete batch plant. Uncontrolled fugitive dust emission factors of 0.3425 tons PM_{10} per acre per month and 0.0343 tons $PM_{2.5}$

per acre per month were used (Countess Environmental 2006, Midwest Research Institute 2005, EPA 2001) and applied to the entire graded acreage and duration of earth moving operations for each segment or substation. A control efficiency of 61 percent was assumed for watering as needed, and application of dust suppressant, if warranted, was applied to uncontrolled emissions based on work sponsored by the Western Regional Air Partnership (WRAP) (Countess Environmental 2006).

Dust from paved and unpaved roads was estimated using mileage and vehicle counts supplied by project engineers for each segment and substation. Emissions were calculated using spreadsheets developed by WRAP (http://www.wrapair.org/forums/dejf/fdh/index.html). The mileage traveled by each type of vehicle was assumed to be half on paved roads and half on unpaved roads. Speed on unpaved roads was limited to 15 miles per hour (mph) and all unpaved roads were assumed to have a graveled surface. An average speed of 55 mph was assumed on paved roads. In addition to speed control, mitigation measures would include dust suppressant application on unpaved roads, if warranted; frequent watering of unpaved roads (twice daily assumed); and prompt removal of dirt tracked onto paved roads. Such measures would be required under Utah dust control regulations.

Traffic Emissions

A number of support vehicles would be used during project construction, including a fleet of pickup trucks, flatbed trucks, and other supporting vehicles such as concrete and boom trucks. As each of these vehicles would emit regulated pollutants, the emissions of these pollutants were calculated using the EPA-approved Mobile6 emission model (EPA 2003).

The model inputs included use of high altitude mode and average vehicle speeds applied to local roadways. Emissions of mobile source NO_x, CO, VOC, and particulate-related combustion pollutants (SO_2, $PM_{2.5}$) were calculated, and the maximum per class emission rate was used to determine aggregate segment emissions. Total pound per day emissions were based on the Mobile6 emission factor (expressed in grams per mile) and the number of vehicle miles traveled. These emission factors were applied to the various vehicle classes based on size and fuel used. For diesel fueled equipment, 15 ppm sulfur content was assumed (effective June 2010).

Construction Equipment Emissions

Nonroad engine exhaust emissions for the project were estimated on a monthly basis using the equipment information and schedule provided. Nonroad engine emission factors were selected based on the type and size of engine. Emission factors for diesel engines were taken from the federal Tier 1-3 emission standards for CO, NO_x, PM, and VOC. The SO_2 emission factor for diesel engines was estimated based on the equation given on page 10 of EPA document NR-009A (EPA 1998) and the June 2010 diesel fuel sulfur content standard of 15 parts per million (ppm). Emission factors for gasoline engines were taken from EPA document 420R-05-019, titled "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition" (EPA 2005a). The SO_2 emission factor for gasoline engines was estimated based on the equation given on page A-2 of EPA document NR-0010 (EPA 1999).

Assumptions made in emission factor selection and emission calculations are listed below:

- PM emission factors were used to conservatively estimate emissions for PM_{10} and $PM_{2.5}$;
- Where available, non-methane hydrocarbon (NMHC) emission factors were used to estimate VOC emissions. Where only hydrocarbon (HC) emission factors were available, HC emissions were conservatively used to estimate VOC emissions;
- Tier 3 diesel VOC emission factor was assumed to be 0.2 grams per brake horsepower-hour (g/bhp-hr) based on page 7 of EPA document NR-009A;
- Tier 3 diesel NO_x emission factor was estimated from the difference of the NMHC + NO_x emission standard and the above 0.2 g/bhp-hr emission factor for VOC;
- Tier 2 diesel VOC emission factor was assumed to be 0.6 g/bhp-hr based on page 6 of EPA document NR-009A;
- Tier 2 diesel NO_x emission factor was estimated from the difference of the NMHC + NO_x emission standard and the above 0.6 g/bhp-hr emission factor for VOC;
- Brake-specific fuel consumption (BSFC) for diesel engines <100 horsepower (hp) was assumed to be 0.408 pound per horsepower-hour (lb/hp-hr) based on Table B-2 of EPA document NR-009A;
- BSFC for diesel engines >100 hp was assumed to be 0.367 lb/hp-hr based on Table B-2 of EPA document NR-009A;
- Air compressors were assumed to have phase 2, 4-stroke engines;
- ATV's were assumed to have phase 1, 4-stroke engines;
- Chainsaws were assumed to have phase 2 engines with catalyst; and
- Generators and compactors were assumed to have phase 2 side-valved engines.

Batch Plant Emissions

A concrete batch plant would be constructed and operated for 6 to 9 months to supply concrete for a portion of the Mona-Limber segment. Existing batch plants would be used to supply concrete needs for other segments.

Construction emissions for the concrete batch plant were scaled from emissions estimated for the Mona-Limber segment based on the relative graded acreage for each.

Operation emissions were based on emission factors in EPA's *Compilation of Air Pollutant Emission Factors* (AP-42) (EPA 2005b) for concrete batching operation (Section 11.12-1). Emissions were based on a total output from the batching operation of 9,000 cubic yards of concrete. The concrete was assumed to be truck mixed. Traffic emissions for delivery of raw materials to the plant were based on Mobile6 emission factors and the amount of raw materials required to produce 9,000 cubic yards of concrete.

4.2.1.4 Summary of Project Emissions

Table 4-1 summarizes total project emissions by segment or activity.

TABLE 4-1
SUMMARY OF PROJECT AIR POLLUTANT EMISSIONS

Segment/Activity	Duration and Projected Time Frame	NO_x (tons)	SO_2 (tons)	CO (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Mona-Limber							
Construction (fugitive dust)	24 months, beginning October 2010	–	–	–	–	19.4	1.9
Paved roads	24 months, beginning October 2010	–	–	–	–	4.2	0.5
Unpaved roads	24 months, beginning October 2010	–	–	–	–	65.0	56.5
Construction equipment	24 months, beginning October 2010	105.0	0.30	146.0	8.5	6.2	6.2
Traffic	24 months, beginning October 2010	9.0	0.04	39.0	5.8	0.2	0.2
	Totals:	114.0	0.34	185.0	14.3	95.0	65.7
Limber-Oquirrh							
Construction (fugitive dust)	24 months, beginning October 2010	–	–	–	–	10.2	1.0
Paved roads	24 months, beginning October 2010	–	–	–	–	4.0	0.5
Unpaved roads	24 months, beginning October 2010	–	–	–	–	51.0	5.1
Construction equipment	24 months, beginning October 2010	69.0	0.20	107.0	6.2	4.1	4.1
Traffic	24 months, beginning October 2010	8.3	0.03	27.0	4.1	0.2	0.2
	Totals:	77.3	0.23	134.0	10.3	69.5	10.9
Limber-Terminal							
Construction (fugitive dust)	24 months, indefinite time frame but not before 2013	–	–	–	–	10.1	1.0
Paved roads	24 months, indefinite time frame but not before 2013	–	–	–	–	4.1	0.5
Unpaved roads	24 months, indefinite time frame but not before 2013	–	–	–	–	52.0	5.2
Construction equipment	24 months, indefinite time frame but not before 2013	88.0	0.20	135.0	8.0	5.2	5.2
Traffic	24 months, indefinite time frame but not before 2013	9.4	0.04	29.0	4.5	0.2	0.2
	Totals:	97.4	0.24	164.0	12.5	71.6	12.1
Limber Substation							
Construction (fugitive dust)	24 months, indefinite time frame but not before 2013	–	–	–	–	17.8	1.8
Paved roads	27 months, indefinite time frame but not before 2013	–	–	–	–	1.7	0.2
Unpaved roads	27 months, indefinite time frame but not before 2013	–	–	–	–	21.0	2.1
Construction equipment	27 months, indefinite time frame but not before 2013	78.0	0.30	255.0	8.2	5.0	5.0
Traffic	27 months, indefinite time frame but not before 2013	3.7	0.04	12.0	1.8	0.1	0.1
	Totals:	81.7	0.34	267.0	10.0	45.6	9.2
Mona Annex							
Construction (fugitive dust)	24 months, beginning October 2010	–	–	–	–	23.3	2.3
Paved roads	30 months, beginning October 2010	–	–	–	–	1.6	0.2
Unpaved roads	30 months, beginning October 2010	–	–	–	–	19.0	1.9
Construction equipment	30 months, beginning October 2010	86.0	0.30	263.0	8.8	5.5	5.5
Traffic	30 months, beginning October 2010	3.8	0.02	12.0	1.9	0.1	0.1
	Totals:	89.8	0.32	275.0	10.7	49.5	10.0

TABLE 4-1
SUMMARY OF PROJECT AIR POLLUTANT EMISSIONS

Segment/Activity	Duration and Projected Time Frame	NO_x (tons)	SO_2 (tons)	CO (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Batch Plant							
Construction (all sources)	Construction period, October 2010-2011	1.4	0.004	2.2	0.17	1.1	0.18
Operation Emissions	6-9 months during Mona-Limber construction	–	–	–	–	0.09	0.09
Operation Traffic	6-9 months during Mona-Limber construction	1.2	0.003	1.5	0.27	3.9	0.63
	Totals:	2.6	0.007	3.7	0.44	5.1	0.90

In addition to the pollutants shown in Table 4-1, smaller amounts of hazardous air pollutants would be emitted from construction operations and from the batch plant. Such emissions, which have not been quantified, may include metals from soil fugitive dust and concrete raw materials, and organic hazardous air pollutants from gasoline and diesel exhaust.

4.2.1.5 Impacts

Construction activities associated with the project would release regulated pollutants into the atmosphere for subsequent transport. Some of these pollutants may be transported away from the immediate area into the surrounding air. Because these operations may occur in and around areas designated as non-attainment for ambient air quality standards, a screening air quality dispersion modeling analysis was conducted to assess the likelihood of project impact on local air quality.

The EPA SCREEN3 model was used along with a characteristic operational scenario and length of activity to simulate the construction emissions associated with the project. The largest portion of construction related activity would come from land preparation, such as grading and dozing, which can produce fugitive particulate matter emissions.

Worst-case daily and hourly emissions were calculated for the pollutants and activities expected to have maximum short-term impacts; annual modeling was not performed because the activities would be spread out over many miles of the transmission line corridor over the course of a year, with only small impacts in any given location. Similarly, on-road mobile source emissions were not modeled because impacts would occur over large distances. The traffic related to project construction represents a small fraction of the total traffic volume on public roads in the vicinity of the project.

Average daily and maximum hourly emissions were calculated for the following pollutants and activities for modeling:

- For PM_{10}, fugitive emissions from Mona-Limber construction (higher “per day” emissions than other segments or substations due to larger graded area) plus associated PM_{10} emissions from construction equipment involved in road construction, foundation installation, and structure erection.

- For CO and SO_2, emissions from construction equipment associated with Mona Annex construction (highest construction equipment emissions for any segment or substation). Emissions from all construction equipment active during the worst-case month were used even though it is unlikely that all equipment would operate simultaneously at the site.

NO_x was not modeled because there are no short-term ambient standards for NO_x. VOCs were not modeled because they are regulated as precursors to other pollutants (ozone, PM_{10}) and are generally modeled only as part of regional applications.

For the SCREEN3 modeling, an activity length (distance within which nominal construction activity could occur for a reasonable time) was set to 1 mile. With transmission towers to be placed at about 800 to 1,000 foot intervals, this equates to about 5 to 8 tower sites per mile, with associated access roads, all of which could see overlapping activity on a given day. Equipment emissions assumed that grading, foundation installation, and structure erection would all occur within the mile-long corridor on a given day. Together with the distance and a 250-foot right-of-way, a volume source approach was used to simulate emission activity within that region. The volume source assumed an approximate equivalent area, with initial lateral dimensions of around 400 meters and release and initial vertical dimension of 3 meters each.

A unit emission rate was used for all pollutants and, because activities would occur nominally during daylight hours, daylight stability classes (i.e., stability classes A-D or 1-4) were run. Maximum ground-level concentrations were calculated for all wind speeds and mixing heights associated with those stability classes and appropriate averaging period conversions were applied to the maximum SCREEN3 hourly modeled concentration.

EPA has established significance levels for various pollutants and averaging periods. If modeled concentrations for a given pollutant and averaging period are below the significance levels, the emissions are not expected to cause or contribute to an exceedance of the NAAQS. The significance levels and maximum project impacts are shown in Table 4-2. As shown in the table, none of the modeled concentrations exceed significant impact levels, and therefore, the likelihood of the project significantly impacting local air quality is low.

TABLE 4-2
MODELING SIGNIFICANT LEVELS AND IMPACT ANALYSIS RESULTS

Pollutant and Averaging Period	Significance Level ($\mu g/m^3$)	Maximum Modeled Impact ($\mu g/m^3$)
PM_{10}: 24 hours	5	4.1
CO: 1 hour	2,000	557
CO: 8 hours	500	389
SO_2: 3 hours	25	0.7
SO_2: 24 hours	5	0.3

4.2.1.6 General Conformity

In 1993, the EPA promulgated a rule requiring federal actions to conform to State Implementation. Conformity means that a federal action would not interfere with strategies to attain the NAAQS. The State of Utah has incorporated the federal conformity requirements in 40 CFR 93 by reference.

Federal actions that are responsible for air pollutant emissions within a nonattainment or maintenance area (a maintenance area is one that has been redesignated from nonattainment to attainment) must undergo a conformity applicability analysis to determine whether a conformity determination is necessary. The total of project-related direct and indirect emissions (such as emissions from associated traffic) is tested against *de minimis* emission levels. Conformity determinations are required for any federal action where the total of direct and indirect emissions exceeds the annual *de minimis* thresholds.

Portions of the proposed project would occur within a number of nonattainment and maintenance areas. The batch plant and the Mona Annex are not in any nonattainment or maintenance area, but portions of Mona-Limber, Limber-Oquirrh, Limber-Terminal, and the Limber Substation are within nonattainment and/or maintenance areas. Maximum annual direct and indirect project-related emissions have been calculated for comparison to the *de minimis* thresholds and include fugitive dust, construction equipment emissions, and tailpipe and evaporative emissions from project-related traffic. To determine maximum project-related annual emissions, it was assumed that Mona-Limber and Limber-Oquirrh would occur simultaneously, while construction of Limber-Terminal and the Limber Substation could occur simultaneously but not overlapping in time with Mona-Limber and Limber-Oquirrh. Fugitive dust, construction equipment, and traffic emissions were apportioned between the portions of each activity within or outside of each nonattainment or maintenance area based on the percentage of the transmission line corridor that is within or outside of each area.

The maximum annual direct and indirect emissions within each nonattainment or maintenance area are compared with the *de minimis* levels in Table 4-3. All annual project emission totals are below the applicable *de minimis* levels; therefore, a conformity determination is not required.

TABLE 4-3
COMPARISON OF MAXIMUM ANNUAL PROJECT EMISSIONS TO GENERAL CONFORMITY *DE MINIMIS* LEVELS

Pollutant	*De Minimis* Level (tons per year)	Total of Direct and Indirect Project Emissions (tons per year)	Comments
Salt Lake County SO_2 Nonattainment Area (Includes a portion of East Tooele County)			
SO_2	100	0.10	Maximum project emissions: portion of Limber-Oquirrh segment
Salt Lake County Ozone Maintenance Area			
VOCs	100	3.3	Maximum project emissions: portion of Limber-Terminal segment
NO_x	100	26	Maximum project emissions: portion of Limber-Terminal segment
Salt Lake County PM_{10} Nonattainment Area			
PM_{10}	100	49	Maximum project emissions: portion of Limber-Oquirrh segment
Utah County PM_{10} Nonattainment Area			
PM_{10}	100	61	Maximum project emissions: portion of Mona-Limber segment
Salt Lake City $PM_{2.5}$ Nonattainment Area (Includes Salt Lake County and portions of Tooele County with project-related emissions)			
$PM_{2.5}$	100	8.3	Maximum project emissions: simultaneous construction of portion of Mona-Limber segment and Limber-Oquirrh segment
SO_2	100	0.26	Maximum project emissions: simultaneous construction of Limber-Terminal segment and Limber Substation
NO_x	100	86	Maximum project emissions: simultaneous construction of Limber-Terminal segment and Limber Substation
VOCs	100	11	Maximum project emissions: simultaneous construction of Limber-Terminal segment and Limber Substation

TABLE 4-3 COMPARISON OF MAXIMUM ANNUAL PROJECT EMISSIONS TO GENERAL CONFORMITY *DE MINIMIS* LEVELS			
Pollutant	***De Minimis* Level (tons per year)**	**Total of Direct and Indirect Project Emissions (tons per year)**	**Comments**
Provo (Utah County) $PM_{2.5}$ Nonattainment Area (Includes portions of Utah County with project-related emissions)			
$PM_{2.5}$	100	8.3	Maximum project emissions: portion of Mona-Limber segment
SO_2	100	0.12	Maximum project emissions: portion of Mona-Limber segment
NO_x	100	43	Maximum project emissions: portion of Mona-Limber segment
VOCs	100	5.3	Maximum project emissions: portion of Mona-Limber segment

4.2.1.7 Fugitive Dust Plan Requirements

As noted previously, activities associated with transmission line and road construction that occur in Salt Lake and Utah counties would be required to have a fugitive dust control plan in accordance with UAC R307-309. Dust generating activities outside those areas are required to meet general dust control requirements as specified in UAC R307-205.

For areas outside the Salt Lake County and Utah County areas, the project would be required to meet the following:

- Fugitive emissions shall not exceed 20 percent opacity.
- Fugitive dust must be minimized from any aggregate storage or handling activities.
- Watering, chemical stabilization, wind breaks, and other similar measures must be employed to minimize fugitive dust from cleared areas and from unpaved roads.
- For any new roads with an average of 150 vehicle trips per day or greater, a notice of intent must be submitted prior to construction. Materials deposited on paved roads must be removed promptly.

A fugitive dust control plan has been completed as a part of the POD for project-related dust generating activities in Salt Lake and Utah Counties. Requirements include:

- Fugitive emissions shall not exceed 15 percent opacity.
- Opacity caused by fugitive dust shall not exceed 10 percent at the property boundary and 20 percent on site.
- A fugitive dust control plan must be submitted to the executive secretary for approval no later than 30 days after the source becomes subject to UAC R307-309. Control strategies must be addressed for the following project-related activities:
  - Material storage
  - Material handling and transfer
  - Roadways and yard areas
  - Material loading and dumping
  - Hauling of materials
  - Drilling, blasting, and pushing operations
  - Clearing and leveling

  - Earthmoving and excavation
  - Exposed surfaces
  - Any other source of fugitive dust
- Strategies expected to be employed may include:
  - Wetting or watering
  - Chemical stabilization
  - Enclosing or covering operations
  - Wind breaks
  - Traffic speed limitations
  - Cleaning of paved roadways
  - Covering loads
  - Revegetating disturbed area

Other requirements include preventing material being deposited on any paved roadway and removing any tracked out dirt as soon as possible. Fugitive dust from unpaved roads must be minimized to the maximum extent possible.

4.2.1.8 Global Climate Change

The assessment of climate changing pollutant emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate. However, the IPCC (2007) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations."

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. Currently BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this project-specific effort on global climate change. However, potential impacts to air quality due to climate change are likely to be varied. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Less snow at lower elevations would be likely to impact the timing and quantity of snowmelt, which, in turn, could impact aquatic species. In the future, as tools for predicting climate changes in a management area improve and/or changes in climate affect resources and necessitate changes in how resources are managed, BLM may be able to re-evaluate decisions made as part of this project and adjust management accordingly.

4.2.2 Earth and Water Resources

4.2.2.1 Earth Resources

The potential effects on earth resources (geology/soils) and the potential for geologic hazards to affect the project facilities are discussed in this section. The potential for seismic activity, liquefaction, landslides, or flooding varies along the project centerline. Alternative routes B1, B2, H, and I have the greatest potential for seismic activity, liquefaction, landslides, or floods. In accordance with the NESC, the

Proponent would design and construct the transmission structures and substation facilities to withstand geologic hazards by taking earthquake activity, fault locations, soil liquefaction, landslides, and floodplains into consideration. Therefore, geologic hazards in the project area are expected to have a minimal impact on project facilities. The following section describes in more detail the potential for geologic hazards for each project alternative.

No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to or from earth resources.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

As Alternative A1 crosses six faults, there is a potential for seismic activity along this route.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

As Alternative A2 crosses six faults, there is a potential for seismic activity along this route.

<u>Alternative B1 – East Rush Valley</u>

As this alternative crosses 11 faults, there is a greater potential for seismic activity along this route.

<u>Alternative B2 – East Rush Valley</u>

As this alternative crosses 11 faults, there is a greater potential for seismic activity along this route.

<u>Alternative C1 – Tintic Junction</u>

As this alternative crosses one fault, there is a lesser potential for seismic activity along this route.

<u>Alternative C2 – Tintic Junction</u>

As this alternative crosses one fault, there is a lesser potential for seismic activity along this route.

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

As this alternative crosses four faults, there is a potential for seismic activity along this route.

Alternative E1 – Pass Canyon

As this alternative crosses nine faults, there is a greater potential for seismic activity along this route.

Alternative E2 – Proponent's Proposed Action

As this alternative crosses nine faults, there is a greater potential for seismic activity along this route.

Alternatives F1 and F2 – Middle/Butterfield Canyon

As these alternatives cross three faults, there is a lesser potential for seismic activity along these routes.

Alternative G – Lake Point

As this alternative crosses no faults, there is a lesser potential for seismic activity along this route. This alternative is estimated to have approximately 16 miles of high potential for liquefaction activity along the project centerline. Areas susceptible to moderate and high liquefaction are found along the Great Salt Lake in Salt Lake and Tooele counties. As this alternative crosses areas mapped as the 100-year floodplain near the Great Salt Lake, flooding is more likely to occur along this route.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Alternative H is estimated to have approximately 24.0 miles of high potential for liquefaction or landslide activity along the project centerline. Areas susceptible to moderate and high liquefaction are found along the Great Salt Lake in Salt Lake and Tooele counties. As this alternative crosses no faults, there is a lesser potential for seismic activity along this route. As this alternative crosses areas mapped as the 100-year floodplain near the Great Salt Lake, flooding is more likely to occur along this route.

Alternative I – East Tooele Valley

Alternative I is estimated to have approximately 13.6 miles of high potential for liquefaction or landslide activity along the project centerline. Areas susceptible to moderate and high liquefaction are found along the Great Salt Lake in Salt Lake and Tooele counties. As this alternative crosses no faults, there is a lesser potential for seismic activity along this route. As this alternative crosses areas mapped as the 100-year floodplain near the Great Salt Lake, flooding is more likely to occur along this route.

Substation Sites

There are two proposed substation sites (Mona Annex and Limber). Both locations are anticipated to have a low potential for seismic, liquefaction, landslide, or flood activity, based on the absence of any known geologic hazards located within the proposed substation sites.

Soils

The primary concern associated with soils is the potential for accelerated soil erosion. Erosion potential is the result of several factors, including slope, vegetation cover, climate, and the physical and chemical characteristics of the soil, and is an indication of how susceptible soils are to increased erosion if disturbed. Increased soil erosion may occur when vegetation is removed during construction, or in areas where the surface is disturbed by heavy equipment. Increased water erosion often occurs during high-intensity or long-duration rain storms and may reduce the productivity of the soil, as well as affect the water quality of streams by accelerating sediment loading. Construction could also cause loss of productivity of agricultural and grazing land because of soil compaction and/or increased erosion.

Table 4-4 summarizes the expected ground disturbance in acres associated with the construction of each alternative. Temporary ground disturbance during construction would be associated with structure work areas, lay-down and staging areas, and wire splicing, pulling, and tensioning sites. Permanent ground disturbance would occur as a result of structure base areas, access roads, and substation sites.

TABLE 4-4
SUMMARY OF GROUND DISTURBANCE AND VEGETATION CLEARING

Alternative	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[2]	Right-of-way Vegetation Clearing (acres)[3]
Mona to Limber			
Alternative A1	748	151	236
Alternative A2 – BLM’s Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent’s Proposed Action	750	136	303
Alternative B1	770	173	310
Alternative B2	773	157	376
Alternative C1	739	174	578
Alternative C2	740	158	642
Limber to Oquirrh			
Alternative D – BLM’s Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	248	61	227
Alternative E1	261	69	232
Alternative E2 – Proponent’s Proposed Action	261	68	227
Alternative F1	245	79	261
Alternative F2	250	80	267
Alternative G	414	115	96
Limber to Terminal			
Alternative H – Environmentally Preferred Alternative/Proponent’s Proposed Action	383	88	41
Alternative I	342	72	41
Mona Annex Substation	243	206	–
Limber Substation	195	155	–

[1]Temporary disturbance = the area disturbed due to structure work areas, wire splicing sites, wire pulling sites, wire tensioning sites, construction yards, and one concrete batch plant (refer to Table 2-2).
[2]Permanent disturbance = the area disturbed due to structure base areas and access roads (refer to Tables 2-2 and 2-7).
[3]Right-of-way clearing = the estimated area that would require vegetation clearing within the right-of-way (calculations include vegetation types with the potential to grow 12 feet tall: mountain shrub, pinyon-juniper, riparian, deciduous forest, mixed conifer forest, spruce-fir, and hybrid oak).

Selective mitigation measures 1, 2, 3, and 14 (refer to Table 2-6) would be implemented, as needed, to reduce impacts on soil resources. Mitigation measures would minimize ground disturbance by limiting the construction of new access roads, improving existing access roads, designing new access roads to follow the landform contours, and traveling overland, where possible.

The majority of impacts on soils would be temporary during construction. Long-term effects would be minimal due to the limited extent of permanent ground disturbance and potential for increased erosion rates. Overall, with implementation of mitigation measures, impacts on soil resources are expected to be low.

4.2.2.2 Water Resources

No Action Alternative

Under this alternative, the environment would remain as it presently exists.

Impacts Common to All Alternatives

Overall, impacts on surface water resources would be low, since there would be limited disturbance in the vicinity of surface water resources. There would be low or no impact on groundwater, since construction activities generally would not reach groundwater depths. Several BMPs and selective mitigation measures (refer to Tables 2-5 and 2-6) would be implemented to minimize the potential for adverse effects to surface waters, the City of Tooele municipal watershed (Alternatives D, E1, E2, F1, and F2), and the Lincoln Culinary Water System (Alternatives E1 and E2). These mitigation measures include implementation of an Erosion Control Plan; restricting construction vehicles to designated access routes; minimizing clearing and disturbance of native vegetation; reclamation of disturbed areas; spanning sensitive features including waterways, springs, pipelines, and wells; prohibiting refueling outside designated areas; and implementing spill prevention and containment measures.

<u>Perennial Streams and Springs</u>

Ground-disturbing activities in the vicinity of surface water features could result in increased sedimentation, which could affect aquatic ecology, the quality of domestic water supplies and irrigation systems, and the aesthetic quality of the stream or river. Accidents involving construction equipment adjacent or proximal to a surface water feature could result in spillage of petroleum products or construction materials that could contaminate nearby water. Construction activities could disrupt the natural flow and/or quality of springs. Two areas of potential concern are the drinking water source protection zones for (1) Lincoln water users' municipal water supply in Pass Canyon (Link 235, Alternatives E1 and E2) and (2) Tooele City wells located in Middle Canyon (Links 190 and 190A, Alternatives D, E1, E2, F1 and F2). Construction activities in this area could have the potential to directly affect both the spring/wells and any associated buried water lines.

Similar to the mitigation measures described for soil resources, mitigation that limits the construction of new access roads in the vicinity of streams would protect the integrity of the riparian areas, streambanks, and streambeds, and avoid turbidity and sedimentation. In addition, BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6) would be implemented to (1) avoid or span sensitive features that include riparian areas, springs, well sites, and water courses, and (2) to mitigate the potential for the spillage of petroleum products or other hazardous materials during construction, operation and maintenance (including potential contamination associated with pesticides applied for management of noxious weeds). Applicable laws and regulations, including local zoning ordinances related to control of potential contamination sources, would be followed with respect to uses within drinking water source protection zones. Before application of pesticides for noxious weed management, all required permits from the federal, state, and local authorities will be obtained, if necessary. Therefore, impacts on surface water resources would be anticipated to be low.

<u>100-Year Floodplains</u>

A 100-year floodplain could be susceptible to increased sedimentation and bank erosion due to inundation from rainfall or snowmelt. By avoiding placement of a tower in a designated 100-year floodplain or major wash, effects on erosion, deposition, and modified flow patterns can be reduced. Impacts on 100-year floodplains are anticipated to be low.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Approximately 99 intermittent drainages are crossed by the route, and one well and one spring are located less than 600 feet from the reference centerline for Alternative A1. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative A2 – BLM’s Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent’s Proposed Action</u>

One perennial stream and approximately 129 intermittent drainages are crossed by the route, and two springs are located less than 600 feet from the reference centerline for Alternative A2. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative B1 – East Rush Valley</u>

Approximately 154 intermittent drainages are crossed by the route, and one well and one spring are located less than 600 feet from the reference centerline for Alternative B1. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative B2 – East Rush Valley</u>

One perennial stream and approximately 154 intermittent drainages are crossed by the route, and two springs are located less than 600 feet from the reference centerline for Alternative B2. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative C1 – Tintic Junction</u>

Approximately 116 intermittent drainages are crossed by the route and one well is located less than 600 feet from the reference centerline for Alternative C1. Overall, impacts are would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative C2 – Tintic Junction</u>

One perennial stream and approximately 107 intermittent drainages are crossed by the route and two springs are located less than 600 feet from the reference centerline for Alternative C2. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

Three perennial streams and approximately 57 intermittent drainages are crossed by the route, and one spring, the City of Tooele municipal watershed property, and four underground water wells are located less than 600 feet from the reference centerline for Alternative D. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative E1 – Pass Canyon</u>

Four perennial streams and approximately 56 intermittent drainages are crossed by the route, and one spring, the City of Tooele municipal watershed property, Lincoln Culinary Water System, and four underground water wells are located less than 600 feet from the reference centerline for Alternative E1. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative E2 – Proponent's Proposed Action</u>

Three perennial streams and approximately 57 intermittent drainages are crossed by the route, and one spring, the City of Tooele municipal watershed property, the Lincoln Culinary Water System, and four underground water wells are located less than 600 feet from the reference centerline for Alternative E2. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

<u>Alternative F1 – Middle/Butterfield Canyon</u>

Five perennial streams and approximately 77 intermittent drainages are crossed by the route, and three springs, the City of Tooele municipal watershed property, and four underground water wells are located less than 600 feet from the reference centerline for Alternative F1. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Alternative F2 – Middle/Butterfield Canyon

Five perennial streams and approximately 77 intermittent drainages crossed by the route, three springs, the City of Tooele municipal watershed property, and four underground water wells are located less than 600 feet from the reference centerline for Alternative F1. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Alternative G – Lake Point

One perennial stream and approximately 96 intermittent drainages are crossed by the route, one well, and one spring are located less than 600 feet from the reference centerline for Alternative G. Overall, impacts would be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

One perennial stream and approximately 63 intermittent drainages are crossed by the route, and two wells, and two springs are located less than 600 feet from the reference centerline for Alternative H. Overall, impacts are expected to be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Alternative I – East Tooele Valley

Approximately 39 intermittent drainages are crossed by the route and, and one well and a spring are located less than 600 feet from the reference centerline for Alternative I. Overall, impacts are expected to be low for these water resources due to implementation of several BMPs described in Tables 2-5 and selective mitigation measures #1, 2, and 7 (Table 2-6).

Substation Sites

Mona Annex Substation

No water resources should be affected by the Mona Annex Substation.

Limber Substation

No water resources should be affected by the Limber Substation.

4.2.3 Biological Resources

4.2.3.1 Introduction

This section describes and evaluates the potential impacts on biological resources that would result from the construction, operation, maintenance, and decommissioning of the proposed transmission lines and substations. The following describes the impact assessment methodology and summarizes the assessment results, including the identification of mitigation measures that would be implemented to minimize potential adverse impacts on biological resources.

4.2.3.2 Impact Assessment Methodology

An impact assessment methodology was developed to identify and evaluate potential impacts on biological resources associated with the Proponent's Proposed Action and alternatives. This methodology generally consisted of assigning sensitivity classifications to biological resources that occur within the 2-mile-wide study corridors, identifying impact levels based on resource sensitivity and Project-related activities, and developing resource-specific mitigation measures to minimize adverse impacts for each alternative.

Impact Criteria

These sensitivity classifications serve as a basis for the assignment of initial impact levels. Criteria used to assign resource sensitivity included species legal status (federally listed, BLM, and state sensitive, etc.) and biological importance of habitats (wetlands, crucial seasonal ranges, hybrid oak community, etc.). Table 4-5 identifies the sensitivity classifications for biological resources that occur in the study corridors.

TABLE 4-5
BIOLOGICAL RESOURCE SENSITIVITY CLASSIFICATION

Resource	Sensitivity
Vegetation Communities	
Disturbed	Low
Agriculture	Low
Invasive grassland	Low
Barren	Low
Greasewood	Low
Desert shrub	Moderate
Big sagebrush	Moderate
Mixed sagebrush	Moderate
Native grassland	Moderate
Pinyon-juniper	Moderate
Mountain shrub	Moderate
Mixed conifer	Moderate
Deciduous forest	Moderate
Spruce-fir	Moderate
Hybrid oak	High
Surface water	High
Riparian	High
Wetland	High

TABLE 4-5 BIOLOGICAL RESOURCE SENSITIVITY CLASSIFICATION	
Resource	**Sensitivity**
Wildlife Habitats	
Crucial pronghorn yearlong range	Low
Core bat area	Moderate
Crucial sage-grouse brood/winter range	Moderate
Crucial mule deer winter/spring range	Moderate
Crucial mule deer spring/fall range	Moderate
Crucial elk winter/spring range	Moderate
Core raptor nesting area	High
Waterfowl movement pathway	High
Crucial mule deer summer/fall range	High
Crucial mule deer winter range	High
Crucial elk summer/fall range	High
Crucial elk winter range	High

Impact levels are based on habitats that occur along the assumed transmission line centerline (link number and milepost) and within the substation sites. Impact levels were assigned based on resource sensitivity, resource quality (the existing condition of the resource), resource quantity (the amount of the resource potentially affected), and the type and duration of impact (short or long term). These criteria were systematically applied to develop impact levels of high, moderate, or low for biological resources.

Impacts were classified as high if the proposed Project would result in one or more of the following: mortality of a federally endangered, threatened, or candidate wildlife species; permanent loss of critical habitat; mortality rates that result in population-level effects for sensitive and other non-listed species; permanent displacement of individuals from biologically important habitats (i.e., greater sage-grouse leks); and the permanent loss of habitat that would result in species- or population-wide effects.

Impacts were classified as moderate if the proposed Project would result in one or more of the following: permanent loss of habitat for a federally endangered, threatened, or candidate wildlife species; permanent loss of important habitat for sensitive species or crucial habitats; mortality levels that do not reduce population viability; permanent loss of biologically important habitats (i.e., core raptor nesting areas); disturbance during a critical or sensitive period; and permanent displacement from important habitats that do not have population-level effects (i.e., crucial winter range).

Impacts were classified as low if the proposed Project resulted in one or more of the following: temporary disturbance of federally listed species; minimal loss of habitat; limited mortality of sensitive and common species; and temporary displacement from seasonal habitats.

Impact Types

The construction, operation, maintenance, and decommissioning of the proposed transmission lines and substations would result in both direct and indirect adverse effects on biological resources. Direct effects associated with construction activities include the following:

- Behavioral disturbance and displacement of wildlife within and adjacent to the Project area during construction (temporary)
- Loss and fragmentation of wildlife habitat associated with clearing and grading for access roads, transmission structures, and substations (permanent)

- Increased potential for the establishment and spread of noxious weeds in disturbed areas (permanent)
- Long-term displacement of individual animals from the Project area due to habitat loss and fragmentation (permanent)
- Potential for mortality for wildlife species with limited mobility or that occupy burrows or nests in work areas (temporary)
- Potential for the spread of noxious weeds and initiation of human-caused wildfires (temporary)

Direct effects associated with operation of the facilities and the presence of the transmission lines include the following:

- Potential for wildlife mortality due to collisions with structures, conductors, or shield wires (permanent)
- Potential for wildlife mortality due to use of transmission line structures as perches by raptors and ravens (permanent)
- Behavioral disturbance and/or abandonment of adjacent habitats in environments that lack existing vertical structure (permanent)

Direct effects associated with maintenance activities include the following:

- Behavioral disturbance and displacement of wildlife within and adjacent to the Project area during routine inspections and maintenance activities (temporary but long-term)
- Potential for the spread of noxious weeds and initiation of human-caused wildfires by maintenance vehicles (temporary but long-term)

The primary indirect effects are associated with the construction of permanent access roads, which could be used by the general public to access currently inaccessible habitats. Human activity and vehicle noise could result in displacement, abandonment of habitat, behavioral disruption, and additional stress during critical periods. New access into previously inaccessible habitats may also increase displacement of wildlife and mortality via legal hunting and poaching. Finally, public use of access roads could facilitate the spread of noxious weeds and increase the risk of human-caused wildfire. These indirect effects would all be permanent.

As previously noted, construction activities could result in temporary disturbance to wildlife in the vicinity of the Project area. While opportunities for dispersed wildlife viewing and hunting exist throughout the Project area, there are no specific areas that receive concentrated use for these activities. Given the limited duration of construction-related disturbance and the absence of any areas utilized from focused, wildlife-based recreation, construction of the proposed project would not significantly affect hunting or wildlife viewing opportunities in the Project area.

4.2.3.3 Mitigation Planning

In addition to the BMPs described in Chapter 2 (refer to Table 2-5), selective mitigation measures (refer to Table 2-6) would be implemented to minimize adverse impacts on biological resources, including measures 1, 2, 4, 7, 12, 13, 14, 15, 16, and 17.

Habitat loss and fragmentation are among the primary concerns associated with the construction of new transmission lines. These adverse effects can be reduced by locating new transmission lines parallel and adjacent to existing lines and/or established transmission corridors. Specifically, placing new lines adjacent to existing lines can minimize habitat fragmentation and reduced habitat security. This also facilitates the use of existing access roads, and minimizes physical ground disturbance and associated habitat loss. Paralleling existing lines also reduces adverse effects associated with the establishment of large vertical structures, including predation-related mortality, behavioral disturbance, and habitat abandonment.

There would be no impacts on aquatic habitats and associated fisheries associated with any of the alternatives. The transmission lines would be designed to span all creeks, and access roads would be designed to avoid disturbing creek beds and adjacent areas. Construction vehicles and equipment would be prohibited from working in and crossing perennial streams. An erosion control plan would be implemented to minimize the potential for sedimentation. Spill prevention and containment measures would be implemented, and vehicle refueling and maintenance activities would be limited to designated work areas at least 100 feet away from all creeks. The project would comply with the requirements of Executive Order 11988 (Floodplain Management), Executive Order 11990 (Wetland Protection), and Sections 401 and 404 of the Clean Water Act.

Concern regarding avian electrocutions on transmission lines has resulted in the development of avian-safe (or raptor-safe) design guidelines (APLIC 1996; 2006). Research has indicated that most avian electrocutions occur on smaller voltage lines (less than 69kV), because the narrow spacing between conductors can be bridged by birds with long wingspans (APLIC 2006). The standard raptor-safe design includes a minimum vertical separation of 60 inches between conductors. The proposed 500kV and 345kV transmission lines would have a minimum vertical conductor separation of 120 inches (refer to Section 2.6.1). This design feature would eliminate the potential for avian electrocutions on any of the transmission lines.

4.2.3.4 Summary of Impact Analysis Results

No Action Alternative

Under this alternative, there would be no construction, operation, or maintenance activities associated with the transmission lines and substations. There would be no loss or modification of vegetation communities or wildlife habitats, and no direct or indirect impacts on any plant or wildlife species.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Vegetation

Table 4-6 quantifies vegetation communities crossed, estimated permanent ground disturbance and clearing of vegetation, and residual vegetation impact levels by alternative. Alternative A1 would result in approximately 151 acres of permanent ground disturbance and the clearing of approximately 236 acres of vegetation (Table 4-6). Residual vegetation impact levels for Alternative A1 include 18.2 miles of low impact, 48.7 miles of moderate impact, and 1.0 mile of high impact (Table 4-6). Selective mitigation measures would be implemented to minimize potential adverse impacts on vegetation (refer to Table 2-6). The high impact area associated with shrub riparian habitat along Link 105 would be spanned or otherwise avoided to the maximum extent permitted by design guidelines. BMPs would minimize the potential for the introduction/spread of noxious weeds and the risk of human-caused wildfire.

