Appendix D

Operation & Maintenance

Operation and Maintenance Plan

This document presents the operation and maintenance (O&M) plan for Western Area Power Administration's (Western) Sierra Nevada Region (SNR) transmission line systems.

1.0 Inspection/System Management

In compliance with Western's Reliability Centered Maintenance Program, Western would conduct aerial, ground, and climbing inspections of its existing transmission infrastructure since initial construction. The following paragraphs describe Western's inspection requirements.

Aerial Inspections

Aerial inspections would be conducted a minimum of every 6 months by helicopter or small plane over the entire transmission system to check for hazard trees[1] or encroaching vegetation, as well as to locate damaged or malfunctioning transmission equipment. Typically, aerial patrols would be flown between 50 and 300 feet above Western's transmission infrastructure depending on the land use, topography, and infrastructure requirements. In general, the aerial inspections would pass over each segment of the transmission line within a one-minute period.

Ground Inspections

Annual ground inspections would check access to the towers/poles, tree clearances, fences, gates, locks, and tower hardware, and ensure that each structure would be readily accessible in the event of an emergency. They would allow for the inspection of hardware that would not be possible by air, and identify redundant or overgrown access roads that should be permanently closed and returned to their natural state. Ground inspections would typically be conducted by driving a pickup truck along the ROW and access roads. Detailed ground inspections would be performed on 20 percent of all lines and structures annually, for 100 percent inspection every 5 years. Ground inspections would involve a shake test, which includes manually shaking the knee braces of the tower to see if there is anything loose on the structure.

Climbing Inspections

Climbing inspections would be performed on all antenna towers at least once every 7 years to identify deterioration in hardware that could not be detected from either ground or aerial patrols. In addition, climbing of transmission line structures would occur if problems were identified during ground inspections. Typically, such activities would involve the use of a pickup truck or bucket truck.

1.1 Maintenance Activities

In general, Western O&M activities for Sierra Nevada Region transmission line systems would include the following:

- **Vegetation maintenance (transmission line and access road ROWs).** Vegetation maintenance would ensure that vegetation did not interfere with human safety, transmission line conductors, towers, other hardware, or impede access to the transmission line for maintenance crews. In general, vegetation maintenance could be performed using a variety of methods including manual methods

[1] Trees located within or adjacent to the easement or permit area that present an immediate hazard to the facility or have the potential to encroach within the safe distance to the conductor as a result of bending, growing, swinging, or falling toward the conductor.

(hand-controlled, powered, or non-powered tools such as chainsaws and clippers), mechanical methods (such as heavy-duty mowers), and herbicidal applications (used either to prohibit or retard vegetative growth).

- **Access road maintenance.** Access road maintenance would include activities to ensure that legal access roads were in appropriate condition for all-weather access to transmission lines by maintenance and inspection crews. These activities would include grading, surfacing, erosion-control measures, and constructing water diversions such as culverts, ditches, and water bars.
- **Transmission line and associated structure, hardware, and equipment maintenance.** This category of activities would include equipment and system maintenance and upgrades, routine aerial and ground patrols of transmission lines and ROWs, and transmission system repairs.

The methods used to complete maintenance activities would be selected in consultation with the appropriate land managers.

1.1.1 Vegetation Maintenance

Western's Integrated Vegetation Management (IVM) program identifies the correct vegetation maintenance approach (also referred to as prescription) for specific areas based on the sensitivity of resources, reliability and safety issues, and environmental laws and regulations. Western's intent is to secure and maintain a manageable and stable ROW that minimizes vegetative threats to transmission system safety, security and reliability, and ultimately does not require frequent re-treatments. Achieving this desired condition is a process that may take several iterations over an extended period of time. The desired condition serves as the guide for future vegetation management decisions and treatment activities. Once achieved, it is intended that the desired condition will be proactively maintained. Western also encourages landowners and governmental entities to manage lands adjacent to the ROW in a manner which further reduces vegetation and wildfire hazards which are a threat to the safe, secure, and reliable operation of the power facility. Western's desired condition, on and adjacent to its ROW and fee lands is consistent with ANSI A300 Part 7, which may be used for additional guidance and reference, and is characterized by:

- Stable, compatible plant communities free from noxious or invasive plants. Compatible plant communities will typically be comprised of native plant species, which, at a mature height, will not interfere with the safety, security, and reliability of the transmission system. Western's goal is to manage vegetation for the exclusion of incompatible plant species and the retention and recruitment of compatible species
- Vegetation managed to reduce wildfire risk and enhance wildfire survivability. The density of vegetation after treatment and areas of regeneration will be managed to reduce the overall fire risk. Vegetation debris from intensive or repetitive treatments may also require mitigation to reduce wildfire risk and enhance the survivability of the transmission facility.
- Adequate access routes to provide for efficient and cost effective vegetation treatment activities.

Western will manage undesirable vegetation in which action clearance thresholds are established and proactively monitored. For those areas that are in violation of the threshold, all possible control options are evaluated, selected, and implemented. Control options are based on worker and public safety, environmental impact, effectiveness, site characteristics, and economics. Initially, the ROW is restored through the removal of undesirable vegetation. The ROW is then enhanced via various management techniques to protect facilities, reduce the potential for fire, and provide habitat for wildlife and a variety of plant species.

Western would implement a combination of vegetation management practices that are consistent with the principles of IVM and in concert with land owner goals and policies. Western would develop specific prescriptions to manage vegetation along the ROWs. The following paragraphs describe the general vegetation management methodologies**.**

Manual Vegetation Control Methods

Manual vegetation control is defined as the application of powered and non-powered handheld tools or installation of synthetic or natural barriers to manage vegetative growth. The primary benefit of manual methods is selectivity; only unwanted or target vegetation is removed, while non-target vegetation is not disturbed. The primary disadvantages of manual methods are that they are labor intensive and they are only effective in vegetation with relatively low density. The manual vegetation control techniques currently employed by Western are described below.

Cutting

The most commonly used manual method to control vegetation is cutting target plants with power saws. Other manually operated tools such as axes, machetes, and clippers may also be used. This method is highly effective on species that do not resprout. For species that resprout, including most deciduous trees, sprouts may resurge to original heights within several years and at much greater density than the original stems. Access for subsequent manual treatments is thereby hindered.

