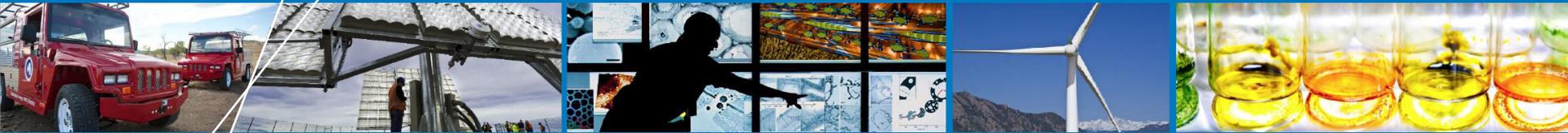


Transmission: Construction Through Operation and Maintenance

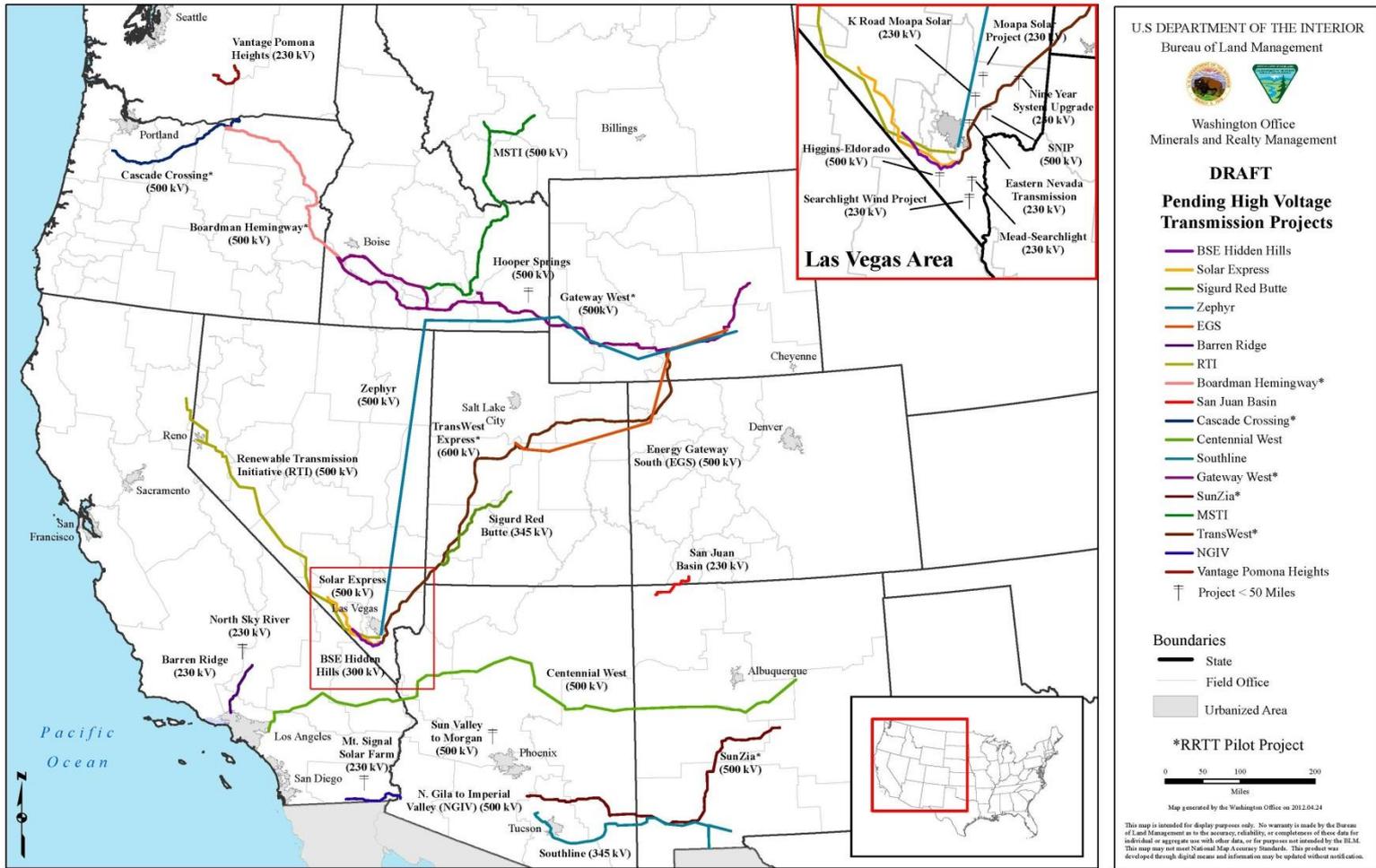


*BLM Transmission Training
Webinar Series*

Webinar 7

August 22, 2013

MAP Pending High Voltage Lines



Transmission 101: Construction Through Operations and Maintenance

August 22, 2013



**Karen Stackpole, Resource/Construction Monitoring
Service Area Manager
HDR Environmental, Operations and Construction, Inc.**

Topics We Will Cover Today

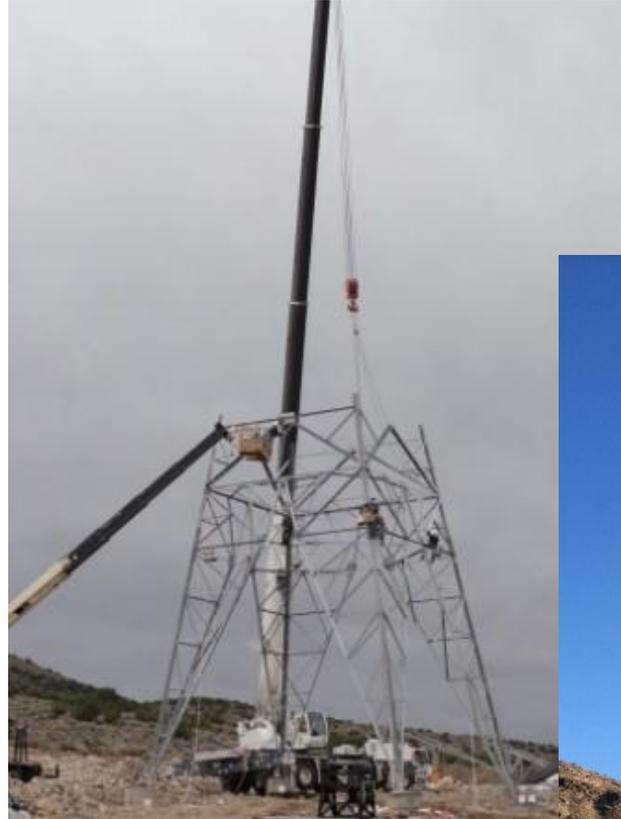


- ✓ Access Road Construction and On-going Frequency of Access
- ✓ Temporary Construction Space
- ✓ Erosion Control Devices
- ✓ Soils and Geotechnical
- ✓ Fire Hazards
- ✓ Water Use
- ✓ Vegetation Management
- ✓ Sequence of Events - Construction Equipment Use (including helicopters)
- ✓ Processes for all Phases (Planning, Pre-Construction, Construction and Mitigation Measures, O&M)

Construction Activity – Basic Sequence of Events

- ✓ Staking ROW, centerline, workpad and road boundaries
- ✓ Building roads and work areas
- ✓ Excavating and installing foundations and anchors
- ✓ Assembling and erecting structures
- ✓ Stringing conductor and wire
- ✓ Grounding
- ✓ Reclamation

Sounds simple enough...