TABLE 4-6
COMPARISON OF VEGETATION RESOURCE IMPACTS

Alternative	Vegetation Communities Crossed (linear miles)															Disturbance[1]		Residual Impacts[2]		
	Agriculture	Barren	Big Sage	Deciduous Forest	Salt Desert Shrub	Disturbed	Grassland	Greasewood	Invasive Grassland	Mixed Conifer	Mixed Sage	Mountain Shrub	Pinyon-Juniper	Riparian	Wetland	**Grading**	**Clearing**	**Low**	**Moderate**	**High**
Mona to Limber																				
Alternative A1	4.2	0.3	36.0	–	3.2	0.5	1.8	3.0	10.3	–	0.6	–	7.2	0.6	–	151	236	18.2	48.7	1.0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	3.7	0.3	36.3	–	3.2	0.5	1.5	2.9	10.0	–	0.5	–	9.4	0.6	–	136	303	17.4	51.0	1.0
Alternative B1	3.9	–	35.6	–	4.6	0.6	2.9	4.0	7.8	–	0.4	0.1	10.1	–	–	173	310	16.3	53.7	0.0
Alternative B2	3.5	–	36.0	–	4.6	0.6	2.6	4.0	7.5	–	0.4	0.1	12.3	–	–	157	376	15.5	56.0	0.0
Alternative C1	2.0	0.3	30.0	0.1	2.8	–	1.4	2.9	7.0	–	1.3	0.3	18.1	0.1	–	174	578	12.2	53.9	1.0
Alternative C2	1.5	0.3	30.3	0.1	2.9	–	1.1	2.9	6.7	–	1.3	0.3	20.2	0.1	–	158	642	11.3	56.2	1.0
Limber to Oquirrh																				
Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	3.6	–	5.2	1.5	0.2	3.8	1.4	0.6	3.3	0.2	0.3	6.4	3.9	0.7	0.1	61	227	11.3	19.1	0.7
Alternative E1	1.6	–	6.0	0.6	0.2	4.2	1.5	0.2	3.7	0.2	0.7	6.0	6.5	1.0	0.1	69	232	9.8	19.8	1.5
Alternative E2 – Proponent's Proposed Action	3.6	–	5.5	0.6	0.2	3.3	1.4	0.6	3.4	0.2	0.7	6.5	3.8	1.0	0.2	68	227	10.8	18.8	1.5
Alternative F1	2.1	–	4.0	1.5	0.2	4.3	1.2	0.2	2.7	3.9	0.7	4.4	4.2	0.4	0.1	79	261	9.3	19.6	0.4
Alternative F2	2.6	–	4.0	1.5	0.2	3.4	1.2	0.6	2.8	3.9	0.3	4.4	4.5	0.4	0.1	80	267	9.3	19.9	0.4
Alternative G	5.0	0.1	11.1	–	0.3	5.7	2.5	1.4	5.5	–	0.5	1.4	3.2	0.7	11.2	115	96	17.7	18.8	12.5
Limber to Terminal																				
Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action	2.9	0.1	6.7	–	0.3	11.4	1.6	1.1	4.6	–	0.5	0.1	1.6	0.6	13.7	88	41	20.2	10.7	14.5
Alternative I	3.0	0.1	5.8	–	0.4	8.6	1.9	0.8	8.3	–	0.2	–	1.8	0.5	8.0	72	41	21.7	10.1	8.6

NOTES: [1]Estimated total permanent ground disturbance (grading) and removal of vegetation (clearing) in acres based upon data in Tables 2-9 and 4-4.
[2]Impact levels in linear miles. Impacts may be reduced based on site specific engineering and design in conjunction with mitigation.

Sensitive Wildlife Habitat

Table 4-7 shows sensitive habitats crossed, selective mitigation measures that would be implemented, and residual wildlife impact levels by alternative. Alternative A1 crosses 18.4 miles of core raptor nesting habitat, 33.9 miles of crucial greater sage-grouse habitat, 24.8 miles of crucial mule deer habitat (14.8 miles of spring/fall range and 10.0 miles of winter/spring range), and 37.2 miles of crucial pronghorn yearlong habitat. Initial wildlife impacts associated with Alternative A1 include 2.9 miles of low impact, 46.6 miles of moderate impact, and 18.4 miles of high impact. Alternative A1 would parallel a 345kV transmission line corridor for 5.8 miles.

Initial high impacts are associated with core raptor nesting habitat in the Goshen Valley and the western Rush Valley. This impact level would be reduced to moderate by implementing selective mitigation measures (refer to Tables 2-6 and 4-4). Specifically, pre-construction surveys would be conducted to identify all raptor nests within the Project area, and the final Project design would incorporate survey data to prevent the destruction of raptor nests. Additionally, seasonal restrictions and buffers would be implemented to minimize disturbance during sensitive nesting periods.

Moderate impacts are associated with crucial greater sage-grouse and mule deer habitats. Habitat loss and fragmentation associated with ground disturbance would be unavoidable. The transmission lines also would increase the potential for raptor/raven predation on greater sage-grouse. Selective mitigation measures would be implemented to minimize adverse impacts (refer to Tables 2-6 and 4-4). Specifically, information from pre-construction surveys for greater sage-grouse leks would be incorporated into the Project design to prevent physical ground disturbance within or adjacent to leks. Seasonal restrictions on construction and maintenance activities would be implemented in proximity to active leks. Where practicable, access roads would be closed to minimize public access and associated disturbance, displacement, and increased legal and illegal mortality of greater sage-grouse and mule deer. Residual wildlife impact levels for Alternative A1 include 49.5 miles of low impact and 18.4 miles of moderate impact (Table 4-7).

Special Status Species

No known federally listed plant or animal species or designated critical habitats occur along Alternative A1. Potential suitable habitat for Pohl's milkvetch occurs along approximately 29 miles of Alternative A1. Pre-construction surveys would be conducted in the Project area for Pohl's milkvetch, as well as other special status plant species and noxious weeds. The results of these surveys would be incorporated into the final Project design, and appropriate avoidance measures (i.e., spanning areas supporting plants/populations, transplanting, etc.) would be developed in consultation with the BLM. Although Alternative A1 could result in the loss of some individual plants, it would not result in a significant adverse impact on any special status plant species.

Alternative A1 could adversely affect several special status wildlife species, including the kit fox, pygmy rabbit, greater sage-grouse, long-billed curlew, burrowing owl, short-eared owl, and ferruginous hawk. The primary adverse effects would include short-term disturbance during construction and maintenance activities, habitat loss and mortality resulting from physical ground disturbance, and long-term disturbance and potential mortality associated with public use of access roads and the presence of transmission line structures. While habitat loss would be an unavoidable impact, potential adverse effects on special status wildlife species would be reduced through the implementation of selective mitigation measures.

TABLE 4-7
COMPARISON OF BIOLOGICAL RESOURCE IMPACTS

Alternative	Parallel Lines[1] (voltage size)	Sensitive Wildlife Habitats[2]						Selective Mitigation Measures[3]	Residual Impacts[4]		
		Raptor Nesting	Waterfowl Pathway	Sage-Grouse	Mule Deer	Elk	Pronghorn		Low	Mod	High
Mona to Limber											
Alternative A1	5.8 (345kV)	18.4	–	33.9	24.8	–	37.2	1, 2, 4, 7, 13, 14, 16, 17	49.5	18.4	0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action	3.6 (345kV)	18.4	–	33.9	29.1	–	37.2	1, 2, 4, 7, 11, 13, 14, 16, 17	51.0	18.4	0
Alternative B1	5.8 (345kV)	14.0	2.0	33.1	34.0	4.6	28.1	1, 2, 4, 7, 13, 14, 15, 16, 17	45.5	24.5	0
Alternative B2	3.6 (345kV)	14.0	2.0	33.1	38.4	4.6	28.1	1, 2, 4, 7, 13, 14, 15, 16, 17	47.0	24.5	0
Alternative C1	5.8 (345kV)	13.7	–	40.8	19.3	–	28.0	1, 2, 4, 7, 13, 14, 16, 17	53.3	13.7	0
Alternative C2	3.6 (345kV)	13.7	–	40.8	23.6	–	28.0	1, 2, 4, 7, 13, 14, 16, 17	54.7	13.7	0
Limber to Oquirrh											
Alternative D- BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	12.3 (138kV)	0.8	–	6.2	19.1	9.9	–	1, 2, 4, 7, 11, 12, 13, 14, 16, 17	18.1	13.0	0
Alternative E1	14.5 (138kV)	0.8	–	6.2	22.1	11.2	–	1, 2, 4, 7, 12, 13, 14, 16, 17	14.8	16.3	0
Alternative E2 – Proponent's Proposed Action	16.8 (345kV)	0.8	–	6.2	20.4	10.3	–	1, 2, 4, 7, 12, 13, 14, 16, 17	16.5	14.6	0
Alternative F1	2.1 (138kV)	0.8	–	6.2	12.1	2.1	–	1, 2, 4, 7, 12, 13, 14, 16, 17	23.9	5.4	0
Alternative F2	2.2 (138kV)	0.8	–	6.2	12.1	2.1	–	1, 2, 4, 7, 12, 13, 14, 16, 17	24.3	5.4	0
Alternative G	22.1 (138kV)	5.9	23.3	5.8	15.6	13.0	–	1, 2, 7, 13, 14, 15, 16, 17	9.7	39.3	0
Limber to Terminal											
Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action	26.1 (138kV)	5.9	26.9	5.8	6.1.	4.0	–	1, 2, 7, 13, 14, 15, 16, 17	12.0	33.4	0
Alternative I	25.1 (138kV)	0.8	16.0	6.2	7.0	5.0	–	1, 2, 7, 13, 14, 15, 16,17	18.8	21.6	0

NOTES:
[1]Linear miles of existing 345kV and 138kV transmission lines that the alternative route would parallel (345kV line separation = 1,500 feet; 138kV line separation = 70 feet)
[2]Linear miles of crucial or sensitive habitat crossed
[3]Selective mitigation measures that would be implemented to minimize adverse impacts on vegetation and wildlife (refer to Table 2-6)
[4]Linear miles of impacts for entire alternative route

Pre-construction surveys would be conducted along the study corridor for sage-grouse leks, pygmy rabbits and burrows, and raptor nests (including burrowing owl and ferruginous hawk). Information obtained through these surveys would be incorporated into the final Project design to minimize impacts on special status species. The final locations of transmission line structures and access roads would avoid or span occupied habitats and nest sites to minimize the potential for mortality associated with construction activities. Seasonal restrictions and buffers would be applied to construction activities in the vicinity of sage-grouse leks and raptor nests to minimize behavioral disturbance during sensitive periods.

General habitat loss and fragmentation for special status species would be reduced by implementing selective mitigation measures. Where feasible, access roads in the vicinity of leks or raptor nests would be closed to public access via gates or barriers, to reduce long-term disturbance and the potential for illegal mortality. The long-term presence of transmission line structures would have both beneficial and adverse impacts on special status species. As previously noted, the creation of perching sites can increase the risk of nest predation and mortality of birds and small mammals in the immediate vicinity of these structures. Certain species, such as the greater sage-grouse and pygmy rabbit, may be adversely affected by slightly higher mortality rates while raptors, such as the ferruginous hawk, may benefit by the creation of perching and nesting habitat. Alternative A1 would eliminate some foraging habitat for the Townsend's big-eared bat and fringed myotis, but would not affect bat roosts or hibernacula. Although Alternative A1 would result in habitat loss (refer to Table 4-6) and the potential for mortality of individual animals, it would not have a significant adverse effect on any special status species.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Alternative A2 is similar to Alternative A1, with Links 5 and 20 replaced by Links 10 and 15. This alternative would parallel a 345kV transmission line corridor for 3.6 miles. In order to reduce direct and indirect impacts associated with construction of permanent roads on BLM-administered lands, selective mitigation measure #11 – Helicopter construction would be implemented on Link 10 for approximately 3.5 to 4.0 miles over the Long Ridge Mountains. Alternative A2 crosses 1.5 miles more crucial mule deer spring/fall habitat, and would result in less permanent ground disturbance (136 acres) and more clearing (303 acres). Potential impacts on special status species would be similar to those described for Alternative A1. Residual vegetation and wildlife impact levels are similar to Alternative A1 (refer to Tables 4-3 and 4-4).

<u>Alternative B1 – East Rush Valley</u>

Vegetation

Alternative B1 would result in approximately 173 acres of permanent ground disturbance, and the clearing of approximately 310 acres of vegetation (refer to Table 4-6). Selective mitigation measures and BMPs implemented to minimize potential adverse impacts on vegetation are similar to those described for Alternative A1. The high impact area associated with the Ophir Creek riparian forest would be spanned and tree clearing would be limited in an effort to minimize disturbance of this community. Initial and final vegetation impact levels for Alternative B1 include 16.3 miles of low impact and 53.7 miles of moderate impact (Table 4-6).

Sensitive Wildlife Habitat

Alternative B1 crosses 14.0 miles of core raptor nesting habitat, 33.1 miles of crucial greater sage-grouse habitat, 2.0 miles of waterfowl pathway, 34.0 miles of crucial mule deer habitat (9.2 miles of winter range, 14.8 miles of spring/fall range, and 10.0 miles of winter/spring range), 4.6 miles of crucial elk winter range, and 28.1 miles of crucial pronghorn year-long habitat (refer to Table 4-7). Alternative B1 would parallel a 345kV transmission line corridor for 5.8 miles.

Initial wildlife impacts associated with Alternative B1 include 2.9 miles of low impact, 42.7 miles of moderate impact, and 24.5 miles of high impact. Initial high impacts are associated with core raptor nesting habitat, crucial mule deer and elk winter ranges, and the waterfowl movement pathway adjacent to Rush Lake. Moderate impacts are associated with crucial greater sage-grouse habitat and crucial mule deer spring/fall and winter/spring habitats. Alternative B1 is adjacent to, but does not cross through the core bat habitat area, and would not affect any roosts or hibernacula. Selective measures implemented to minimize potential adverse impacts on wildlife resources are similar to those described for Alternative A1. Specifically, pre-construction surveys would be conducted for raptor nests and sage-grouse leks, and seasonal restrictions on construction activities would be implemented within the nest/lek buffer zones, as well as in crucial mule deer and elk winter ranges. Conductors on the portion of the transmission line within the waterfowl pathway would be marked to reduce the potential for collision-related mortality. Where practicable, access roads would be closed to public access. Residual wildlife impact levels for this alternative include approximately 45.5 miles of low impact and 24.5 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats occur or are known to occur in the Alternative B1 corridor. There are approximately 13 miles of potential suitable habitat for Pohl's milkvetch along this alternative. Special status wildlife species and the mitigation measures are similar to those described under Alternative A1. The riparian forest along Ophir Creek does represent suitable habitat for two additional species (Lewis's woodpecker and western red bat). Potential adverse effects on these species include temporary disturbance during construction and habitat loss resulting from the removal of riparian trees. Limited and selective tree clearing would minimize potential impacts on riparian habitat. Although Alternative B1 would result in habitat loss (refer to Table 4-6) and the potential for mortality of individual animals, it would not have a significant adverse impact on any special status species.

<u>Alternative B2 – East Rush Valley</u>

The Alternative B2 corridor is similar to Alternative B1, with Links 5 and 20 replaced by Links 10 and 15. This alternative would parallel a 345kV transmission line corridor for 3.6 miles (Table 4-7). Impact types and mitigation measures would be the same as described for Alternative B1. Alternative B2 crosses 4.1 miles more crucial mule deer spring/fall habitat, and would result in less permanent ground disturbance (157 acres) and more clearing (376 acres). Potential impacts on special status species would be similar to those described for Alternative B1. Residual vegetation impact levels are similar to Alternative B1 with 0.8 mile less low impact and 2.3 miles more moderate impact (refer to Table 4-6). Residual wildlife impact levels are similar to Alternative B1 with 1.5 miles more low impacts (refer to Table 4-4).

Alternative C1 – Tintic Junction

Vegetation

Alternative C1 would result in approximately 174 acres of permanent ground disturbance and the clearing of approximately 578 acres of vegetation (refer to Table 4-6). Initial and residual vegetation impact levels for Alternative C1 include 12.2 miles of low impact, 53.9 miles of moderate impact, and 1.0 mile of high impact (refer to Table 4-6). Selective mitigation measures and BMPs implemented to minimize potential adverse impacts on vegetation are similar to those described for Alternative A1. The high impact area associated with shrub riparian habitat along Link 105 would be spanned or otherwise avoided to minimize disturbance.

Sensitive Wildlife Habitat

Alternative C1 crosses 13.7 miles of core raptor nesting habitat, 40.8 miles of crucial greater sage-grouse habitat, 19.3 miles of crucial mule deer habitat (5.6 miles of spring/fall range and 13.7 miles of winter/spring range), and 28.0 miles of crucial pronghorn habitat (refer to Table 4-7). This alternative would parallel a 345kV transmission line corridor for 5.8 miles. Initial wildlife impacts associated with Alternative C1 include 8.9 miles of low impact, 44.4 miles of moderate impact, and 13.7 miles of high impact. Initial high impacts are associated with core raptor nesting habitat and moderate impacts are associated with crucial greater sage-grouse and mule deer habitats. Impact types and mitigation measures are similar to those described for Alternative A1, and include pre-construction surveys, seasonal restrictions and buffer zones, and closure of access roads. Residual wildlife impact levels for Alternative C1 include 53.3 miles of low impact and 13.7 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative C1. There are approximately 32 miles of potential suitable habitat for Pohl's milkvetch along this alternative. Special status wildlife species and associated mitigation measures are similar to those described under Alternative A1. While Alternative C1 would result in habitat loss (refer to Table 4-6) and the limited potential for mortality of individuals in construction areas, this alternative would not result in a significant adverse impact on any special status wildlife species.

Alternative C2 – Tintic Junction

The Alternative C2 corridor is similar to Alternative C1, with Links 5 and 20 replaced by Links 10 and 15. This alternative would parallel a 345kV transmission line corridor for 3.6 miles. Impact types and mitigation measures would be the same as described for Alternative C1. Alternative C2 crosses 4.1 miles more crucial mule deer winter/spring habitat, and would result in less permanent ground disturbance (158 acres) and more clearing (642 acres). Potential impacts on special status species would be similar to those described for Alternative C1. Residual vegetation impact levels are similar to Alternative C1 with 0.9 mile less low impact and 2.3 miles more moderate impact (refer to Table 4-6). Residual wildlife impact levels are similar to Alternative C1 with 0.6 mile more low impact (refer to Table 4-7).

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Vegetation

Alternative D would result in approximately 61 acres of permanent ground disturbance and the clearing of approximately 227 acres of vegetation (refer to Table 4-6). Initial and residual vegetation impact levels for this alternative include 11.3 miles of low impact, 19.1 miles of moderate impact, and 0.7 mile of high impact. Selective mitigation measures would be implemented to minimize potential adverse impacts on vegetation. The high impact areas include riparian forest habitat along Settlement Creek (Link 190A), and shrub riparian habitats along Pine Creek (Link 220). Selective mitigation measures, including spanning and selective clearing, would minimize disturbance of these riparian habitats. This alternative would result in approximately 29 square feet of permanent wetlands disturbance and 0.7 acre of temporary wetlands disturbance. BMPs would minimize the introduction/spread of noxious weeds and risk of human-caused wildfire.

Sensitive Wildlife Habitat

Alternative D crosses 0.8 mile of core raptor nesting habitat, 6.2 miles of crucial greater sage-grouse habitat, 19.1 miles of crucial mule deer habitat (8.6 miles of winter range, 2.0 miles of summer/fall range, and 8.1 miles of winter/spring range), and 9.9 miles of crucial elk habitat (7.0 miles of winter range and 2.9 miles of summer/fall range). This alternative would parallel approximately 12.3 miles of existing transmission lines. Initial wildlife impacts associated with Alternative D include 8.8 miles of low impact, 8.2 miles of moderate impact, and 13.4 miles of high impact. Initial high impacts are associated with core raptor nesting habitat and mule deer and elk winter and summer/fall ranges. Moderate impacts are associated with crucial greater sage-grouse habitat and crucial mule deer winter/spring habitat.

Habitat loss and fragmentation associated with ground disturbance would be an unavoidable adverse impact and would affect all wildlife species. Selective mitigation measures would be implemented to reduce impacts (refer to Tables 2-6 and 4-4). In order to reduce direct and indirect impacts associated with construction of permanent access roads on Link 230 over the Oquirrh Mountains, selective mitigation measure #11 – Helicopter Construction would be recommended for approximately 4 miles. Specifically, pre-construction surveys would be conducted for raptor nests and greater sage-grouse leks, and final Project design would incorporate survey results to avoid nests and leks. Seasonal restrictions on construction activities would be implemented within specific buffer zones around raptor nests and sage-grouse leks, and within crucial mule deer and elk winter and summer/fall ranges. Where practicable, access roads would be closed to minimize public access and associated disturbance, displacement, and increased legal and illegal mortality. Residual wildlife impact levels for Alternative D include 18.1 miles of low impact and 13.0 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative D. Pre-construction surveys would be conducted for special status plant species and noxious weeds. The results of these surveys would be incorporated into the final Project design, and appropriate avoidance measures (i.e., spanning areas supporting plants/populations, transplanting) would be developed in consultation with the BLM. Alternative D would not result in a significant adverse impact on any special status plant species.

Alternative D could affect several special status wildlife species, including the western toad, lyrate mountainsnail, kit fox, pygmy rabbit, greater sage-grouse, long-billed curlew, burrowing owl, short-eared owl, ferruginous hawk, and northern goshawk. The primary adverse effects would include short-term disturbance during construction and maintenance activities, habitat loss and limited mortality resulting from physical ground disturbance, and long-term disturbance, and potential mortality associated with public use of access roads and the presence of transmission line structures. While habitat loss would be unavoidable, adverse effects on special status wildlife species would be reduced through the implementation of selective mitigation measures.

Pre-construction surveys would be conducted along the Project corridor for greater sage-grouse leks, pygmy rabbits, raptor nests (including burrowing owl, ferruginous hawk, and northern goshawk), and the lyrate mountainsnail. Information obtained through these surveys would be incorporated into the final Project design to reduce impacts on special status species. The final locations of transmission line structures and access roads would avoid or span occupied habitats and nest sites to minimize the potential for mortality associated with construction activities. Seasonal restrictions and buffers would be applied to construction activities in the vicinity of sage-grouse leks and raptor nests to minimize behavioral disturbance during sensitive periods.

General habitat loss and fragmentation for special status species would be reduced by implementing selective mitigation measures. Where feasible, access roads would be closed to public access to reduce long-term disturbance and the potential for illegal mortality. The long-term presence of transmission line structures would have both beneficial and adverse impacts on special status species. As previously noted, the creation of perching sites can increase risk of nest predation and mortality of birds and small mammals in the immediate vicinity of these structures. Certain species, such as the greater sage-grouse, could experience higher rates of predation-related mortality while others, such as the ferruginous hawk, may benefit by the creation of perching and nesting habitat. Alternative D would eliminate foraging habitat for the Townsend's big-eared bat and fringed myotis, but would not affect bat roosts or hibernacula. Although Alternative D would result in habitat loss and the potential for mortality of individual animals, it would not have a significant adverse impact on special status species.

<u>Alternative E1 – Pass Canyon</u>

Vegetation

Alternative E1 would result in approximately 69 acres of permanent ground disturbance and the clearing of approximately 232 acres of vegetation (refer to Table 4-6). Initial and residual vegetation impact levels for Alternative E1 include 9.8 miles of low impact, 19.8 miles of moderate impact, and 1.5 miles of high impact. Selective mitigation measures would be implemented to minimize potential adverse impacts on vegetation (refer to Table 2-6). High impact areas include riparian forest habitat along Settlement Creek (Link 190), shrub riparian habitats along Pine Creek and Pass Creek (Links 220 and 225), and hybrid oak along Link 235. Riparian habitats would be spanned and trees selectively cleared to reduce impacts on these communities. This alternative would result in approximately 29 square feet of permanent wetlands disturbance and 0.8 acre of temporary wetlands disturbance. BMPs would minimize the introduction/spread of noxious weeds and risk of human-caused wildfire.

Sensitive Wildlife Habitat

Alternative E1 crosses 0.8 mile of core raptor nesting habitat, 6.2 miles of crucial greater sage-grouse habitat, 22.1 miles of crucial mule deer habitat (11.2 miles of winter range, 1.6 miles of summer/fall range, and 9.3 miles of winter/spring range), and 11.2 miles of crucial elk habitat (9.9 miles of winter range and 1.3 miles of summer/fall range). Initial wildlife impacts associated with Alternative E1 include 6.2 miles of low impact, 8.6 miles of moderate impact, and 16.3 miles of high impact. Initial high impacts are associated with core raptor nesting habitat, and mule deer and elk winter and summer/fall ranges. Moderate impacts are associated with crucial greater sage-grouse habitat and crucial mule deer winter/spring habitat. Impact types and mitigation measures are the same as described for Alternative D. Alternative E1 would parallel existing transmission lines for approximately 12.1 miles, including portions of the route that traverse crucial mule deer and elk seasonal ranges in the Oquirrh Mountains. Residual wildlife impact levels for Alternative E1 include 14.8 miles of low impact and 16.3 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative E1. Potential impacts on special status wildlife species associated with this alternative are similar to those described for Alternative D.

<u>Alternative E2 – Proponent's Proposed Action</u>

The Alternative E2 corridor is similar to Alternative E1, with Link 285 replaced by Link 265 near the existing Oquirrh Substation. This alternative would also parallel approximately 16.8 miles of transmission lines. Vegetation communities, crucial habitats, special status species, impact types, and mitigation measures are the same as described for Alternative E1. Alternative E2 crosses 0.9 mile less elk winter range and 0.6 mile less mule deer winter range (refer to Table 4-7). This alternative would result in approximately 29 square feet of permanent wetlands disturbance and 0.8 acre of temporary wetlands disturbance. Residual vegetation impact levels are similar to Alternative E1 with 1.0 mile more low impact and 1.0 mile less moderate impact (refer to Table 4-6). Residual wildlife impact levels are similar to Alternative E1 with 1.7 miles more low impact and 1.7 miles less moderate impact (refer to Table 4-7).

<u>Alternative F1 – Middle/Butterfield Canyon</u>

Vegetation

Alternative F1 would result in 79 acres of permanent ground disturbance and the clearing of approximately 261 acres of vegetation (Table 4-6). Initial and residual vegetation impact levels for Alternative F1 include 9.3 miles of low impact, 19.6 miles of moderate impact, and 0.4 mile of high impact. High impacts are associated with riparian forest and wetland communities along Settlement Creek (Link 190), Middle Creek (Link 215), and Butterfield Creek (Link 210). Selective mitigation measures and BMPs implemented to minimize potential adverse impacts on vegetation are similar to those described for Alternative D. Riparian forest and wetland communities would be spanned or otherwise avoided, and tree clearing would be limited in these areas. This alternative would result in approximately 113 square feet of permanent wetlands disturbance and 3.1 acres of temporary wetlands disturbance.

Sensitive Wildlife Habitat

Alternative F1 crosses 0.8 mile core raptor nesting habitat, 6.2 miles of crucial greater sage-grouse habitat, 12.1 miles of crucial mule deer habitat (4.5 miles of winter range and 7.6 miles of winter/spring range), and 2.1 miles of crucial elk winter range (Table 4-7). This alternative would parallel existing transmission lines for approximately 2.1 miles. Initial wildlife impacts associated with Alternative F1 include 14.4 miles of low impact, 9.5 miles of moderate impact, and 5.4 miles of high impact. Initial high impacts are associated with core raptor nesting habitat, and mule deer and elk winter ranges, and moderate impacts are associated with crucial greater sage-grouse habitat and mule deer winter/spring range. Impact types and selective measures are similar to those described for Alternative D, and include pre-construction surveys, seasonal restrictions and buffer zones, and closure of access roads (refer to Table 2-6). Residual wildlife impact levels for Alternative F1 include 23.9 miles of low impact and 5.4 miles of moderate impact.

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative F1. Special status wildlife species that are known or likely to occur along this alternative, and the mitigation measures that would be implemented to minimize adverse effects on these species are similar to those described for Alternative D. Alternative F1 contains suitable habitat for two additional special status species (Lewis's woodpecker and western red bat). Potential adverse impacts on the Lewis's woodpecker and western red bat include temporary disturbance during construction, and habitat loss associated with the removal of large riparian trees. These effects would be minimized by limited, selective tree clearing in forested riparian habitats through the implementation of selective mitigation measures. Although Alternative F1 would result in habitat loss (refer to Table 4-6) and the potential for mortality of individual animals, it would not have a significant adverse impact on any special status species or their habitats.

Alternative F2 – Middle/Butterfield Canyon

The Alternative F2 corridor is similar to Alternative F1, with the exception of some short links near the existing Oquirrh Substation. Total ground disturbance and vegetation clearing would be similar to Alternative F1 (refer to Table 4-6). Initial and final vegetation impact levels are similar to Alternative F1. Residual wildlife impact levels, and potential impact types and mitigation measures for vegetation, wildlife, and special status species, are the same as described for Alternative F1 (refer to Table 4-7). This alternative would result in approximately 113 square feet of permanent wetlands disturbance and 3.1 acres of temporary wetlands disturbance.

Alternative G – Lake Point

Vegetation

Alternative G would result in approximately 115 acres of permanent ground disturbance and the clearing of approximately 96 acres of vegetation (refer to Table 4-6). Initial and residual vegetation impact levels associated with this alternative include 17.7 miles of low impact, 18.8 miles of moderate impact, and 12.5 miles of high impact. High impacts are associated with wetland communities. This alternative would result in approximately 3,386 square feet (0.08 acre) of permanent wetlands disturbance and 103.6 acres of temporary wetlands disturbance. As previously discussed, the results of formal wetland delineations would be incorporated into final Project design, and wetlands would be spanned or disturbance would be minimized to the extent practicable. Selective mitigation measures would be implemented to minimize potential adverse impacts on vegetation (refer to Table 2-6). BMPs would minimize the potential for the introduction/spread of noxious weeds and the risk of human-caused wildfire.

Sensitive Wildlife Habitat

Alternative G crosses 5.9 miles of core raptor nesting habitat, 5.8 miles of crucial greater sage-grouse habitat, 23.3 miles of waterfowl pathways, 15.6 miles of crucial mule deer habitat (9.2 miles of winter range and 6.4 miles of winter/spring range), and 13.0 miles of crucial elk winter range. Initial wildlife impacts associated with this alternative include 6.1 miles of low impact, 3.5 miles of moderate impact, and 39.3 miles of high impact. High initial impacts are associated with core raptor nesting habitat, waterfowl movement pathways, and mule deer and elk winter ranges. Moderate impacts are associated with mule deer winter/spring range.

Impact types and selective measures implemented to minimize potential adverse impacts on wildlife resources are similar to those previously described. Habitat loss and fragmentation associated with ground disturbance would be an unavoidable adverse impact and would affect all wildlife species. Pre-construction surveys would be conducted for raptor nests, and final design would incorporate survey results to avoid disturbance of nests. Seasonal restrictions on construction activities would be implemented within the nest buffer zones and in crucial mule deer and elk winter ranges. Where practicable, access roads would be closed to minimize public access and associated disturbance, displacement, and increased legal and illegal mortality. Conductors would be marked along portions of the transmission lines that traverse waterfowl movement pathways to reduce the potential for avian mortality. Final wildlife impact levels for Alternative G include 9.7 miles of low impact and 39.3 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative G. Pre-construction surveys would be conducted for special status plant species and noxious weeds. The results of these surveys would be incorporated into the final Project design, and appropriate avoidance measures (i.e., spanning areas supporting plants/populations, transplanting) would be developed in consultation with the BLM. Although Alternative G could result in the loss of some individual plants, it would not result in a significant adverse impact on any special status plant species.

Alternative G crosses potential habitat for several special status wildlife species, including the western toad, lyrate mountainsnail, southern tightcoil, Preble's shrew, kit fox, pygmy rabbit, greater sage-grouse, long-billed curlew, burrowing owl, and ferruginous hawk. Special status bat species (Townsend's big-eared bat and fringed myotis), bald eagle, and peregrine falcon may forage in the habitats along this alternative. Alternative G would not affect any known bat roosts or hibernacula. The primary adverse effects on special status wildlife species would include short-term disturbance during construction and maintenance activities, habitat loss and mortality resulting from physical ground disturbance, and long-term disturbance and potential mortality associated with public use of access roads and the presence of transmission line structures. While habitat loss would be unavoidable, adverse effects on special status wildlife species would be reduced through the implementation of selective mitigation measures.

Pre-construction surveys would be conducted for greater sage-grouse leks, pygmy rabbits, Preble's shrew, raptor nests, lyrate mountainsnail, and southern tightcoil. Information obtained through these surveys would be incorporated into the final design to reduce impacts on special status species. Transmission line structures and access roads would be located to avoid or span occupied habitats and nest sites, and minimize the potential for mortality associated with construction activities. Seasonal restrictions and buffers would be applied to construction activities in the vicinity of sage-grouse leks and raptor nests to minimize behavioral disturbance during sensitive periods. General habitat loss and fragmentation for special status species would be reduced by implementing selective mitigation measures. Where feasible, access roads would be closed to public access to reduce long-term disturbance and the potential for illegal mortality. The long-term presence of transmission line structures would have both beneficial and adverse impacts on special status species. As previously noted, the creation of perching sites can increase risk of nest predation and mortality of birds and small mammals in the immediate vicinity of these structures. Certain species, such as the greater sage-grouse and pygmy rabbit, could experience higher rates of predation-related mortality while others, such as the ferruginous hawk, may benefit by the creation of perching and nesting habitat. Although Alternative G would result in habitat loss (refer to Table 4-6) and limited mortality of individual animals, this alternative would not have a significant adverse impact on any special status species or their habitats.

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Vegetation

Alternative H would result in approximately 88 acres of permanent ground disturbance and the clearing of approximately 41 acres of vegetation (refer to Table 4-6). Initial and final vegetation impact levels for Alternative H include 20.2 miles of low impact, 10.7 miles of moderate impact, and 14.5 miles of high impact. High impacts are associated with wetland communities, although the extent of these communities may be overestimated (refer to Section 3.2.3). This alternative would result in approximately 3,905 square feet (0.09 acres) of permanent wetlands disturbance and 119.8 acres of temporary wetlands disturbance. Selective mitigation measures would be implemented to minimize potential adverse impacts on vegetation. Formal wetland delineations would be completed prior to construction, and the results incorporated into final design to span or otherwise avoid wetlands to the maximum extent practicable. Where wetlands cannot be avoided, selective mitigation measures 1, 2, 7, 11, 12, 14, and 16 would be implemented. Location-specific mitigation measures, such as construction mats, would be developed in consultation with the USACE as part of the permitting process. BMPs would minimize the potential for the introduction/spread of noxious weeds and the risk of human-caused wildfire.

Sensitive Wildlife Habitat

Alternative H crosses 5.9 miles of core raptor nesting habitat, 5.8 miles of crucial greater sage-grouse habitat, 26.9 miles of waterfowl pathways, 6.1 miles of crucial mule deer habitat (1.1 miles of winter range and 5.0 miles of winter/spring range), and 4.0 miles of crucial elk winter range. Initial wildlife impacts associated with Alternative H include 8.5 miles of low impact, 3.5 miles of moderate impact, and 33.4 miles of high impact. High initial impacts are associated with core raptor nesting habitat, waterfowl movement pathways, and mule deer and elk winter ranges. Moderate impacts are associated with crucial greater sage-grouse habitat and crucial mule deer winter/spring range.

Impact types and selective measures implemented to minimize potential adverse impacts on wildlife resources are similar to those previously described. Habitat loss and fragmentation associated with ground disturbance would be an unavoidable adverse impact and would affect all wildlife species. High and moderate impact levels would be reduced by implementing selective mitigation measures. Specifically, pre-construction surveys would be conducted for raptor nests and greater sage-grouse leks, and final design would incorporate survey results to avoid nests and leks. Seasonal restrictions on construction activities would be implemented within the nest/lek buffer zones and in crucial mule deer and elk winter ranges. Where practicable, access roads would be closed to minimize public access and associated disturbance, displacement, and increased legal and illegal mortality. Conductors would be marked along portions of the transmission lines that traverse waterfowl movement pathways to reduce the potential for collision-related avian mortality. Residual wildlife impact levels for Alternative H include 12.0 miles of low impact and 33.4 miles of moderate impact (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative H. Pre-construction surveys would be conducted for special status plant species and noxious weeds. The results of these surveys would be incorporated into the final design, and appropriate avoidance measures would be developed in consultation with the BLM (i.e., spanning areas supporting plants/populations, transplanting). Although Alternative H could result in the loss of some individual plants, it would not result in a significant adverse impact on any special status plant species.

Alternative H crosses potential habitat for several special status wildlife species, including the western toad, lyrate mountainsnail, southern tightcoil, Preble's shrew, kit fox, pygmy rabbit, greater sage-grouse, long-billed curlew, burrowing owl, and ferruginous hawk. Bat species (Townsend's big-eared bat and fringed myotis), as well as the bald eagle and peregrine falcon, are likely to forage along this alternative. Alternative H would not affect any known bat roosts or hibernacula. The primary adverse effects on special status wildlife species would include short-term disturbance during construction and maintenance activities, habitat loss and mortality resulting from physical ground disturbance, and long-term disturbance and potential mortality associated with public use of access roads and the presence of transmission line structures. While habitat loss would be an unavoidable impact, potential adverse effects on special status wildlife species would be reduced through the implementation of selective mitigation measures.

Pre-construction surveys would be conducted for sage-grouse leks, pygmy rabbits, Preble's shrew, raptor nests, lyrate mountainsnail, and southern tightcoil. Information obtained through these surveys would be incorporated into the final design to reduce impacts on special status species. The final locations of transmission line structures and access roads would avoid or span occupied habitats and nest sites to minimize the potential for mortality associated with construction activities. Seasonal restrictions and buffers would be applied to construction activities in the vicinity of sage-grouse leks and raptor nests to minimize behavioral disturbance during sensitive periods. General habitat loss and fragmentation for special status species would be reduced by implementing selective mitigation measures. Where feasible, access roads would be closed to public access to reduce long-term disturbance and the potential for illegal mortality. The long-term presence of transmission line structures would have both beneficial and adverse impacts on special status species. As previously noted, the creation of perching sites can increase risk of nest predation and mortality of birds and small mammals in the immediate vicinity of these structures. Certain species, such as the greater sage-grouse and pygmy rabbit, could experience higher rates of predation-related mortality while others, such as the ferruginous hawk, may benefit by the creation of perching and nesting habitat. Although Alternative H would result in habitat loss (refer to Table 4-6) and the potential for mortality of individual animals, it would not have a significant adverse impact on any of these species or their habitats.

Alternative I – East Tooele Valley

Vegetation

Alternative I would result in approximately 72 acres of permanent ground disturbance and the clearing of approximately 41 acres of vegetation (refer to Table 4-6). Initial and residual vegetation impact levels associated with Alternative I include 21.7 miles of low impact, 10.1 miles of moderate impact, and 8.6 miles of high impact. High impact areas (wetlands), impact types, and mitigation measures are the same as described for Alternative H. This alternative would result in approximately 2,661 square feet (0.06 acre) of permanent wetlands disturbance and 77.7 acres of temporary wetlands disturbance.

Sensitive Wildlife Habitat

Alternative I crosses 0.8 mile of core raptor nesting habitat, 6.2 miles of crucial greater sage-grouse habitat, 16.0 miles of waterfowl pathways, 7.0 miles of crucial mule deer habitat (1.2 miles of winter range and 5.8 miles of winter/spring range), and 5.0 miles of crucial elk winter range. Initial wildlife impacts associated with Alternative I include 12.2 miles of low impact, 6.6 miles of moderate impact, and 21.6 miles of high impact. Initial high impacts are associated with core raptor nesting habitat, waterfowl movement pathways, and mule deer and elk winter ranges. Moderate impacts are associated with crucial greater sage-grouse habitat and crucial mule deer winter/spring range. Impact types and mitigation measures are the same as described for Alternative H. Residual wildlife impact levels for Alternative I include 18.8 miles of low and 21.6 miles of moderate impacts (refer to Table 4-7).

Special Status Species

No federally listed plant or animal species or designated critical habitats are known to occur along Alternative I. Special status wildlife species that are known or likely to occur along this alternative, and the mitigation measures that would be implemented to minimize adverse effects on these species are the same as described for Alternative H. Although Alternative I would result in habitat loss (refer to Table 4-6) and the potential for mortality of individual animals, it would not have a significant adverse impact on any of these species or their habitats.

Substation Sites

<u>Mona Annex Substation</u>

Construction of the proposed Mona Annex Substation would result in the permanent loss of approximately 203 acres of non-cultivated agricultural land, sparse big sagebrush, and invasive grassland. Impacts on vegetation are low. BMPs would be implemented to minimize the potential for the introduction/spread of noxious weeds and human-caused wildfire associated with construction activities.