Girdling

Girdling involves manually cutting away bark and cambium tissues around the trunk of target trees. This treatment is rarely practiced by Western, but could be appropriate in some cases (e.g., where large trees cannot be felled by cutting). Conifer species are killed by girdling, but hardwoods frequently will resprout below the girdle unless the cut is treated with herbicide. Girdling results in standing dead trees or snags, which are left to decompose and fall on their own. Snags are left at the land owner's request and provide habitat for cavity-nesting species and other wildlife. Girdling could pose a fuels-management problem by mixing standing dead fuel with live fuel, which could significantly increase the potential for a crown fire.

Topping and Trimming

Topping involves cutting a tree at a specific height to prevent it from growing into transmission lines or microwave beam paths without felling the whole tree. This treatment is used in rare cases by Western as the situation dictates. Trimming or pruning is the removal of selected branches from tree trunks for the same purposes. Directional pruning is practiced by Western, whereby the trees are pruned to direct growth away from the conductors. Western uses these highly labor-intensive techniques in special situations where it is desirable to leave trees in place as visual screens (e.g., along roads, streams, and rivers) or where easement contracts and land/resource plans dictate such tree removal or trimming criteria (e.g., in orchards and along streams) (Western 2007).

Under the buffered vegetation management approach, limbing or trimming of the individual branches that encroach into the buffered vegetation area would be the preferred method. Within the buffered vegetation management area, topping would not be acceptable because it could encourage faster growth in an undesirable direction.

Slash Disposal/Fuels Reduction

Manual cutting operations by Western are sometimes followed by slash disposal techniques designed to reduce fire hazards or to improve aesthetic appeal. Slash refers to the debris left within the vegetation treatment area. Depending on land-owner preference, access limitations, and fire safety, the slash can be treated by one of the following methods: it can be chipped and left on site; burned in piles; removed from the site; or lopped and scattered. Western acknowledges land manager concerns related to fuels left in the ROW and would reduce fuel load during vegetation management activities, to the extent feasible.

Mechanical Vegetation Control Methods

Mechanical methods employ machines to remove or control vegetation. These methods are often nonselective in that certain plants cannot be either targeted for removal or avoided. Mechanical methods, however, may be highly effective at controlling brush on gentle topography with few site obstacles. Most pieces of mechanical equipment are not safe to operate on slopes over 30 to 35 percent; mechanical methods are also constrained where soils are susceptible to compaction or erosion. Site obstacles such as rocks, stumps, or logs also reduce efficiency of these methods (Western 2007). Western would use mechanical methods to remove vegetation in portions of the ROW.

Herbicide Control Methods

Western would coordinate with land managers and local agencies to ensure that its use of herbicides would be consistent with local regulations and guidelines.

An herbicide is a chemical used to kill or suppress the growth of nonnative or invasive plants. The most satisfactory classification of herbicides is based upon how they are used for noxious-weed control and how they work. Accordingly, herbicides are classified into two major types:

- Selective herbicides kill certain plants but do not significantly affect the most desirable plants. For example, some selective herbicides kill broadleaf plants (including brush) but do not affect grasses.
- Nonselective herbicides are chemicals that are generally toxic to plants without regard to species.
- Plants differ in susceptibility to any specific chemical, and the choice of herbicide and application rate depends on the species to be controlled.

Western proposes using only those herbicides that have been approved for use in ROW maintenance based on evaluations of toxicity, solubility, soil adsorption potential, and persistence in water and soil. Further, these herbicides must be registered for use in California by the U.S. Environmental Protection Agency. Western would use only employees or contractors with required applicator licenses/certificates.

Western would follow strict safety procedures and best management practices (BMPs) while applying herbicides. These practices, described in Western's IVM Program (Western 2007), are a part of the Master O&M Program and would include:

- Reviewing federal and California pesticide regulations for restrictions on use of particular herbicides;
- Reviewing interagency agreements for herbicide type or application method restrictions;
- Using herbicides approved by the respective land management agency;
- Observing site conditions to match specific herbicides and application methods to those conditions, including the plants that are to be controlled, seasonal limitations, presence of sensitive environmental areas (such as listed and/or sensitive species, habitat, and wetlands), presence/proximity of non-target vegetation, presence/proximity of crops, and vegetation conditions (such as height and amount of tall-growing brush);

- Following all restrictions and guidance listed on the herbicide label;
- Calibrating equipment to ensure proper mixture and volume of herbicide;
- Selecting the proper nozzle tip to avoid overspray;
- Handling herbicides carefully to avoid accidental spills and ensure worker and public safety;
- Adjusting herbicide application methods and equipment based on wind speed and direction, which could include avoiding application on windy days when drift potential exceeds that which is recommended on the label;
- Providing the land owner and/or appropriate agency with the following information after completion of a particular activity: herbicide used, amount (including concentration), location of application, and method and date of application.

There are several different ways to apply herbicides, and the method selected depends on the type of control needed, the type of vegetation, and the site situation (i.e., site conditions, location). Application methods Western would use include stump treatment, basal spray treatment, foliage spray treatment, soils treatment, and under-surfacing materials treatment.

Stump Treatment

Western currently applies either an oil-based herbicide mixture or a ready-to-use non-oil solution. This type of treatment is used when vegetation is cut to the ground. This method is primarily used after initial clearing and during maintenance clearing when trees have grown too tall to use foliage spray or when drift is an issue. As needed, cut surfaces of stumps would be treated with registered borax fungicide (e.g. Sporax) soon after the tree is felled.

Basal Spray Treatment

This treatment method involves spraying the lower part of the stem and the exposed roots of incompatible vegetation with an oil-based formula. Basal spray treatment would be used on resprouting species and nonnative and invasive plant species. This method is more selective than a foliage spray and does not cause immediate brownout of vegetation. In general, this treatment is prescribed where:

- brush is too tall to use foliage spray without causing unacceptable drift;
- the ROW is adjacent to cropland, residences, susceptible vegetation, or other sensitive areas, and drift is a problem;
- the ROW contains a high density of compatible species, and a foliage spray cannot be applied without injuring the compatible cover.