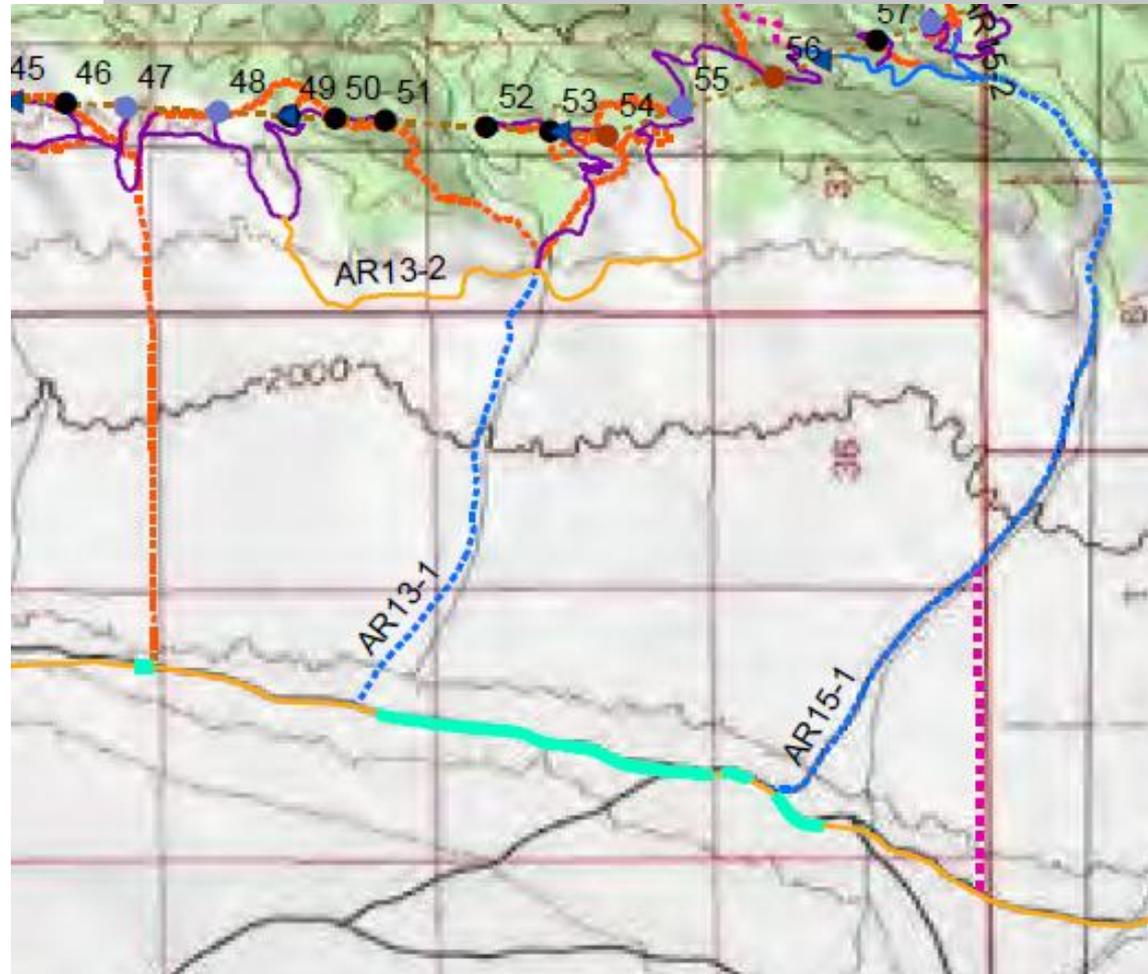
Creating Access Roads – What it Takes

Possible Equipment List:

- Lowboy
- Bulldozer
- Excavator with ripper/stump grinder attachments
- Grader
- Roller
- Backhoe
- Loader
- Gravel Trucks
- Hydro-axe
- Pick-up Trucks
- Water Trucks/Water Bug
- Chipper/Chainsaws
- Mechanic Trucks
- Dynamite