The development of this site would result in the permanent loss of approximately 203 acres of crucial mule deer winter/spring range. However, habitat quality at this site has been reduced because of wildfire, agricultural activities, and the establishment of non-native grasses. Potential disturbance impacts on mule deer would be minimized by prohibiting construction activities during sensitive periods. Wildlife impacts are anticipated to be low.

No federally listed plant or animal species or designated critical habitats are known to occur within or adjacent to the proposed Mona Annex Substation site. The site does support potential habitat for several special status wildlife species, including the kit fox, greater sage-grouse, long-billed curlew, burrowing owl, ferruginous hawk, and bats. The primary adverse effects would include short-term disturbance and displacement during construction, and the loss of 203 acres of habitat. Habitat loss would be an unavoidable impact. Potential adverse effects on special status wildlife species would be reduced through the implementation of selective mitigation measures, including pre-construction surveys and seasonal restrictions on construction activities (where necessary). The development of the Mona Annex would not have a significant adverse impact on special status wildlife species.

Limber Substation

The Limber Substation would result in the permanent loss of approximately 155 acres of non-native grassland, big sagebrush, and pinyon-juniper. Mitigation measures are the same as described for the Mona Annex, and residual vegetation impacts are low. This substation site is in crucial greater sage-grouse habitat, crucial mule deer winter/spring range, and a core raptor nesting area. Impact levels would be reduced by implementing selective mitigation measures (refer to Table 2-6). Habitat loss would be unavoidable; however, the predominance of non-native grassland habitat on this site somewhat reduces habitat loss and fragmentation effects. Data from pre-construction surveys for sage-grouse leks and raptor nests would be incorporated into the final design, including seasonal restrictions and buffer zones. Potential disturbance impacts on mule deer would be reduced by prohibiting construction activities during sensitive periods. Residual wildlife impacts would be low.

No federally listed plant or animal species or designated critical habitats are known to occur within or adjacent to this site. Potential special status species that may occur on this site, impact types, and mitigation measures are the same as described for the Mona Annex. The development of the future Limber Substation would not have a significant adverse impact on any special status wildlife species.

4.2.4 Wildland Fire Ecology and Management

The Project alternatives are not anticipated to have significant impacts on the wildland fire ecology and management within the Project area. The alternatives do not conflict with the SLFO and FFO Fire Management Plans, with the exception of Link 190 at the south end of Settlement Canyon Reservoir. This reservoir is the only major water source on the east side of the Tooele Valley where fire helicopters can dip buckets for fire-fighting operations. Link 190 would potentially present a logistical and flight safety hazard to fire operations. As a mitigation measure, Link 190A has been introduced to avoid fire aviation operation conflicts, locating the transmission line route approximately 1,200 feet south of the reservoir in the foothills of the left hand fork of Settlement Canyon.

It is unlikely that the Project facilities would cause fires, except in the rare case of arcing from the power line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures ground the current. However, there are potential short-term impacts during construction when there is an increased risk of ignitions due to construction activities. Fire-safety mitigation measures and protocols are addressed in detail in the fire protection portion of the POD. Potential indirect effects include increased fire frequency due to increased traffic on access roads. Studies have shown that road density may be related to the frequency of human-caused ignitions. Mitigation measures would be implemented in areas of concern to limit the construction of new access roads or limit access to new roads.

Wildland fires have the potential to significantly affect the operation of the Project facilities and, consequently, the reliability of the transmission system in the region. The alternatives from Mona to Limber (A1, A2, B1, B2, C1, and C2), in particular, are susceptible to outages due to the incidence of wildfires in the area. Wildfires generate heat and smoke and have been documented to cause line outages in Utah and other parts of the western United States (Rocky Mountain Power 2008). The Long Ridge Mountains on the west side of Juab Valley are highly susceptible to lightning strikes, and cheatgrass in the area allows fires to grow and spread rapidly (UFFSL 2007). Wildfires can damage transmission line structures and smoke can cause transmission lines to arc, rendering them out-of-service.

A wildfire on the west side of Juab Valley could result in the outage of three 345kV transmission lines within the existing corridor, as well as the proposed 500kV line. The outage of these lines would likely result in the loss of the entire load serving the Wasatch Front and cause rotating blackouts (Rocky Mountain Power 2008). Alternatives A1, B1, and C1 parallel the existing corridor for approximately 5.8 miles, and Alternatives A2, B2, and C2 parallel the existing corridor for approximately 3.6 miles.

4.2.5 Cultural Resources and Native American Concerns

4.2.5.1 Introduction

This section describes and evaluates the potential impacts on cultural resources and Native American concerns that would result from the construction, operation, maintenance, and decommissioning of the proposed transmission lines and substations.

The primary cultural resource impact issue is the loss or degradation of prehistoric and historic archaeological sites. Three types of impacts could affect archaeological sites:

1. Direct and permanent ground disturbance during construction
2. Direct and long-term visual and auditory intrusions
3. Indirect and permanent disturbances due to changes in public accessibility

As outlined in the PA, cultural resources will be considered during the post-EIS phase of the project. Consultation with appropriate land management agencies, tribal governments, and the SHPO will continue and intensive pedestrian surveys of the selected route, associated access roads, substations, and similar ancillary facilities will be conducted. All cultural resources identified during the intensive surveys will be evaluated for eligibility to the NRHP based on criteria set forth in the federal regulation 36 CFR 60.4:

> *The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:*
>
> *(A) that are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(B) that are associated with the lives of persons significant in our past; or*
>
> *(C) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(D) that have yielded, or may be likely to yield, information important in prehistory or history.*

4.2.5.2 Impact Assessment Methodology

An impact assessment methodology was developed to identify and evaluate potential impacts on cultural resources associated with the Proposed Action and alternatives. The methodology involved a two-step process. First, all cultural resources within the Class I study area were assigned a sensitivity level of either low, moderate, high, or very high (refer to Section 3.2.5). Based on sensitivity levels, impact levels were then assigned along each link in 0.1-mile segments (Appendix C, Map C-7). This information was compiled and the length of each impact level for each alternative route was calculated (refer to Table 4-7). The criteria used to define impacts follows.

- *High Impact Level* – Locations where sites eligible for listing on the NRHP or special status sites would be affected by construction of the proposed Project. These resources are likely to be important for values other than their information potential or may contain human burials. These sites are more difficult to avoid by construction, and data recovery studies, if required, would involve a greater number of features and may or not eliminate high impacts.

- *Moderate Impact Level* – Locations where sites eligible for listing on the NRHP, or whose eligibility is unknown, would be affected by construction of the proposed Project. These include sites that are more easily avoided by construction, and are expected to result in few, if any, adverse effects. Data recovery studies, if required, would involve fewer features and are unlikely to encounter human remains.

- *Low Impact Level* – Locations where sites are not eligible for listing on the NRHP would be affected by construction of the proposed Project. In these areas, no data recovery or other mitigation would be required.

Ratings of impacts along each alternative link were based on consideration of (1) the sensitivity (quality) of cultural resources, and (2) the extent of ground disturbance. Because intensive surveys have not been conducted along all the alternative links, detailed inventories of archaeological and historical sites are not available. Detailed construction plans have not been completed either, so both sensitivity of the resources and the extent of ground disturbance were estimated by developing models.

The inventory section of Chapter 3 described how cultural resource sensitivities were characterized as low, moderate, high, or very high. The impact assessment evaluates the potential to affect these resources based on construction of the transmission lines, ancillary facilities, and associated new access. Zones for each level of access identified in Table 2-7 were considered in the assessment.

Impacts to significant cultural resource properties can be effectively reduced, and in some instances eliminated, through project planning. The application of selective mitigation methods (i.e. avoidance, data recovery, construction monitoring, and archival research) to cultural resources would reduce impacts. Avoidance is the preferred mitigation for cultural resources. Spanning of the sites and the selective alignment of new access roads would likely provide adequate avoidance and provide for a finding of no significant effect to cultural properties. If avoidance is not possible, other mitigation efforts would be necessary. Measures to avoid or mitigate high impacts are likely to require substantial effort and may or may not eliminate high impacts. Measures to avoid or mitigate moderate impacts are likely to require moderate-to-high levels of effort, but are expected to result in few, if any, adverse effects. Measures to avoid or mitigate low impacts would likely not be extensive and could potentially eliminate the impacts and result in no adverse effects. All mitigation efforts will be in accordance with the requirements of the PA negotiated for this Project.

Potential visual effects on cultural resources were evaluated as part of this assessment. Historic sites identified during the Class I survey in the visual APE potentially would be affected due to changes in the existing historic setting or to views from sensitive cultural sites. The Project could represent a noticeable additional modification to the setting of cultural resources within the Project visual APE. The introduction of these contrasting elements could create an indirect impact by altering the setting of the cultural site, possibly diminishing its integrity. Once a preferred alternative has been identified, a detailed cultural resources inventory of the route will be conducted and this inventory will include a more detailed analysis of visual effects on specific cultural resources.

4.2.5.3 Summary of Impact Analysis Results

Impacts on cultural resources are generally rated as low to moderate throughout the Project area, reflecting the high potential to satisfactorily mitigate impacts on the types of sites identified within the study area. BMPs (refer to Table 2-5) incorporated into the Project description will further reduce impacts. The PA developed in conjunction with the preparation of the EIS stipulates that the preferred/selected alternative will be subject to Class III (intensive) investigations and that a comprehensive Treatment Plan addressing the effects of the proposed undertaking on historic properties be prepared and implemented.

A summary of the impacts for each project alternative is presented in Table 4-8. The following sections describe the potential impacts on cultural resources for each Project alternative.

TABLE 4-8
SUMMARY OF ESTIMATED CULTURAL RESOURCE IMPACTS

Alternative Route	Alternative Length (miles)	Low Impacts	Moderate Impacts	High Impacts
Mona to Limber				
Alternative A1	67.9	67.7	0.7	0.0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	69.4	69.0	0.4	0.0
Alternative B1	70.0	69.0	0.5	0.0
Alternative B2	71.5	71.2	0.3	0.0
Alternative C1	67.1	66.2	0.9	0.0
Alternative C2	68.4	67.9	0.5	0.0
Limber to Oquirrh				
Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	31.1	30.9	0.2	0.0
Alternative E1	31.1	30.8	0.1	0.0
Alternative E2 – Proponent's Proposed Action	31.1	30.9	0.2	0.0
Alternative F1	29.3	29.1	0.2	0.0
Alternative F2	29.6	29.4	0.2	0.0
Alternative G	49.0	48.4	0.6	0.0

TABLE 4-8 SUMMARY OF ESTIMATED CULTURAL RESOURCE IMPACTS				
Alternative Route	**Alternative Length (miles)**	**Low Impacts**	**Moderate Impacts**	**High Impacts**
Limber to Terminal				
Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action	45.4	44.7	0.7	0.0
Alternative I	40.4	36.4	4.0	0.0
NOTES: All impacts are estimated in miles				

No Action Alternative

Under this alternative, the environment would remain as it presently exists. This option would forego the opportunity to develop detailed cultural resource inventories along a route, and any recovery of archaeological data that might be undertaken to mitigate Project impacts; however, any conflicts with heritage preservation would be avoided by the No Action Alternative.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Alternative A1 is anticipated to have approximately 67.7 miles of low impact, 0.7 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of five NRHP-eligible sites located within 500 feet of the proposed centerline. One prehistoric site is located along Link 5. There are important prehistoric Fremont villages (400 AD to 1300 AD) in the general region of these links (Marwitt 1986:161-162). A historic site is located along Link 20 and the centerline bisects historic linear sites along Links 20, 50, and 105.

The highest potential for visual effects to cultural resources would occur along Link 20 due to a number of historic mining sites located within 1 mile of the centerline. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Alternative A2 is anticipated to have approximately 69.0 miles of low impact, 0.4 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of three NRHP-eligible sites located within 500 feet of the proposed centerline. A prehistoric site is located along Link 10, and the centerline bisects historic linear sites along Links 50 and 105.

The highest potential for visual effects to cultural resources would occur along Link 105 at the Clover Reservoir Dam and the Clover Railroad Siding sites. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative B1 – East Rush Valley

Alternative B1 is anticipated to have approximately 69.0 miles of low impact, 0.5 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of four NRHP-eligible sites located within 500 feet of the proposed centerline. One prehistoric site is located along Link 5. Important prehistoric Fremont villages (400 AD to 1300 AD) exist in the general region of this link (Marwitt 1986:161-162). The centerline bisects historic linear sites along Links 20 and 50. There are also historic mining sites located along Link 20. Two historic mining districts (Ophir and Mercur) are located in the mountains along Link 95. The western margin of the Mercur Mining District is bisected by the alternative, but no identified cultural resource sites are located within the proposed right-of-way.

The highest potential for visual effects to cultural resources would occur along Link 95 due to a number of historic mining sites associated with the Ophir Mining District. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative B2 – East Rush Valley

Alternative B2 is anticipated to have approximately 71.2 miles of low impact, 0.3 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of two NRHP-eligible sites located within 500 feet of the proposed centerline. One prehistoric site is located along Link 10, and important prehistoric Fremont villages (400 AD to 1300 AD) exist in the general region of this link (Marwitt 1986:161-162). The centerline bisects a historic linear site along Link 50. Two historic mining districts (Ophir and Mercur) are located in the mountains along Link 95. The western margin of the Mercur Mining District is bisected by the alternative, but no identified cultural resource sites are located within the proposed right-of-way.

The highest potential for visual effects to cultural resources would occur along Link 95 due to a number of historic mining sites associated with the Ophir Mining District. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative C1 – Tintic Junction

Alternative C1 is anticipated to have approximately 66.2 miles of low impact, 0.9 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of six NRHP-eligible sites located within 500 feet of the proposed centerline. One prehistoric site is located along Link 5. Important prehistoric Fremont villages (400 AD to1300 AD) exist in the general region of this link (Marwitt 1986:161-162). The centerline bisects five historic linear sites: two along Link 20, one along Link 24, and one along Link 26 within the Tintic Mining District, which is listed on the National Register of Historic Places.

The highest potential for visual effects to cultural resources would occur along Link 20 due to a number of historic mining sites along Links 24 and 26 due to the Tintic Mining District, Denver and Rio Grande Railroad, and Salt Lake and Western Railroad. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative C2 – Tintic Junction

Alternative C2 is anticipated to have approximately 67.9 miles of low impact, 0.5 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of four NRHP-eligible sites located within 500 feet of the proposed centerline. A prehistoric site is located along Link 10. The centerline bisects three historic linear sites: one along Link 24, one along Link 26 within the Tintic Mining District and one along Link 10.

The highest potential for visual effects to cultural resources would occur along Links 24 and 26 due to the Tintic Mining District, Denver and Rio Grande Railroad, and Salt Lake and Western Railroad. Other cultural resources associated with this alternative are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Alternative D is anticipated to have approximately 30.9 miles of low impact, 0.2 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of one NRHP-eligible historic linear site that is bisected by the centerline along Link 241.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative E1 – Pass Canyon

Alternative E1 is anticipated to have approximately 30.8 miles of low impact, 0.1 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of one NRHP-eligible historic linear site bisected by the centerline along Link 220.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative E2 – Proponent's Proposed Action

Alternative E2 is anticipated to have approximately 30.9 miles of low impact, 0.2 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of two NRHP-eligible historic linear sites bisected by the centerline along Links 220 and 241.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative F1 – Middle/Butterfield Canyon

Alternative F1 is anticipated to have approximately 29.1 miles of low impact, 0.2 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of two NRHP-eligible historic linear sites bisected by the centerline along Link 215.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative F2 – Middle/Butterfield Canyon

Alternative F2 is anticipated to have approximately 29.4 miles of low impact, 0.2 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of two NRHP-eligible historic linear sites bisected by the centerline along Link 215.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Alternative G – Lake Point

Alternative G is anticipated to have approximately 48.4 miles of low impact, 0.6 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of five NRHP-eligible sites located within 500 feet of the proposed centerline. Two prehistoric cave sites, which were occupied during the Early Archaic (8500 to 5500 BP) and again between the Late Archaic through the Fremont (3200 to 1000 BP) (Madsen 1983;ii,15), are located along Link 370. Historic linear sites along Links 241, 335, and 370 are bisected by the centerline.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Alternative H is anticipated to have approximately 44.7 miles of low impact, 0.7 mile of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of five NRHP-eligible sites located within 500 feet of the proposed centerline. Two prehistoric cave sites, which were occupied during the Early Archaic (8500 to 5500 BP) and again between the Late Archaic through the Fremont (3200 to 1000 BP) (Madsen 1983;ii,15), are located along Link 370. Historic linear sites along Links 335, 370, and 386 are bisected by the centerline.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines would be blocked by terrain.

<u>Alternative I – East Tooele Valley</u>

Alternative I is anticipated to have approximately 36.4 miles of low impact, 4.0 miles of moderate impact, and no high impact on cultural resources. The amount of moderate impact is a result of the presence of 13 NRHP-eligible sites located within 500 feet of the proposed centerline. Two prehistoric cave sites, were occupied during the Early Archaic (8500 to 5500 BP) and again between the Late Archaic through the Fremont (3200 to 1000 BP) (Madsen 1983;ii,15), are located along Link 370. Two historic military sites are located along Link 330. Historic linear sites along Links 326, 330, 360, 370, 385, and 386 are bisected by the centerline.

The potential for visual effect to cultural resources is anticipated to be low for this alternative because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the substations would be blocked by terrain.

Substation Sites

There are two proposed substation sites (Limber and Mona Annex). Both locations are anticipated to have a low impact on cultural resources. No known cultural resources are located within the proposed substation sites.

The potential for visual effect is anticipated to be low because the cultural resources associated with it are either too far away, located in settings that have already been modified, or are located in areas where views of the transmission lines and substations would be blocked by terrain.

4.2.5.4 Native American Concerns

As previously stated in Chapter 1, no Native American concerns have been identified at this time; however, consultation will continue as outlined in the PA. Once the Class III survey and report have been completed, the BLM will host a field visit for the Paiute Indian Tribe of Utah and other interested tribes. If any traditional cultural places are identified through this process, the guidelines for evaluating them (National Register Bulletin 38) will be followed. Potential measures to mitigate impacts to traditional cultural places include, but are not limited to (1) shifting of tower locations to avoid direct impacts, (2) minimizing ground disturbance by careful placement of new access roads and staging areas, and (3) scheduling construction activities to avoid conflicts with traditional cultural activities.

4.2.6 Paleontological Resources

4.2.6.1 Introduction

This section describes and evaluates the potential impacts on paleontological resources that would result from the construction, operation, maintenance, and decommissioning of the proposed transmission lines and substations.

The primary impact issue for paleontological resources is the loss of scientifically significant fossils and their contextual data. Two types of impacts could potentially affect paleontological resources:

1. Direct and permanent ground disturbance during construction
2. Indirect and permanent disturbance due to changes in public accessibility

The primary concern regarding impacts to paleontological resources is that direct damage or destruction of fossils would result in the loss of important scientific information. It is possible that ground disturbance, such as grading and cutting of access roads, auguring or blasting for tower footings and anchors, or preparing batch-plant sites and staging areas, could encounter important paleontological resources. In addition, adverse impacts indirectly associated with construction are a concern. For example, fossils could be subject to damage or destruction by erosion that is accelerated by construction disturbance. Improved access and increased visibility as a result of construction could cause fossils to be damaged, destroyed, or collected because of unauthorized collection or vandalism. However, not all impacts of construction are adverse to paleontology. Excavation can and often does reveal significant fossils that would otherwise remain buried and unavailable for scientific study. In this manner, excavation can result in beneficial impacts. Such fossils can be collected properly and catalogued into the collection of a museum repository so that they can be available for scientific study.

To mitigate potential impacts to paleontological resources, a more detailed inventory would be completed for those portions of the proposed route that warrant further investigation (i.e., PFYC of 3, 4, and 5), and to develop plans to avoid or mitigate impacts once more information is available. Areas of potential scientifically significant paleontological resources would be reviewed in coordination with the land-managing agency to identify the need, if any, for pre-construction field surveys. Following pre-construction field surveys, a plan would be developed to address the mitigation of specific areas. Mitigation of ground-disturbing impacts may involve: (1) minor design modifications, such as shifting the location of a tower or access road in order to avoid direct effects; or (2) collecting important fossil specimens and their contextual information from paleontological localities by conducting research prior to or during construction. Also, the plan would address mitigation of paleontological resources that may be discovered during construction. A rating of low residual impact assumes that scientifically significant fossil specimens and contextual information would be adequately collected from localities if they could not be avoided by the proposed route. Therefore, residual impacts on paleontological resources would be considered low to nonexistent, as long as proper mitigation procedures collected significant fossils along with their contextual data.

4.2.6.2 Impact Assessment Methodology

In order to assess the relative impact each alternative route may potentially have on paleontological resources, potential impact levels were determined for each alternative route based on the PFYC and the inventory database of fossil localities. Literature research, institutional record searches, and the PFYC provided the data necessary to assign a potential impact level of high, low, or moderate/undetermined to portions of the project area. Future provisions for mitigation of adverse impacts to significant paleontological resources exposed during construction-related activities along the project corridor are based upon these determinations of potential impact level. The terms “high potential impact level,” “low potential impact level,” and “moderate/undetermined potential impact level” are defined below:

- *High Potential Impact Level* – Geological units with a high potential for containing significant paleontological resources are determined to have a high potential impact level. In these cases, the geological unit contains a high density of recorded fossil localities, has produced fossil remains in or near the vicinity of the project, and is very likely to yield additional remains during construction. Areas identified as having a class 4 or 5 in the PFYC system are considered to have a high potential impact level.

- *Moderate/Undetermined Potential Impact Level* – The geological unit has limited exposure in the project area, is poorly studied, or contains no recorded paleontological resource localities. However, in other areas, the same or similar geological units may contain sufficient paleontological localities to suggest that exposures of the unit in the project area would have at least a moderate potential for yielding fossil remains. Areas with a class 3 in the PFYC system are considered to have a moderate or undetermined potential impact level.

- *Low Potential Impact Level* – The geological unit contains no or a very low density of recorded fossil localities, has produced little or no fossil remains in the vicinity of the project, and is not likely to yield any fossil remains. Nevertheless, geological units with few or no prior recorded fossil localities can still prove fossiliferous during paleontological mitigation activities. Areas identified as having a class 1 or 2 in the PFYC system are considered to have a low potential impact level.

The analysis of impacts to paleontological resources is based on a literature review of known resources, record searches at paleontological institutions, and assignment of paleontological potential based on geological units and known fossil localities. The following indicators were considered when analyzing the potential impacts to paleontological resources:

- Known fossil localities
- Proximity to geological units with potential to contain paleontological resources
- Depth of excavations associated with project components

4.2.6.3 Summary of Impact Analysis Results

Impacts to paleontological resources are rated as low to moderate/undetermined along the project centerline (Table 4-9). A summary of the impacts for each project alternative is presented in Table 4-9. The following section describes the potential impacts on paleontological resources for each project alternative.

TABLE 4-9
SUMMARY OF ESTIMATED PALEONTOLOGICAL RESOURCE IMPACTS

Alternative	Length (miles)	Low Impacts (miles)	Moderate/ Unknown Impacts (miles)	High Impacts (miles)
Mona to Limber				
Alternative A1	67.9	43.5	24.4	0.0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	69.4	45.2	24.2	0.0
Alternative B1	70.0	58.3	11.7	0.0
Alternative B2	71.5	60.0	11.5	0.0
Alternative C1	67.0	36.9	30.0	0.0
Alternative C2	68.4	38.6	29.8	0.0

TABLE 4-9 SUMMARY OF ESTIMATED PALEONTOLOGICAL RESOURCE IMPACTS				
Alternative	**Length (miles)**	**Low Impacts (miles)**	**Moderate/ Unknown Impacts (miles)**	**High Impacts (miles)**
Limber to Oquirrh				
Alternative D – BLM’s Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	31.1	21.0	10.1	0.0
Alternative E1	31.1	23.2	7.8	0.0
Alternative E2 – Proponent’s Proposed Action	31.1	20.8	10.3	0.0
Alternative F1	29.3	21.1	8.1	0.0
Alternative F2	29.6	21.1	8.5	0.0
Alternative G	49.0	29.7	19.3	0.0
Limber to Terminal				
Alternative H – Environmentally Preferred Alternative/Proponent’s Proposed Action	45.4	28.9	16.5	0.0
Alternative I	40.4	13.3	27.2	0.0

No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to paleontological resources.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Alternative A1 is anticipated to have approximately 43.5 miles of low impact, 24.4 miles of moderate/undetermined impact, and no high impact on paleontological resources along the project centerline. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits and Salt Lake Formation that may contain fossil land mammals or other vertebrates.

<u>Alternative A2 – BLM’s Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent’s Proposed Action</u>

Alternative A2 is anticipated to have approximately 45.2 miles of low impact, 24.2 miles of moderate/ undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits and Salt Lake Formation that may contain fossil land mammals or other vertebrates.

<u>Alternative B1 – East Rush Valley</u>

Alternative B1 is anticipated to have approximately 58.3 miles of low impact, 11.7 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

<u>Alternative B2 – East Rush Valley</u>

Alternative B2 is anticipated to have approximately 60.0 miles of low impact, 11.5 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

<u>Alternative C1 – Tintic Junction</u>

Alternative C1 is anticipated to have approximately 36.9 miles of low impact, 30.0 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits Salt Lake Formation that may contain fossil land mammals or other vertebrates.

<u>Alternative C2 – Tintic Junction</u>

Alternative C2 is anticipated to have approximately 38.6 miles of low impact, 29.8 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits Salt Lake Formation that may contain fossil land mammals or other vertebrates.

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

Alternative D is anticipated to have approximately 21.0 miles of low impact, 10.1 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

<u>Alternative E1 – Pass Canyon</u>

Alternative E1 is anticipated to have approximately 23.2 miles of low impact, 7.8 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

<u>Alternative E2 – Proponent's Proposed Action</u>

Alternative E2 is anticipated to have approximately 20.8 miles of low impact, 10.3 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

Alternatives F1 and F2 – Middle/Butterfield Canyon

Alternative F1 is anticipated to have approximately 21.1 miles of low impact, 8.1 miles of moderate/undetermined impact, and no high impact on paleontological resources. F2 is anticipated to have approximately 21.1 miles of low impact, 8.5 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

Alternative G – Lake Point

Alternative G is anticipated to have approximately 29.7 miles of low impact, 19.3 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

Limber to Terminal

Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action

Alternative H is anticipated to have approximately 28.9 miles of low impact, 16.5 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

Alternative I – East Tooele Valley

Alternative I is anticipated to have approximately 13.3 miles of low impact, 27.2 miles of moderate/undetermined impact, and no high impact on paleontological resources. Moderate/undetermined impact areas are comprised of Lake Bonneville deposits that may contain fossil land mammals or other vertebrates.

Substation Sites

There are two proposed substation sites (Mona Annex and Limber). Both locations are anticipated to have a low impact on paleontological resources, based on the absence of any known paleontological resources located within the proposed substation sites and on the presence of Quaternary alluvium and colluvium, which have a low PFYC.

4.2.7 Visual Resources

4.2.7.1 Introduction

This section summarizes visual impacts of the Project alternatives. Visual resource impacts would result from the construction, operation, maintenance, and decommissioning of the proposed 345kV and 500kV transmission lines and the proposed Mona Annex and Limber substations.

4.2.7.2 Impact Assessment Methodology

The primary purpose of the impact assessment was to evaluate and characterize the level of visual modification to the landscape that could result from the construction, operation, and maintenance of the proposed Project. Impacts associated with the Project could occur if scenic quality is degraded or views from sensitive viewpoints are adversely modified. This section of the report describes the impact assessment methods and results of the visual resources study. Identified visual impacts are discussed in terms of residual impacts. Residual impacts would occur after selective mitigation measures have been implemented and are discussed as they affect scenic quality and sensitive viewers pertaining to the study area. Compliance with agency management objectives is based on the anticipated Project contrast as it affects scenic quality and sensitive viewers.

The Project would cause construction, operations, and maintenance impacts on visual resources as a result of the following:

- The presence of construction vehicles and equipment (short term)
- The construction of new roads and the upgrading of existing roads for access (long term)
- Ground disturbance at transmission line structures and substation sites (short term)
- Assembly and erection of transmission line structures and substation components (short term)
- The stringing of conductors (short term)
- Transmission line structures (long term)
- Substation components (long term)

Impacts evaluated in this study include the following:

- Effects of views from residences in the communities of Magna, Tooele, Lincoln, Saint John, Onaqui, and Mona, as well as those scattered in the Salt Lake, Tooele, Rush, Cedar, Goshen, and Juab valleys

- Effects on views from the NOMA, Goshen Reservoir Camping Area, Fivemile Pass OHV Recreation Area, Settlement Canyon Reservoir, Little Moab Cave Area, Yellow Fork Canyon Regional Park, Tooele County trails, and other parks and recreation areas

- Effects of views from I-80, U.S. 6, SR 73, SR 36, and other travel routes, as well as the Middle Canyon State Scenic Backway, Pony Express National Backcountry Byway, and other designated scenic byways and recreation destination routes

- Effects on views from cultural resource sites such as the California National Historic Trail and Pony Express National Historic Trail (e.g., eligible historic sites, historic trails and cemeteries, etc.)

- Effects on scenic quality in the Oquirrh Mountains, Tintic Mountains, Stansbury Mountains, and other high quality landscapes

- Effects on developed landscapes (compatibility)

- Compliance with agencies' visual management objectives (e.g., VRM classes)

The impact assessment methodology (refer to Appendix F, Figure F-18) is consistent with the BLM Manual Handbooks 8410-1 Visual Resource Inventory and 8431-1 Visual Resource Contrast Rating, as well as other studies conducted on similar high-voltage transmission line projects. The measure of visual impacts is based on project contrast created as a result of the Project as compared to existing scenic quality, viewer sensitivity, and viewing distance, as identified in the inventory process. This systematic approach employs various contrast and impact models that when combined help to estimate residual (mitigated) impacts of the Project on viewers and scenic quality.

The visual impact analysis was conducted with GIS software to model the potentially seen areas in order to develop maps of visual impacts and document the effects of the Project. Changes in the landscape (contrast) in terms of landform, vegetation, and structures were developed from an evaluation of existing data (aerial photography, GAP data, digital elevation models, etc.), coupled with field observation.

Impact Levels

Viewer sensitivity and change to the existing landscape character are the primary factors in determining visual impacts. Impacts on scenic quality and developed areas were determined by comparing visual changes associated with the Project (e.g., new or additional lines in the landscape) with existing landscape elements and compatibility with the Project features. Residual impacts represent impact levels after selective mitigation measures are employed to reduce impacts. In some cases, there were site-specific circumstances that modified impact levels. The intensity of residual impacts was placed on a scale of three levels defined as follows:

- *High Impact* – Assigned to segments of the Project or areas where Project contrast would be readily apparent to the casual viewer. High impacts also are expected in high quality, diverse, and rare or unique and natural scenic landscapes, where anything more than minimal change in the landscape would occur. High impacts would also be expected where the development context would not absorb the introduction of a Project component, such as in a residential or recreational landscape where no transmission lines or similar features occur. Project features would be visually intrusive and incongruent with the form, line, color, and/or texture of the existing landscape.

- *Moderate Impact* – Assigned to segments of the Project or areas where project contrast would co-dominate with existing landscape features and be moderately apparent to the casual viewer. Moderate impacts also are expected in interesting, but not outstanding natural scenic quality where changes would modify the inherent quality of the landscape, or in developed areas that may accept some degree of change without substantially modifying the character of the developed landscape. Typically, the Project would parallel existing linear features.

- *Low Impact* – Assigned to segments of the Project or areas where Project contrast would be subordinate in the landscape and not readily apparent to the casual viewer. Low impacts on natural scenic quality would occur where Project contrast are minimal and where scenery is common, or where the development context is such that the changes caused by the Project are easily absorbed or are in character with the existing development. In most low impact situations, the proposed Project would parallel an existing similar transmission line facility.

4.2.7.3 Visual Resource Management Compliance

Compliance with VRM class objectives is based on change in the landscape (refer to Appendix F, Table F-16), or project contrast and existing landscape conditions. A strong project contrast would be acceptable in a VRM Class IV Objective area because "the level of change to the characteristic landscape can be high," or management activities may contrast *strongly* with the existing character of the landscape.

Similarly, in a Class III Objective VRM area, "change to the characteristic landscape should be moderate;" therefore, *moderate* project contrast resulting from management activities (the Project) would be acceptable. Finally, Class II VRM Objectives would only allow for *weak* project contrast, or a "low level of change" in the landscape. Table F-16 (Appendix F) reflects the management objectives as stated in the BLM Manual policy with regards to changes in the characteristic landscape.

4.2.7.4 Visual Simulations

Visual simulations were produced to show the range of potential impacts resulting from the presence of the various Project components in different landscape settings from sensitive viewpoints. Landscape settings include undeveloped valleys, agricultural landscapes, foothills, and mountainous areas. Eighteen simulations were developed at eleven viewpoints over the Project area. Table F-17 (Appendix F) summarizes the locations of the visual simulations and sensitivities of the viewpoints shown in Appendix G.

4.2.7.5 Summary of Impact Analysis Results

A summary of initial visual impacts on high and moderate sensitivity viewers and scenic quality and total miles of residual impacts and selective mitigation measures for each alternative are summarized in Appendix F, Table F-15. Map C-8 (Appendix C) shows the locations of the sensitive viewpoints, scenic quality, and visual resource management objectives.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and visual impacts on viewers and scenic quality would not occur. No visual contrast would be created and the landscape would remain in its current condition.

Mona to Limber

<u>Alternative A1 – North Long Ridge Mountains</u>

Moderate impacts would occur to scenic quality in Class B agricultural landscapes in the upper Rush Valley and southern Goshen Valley along Links 105 (Mileposts 3.7-4.3) and 20 (Mileposts 3.8-5.0) Mitigation measures would reduce impacts from high to moderate by reducing structure contrast (refer to Appendix F, Section F.2.1.4 for mitigation measure planning). Moderate scenic quality impacts also would occur in Class C landscape in areas of strong project contrast, occurring along most of the alternative. Moderate scenic quality impacts totaling 41.3 miles would remain over most of this alternative.

High impacts for 0.7 mile (Link 150 between Mileposts 2.5 and 3.2) would be created as a result of transmission line views from two residences located west of South Mountain north of East Hickman Canyon. The 500kV transmission line would be viewed against the scenic mountain landscape in the immediate foreground and dominate views from this location.

Moderate impacts also would occur on the north end of Rush Valley and south of South Mountain for residences located along Indian Mountain Road. Residences in this area have views to the Stansbury

Mountains in the direction of the transmission lines, where the lines would be viewed against the mountains along Link 150, around Milepost 1.5. Mitigation measures would be used to reduce impacts in this area. However, between Mileposts 2.5 and 3.2, the strong structure contrast would be viewed in the immediate foreground and seen against South Mountain to one residence located west of Mormon Trail Road. The Project would be partially obscured by topography in this area, but the transmission lines would remain dominant in the viewshed from this location and impacts would remain moderate to high.

Alternative A1 also would cause moderate impacts on residences viewing the line in north Rush Valley (Saint John, Onaqui, and Rush Valley) along Link 105. The presence of the transmission lines would cause moderate impacts on residences located on the east side of the Saint John area, on the east side of North Main Street. Views to the transmission lines would be largely unobstructed across the valley from these viewpoints and would be a prominent feature in the valley from these residences. West of Faust and the SR 36 intersection, impacts on one residence located along the railroad would be low due to distance from the Project (1.7 miles) and topographical screening to the east.

The 500kV line would cause moderate impacts on one residence located at the south end of Cedar Valley, where the line would cause strong contrast and be visible within 0.8 miles up the valley to the north (Link 60). To the southeast, moderate impacts on residences located in the south end of Goshen Valley also would occur. Several houses located along Tunnel Road and West 17600 South (south of U.S. 6) would view the line across the valley to the south and west in an area of strong project contrast (Links 20 and 50).

In northern Juab Valley, the Project would be viewed from residences located along Goshen Valley Road and the near the Burraston Ponds WMA, in the context of existing transmission infrastructure at a distance of at least 2 miles. Moderate-strong contrast created along Links 1, 2, and 5 in this context and at this distance would cause moderate to low impacts on these residences (refer to Viewpoint 2, Appendix G). Also, this alternative would cause moderate impacts along Links 50 and 20 on the residences on the south side of Goshen Valley, where strong contrast would be seen unobstructed in the middleground as the line crosses the west side of the valley.

High impacts would occur on views from SR 36 in northern Rush Valley (Link 90, Mileposts 9.8-14.3, and Link 105, Mileposts 0.0-2.8) where strong contrast would be seen in an open and generally parallel viewing condition in the foreground and immediate foreground for 7.3 miles (refer to Viewpoint 1, Appendix G). Along Links 150 and 105, north-bound travelers using the Mormon Trail Road would also view the line for a long duration, as it parallels Mormon Trail Road and is viewed against South Mountain for 7.4 miles (Link 105, Mileposts 5.2-7.7; Link 150, Mileposts 0.0-4.9) resulting in strong project contrast. The Project would cross SR 199 west of the SR 36 junction at essentially a perpendicular angle at Link 105 (Milepost 1.7), and result in strong project contrast within the immediate foreground view of SR 36 for more than 3 miles in northern Rush Valley. Along Link 90, high impacts, especially to south-bound viewers, would remain due to strong contrast in the immediate foreground where the line would be seen against the distant Onaqui Mountains in the background within the context of a relatively natural landscape. Mitigation measures would be used in this area, but high impacts would remain.

High impacts on views from the Little Moab destination route would occur for 3.2 miles where viewers would see strong contrast to the south and where the line parallels and crosses the road for a short duration (Link 55, Mileposts 1.0-3.0; Link 60, 0.0-0.3). Mitigation measures would be used in this location, but high impacts would remain. The line would be largely screened by topography from the caving area and Little Moab OHV site, but impacts would remain to views from the recreation destination route. Impacts on campers and recreationists using the Twelvemile camping area also would occur, but are difficult to quantify due to the dispersed nature of the recreation activities, and typically would be reduced due to topography and distance of greater than 1 mile to the Project. Impacts on Class C scenic quality in this area are expected to be moderate after mitigation measures are applied.

High impacts on views from the Pony Express National Historic Trail where the line crosses the highway (Faust Road) would occur for a short distance. Impacts would be reduced at the crossing by offsetting the towers the maximum feasible distance from the road, and views would be short in duration for travelers using this highway. High impacts would remain for a distance of 1 mile. Similar high impacts for a short distance are expected at the Railroad Bed Tooele County Scenic Byway, where views would be slightly longer in duration due to typical traveling speed on the gravel road and flatter terrain. High impacts would remain for 1 mile after mitigation measures are applied.

Future moderate impacts also would occur on views from Tooele County planned trails and planned residential areas in southern Goshen Valley. Low impacts would occur on views from the Mormon Trail Loop, South Mountain Loop Trail, and Rush Valley Tour Trail, where the line would be seen from the west side of South Mountain.

Contrast generally would be strong in areas of VRM Class III Objective at the Long Ridge Mountains crossing (Links 1, 2, 3, 5, and 20), but the Project would comply with visual management objectives after mitigation measures are applied to reduce contrast to a moderate level. Changes to the characteristic landscape may be moderate in VRM Class III Objective areas, as defined in the BLM Manual policy. All other BLM lands crossed along this alternative are VRM Class IV Objective, and the Project would comply with the objectives for that class (high level of change in the landscape, or strong contrast, acceptable).

<u>Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action</u>

Scenic quality impacts would be identical to Alternative A1 along most of this alternative, except in the Goshen Valley. Fewer Class B scenic quality agricultural landscapes would be impacted. Class C scenery would be impacted similarly along the Long Ridge Mountains and Old Canyon. Moderate scenic quality impacts would remain over most of this alternative.

Impacts on viewers would also be identical to Alternative A1, except where this alternative diverges from Alternative A1 in southern Goshen Valley. One isolated residence in southern Goshen Valley would view the Project in the immediate foreground under strong Project contrast viewed against the Long Ridge Mountains, causing moderate impacts after mitigation measures are implemented. Also, the alternative would cause moderate impacts along Link 50 on other residences on the south side of Goshen Valley, where strong contrast would be seen unobstructed in the middle ground as the line crosses the west side of the valley. Impacts on views from the Nephi WMA and Burraston Ponds WMA would be identical to Alternative A1. Lower impacts on Goshen Canyon Road and adjacent residences would occur, as compared to Alternative A1, primarily because of distance to the Project from these viewpoints.