Foliar Spray Treatment

Foliar spraying is a common method of applying herbicides on brush up to 15 feet tall. This method uses a water-based formulation that is applied to the entire plant's foliage and stems. Because it is sprayed into the air, drift can be a problem under certain atmospheric conditions. Also, most foliage sprays cause immediate brownout of vegetation. This method would not be used in areas where drift and brownout are concerns (e.g., adjacent to cropland, residences, susceptible vegetation, or other environmentally or visually sensitive areas).

Documentation and Reporting

Per federal regulations, Western would document and report information pertaining to herbicide application within the ROW and associated facilities. This information could include herbicide type, quantity, and application area. Reporting format and frequency would be decided in coordination with the appropriate land manager.

1.1.2 Access Road Maintenance

As part of the O&M program, Western must maintain safe and reliable access roads to the existing infrastructure. Western would notify land managers before work begins and would comply with applicable specifications, as required. Western would also take into account land-manager guidelines. In addition, land managers would be notified when work was completed so that they have an opportunity to inspect the work.

For all access road work, any equipment will be cleaned and inspected prior to operations. All ditches, existing culverts, and inlet assemblies will be cleaned. Slash and debris may be scattered, but will not be placed near or in stream channels, culvert inlets, or ditches. There will be a clearing limit of 4 feet on both sides of the existing roadbed. Trees over 6 inches in diameter within the clearing limit that do not impede blading will be limbed to a height of 14 feet and left standing.

The following paragraphs describe Western's general approach to maintaining its existing legal access roads.

Clearing Culverts and Ditches

Existing culverts and ditches would be kept free of debris and obstructions. Ditches on newly constructed roads could require frequent cleaning and checking after each major storm until revegetation has occurred. Additionally, it would be Western's goal to check each culvert at least once a year after spring rains and before winter rains; additional culvert checks will be performed as needed to keep culverts clean and unobstructed. During inspection and clearing of culverts and ditches, Western would:

- leave grass in the ditch unless it had filled with sediment and were no longer functioning;
- check for undercutting road shoulders and banks;
- check culverts for blockage by debris;
- not leave a berm on the side of the road; as berms would channel water down the road.

Culvert and Ditch Design

Culverts

Culverts would be made of corrugated metal or corrugated steel. Western would clear an area 10 feet upstream and 10 feet downstream of a culvert, with a width 2 feet wider than the diameter of the culvert.

- Western understands the potential for adverse environmental effects if a culvert is installed without consideration of existing biological resources. As such, Western would consider the following guidelines when constructing new culverts:
- Whenever possible, low-water crossings would be installed instead of a culvert;
- Applicable permits (including national regulatory permits for wetlands and state water-quality certification) would be obtained as appropriate;

- Projects would be scheduled so that they did not coincide with fish migrations, spawning, and egg-incubation periods;
- The appropriate erosion and sediment controls would be installed on disturbed soils as soon as possible (i.e., before site work was finished) consistent with the terms and conditions of all applicable permits.

Culverts would be large enough to pass a 100-year flood at 67 to 75 percent of capacity. They would be designed to accommodate water velocities and flows necessary for fish, frogs, and other aquatic species to swim through the culvert. Culvert diameters would match the width of the stream at an average point. Stream widths would be measured at the top of the banks to best represent the stream size during normal high water or bank-full conditions. The angle or slope of the culvert would be equal to the stream grade to maintain an acceptable water velocity for fish passage.

Water Bars

A water bar is a ridge that directs water off the road. Water bars would be spaced 200 feet apart for roads with a grade under 6 percent, 125 feet apart for grades between 6 and 10 percent, and 50 feet apart for grades between 10 and 13 percent.

Rolling Drain Dips

A rolling drain dip allows for cross-drainage. It consists of a shallow dip followed by a hump, along with an earth berm at the edge of one side of the road.

Removing Slide Debris

Slide debris can cause increased sediment loads in established roadway drainage systems as well as in established streams. In order to prevent this, Western would not sidecast removed material. Should slide debris occur, the cause would be evaluated to determine if removal of the slide debris could exacerbate slope instability by undercutting the toe of the slope. In some instances, removal of some debris could be required and stabilization of the remaining material could prevent further problems. The appropriate erosion and sediment controls would be installed on disturbed soils as soon as possible (i.e., before site work was finished). Mulching and other forms of erosion control would be used to prevent erosion.

Repairing Road Structures

In order to maintain safe access, associated road structures would be routinely inspected and maintained. Road structures in need of repair could include bridges, culverts, cattle guards, and fences. Should a structure need to be modified, maintenance activities would be designed to reduce erosion and sedimentation in streams. Western would employ the following BMPs:

- Be consistent with applicable specifications of the appropriate land manager;
- Protect vegetation and minimize the amount of disturbance of plants and soils by equipment;
- Work quickly to minimize the time disturbed soils are exposed;
- Divert runoff away from exposed soils into vegetated buffers;
- Disperse concentrated stream flows;
- Provide adequate runoff channels;
- Trim slopes to stable configurations and revegetate as soon as possible;

- Comply with land manager design and engineering requirements for new or modified structures;
- Inspect new or modified structures at least once a year after spring rains and before winter rains;
- Mitigate the damage created during emergency road repairs as soon as possible to prevent further damage and erosion.

Controlling Erosion

Western would work with guidance from each land manager to review and annually prioritize roads for repair over a 5 year period. This would involve monitoring for erosion, rehabilitating gullies and rills, and ensuring that there are no ruts deeper than 3 inches.

Repairing Damaged Access Roads

For damaged access roads or roads with existing drainage and erosion problems, Western would replace the surface material lost or worn away, then grade and shape the road surface, turnouts, and shoulders to their original condition, or better. Watering could be required to control dust and to retain fine surface rock.

This program would make it a goal to eliminate old erosional features while proactively preventing new problems. While repairing damaged access roads, it would be Western's goal to adhere to the following BMPs:

- Be consistent with applicable specifications of the appropriate land manager;
- Minimize the amount of disturbance to plants and soils by equipment;
- Work quickly to minimize the time disturbed soils are exposed;
- Divert runoff away from exposed soils and into vegetated areas;
- Disperse concentrated stream flows;
- Provide adequate runoff channels;
- Trim slopes to stable configurations and revegetate as soon as possible;
- Check road quality at least once a year after spring rains and before winter rains;
- Mitigate any damage created by emergency repairs as soon as possible to prevent further damage and erosion.