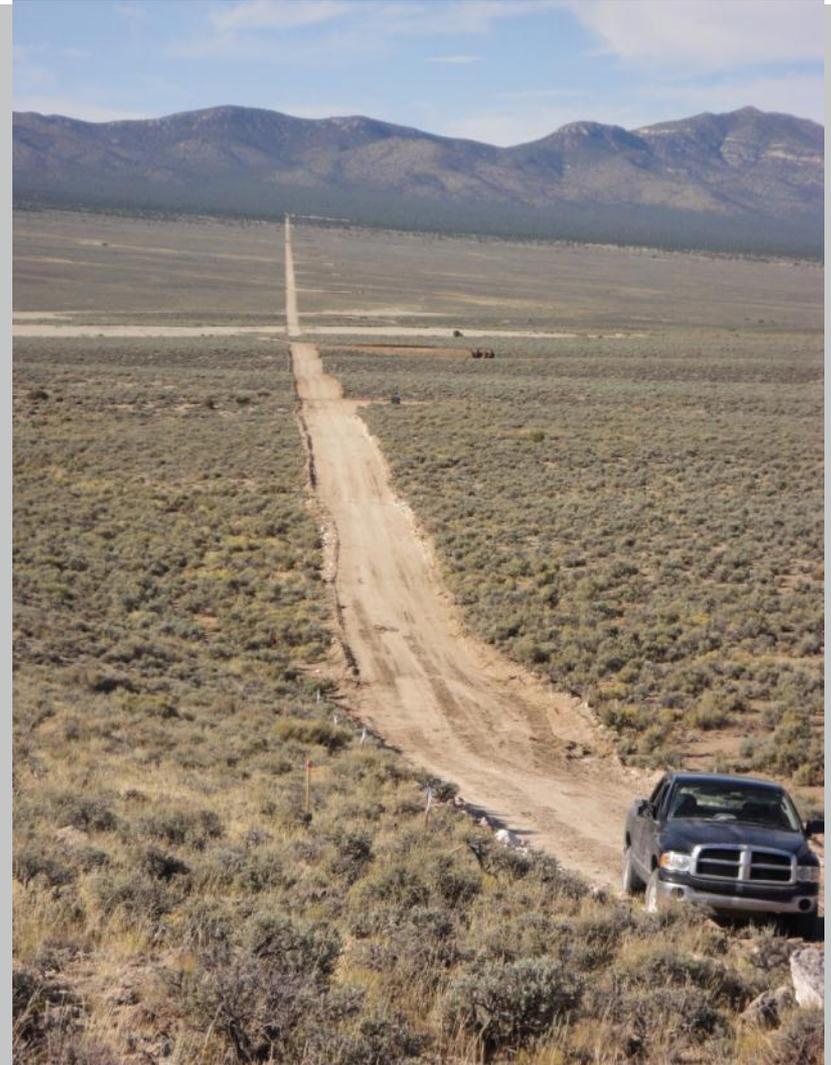
Types of Access Roads



- ✓ Temporary
- ✓ Permanent
- ✓ Spur
- ✓ Existing
- ✓ Two-Track
- ✓ Drive and Crush

Access Road Construction – Key Points

- ✓ To the extent possible, use existing roads and construct spurs. Boundary flagging is key for areas slated for new construction.
- ✓ Construction contractors often find that there are not enough roads – they look at it from a cost perspective, equipment traveling miles outside of the ROW takes additional time, water, and money.
- ✓ Avoid resources that are going to be problem areas for construction (need to know not only where your resources are, but other sensitive areas that should be identified during mapping, e.g., caliche dens, rock outcrops, cliff faces, within buffer of known raptor nest or grouse habitat).
- ✓ Expect change. Contractor may find they need ingress and egress route to some structures, a turnaround, or wider road than expected due to terrain or other conditions.



Use of Access Roads – Avoiding Conflicts

- ✓ Can a helicopter be used instead?
- ✓ Flagging / Signage Plan
- ✓ Seasonal Restrictions
- ✓ Requires Intensive Advanced Planning



Temporary Construction Space

These are areas intended for restoration at the completion of the project



- ✓ Work Pads
- ✓ Pull Sites
- ✓ Storage/Staging Areas
(Water Tanks or Tankers,
Topsoil, Gravel, Slash,
Heavy Equipment,
Refueling Areas, Concrete
Batch Plants, Trailers, Wire
Reels, Poles)
- ✓ Laydown/Material Yards
- ✓ Helicopter Landing Zones

Erosion Control Devices



Erosion Issue:

- ✓ The potential for erosion exists when there is a slope, the removal of vegetation, use of heavy equipment, weather (precipitation, wind), certain soil types that don't allow for suitable compaction

Example Mitigation Measures:

- ✓ Helicopter use in certain areas can minimize impacts
- ✓ Water bar installation in roads
- ✓ Reseeding, topsoil returned to natural contour of the land, cross drains installed
- ✓ Temporary culvert installation if necessary (be aware of 404 requirements)
- ✓ New roads – follow topographic relief (landform contours)
- ✓ Close roads that are not intended for project use
- ✓ Reduce speed
- ✓ Use mats in wet, clayey soils if possible
- ✓ Certified weed-free materials

Erosion Control Devices – Ineffective or Not Present



Erosion Control Devices

Improper Installation = Not Effective

Video clip showing a canyon with large potential for flow. Contractor had recently installed a very small culvert, and there were straw waddles that would not be expected to be effective should a large amount of flow occur in the canyon.

Soils and Geotechnical Studies



Process that evaluates soil conditions by collecting core samples using a drill rig. In areas that have access concerns smaller track-mounted drill rigs can mobilize easier, or helicopters can transport rigs to the site.