As with Alternative A1, contrast generally would be strong in areas of VRM Class III Objective at the Long Ridge-Old Canyon crossing (Links 1, 2, 3, and 10). However, the Project would comply with visual management objectives after mitigation measures are applied to reduce contrast to a moderate level, because changes to the characteristic landscape may be moderate in VRM Class III Objective areas as defined in the BLM manual policy. Selective mitigation measure #11 – Helicopter Construction would be implemented on BLM-administered lands of Link 10 to reduce direct and indirect impacts associated with permanent access road construction. All other BLM lands crossed along this alternative are VRM Class

IV Objective, and the Project would comply with the objectives for that class (high level of change in the landscape, or strong contrast, acceptable).

Alternative B1 – East Rush Valley

Moderate impacts would occur on scenic quality in Class B agricultural landscapes for 2.5 miles (Links 20, Mileposts 3.8-5.0; Link 120, Mileposts 0.5-0.9; and Link 140, Mileposts 0.5-0.9, 1.4-1.9) in the Goshen Valley and northern Rush Valley after mitigation measures are used. Moderate impacts on Class B landscapes in the Oquirrh Mountains for 8.6 miles (Link 95, Mileposts 1.4-7.5 and 8.3-10.8) also would occur. Moderate scenic quality impacts would typically remain over most of this alternative.

Impacts on residences in Goshen Valley, Cedar Valley, and Juab Valley would be identical to Alternative A1 (Links 5, 20, 50, 55, and 60), and identical mitigation measures would be implemented. In addition, high impacts on one residence located on Ophir Canyon Road east of SR 73 would remain for one mile (Link 95, Mileposts 11.1-12.1), with a transmission structure located less than 1,000 feet away. Though the towers would be located in a superior position from the house, the structures still would be viewed in the immediate foreground, contrasting strongly with the landscape; the conductor would potentially obstruct views to the Oquirrh Mountains across the valley to the east. Mitigation measures would be implemented along this segment of transmission lines, but high impacts would remain.

Moderate impacts would remain on views from one residence located north of the SR 73/SR 36 intersection (Links 120 and 135), on views from residences located west of Rush Lake, and on views from residences located along Indian Mountain Road in north Rush Valley (Link 140), where strong contrast would be seen in an open, unobstructed landscape with no existing transmission. The installation of bird diverters to mitigate impacts on avian flyways would increase the visibility of the line along Links 135 and 140 for this alternative, but moderate impacts on residential views would remain.

Impacts on views from roads and recreation areas would be identical to Alternative A1 at U.S. 6, Moab area, Twelvemile Pass (dispersed) Camping Area, Railroad Bed Scenic Byway, and in the north end of Rush Valley (refer to Viewpoint 1, Appendix G). High impacts would remain for one mile on the Pony Express National Historic Trail, however, would occur at a different location (Link 95, Mileposts 0.9-1.9) than Alternative A1, but would be in a similar landscape setting and viewing condition. However, this alternative would be closer to a Pony Express National Historic Trail marker (see also Viewpoint 3, Appendix G) where viewing duration would be longer. In north Rush Valley, views from the SR 36 crossing at Link 120 (Milepost 3.3) would be open and unobstructed, contrasting strongly with the existing setting, but would be brief. High impacts would occur for a short distance to views from the highway in this area. This alternative would pass through the Fivemile Pass Recreation Area, but the visual impacts on viewers from this area would be low based on the higher use of OHV and other trails (e.g., Race Loop, Constrictor Canyon, Rattlesnake Canyon, etc.). Impacts on views from the recreation area are limited to the Faust Road/Pony Express National Historic Trail and SR 73 and are discussed below.

High impacts also would remain for 2.9 miles along Link 95 at the SR 73 crossing (Mileposts 6.0-8.9). The line would be seen for a short duration along its axis, down Rush valley to the south for travelers using southbound SR 73 (refer to Simulation Viewpoint 4, Appendix G), and for 1.7 miles where the line parallels the highway near Ophir (Mileposts 10.4-12.1). The line would quickly disappear to the south down the valley, causing moderate to low impacts on views from roadways until it approaches Faust Road (Pony Express National Historic Trail) (high; Mileposts 0.9-1.9).

VRM compliance would be identical to Alternative A1.

Alternative B2 – East Rush Valley

Scenic quality, viewer, and historic site impacts created as a result of Alternative B2 would be identical to B1 north of southern Goshen Valley and identical to Alternative A2 south of Goshen Valley.

Compliance with visual management objectives would be identical to Alternative A2 on Class III lands (Links 1, 2, 3, and 10).

Alternative C1 – Tintic Junction

Alternative C1 scenic quality impacts would be identical to Alternative A1 across Class B agricultural landscapes in Goshen Valley and north Rush Valley (Links 20 and 105). Alternative C1 also would add additional moderate Class B impacts for 2.5 miles in the East Tintic Mountains along Link 24 between Mileposts 1.1 and 3.6. Moderate scenic quality impacts would remain over most of this alternative after the implementation of mitigation measures.

Impacts on residences in Goshen Valley, Cedar Valley, and Juab Valley would be identical to Alternative A1 (Links 5, 20, 50, 55, and 60), and identical mitigation measures would be implemented. In addition, residential viewers located north of SR 36 and SR 6 intersection and in the Mammoth settlement would be affected by the Project; views would largely be obstructed by topography and vegetation, but moderate impact would remain for 0.3 mile to residences for a short distance after mitigation measures are implemented (Link 26, Mileposts 1.0-1.3). Views of the line to the northeast backdropped against Mammoth Peak in the Tintic Mountains would also occur to residences located near Tintic Junction, causing high impacts for about 1.4 miles along Link 26 (Mileposts 1.7-3.1).

In south Tooele County and north Juab County along Link 26, the line would be near SR 36, generally paralleling the highway from junction U.S. 6 north to a point about 1.0 mile north of the county line (Link 30, Milepost 0.0). Views in this section would be largely open and unobstructed and long in duration. The line would be offset from U.S. 6 to the west near Silver City, crossing at a right angle (Link 24, Milepost 7.4). Foreground and immediate foreground views of the line would be fairly short in duration, but high impacts would remain for approximately one mile.

Also, high impacts would remain for 0.7 miles to one residence located near the SR 36 Railroad Bed Road intersection (Link 32, Mileposts 1.5-2.3; Link 35 Mileposts 0.0-0.4), where strong contrast would be viewed in the immediate foreground across a small valley towards Railroad Bed Road to the north.

Impacts on Mormon Trail Road and SR 36 would be identical to Alternative A1 on the north along Links 150, 105, and 90. Identical mitigation measures would be used along these links. Views from SR 36 also would be affected by the 500kV line on the south end of the alternative along Links 35, 32, 30, 26, and 24. High impacts are expected for 2.7 miles on travelers who would view the line in the immediate foreground for a short distance east of the highway near the Railroad Bed Road intersection (Link 32, Mileposts 0.3-2.3 and Link 35, Mileposts 0.0-0.7). The Project would be viewed down its axis, a short duration, for northbound travelers (Link 35, Mileposts 0.0-0.7), and views quickly would be directed away from the Project. Southbound travelers would view the line for a longer duration, as the line generally parallels the road, but then turns to the southeast and would be blocked by topography. South of there, near the Juab-Tooele county line, the lattice structures would be viewed in the immediate foreground under strong project contrast conditions where the line would parallel the highway within 0.5 mile for about 8.5 miles before crossing the highway at a right angle south of Silver City (Link 30, Mileposts 0.0-0.9; Link 26, Mileposts 0.0-8.2; Link 24, Mileposts 6.9-7.9). High impacts on views from the road are expected over most of this segment, modified only in the area around the SR 6/SR 67 intersection where some extractive surface mining activities and commercial development occurs (Link 26, Mileposts 0.9-1.2).

Impacts on views from the Vernon Reservoir destination route would be limited to near the intersection with SR 67, and would only be on viewers approaching SR 67 from the west on Cherry Creek Road. Views would be long in duration, and strong contrast created by the Project would be seen at a right angle to viewers approaching the highway. High impacts would result on views from this location. Viewers looking from the Uinta National Forest trails would see the Project at typically over 1 mile, set along the foothills east of SR 36 along Links 26 and 30. Moderate viewer impacts are expected for a short distance on views from these trails, where views are not screened and viewer orientation is toward the East Tintic Mountains at the Juab-Tooele-Utah county line (Boulter Peak).

Compliance with visual management objectives would be identical to Alternative A1 on Class III lands (Links 1, 2, 5, and 20).

Alternative C2

Scenic quality, viewer, and historic site impacts created as a result of Alternative C2 would be identical to C1 north of southern Goshen Valley and identical to Alternative A2 south of Goshen Valley.

Compliance with visual management objectives would be identical to Alternative A2 on Class III lands (Links 1, 2, 3, and 10).

Limber to Oquirrh

Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative

Impacts on scenic quality would typically be moderate after mitigation measures are applied. Moderate scenic quality impacts on Class B landscapes are expected along Links 190A, 220, and 226. Moderate scenic quality impacts also would occur in Class C landscape in areas of strong project contrast, occurring along most of the alternative.

High initial impacts for 1.1 miles are expected to occur to residences located along Links 190A (Mileposts 3.8-4.4) and 220 (Mileposts 0.0-0.5) at the end of Grimm Hill Road and Cassidy Drive in the foothills north of Settlement Canyon, where right-of-way clearing, road, and 345kV structures would cause strong contrast in the foreground. However, after alternative structure, road grading and placement, right-of-way clearing, and other mitigation measures are applied, moderate residual impacts would occur (see Viewpoints 9a, 9b, and 9c, Appendix G). High impacts also are expected along 0.4 mile of the line west of SR 36 on the south side of Tooele City (Link 190A, Mileposts 1.0-1.4) where the line would be visible in the immediate foreground with strong contrast, where it would be viewed ascending the hill towards Settlement Canyon. The 345kV line would typically be viewed in the middleground and background from east Tooele residences under moderate to strong viewing contrast, causing moderate-to-low impacts.

On the east side of the Oquirrh Mountains, the line would be viewed against the Kennecott Mine and existing transmission lines primarily in the middleground, causing low impacts on residences located southeast of West 8200 South east of SR 111 (Links 241 and 255).

This alternative would cross Mormon Trail Road east of the future Limber Substation (refer to Appendix G, Viewpoint 1) causing high impacts for 0.5 miles, primarily for southbound viewers who would see the line against South Mountain for a short duration (Link 160, Mileposts 0.0-0.5). Northbound viewers would have impacts mitigated somewhat by the industrial backdrop of the Tooele Army Depot, but high impacts would remain.

At the SR 36 crossing north of Stockton Bar, the line would cause high impacts approximately two miles on highway travelers viewed to the west of the highway but would be seen against existing infrastructure and an industrial setting as it parallels the road, reducing impact levels where it is located on the west side of the highway (Link 185, Mileposts 0.7-0.8).

Settlement Canyon Road destination route travelers would view the line as it crosses the road near the reservoir. The line would cross the Settlement Canyon Recreation Area, and be viewed for a short duration in an inferior position (from below). However, impacts would remain high for 0.3 miles of the line in this area in the immediate foreground where the structures would be located near the edge of the road on the south side of the reservoir (Link 190A, Mileposts 2.2-2.5). Views from Legion Park Campground and Camp Wapiti would be within the immediate foreground. Similarly, the strong project contrast would be viewed in the immediate foreground for a short duration to viewers travelling on the Middle Canyon Road State Scenic Backway, causing high impacts for 0.3 miles after mitigation measures are implemented (Links 190A, Mileposts 4.2-4.3; Link 220, Mileposts 0.0-0.2).

On the east side of the Oquirrh Mountains, the industrial modified setting created by the mine in the background, existing infrastructure, and industrial image typesetting near the substation would cause moderate-to-low impacts on views from the New Bingham Highway and SR 111.

Class IV Objective landscape crossed (Link 230) would be in an area of moderate project contrast and, therefore, would comply with the objective to provide for management activities, which require major modifications of the existing character of the landscape. In order to reduce direct and indirect impacts associated with construction of permanent access roads on Link 230 over the Oquirrh Mountains, selective mitigation measure #11 – Helicopter Construction would be recommended for approximately 4 miles.

<u>Alternative E1 – Pass Canyon</u>

Scenic quality impacts would be identical to Alternative D south and west of Pine Canyon. High impacts would occur to Class A scenery crossed along Link 235 in Pass Canyon, where the Project would parallel an existing transmission line through the NOMA to its east boundary. High scenic quality impacts are expected along Link 235 in Pass Canyon and NOMA for 2.4 miles. Moderate scenic quality impacts are expected on the west side of the Oquirrh Mountains in Class B and Class C landscapes shared by Alternative D, and on the east side of the Oquirrh Mountains in Class C areas.

Impacts on residences located at the end of Grimm Hill Road, Cassidy Drive in the foothills north of Settlement Canyon, and SR 36 on the south side of Tooele City would be similar to Alternative D. Impacts on residences located around Lincoln would be low along Links 225 and 235 after mitigation measures are implemented due to distance from the transmission lines (1.5 miles at a minimum) (refer to Appendix G, Viewpoint 7). At this distance and with mitigation measures applied, the Project would not be readily apparent to the casual viewer.

Because the NOMA provides for dispersed recreation (no established trails, developed recreation sites, interpretive areas, etc.), no specific viewpoints for impact analysis have been identified, and impacts on the NOMA (Links 225 and 235) would be primarily on scenic quality, as described above. The Project would also cause high impacts identical to Alternative D on views from the Middle Canyon Road State Scenic Backway, Settlement Canyon recreation destination route, SR 36, and Mormon Trail Road.

On the east side of the Oquirrh Mountains, the line would be viewed against the Kennecott Mine and existing transmission lines modifying moderate to strong contrast generally seen from the middleground and background from residences and road travelers (SR 111, New Bingham Highway, Old Bingham Highway), causing low impacts on residences located southeast of W8200S east of SR 111. On the east side of the Oquirrh Mountains on the West Bench, views from a residence located along Herriman Highway and multiple residences located north of Yellow Fork Canyon would be obscured by topography.

The Project would not be in compliance with Class II areas of the NOMA along Link 235, Mileposts 0.0 to 2.5, because strong to moderate-strong contrast would be created. In VRM Class II Objective areas, weak or moderate-weak contrasts are allowable (level of change to the characteristic landscape should be low).

<u>Alternative E2 – Proponent's Proposed Action</u>

Alternative E2 impacts would be identical to Alternative E1 across the Oquirrh Mountains and the NOMA and on the west side of the mountains and Tooele Valley. Along the West Bench near the existing Oquirrh Substation, impacts would be identical to Alternative D. After implementation of mitigation measures, high impacts remaining on scenic quality across the NOMA would be identical to Alternative E1, and high impacts remaining on sensitive viewers would be similar to Alternative D on the west side of the Oquirrh Mountains.

Compliance with VRM objectives would be identical to Alternative E1.

<u>Alternative F1 – Middle/Butterfield Canyon</u>

Impacts created as a result of Alternative F1 are identical to Alternative D between Middle Canyon and Mormon Trail Road.

The majority of impacts created as a result of Alternative F1 would be a result of scenic quality and high sensitivity recreation viewpoints. Scenic quality impacts would be high in Class A scenery areas of the Oquirrh Mountains along Link 210 and Link 215, totaling 5.3 miles of high impacts on scenic quality.

Impacts on views from residential areas would be somewhat less than Alternative D1, though all of the high impacts would be identical (Grimm Hill Road, Cassidy Drive in the foothills north of Settlement Canyon, and SR 73 on the south side of Tooele City). On the east side of the Oquirrh Mountains on the West Bench, impacts on residences would be identical to Alternative E1.

Impacts on Middle Canyon State Scenic Backway would be greater than Alternatives D, E1, or E2, as the line would be in the immediate foreground view of travelers along most of its length between the mouth of Middle Canyon on the west side of the Oquirrh Mountains and the mouth of Butterfield Canyon on the east. Additionally, Alternative F1 would affect views from Copper Canyon (planned) Overlook Trail and the Butterfield Pass Viewing Area along the backway. Strong contrast would be created by right-of-way clearing and grading as a result of the construction of access roads, tower pad sites, and temporary work areas, and the introduction of 345kV structures where none are presently in place. High impacts on views from this travel corridor are expected along most of the route in this area, but intermittent screenings due to topography and vegetation are expected.

The Project would not comply with Class II VRM areas crossed along Link 215 between Mileposts 2.4 and 3.0 in the Oquirrh Mountains, because strong changes in the characteristic landscape would be above the acceptable level allowed for the Class II objective.

<u>Alternative F2 – Middle/Butterfield Canyon</u>

Impacts on viewers, scenic quality, and historic properties created as a result of Alternative F2 would be identical to Alternative F1, except near the existing Oquirrh Substation, where impacts would be identical to Alternative D. This alternative would be located closer to Old Bingham Highway and parallel SR 111 for about 0.3 mile less than Alternative F1, but the existing infrastructure and industrial setting would cause low final impacts on views.

Compliance with VRM objectives would be identical to Alternative F1.

<u>Alternative G – Lake Point</u>

High scenic quality impacts are expected at the Lake Point crossing of the north Oquirrh Mountains, where Links 370 and 374 cross Class A scenery. In other areas of Class A scenery, impacts are modified by the adjacent industrial setting created by the multiple transmission lines, railroad, and Kennecott infrastructure on the east end of the mountains. Class B scenery impacts would be moderate in irrigated agricultural areas in northern Tooele Valley along Links 352, 353, and 356. Scenic quality impacts would typically be moderate after mitigation measures are implemented.

Impacts on residential viewers would remain high for 0.8 miles where the alternative crosses SR 138 and Old Lincoln Highway (Link 352, Mileposts 2.0-2.4) and along Clinton Landing Road (Link 366, Mileposts 1.6-2.0). The Project would be seen in the immediate foreground with strong contrast to these viewers. Where the line parallels the existing H-frame and to the west, moderate impacts are expected on foreground views from residences in and around Higley Road. Impacts on residences would occur to views from those located on the west side of Grantsville, with those on the south of Mack Canyon Road and West Main Street having the highest visibility of the line. The line would be a minimum of 1.3 miles from the nearest residence, however, and impacts are expected to be low after mitigation measures are applied.

On the northeast side of Tooele Valley, views from residences located north of SR 138 near Stansbury Park would view the Project adjacent to the existing 138kV line and at sufficient distance such that low impacts would occur. Near Lake Point and along Clinton Landing Drive, the Project would cause moderately strong contrast on views towards the Great Salt Lake in the immediate foreground, causing high impacts on views from several houses there.

The transmission lines would roughly parallel Mormon Road to the west in northwest Tooele Valley and be viewed against the scenic Stansbury Mountains, causing high impacts for a short distance. The line also would cross SR 138 and strongly contrast with the existing views in this area for a short duration for highway travelers, causing high impacts.

Also, the 345kV line would roughly parallel I-80/California Trail National Historic Trail corridor to the south, crossing approximately 2 miles west of the Tooele exit. Impacts would generally be moderate to low due to the presence of the existing 345kV line and developed landscape viewing context, but would remain high for 2.8 miles (Link 365, Mileposts 1.8-2.0), as the line crosses the highway (Mileposts 0.2 and 2.8) and where it would be viewed against the Great Salt Lake on the north side of the highway.

The installation of bird diverters to mitigate impacts on avian flyways would increase the visibility of the line along Links 352, 352, 354, 356, 370, 366, and 385 for this alternative from I-80/California National Historic Trail and residences in the north Tooele Valley.

The Project also would be viewed in the foreground of the Grantsville Reservoir Camping Area with associated strong contrast. Impacts would be moderate after mitigation measures are implemented. Low impacts on views from the I-80 rest area would be mitigated primarily by viewer orientation, which would be towards the lake.

The transmission lines would create high impacts on high sensitivity viewers accessing the Stansbury Mountains via Davenport Canyon/North Willow Canyon Scenic Byway, South Willow Canyon Scenic Byway, and Box Canyon destination route. Views toward the Stansbury Mountains for westbound travelers and across the Tooele Valley for eastbound travelers would be dominated by the towers for a short distance as the line crosses the roads. Impacts would be greater to viewers traveling into the Stansbury Mountains because of the high quality, intact Class A scenic backdrop provided by the mountains. Impacts on views to the east across the Tooele Valley from these routes would be reduced by the presence of the Tooele Army Depot (refer to Viewpoints 5a and 5b, Appendix G), which has locally modified the setting.

Low impacts would occur to views from SR 201, where the line would be viewed in an industrial setting. Low impacts are expected on views from SR 172 west of the existing Terminal Substation, where the landscape is primarily commercial and industrial.

Near the existing Oquirrh Substation and to the west of SR 111, impacts would be identical to Alternative D.

There are no BLM lands crossed by this alternative, and therefore, no VRM compliance issues.

Limber to Terminal

<u>Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action</u>

Impacts on scenic quality as a result of Alternative H would be identical to Alternative G from Lake Point west into Tooele Valley. Moderate scenic quality impacts in undeveloped landscapes north of SR 201 would occur along portions of Links 375 and 385, where the landscape is otherwise industrial.

Viewer impacts would be identical to Alternative G in Tooele Valley and near Lake Point. In and around Magna, the Project would be blocked from view by vegetation from almost all of the residences located there, except for one residence, located north of the S8000W and SR 201 intersection, which would view the Project in the context of a highly developed industrial landscape and along an existing line, causing low impacts.

The Project would cross and then parallel SR 201 for about 2 miles in a primarily industrial setting, causing low impacts (Link 375). Impacts on views from the Copper Club Golf Course would be modified by the industrial setting, and screening provided by vegetation would be low.

There are no BLM lands crossed by this alternative, and therefore, no VRM compliance issues.

Alternative I – East Tooele Valley

Scenic quality impacts would be identical to Alternative H along Link 370 in Class A landscapes. Otherwise, this alternative typically would create moderate final scenic quality impacts along the east bench of Tooele Valley in Class C landscapes.

Viewer impacts and mitigation measures implemented would be identical to Alternative H along Link 370 (adjacent to I-80/California National Historic Trail, I-80 rest area), and identical to Alternative D near South Mountain and the Mormon Trail Road (South Mountain Loop planned trail, Mormon Trail Road).

High impacts on views from residences would occur along Links 325, 326, 330, and 360 across the west side of NOMA and through north Tooele. This alternative would cause about 3.3 miles of high impacts on views from residences located near the Union Pacific Railroad crossing and SR 112 and at the north end of N1000W, on W600N, and other areas on the north end of the city, mostly west of SR 36. Other high impacts would be associated with views from Droubay Road immediately north of the railroad, where residences have views of the North Oquirrh Mountains and where strong contrast is expected. Moderate impacts are expected on views from residences located along Lake Shore Drive (refer to Simulation Viewpoint 6, Appendix G).

Moderate impacts would occur in an industrial setting on views from SR 112 and SR 36, where the line crosses each highway. The SR 112 crossing is located in the industrial setting adjacent to the Tooele Army Depot and railroad. The SR 36 crossing is located in a commercial and industrial setting, and impacts would be moderate in this area after mitigation measures are applied.

The Project would typically cause low impacts on views from the I-80 corridor adjacent to the railroad, existing utility corridor, and Kennecott tailings pond along Link 385, after mitigation measures are applied.

The Project would comply with Class III areas of the NOMA along Link 360.

Substation Sites

Mona Annex Substation

Moderate impacts would be created in the Class C scenic quality agricultural landscape as a result of the proposed Mona Annex Substation.

Low impacts on views for residences located to the northeast, east, and southeast would occur due to distance, vegetation screening, and the presence of existing infrastructure in the viewshed (refer to Appendix G, Viewpoint 2). The residence located east of the substation (southeast of Burraston Ponds) would view moderate-strong contrast at more than 1 mile, which would result in moderate impacts after mitigation measures are applied.

The Mona Annex Substation would create moderate-strong contrast. However, travelers using I-15 would have a short viewing duration of the proposed substation, and the overall discernable change to the characteristic landscape would be moderate. Thus, compliance is anticipated for the lands designated as

VRM Class III (upon which the proposed substation would be located) based on BLM objectives for VRM Class III.

Limber Substation

Moderate impacts would be created in the Class C scenic quality agricultural landscape as a result of the future Limber Substation. High impacts on views from the Mormon Trail Road also are expected (refer to Appendix G, Viewpoint 1). High impacts and strong contrast to views from the Mormon Trail Road are expected where attention is directed toward the Stansbury Mountains. Low impacts on views from residences located to the south on the west side of Mormon Trail Road are expected due to distance and topography after mitigation measures are applied.

4.2.8 Wilderness Characteristics

The Oquirrh Mountains Wilderness Inventory Area (WIA, itself a part of the proposed America's Red Rock Wilderness Act, is within the NOMA and would not be crossed by any of the alternative routes. However, short- and long-term impacts on the wilderness characteristics of the WIA would occur as a result of Alternatives E1, E2, and I, which cross through the NOMA adjacent to the WIA.

Alternatives E1 and E2 would have short- and long-term impacts on the wilderness characteristics of the Oquirrh Mountains WIA. Alternatives E1 and E2 cross the Oquirrh Mountains just south of the WIA, paralleling an existing 138kV transmission line. In addition, a temporary access road would likely be required within the WIA, outside of the transmission line right-of-way. Short-term impacts on wilderness characteristics (naturalness, opportunities for solitude, and primitive recreation) would occur during construction. Construction noise and activities adjacent to the WIA would diminish the naturalness of the area, as well as limit opportunities for solitude. Construction would temporarily block access along the existing 138kV transmission line, limiting opportunities for primitive recreation in the area. Mitigation measures would be implemented to rehabilitate the temporary access road, and the road would be blocked to motorized traffic.

Direct long-term impacts on the naturalness of the WIA would result from vegetation clearing and grading along the temporary access road and work areas within and adjacent to the WIA. Also, tall vegetation would be cleared within the 150-foot wide transmission line right-of-way, adjacent to the existing 80-foot wide transmission line right-of-way, south of the WIA. Selective mitigation measures 3, 4, 5, and 12 (refer to Table 2-6) would be implemented to lessen impacts by reducing right-of-way width, vegetation clearing, and ground disturbance. However, significant residual impacts would remain, due to the level of ground disturbance and clearing within the right-of-way and along the access road.

Alternative I crosses the NOMA for approximately 2 miles along Link 360. Alternative I would parallel an existing 138kV line through the NOMA and would be located below the 5,200 feet elevation line. Additionally, Alternative I is located in a grassland setting and would not require any vegetation clearing through the NOMA. However, long-term, indirect impacts on the wilderness characteristic of naturalness would occur as a result of the presence of the 345kV structures and access roads.

4.2.9 Land Use and Recreation Resources

4.2.9.1 Introduction

This section describes and evaluates the potential impacts on land use and recreation resources that would result from the construction, operation, maintenance, and decommissioning of the proposed transmission lines and substations. The following describes the impact assessment methodology and summarizes the assessment results, including the identification of mitigation measures that would be implemented to minimize potential adverse impacts on land and resource uses.

4.2.9.2 Impact Assessment Methodology

An impact assessment methodology was developed to identify and evaluate potential impacts on land and resource uses associated with the Proposed Action and Project alternatives. This methodology generally consists of assigning sensitivity classifications to land use and recreation uses that occur within the 6-mile wide study corridors, identifying initial impact levels based on resource sensitivity and Project-related impacts, developing resource-specific mitigation measures to minimize adverse impacts, and incorporating mitigation measures to assign final impact levels for each Project alternative.

Impact Criteria

Impact levels—high, moderate, and low—were established to determine the impact the Project would have on the various land and resource uses. Table 4-10 summarizes the impact criteria used to assign impact levels to the existing land use resources.

TABLE 4-10
IMPACT CRITERIA SUMMARY

Impact Level	Impact Criteria
High	▪ Areas of very high or high sensitivity where the Project would create a direct long-term conflict with existing land uses ▪ Areas where the Project would physically conflict with existing residential, commercial, industrial, military, or agricultural uses (i.e., displacement of homes, businesses, center-pivot irrigation agriculture fields) ▪ Areas where the Project would physically conflict with any designated recreation or preservation use area ▪ Areas where the Project would conflict with any applicable adopted policy or goal of the affected land-management agency ▪ Residential areas where the Project would physically conflict with planned subdivisions at the final plat approval stage ▪ Areas where the Project may require extensive efforts beyond standard construction practices to ensure public or worker safety
Moderate	▪ Areas of moderate sensitivity where the Project would create an indirect conflict with residential, commercial, or military uses ▪ Areas where the Project would create short-term impacts on agricultural operations ▪ Areas where the transmission lines would require expansion of existing right-of-way in a designated recreation area or residential areas (existing and proposed conceptual plans)
Low	▪ Areas of low sensitivity where land use is compatible with a transmission line

4.2.9.3 Summary of Impact Analysis Results

Table 4-11 summarizes the selective mitigation measures (see Table 2-6) that would be implemented and the residual impacts associated with each of the alternatives.

TABLE 4-11
SUMMARY OF MITIGATION MEASURES AND IMPACTS

Alternative	Selective Mitigation Measures	Impacts (miles)		
		Low	Moderate	High
Mona to Limber				
Alternative A1	2, 9	66.2	1.7	0.0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	2, 9, 11	69.4	0.0	0.0
Alternative B1	1, 2, 5, 7, 9	68.2	1.8	0.0
Alternative B2	1, 2, 5, 7, 9	71.3	0.2	0.0
Alternative C1	2, 9	65.4	1.7	0.0
Alternative C2	2, 9	68.4	0.0	0.0
Limber to Oquirrh				
Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	1, 2, 5, 7, 11, 12	25.5	4.2	1.4
Alternative E1	1, 2, 4, 5, 7	17.9	7.5	5.7
Alternative E2 – Proponent's Proposed Action	1, 2, 4, 5, 7, 12	20.8	4.6	5.7
Alternative F1	2, 4, 7, 9	22.4	6.9	0.0
Alternative F2	2, 4, 7, 9, 12	22.7	6.9	0.0
Alternative G	1, 2, 5, 12	19.8	29.2	0.0
Limber to Terminal				
Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action	1, 2, 5, 9, 12	21.1	24.3	0.0
Alternative I	5, 12	28.0	10.1	2.3

No Action Alternative

Under this alternative, there would be no construction, operation, or maintenance activities associated with the transmission lines and substations. There would be no impacts on existing land use within the Project area, and current management objectives and guidelines would be carried forward.

However, the current opportunity to integrate the Project with local, state, and federal long-range planning efforts (i.e., general plan, zoning updates, master plans) would be lost, making the siting of transmission lines and substations more difficult in the future as population and development in the study area increase.

Impacts Common to All Alternatives

Impacts on grazing may result from all of the action alternatives. Short-term impacts on grazing would result from construction disturbance at tower sites, substation sites, staging areas, and in areas where new temporary access is required. Long-term impacts would result from those areas permanently displaced by project facilities and access roads. Long-term impacts on grazing would be low because of the minimal extent of disturbance on rangelands as a result of project construction and operation. The area disturbed by construction may be minimal, and following the rehabilitation the only areas removed from use for the life of the Project would be new access roads that would remain permanently, the structure base areas (approximately 0.02 acre per mile for the 345kV single pole structure and 0.3 acre per mile for the 500kV structure), and the two substations. The remainder of the rangeland within the right-of-way would be available for grazing. Any damaged range improvements would be repaired or replaced.

Short-term impacts on primitive or dispersed recreation opportunities may result from all of the action alternatives. Access would be limited to certain areas during construction, and construction noise and activities may discourage people from recreating in the surrounding area. However, long-term impacts on primitive recreation activities such as hunting, hiking, and OHV use are expected to be minimal with no effect on recreation usage. Impacts on recreation resources due to diminished visual resources are addressed in Section 4.2.7, and impacts on developed recreation areas are addressed below for each alternative.

The construction of new access roads would potentially increase OHV use and traffic in areas where access was previously limited or non-existent. Increased access may result in indirect impacts on other resources, particularly biological and cultural resources. Mitigation measures would be implemented in some areas to limit the construction of new access roads, reclaim temporary construction access roads, and limit access to new permanent access roads.

Mona to Limber

Alternative A1 – North Long Ridge Mountains

Impacts associated with Alternative A1 include moderate and low impacts. Moderate impacts are associated with center-pivot irrigated agriculture in Goshen Valley. Effects on dryland agriculture in the Goshen, Cedar, and Rush Valleys would be minimized by limiting the construction of new access roads. The Pony Express Trail National Backcountry Byway would be crossed; however, the impact level would be low. Alternative A1 would impact one planned development in Goshen Valley, but would not impact any recreation areas. Effects on the planned development would be low as a result of the development being conceptual.

Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action

The impacts associated with Alternative A2 and mitigation measures would be similar to Alternative A1; however, Alternative A2 avoids irrigated agricultural fields in Goshen Valley and associated moderate impacts. In addition, in order to reduce direct and indirect impacts associated with construction of permanent roads on BLM-administered lands, selective mitigation measure #11 – Helicopter Construction, would be implemented on Link 10 for approximately 3.5 to 4.0 miles over the Long Ridge Mountains.

<u>Alternative B1 – East Rush Valley</u>

Impacts associated with Alternative B1 include low and moderate impacts. Moderate impacts are associated with the Mercur Canyon Outwash hazardous waste site and center-pivot irrigated agriculture in Goshen and Rush Valleys. Low impacts are associated with dryland agriculture in Goshen, Cedar, and Rush valleys; the Fivemile Pass Recreation Area; and the Pony Express Trail National Backcountry Byway. Impacts would be reduced by realigning the alternative to avoid or span the hazardous waste site. Effects on the Fivemile Pass Recreation Area would be minimized by limiting the construction of or access to new access roads. The Pony Express Trail National Backcountry Byway would be crossed; however, the impact levels would be low. Effects on dryland agriculture would be minimized by limiting the construction of new access roads. Alternative B1 would impact one proposed development in the Goshen Valley. Effects on the planned development would be low because of the development being conceptual.

<u>Alternative B2 – East Rush Valley</u>

Impacts and mitigation measures would be similar to Alternative B1.

<u>Alternative C1 – Tintic Junction</u>

Impacts associated with Alternative C1 would include low impacts and moderate impacts. Moderate impacts are associated with center-pivot irrigated agriculture in Goshen Valley. The Pony Express Trail National Backcountry Byway and Railroad Scenic Byway would be crossed; however, the impact level would be low. Effects on dryland agriculture would be minimized by limiting the construction of new access roads. Alternative C1 would not impact any proposed developments or recreation areas.

<u>Alternative C2 – Tintic Junction</u>

Impacts and mitigation measures would be similar to Alternative C1.

Limber to Oquirrh

<u>Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative</u>

Impacts associated with Alternative D include low, moderate, and high impacts. High impacts are associated with the Carr Fork Reclamation and WMA/Pine Canyon Conservation Area (Superfund site). Moderate impacts along Link 226 are associated with Kennecott's conceptual West Bench Master Plan development. Mitigation measures would be implemented to reduce the soil disturbance and limit new access in the Carr Fork Reclamation and WMA/Pine Canyon Conservation Area and Superfund site. No access roads or transmission structures are proposed to cross the capped waste repository. In addition, in order to reduce direct and indirect impacts associated with construction of permanent access roads on Link 230 over the Oquirrh Mountains, selective mitigation measure #11 – Helicopter Construction would be recommended for approximately 4 miles. To reduce impacts on planned developments along Old Bingham Highway, right-of-way would be shared with existing transmission lines and the highway right-of-way. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. Impacts to the Tooele Army Depot Heliport are expected to be low, pending FAA airspace review and approval.

Alternative E1 – Pass Canyon

Impacts associated with Alternative E1 include low, moderate, and high impacts. The high impacts are associated with the Carr Fork Reclamation and WMA/Pine Canyon Conservation Area (Superfund site) and the NOMA. Mitigation measures would be implemented similar to Alternative D in the Carr Fork Reclamation and WMA. Impacts in the NOMA would be reduced by prohibiting the construction of a permanent access road, reclaiming the temporary construction access road, and limiting vegetation clearing within the right-of-way. However, since Alternative E1 conflicts with the management direction of the NOMA and Reclamation and WMA, the impact level through these areas remains high. The moderate impacts are associated with the crossing of the Middle Canyon Road Scenic Byway and Kennecott's conceptual West Bench Master Plan and Daybreak developments. The route crosses through a portion of a conceptual planned park along Bingham Creek within the Daybreak property. Impacts to the park would be low, as a result of the existing transmission lines and conceptual plans for the park. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. Impacts to the Tooele Army Depot Heliport are expected to be low, pending FAA airspace review and approval.

Alternative E2 – Proponent's Proposed Action

Alternative E2 shares the same alignment and associated impacts with Alternative E1 through Link 240, on the east side of the Oquirrh Mountains. Impacts associated with Alternative E2 include low, moderate, and high impacts. Moderate impacts along Links 241 and 265 are associated with Kennecott's conceptual West Bench Master Plan and Daybreak developments. To reduce impacts on planned developments along Old Bingham Highway, right-of-way would be shared with existing transmission lines and the highway right-of-way. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. Impacts to the Tooele Army Depot Heliport are expected to be low, pending FAA airspace review and approval.

Alternative F1 – Middle/Butterfield Canyon

Impacts associated with Alternative F1 include low and moderate impacts. Moderate impacts are associated with the Middle Canyon Road Scenic Byway and Kennecott's conceptual West Bench Master Plan and Daybreak developments, including a conceptual planned park along Bingham Creek within the Daybreak property. The dispersed recreation in Middle and Butterfield Canyons may be affected. The quality of recreational activities may be diminished due to the clearing of vegetation and decreased aesthetics. However, the recreational opportunities may increase if the Middle and Butterfield Canyon Roads are improved. In addition, Kennecott Copper is exploring opportunities to expand its open pit and underground mining operations in and at the mouth of Butterfield Canyon. If Kennecott Copper decides to proceed with an expansion in the future, it may conflict with Alternative F1, potentially requiring the relocation of the transmission lines. Impacts along Bingham Creek would be the same as Alternative E1. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. Impacts to the Tooele Army Depot Heliport are expected to be low, pending FAA airspace review and approval.

Alternative F2 – Middle/Butterfield Canyon

Alternative F2 shares the same alignment and associated impacts with Alternative F1, with the exception that Alternative F2 runs along Links 315 and 265, rather than Link 285. There are moderate impacts associated with Link 315, which crosses Kennecott's West Bench Master Plan along SR 111, and Link 265, which crosses Daybreak developments on the south side of Old Bingham Highway. In addition to the mitigation measures described for Alternative F1, impacts on planned developments along Old Bingham Highway would be minimized by sharing right-of-way with existing transmission lines and the highway right-of-way. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. Impacts to the Tooele Army Depot Heliport are expected to be low, pending FAA airspace review and approval.

Alternative G – Lake Point

Impacts associated with Alternative G include low and moderate impacts. Moderate impacts are associated with irrigated agriculture, the Tooele SAMP, the Davenport Canyon/North Willow Canyon and South Willow Canyon Scenic Byways, and Kennecott's West Bench Master Plan, which is bisected by Alternative G on the east side of the Oquirrh Mountains. Impacts on agriculture and the Tooele SAMP would be reduced by limiting the construction of new access roads where possible, particularly in the Tooele SAMP impact avoidance zone on the northwest side of the valley. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low. To reduce impacts on planned developments along Old Bingham Highway, right-of-way would be shared with existing transmission lines, the highway right-of-way, and railroad bed.

Limber to Terminal

Alternative H –Environmentally Preferred Alternative/Proponent's Proposed Action

Impacts associated with Alternative H are similar to Alternative G, up to the Lake Point Area, and includes low and moderate impacts. The moderate impacts are associated with irrigated agriculture, the Tooele Special Area Management Plan, the Davenport Canyon/North Willow Canyon and South Willow Canyon Scenic Byways, and Kennecott's West Bench Master Plan between the Lake Point area and the Terminal Substation. Mitigation measures would be similar to Alternative G. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low.

Alternative I – East Tooele Valley

Impacts associated with Alternative I include low, moderate, and high impacts. The high impacts are associated with the NOMA, Green Ravine Conservation Easement, and the potential displacement of structures along the railroad. The moderate impacts are associated with the Tooele Army Depot, agriculture, residential, Kennecott's West Bench Master Plan development, and the conceptual Saddleback development. The construction of new access roads would be limited to reduce impacts on the NOMA and Green Ravine Conservation Easement. Right-of-way would be shared or reduced where possible along the railroad through Tooele City to avoid the displacement of structures. Impacts to the Tooele Army Depot Heliport and Tooele Valley Hospital heliport are expected to be low, pending FAA airspace review and approval. The future Mountain View Highway would be aerially spanned and impacts to the highway would be low.