Removing Access Roads

Western would consider removing access roads that are no longer needed. Western would annually prioritize roads for removal and provide land-management agencies with a plan to restore the abandoned roads to a natural state over a 5- to 6-year period.

1.1.3 Transmission System Maintenance

The need for repairs and preventative maintenance would be based on the results of inspections or other reports. Repairs and preventative maintenance could include: replacing insulators; tightening, replacing, or repairing towers/poles or hardware; and looking for ROW encroachments. These activities would be performed wherever damage or deterioration of transmission lines or facilities pose a threat to safety or reliability. The type of equipment needed could include a pickup truck, bulldozer, backhoe, bucket truck, and hand tools, and would depend on the required repair or maintenance. For major activities, Western would coordinate with the land manager.

1.2 Equipment/System Upgrades

For the transmission system to operate in a safe, reliable, and efficient manner, Western would replace or upgrade system components based on the age, condition, and technology of the equipment. System upgrades or replacements could include new conductors, capacitor banks, transformers and breakers, small solar-power arrays, and other electrical equipment.

1.3 Regulatory Coordination

Western would coordinate with resource agencies and land managers on major facilities maintenance and vegetation removal activities. The following bullets describe the process and reporting requirements that Western would follow for category A, B, and C maintenance activities (section 1.4 provides a description of the O&M activity categories).

- **Identification of maintenance activity.** Western is required to conduct aerial and ground inspections of its lines on a periodic basis. During inspections, Western would identify problem areas or equipment. These maintenance projects would be prioritized based on public and worker safety, system reliability, protection of the environment, and funding. Section 1.3.1 describes the frequency of each type of maintenance activity.
- **Coordination with resource agencies and land managers.** Western would coordinate with the appropriate resource agencies and land managers for each major maintenance project, providing a description of the maintenance task and coordinating with them regarding measures.
- **Training of Western personnel or contractors.** Western would train its maintenance personnel on SOPs and other measures on an annual basis. Should a contractor be hired to conduct a particular task, Western would train the contractor prior to project startup. All SOPs would be incorporated into the contractor's master contract. Western personnel and contractors would be responsible for complying with measures.
- **Monitor maintenance activity.** Western's personnel would monitor maintenance activities to make sure that the contractor was complying with the applicable SOPs and other measures. Western would also conduct follow-up inspections of the ground-disturbance activity sites.

1.3.1 Standard Operating Procedures

SOPs would be followed for every O&M activity, regardless of the activity category, throughout the Proposed Action. All Western O&M personnel would be subject to an annual training that includes SOPs, environmental laws and regulations, and applicable agency requirements. SOPs would be included as part of the contract with any contractor selected to conduct O&M activities. Prior to conducting the O&M activity, Western's O&M personnel would review the SOPs with the selected contractor to make sure the intent and background of each procedure was clearly understood. In addition, Western's O&M personnel would monitor the contractor during maintenance activities, and conduct follow-up inspections of the job site at periodic intervals after the work had been completed.

1.3.2 Projected O&M Frequency

Western would continue periodic aerial and ground patrols of the transmission lines and towers. Aerial inspections would be performed a minimum of every 6 months by flying a helicopter at 50 to 300 feet above the conductors. Ground patrols would be conducted semi-annually using a pickup truck to drive along lines. During either type of patrol, problems could be identified that may require immediate repair

or replacement of transmission line hardware or vegetation management. Typically, equipment repair or replacement would be conducted by a four-person crew with two or three trucks, a boom line truck, and an aerial and assist truck. Western would also conduct periodic climbing inspections of antenna towers.

Western would also monitor vegetation clearance and access roads along the ROWs. Western would prioritize those areas that needed maintenance according to public and worker safety, transmission reliability, environmental protection, and funding.

1.4 Operation and Maintenance Activity Categories

The following is a list of the O&M activities according to their associated activity category. Note that substation and facility maintenance activities are restricted to the confines of the existing fenced substation or facility perimeter.

- Category A – Inspection and Minor Maintenance Activities
- Category B – Routine Maintenance Activities
- Category C – New Infrastructure

1.4.1 Category A – Inspection and Minor Maintenance Activities

Maintenance activities in Category A are primarily inspection-type actions, with some minor repairs that would cause minimal, if any, soil disturbance. Typical activities under Category A may include but would not be limited to:

Substation Maintenance

- Maintenance and replacement of transformers and breakers
- Servicing and testing of equipment at existing substations, including oil change-outs
- Installation or replacement of bushings
- Cleaning or replacement of capacitor banks
- Maintenance or installation of propane tanks within a substation yard
- Maintenance of switches, voltage regulators, reactors, tap changes, reclosers, and valves
- Replacement of wiring in substations and switchyards
- Replacement of existing substation equipment including regulators, capacitors, switches, wave traps, radiators, and lightning arresters
- Installation of cut-out fuses
- Adjustment and cleaning of disconnect switches
- Placement of temporary transformers
- Maintenance, installation, and removal of solar power arrays and controllers
- Installation of foundation for storage buildings above ground mat within existing substation yard
- New footings
- Ground mat repairs
- Remediation of small spill of oil and hazardous materials (less than 1 gallon)
- Clearing vegetation by hand within the property boundary of a fenced substation
- Application of soil sterilants and herbicides within the property boundary of a fenced substation
- Maintenance or installation of oil containment structures