Discreet soil samples collected at specific locations will aid engineers in identifying:

- ✓ The design of the foundations and structures (high wind and ice can cause an uplifting force on the structures)
- ✓ If engineered fill dirt needs to be imported and existing soil removed to adequately place foundations – cut and fill
- ✓ Where temporary shoring or dewatering systems may be needed – soil stability
- ✓ Resistivity testing/corrosive potential to assess structure grounding needs
- ✓ Overall geologic conditions.

Geotechnical Parameters

- Water content
- Porosity
- Specific gravity
- Dry bulk density
- Organic carbon content
- Percent Fines

Fire Hazards

Typically located in a fire-prone landscape

- Hazardous materials
 - High winds/lightning strikes
 - Welding
 - Sparks from equipment on rock
 - Blasting
 - Vehicles or equipment left running over dry vegetation
 - Burning of debris or trash
- Provide workers with district phone number or dispatch to report fires
 - Enforce project-wide communication system
 - Enforce each vehicle has firefighting equipment
 - Enforce no burning
 - Enforce vehicles are equipped with spark arresters



Water Use



Why do they need so much water?

1. Control dust when constructing and vehicles are using roads
2. Compact soils on roads and structure pads during construction.



Require dust control, but be aware additives likely can't be used in sensitive habitat.

Vegetation Management



- ✓ Clearing Danger Trees at the end of construction
- ✓ Tree Trimming during O&M



Sequence of Events



Construction – Sequence of Events

Sequence of Events

Road Construction
ECD Installation/On-Going Repairs
Footing Installation/Concrete/Select Fill/
Foundations/Anchors/Anchor snubs
Anchor Testing Crew
Structure Hauling
Structure assembly
Cribbing
Structure Erection/Structure Setting
Guying
Wire Installation – hanging travelers,
stringing, clipping
Site Development – Civil Work
Fencing, Gate Installation
ECD Repairs
Trenching/Grounding
Restoration



Construction – Activity and Equipment Use

Activity

Road Construction
ECD Installation/On-Going Repairs
Site Development – Civil Work



Equipment Use

Lowboy
Bulldozer
Excavator with ripper/stump grinder/rock hammer attachments
Grader
Roller
Backhoe
Loader
Gravel Trucks
Hydro-axe
Pick-up Trucks
Water Trucks/Water Bug
Chipper/Chainsaws
Mechanic Trucks
Dynamite

Construction – Activity and Equipment Use

Construction Activity

Footing Installation/Concrete/Select Fill/
Foundations/Anchors/Anchor
snubs/Tensioning (if guy wires present)



Equipment Use

Hole Diggers
Bulldozers
Pick-up Trucks
Water Trucks
Concrete Trucks
Dump Trucks
Pickup Trucks
Carry All
Hydraulic Cranes
Wagon Drill
Excavator

Construction – Activity and Equipment Use

Activity

Structure Hauling
Structure assembly
Cribbing
Structure Erection/Structure Setting



Equipment Use

Steel Haul Trucks
Pickup Trucks
Yard and Field Cranes
Cranes (120-300 ton)
Fork Lifts
Water Trucks
Carry Alls
2-ton Trucks



Construction – Construction – Activity and Equipment Use

Activity

Wire Installation – hanging travelers, stringing, clipping



Equipment Use

Wire-Reel Trailers
Diesel Tractors
20-ton Cranes
30-ton Cranes
5-ton Trucks
Pickup Trucks
Splicing Trucks
3-drum Pullers
Single Drum Puller
Double Bull-Wheel Tensioner
Sagging Equipment (D-8 Cat)
Carry All's
Water Trucks
Water Tanker Trucks
Static Wire Reel Trailers
Helicopter

Construction – Activity and Equipment Use

Activity

Fencing, gate Installation

Equipment Use

Pickup Truck
Boom Truck
Carry Alls
Backhoe
Concrete Truck
Reel Stand Truck
Bobcats