Substation Sites

Mona Annex Substation

The proposed Mona Annex Substation site is located on approximately 282 acres of private land and 86 acres of BLM land; however, the substation's permanent footprint would encompass 45 acres of BLM land. The primary land use in the area is livestock grazing. The substation would result in the permanent disturbance of 203 acres, affecting the resources available for livestock grazing. The site is located within the BLM Paint Mine grazing allotment, and would result in a 2 percent decrease of Animal Unit Months (BLM 2008b). Since grazing is one of the primary land uses in the Project area, the loss of available grazing land is not anticipated to have a significant impact on the resource in the region or within the BLM Paint Mine grazing allotment. The substation site may conflict with Juab County's conceptual long-range transportation plan, which is still in progress. The plan may include a belt route on the west side of Juab Valley, running through the proposed substation site. However, since the surrounding area is mostly vacant land, it should be possible for Juab County to plan the belt route around the substation.

Limber Substation

The future Limber Substation site is located on private grazing land. The substation would result in the permanent disturbance of approximately 155 acres, affecting the resources available for livestock grazing. However, since grazing is one of the primary land uses in the Project area, the loss of available grazing land is not anticipated to have significant impacts on the resources in the region.

4.3 Special Designations

Potential impacts on the Pony Express National Historic Trail, California National Historic Trail, and Pony Express Trail National Backcountry Byway are discussed in the Visual Resources Section 4.2.7. The North Stansbury Mountains WSA is located approximately 3.1 miles west of Alternatives G and H. Due to existing industrial uses in the area and the distance between the WSA and the alternative routes, the indirect impacts on the WSA would be low.

4.4 Social and Economic Conditions

4.4.1 Public Safety

4.4.1.1 Hazardous Materials

Petroleum products such as gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents would be present on-site during construction. These products would be used to fuel, lubricate, and clean vehicles and equipment. These products would be contained within fuel trucks or in approved containers. When not in use, such materials would be stored properly to prevent drainage or accidents.

All construction, operation, and maintenance activities would comply with all applicable federal, state, and local regulations regarding the use of hazardous substances. Hazardous materials would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash, litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed and transported to a disposal facility authorized to accept such materials.

The construction or maintenance supervisor would ensure that all applicable federal, state, and local laws are obeyed. These would include, but not be limited to, the RCRA; CERCLA; Toxic Substance Control Act; UDOT regulations; Clean Air Act; CWA; and emergency planning and community right-to-know. In addition, regulations of the Occupational Safety and Health Administration would be followed. Health and safety procedures to respond to accidental release of hazardous materials would be developed as part of the POD during the engineering design phase of the Project. The Project Proponent would coordinate with the land-management agencies to incorporate specific agency requirements into the POD.

Sulfur Hexafluoride (SF_6)

SF_6 is an inorganic compound that is colorless, odorless, non-toxic and non-flammable gas (under standard conditions). It is generally transported as a liquefied compressed gas and is used in a number of applications, including as a gaseous dielectric medium or other use in the electrical industry, other industrial uses, and limited medical uses.

SF_6 is used in the electrical industry for insulation and current interruption in electric transmission and distribution equipment; it is a gaseous dielectric medium for high-voltage (345kV and greater) circuit breakers, switchgear, and other electrical equipment. SF_6 gas under pressure is used as an insulator in gas-insulated switchgear because it has a much higher dielectric strength than air or dry nitrogen. This property makes it possible to significantly reduce the size of electrical gear. This makes gas-insulated switchgear more suitable for certain purposes such as indoor placement, as opposed to air-insulated electrical gear, which takes up considerably more room. Gas-insulated electrical gear is also more resistant to the effects of pollution and climate, as well as being more reliable in long-term operation because of its controlled operating environment. Although most of the decomposition products tend to quickly re-form SF_6, arcing or corona can produce disulfur decafluoride, a highly toxic gas.

Also, SF_6 is considered a highly potent greenhouse gas with a global warming potential of greater than that of CO_2 when compared over a 100-year period. The EPA (2007) is concerned that if SF_6 should leak from electrical equipment, the leaking SF_6 would contribute to global warming. Currently, the EPA is collaborating with the electric power industry to identify and implement cost-effective solutions to reduce the use of SF_6. The Proponent has voluntarily joined the partnership to reduce SF_6 emissions. As part of this partnership, the Proponent has agreed to the following measures:

- Estimate current annual SF_6 emissions
- Annually inventory emissions of SF_6 using an established emissions inventory protocol
- Establish strategy for replacing older, leakier equipment
- Implement SF_6 recycling
- Ensure that only knowledgeable persons handle SF_6
- Submit annual progress reports

With this protocol and other BMPs in place, the Proponent does not anticipate leaks from equipment.

4.4.1.2 Electric and Magnetic Fields and Effects

The proposed Project involves the construction and operation of 500kV and 345kV transmission lines. The 500kV single-circuit transmission line would be constructed on a new 250-foot-wide right-of-way and supported on steel lattice structures, as illustrated in Figure 2-12. In this single-circuit configuration, each of the three phase conductors (a bundle of three 1.504-inch subconductors separated by 25 inch spacing horizontally between the top two subconductors and 18 inches from each of these subconductors to the bottom subconductor) of the transmission circuit is suspended from V-string insulators, described as a triangular or delta configuration. The new line would be operated initially at 345kV, and then in the future the substation equipment would be upgraded to permit operation at 500kV.

In addition, a new 345kV double-circuit line would be constructed, which would support six phases, each consisting of twin 1.345-inch subconductors separated by 18 inches. The phases would be supported on a steel monopole. The 345kV structure is illustrated in Figure 2-11. This line would be constructed on a new 150-foot-wide right-of-way.

The levels of audible noise, radio and television noise, as well as EMF associated with the operation of these lines, were calculated using algorithms developed by the Bonneville Power Administration (BPA 1991), an agency of the DOE, for each of the proposed configurations; the results are summarized below. The calculated values are compared to relevant impact criteria. The potential contributions of any existing transmission lines that might be sufficiently close (if any) were not considered in the calculations presented.

4.4.1.3 Audible Noise and Interference

Construction Noise

If the Project were implemented, some level of noise would result from construction, maintenance, and operation of the transmission lines and substations. During construction, noise would be generated by the equipment used for grading (access roads, tower sites, and substations), assembly and erection of towers, wire-pulling and splicing, equipment installation (substations), and rehabilitation activities. During maintenance activities, noise could be generated from a vehicle driving along the access roads for tower and line inspection, a helicopter flying along the right-of-way for tower and line inspection, or equipment and crew conducting maintenance and/or repairs. Calculations of noise from these activities are complicated by the fact that noise levels continuously rise and fall (e.g., the quantity, distribution, and usage of equipment vary with the type of activity).

In determining the impacts of noise, the important factor is the closeness of the activity to wildlife and persons detecting the sound. The Project area is almost entirely rural open space and remote, with background noise typical of such settings. Substations are located in rural unpopulated areas with the majority of the transmission lines traversing vacant/unpopulated land. In most cases, the closest humans would be construction workers. Where construction would occur near more populated areas, the noise from construction (and subsequent maintenance) might be audible; however, such noise would be temporary and possibly considered only as a nuisance. Wildlife most likely would avoid temporary construction disturbance (refer to Biological Resources Section 4.2.3).

Audible noise generated during operation of the transmission lines and substations is addressed below.

Transmission lines and Substation Noise

At the surface of high-voltage powerline conductors, the electric field may become concentrated on surface irregularities to cause the electrical breakdown of the insulating properties of the air and the resulting escape of energy (termed corona). This corona can result in audible noise. Mostly, this occurs during rain. If there is sufficient corona activity, audible noise can be noticeable within a few hundred feet of the transmission lines. The intensity is most pronounced directly underneath the line conductors, and decreases with distance from the transmission lines.

Corona activity depends on a number of factors: altitude, line voltage, conductor size, conductor geometry, and weather conditions. Corona activity is more likely near transmission lines at higher altitudes and is most pronounced during foul weather. Irregularities on the conductor surface (e.g., nicks, water droplets, or debris) will create points where the electric field is intensified sufficiently to produce corona.

When corona occurs on 345kV and 500kV transmission line conductors, it is accompanied by an audible snapping sound. If there is sufficient corona activity on the line, many small snaps from corona sources along a conductor may be sufficient, in combination, to produce a discernable audible noise or crackle at the edge of the right-of-way.

Sound intensity is measured in decibels (dB) referenced to 20 micropascals, which is approximately the pressure threshold of human hearing at 1 kilohertz. The weighting of sound over the frequency spectrum to account for the sensitivity of the human ear is called the *A-weighted sound level*. When the A-weighted scale is applied to a sound-pressure measurement, the level is often reported as dBA, referenced to the audible pressure threshold. The sound intensity of typical human speech is approximately 60 dBA, and background levels of noise in rural and urban environments are about 30 to 40 dBA. Specific identifiable noises such as birdcalls, neighborhood activity, and traffic can produce audible noise levels of 50 to 60 dBA. Table 4-12 lists the sound intensities of common acoustic sources.

TABLE 4-12
COMMONLY ENCOUNTERED AUDIBLE NOISE LEVELS

Source	DBA
Auto horn	110
Inside subway	95
Traffic	75
Conversation	65
Office	55
Living room	45
Library	35
Bedroom	24

Audible noise levels were calculated across the right-of-way in both foul and fair weather conditions for the transmission lines supported on 500kV and 345kV transmission structures.

<u>500kV Structures</u>

The calculated profiles of audible noise levels across the right-of-way for the proposed line operated at 500kV is shown in Figure 4-2. The profiles for that same line operated at 345kV are shown in Figure 4-3.

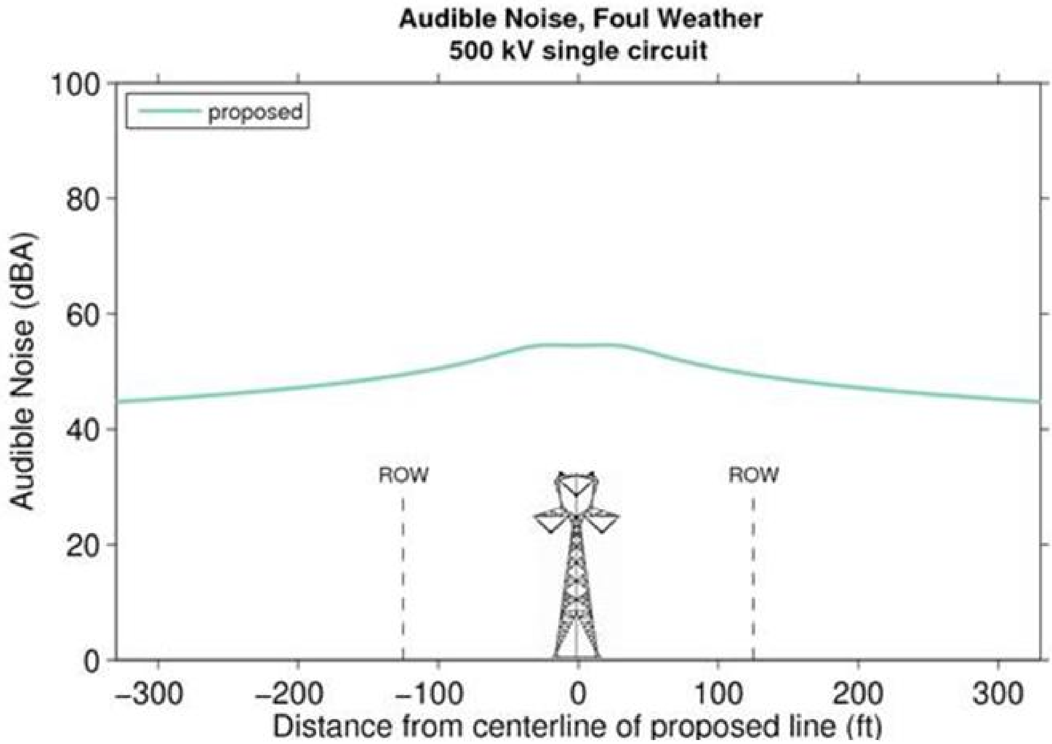


Figure 4-2. Calculated audible noise profile for proposed 500kV transmission line configuration

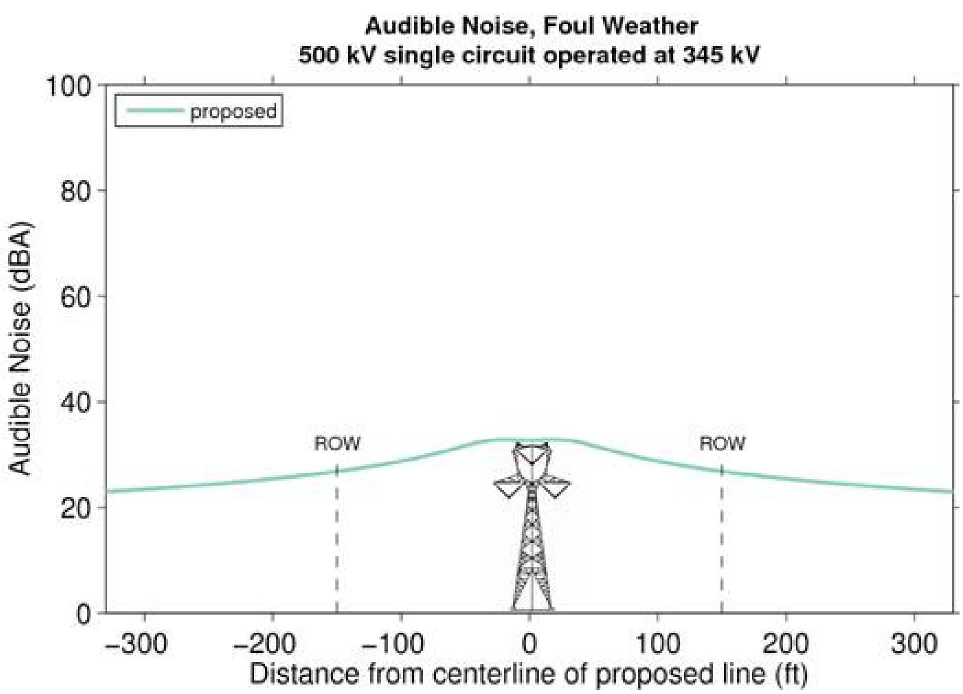


Figure 4-3. Calculated audible noise profile for proposed 500kV transmission line configuration, but initially operated at 345kV

<u>345kV Structures</u>

The levels of audible noise associated with a transmission line designed to 345kV specifications are shown in Figure 4-4.

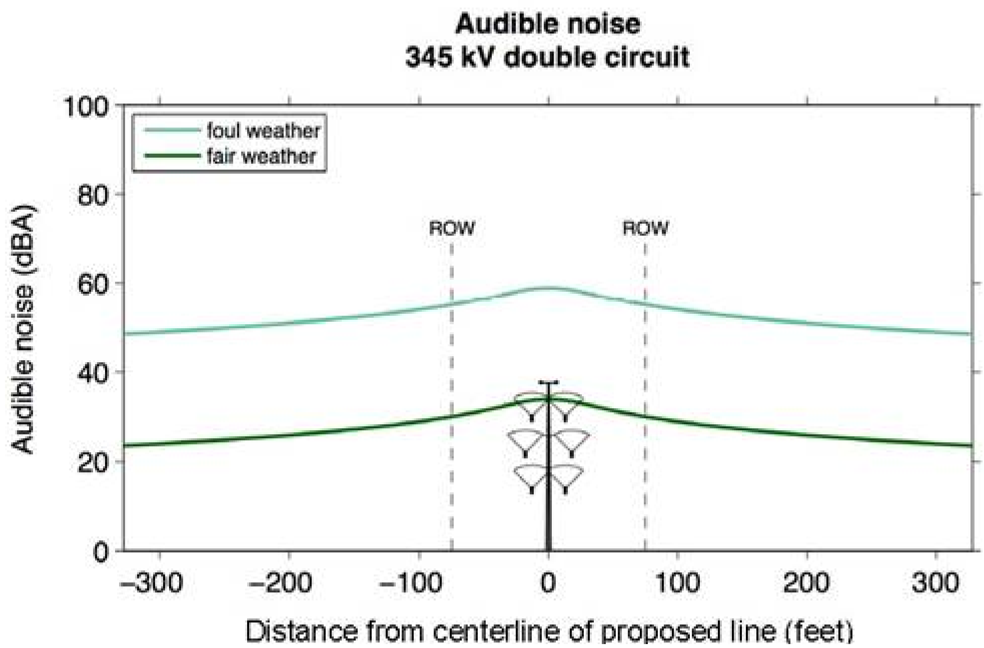


Figure 4-4. Calculated audible noise profile for proposed 345kV transmission line configuration

As indicated in Table 4-13, the audible noise levels at the edges of the right-of-way are less than 55 dBA, the annual average level outdoor target value published by the EPA.

TABLE 4-13
CALCULATED AUDIBLE NOISE LEVELS OF THE MONA TO OQUIRRH 500KV AND 345KV TRANSMISSION LINE CONFIGURATIONS*

Line Configuration	Fair Weather L50		Foul Weather L50	
	- ROW Edge (dBA)	+ ROW Edge (dBA)	- ROW Edge (dBA)	+ ROW Edge (dBA)
500kV	24.4	24.4	49.4	49.4
500kV operated at 345kV	2.7	2.7	27.7	27.7
345kV	30.0	30.0	55.0	55.0

NOTES:
*The noise levels are reported as median or L50 levels, i.e., the dBA value was exceeded 50 percent of the time.
ROW = right-of-way

Radio and Television Noise

<u>Radio Noise</u>

Corona caused by high electric field levels at a conductor surface induces impulsive currents along a transmission line. These induced currents, in turn, cause wideband electric and magnetic noise fields that can affect radio and television reception. Radio noise can produce interference to an amplitude modulated

(AM) signal such as a commercial AM radio audio signal or the video portion of a television station signal. Frequency modulated (FM) radio stations and the audio portion of a television station (which is also FM) are generally not affected by electromagnetic noise from a transmission line.

Weather has a large influence on corona-generated electromagnetic noise, as it does for audible noise. Similarly, altitude elevates radio noise as well.

500kV Structures

Radio noise is measured in units of dB based on its field strength referenced to a signal level of 1 microvolt/meter (μV/m). The levels of radio interference were calculated at a frequency of 0.5 megahertz (MHz) for the 500kV configuration in foul weather, and the resulting profiles across the right-of-way are shown in Figures 4-5 and 4-6.

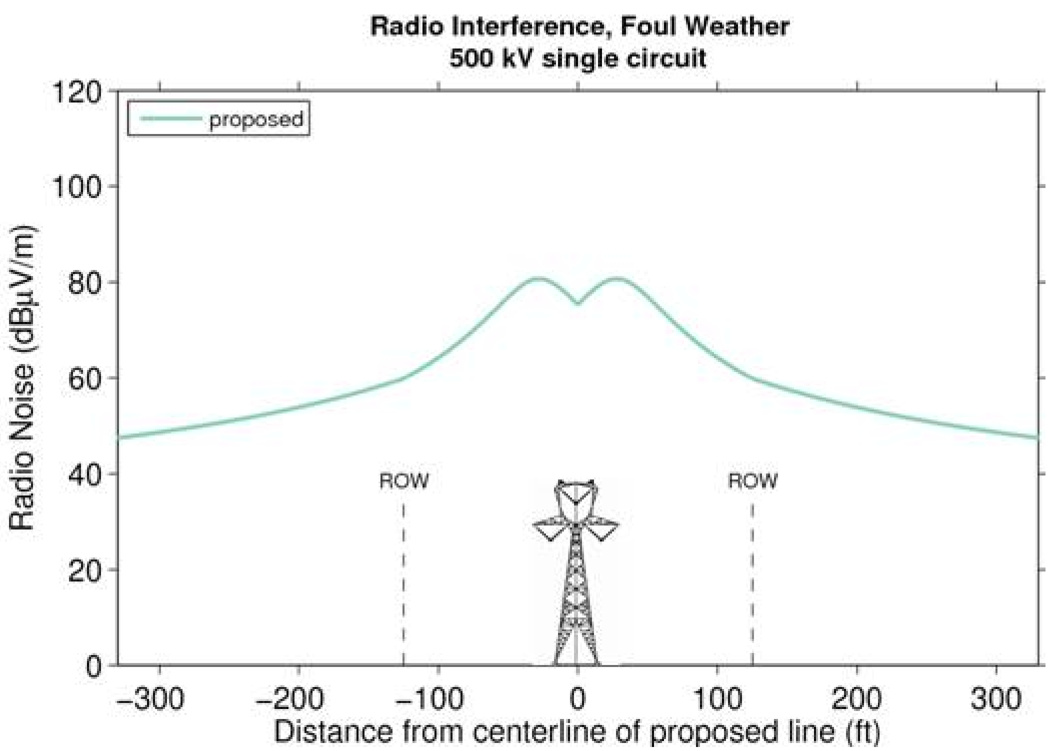


Figure 4-5. Calculated radio interference profile for proposed 500kV transmission line

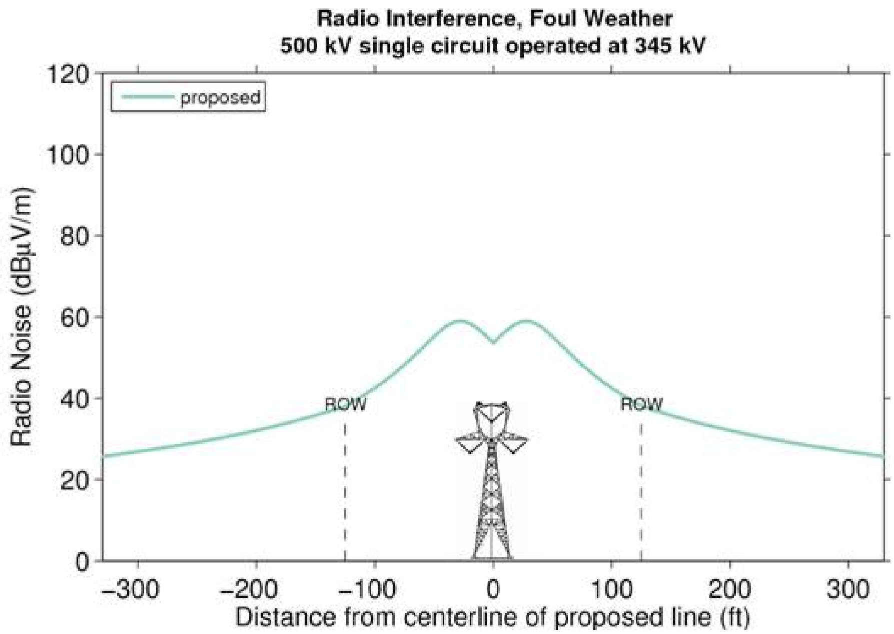


Figure 4-6. Calculated radio interference profile for proposed 500kV transmission line, but initially operated at 345 kV

<u>345kV Structures</u>

Figure 4-7 shows the calculated levels of radio noise associated with the operation of the 345kV configuration.

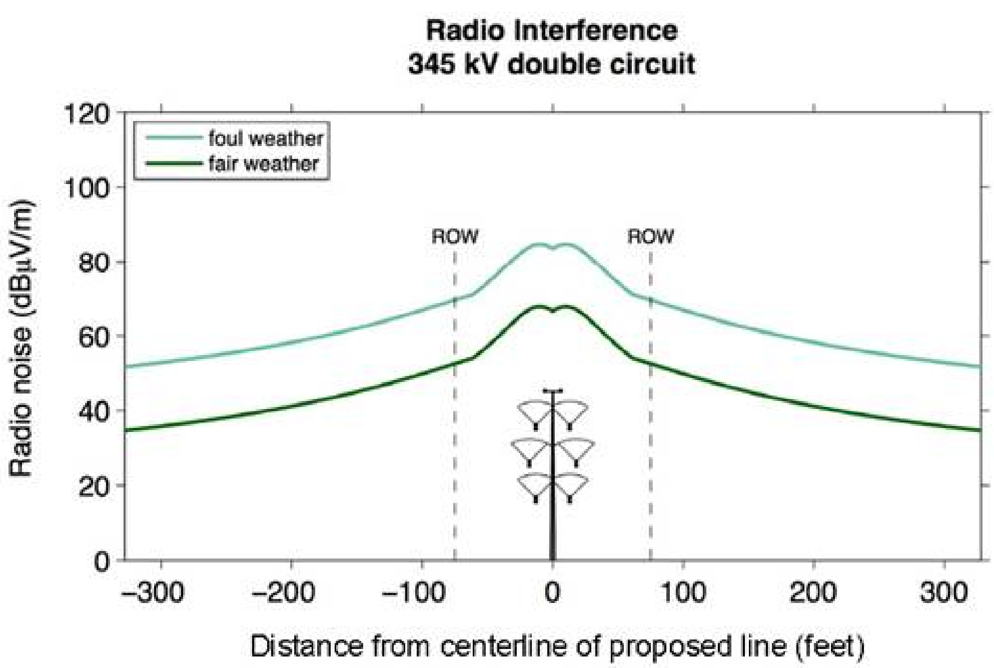


Figure 4-7 Calculated radio interference profile for proposed 345kV transmission line

Radio Noise Assessment

The fair-weather radio-interference levels at a reference location (100-foot lateral distance from the outside conductor of the proposed lines) are less than 67 dBµV/m (Table 4-14). In general, radio noise is not a concern for transmission lines, and the Proponent would work with landowners to mitigate radio interference associated with its facilities if they should arise.

TABLE 4-14
CALCULATED RADIO NOISE LEVELS FOR MONA TO OQUIRRH 500KV AND 345KV TRANSMISSION LINE CONFIGURATIONS*

Line Configuration	Fair Weather L50 - ROW Edge (dBµV/m)	Fair Weather L50 + ROW Edge (dBµV/m)	Foul Weather L50 - ROW Edge (dBµV/m)	Foul Weather L50 + ROW Edge (dBµV/m)
500kV	42.9	42.9	59.9	59.9
500kV operated at 345kV	21.1	21.1	38.1	38.1
345kV	52.5	52.5	69.5	69.5

NOTE: *The noise levels are reported as median or L50 levels, i.e. the dBA value was exceeded 50 percent of the time. A 10 percent overvoltage was used in calculations to place an upper bound on interference levels.
ROW = right-of-way

Television Noise

The electromagnetic energy released by corona that produces noise in the radio receiver band also produces noise in the television receiver band. The strength of the electromagnetic noise at television frequencies is much less than at radio frequencies and is generally not a concern. As in the case of radio noise, television noise decreases with distance from the corona source and decreases with increasing frequency. The television noise does not affect the audio portion of the television signal, which is an FM signal. The video portion of a television signal is AM and thus can be impacted by corona noise if the television signal strength is low, the transmission line corona activity is high (such as in foul weather), and the television receiving antenna is located close to the transmission line. Even in these cases, if there is television interference it can often be resolved simply by relocating the antenna. Moving the antenna farther away from the transmission line or increasing its height is usually sufficient to resolve the problem. Corona-generated television interference does not affect cable television or satellite television.

The television noise was calculated at a frequency of 75 MHz. This frequency is near channels 2 and 3. Television bands are grouped in two categories: very high frequency (VHF) for channels 2-13, and ultra high frequency (UHF) for channels 14-83. The UHF channels are much higher in frequency than the VHF bands, and therefore television noise is much less likely to occur at UHF than at VHF. In addition, VHF television noise is much less likely to occur than radio noise because of the increasing frequency, as is seen by comparing television noise profiles in Figures 4-8, 4-9, and 4-10 with the radio noise profiles in Figures 4-4, 4-5, and 4-6 and the low levels of television interference at the edges of the right-of-way (Table 4-15). In general, television noise is not a concern for transmission lines. The Proponent, however, would work with landowners to identify sources of television interference and to mitigate television interference caused by its facilities.

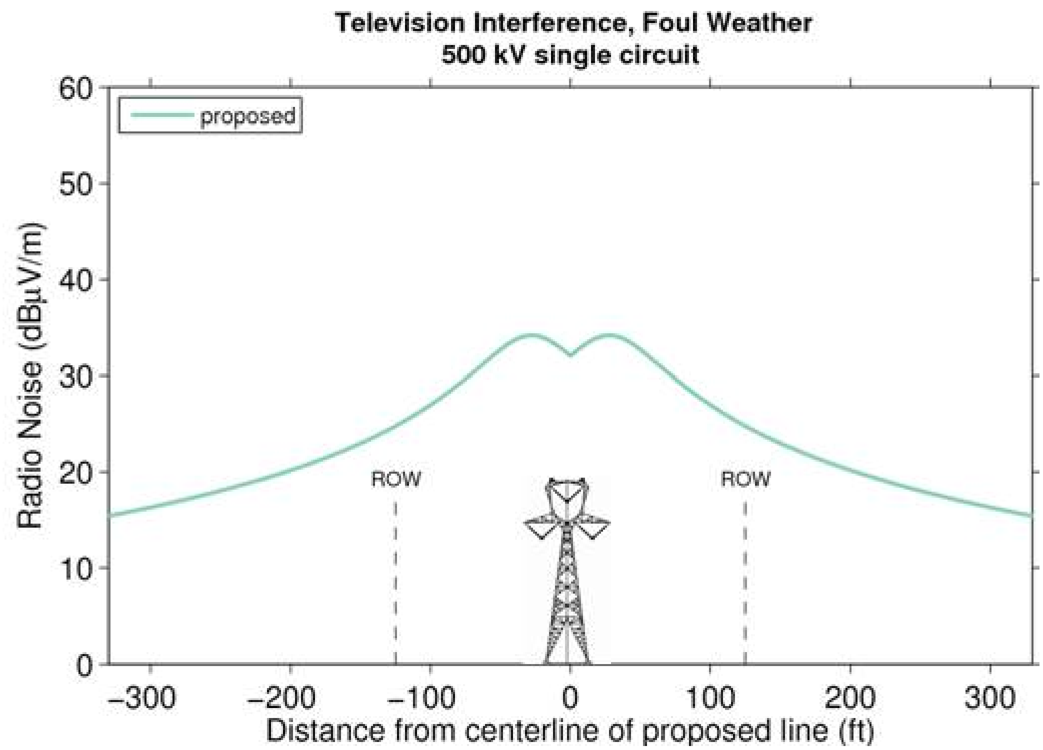


Figure 4-8. Calculated television interference profile for proposed 500kV transmission line configuration

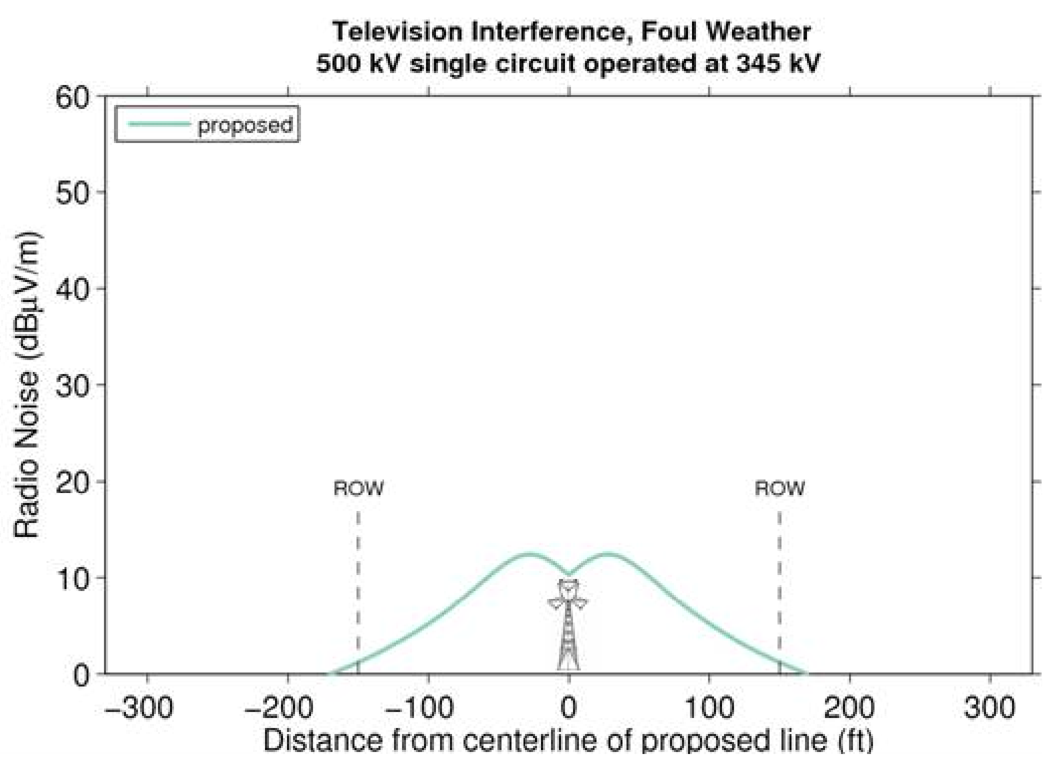


Figure 4-9. Calculated television interference profile for proposed 500kV transmission line configuration, but initially operated at 345kV

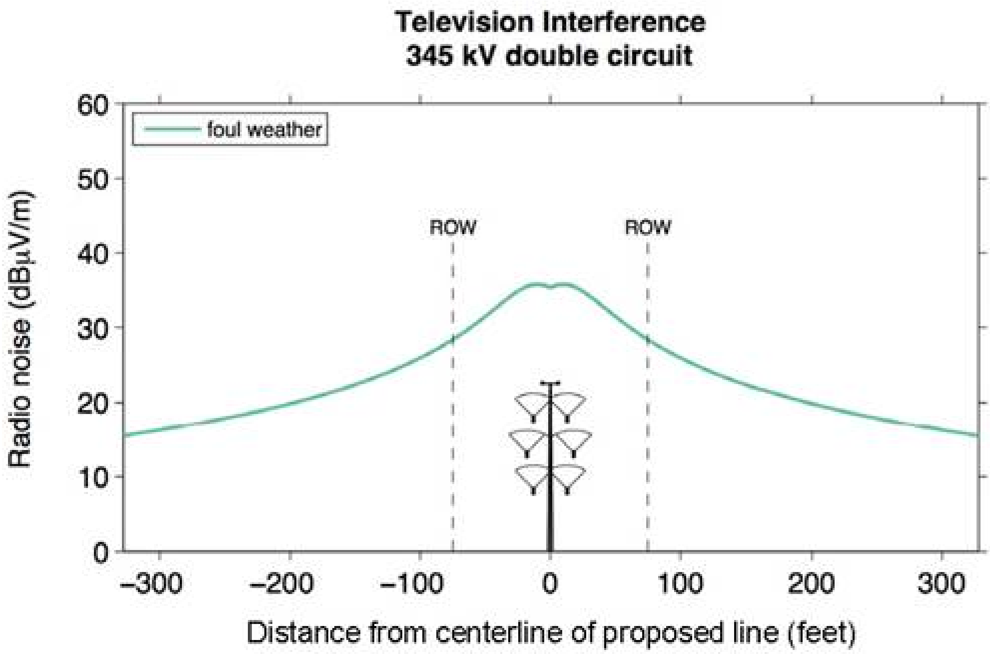


Figure 4-10. Calculated television interference profile for proposed 345kV transmission line configuration

TABLE 4-15
TELEVISION INTERFERENCE LEVELS IN RAIN FOR MONA TO OQUIRRH 500KV AND 345KV TRANSMISSION LINE CONFIGURATIONS*

Line Configuration	Foul Weather L50 - ROW Edge (dBµV/m)	Foul Weather L50 + ROW Edge (dBµV/m)
500kV	24.8	24.8
500kV operated at 345kV	3.0	3.0
345kV	28.4	28.4

NOTE:
*The noise levels are reported as median or L50 levels, i.e. the dBA value was exceeded 50 percent of the time. A 10 percent overvoltage was used in calculations to place an upper bound on interference levels.
ROW = right-of-way

Electric and Magnetic Fields

Transmission lines

Electric and magnetic fields were calculated with conservative assumptions regarding the ground clearance of conductors, and conservative overvoltage assumptions for predicting electric-field phenomena. Calculated levels are reported at a height of 1 meter (3.28 feet) above ground in accordance with the standard protocol for taking measurements near power lines (Institute of Electrical and Electronics Engineers [IEEE] 1994).

Figures 4-11, 4-12, and 4-13 show profiles of the calculated electric field for the 500kV, 500kV operated at 345kV, and 345kV configurations, respectively.

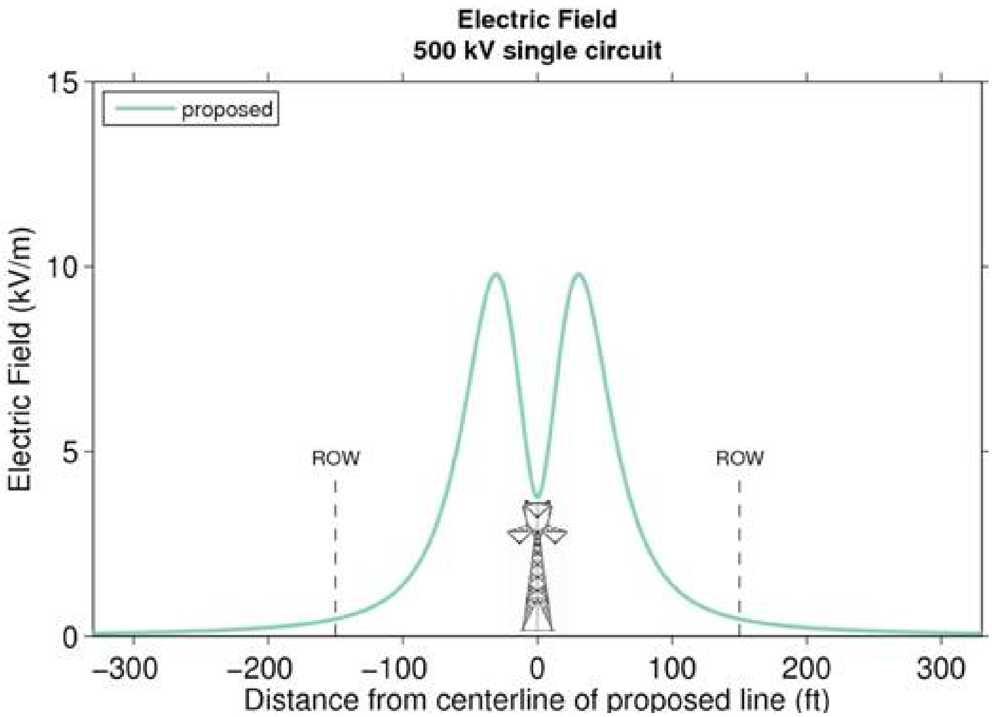


Figure 4-11. Calculated electric field profile for proposed 500kV transmission line configuration

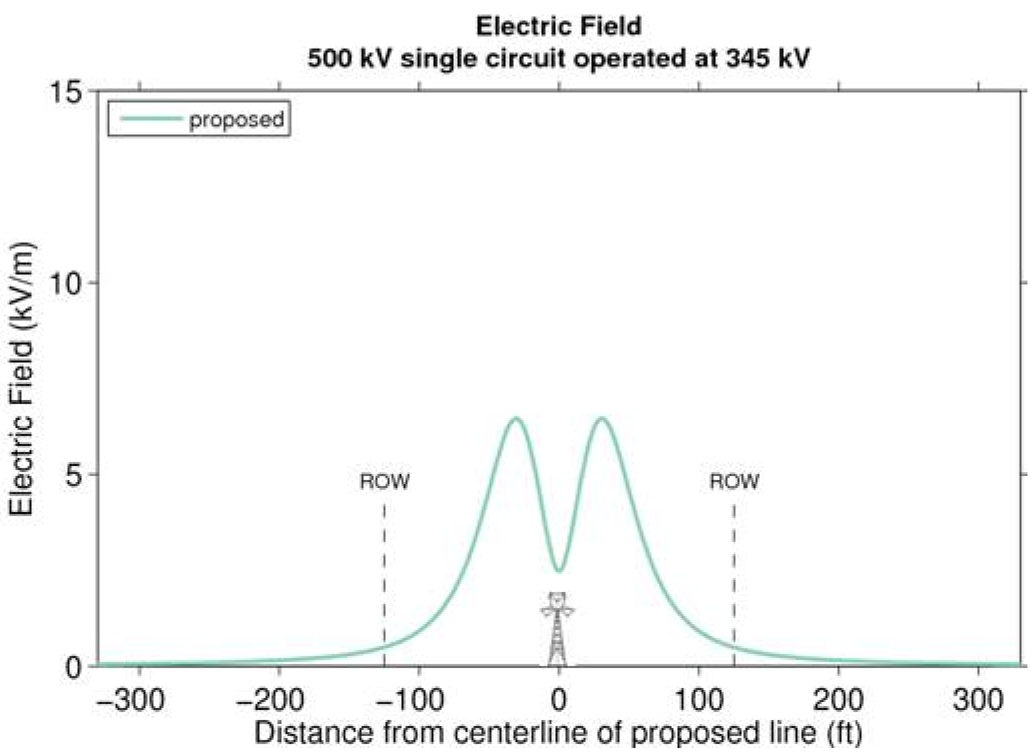


Figure 4-12. Calculated electric field profile for proposed 500kV transmission line configuration but initially operated at 345kV

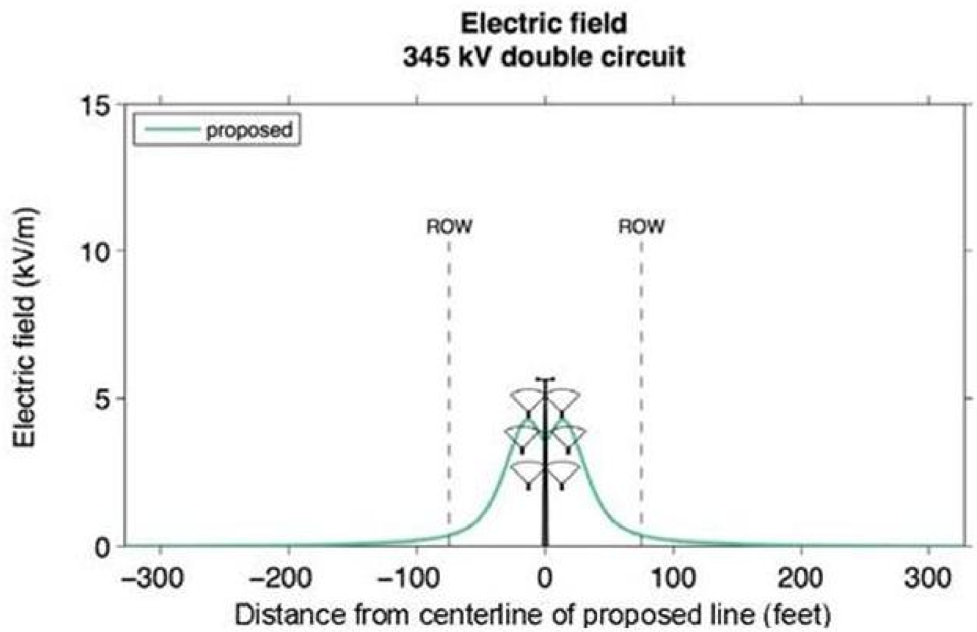


Figure 4-13. Calculated electric field profile for proposed 345kV transmission line configuration

The maximum expected load on the 500kV line is 2,026 Amperes (2,938 Amperes for the 500kV line operated at 345kV) and 1,838 Amperes for the 345kV line, but this would be expected to occur for only a limited number of hours each year. In typical operation, the current flows would be less, and so the calculated magnetic field values summarized below would be considerably lower. Figures 4-14, 4-15, and 4-16 show the calculated magnetic fields for the single circuit and double-circuit lines configured at 500kV, 500kV operated at 345kV, and 345kV, respectively.