Transmission Line Maintenance

- Ground and aerial patrols
- Ground wire maintenance
- Aircraft warning device maintenance
- Insulator maintenance
- Bird guard maintenance
- Cross arms maintenance on wood pole structures
- Emergency manual removal and/or pruning of danger trees or vegetation
- Steel members of steel transmission line structures
- Hardware on wood and steel transmission line structures
- X brace and knee brace maintenance
- Dampener maintenance
- Ground rod maintenance
- Armor rod maintenance and clipping-in structures
- Conductor upgrade/maintenance
- Emergency placement of rocks at bases of poles or structures to stabilize small eroded areas
- Remediation of small spill of oil and hazardous materials (less than 1 gallon)
- Antennae maintenance
- Structure mile marker maintenance
- Ground spike maintenance on wood pole structures
- Conductor upgrade, replacement, and/or maintenance
- Overhead ground-wire (OHGW) upgrade, replacement, and/or maintenance
- Wood preservative maintenance on wooden pole structures
- Routine minor erosion prevention at bases of poles or structures
- Emergency minor erosion control at bases of poles or structures to stabilize

Communication System

- Microwave radio tower maintenance
- Communication tower and antennae maintenance
- Light beacon maintenance
- Microwave dish maintenance
- Parabolic dish maintenance
- Periodic antenna tower climbing inspections
- Maintenance or installation of propane tanks

Facilities Maintenance

- Building maintenance including interior and exterior painting; and roof, ceiling, floor, window, and door maintenance
- Clearing vegetation by hand within the property boundary of fenced maintenance facilities
- Application of soil sterilants and herbicides within the property boundary of fenced maintenance facility

1.4.2 Category B – Routine Maintenance Activities

Maintenance activities in Category B include some of the typical repair tasks that would occur along Western's existing ROW. Category B actions have the potential to cause minimal effects to sensitive resources. Category B maintenance equipment may include, but would not be limited to, rubber-tired vehicles such as bucket trucks, backhoes, front-end loaders, cranes, auger trucks, bobcats, and pole trucks. Typical activities under Category B may include but would not be limited to:

Transmission Line Maintenance

- Maintenance and repair of existing culverts
- Removal of soil deposition around tower legs
- Ground anchors maintenance
- Filling of erosional features on access roads
- Remediation of small spill of oil and hazardous materials (between 1 and 10 gallons)
- Grading existing access roads
- Application of herbicides
- Placement of fill or rock(s) around existing culverts
- Placement of fill or rock(s) around existing towers or structures
- Wood pole maintenance
- Maintenance, grading and repair of existing access roads to approved standards
- Remediation of erosional features on access roads, and sources or causes of the erosion
- Remediation of small spills
- Installation or replacement of underground and overhead power, communication, fiber optics, ground wire, or ground electrical line (less than 100 feet)
- Installation or replacement of power, communication, fiber optics, OHGW, or electrical line over water features (less than 100 feet)
- Vehicle and equipment staging
- Installation and repair of fences and gates
- Installation or replacement of underground and overhead power, communication, or ground electrical line (less than 100 feet)
- Manual removal and/or pruning of danger trees or vegetation
- Mechanical vegetation management by means of masticators or other similar mechanical equipment
- Installation of minor rip-rap on creeks and rivers

Communication System Maintenance

- Foundations or footings maintenance
- Installation of underground and overhead power, communication, or ground electrical line (less than 100 feet)
- Installation of cellular equipment onto existing infrastructure
- Installation of underground and overhead power, communication, fiber optics, ground wire, or ground electrical line (less than 100 feet)
- Installation or replacement of power, communication, fiber optics, OHGW, or electrical line over water features (less than 100 feet)
- Installation of equipment on existing towers
- Maintenance and repair of existing access roads
- Maintenance and repair of existing culverts
- Remediation of small spill of oil and hazardous materials (between 1 and 10 gallons)
- Application of soil sterilants and herbicides

1.4.3 Category C – New Infrastructure

Category C tasks are generally those maintenance activities that would disturb large areas and would utilize heavy equipment. Category C maintenance equipment may include, but would not be limited to, the use of steel-tracked and/or rubber-tired bulldozers, graders, backhoes, and front-end loaders. Typical activities under Category C may include but would not be limited to:

Transmission Line and Communication System Maintenance

- Adding new access roads within and outside of existing road easement
- Installation of new culverts
- Installation of new foundation for storage building at existing facilities
- Erosion-control projects at existing facilities
- Reconductoring
- Mechanical vegetation management by means of bulldozers or other similar mechanical equipment
- Installation or replacement of underground and overhead power, communication, fiber optics, or ground electrical line (greater than 100 feet)
- Installation or replacement of power, communication, fiber optics, or electrical line over water features (greater than 100 feet)
- Tower/pole relocation/realignment within existing ROW
- Installation or replacement of underground and overhead power, communication, or ground electrical line (greater than 100 feet)
- Remediation of a small spill of oil and hazardous materials (greater than 10 gallons)

Appendix E

Disturbance Assumptions

SLTP Disturbance Assumptions

These disturbance calculations represent best estimates of temporary and permanent ground disturbance based on available information. These estimates are subject to change pending final engineering of the Proposed Project and alternative corridors. We anticipate that final disturbance acreages will reasonably match these calculated estimates.

North Segment

- 500-kV – 5 towers/mile (rounded to the nearest whole number) @ 0.9 acre temporary disturbance (200 feet x 200 feet) and 0.1 acre permanent disturbance.
- Existing public or private roads or two track trails would be used as much as possible to access the corridor and road repair or improvement would be as necessary. For disturbance calculations, we estimated the following miles and disturbance acres for roads:

North Segment	Units	Existing Roads	New Roads	
		Dirt, gravel, or 2-track trails	Temporary	Permanent
Proposed Corridor	Miles	20.0	5.0	3.0
	Acreage	34.0	8.0	4.0

- 1 pulling site every 3 miles @ 2.0 acres (600 feet x 150 feet) of disturbance at each pulling site.
- Material storage sites every 15 miles, depending on needs, @ 5 acres each (one storage site for this section).
- One new substation @ up to 50 acres.

Central Segment

- 500-kV – 5 towers/mile (rounded to the nearest whole number) @ 0.9 acre temporary disturbance (200 feet x 200 feet) and 0.1 acre permanent disturbance.
- Existing public or private roads or two track trails would be used as much as possible to access the corridor and road repair or improvement would be as necessary. For disturbance calculations, we estimated the following miles and disturbance acres for roads:

Central Segment	Units	Existing Roads	New Roads	
		Dirt, gravel, or 2-track trails	Temporary	Permanent
Proposed Corridor	Miles	125.0	2.0	20.0
	Acreage	225.0	3.0	36.0
Patterson Pass Road Alternative Corridor	Miles	130.0	2.0	29.0
	Acreages	233.0	3.0	51.0

- 1 pulling site every 3 miles @ 2.0 acres (600 feet x 150 feet) of disturbance at each pulling site.
- Material storage sites every 15 miles, depending on needs, @ 5 acres each (three storage site for this section).