Construction – Activity and Equipment Use

Activity

Trenching/Grouting



Equipment Use

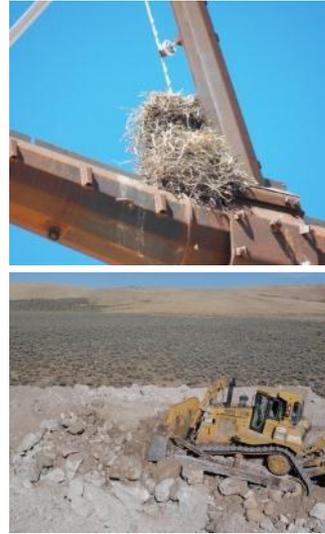
Trenchers
Dozers (Ripper)
Roller Compactors
Plate Compactors
Excavators
Boom Trucks



Sunrise Power Link – San Diego Gas and Electric Constructing With Helicopter Video (You Tube)

<http://www.youtube.com/watch?v=GBWHUdPQCH8>

Processes During Each Phase



Planning Phase – Surveys to Support EIS, Preparation of the Construction, Operations and Management Plan (COM Plan)

Construction Considerations/Practices

- Construction Plan
- Transportation Management Plan
- Blasting Plan
- Flagging, Fencing, and Signage Plan
- Erosion, Dust Control, Air Quality and Water Quality Plans
- Fire Protection Plan
- HAZMAT Plan and Forms
- Emergency Preparedness and Response Plan

Environmental Considerations

- Biological Resources
- Cultural Resources
- Paleontological Resources
- Air Quality
- Land Use
- Deviation Requests
- Construction Scheduling/Coordination
- Environmental Training
- Reporting



Planning Phase – COM Plan

Cultural Resources

Make sure there is a thorough cultural resource plan included in your COM plan. But recognize there is a constant risk of encountering an unanticipated discovery!

- Historic Properties Treatment Plan
- Archaeological Monitoring Plan

Paleontological Resources

Have a treatment plan in place and a paleontologist under contract and ready to respond to monitor construction activities in areas where sensitive soils are located. (During siting process try to stay out of specific paleo rich sensitive layers if you can avoid them).

- Literature Review & Treatment Plan
- Orientation & Guidelines for Construction Contractors
- Checklist for Paleo Resources



Planning Phase – COM Plan

Biological Resources

- Biological Opinion (and Amendments)
- Avian and Bat Protection Plan
- Biological Protection Plan
- Agricultural Impact Mitigation Plan
- Noxious Weed Management Plan



Pre-Construction Phase - Kick-off Meeting



Environmental Training Program

- ✓ General Environmental Compliance Training
- ✓ Species-Specific Environmental Training
- ✓ Timing of administering the training
- ✓ Documentation

Provide environmental training for managers.

Require environmental and specialized species training for all employees working on the project.

- Speed limit
- Seasonal closures/restricted areas
- Roads that are closed and why
- Require firefighting tools for each truck
- Good housekeeping
- Identify sensitive species or areas located nearby or within the ROW
- MBTA surveys
- Process for variance requests

Pre-Construction Phase – Variance Requests



Photo shows an overland travel route that was created after the variance request process was properly completed. This route was flagged, surveyed, and approved within 24 hours. This route was needed for construction activities to avoid an active bird nest buffer.

Process for Variance Requests

- ✓ Why they happen
- ✓ Protocol for efficient processing
- ✓ Expect change!

Variance request could be the result of an unanticipated discovery, a constructability issue, or access.

Pre-Construction Phase – Variance Requests

Examples of variance requests:

- new access road
- use an existing access road
- additional workspace, staging areas, or material yards
- construction methodology changes (techniques or equipment that requires notification or approval; such as additives to water for dust control, hydro-seeding application methodology, application of gravel on roads, changing soil conditions, encountering rock causing the need for blasting)
- road widening beyond the approved width for wider truck access
- installation of gates, stand tanks, cattle guards beyond what was planned.

- An unanticipated resource discovery (archeological, paleontological, even an active bird nest)
- Contractor requests to complete work within an area that is under a seasonal restriction
- Re-routes of roads outside the surveyed right-of-way
- Additional vegetation clearing & grubbing
- Need for landing zones/landing pads

Understand that some change requests are to be expected, and may not be able to be anticipated during route siting.