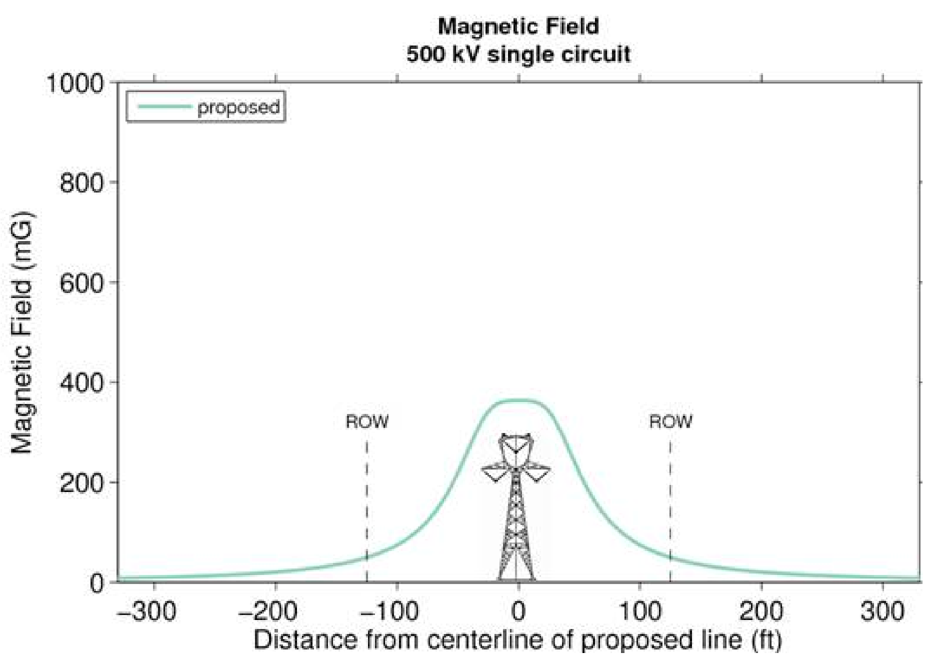


Figure 4-14. Calculated magnetic field profile for proposed 500kV transmission line configuration at 2,026 Amperes

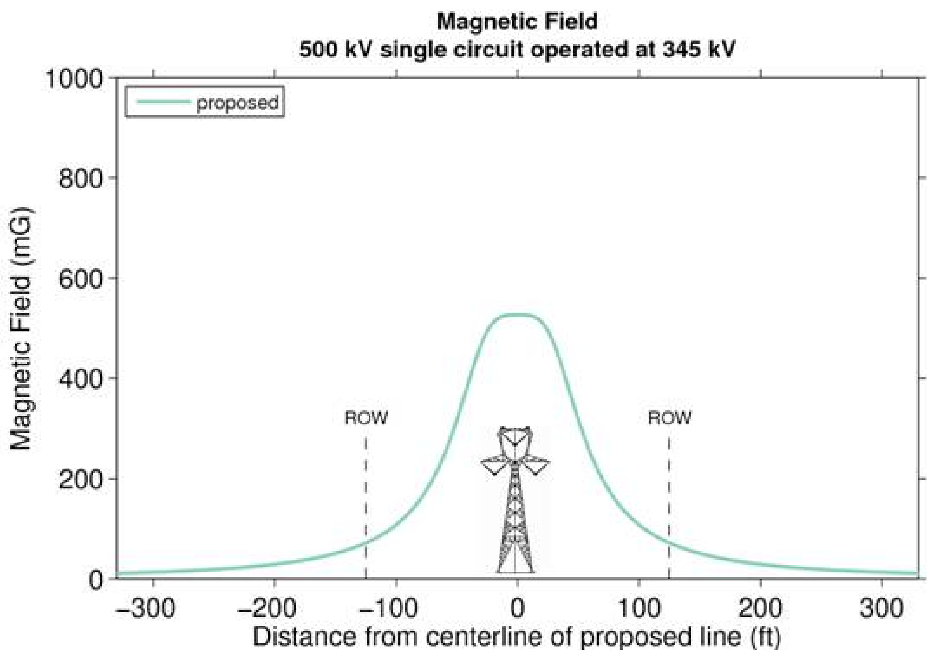


Figure 4-15. Calculated magnetic field profile at 2,936 Amperes for proposed 500kV transmission line configuration but initially operated at 345kV

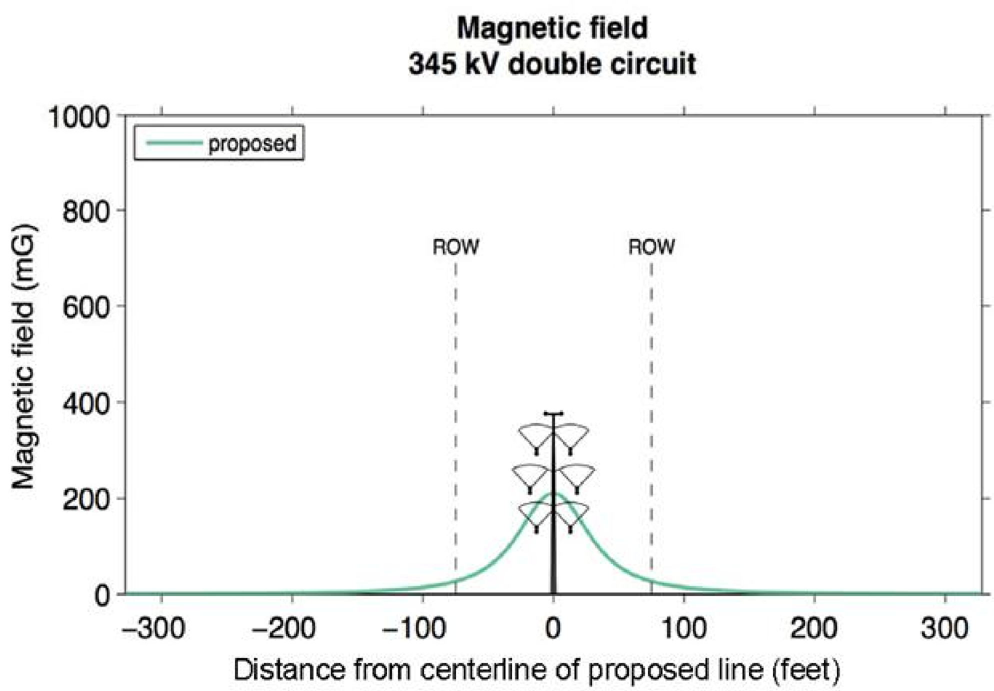


Figure 4-16. Calculated magnetic field profile for proposed 345kV transmission line at 1,838 Amperes

Table 4-16 shows the edge of right-of-way electric and magnetic field values for existing and proposed conditions.

TABLE 4-16
CALCULATED MAXIMUM ELECTRIC AND MAGNETIC FIELD LEVELS FOR MONA TO OQUIRRH 500KV AND 345KV TRANSMISSION LINE CONFIGURATIONS*

Line Configuration	Magnetic Field		Electric Field	
	West Right-of-way Edge* (mG)	East Right-of-way Edge* (mG)	West Right-of-way Edge* (kV/m)	East Right-of-way Edge* (kV/m)
500kV	49.4	49.4	0.75	0.75
500kV (operated at 345kV)	71.6	71.6	0.50	0.49
345kV	26.7	26.7	0.372	0.372

NOTE: *A 10 percent overvoltage was used in calculations to place an upper bound on electric field levels, and magnetic fields were calculated at a maximum load.

Substations

The characterization of EMF around a substation is complicated, but experience indicates that the EMF from substations "attenuate sharply with distance and will often be reduced to a general ambient level at the substation property lines" (IEEE 1994). The exception is where transmission and distribution lines enter the substation. Thus, the operation of equipment within the substation would not be a significant source of EMF outside the property boundaries, and addressing the EMF associated with the transmission lines as described above effectively addresses potential EMF from substations.

Induction Issues

Magnetic fields associated with transmission lines can induce voltage and current in long conducting objects that are parallel to a transmission line. Such induction is a potential source of shocks when metallic structures near an energized line are not properly grounded. A fence, irrigation pipe, pipeline, electrical distribution line, or telephone line forms a conducting loop when it is grounded at both ends (in which case an earth return completes the loop). The magnetic field from a transmission line can induce a current to flow in such a loop if it is oriented parallel to the line and links lines of magnetic flux. If only one end of the fence is grounded, then an induced voltage appears across the open end of the loop. The possibility for a shock exists if a person closes the loop at the open end by contacting both the ground and the conductor. The magnitude of this possible shock depends on (1) the magnitude of the field; (2) the length of the object (the longer the object, the larger the induced voltage); (3) the orientation of the object with respect to the transmission line (parallel as opposed to perpendicular, where no induction would occur); and (4) the electrical impedance of the current path (high impedance limits current flow).

Magnetic induction from power lines has been investigated for many years, and utility companies routinely install mitigation measures to reduce induced current and voltage. Grounding policies employed by utility companies for long fences, for instance, reduce the magnitude of induced voltage by grounding the fence at intervals and properly bonding all conducting portions of the structure. For very long fences parallel to a transmission line, the electrical continuity of the fence is sometimes interrupted, creating smaller induction loops. Similar techniques and procedures are available for irrigation pipes and buried gas pipelines. During construction of the proposed line, the Proponent should review and address potential induction issues.

Electric fields associated with transmission lines also can induce voltages in metallic objects, if not properly grounded. The Proponent will work with landowners to ensure that metallic buildings and fences are appropriately grounded, so induction problems can be prevented.

Electric and Magnetic Field Standards

Two international scientific organizations, the International Commission for Nonionizing Radiation Protection (ICNRP) and the International Committee for Electromagnetic Safety (ICES), have published guidelines for limiting public exposure to EMF. These guidelines set limits at high field levels to protect against the direct, acute health effects (i.e., stimulation of nerves and muscles, a shock-like effect) that can occur at these high field levels. Although ICNIRP and ICES have the same objectives[1] and used similar methods, the recommended limits for exposure of the general public to EMF at the frequencies used to transmit electricity differ, as seen in Table 4-17. Exposure standards are set based on acute effects–those that occur from short-term exposure to high field levels–because both organizations judged that evidence for effects from long-term exposure to EMF was insufficient for setting exposure standards.

TABLE 4-17
REFERENCE LEVELS FOR WHOLE BODY EXPOSURE TO 60-Hz FIELDS: GENERAL PUBLIC

Organization Recommending Limit	Magnetic Fields [1]	Electric Fields [1]
International Commission on Non-ionizing Radiation Protection (ICNIRP) Restriction Level	833 mG	4.2kV/m [2]
International Committee on Electromagnetic Safety (ICES) Maximum Permissible Exposure (MPE)	9,040 mG	5kV/m 10kV/m [3]

NOTES:
[1]Both organizations judged that evidence for effects from long-term exposure was insufficient for setting exposure standards.
[2]Exposures above these levels are permitted if it can be shown that the ICNIRP Basic Restrictions (2 milliAmperes per square meter) are not exceeded. Recent modeling by scientists suggests that the Basic Restriction for the general public might not be exceeded unless exposures are greater than about 9.125 kV/m (Dimbylow *et al.* Phys. Med. Biol. 50:1047, 2005). Moreover, these limits apply to locations where persons spend significant amounts of time (Council of the European Community. Official Journal of the European Communities, L199:59, 1999.).
[3]Exception within transmission line rights-of-way.
mG = milligaus

The ICNIRP recommends a residential exposure limit to magnetic fields of 833 milligauss (mG) and an occupational exposure limit of 4,200 mG. The ICES recommends that magnetic field exposures be limited to 9,040 mG. Magnetic field levels in ordinary environments are far too low to cause acute effects.

For all alternatives, the levels of EMF at the edge of the right-of-way and beyond would be below limits for human exposure recommended by both ICNIRP and ICES (see Figures 4-2 through 4-15).

[1]The scope of ICES is the "Development of standards for the safe use of electromagnetic energy in the range of 0 Hz to 300 GHz relative to the hazards of exposure to man … to such energy." ICES encourages balanced international volunteer participation of the public, the scientific and engineering community, agencies of governments, producers, and users. ICNIRP is an independent group of approximately 40 experts assembled from around the world. It is the formally recognized, non-governmental organization charged with developing safety guidance for non-ionizing radiation for the World Health Organization (WHO 2007), the International Labour Organization, and the European Union.

EMF Health Research

The proposed transmission line would produce EMF, as do all sources of electricity. EMF at intensity levels that would be produced at the edge of the right-of-way also can be found in the ordinary environment. EMF exposure would be well below exposure limits, in keeping with recommendations noted in Table 4-17.

Several public health and scientific organizations have reviewed the research on EMF and health, and considered the strengths and limitations of the epidemiologic and laboratory studies. These reviewers have concluded that the overall body of research does not indicate any disease or adverse health effect caused by EMF exposure at levels below the guideline limits.

Pacemakers and Project-Related EMF

Implanted cardiac pacemakers are designed to detect abnormal electrical signals from the beating heart and administer therapy in the form of electrical pulses through implanted electrodes to maintain or restore normal heart function. Many sources of EMF at a variety of frequencies have been reported to affect pacemaker function including IPods and other personal MP3 players, cell phones, wireless phones, electric pencil sharpeners, power tools, anti-theft and security devices in stores, libraries and airports, video games, ordinary magnets (i.e., on refrigerators or kitchen cabinets), escalators, electric vehicle ignition and motors, etc. If pacemaker wearers, however, avoid proximity to these devices, then their pacemakers will not be subject to potential interference from electric and magnetic fields.

The literature suggests that pacemakers also can be affected by EMF from utility power sources and may be somewhat more sensitive to 60-Hz electric fields than 60-Hz magnetic fields. In the case of electric fields, but not magnetic fields, buildings, walls, shrubbery, and vehicles, among other conductive objects, can effectively shield electric fields under most circumstances, thereby lessening the potential for electric fields to affect pacemakers. The manufacturers of pacemakers also have designed their devices in various ways to minimize potential interference from endogenous sources (e.g., muscle potentials) and interference by conducted currents from exogenous sources (e.g., touching electrical appliances). These measures also serve to minimize potential interference by electric fields. To protect the patient, most pacemakers (particularly new pacemakers) are designed to filter out external electrical signals and go into an automatic pacing mode for the period of time that interference is detected.

The expected electric and magnetic field levels at the edge of the proposed right-of-way for the Project are less than 1.1 kilovolts/meter (kV/m), without taking into account any shielding provided by objects in the environment, and 1,000 mG, respectively (Table 4-16). While there is no universal guidance as to acceptable levels of EMF for pacemakers, the American Conference of Governmental Industrial Hygienists (ACGIH) has recommended guidelines for occupational exposures, including EMF (AGCIH 2006). These guidelines are designed to identify levels to which nearly all workers may be exposed repeatedly without adverse effect and, for EMF, suggest that patients with pacemakers or similar devices limit their exposure to electric fields to 1 kV/m and magnetic fields to 1,000 mG (ACGIH 2006). Thus the expected levels of magnetic fields on the right-of-way and electric fields just outside the edge of the right-of-way would be less than the ACGIH guideline levels.

In response to a specific concern raised by Tooele City residents, the Proponent contacted Medtronics Incorporated to request recommendations for maximum EMF exposure to persons with pacemakers. In a February 2010 email, Medtronics sent its most recent information about its devices (Medtronics 2010). Medtronics report the minimum threshold level for interference as 1 Gauss (1,000 mG) for magnetic fields and 6kV/m for electric fields. The maximum levels of EMF even underneath the conductors of the double-circuit 345-kV line section would be less than these levels (Figures 4-13 and 4-16).

While there are locations on the proposed right-of-way between the Mona and Limber Substations where the electric field from the single-circuit 500kV transmission line would be higher than the ACGIH guideline, the electric field levels outside the 500kV right-of-way are also below the ACGIH guideline (Table 4-12).

The minimum distance between existing residences and the proposed 345kV transmission line route is 960 feet. Based on levels described above (page 4-89), there would be no effect on an individual with a pacemaker at the residence. Regarding potential effects of the proposed 500kV transmission line, an individual with a pacemaker should prudently avoid entering the 500kV right-of-way (250 feet wide) as the electric fields from the 500kV transmission line exceed the ACGIH guidelines, as indicated in the paragraph above.

4.4.2 Socioeconomic Environment

4.4.2.1 Introduction

The construction of new high voltage transmission lines and substations has the potential to impact the socioeconomic environment within the defined study area. This section identifies and evaluates the potential impacts of each alternative.

4.4.2.2 Significance Criteria

NEPA or CEQ regulations do not provide specific thresholds of significance for socioeconomic impact assessment. This is due to the observation that significance is contextual in nature and varies with the setting of the Proposed Action (40 CFR 1508.27[a]). As such, a set of significance criteria were developed specifically for this analysis and are summarized as follows. If any of the following occur, the alternatives would have to be evaluated for a significant impact.

- Displace or require the relocation of a substantial number of existing residents
- Generate demand for temporary housing of construction workers that exceeds the supply of local housing or hotel/motel facilities
- Require public service expenditures substantially greater than available approved revenue
- Disproportionally affect minority and/or low-income populations

4.4.2.3 Facility Construction

Overall Project Expenditures and Workforces

<u>Estimated Project Expenditures</u>

The estimated construction costs associated with each alternative are summarized in Table 4-18.

TABLE 4-18 ESTIMATED CONSTRUCTION COSTS	
Alternative Route	**Total Construction Cost**
Mona to Limber	
Alternative A1	$170,530,722
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/Proponent's Proposed Action	$170,269,972
Alternative B1	$176,527,980
Alternative B2	$176,267,230
Alternative C1	$172,616,725
Alternative C2	$172,355,975
Limber to Oquirrh	
Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	$124,521,694
Alternative E1	$127,037,284
Alternative E2– Proponent's Proposed Action	$128,295,078
Alternative F1	$121,167,574
Alternative F2	$122,844,634
Alternative G	$205,439,832
Limber to Terminal	
Alternative H – Environmentally Preferred Alternative/ Proponent's Proposed Action	$189,088,498
Alternative I	$167,705,985
SOURCE: Rocky Mountain Power 2009	

Workforce Requirements

The construction of the proposed line and facilities would require a number of specialized skill sets. An estimate of the number of individuals and specialties are summarized in Tables 2-8a and 2-8b. Construction of the transmission line and substations is expected to occur over several years. Construction of the Mona to Limber and Limber to Oquirrh segments are expected to start in October of 2010 and run through June 2013. It is estimated that the workforce for the Mona to Limber segment will reach a high of 288. For the Limber to Oquirrh segment, the workforce is expected to reach a high of 249 over the 24 month construction period. Construction of the Limber to Terminal segment is not expected to start until 2015 and require 243 workers during the construction period. Construction of the Mona Annex Substation is expected to start in October 2010 and run through June 2012 and will require 154 workers. Construction of the Limber Substation is also not expected to start until 2015 or 2016 and will require 154 workers.

Project Scheduling

The Proponent has proposed the following schedule for the overall Project:

- Start acquisition of right-of-way in the third quarter of 2009
- Start construction of facilities in third quarter of 2010
- Project in-service by June 2013

4.4.2.4 Summary of Impact Analysis Results

No Action Alternative

If no action were taken, the Project would not be granted a right-of-way and the transmission lines and substations would not be constructed. The human environment would remain as-is and management direction from the current management plans would continue. The advantages of the No Action Alternative would be the avoidance of any of the socioeconomic impacts described below that would occur with the construction of the transmission lines. However, the projected electricity demands in northern Utah would not be met. This could lead to increased cost of energy and continued dependence on a system that is less reliable than would be if the Project were completed.

Impacts Common to All Alternatives

<u>Impacts on Employment</u>

The construction and operation of the proposed transmission lines and related facilities would be expected to have a minimal impact on local employment. The largest potential impact from the Project on employment would occur during the construction phase. The construction of facilities for the entire Project would be expected to employ several hundred laborers (refer to Tables 2-8a and 2-8b). However, construction would be expected to be staggered over several years so average direct employment would not be expected to exceed 650 at any one time and would be dispersed across the study area. It would be anticipated that a large percentage of the construction workforce would commute to the project site from their residences rather than relocate. This is due to the fact that construction employees are typically willing to commute up to two hours from their homes to construction sites (Electric Power Research Institute 1982) and the close proximity of the large population base of the greater metropolitan area along the Wasatch Front. However, some positions would likely have to be filled by others coming from outside the area. The addition of new residents to the area also would have an added effect of increasing economic activity, which could create new jobs in the area. This indirect impact on employment would be expected to be small and relative to the study area. The change in employment would be expected to be short term and dissipate upon completion of construction. Operation of the new facilities would have negligible impacts on local employment.

<u>Impacts on Population</u>

The proposed transmission line Project and alternative routes would be expected to cause a slight increase in employment due to the construction of the Project. The slight increase in employment would not be expected to cause any measurable impacts on population trends. All counties in the study area, except Juab County, have been experiencing high levels of population growth and this would be expected to continue in the future. Any changes in population due to the Project would be small and would not impact these projected trends.

<u>Impacts on Housing</u>

Any small, short-term changes in population due to the Project would not be expected to have any measureable impact on available housing in the study area. Existing permanent and temporary housing are adequate to supply any new residents to the area.

Impacts on Government-provided Services

The Project and alternative routes would be expected to have negligible impacts on government-provided services in the study area because changes in employment and population would be predicted to be small due to the construction and operation of the transmission lines. Therefore, it would not be anticipated that there would be a measurable change in the demand or supply of relevant government services throughout the study area.

Facility Impacts on Property Values

The development or upgrade of electric transmission line facilities has received a great deal of public scrutiny regarding the impacts of the facilities on private property values. As such, a number of studies have been conducted to determine the impact of transmission lines on property values. The results of the studies are varied. In general, the impacts are difficult to measure, vary among individual properties, and are influenced by a number of interplaying factors, including the following:

- Proximity of residential properties to towers and lines
- Type and size of high-voltage transmission line (HVTL) structures
- Appearance of easement landscaping
- Surrounding topography (Pitts and Jackson 2007)

Pitts and Jackson (2007) in their review of the literature summarize the following conclusions on the impacts of HVTL.

- When negative impacts are present, studies report an average decline of prices of one to ten percent;
- The diminution in value is attributable to the visual unattractiveness of the lines, potential health hazards, disturbing sounds and safety concerns;
- The impacts diminish as the distance between the HVTL and the impacted properties increase and disappear completely at a distance of 200 feet from the lines;
- Where views of lines and towers are completely unobstructed, negative impacts can extend up to a quarter of a mile;
- If HVTL structures are at least partially screened from view by trees, landscaping, or topography, any negative effects are reduced considerably;
- Value diminution attributed to HVTL proximity is temporary and usually decreases over time, disappearing completely in four to ten years.

Although there is evidence that HVTL have affected property values in some cases, the effects are generally smaller than anticipated. Impacts on property values may also be associated with visual impacts and EMF. These issues and potential impacts are described in Sections 4.2.7 and 4.5.

Fiscal Impacts

The construction and operation of the transmission line would generate additional property taxes to counties where the line would be located. Because the Proponent's electric utility property is valued on a centralized basis by the Utah State Tax Commission and because the Commissions appraisal methodology bundles generation, distribution and transmission property together for assessment purposes, it is not possible to precisely estimate the amount of property taxes that would result from the Proponent's planned investment in the proposed Project. However, it is quite certain that an investment in new transmission assets would lead other assessed values resulting in higher property tax receipts for counties where the transmission line would be located. The magnitude of these tax revenues are estimated and summarized in Table 4-19. The property taxes for the first year that the line would be in service were estimated by applying an average tax rate of 1.5 percent to the construction cost of each segment of the line and are summarized in column 2 of Table 4-19 (Patterson 2009). It would be anticipated that tax revenues would fall in years following year one, as assessed values would consider cost of operation. In order to estimate an average cash flow for each segment of the line, a capitalization rate of 7.67 percent (Utah State Tax Commission 2009) was applied to cost of construction and is summarized in column 3 of Table 4-18. The annual tax revenue was then estimated by applying the 1.5 percent average tax rate to the annual cash flow and is summarized in column 4 of Table 4-19 for each segment of the line.

TABLE 4-19
ESTIMATED TAX REVENUES

Alternative Route	First Year Property Taxes[a]	Estimated Annual Cash Flows[b]	Property Taxes Remaining Years in Service[c]
(1)	(2)	(3)	(4)
Mona to Limber			
Alternative A1	$2,557,961	$13,079,706	$196,196
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action	$2,554,050	$13,059,707	$195,896
Alternative B1	$2,647,920	$13,539,696	$203,095
Alternative B2	$2,644,008	$13,519,697	$202,795
Alternative C1	$2,589,251	$13,239,703	$198,596
Alternative C2	$2,585,340	$13,219,703	$198,296
Limber to Oquirrh			
Alternative D – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative	$1,867,825	$9,550,814	$143,262
Alternative E1	$1,905,559	$9,743,760	$146,156
Alternative E2 – Proponent's Proposed Action	$1,924,426	$9,840,232	$147,603
Alternative F1	$1,817,514	$9,293,553	$139,403
Alternative F2	$1,842,670	$9,422,183	$141,333
Alternative G	$3,081,597	$15,757,235	$236,359
Limber to Terminal			
Alternative H – Environmentally Preferred Alternative/Proponent's Proposed Action	$2,836,327	$14,503,088	$217,546
Alternative I	$2,515,590	$12,863,049	$192,946

[a] First year property taxes from each segment of the line were estimated by multiplying an average tax rate of 1.5 percent by the estimated construction cost of the line.
[b] Estimated annual cash flows were determining by applying the 2009 capitalization rate for utilities (7.67 percent) to the estimated construction cost of each line segment (Patterson 2009).
[c] Property taxes from each segment of the line in remaining years in service were estimated by multiplying an average tax rate of 1.5 percent by the estimated annual cash flows.

4.4.2.5 Environmental Justice

Potential minority or low-income populations within the Project area are discussed in Section 3.4.4. There are six census block groups within Salt Lake County in the north-eastern portion of the study area that have potential minority or low-income populations. There were no potential minority or low-income populations identified in the study area within Juab, Tooele, and Utah counties. None of the minority or low-income populations in Salt Lake County are closer than 3.5 miles from the alternative transmission line routes and facilities. As such, it is not expected that any of the potential minority or low-income populations would be disproportionately impacted by the development or operation of these facilities.

4.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts were identified for air, water, earth, paleontological, cultural, socioeconomic, or public safety (hazardous materials or noise) resources for the proposed Project. Further, there are no anticipated significant unavoidable adverse impacts associated with EMF. Table 4-20 shows the significant unavoidable adverse impacts on vegetation, visual, and land use resources associated with alternative routes for the project.

TABLE 4-20
SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS
(MILES CROSSED)

Alternative	Vegetation (Wetlands/Riparian)	Scenic Quality	Views from Residences	Recreation and Travel Corridor Views: High Sensitivity	Recreation and Travel Corridor Views: Moderate Sensitivity	Special Management Areas (Carr Fork WMA, NOMA)	Wilderness Characteristics for WIA
Mona to Limber							
Alternative A1	1.0	0.0	0.7	5.5	20.2	0.0	0.0
Alternative A2 – BLM's Preferred Alternative on Federal Lands/Environmentally Preferred Alternative/ Proponent's Proposed Action	1.0	0.0	2.5	5.5	20.2	0.0	0.0
Alternative B1	0.0	0.0	0.9	5.5	16.8	0.0	0.0
Alternative B2	0.0	0.0	1.8	5.5	16.8	0.0	0.0
Alternative C1	1.0	0.0	2.3	6.1	28.7	0.0	0.0
Alternative C2	1.0	0.0	3.2	6.1	28.7	0.0	0.0
Limber to Oquirrh							
Alternative D – BLM's Preferred Alternative on Federal Lands/ Environmentally Preferred Alternative	0.7	0.1	0.4	0.6	2.2	1.4	0.0
Alternative E1	1.5	2.4	0.4	0.6	3.2	5.7	2.6
Alternative E2 – Proponent's Proposed Action	1.5	2.5	0.4	0.4	3.2	5.7	2.6
Alternative F1	0.4	5.3	0.3	9.5	12.8	0.0	0.0
Alternative F2	0.4	5.3	0.3	9.5	8.5	0.0	0.0
Alternative G	12.5	0.0	0.3	1.9	1.1	0.0	0.0

TABLE 4-20
SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS
(MILES CROSSED)

Alternative	Vegetation (Wetlands/Riparian)	Scenic Quality	Views from Residences	Recreation and Travel Corridor Views		Special Management Areas (Carr Fork WMA, NOMA)	Wilderness Characteristics for WIA
				High Sensitivity	Moderate Sensitivity		
Limber to Terminal							
Alternative H – Environmentally Preferred Alternative/ Proponent's Proposed Action	14.5	0.0	0.3	1.9	1.1	0.0	0.0
Alternative I	8.6	0.0	3.0	0.0	0.9	2.3	2.0

4.6 Cumulative Effects

This section presents the cumulative effects associated with the Project, including (1) a general definition of cumulative impacts, (2) elements that were considered in the cumulative impact analysis, (3) the assessment approach, and (4) the results of the cumulative impact assessment for the Project.

4.6.1 Definition

Cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes other such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. These reasonably foreseeable future actions refer to future action projections, or estimates, of what is likely to take place when a Proposed Action is implemented. They are not part of the Proposed Action, but are projections being made so that future impacts, cumulative and otherwise, can be estimated as required by NEPA. Cumulative impacts are interdisciplinary, multi-jurisdictional, and usually do not conform to political boundaries. The CEQ has defined the resulting effects as direct and indirect. Direct effects are caused by the Project action and occur at the same time and place. Indirect effects also are caused by the Project action, but are later in time or further removed in distance, yet are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are the total effect on a given resource or ecosystem of all actions taken or proposed.

4.6.2 Cumulative Impact Assessment Process

The cumulative impact assessment process considered (1) scoping and Project issues; (2) cumulative impact time frames and the resources (or receptors) that may be affected by the Project alternatives; (3) the geographical area in which the impacts would occur; and (4) other past, present, and reasonably foreseeable future actions that have, or can be expected to cause, impacts on these resources when considered with development of the Project.

4.6.2.1 Scoping and Project Issues

The scoping of cumulative impact issues was conducted in association with federal, state, and local agencies; special interest groups; and the CWG (refer to Appendix B). Scoping was conducted in reference to both geographic and resource related issues.

4.6.2.2 Cumulative Impact Time Frame and Receptors

The temporal time frame for the cumulative effect analysis is established as projects foreseeable out to 2020. This time frame allows for the incorporation of potential effects from past and reasonably foreseeable future impacts in the impact areas.

The baseline condition for the cumulative effects analysis was defined as current conditions in 2009. The affected environmental resources and potential direct and indirect effects of the Project were identified using the Project description and information contained in Chapters 3 and 4. The resources or receptors that were evaluated included the following:

- Climate and Air Quality
- Earth Resources
- Water Resources
- Biological Resources
- Wildland Fire Ecology and Management
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Wilderness Characteristics
- Land Use and Recreation Resources
- Special Designations
- Social and Economic Conditions
- Public Safety

4.6.2.3 Identification of Geographic Area in Which Impacts Would Occur

The cumulative impact study area, or "sphere of influence," for the Project varied according to the affected resource. Table 4-21 outlines the respective resource, cumulative impact study area, and reasoning for area of analysis that would be anticipated to be cumulatively affected. As a result of the linear nature of the project, the boundaries of the resource specific cumulative impact study area would reasonably account for past, present, and foreseeable future actions.

TABLE 4-21
CUMULATIVE IMPACT STUDY AREAS BY RESOURCE

Climate and Air quality	Juab, Salt Lake, Tooele and Utah Counties	Same analysis area as described in Chapter 3
Earth Resources (geology, soils)	1 mile wide study corridor	Same analysis area as described in Chapter 3
Water Resources	1 mile wide study corridor	Same analysis area as described in Chapter 3

TABLE 4-21 CUMULATIVE IMPACT STUDY AREAS BY RESOURCE		
Biological Resources (vegetation and wildlife)	2 mile wide study corridor	Same analysis area as described in Chapter 3
Wildland Fire Ecology and Management	6 mile wide study corridor	Same analysis area as described in Chapter 3
Cultural Resources	1 mile wide study corridor	Same analysis area as described in Chapter 3
Paleontological Resource	1 mile wide study corridor	Same analysis area as described in Chapter 3
Visual Resources	6 mile wide study corridor	Same analysis area as described in Chapter 3
Wilderness Characteristics	6 mile wide study corridor	Same analysis area as described in Chapter 3
Land Use and Recreation Resources	6 mile wide study corridor	Same analysis area as described in Chapter 3
Special Designations	6 mile wide study corridor	Same analysis area as described in Chapter 3
Social and Economic Conditions	Overall study area boundary (Juab, Salt Lake, Tooele and Utah counties)	Same analysis area as described in Chapter 3
Public Safety (EMF, Noise)	Right-of-way width	Same analysis area as described in Chapter 4

4.6.2.4 Identification of Past, Present, and Reasonably Foreseeable Actions and Trends

Known present and past activities within the Project area are described in detail in Section 3.2.9 and include agriculture, grazing, mining, and general recreation; growth of cities and towns, including residential, industrial, and commercial areas; transportation and utility corridors; conservation easements, parks, and open space; and military installations and hazardous waste sites. Also, Table 4-22 summarizes the known projects considered in the cumulative impact assessment.

Reasonably foreseeable future actions and trends for the impact areas are described below. The growth of cities and towns within the Project area is expected to continue, particularly in the Salt Lake and Tooele valleys. Residential and commercial areas are also expected to grow in the Tooele Valley and the southwest portion of the Salt Lake Valley in South Jordan, West Jordan, and Herriman. Industrial areas are likely to expand in the northwest portion of the Tooele Valley, the Lake Point area, and the western portions of West Jordan and Salt Lake City. Federal and state highways and county roads may be improved and expanded to keep up with the growing population in the area.

Agriculture, grazing, and mining will continue to be major land uses within the Project area. Agriculture and grazing are prevalent in the southern portion of the Project area in Tooele, Juab, and Utah counties. The majority of BLM land in this area is allotted for livestock grazing. Active mining operations are present in the Oquirrh and Tintic mountains, and as the demand for metals increases, mining operations are likely to expand. Kennecott Copper is researching opportunities to expand its tailings pond in Salt Lake County, as well as its open pit and underground mining operations in the Oquirrh Mountains.

4.6.2.5 Identification of Specific Ongoing and Future Projects

In addition to the past, present, and future foreseeable trends previously described, the analysis of cumulative effects also factored in specific known projects that are either on-going or scheduled for completion in the foreseeable future. Table 4-22 summarizes the known projects considered in the cumulative impact assessment.

TABLE 4-22
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name	Type of Development	Location	Timeframe
BLM	Holly Energy UNEV pipeline	400-mile, 12-inch diameter petroleum products pipeline	Woods Cross, Utah, to a location north of Las Vegas, Nevada	FEIS scheduled for completion in April 2010; construction to begin in summer/fall 2010
	Energy Gateway South 500kV Transmission Corridor Project	750-mile long 500kV transmission line	Wyoming, Colorado, Utah, and Nevada	EIS schedule for completion in 2012; in-service 2015-2016
	TransWest Express Project	800-mile long 600kV DC transmission line	Wyoming, Colorado, Utah, and Nevada	EIS schedule for completion in 2012; in-service 2014-2015
	Proposed Mona Annex Substation to future Limber Substation	69-mile 500kV transmission line	Juab, Utah, and Tooele counties	No specific timeframe, load driven
BLM	Magnum Gas Storage (MGS) Project	Interstate Natural Gas storage facility	Millard, Juab, and Utah counties	Planning to submit their preliminary draft applicant-prepared EA to the agencies in October 2009. Following agency comment and Magnum revision of the document, MGS Project intends to submit their Application for Certificates of Public Convenience and Necessity and applicant-prepared environmental assessment (EA) by November 2009. The EA is scheduled for completion in May 2010 and construction to begin in fall of 2010.
UDOT, FHWA	Midvalley Highway	4 to 6 lane expressway or freeway	From I-80 to Tooele City	FEIS scheduled for completion in Spring 2010
	Mountain View Highway	6 lane freeway	From I-80 in Salt Lake City to I-15 in Utah county	Phased construction through 2030
Tooele County	Pioneer Ridge wind farm	Wind farm	South Mountain and the Stockton Bar	0-5 years approved by County
	Gravel pit	Gravel pit	Tooele County, near 10-mile Pass	0-5 years
	Leo's Sweet Sage Acres	Residential development	Southern Tooele County, just east of SR 36	Under construction
	The Benches at South Rim	Residential development	Southern foothills of South Mountain	Under construction

TABLE 4-22
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name	Type of Development	Location	Timeframe
Tooele County	Saddleback	Residential development	Near Lake Point in the foothills of the Oquirrh Mountains	0-10 years
	Horseshoe – Grantsville	138kV Transmission Line	South of I-80 and southwest of the Great Salt Lake	No specific timeframe, load driven
	Tooele – Grantsville relocate	46kV Transmission Line	West of SR 36 and Southwest of the Great Salt Lake	No specific timeframe, load driven
	Terminal – Horseshoe relocate	138kV Transmission Line	South of I-80 and southwest of the Great Salt Lake	No specific timeframe, load driven
	Horseshoe – Limber #1	138kV Transmission Line	West of SR 36 and Southwest of the Great Salt Lake	No specific timeframe, load driven
	Tooele – Oquirrh rebuild	138kV Transmission Line	Over the Oquirrh Mountains, through the BLM NOMA	No specific timeframe, load driven
	Tooele – Staker	138kV Transmission Line	North of SR 73 and southeast of the Tooele Army Depot	No specific timeframe, load driven
Tooele City	Overlake Planned District	Mixed-use community that will be built in phases	Northwest portion of Tooele City	On-going for the next 0-30 years
Salt Lake County	Kennecott Lands West Bench Master Plan ▪ Little Valley	Mixed-use master planned community that will be built in phases ▪ Residential development west of Magna	West Bench of the Salt Lake Valley	On-going for the next 0-75 years
Salt Lake City	NW Quadrant Plan	New land use plan for the Northwest Quadrant	Northwest portion of Salt Lake City	Scheduled for completion in early 2009
South Jordan	Daybreak Development	Mixed-use community that will be built in phases	Western portion of South Jordan	On-going for the next 0-10 years
	Industrial Development	Light industrial	South side of Old Bingham Highway	Under construction – 0-5 years
Herriman	Rosecrest	Mixed-use community that will be built in phases	East side of Herriman	Under construction; on-going for the next 10 years
	South Hills	Mixed-use community that will be built in phases	East side of Herriman	Under construction; on-going for the next 10 years

TABLE 4-22 CURRENT AND FUTURE PROJECTS				
Jurisdiction/ Agency	**Project Name**	**Type of Development**	**Location**	**Timeframe**
Juab County	Currant Creek – Phase II expansion	Gas-fired power plant expansion	Adjacent to the existing Currant Creek Power Plant	3-10 years
	Mona Annex – Vickers/Nebo	138kV Transmission Line	South of the Currant Creek Power Plant and east of U.S. 6	No specific timeframe, load driven
	Ashgrove – Vickers tap	138kV Transmission Line	South of the Current Creek Power Plant and east of U.S. 6	2009-2010
	Mona Annex – Delta	138kV Transmission Line	East of the IPP Power Plant and north of U.S. 50/U.S. 6 merge	2010-2015
Utah County	New substation Cedar Fort – Fairfield area	Substation	West of Pleasant Grove and northwest of Utah Lake	No specific timeframe, load driven
	Jumbers Point – Staker	138kV Transmission Line	South of SR 74 and west of Utah Lake	2009-2011
	Pelican Point – Goshen – Spanish Fork	138kV Transmission Line	North of U.S. 6 and west of Utah Lake	No specific timeframe, load driven

FLPMA mandates that, to the extent practical, future utility projects should be consolidated within established corridors, thereby limiting cumulative impacts. As part of the Project, the BLM SLFO would establish a major right-of-way up to 250 feet wide (depending on location) to accommodate the 500kV and 345kV lines. A portion of this project would be located within a proposed utility corridor which would also accommodate the UNEV pipeline project as well as future linear utilities.