San Luis Segment

- 500-kV – 5 towers/mile (rounded to the nearest whole number) @ 0.9 acre temporary disturbance (200 feet x 200 feet) and 0.1 acre permanent disturbance.
- Existing public or private roads or two track trails would be used as much as possible to access the corridor and road repair or improvement would be as necessary. For disturbance calculations, we estimated the following miles and disturbance acres for roads:

San Luis Segment	Units	Existing Roads	New Roads	
		Dirt, gravel, or 2-track trails	Temporary	Permanent
Proposed Corridor	Miles	16.0	0.0	4.0
	Acreage	28.0	0.0	6.0
Butts Road Alternative Corridor	Miles	15.0	0.0	6.0
	Acreage	25.0	0.0	10.0
West of Cemetery Alternative Corridor	Miles	34	0.0	13
	Acreages	57	0.0	20

- 1 pulling site every 3 miles @ 2.0 acres (600 feet x 150 feet) of disturbance at each pulling site.
- Material storage sites every 15 miles, depending on needs, @ 5 acres each (one storage site for this section).
- One new substation @ up to 50 acres.

San Luis Segment (70-kV Routes)

- 15 towers/mile (rounded to the nearest whole number) @ 0.115 acre temporary disturbance (50 feet easement width x 100 feet long) and 0.0001 acre permanent disturbance (5 feet x 5 feet)
- Existing roads or two track trails would be used as much as possible to access the corridor and road repair or improvement would be as necessary. A new 50-foot spur road @ 20 feet wide would be constructed for each tower. The spur roads would be maintained at 12 feet wide after completion of tower construction
- 1 pulling site every 3 miles @ 2.0 acres (600 feet x 150 feet) of disturbance at each pulling site.
- Material storage sites every 15 miles, depending on needs, @ 5 acres each (no storage sites for this section, as this section would share the storage site for the Butts Road to San Luis Substation section)

South Segment

- 230-kV – 5 towers/mile (rounded to the nearest whole number) @ 0.6 acre temporary disturbance (200 feet x 125 feet) and 0.1 acre permanent disturbance.
- Existing public or private roads or two track trails would be used as much as possible to access the corridor and road repair or improvement would be as necessary. For disturbance calculations, we estimated the following miles and disturbance acres for roads:

South Segment	Units	Existing Roads	New Roads	
		Dirt, gravel, or 2-track trails	Temporary	Permanent
Proposed Corridor	Miles	40.0	2.0	7.0
	Acreage	70.0	4.0	13.0
San Luis to Dos Amigos Alternative Corridor	Miles	40	2.0	7.0
	Acreage	70	4.0	13.0
Billy Wright Road Alternative	Miles	32.0	0.0	10.0
	Acreages	56.0	0.0	16.0

- 1 pulling site every 3 miles @ 2.0 acres (600 feet x 150 feet) of disturbance at each pulling site.
- Material storage sites every 15 miles, depending on needs, @ 5 acres each (one storage site for this section).
- It is assumed that there would be double-circuit towers/poles between San Luis and Los Banos substations for approximately 3 miles. The double-circuit towers/poles would support the 230-kV tie-line between San Luis and Los Banos substations, as well as a portion of the San Luis/Dos Amigos 230-kV circuit that would be located between San Luis Substation and a point near the Los Banos Substation.

Sources

Barren Ridge Renewable Transmission Project. Appendix C: Detailed Construction, Operation, and Maintenance Process; POWER Engineers, Inc.

Gateway West Transmission Line Project. Appendix B: Transmission Line and Substation Components Common to All Action Alternatives; BLM.

Sacramento Area Voltage Support Project. Appendix B: Alternatives Comparison; Western and SMUD.

Southwest Intertie Project Construction, Operation and Maintenance Plan. Section 3: Project Components; BLM and Western.

Corridor	Voltage	Total Miles	Disturbance Estimates by Project Component															
			New Structures			Existing Roads (Dirt, gravel or 2-track)		New Roads				Pulling Sites		Material Storage		New Substations	Total Temporary Acres	Total Permanent Acres
			Number	Temporary Acres	Permanent Acres	Miles	Permanent (acres)	Temporary (miles)	Temporary (acres)	Permanent (miles)	Permanent (acres)	Number	Temporary Acres	Number	Temporary Acres	Permanent (Acres)		
North Segment																		
Proposed Project	500-kV	7.7	39	35.1	3.9	20.0	34.0	5.0	8.0	3.0	4.0	3	6	1	5.0	50.0	54.1	91.9
Central Segment																		
Proposed Project	500-kV	48.0	240	216.0	24.0	125.0	225.0	2.0	3.0	20.0	36.0	16	32	3	15.0	0.0	266.0	285.0
Patterson Pass Road Alternative	500-kV	48.0	240	216.0	24.0	130.0	233.0	2.0	3.0	29.0	51.0	16	32	3	15.0	0.0	266.0	308.0
San Luis Segment																		
Proposed Project	500-kV	9.1	46	41.4	4.6	16.0	28.0	0.0	0.0	4.0	6.0	3	6	1	5.0	50.0	52.4	88.6
Butts Road Alternative	500-kV	9.6	48	43.2	4.8	15.0	25.0	0.0	0.0	6.0	10.0	3	6	1	5.0	50.0	54.2	89.8
West of Cemetery Alternative	500-kV	10.3	52	46.8	5.2	34.0	57.0	0.0	0.0	13.0	20.0	3	6	1	5.0	50.0	57.8	132.2
San Luis Segment – 70-kV																		
Proposed Project	N/A	7.0	105	12.1	0.01	0.0	0.0	1.0	2.4	1.0	1.4	2	4.0	1	5.0	0.0	23.5	1.4
West of O'Neill Forebay Alternative	N/A	7.0	105	12.1	0.01	0.0	0.0	1.0	2.4	1.0	1.4	2	4.0	1	5.0	0.0	23.5	1.4
South Segment																		
Proposed Project	N/A	18.0	90	54.0	9.0	40.0	70.0	2.0	4.0	7.0	13.0	6	12	1	5.0	0.0	75.0	92.0
San Luis to Dos Amigos	N/A	18.0	90	54.0	9.0	40.0	70.0	2.0	4.0	7.0	13.0	6	12	1	5.0	0.0	75.0	92.0
Billy Wright Road	N/A	19.5	98	58.8	9.8	32.0	56.0	0.0	0.0	10.0	16.0	7	14	1	5.0	0.0	77.8	81.8