Construction Phase



- ✓ Hold General Environmental Training Programs – Document!
- ✓ Implement Well-Thought Out Variance Request Process
- ✓ Implement Mitigation Measures

Mitigation Measures - Habitat Protection During Construction Phase

- Establish a signage/flagging plan to prevent unplanned impacts (not paint)
- Prior to ground disturbing activities a biological monitor surveys/inspects areas for rare plants, wildlife. Project personnel must stay out of construction exclusion areas!
- Enforce weed inspection program
- Establish wash stations in staging yards
- Where feasible, begin construction in weed-free areas before moving into weed infested areas.
- Sweep out vehicle cabs and dispose of trash in waste receptacles.
- Inspect, remove, and properly dispose of weed seed and plant parts found on clothing, equipment, and vehicles.
- Separate topsoil to maintain seedbank, tackify stockpile
- Use of exclusionary devices to protect sensitive plants
- Erosion control devices consisting of straw/hay must be state-certified weed-free
- Water the work areas and the roads to control dust



Mitigation Measures – Protecting Nesting Birds During Construction

- Biological monitors should be present during the nesting season between April 1 and August 31.
- Prior to any ground-disturbing construction activity, the biological monitors will survey, inspect and flag buffer areas for avoidance of nests or breeding birds (migratory birds, raptors/burrowing owls)
- Seasonal restrictions/critical habitat
- Maintain slash onsite – *if appropriate*
- Stay out of buffer areas flagged for nests or breeding pairs of birds.
- Install perch deterrents (requires post-construction monitoring)



Mitigation Measures – Protecting Sage Grouse During Construction

✓ Winter habitat closure

November to March

✓ Active leks

(no construction within 2 miles from
2 hours before sunrise to 9 am)

March to May

✓ Nesting

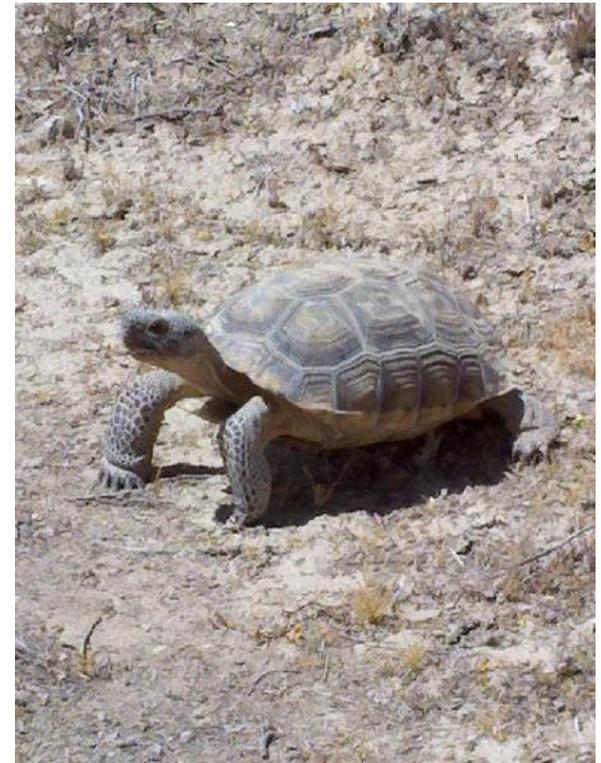
(no disturbance)

May to June



Mitigation Measures – Protecting Desert Tortoise During Construction

- Hold tortoise education program
- Conduct pre-construction surveys, excavate burrows immediately prior to construction
- Stay on roads and cleared areas, escorted by monitors
- No pets, prevent raven predation/raven nesting
- Relocate/handle tortoises only as needed
- Cover open holes overnight so tortoises do not fall in. Enforce correct installation of tortoise fencing.
- Check under vehicles and equipment before moving
- Monitors must be present with each work crew in the desert tortoise high season (March to October).



Resource Protection Examples During Construction



Resource Protection Examples During Construction



Resource monitor present when construction working in the area of a sensitive resource



Communicate ways to help construction personnel stay in compliance

Operations and Maintenance (O&M)

Utilities Conduct Periodic Inspections for Preventative Maintenance – this level of effort varies between utility companies.

1-2 people fly lines to inspect guy wires, insulators for chipping, bullet holes, wire sagging or vibration issues. On guyed structures maintenance could also involve checking tension on guy wires because cattle will rub on the wires.

In coastal areas – corrosion problems with switches that will require more frequent inspections.

Ice or wind storms could trigger an inspection

Easements – Maintain driving access or walk-in access

Within the ROW – Spray herbicides from helicopter or a side sprayer from a truck
Height of any tree in ROW cannot be greater than 20 feet from top of tree to wire

Questions, Comments, Discussion

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