4.6.3 Results

The results of the cumulative impact analysis are presented below for each of the receptors identified in Section 2.6.2.

4.6.3.1 Climate and Air Quality

Past, present, and reasonably foreseeable future actions identified in Sections 4.6.2.4 and 4.6.2.5 were reviewed for potential cumulative impacts on climate change and air quality.

Climate Change

Construction and operation of the proposed transmission lines is not expected to contribute to climate change. However, the proposed transmission lines would transport power from both existing and future generation sources; which could be a mix of thermal and renewable resources. Emissions of criteria pollutants from the existing generation sources already have been permitted at full capacity under state and federal permit programs to ensure compliance with National Air Ambient Air Quality Standards.

Construction and operation of any new facility would have to be evaluated as part of that facilities' permitting and approval process.

Assessment of impacts on global climate change is in its formative phase, and it is not yet possible to know with confidence the net effect of such change. Climate change must be viewed from a global perspective; therefore, the magnitude of the emissions potentially contributed indirectly by the project needs to be viewed in that context. The IPCC Fourth Assessment Report (2007) concluded that current climate models are not able to predict with sufficient precision global impacts of individual projects, nor can they predict localized climate impacts resulting from global temperature changes. The mechanisms involved in land-atmosphere interactions are not well understood (National Research Council 2005). The precise timing, nature, and magnitude of climate-change impacts at a specific location are not certain. This uncertainty is increased by an inability to predict the effects of the technological, political, regulatory, and business response to the findings of the IPCC and other evidence of changing climate. Climate change impacts resulting from operation of the proposed transmission lines as part of the western interconnection transmission system in the United States, and potential atmospheric emission pollutants from connected thermal generation plants also would depend on annual weather conditions and the changing mix of generation sources. Any attempt to predict indirect and cumulative climate impacts that would be expected from contributions of thermal generation in the region would be highly speculative.

Air Quality

Past and present actions with potential for air quality impacts include residential, commercial and industrial development, highway construction, military operations, mining and smelter operations, fugitive dust from farming, and dust from gravel roads or during construction. For emission sources such as construction activities and gravel road dust, the effects are temporary. Air quality in the area would be affected by the reasonably foreseeable future construction and operations of projects, such as gravel and mining operations; residential, commercial, and industrial development; and highway construction. Impacts of construction for future transmission lines or transmission line upgrades would be similar to impacts of the Proposed Action, and again, would be temporary.

Impacts related to power generated during transmission line operation would indirectly affect air quality in the region. The emissions occurring under the cumulative conditions would be forecasted, managed, and planned for through air quality rules, regulations, and attainment plans established by the Utah DEQ and EPA. Power plant emissions would need to be within permitted emission levels required by local air management agencies, with EPA oversight, and at these levels, the emissions would be consistent with applicable air quality management plans. However, the proposed Project has the potential to import renewable energy resources, which would potentially result in a reduction of emissions from existing thermal power plants in the region.

4.6.3.2 Earth and Water Resources

The cumulative effects on earth and water resources would not be measurably different than the additive effects of the Project. Planned projects in the area could add to the potential for wind and water soil erosion, stream bank degradation, and sedimentation in water bodies, dependent on the mitigation implemented. The potential to increase erosion rates is expected to occur mostly during the construction of the projects, which would occur in different geographic areas at different times. The cumulative effects of the planned projects within the Project area would likely be somewhat more than any single project. Overall, the proposed projects within the study area together would have minimal long-range effects on soils, geology, and water resources.

4.6.3.3 Biological Resources

Past and present actions that have most significantly affected vegetation and wildlife resources within and adjacent to the alternative transmission line corridors and substation sites include: (1) agricultural land uses in the Cedar, Goshen, Tooele, and Rush valleys, (2) water diversions, (3) mining activities in the Oquirrh and East Tintic mountains, (4) urban development in Tooele and Salt Lake valleys, (5) military facilities in Rush and Salt Lake valleys, and (6) the development of roads and utility corridors throughout the study area. Adverse effects associated with these activities include: (1) the permanent loss of vegetation and wildlife habitat, (2) reduced habitat quality due to fragmentation of native communities and the introduction/spread of non-native vegetation and noxious weeds, (3) decreased habitat security due to increased access by on- and off-road vehicles, and (4) increased risk of mortality associated with legal and illegal hunting, vehicle collisions, and collision with transmission lines.

The loss and degradation of native habitats has been most significant in the valleys and the eastern foothills of the Oquirrh Mountains. Sagebrush habitats, in particular, have been significantly reduced and fragmented by agricultural activities, urban development and military facilities, roads and utility corridors, and the establishment of non-native plant species. These factors have affected the habitat quality for greater sage-grouse, pronghorn, and other sagebrush-dependent species. Industrial development in the northern Salt Lake Valley and along the Great Salt Lake has eliminated many wetlands and associated waterfowl habitats. Urban development and mining in the western Salt Lake Valley have eliminated and fragmented habitats, particularly crucial mule deer and elk seasonal ranges. Finally, existing transmission lines along the I-80 corridor pose a risk of collision-related mortality for migratory waterfowl and shorebirds.

The Project, in conjunction with the current and future projects identified on Table 4-22, would result in the additional loss and fragmentation of wildlife habitats. The actual effects of habitat loss and fragmentation would depend on the specific amounts, types, and locations of the habitat. For example, future development of Kennecott land could result in population-level effects for mule deer and elk by eliminating crucial winter ranges. Cumulatively, current and future projects (particularly linear projects such as roads and transmission lines) could fragment areas to the extent that wildlife movement patterns are altered and habitats are effectively precluded from use by wildlife. For example, the Limber Substation and the Pioneer Ridge wind farm could cumulatively reduce movement between and use of habitats in the Stansbury Mountains and South Mountain. The Project would contribute to the cumulative loss of habitat. Habitat loss would be minimized by paralleling existing transmission lines and roads to the maximum extent practicable and minimizing construction of new access roads. The Project would result in cumulative effects relative to habitat loss and fragmentation.

Current and future projects also could result in temporary disturbance, behavioral disruption, and long-term displacement of wildlife. The cumulative effects of such disturbances would depend on the nature, timing, and duration of the development activities. The effects of displacement would depend on the species-specific response and the importance of the habitat that is abandoned. For example, the establishment of wind turbines or transmission lines in occupied greater sage-grouse habitat may result in the abandonment of habitats in proximity and/or adjacent to the structures. If the abandoned area contains an active lek, then displacement effects could be significant. The Project would result in the disturbance and displacement of wildlife. Mitigation measures implemented to minimize the effects of disturbance and displacement include seasonal and spatial restrictions on construction in important habitats (i.e., crucial winter range) and maintaining buffers around sensitive resources (i.e., raptor nests, leks, etc.). Although the Proposed Action would result in temporary disturbance during construction, it has been designed to minimize potential long-term displacement of wildlife. Disturbance and displacement impacts would represent minor cumulative effects.

Current and future projects would likely increase the potential for the establishment and spread of non-native plants and noxious weeds, as well as the risk of unintentional, human-caused wildfire. Projects that result in physical ground disturbance or substantial degradation of native plant communities would facilitate the establishment/spread of non-native plant species. The cumulative effects of these projects would depend on project-specific monitoring and eradication efforts. Likewise, construction activities and increased vehicle/OHV access would increase the potential for wildfire. The fire risk would depend on the vegetation characteristics of the Project area, the type and timing of construction activities, and project-specific planning and monitoring. The Project includes the development and implementation of a Weed Management Plan and plant and wildlife species conservation measures. These plans would minimize the potential risk of non-native plants/noxious weeds and wildfire, and the Project would not contribute to cumulative effects relative to these issues.

The Proposed Action and other current and future projects (refer to Table 4-22) would cumulatively increase the potential for wildlife mortality. The increased risk of mortality would be associated with construction activities (equipment and vehicles), legal and illegal harvest, and collisions with vehicles, transmission lines, and wind turbines. Construction activities could result in mortality of animals that have limited mobility or that nest or burrow in development sites. The construction of new roads and highways would increase potential mortality associated with vehicle-wildlife collisions. New roads that provide access into undisturbed habitats could increase the potential for legal and illegal killing of both game and non-game species. Finally, transmission lines create the risk of collision-related mortality for birds and bats. The degree and magnitude of such mortality would depend on the location of these facilities relative to bird and bat migration and movement corridors. While mortality associated with the Proposed Action is difficult to quantify, the Project would represent a small contribution to cumulative mortality effects.

The Project is not known to affect any federally listed species or designated critical habitats, and would not contribute to cumulative effects on threatened or endangered species. The Proposed Action and other current and future projects would likely affect several special status species (i.e., BLM-sensitive), such as the greater sage-grouse, as a result of habitat loss and potential displacement effects. The cumulative effects on special status species is difficult to assess, and would largely depend on project-specific measures to minimize habitat loss and fragmentation, disturbance and displacement from important habitats, and mortality of individuals. The Project would represent a small contribution to cumulative effects on special status species.

4.6.3.4 Wildland Fire Ecology and Management

Potential cumulative impacts of the Project on wildland fire ecology and management include (1) an increase in fire frequency and extent, (2) fragmentation of the landscape, and (3) an increase in the complexity of fire suppression operations.

New access roads, combined with new residential developments and population growth, are expected to increase access and traffic in areas that currently see little use. Increased access may lead to increases in the number of human-caused ignitions in the area. In addition, it may accelerate the spread of noxious weeds, such as cheatgrass, which has the potential to significantly alter natural fire regimes by increasing fire frequency and size. In the short term, these impacts would be mitigated during construction, as outlined in the Weed Plan and fire protection portion of the POD. Long-term impacts may be mitigated by limiting the number of new access roads that are constructed, and prohibiting access along permanent access roads.

The addition of linear features and developments in the Project area would further fragment the landscape and increase the complexity of fire suppression operations. The proposed and future transmission line projects may affect areas where the restoration of natural fire processes is desired by limiting opportunities for prescribed fire. Additional features and structures on the landscape would increase the complexity of fire suppression operations by increasing the number of structures that need protection, and potentially posing safety hazards to firefighters and the public. Despite these potential impacts, the addition of the Project facilities to the landscape is not expected to significantly affect the fire ecology and management of the area.

4.6.3.5 Cultural Resources

Over time, cultural resources are subject to attrition as cultures change, and archaeological and historical sites weather and erode. In addition, prior development in the region has either degraded or resulted in the loss of some cultural resources. Intensive level cultural resource inventories will be required should an alternative be selected for construction. The Class III cultural resource inventory will consist of an intensive pedestrian survey along the selected alternative route. The results of the survey will be presented in a technical report. The final Class III report will permit the BLM, in consultation with the SHPO, to identify NRHP-eligible properties and make determinations on eligibility of, and potential effects on, those properties. A treatment plan outlining the procedures for mitigating the effects on historic properties that would be adversely affected by the undertaking would be prepared and implemented in consultation with the BLM, SHPO, and other involved agencies.

Cultural resources could be destroyed by construction activities such as clearing, grading, drilling, and substation development. Development of new access corridors and rights-of-way could increase access to previously inaccessible areas leading to potential vandalism of cultural resource sites. The extent of impacts on cultural resources could be significantly reduced through avoidance and the implementation of mitigation measures. Where feasible, avoidance of significant cultural resource sites is preferred. Potential impacts on cultural resources in the area would be incremental rather than totally new; as a result, major impacts on cultural resources would be unlikely. The potential to mitigate impacts on archaeological and historical sites is high, and indirect effects on cultural resources, as a result of increased public access to this area, are expected to be low. Disturbances from future developments and surface-disturbing activities could uncover or destroy cultural resource sites. Despite the potential for adverse effects on some sites, future actions proposed on federal and/or state lands would require cultural resource evaluations and mitigation of affected significant historic properties. The resulting cultural resource documentation would increase the cultural resources knowledge base for the region; however, developments solely on private land are largely exempt from this requirement.

4.6.3.6 Paleontological Resources

Since the geological deposits in the Project area have not been known to be major fossiliferous sources, there is a slight chance that paleontological resources would be affected by future projects. While the chances of affecting paleontological resources may increase with additional projects in the area, the cumulative effects are expected to be minimal.

4.6.3.7 Visual Resources

Cumulative visual impacts may occur as a result of the construction, operations, and maintenance of the Project in context with other post construction activities and the future projects listed on Table 4-22, if they are either seen in the same field of view and/or are in the same landscape setting as the Project. The cumulative effect of the Project depends on the nature of change in form, line, color, and texture resulting from the introduction of additional facilities or landscape modifications.

A large portion of the regional landscape in the study area remains undeveloped. Past and present activities have changed the visual landscape primarily through urbanization, industrial development, and natural resource extraction. In the recent past, less developed areas of Salt Lake County and Tooele County have changed in visual character from naturally or agriculturally dominated landscapes to residential and commercial landscapes, and this trend will likely continue as these areas become more developed.

The introduction of new transmission lines in the unaltered landscape would produce the first incremental change into the viewshed. Each successive change in the viewshed, when similar development occurs, becomes less noticeable than the first. Where the transmission lines would follow existing similar lines, the cumulative impacts of the Project would not be significant. Specifically, the Project would increase the industrial character of the Current Creek Power Plant, Mona Substation and existing 345kV utility corridor near Mona, the north and south Tooele Army Depot sites, the Kennecott industrial corridor along I-80, and the industrial areas around the existing Terminal and Oquirrh substations. Other incremental changes would occur along the 138kV corridor south of I-80, west of the NOMA in north Tooele Valley, in the existing 138kV corridor though the NOMA, along the 46kV corridor south of Tooele City, north of Magna, east of Copperton, and east of SR 73 near the Tooele Army Depot.

The Project would cause the greatest cumulative visual impacts in undeveloped and rural landscapes with minimal modifications include areas such as the Tintic Mountains, Oquirrh Mountains, southern Goshen Valley, southern Cedar Valley, southern and northern Rush Valley, and the Stansbury foothills. Cumulative impacts on residential views in southern Goshen Valley, southern Cedar Valley, northern Juab County, north and central Rush Valley, and southern Tooele County would experience the greatest incremental change; however, these views include modified elements. Cumulative visual impacts on highway views would be greatest from U.S. 6, SR 36, SR 73, SR 199, and SR 138 in areas without existing transmission facilities where the line parallels or crosses the roads. Cumulative impacts also would occur to views from designated scenic routes and historic trails where the line crosses them in the Stansbury foothills, at the Pony Express National Historic Trail, and at the Railroad Bed Scenic Byway.

The Energy Gateway South Project and TransWest Express Project would add cumulatively to the visual impacts in the southern portion of the Project area, and other linear facilities such as the Holly Energy UNEV Pipeline project, Midvalley Highway, and Mountain View Highway would also add to the cumulative visual effects in the future. Industrial development, such as the potential Current Creek Power Plant expansion, would further incrementally increase the industrial character of the area around the existing Mona Substation. Residential, commercial, and mixed-use developments such as those proposed at Saddleback and Daybreak and in the West Bench Master Plan are typically located in or adjacent to urbanized areas. These developments would incrementally alter the visual setting, except where they occur in primarily undeveloped landscapes, such as in southern Tooele County (i.e., Leo’s Sweet Sage Acres).

Other cumulative visual impacts expected in the study area could result from wind farm development, including the Pioneer Ridge wind farm currently being planned for development. The visual impacts of wind farm construction, operation, and maintenance are primarily due to the dominance of turbines at very long distances. Visual impacts such as shadow flicker, blade rotation, red and white FAA lighting, color and structure contrast, and glare would potentially occur as a result of wind farm construction. In addition, wind farms would also include interconnecting transmission facilities that would add to the cumulative visual effects.

Mining activity may also add cumulatively to visual impacts. Modifications to landform and vegetation and resulting visual contrast could moderately increase the industrial character of existing mining areas, or substantially increase visual impacts on undeveloped landscapes. Above-ground extractive activities would most affect viewsheds and scenery by the presence of heavy equipment, mine pit excavations, stockpiling/tailings areas, ancillary structures, and access road construction, primarily. Substantially less cumulative visual impact would occur with new subsurface mining activities.

4.6.3.8 Wilderness Characteristics

Cumulative impacts on wilderness characteristics are expected to be minimal as a result of the construction of the projects listed in Table 4-22. Of all of the projects listed in Table 4-22, only Saddleback residential development will indirectly impact wilderness characteristics in the Oquirrh Mountains WIA. A growing population in the Tooele Valley may increase recreation use in the Oquirrh Mountains WIA, particularly if an access road is constructed through Pass Canyon because of the Project. If Alternative E1 or E2 is constructed, these impacts may be mitigated by rehabilitating the temporary construction road or by prohibiting motorized access.

4.6.3.9 Land Use and Recreation Resources

Cumulative land use impacts may occur as a result of the construction, operation, and maintenance of the Project and other projects listed on Table 4-22. Multiple transmission line projects are planned throughout the Project area, including Energy Gateway South and TransWest Express Projects; multiple 46kV and 138kV lines in Tooele, Juab, and Utah Counties; and transmission lines associated with the proposed Pioneer Ridge Wind Farm. These projects would require the construction of some new access roads throughout the Project area. The construction of new access roads would potentially increase OHV use and traffic in areas where access was previously limited or non-existent. Increased access also may result in indirect impacts on other resources, particularly biological and cultural resources (described in Sections 4.6.3.3 and 4.6.3.5).

In the southern portion of the study area, most cumulative impacts on land uses are expected to be minimal with the addition of the Project. Small areas of agriculture and rangeland would be permanently removed from production by tower foundations, permanent access roads, and a future substation. These impacts would accumulate with the other future projects in the area, such as Energy Gateway South and TransWest Express Projects, the Holly UNEV pipeline, and the Magnum Gas Storage Project. However, the amount of permanent disturbance and loss of agriculture and rangeland production associated with these projects would not be significant in the context of the region. In Rush Valley, the Project will likely be located in a future proposed utility corridor that would potentially include the UNEV pipeline and other future utility lines.

In the northern portion of the study area, cumulative impacts may occur in areas where multiple projects are planned in proximity to one another, creating land use conflicts. These areas include the area between Tooele and Stockton, Butterfield Canyon, NOMA, and the Lake Point area.

Projects in the Tooele/Stockton area include the Pioneer Ridge Wind Farm, the UNEV pipeline, the Tooele-Staker 138kV line, and the proposed Project. The Project would be parallel to the proposed UNEV pipeline along the railroad through the Tooele Army Depot and the Utah Industrial Depot. Space is limited in this area, and the co-location of both projects may impact structures and storage areas in the Tooele Army Depot and industrial depot. These impacts may be mitigated by reducing or sharing right-of-way to minimize the separation between the transmission lines and pipeline and implementing cathodic protection measures. The Tooele-Staker 138kV line would likely follow existing transmission lines south from the Tooele Substation in the foothills. Due to the existing transmission lines in the foothills, the Project would have minimal cumulative impact in conjunction with the future 138kV line in this area. The Pioneer Ridge Wind Farm is not located close to the development on South Mountain, and significant cumulative impacts on land use resources are not anticipated.

Future projects in and around the mouth of Butterfield Canyon include Kennecott's West Bench Master Plan and the possibility of expanded Kennecott Copper open pit and underground mining operations. If either Alternative F1 or F2 were constructed, the transmission lines could potentially conflict with Kennecott's mining operations, requiring the relocation of the transmission lines at some point in the future. Relocating the transmission lines in the area may result in impacts on the Yellow Fork Canyon Regional Park and Rose Canyon Ranch Open Space on the south side of Butterfield Canyon Road, and impacts on existing and planned residential developments near the mouth of Butterfield Canyon. Kennecott Copper is currently exploring the feasibility of expanding its operations, and the potential size and location of future expansions in the area is uncertain at this time.

As planned in the NOMA, the existing 138kV line that crosses through Pass Canyon and over the Oquirrh Mountains would likely be rebuilt in the next 5 years, the timing of which will be determined by local area load demands. Alternatives E1 and E2 would parallel the 138kV line over the Oquirrh Mountains. The projects could potentially be constructed simultaneously so that short-term impacts associated with construction would be limited to a single period. Also, the same access road could be used for both projects. In the NOMA, the Project is not expected to have any additional cumulative impacts beyond the impacts described earlier in this chapter (i.e., biological, visual).

Major planned projects in the Lake Point area include the UNEV pipeline and the Kennecott tailings pond expansion. The Project would potentially parallel the UNEV pipeline on the north side of the tailings pond and around Lake Point. On the north side of the tailings pond and around Lake Point, space is limited due to I-80, the railroad, mining operations, and existing transmission lines. To avoid impacts on the tailings pond and mining operations, transmission lines would likely need to be consolidated within a narrower corridor to allow room for the Project and pipeline. In addition, the impacts may be mitigated by reducing or sharing right-of-way and implementing cathodic protection measures in order to site the transmission lines and pipeline with minimal separation. Plans for the Kennecott tailings pond expansion have not been finalized. If the expansion is planned for the area west of the current tailings pond, it may conflict with the alignment of Link 385, requiring the relocation of the line. There may be cumulative impacts associated with the tailings pond expansion and the potential relocation of the transmission lines; however, they are uncertain at this time.

4.6.3.10 Special Designations

Cumulative impacts on special designated areas are related primarily to visual concerns as previously described. Significant effects on the Back Country Byways, National Trails, or WSA are not expected.

Impacts from a second future transmission line project between Mona Annex and Limber substations would be expected to be similar to those identified for this Project. The cumulative effects of two projects in one corridor (e.g. proposed Project, future line) are likely to produce impacts that are of a slightly higher degree and possibly of longer duration.

4.6.3.11 Social and Economic Conditions

The Project is not expected to have a significant direct cumulative effect on the social and economic conditions within the Project area. The most notable direct effect of the Project would be in urban areas, particularly around residential areas, where transmission lines are not compatible with this land use.

If the Project is built, the cumulative beneficial impact on the social and economic conditions within the Project area could be significant, including operational revenues, employment revenues, and increased availability of electricity. It is reasonable to assume that a future 500kV line would have similar beneficial cumulative impacts. In addition, indirect cumulative effects range from increases in housing stock to job growth. If current trends continue, Utah's economy will continue to grow, the population will increase, government services will expand, and the housing stock will increase. This Project would not induce this growth; however, this Project would accommodate the increased demand that would be placed on the current electrical system.

4.6.3.12 Public Safety

Past, present, and reasonably foreseeable future actions that could affect EMF levels near residences were considered in this cumulative impacts analysis. Additionally, other potential impacts on occupational and public safety are considered.

Several public health and scientific organizations have reviewed the research on EMF and health, and considered the strengths and limitations of the epidemiologic and laboratory studies. These reviewers have concluded that the overall body of research does not indicate any disease or adverse health effect caused by EMF exposure at levels below the guideline limits. The audible noise levels at the edges of the right-of-way are estimated to be less than 55 dBA, the annual average level outdoor target value published by the EPA. While the proposed transmission line would produce EMF, as do all sources of electricity, EMF at intensity levels that would be produced at the edge of the right-of-way also can be found in the ordinary environment. EMF exposure resulting from the proposed transmission line would be well below exposure limits, in keeping with recommendations noted in Table 4-17. With the addition of any future transmission line(s), cumulative effects of audible noise levels and EMF exposures could be additive. If additional transmission lines were built in the same right-of-way, estimates of EMF exposure would have to be reevaluated.

Potential effects on occupational health and safety from construction and operation of reasonable foreseeable future actions would be limited. Nevertheless, with the unique occupational hazards associated with heavy construction (including the use, storage, and transport of hazardous materials) and the electric power industry, fatalities and injuries from on-the-job accidents could occur.

4.6.4 Irreversible and Irretrievable Commitment of Resources

Resources committed to the proposed Project would be material and nonmaterial, including financial. Irreversible commitment of resources for the purposes of this section has been interpreted to mean that those resources once committed to the proposed Project would continue to be committed throughout the

50-year life of the project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed, or degraded during construction, operation, maintenance, and decommissioning of the proposed Project could not be retrieved or replaced for future use. Irreversible and irretrievable commitments of resources for the Project are summarized in Table 4-23.

TABLE 4-23
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resource	Type of Commitment/ Reason for Commitment	Irreversible	Irretrievable
Air Quality	▪ Degradation of air quality ▪ Construction activities	No	Construction phase
Soils	▪ Soil loss and erosion ▪ Construction activities	Yes	Yes
Water	▪ None (see construction materials below)	–	–
Geological	▪ None (see construction materials below)	–	–
Biological	▪ Disturbance to and/or loss of vegetation, habitat, and wildlife species ▪ Construction and operation	Yes	Project life
Archaeological and Historical Sites	▪ Disturbance or removal of sites ▪ Construction, operation, maintenance, and decommissioning	Yes	Yes
Special Status Cultural Sites	▪ Disturbance or removal of sites, interference with visual setting ▪ Construction, operation, maintenance, and decommissioning	Yes	Project life
Traditional Cultural Places	▪ Disturbance or removal of sites, interference with visual setting, aural disturbance ▪ Construction, operation, maintenance, and decommissioning	Yes	Project life Construction phase
Paleontological	▪ Disturbance or removal of fossils ▪ Construction activities	Yes	Yes
Visual	▪ Degradation of natural scenic quality, viewshed intrusion ▪ Construction and operation	Yes	Project life
Land Use and Recreation	▪ Disturbance to agriculture and grazing ▪ Exclusion of residential, institutional, and industrial uses ▪ Increased recreational use along new access roads ▪ Increased access construction ▪ Construction and operation	Yes	Project life
Human Health	▪ Potential adverse electrical effects ▪ Operation	Unknown	Unknown
Noise	▪ Noise exceeding ambient levels ▪ Construction and operation	Yes No	Construction phase
Socioeconomic	▪ Increased regional and local employment and revenues ▪ Construction and operation	Yes	Project life

TABLE 4-23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES			
Construction Materials and Fuels	▪ Use of: o Aggregate o Water o Steel o Aluminum o Concrete o Wood o Fossil fuels	 Yes Yes Yes Yes Yes Yes Yes	 Yes Yes No No Yes No Yes

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Chapter 5 – Consultation and Coordination

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CHAPTER 5 – CONSULTATION AND COORDINATION

5.1 Introduction

The BLM conducted a comprehensive agency coordination and public participation program, commencing with scoping early on and continuing throughout the environmental process. The intent of the program was to encourage interaction between the BLM and other federal, state, and local agencies, and the public, to keep them informed about the Project and to solicit information that assists in planning, decision-making, and preparing the EIS.

The approach has been to integrate planning, analysis, and review activities with agency and public participation. Generally, the public participation program for the Project has incorporated several methods of approaching the public and agencies throughout the planning and NEPA process, with an emphasis at key milestones of the process. These methods generally include information dissemination and proactive agency and public participation.

During the scoping process and the consultation and coordination throughout the preparation of the EIS, formal and informal efforts were made by the BLM to involve other federal agencies, state and local governments, American Indian tribes, and the public. Consultation and coordination with federal and intergovernmental agencies, organizations, American Indian tribes, and interested groups and individuals are important to (1) ensure that the most appropriate data have been gathered and employed for analyses, and (2) to ensure that agency and public sentiment and values are considered and incorporated into decision making.

This chapter provides a brief description of the methods employed for communication and interaction, which includes scoping; consultation and coordination with agencies, tribes, and stakeholders; Proponent-initiated activities; and public review of the Draft EIS.

5.1.1 Summary of Changes from the Draft EIS

Chapter 5 now includes information on the public review of the Draft EIS and preparation of a Draft BA. A summary of Proponent-initiated public outreach activities conducted in response to public comments received on the Draft EIS has also been included. Table 5-3 has been updated to include additional agencies contacted since the publication of the Draft EIS. Table 5-5 has been updated to include additional preparers and contributors to the Final EIS.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

5.2 Scoping Process

The scoping process is summarized below and documented in the *Mona to Oquirrh Transmission Corridor Project EIS Scoping Report* (BLM 2008), which is available on the BLM project website. The purpose of scoping is to identify the issues related to the Project. It is an open process intended to incorporate the views and concerns of federal, state, and local agencies, and the public regarding the scope of issues to be analyzed in the EIS. Other objectives of scoping include the following:

- Identifying and inviting agencies relevant to the Project to participate in the preparation of the EIS as cooperating agencies
- Identifying the relevant and substantive issues that need to be addressed during the studies and in the EIS
- Identifying other environmental review and consultation requirements
- Determining the range of alternatives to be evaluated
- Developing the environmental analysis criteria and process allocating EIS assignments among agencies
- Identifying other environmental review and consultation requirements

5.2.1 Approach

The range of issues summarized in this chapter has been derived from the scoping process and ongoing public involvement. Some of the activities implemented early in the Project are listed below.

- Agency, interagency, and stakeholder meetings (listed in Appendix B) were held to discuss the Project and to solicit comments.

- Announcements to inform the public of the Project, EIS preparation, and public scoping meetings included the *Federal Register* NOI, media releases to local newspapers and radio stations, legal notices, and the Environmental Notification Bulletin Board (ENBB).

- A newsletter was distributed to interested parties on the Project mailing list, which includes federal, state, and local government agencies, special interest groups, and individuals. The newsletter introduced the Project, solicited input for the environmental analysis, and announced upcoming public scoping meetings.

- A telephone voice message information line (801-573-6814) was established to provide opportunity for the public to learn about the Project status and/or request information.

- A project website was established. The website contains a brief description of the Project, the need for the Project, and an EIS timeline. The website can be found at: http://www.blm.gov/ut/st/en/fo/salt_lake/planning/mona_to_oquirrh_transmission.html. A link was provided for the public to submit comments via email at UT_M2OTL_EIS@blm.gov.

- The Project was posted on the BLM ENBB https://www.blm.gov/ut/enbb, NEPA UT-020-2008-009.

- Three formal public scoping meetings were held in November 2007, one each in West Jordan, Tooele, and Nephi, Utah, to introduce the Project, explain the purpose of and need for the Project, describe the Project, explain the planning and permitting process, and solicit comments useful for the environmental analysis.

In addition, the Proponent assembled a CWG representing diverse interests associated with the northern portion of the Project area. The CWG met four times at key points throughout the process to provide input on the Project.

5.2.1.1 Notification

A NOI was published in the *Federal Register* on October 16, 2007, announcing the preparation of the EIS for the proposed Project and the opportunity for the public to participate in the process and provide input. The publication of the NOI initiated the 30-day public scoping period (October 16 to November 14, 2007). An addendum to the NOI was published in the *Federal Register* on November 5, 2007, to clarify information regarding the scoping meetings and Project website.

Copies of an informational newsletter (Newsletter No. 1) were mailed on October 23, 2007, to approximately 375 individuals, agencies, and interested organizations on the Project mailing list, and mailed electronically to the BLM's list of hunting and sportsman's organizations. Advertisements and paid legal notices were placed in local newspapers, including the *Salt Lake Tribune, Deseret News, Daily Herald, Tooele Transcript Bulletin, and Nephi Times* (Table 5-1). In addition, a notice was posted on the ENBB (SLFO and FFO), and announcements for the public scoping meetings were posted on several online radio-station community-event calendars (Table 5-2).

TABLE 5-1
PRESS RELEASES AND LEGAL NOTICES

Newspaper	Advertisement Publication Dates	Legal Notice Publication Dates
Salt Lake Tribune	October 25 and November 6, 2007	October 25, 2007
Deseret News	October 25 and November 6, 2007	October 25, 2007
Provo Daily Herald	October 25 and November 6, 2007	October 25, 2007
Tooele Transcript Bulletin	October 25 and November 6, 2007	October 25, 2007
Nephi Times	October 25 and November 6, 2007	October 24, 2007

TABLE 5-2
MEETING ANNOUNCEMENTS POSTED ON ONLINE RADIO STATION EVENT CALENDARS

Radio Station	Location
KNAK	Delta, Utah
KLGL	Manti, Utah
KMGR	Manti, Utah
KMTI	Manti, Utah
KCYQ	Richfield, Utah
KSVC	Richfield, Utah
KCPW	Salt Lake City, Utah
KRCL	Salt Lake City, Utah
KSL	Salt Lake City, Utah
KUED	Salt Lake City, Utah
KUER	Salt Lake City, Utah

Public Meetings

Three public scoping meetings were held in November 2007 to inform the public about the Project and the EIS process, and to solicit input on the scope of the Project and potential issues. An open-house format was used for the meetings. Information was presented on the purpose of and need for the Project, a description of the Project, and the planning and permitting process. Representatives from the BLM, Rocky Mountain Power, and the environmental consulting team assisting the BLM, EPG, were present and available to explain the displays and answer questions. A total of nine members of the public attended the scoping meetings, three at each meeting.

The three public scoping meetings were held at the locations and dates listed below:

West Jordan, Utah
Thursday, November 8, 2007
5:00 – 8:00 p.m.
Sunset Ridge Middle School

Tooele, Utah
Tuesday, November 13, 2007
5:00 – 8:00 p.m.
Tooele County Courthouse

Nephi, Utah
Wednesday, November 14, 2007
5:00 – 8:00 p.m.
Juab High School

Verbal comments provided during the scoping meetings were documented in meeting summaries. Written comments were accepted at the public scoping meetings, via electronic mail, and via United States mail at the SLFO and FFO.

5.2.2 Scoping Results

The results of scoping are documented in the *Mona to Oquirrh Transmission Corridor Project EIS Scoping Report* (BLM 2008). Refer to Section 1.3.2.

5.3 Consultation and Coordination

Agencies and organizations having jurisdiction and/or specific interest in the Project were contacted at the beginning of scoping, during the resource inventory, and prior to the publication of the EIS to inform them of the Project, verify the status and availability of existing environmental data, request data and comments, and solicit their input about the Project. Additional contacts were made throughout the process to clarify or update information. All conversations with agency personnel were documented, were distributed to the appropriate Project personnel, and are maintained in the Project files for further reference. Specific concerns and recommendations were discussed and documented for further action. This section describes the consultation and coordination activities that occurred throughout the EIS process.

5.3.1 Cooperating Agencies

In a letter dated November 2, 2007, the BLM invited seven organizations to participate in the preparation of the EIS as cooperating agencies. The organizations included the following:

- DOD – Tooele Army Depot
- Utah PLPCO
- Utah National Guard – Camp Williams Military Reservation
- Juab, Tooele, Salt Lake, and Utah Counties

Of these organizations, the PLPCO accepted the BLM's invitation and has been participating as a cooperating agency. A meeting was held in January 2008 to introduce the Project and discuss its scope. Numerous state agencies that are represented by the PLPCO were in attendance (Appendix B). In

January 2009, PLPCO reviewed the Administrative Draft EIS. Their comments were incorporated into that document.

5.3.2 American Indian Tribes

Early in the environmental process, the BLM initiated contact with several American Indian tribes in accordance with various environmental laws and Executive Orders[1]. While no American Indian reservations or lands owned in fee are within the Project area, the BLM identified several American Indian tribes whose traditional territories are within the Project area.

As part of scoping, the BLM mailed letters, dated October 25, 2007, to seven American Indian tribes and two individuals to inform them of and determine their interest in the Project. These tribes and individuals are:

- Northwestern Band of Shoshone Nation
- Eastern Shoshone of Wind River Reservation
- Te-Moak Tribe and affiliated Bands
- Confederated Tribes of the Goshute Nation
- Paiute Indian Tribe of Utah
- Uintah-Ouray Ute Indian Tribe
- Skull Valley Band of Goshute Indians
- Art Caamasee
- Elwood Mose

The tribes also were asked to determine the need for further study related to the identification of TCPs in the Project area that might be affected by the Project. Of these tribes, the Paiute Indian Tribe of Utah requested to participate in a field visit to view the Project corridor. Upon completion of the Class III cultural resource survey and report, the BLM will host a field visit for the Paiute Indian Tribe of Utah and other interested tribes. Results of the consultation effort will be documented in a separate report.

5.3.3 Formal Consultation

The BLM is required to prepare EISs in coordination with any studies or analyses required by the Fish and Wildlife Conservation Act (16 U.S.C. 661 et seq.), ESA (16 U.S.C. 1531 et seq.), and the NHPA, as amended (16 U.S.C. 470 et seq.).

5.3.3.1 Biological Resources

Under provisions of Section 7(a)(2) of the ESA, a federal agency that carries out, permits, licenses, funds, or otherwise authorizes an activity must consult with the USFWS as appropriate to ensure that the action is not likely to jeopardize the continued existence of any species listed as threatened or endangered. In accordance with these regulations, the BLM initiated informal consultation with the USFWS in 2007. On

[1] NEPA, NHPA as amended, American Indian Religious Freedom Act of 1978, NAGPRA, as amended, FLPMA, Archaeological Resources Protection Act of 1979, Executive Order 11593 – Protection and Enhancement of the Cultural Environment, Executive Order 12898 – Environmental Justice, Executive Order 13007 – Indian Sacred Sites, Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments

July 6, 2007, the USFWS attended an interagency meeting with the BLM and UDWR to identify and discuss concerns regarding the potential effects of the Proposed Action on wildlife resources, including federally listed species. A second interagency meeting involving the USFWS, BLM, and UDWR was held on August 12, 2008, to discuss these issues further.

In February 2008, the BLM requested a list of threatened, endangered, proposed, and candidate species for the Project area. The USFWS directed the BLM to obtain a species list from the USFWS Region 6 website, which provides county-level lists for Utah. Species lists subsequently were obtained for the Project area (Juab, Tooele, Salt Lake, and Utah Counties) in August 2008. These lists indicated that a total of eight federally listed species occur within these four counties, including three endangered species, three threatened species, and two candidates for federal listing. The USFWS data also indicated that no designated critical habitat occurs within or adjacent to the Project area.

A draft BA was prepared and concluded that the Project would not adversely affect federally listed species or designated Critical Habitats. The draft BA has been submitted to the USFWS and the ESA Section 7 process has been completed.

5.3.3.2 Cultural Resources

Numerous agencies and organizations were consulted about cultural resources during preparation of this EIS. These contacts were made in compliance with the requirements of NEPA and also to initiate formal consultations required by Section 106 of the NHPA. The purpose of the consultations is to solicit expressions of concern, collect relevant data, obtain reviews of the analysis of the collected information, and negotiate a PA specifying how cultural resources would be considered during the EIS and post-EIS phases of Project-planning and implementation.

The BLM initiated Section 106 consultation with the Utah SHPO in June 2007. A PA was executed between the various agencies involved with authorizing the Project. The BLM SLFO is serving as the lead federal agency for Section 106 compliance. Other agencies participating in the PA include the Utah SHPO, Rocky Mountain Power, DOD (Tooele Army Depot), Utah SITLA, PLPCO, and UDOT. The BLM invited the Advisory Council on Historic Preservation to participate in the project and to be a signatory to the PA; however, it declined to do so at that time.