Appendix F

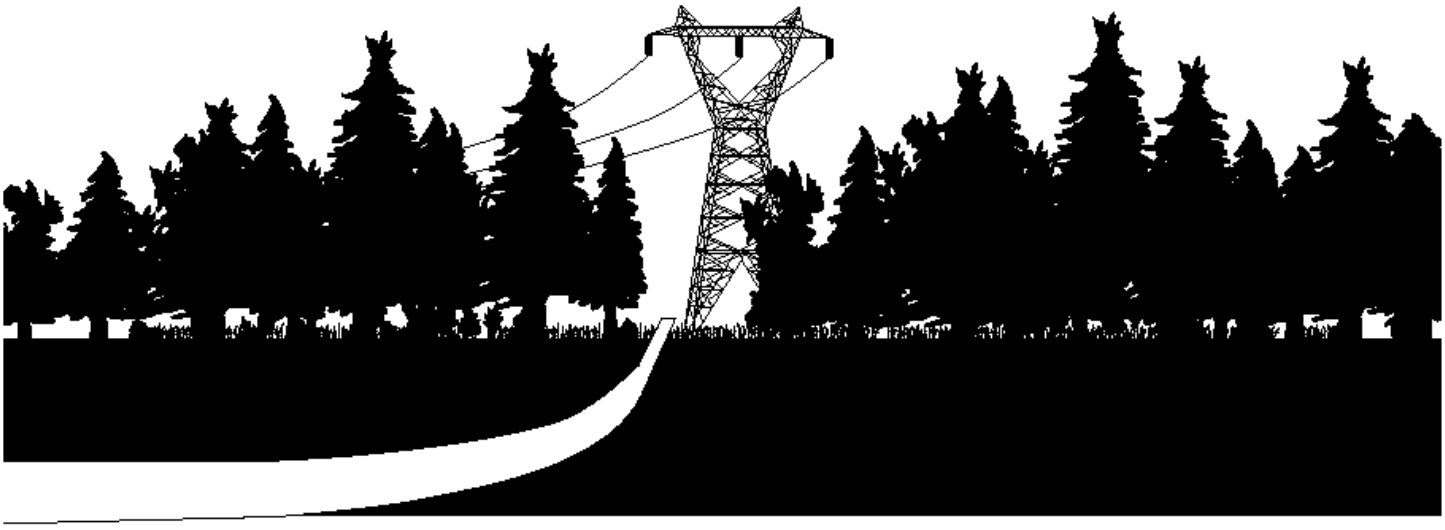
Construction Standards

Western
AREA POWER
ADMINISTRATION

CONSTRUCTION STANDARDS

STANDARD 13

ENVIRONMENTAL QUALITY PROTECTION



September 2013

SAFETY
A HABIT TO LIVE BY

STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

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STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

SECTION 13.1—REQUIRED SUBMITTALS, REPORTS, AND PLANS

1. FINAL PAYMENT: For each section below, final payment may be withheld until the referenced submittal, report, or plan is received.

SECTION 13.2--CONTRACTOR FURNISHED DATA

1. RECYCLED MATERIALS QUANTITY REPORT: Submit quantities of recycled materials listed in Section 13.7, "Recycled Materials Quantities", to the COR prior to submittal of final invoice.

2. RECOVERED AND BIOBASED MATERIAL PRODUCTS REPORT: Provide the COR the following information for purchases of items listed in Section 13.8, "Use of Recovered and Biobased Material Products".

   (1) Quantity and cost of listed items with recovered or biobased material content and quantity and cost of listed items without recovered or biobased material content prior to submittal of final invoice.

   (2) Written justification of listed items if recovered material or biobased material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

3. RECLAIMED REFRIGERANT RECEIPT: A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR prior to submittal of final invoice in accordance with Section 13.9.5, “Refrigerants and Receipts”.

4. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR prior to submittal of final invoice in accordance with Section 13.9.8, “Waste Material Quantity Report”.

   (1) Unregulated Wastes (i.e., trash): Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

5. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Submit the Plan as described in Section 13.11.2, "Spill Prevention Notification and Cleanup Plan”, to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

6. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Submit the Plan as described in Section 13.11.3, "Tanker Oil Spill Prevention and Response Plan”, to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

7. PESTICIDE USE PLAN: Submit a plan as described in Section 13.12.3, “Pesticide Use Plan”, to the COR for review and comment 14 days prior to the date of intended pesticide application. Review of

the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after application, submit a written report in accordance with Standard 2 – Sitework, Section 2.1.1_5, “Soil-Applied Herbicide”.

8. TREATED WOOD UTILITY POLES AND CROSSARMS RECYCLING - CONSUMER INFORMATION SHEET RECEIPT: Submit treated wood utility poles and crossarms - consumer information sheet receipts to the COR prior to submittal of final invoice (see 13.13, “Treated Wood Utility Poles and Crossarms Recycling or Disposal”).

9. PREVENTION OF AIR POLLUTION: Submit a copy of permits, if required, as described in 13.14, “Prevention of Air Pollution” to the COR 14 days prior to the start of work.

10. ASBESTOS LICENSES OR CERTIFICATIONS: Submit a copy of licenses, certifications, Demolition and Renovation Notifications and Permits for asbestos work as described in 13.15, ”Handling and Management of Asbestos Containing Material” to the COR 14 days prior to starting work. Submit copies of certificates of disposal and/or receipts for waste to the COR prior to submittal of final invoice.