A cultural resource study involving the collection of Class I data and a Class II field reconnaissance was conducted to identify and assess potential impacts the proposed Project may have on cultural resources and to support the evaluation of Project alternatives for the EIS. Once a preferred route has been identified, an intensive Class III inventory survey will be conducted to specifically identify those cultural resources that occur within the Project's APE. The results of this study will be documented in a report to support the BLM's on-going consultations with the Utah SHPO.

5.3.4 Other Coordination

The coordination with federal, state, and local agencies, interest groups, and stakeholders is described below and the entities are listed in Table 5-3. A list of agency and stakeholder meetings is presented in Appendix B.

TABLE 5-3 CONTACTS WITH AGENCIES AND ORGANIZATIONS
Federal Agencies

DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
    Utah Field Office
DEPARTMENT OF DEFENSE
Army
    Tooele Army Depot
    Deseret Chemical Depot
    Dugway Proving Grounds
Air Force
    Hill Air Force Base
DEPARTMENT OF AGRICULTURE
Forest Service
    Uinta National Forest, Spanish Fork Ranger District

State Agencies

UTAH
    Public Lands Policy Coordination Office
    Resource Development Coordination Committee
    Office of Energy Advisor
    Department of Environmental Quality
    School and Institutional Trust Lands Administration
    Division of Wildlife Resources
    Department of Transportation
    Historic Preservation Office
    Army National Guard
        Camp Williams Military Reservation

County Agencies

TOOELE COUNTY
    County Commission
    Department of Economic Development
UTAH COUNTY
    County Commission
    Engineering Department, Planning and Zoning Division
    Department of Public Works
JUAB COUNTY
    County Commission
    Department of Economic Development
    Department of Planning and Zoning
SALT LAKE COUNTY
    Department of Planning and Development
    Department of Intergovernmental Relations
    Deputy Mayor’s Office

Local Agencies

TOOELE CITY
    Department of Public Works/Community Development
    Engineering Department
    Planning Commission
    Mayor’s Office
CITY OF WEST JORDAN
    Community Development Department
    Office of Development Assistance
    City Manager’s Office
    Planning and Zoning

TABLE 5-3 CONTACTS WITH AGENCIES AND ORGANIZATIONS

MONA CITY
  Mayor's Office
  City Council
EUREKA CITY
  City Council
West Valley City
  Community and Economic Development Department
SALT LAKE CITY
  Community and Economic Development Department
  Planning and Zoning
  Mayor's Office
  City Council
CITY OF SOUTH JORDAN
  Economic Development
  City Manager's Office
  Public Works
  Community Development
GOSHEN CITY
  Mayor's Office
STOCKTON TOWN
  Mayor's Office
GRANTSVILLE CITY
  Mayor's Office
CEDAR FORT
  Mayor's Office

Special Interest Groups
Inland Sea Shorebird Reserve Raptor Inventory Nest Survey Great Salt Lake Alliance Great Salt Lake Audubon Society Friends of Great Salt Lake
American Indian Tribes
Paiute Indian Tribe of Utah Kanosh Band of Paiutes Skull Valley Band of Goshute Indians Confederated Tribes of Goshute Reservation Uintah-Ouray Ute Indian Tribe
Other Stakeholders
The Larry Miller Group The Ensign Group Kennecott Land Kennecott Utah Copper Holly Energy Farmland Reserve, Inc. Suburban Land Reserve, Inc.

5.3.4.1 Federal Agencies

Beginning in June 2007, the BLM conducted meetings with the Tooele Army Depot, the Deseret Chemical Depot, and the Uinta National Forest to introduce the Project and identify potential issues. Further contacts were made, as needed, to provide Project updates and solicit input.

5.3.4.2 Intergovernmental

Beginning in August 2007, meetings were conducted with the county and local agencies listed in Table 5-3 to introduce the Project. A second round of meetings with the county and local agencies began in December 2007 to discuss potential issues and collect land use data. Additional meetings were held in the fall of 2008, and again in the summer/fall of 2009, to review the alternative routes and substation sites and solicit feedback on the Project.

5.3.5 Interest Groups/Other Stakeholders

Individual meetings were held from June 2007 to September 2009 with local interest groups and stakeholders to introduce the Project and identify potential issues. Initial meetings were held to introduce the Project and follow-up meetings were held, as necessary, to keep the groups informed of the Project status and to remain apprised of potential issues. The interest groups and stakeholders that were contacted are listed below:

- The Ensign Group
- Friends of Great Salt Lake
- Great Salt Lake Alliance
- Great Salt Lake Audubon Society
- Holly Energy
- Inland Sea Shorebird Reserve
- Kennecott Land
- Kennecott Utah Copper
- The Larry Miller Group
- Raptor Inventory Nest Survey
- Farmland Reserve, Inc.
- Suburban Land Reserve, Inc.

5.3.6 Information Dissemination

Mailing lists maintained by the BLM SLFO and FFO were compiled. Federal and state agency representatives, community leaders, and potential stakeholders were added to the mailing list. The mailing list was used to distribute Project information. Additionally, interested organizations and individuals who commented on the Project or requested information were added to the mailing list.

As explained in Section 5.2, information about the Project was disseminated early in the environmental process. The publication of the NOI in the *Federal Register* marked the beginning of the EIS and scoping. Additional notifications included press releases and paid legal notices, announcements on local radio stations, a newsletter distributed to those on the Project mailing list, public scoping meetings, a Scoping Report, stakeholder meetings, CWG meetings, and the ENBB.

The availability of the EIS was announced through a *Federal Register* Notice of Availability, press releases, paid legal notices, radio announcements, a project newsletter, the BLM Project website, and the ENBB. Also, newsletters announcing the availability of the Draft EIS were sent to those on the mailing list, plus landowners within 1 mile of the alternative routes.

5.3.7 Public Review of the EIS

BLM and EPA each published a Notice of Availability of the Draft EIS and Draft Pony Express RMP Amendment for public review and comment in the *Federal Register* on May 15, 2009, which initiated a 90-day public comment period. More than 52 hard copies and 200 electronic copies of the Draft EIS were distributed in May 2009 to federal agencies; tribal, state, and local governments; organizations; and individuals. The availability of the Draft EIS, deadline for public comments, and locations, dates, and times of public meetings on the Draft EIS were announced in paid newspaper legal notices, paid newspaper advertisements, and newsletters that were mailed out to affected property owners, agencies, and stakeholders. BLM held three public meetings, one each in Tooele, Magna, and Nephi, Utah to provide information and solicit public comments on the proposed Project and the Draft EIS.

The comment period ended on August 12, 2009. BLM received 235 submittals containing comments from federal agencies, state, and local governments; public and private organizations; and individuals. The comments in each submittal were identified, recorded, and analyzed. Responses were prepared for all substantive comments. A description of the comment analysis, the comments received, and the responses to those comments are provided in Appendix H.

5.4 Proponent-Initiated Activities

As explained previously, a CWG was created to provide a forum for input into the transmission line and substation siting studies for the Project. The CWG consisted of representatives from cities, counties, and stakeholders in the northern portion of the Project area. While the CWG was not a decision-making entity on the Project, the CWG members were asked to provide feedback on the Project and consider the views of the group, as well as the views of their respective organizations and/or communities. Four CWG meetings have been held to date at key points throughout the process:

- The first CWG meeting was held in November 2007. The purpose of the meeting was to (1) introduce the proposed Project, (2) gather input regarding the scope of the Project and the EIS process, and (3) identify key issues.

- The second CWG meeting was held in February 2008. The purpose of the meeting was to review (1) the preliminary alternative routes and substation sites, (2) the results of the environmental resource inventory, and (3) suggested criteria for establishing the level of compatibility of each resource.

- The third CWG meeting was held in July 2008. The purpose of the meeting was to review (1) the impact assessment results and potential mitigation measures, (2) the alternative comparison process, and (3) the preliminary local area comparison results on private lands.

- The fourth CWG meeting was held in May 2009. The purpose of the meeting was to (1) review the Proponent's Proposed Action and the BLM's Preferred Alternative, (2) review public involvement opportunities, and (3) review the project permitting schedule.

In addition, the Proponent posted a basic description of the Project on their company communications website (www.pacificorp.com/transmission) and met with elected federal, state, and local officials to brief them on the purpose of the Project.

In June 2009, the Proponent hosted three landowner meetings, one each in Tooele, West Jordan, and Nephi. The purpose of the meetings was to inform the public about the project and address concerns from impacted landowners. Due to the large number of public comments received by both BLM and the Proponent regarding the Limber to Oquirrh route in the Tooele Valley, the Proponent also hosted a series of three conflict resolution meetings in August and September 2009 in an attempt to find a compromise solution by either consensus or majority. Affected agencies, stakeholders, and citizens were invited to participate in these meetings.

- Issues and concerns raised during the meetings included:
  - Impacts to private landowners and residents
  - Visual impacts to residences
  - Visual impacts to historic Tooele "T" in foothills
  - Toole City and Tooele County opposition to Proponent Proposed Action
  - Location of Limber Substation
  - Impacts to Grantsville City, Tooele City
  - System reliability questions
  - Citizen/community suggested alternative routes to Proponent Proposed Action

The Proponent was ultimately unsuccessful at finding any additional or new solutions meeting the company's siting criteria (as described in Chapter 2 and Appendix A) that garnered any more public support than the originally proposed routes analyzed in the Draft EIS.

5.5 Preparers and Contributors

Preparers and contributors involved throughout the Project, including BLM staff and consultants, are listed in Tables 5-4 and 5-5.

TABLE 5-4
BLM PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Salt Lake Field Office		
Peter Ainsworth	Archaeologist	Cultural Resources
Dale Earl	Archaeologist	Cultural Resources
Traci Allen	Wildlife Biologist	Wildlife Biology
Alan Bass	Rangeland Management Specialist	Livestock Grazing
Glenn Carpenter	West Desert District Manager	Management Oversight
Erin Darboven	Fuels Specialist	Public Affairs, Fuels
Michael Gates	Rangeland Management Specialist	Soils, Vegetation, Livestock Grazing
Gary Kidd	Natural Resource Specialist	Weeds, Reclamation
Rodd Hardy	Natural Resource Specialist	Threatened and Endangered Plants, Special Status Flora
Mike Nelson	Assistant Field Manager	Project Management, Realty Specialist
JuLee Pallette	Recreation Specialist	Recreation, Visual Resources, Wilderness Characteristics
Cindy Ledbetter	Environmental Specialist	NEPA/Planning
Fillmore Field Office		
Brent Range	Acting Field Manager	Management Oversight
Patricia Bailey	Assistant Field Manager	Management Oversight

TABLE 5-4
BLM PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Steve Bonar	Recreation Specialist	ACECs, Recreation, Visual Resources, Wild and Scenic Rivers, Wilderness/WSAs, Wilderness Characteristics
Joelle McCarthy	Archaeologist	Cultural Resources, Native American Religious Concerns
Matt Rajala	Natural Resource Specialist	Air Quality, Environmental Justice, Farmlands (Prime or Unique), Floodplains, Geology, Minerals, Soils, Socioeconomics, NEPA Coordination
Clara Stevens	Realty Specialist	Project Management, Lands/Access
David Whitaker	Rangeland Management Specialist	Threatened, Endangered, or Candidate Plant Species; Vegetation including Special Status Plant Species other than USFWS candidate or listed species; Range; Livestock Grazing; Weeds

TABLE 5-5
CONSULTANT PREPARERS AND CONTRIBUTORS

Name	Education	Involvement
ENVIRONMENTAL PLANNING GROUP, INC.		
Keith Albury	MA, Geography BA, Natural Science	Geographic Information Systems
Christine Brown	MS, Environmental Sciences and Policy BS, Environmental Science	Project Coordination, Land Use and Recreation Resources, Grazing, and Fire Management
Louise Brown	BS, Administrative Systems	Document Management/Technical Editor
Glenn Darrington, PhD	PhD, History MA, Anthropology BA, Anthropology	Cultural and Historical Resources
Brian Doubek	BS, Earth Science	Geographic Information Systems
Michael Doyle	MLA, Landscape Architecture BS, Environmental Design	Project Management
Terry Enk, PhD	PhD, Wildlife Biology MS, Conservation Biology BA, Biology	Wildlife Biology and Vegetation Resources
Linda Garbareno	BS, Geography/Geographic Information Systems	Visual Simulations
Darrin Gilbert	MLA, Landscape Architecture BLA, Landscape Architecture AAS, Architectural Technology	Visual Resources
Gena Huffman	MS, Anthropology (Archaeology) BA, Political Science and Anthropology	Cultural and Historical Resources
Kristie James	Relevant Technical Courses	Document Management
Michael Kirby	PhD, Geology MS, Geology BS, Geology	Earth and Water Resources, Paleontology
Amanda O'Connor	MS, Conservation Studies BA, Environmental Biology	Senior Technical Review
Randy Palmer	MLA, Landscape Architecture, Environmental Planning BS, Outdoor Recreation	Principal-in-Charge
Frank Pisani	BS, Resource Economics and Environmental Policy and GIS	Geographic Information Systems

TABLE 5-5
CONSULTANT PREPARERS AND CONTRIBUTORS

Name	Education	Involvement
Rhianna Riggs	BS, Mass Communications/Public Relations	Public Involvement
Joel Schneider	MUP, Urban Planning BA, Geography	Project Coordination, Land Use and Recreation Resources
Marc Schwartz	MLA, Landscape Architecture (pending) BS, Forestry	Visual Resources and Simulations
Cindy Smith	BS, Liberal Arts and Sciences	Senior Technical Review
Rachel Tew	BA, Geography, Environmental Policy and Natural Resource Management	Land Use and Recreation Resources
Lauren Weinstein	BS, Resource Planning and Management	Public Involvement Manager
Heather Weymouth	MS, American Studies (Anthropology) BIS, Anthropology (Archaeology)	Cultural and Historical Resources
Scott Woods	BS, Geography	Geographic Information Systems
SUBCONSULTANTS		
Bighorn Archaeological Consultants, LLC		
Jon Baxter	MA, Anthropology BS, Anthropology	Cultural and Historical Resources
Louis Berger Group		
Lisa McDonald, PhD	PhD, Mineral Economics MS, Mineral Economics BS, Earth Science	Socioeconomics and Environmental Justice
Exponent		
Bill Bailey, PhD	PhD, Neuropsychology	Electric and Magnetic Fields
Summit Applied Anthropology		
Molly Molenaar	MA, Anthropology BA, English	Native American Consultation
Wind River Environmental Group, LLC		
Martha Hyden, PhD	PhD Earth Science/Bioclimatology MS Earth Science/Bioclimatology BS, Biology	Air Quality and CAA Conformity Analysis

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Glossary

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GLOSSARY

A-Weighted Sound Level - Sound that is measured with a sound-level meter using the A-weighted response filter that is built into the meter circuitry. The A-weighted filter simulates the frequency response to the human ear.

Access (road) - Road used for passage to and along transmission line for purposes of construction and maintenance.

Aesthetic Quality - A perception of the beauty of a natural or cultural landscape.

Affected Environment - A geographic area and the associated natural, human, and cultural resources that could be influenced by a proposed action. Also, the chapter in an environmental impact statement that describes the existing condition of the environment.

Aggregate - A group or mass of distinct things gathered into, or considered as, a total or a whole.

Aggregation - The natural deposition of sediments in a river channel, gradually building up the slope or level of the riverbed.

Air Quality Classes - Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act that limit the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant, Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be permitted, and Class III applies to areas where industrial deterioration would generally be allowed.

Alignment - The specific, surveyed route of a transmission line.

Alluvial Fan - A gradually sloping mass of alluvium (sand, clay, etc., deposited by moving water) that widens out like a fan from the place where a stream issues from a narrow mountain valley upon a plain or broad valley.

Alluvium - A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain; or as a cone or fan at the base of a mountain slope.

Alternative (action) - An option for meeting the stated need.

Alternative (route) - An optional path or direction for a transmission line.

Ambient - Characteristic of the atmosphere.

Annual (ecology) - A plant that completes its development in 1 year or one season and then dies.

Anticline - A sharply arched fold of stratified rock composed of strata that slope downward in opposite directions from the apex of the arch.

Aquatic - Growing or living in or near the water.

Aquifer - A stratum of permeable rock, sand, etc. that contains water. Water source for a well.

Archaeology - The science that investigates the history of peoples by the remains belonging to the earlier periods of their existence.

Archival - Pertaining to or contained in documents or records that preserve information about an event or individual.

Area of Critical Environmental Concern - A Bureau of Land Management designation for an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life from natural hazards.

Arroyo - A dry gully or a stream in a dry region.

Artifact - Any object showing human workmanship or modification, especially from a prehistoric or historic culture.

Assessment (environment) - An evaluation of existing resources and potential impacts to them from a proposed act or change to the environment.

Avifauna - Birds of a specified region or time.

Background - The portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Base Load - The minimum load of a utility over a given period of time.

Batch Plant Site - An area used for concrete mixing, temporary field office facility, material storage, and stations for equipment maintenance during construction of the transmission line. The area usually covers approximately 2 acres.

Bundle - Two or more conductors combined to form a phase.

Butte - A steep hill standing alone in a plain.

Caliche - Cemented deposit of secondary calcium carbonate found in layers or disseminated throughout the horizon of certain soils in arid to semiarid regions.

Candidate Species - Any species included in the *Federal Register's* Notice of Review being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

Capability - The ability to generate or transmit power.

Capacity - The maximum load that can be generated or transmitted by generating or transmission facilities for a given period of time without exceeding approved limits of temperature or stress.

Centerline - A line along the approximate middle of a transmission line right-of-way.

Circuit - A complete closed conducting path over which electric current may flow.

Conductor - The wire cable strung between transmission line towers through which the electrical current flows.

Construction, Operation, and Maintenance Plan - A detailed plan depicting engineering, access, construction, environmental, and reclamation that is prepared prior to construction and operation of a proposed action.

Contrast - The effect of a striking difference in the form, line, color, or texture of an area being viewed.

Contrast Rating - A method of determining the extent of visual impact for an existing or proposed activity that would modify any landscape feature (land and water form, vegetation, and structures).

Corona - The discharge of energy from an energized transmission line that occurs when the voltage gradient exceeds the breakdown strength of air.

Corridor - A continuous strip of land of defined width, through which a linear utility route (or routes) passes.

Council on Environmental Quality - An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Counterpoise - Conductive cable buried in the ground at a transmission line tower to lower the resistance of the ground to conduct electricity.

Colluvial - Soil and rock detritus accumulated at the bottom of a slope.

Cultural Resources - Any site or artifact associated with cultural activities.

Cumulative Effect - The effect on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Dead-end Structure - Transmission line tower structures that are more robust than tangent structures, used (1) to add longitudinal strength to the line, (2) at turning points (angles), (3) for added safety at crossings of other utilities, such as other transmission lines and roads, and (4) to interrupt long distances of suspension structures that would otherwise provide more exposure to catastrophic line failure over long distances.

Degradation - The wearing down, or away, and general lowering or reduction, of the earth's surface by the processes of weathering and erosion.

Devonian - A geologic period during the Paleozoic Era, spanning in time from 395 to 345 million years ago, marked by an abundance of fish and the appearance of the first land plants and amphibians.

Dip Slope - The downward slope of geologic strata.

Direct Impact - Effects that are caused by the action (i.e., construction) and occur at the same time and place (see Indirect Impact).

Distance Zone - A visibility threshold distance where visual perception changes. The zones are usually defined as foreground, middle ground, and background.

Distributed Generation - A method of generating electricity from multiple small energy sources very near to where the electricity is actually used.

Drainage Basin - The region or area bounded peripherally by a drainage divide or occupied by a river system.

Duct Bank - Containment system for underground transmission lines.

Ecology - The relationship between living organisms and their environment.

Economy Energy - Energy produced and supplied from a more economical source in one system and substituted for that being produced or capable of being produced by a less economical source in another system.

Ecosystem - A complex system composed of a community of plants and animals, and that system's chemical and physical environment.

Ecotone - A transitional zone between two adjacent communities.

Effects - In this realm, considered the cause and effect of an action or the projected degree of change caused by a process (see also Impact).

Electric and Magnetic Field - A space or region within which magnetic forces are present around an electrical current.

Electrostatic Field - Pertaining to a space or region within which atmospheric electricity at rest interferes with radar, radio, or television reception.

Electric Field - Electric effect resulting from the voltage on a transmission line. Measured as volts per meter or kilovolts per meter.

Electric System Losses - Total electric energy losses in an electric system as a result of transmission, transformation, and distribution. Electric energy is lost primarily due to heating of transmission and distribution elements.

Electromagnetic Field - A space or region within which magnetic forces are present around an electrical current.

Emergent (vegetation) - Vegetation with all or part of their vegetative and reproductive parts above the water.

Endangered Species - A plant or animal species whose prospects for survival and reproduction are in immediate jeopardy as designated by the Secretary of the Interior, and as is further defined by the Endangered Species Act of 1973, as amended.

Endemic - Plants or animals that are native to a particular region or country.

Energy Conservation - A means of saving energy.

Environment - The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement (EIS) - A detailed written statement required by the National Environmental Policy Act when an agency proposes a major federal action significantly affecting the quality of the human environment.

Environmental Impact Statement, Draft (DEIS) - A detailed written statement as required by Section 102(2)(c) of the National Environmental Policy Act.

Environmental Impact Statement, Final (FElS) - The final version of the public document required by National Environmental Policy Act (see above).

Eolian - Wind-blown sand or silt material, which when deposited forms dunes or small sandy ridges.

Ephemeral - Present only during a portion of the year. Generally refers to water courses.

Equestrian - On horseback; anything having to do with horses.

Erosion - The group of processes whereby earth or rock material is loosened or dissolved and removed from any part of the earth's surface.

Escarpment - A steep slope or cliff formed by erosion or, less often, by faulting.

Estuarine - Saltmarsh habitats that occur typically at low-lying coastal areas, such as mouths of river systems or tidal areas.

Ethnography - That aspect of cultural and social anthropology devoted to the first-hand description of particular cultures.

Extirpate - To destroy completely.

Extraction - The act of extracting or drawing a substance out of the earth (e.g. mining).

Fault - A fracture or fracture zone in the earth's surface along where there has been displacement of the sides relative to one another parallel to the fracture.

Fauna - The wildlife or animals of a specified region or time.

Federal Energy Regulatory Commission – The agency primarily responsible for ensuring adequate energy supplies at just and reasonable rates and providing regulatory incentives for increased productivity, efficiency, and competition.

Federal Land Policy and Management Act of 1976 - Public Law 94-579 of October 21, 1976. This law is often referred to as the Bureau of Land Management's Organic Act, which provides the majority of the Bureau of Land Management's legislated authority, direction, policy, and basic management guidance.

Firm Energy - Non-interruptible energy and power guaranteed by the supplier to be available at all times, except for reasons of uncontrollable forces or continuity of service provisions.

Floodplain - That portion of a river or stream valley, adjacent to the river channel, which is built of sediments and is inundated with water when the stream overflows its banks.

Foliage - Leaves of a plant or tree.

Foreground - The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Foreground/Middleground - The area visible from a travel route, residence or other use area to a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline.

Forest Edge Effect - The forest edge is the zone where different plant and animal communities and successional stages meet. Widening of the right-of-way would increase the edge effect by further changing the composition of the biotic communities.

Fossil - The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust; exclusive of organisms that have been buried since the beginning of historical time.

Frost Heave - An upthrust of ground or pavement caused by freezing on moist soil.

Frost Jacking - Upward displacement of pilings or other buried structures as a result of frost heaving.

Fuel Cells - Power generating systems that produce DC electricity by combining hydrogen and oxygen in an electrochemical reaction. Compared with traditional generating technologies that use combustion processes first to convert fuel to heat and mechanical energy, fuel cells convert the chemical energy of a fuel to electric energy directly.

Gauss - Measurement of the magnetic flux intensity (intensity of magnetic field attraction per unit area).

Generic Mitigation - Measures, techniques, or practices applied/used generally to reduce adverse impacts on a non-specific basis.

Genus - One of the major taxonomic groups used to scientifically identify plants or animals: several closely related species, or one species, make up one genus, while several genera, or one genus, make up a family.

Geologic Formations - A rock unit distinguished from adjacent deposits by some common character, such as its composition, origin, or the type of fossil associated with the unit.

Geology - The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.

Geothermal Resource - Heat found in rocks and fluids at various depths that can be extracted by drilling or pumping for use as an energy source. This heat may be residual heat, friction heat, or a result of radioactive decay.

Grazing Potential - The potential of an area to support livestock grazing; measured by the number of acres of land required to support one animal unit for a month.

Ground Wire - Two wires installed along the transmission line at the top of the tower structures to protect the conductors from lightning strikes by transferring the energy from the lightning through the ground wires and structures into the ground below.

Habitat - The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.

Habitat Fragmentation - A reduction in area of undisturbed, continuous habitat. Often affects interior forest species that depend on unbroken expanses of mature coniferous forest.

Herbaceous - Of, or having the nature of, an herb or herbs, as distinguished from woody plants.

Herbivorous - Feeding chiefly on plants.

Hogback - A ridge with a sharp crest and sloping sides, often formed by the outcropping edge of steeply dipping rock strata.

Holocene - The second geologic epoch of the Quaternary period, commencing with the end of the last glacial period (the Pleistocene epoch). This era was marked by the establishment of modern climatic and environmental conditions, and spans from roughly 9000 BC to present.

Homogenous - Having similarity in structure because of similarity in descent.

Hydrologic System - The distribution of surface and underground waters.

Hydrology - The science that relates to the water of the earth.

Hydrothermal Coordination - The operation of hydro and thermal generation resources in a way that results in overall lower system operating costs.

Igneous Rock - Rocks solidified from molten magma occurring as intensive or extrusive (volcanic), at or below the surface of the earth.

Impact - Modification in the status of the environment brought about by a proposed action.

Indirect Effects - Caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth-rate, and related effects on air and water and other natural systems, including ecosystems.

Indirect Impact - Effects that are caused by the action and occur later in time or are farther removed, but are still reasonably foreseeable (see Direct Impact).

Infrastructure - The basic facilities on which a community depends, such as schools, power plants, or transportation and communication systems.

Insectivorous - Feeds chiefly on insects.

Insulator - A device that is resistant to electrical conduction used for isolating and supporting conductors.

Intermittent - A river or stream that flows for a period of time, usually seasonally during rainy periods, and stops during dry periods. In arid regions, dry periods may be interrupted by occasional flash floods from brief but intense rain storms.

Intrusive Igneous - Magma forced into or between other rocks while in a molten state.

Jurassic - The second period of the Mesozoic Era, spanning in time from about 190 to 136 million years ago, characterized by the dominance of dinosaurs and the appearance of flying reptiles and birds.

Jurisdictions - The limits or territory within which authority may be exercised.

Kilovolt - 1,000 volts (a volt is a measure of electrical potential difference which would cause a current of ampere to flow through a conductor whose resistance is 1 ohm).

Kilovolts Per Meter - A unit measure of electric field strength.

Kilowatt (kW) - A unit of power equivalent to 1,000 watts.

Lacustrine - Lakes and ponds more than 2 acres in surface area.

Landform - A term used to describe the many types of land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape Character Type - The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinct quality that distinguishes it from immediate surroundings.

Link - A segment of a route alternative sharing common endpoints with adjacent links. Endpoints of a link are determined by the location of intersections with other segments (links) of other routes.

Lithology - The structure and composition of a rock formation, and the study of rocks with the unaided eye, or with little magnification.

Load Shedding - The process of deliberately removing, either manually or automatically, preselected loads from a power system in response to an abnormal condition in order to maintain the integrity of the system and minimize overall outages.

Loam - A rich soil composed of clay, silt, sand, and some organic matter.

Megawatt (MW) - 1,000 kilowatts or 1 million watts (a watt is a unit of electrical power equal to 1/756th horsepower).

Mesa - An isolated, nearly level land mass, formed of nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.

Magnetic Field - Electric effect resulting from an electric current flowing in a conductor. Unit of measurement is a Gauss.

Metamorphic - A rock that has been formed through metamorphism. Metamorphism is the change in the mineralogical, structural, or textural composition of rocks under intense heat and pressure (e.g., turning limestone into marble).

Migratory - Birds, animals, or people that migrate, or move from one region or country to another.

Milliapere - Measure of electric current induced in conductive materials within an electric field.

Milligaus - A unit of measurement for magnetic fields.

Mineral Resources - Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Mississippian - A period of the Paleozoic Era, spanning in time from about 345 to 320 million years ago.

Mitigate - To alleviate, reduce, or render less intense or severe.

Moment Magnitude - A number that indicates the strength of an earthquake. It is related to the energy released during the earthquake.

Monocline - A rock fold or strata that slopes in one direction.

Mudstone - A hardened sedimentary rock consisting of clay that is similar to shale, but does not occur in distinct, bonded layers.

National Environmental Policy Act of 1969 - Public Law 91-190. An Act that encourages productive and enjoyable harmony between man and his environment and promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding or the ecological systems and natural resources important to the nation and establishes the Council on Environmental Quality.

National Register of Historic Places - A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966 and maintained by the National Park Service.

Native Vegetation - Natural vegetation originating in a certain region or country.

Nonspecular Conductors - Conductors that have been treated to reduce reflection, rendering the conductor less shiny and noticeable.

One-hundred-year Flood - A flood with a magnitude that may occur once every 100 years. A 1-in-100 chance of a certain area being inundated during any year.

Ozone - A form of oxygen, 03, produced when an electric spark is passed through oxygen or air.

Paleontology - The science that deals with the life of past geological ages through the study of the fossil remains of organisms.

Paleozoic - The geologic era between the Precambrian and Mesozoic eras covering the time between 570 million and 225 million years ago. The era was characterized by the development of the first fish, amphibians, reptiles, and land plants.

Panoramic - An unlimited view in all directions.

Parent Material - The rock formation that a soil originated from through chemical and physical processes.

Particulates - Minute, separate particles, such as dust or other air pollutants.

Pennsylvanian - A period of the Paleozoic Era, spanning from about 320 to 280 million years ago.

Perennial - Lasting or active through the whole year. May refer to rivers, streams, or plants.

Permafrost - Permanently frozen layer of soil.

Perinian - The seventh and last period of the Paleozoic Era, spanning from about 280 to 225 million years ago, characterized by increased reptile life and major mountain building in North America.

Permeability - The measure of the ease with which a fluid can diffuse through a particular porous material.

Petroglyph - A symbolic design or drawing of an animal or human pecked or carved into a rock or cliff face; generally prehistoric.

Phase - Consists of a bundle of two or more conductors.

Physiographic Province - An area characterized by distinctive topography, geologic structure, climate, drainage patterns, and other features and phenomena of nature.

Pictograph - A symbolic design or drawing of an animal or human painted onto a rock or cliff face; generally prehistoric.

Pithouse - A prehistoric dwelling partially constructed beneath the earth's surface.

Plateau - An elevated tract of relatively level land, such as a tableland or mesa.

Playa - The shallow central basin of a desert plain, in which water gathers after a rain and is evaporated.

Pleistocene - The first geologic epoch during the Quaternary period, spanning from 1.8 million years ago to about 9000 BC, characterized by extensive continental glaciation in the Northern Hemisphere.

Policy - A guiding principle upon which is based a specific decision or set of decisions.

Power Transfer Capacity - The measure of the ability of interconnected electrical systems to move or transfer power in a reliable manner from one area to another. The units of transfer capability are generally expressed in megawatts.

Power Withdrawal - Land that was withdrawn by the Bureau of Reclamation for development of power-related facilities (e.g., hydropower plants, dams, reservoirs, substations).

Precambrian - The earliest geologic era covering all time from the formation of the earth and ending at the Paleozoic Era, which began about 570 million years ago.

Prey - An animal hunted or killed for food by another animal.

Primitive - An area that is not developed; a pristine natural area.

Protective Withdrawal - Lands that have been withdrawn from availability under the various land and mining laws for administrative or protective reasons (e.g., recreation sites, office, or warehouse sites).

Quaternary - The geologic period following the Tertiary in the Cenozoic Era, beginning about 1.8 million years ago, composed of the Pleistocene and Holocene epochs, characterized by the evolution of Hominids into modern humans.

Range - A large, open expanse in which livestock harvest natural vegetation.

Raptor - A bird of prey.

Rare - A plant or animal restricted in distribution. May be locally abundant in a limited area, or few in number over a wide area.

Reactive Compensation - Provides transmission system voltage stability and facilitates power transfers. Reactive compensation is provided by reactors and capacitors located within substations or transition stations.

Reclamation - Returning disturbed lands to a form and productivity that will be ecologically balanced.

Reconnaissance - Preliminary examination or survey of a territory.

Recontouring - Returning a surface to or near to its original form through some type of action, such as grading.

Record of Decision - A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.

Reference Centerline - For purposes of assessing impacts and recommending mitigation, a centerline is assigned that may be slightly adjusted during engineering design.

Refuse Midden - An archaeological site containing a refuse or trash pile.

Region - A large tract of land generally recognized as having similar character types and physiographic types.

Renewable Resource - Any natural resource that can replenish itself naturally over time.

Residual Impact - The impact of an action remaining after application of mitigation.

Revegetation - The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance, such as reseeding.

Right-of-way - Strip of land acquired by legal means, over which the power line and access roads would pass.

Ring Bus - A substation arrangement of circuits and breakers whereby each breaker is shared by two circuits; therefore, two breakers must open to clear each line fault.

Riparian - An aquatic or terrestrial ecosystem that is associated with bodies of water, such as streams, lakes, or wetlands, or is dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. Riparian areas are usually characterized by dense vegetation and an abundance and diversity of wildlife.

Riverine - Relating to, or within the limits of, river or stream channels.

Route - A transmission route is the general path of a transmission line and associated facilities.

Sandstone - A common sedimentary rock primarily composed of sand grains, mainly quartz that are cemented together by other minerals.

Scenic Quality Class - The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (Bureau of Land Management designation).

Scenic Quality Rating Unit - A portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features (landform, water, vegetation, and structures and modifications) which separate it from the surrounding landscape.

Secure Power Transfer - The maximum power transfer permissible for the system to remain stable and operational with a sudden loss of the transferred power.

Sediment - Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.

Seen Area - That portion of the landscape which can be viewed from one or more observer positions. The extent or area that can be viewed is normally limited by landform, vegetation, structures, or distance.

Seismicity - The likelihood of an area being subject to earthquakes. The phenomenon of earth movements.

Seldom-seen Area - Areas that are either beyond the farthest extent of the background zone (of the area or travel routes), or that are seen from areas or travel routes of low use volume.

Selective Mitigation - Measures or techniques developed to reduce adverse impacts on a case-by-case or selective basis.

Semi-arid - A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.

Sensitivity - The state of being readily affected by the actions of external influence.

Series Compensation - Used in the design of a transmission line to electrically increase the flowability of that transmission line. Series compensation provides increased voltage support to the system when the voltage degrades, due to the increased loading of the transmission line. This compensating action improves the electrical characteristics of the transmission line, thereby increasing the amount of power flow on the transmission line.

Shield Wire - (see Ground Wire)

Significant (Impact) - "Significant" has been used in this document to describe any impact that would cause a substantial adverse change or stress to one or more environmental resources. In general, all potential high impacts were considered to be significant.

Simulations - The use of a computer to calculate the effect of a given physical process.

Site - In archaeology, any locale showing evidence of human activity.

Species - A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed producing fertile offspring.

Solar Energy - Energy derived from the sun in the form of solar radiation.

Spinning Reserves - A portion of the operating power reserves that are maintained by utility companies in order to maintain consistent energy supply in response to consumer demand and failures of the generation and transmission system. Spinning reserves are unloaded generation, which is synchronized and ready to serve additional demand. Spinning reserves improve reliability, but are expensive to maintain.

Spring - A place where ground water flows naturally onto the land surface; often the source of a stream.

Static Lines - Small diameter wires that are placed above the phase wires on a transmission line to intercept lightning.

Strata - Horizontal layer of sedimentary rock.

Study Area - A given geographical area delineated for specific research.

Subsidence (soil) - The sinking of the earth's surface because of the withdrawal of water or mineral resources.

Subspecies - Any natural subdivision of a species that exhibits small, but persistent morphological variations from other subdivisions of the same species living in different geographical regions or times.

Substation - An assemblage of equipment, enclosed by a fence, occurring at points along a transmission line. A facility in an electrical transmission system with the capability to route and control electrical power, and to transform power to a higher or lower voltage. Equipment includes transformers, circuit breakers, and other equipment for switching, changing, or regulating the voltage of electricity.

Substrates - Sediment that lies beneath the surface of the earth.

System Stability - The property of a power system that enables it to remain in a state of operating equilibrium under normal operating conditions and to regain an acceptable state of equilibrium after being subjected to a disturbance.

Talus - A pile of rock debris at the foot of a cliff or steep slope.

Tangent Structure - Typical transmission line structure. Can be one of several types, placed four to five per mile in linear position.

Taxon - A taxonomic unit or family, as a species or family.

Taxonomic - A system of arranging animals and plants into natural, related groups, based on some factor common to each, such as structure or biochemistry.

Technical Report - Documentation of detailed studies summarized in the Draft Environmental Impact Statement.

Terminal - (see Substation)

Tertiary - The first period in the Cenozoic Era, spanning from 65 to 1.8 million years ago.

Threatened Species ('I' or LT) - Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the *Federal Register*.

Transition Zone - The area between two discrete environmental areas, which thus contains elements of each. For example, the transition zone between an upland forest and a lowland desert scrub environment.

Triassic - The first period in the Mesozoic Era, spanning from 225 to 190 million years ago and following the Permian Period of the Paleozoic Era; characterized by the appearance of many reptiles, including the dinosaurs.

Tributary - A stream or river that flows into a larger stream or river.

Uranium - A very hard, heavy, silvery, metallic, chemical element that is crucial to the research and development of atomic energy.

Use Volume - The total volume of visitor use that each segment of a travel route or use-area receives.

Utility Corridor - A route used by a utility for pipelines, cables, and transmission lines.

Vanadium - A bright white soft ductile metallic element found in several minerals, such as vanadinite and carnotile.

Variety Class - A designation (A, B, or C) assigned to a homogeneous area of the landscape to indicate the visual importance or quality relative to other landscape areas within the same physiographic province (U.S. Fish and Wildlife Service designation).

Vegetation Communities - A combination of dominant plant species which live together in the same region or on the same landform.

Viewshed - Visible portion of the specific landscape seen from a specific viewpoint, normally limited by landform, vegetation, distance, and existing cultural modifications.

Visual Management Objectives - The term used in this study to generally define Visual Resource Management (Bureau of Land Management) or Visual Quality Objective classes (Forest Service).

Visual Management System - System of land management based upon meeting visual resource goals (Forest Service).

Visual Quality Objective - Classification of landscape areas, according to the types of structures and changes that are acceptable to meet established visual goals (Forest Service designation).

Visual Resource Management Classes - Classification of landscapes according to the kinds of structures and changes that are acceptable to meet established visual goals (Bureau of Land Management).

Visual Sensitivity Levels - The index of the relative degree of user interest in scenic quality and concern for existing or proposed changes in the landscape features of that area in relation to other areas in the study area.

Volcanic Field - A landscape dominated by features formed by volcanic activity, such as cinder cones, cinder covered plains, lava flows, and active or relict volcanoes.

Volts Per Meter - A unit of measurement of an electric field.

Waters of the United States - All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including adjacent wetlands and tributaries to waters of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Wetlands - Those areas that are inundated by surface or groundwater with a frequency sufficient to support vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness Study Area - A roadless area or island of undeveloped federal land that has been inventoried and found to possess wilderness characteristics described under Title VI, Section 603 of Federal Land Policy and Management Act and Section 2C of the Wilderness Act of 1964. These characteristics are: (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

Wilderness - A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation that is protected and managed in order to preserve its natural conditions, as described in Section 2A of the Wilderness Act of 1964.

Wilderness Characteristics - Key characteristics of wilderness listed in section 2(c) of the Wilderness Act of 1964 and used by Bureau of Land Management in conducting wilderness inventories. These characteristics are features of the land associated with the concept of wilderness that specifically deals with naturalness and opportunities for solitude and primitive and unconfined recreation. These characteristics may be considered in land use planning when Bureau of Land Management determines that those characteristics are reasonably present, of sufficient value (condition, uniqueness, relevance, importance), and need (trend, risk), and are practical to manage (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

Wheeling - The use of the transmission facilities of one system to transmit power of and for another system. As applied to Western, the transmission of large blocks of electric power of the Western system from non-federal hydro- and/or thermal-generating plants to points of use by utilities owning or purchasing the output of such plants.

Wind Energy - Form of energy conversion in which turbines convert the kinetic energy of wind into mechanical or electrical energy that can be used for power.

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