11. LEAD PAINT NOTICES: Submit a copy of lead paint notices with contractor and recipient signatures as described in 13.16, “Material with Lead-based Paint” to the COR prior to submittal of final invoice. Submit copies of certificates of disposal and/or receipts for waste to the COR prior to submittal of final invoice.

12. WATER POLLUTION PERMITS: Submit copies of any water pollution permits as described in 13.17, “Prevention of Water Pollution” to the COR 14 days prior to start of work.

13. PCB TEST REPORT: Submit a PCB test report as described in 13.18, “Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment”, prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

14. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed as described in 13.19, “Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment”, to the COR prior to submittal of final invoice.

15. OSHA PCB TRAINING RECORDS: Submit employee training documentation records to the COR 14 days prior to the start of work as described in 13.19.1.

16. CLEANUP WORK MANAGEMENT PLAN: Submit a Cleanup Work Management Plan as described in 13.19, “Removal of Oil-contaminated Material” to the COR for review and comment 14 days prior to the start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

17. POST CLEANUP REPORT: Submit a Post-Cleanup Report as described in 13.19, “Removal of Oil-contaminated Material” to the COR prior to submittal of final invoice.

SECTION 13.3--ENVIRONMENTAL REQUIREMENTS

Comply with Federal, State, and local environmental laws and regulations. The sections in this Standard further specify the requirements.

SECTION 13.4--LANDSCAPE PRESERVATION

1. GENERAL: Preserve landscape features in accordance with the contract clause titled “Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements.”

2. CONSTRUCTION ROADS: Location, alignment, and grade of construction roads shall be subject to the COR's approval. When no longer required, surfaces of construction roads shall be scarified to facilitate natural revegetation, provide for proper drainage, and prevent erosion. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.

3. CONSTRUCTION FACILITIES: Shop, office, and yard areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent and prevent impact on sensitive riparian areas and flood plains. Storage and construction buildings, including concrete footings and slabs, shall be removed from the site prior to contract completion. The area shall be re-graded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion or transport of sediment and pollutants. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.

SECTION 13.5--PRESERVATION OF CULTURAL AND PALEONTOLOGICAL RESOURCES

1. GENERAL: Do not, at any time, remove, disturb, or otherwise alter cultural artifacts or paleontological resources (fossils). Cultural artifacts may be of scientific or cultural importance and includes, but are not limited to bones, pottery, projectile points (arrowheads), other stone or metal tools, surface features (stone circles, rock piles, etc.), glass, metal, ceramic, or other historic objects, structures and buildings (including ruins). Paleontological resources can be of scientific importance and include mineralized animals and plants or trace fossils such as footprints. Both cultural and paleontological resources are protected by Federal Regulations during Federal construction projects. Contractor shall restrict all ground disturbing activities to areas that have been investigated by Western for cultural or paleontological resources, or have been cleared in writing by the Regional Preservation Officer (RPO) and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.

2. KNOWN CULTURAL OR PALEONTOLOGICAL SITES: Following issuance of notice to proceed, Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground in a manner approved by the COR in conjunction with the RPO. Instruct employees and subcontractors that vehicular or equipment access to these areas is prohibited. If access is absolutely necessary, first obtain approval from the COR in conjunction with the RPO. Western will remove the markings during or following final cleanup. For some project work, Western will require an archaeological, paleontological or tribal monitor at or near cultural or paleontological site locations. The contractor, contractor’s employees, and subcontractors shall work with the monitor to insure that sensitive areas are avoided. Where monitors are required, the monitor shall meet with the crew each morning to go over the day’s work. The monitor will also conduct awareness training for all contractors prior to any work in the field. Untrained personnel shall not be allowed in the construction area. For sensitive areas requiring a monitor, the contractor may not access those areas without a monitor being present.

3. UNKNOWN CULTURAL OR PALEONTOLOGICAL SITES: On rare occasions cultural or paleontological sites may be discovered during excavation or other earth-moving or other construction activities.

   (1) Reporting: If evidence of a cultural or paleontological site is discovered, cease work in the area immediately and notify the COR of the location and nature of the findings. If a monitor is present, the monitor should also be notified. Stop all activities within a 200-foot radius of the discovery and do not proceed with work within that radius until directed to do so by the COR.

   (2) Care of Evidence: Protect the area. Do not remove, handle, alter, or damage artifacts or fossils uncovered during construction activities.

SECTION 13.6--NOXIOUS WEED CONTROL

Comply with Federal, State, and local noxious weed control regulations. Provide a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed. Transport only construction vehicles that are free of mud and vegetation debris to staging areas and the project right-of-way.

SECTION 13.7--RECYCLED MATERIALS QUANTITIES

1. GENERAL: All materials generated from the project that can be recycled, shall be recycled. Record quantities of material by category that is salvaged, recycled, reused, or reprocessed, including:

   (1) Transformers, Breakers: Weight without oil.

   (2) Aluminum Conductor – Steel Reinforced (ACSR): Weight in pounds or tons.

   (3) Steel: Weight in pounds or tons.

   (4) Aluminum: Weight in pounds or tons.

   (5) Copper: Weight in pounds or tons.

   (6) Other Metals: Weight in pounds or tons.

   (7) Oil: Gallons (separate by type - less than 2 ppm PCB, 2 to 50 ppm PCB, and 50 or greater ppm PCB).

   (8) Gravel, Asphalt, Or Concrete: Weight in pounds or tons.

   (9) Batteries: Weight in pounds.

   (10) Treated Wood Utility Poles and Crossarms: Weight in pounds.

   (11) Wood construction material: Weight in pounds.

   (12) Cardboard: Weight in pounds.

   (13) Porcelain Insulators: Weight in pounds.

2. RECYCLED MATERIAL QUANTITY REPORT: Submit quantities (pounds or metric tons) of all recycled material by category to the COR within 30 days of recycling and prior to submittal of final invoice.

SECTION 13.8--USE OF RECOVERED MATERIAL AND BIOBASED MATERIAL PRODUCTS

1. RECOVERED MATERIAL PRODUCTS: If the products listed below or other products listed at http://www.epa.gov/epawaste/conserve/tools/cpg/products/index.htm are obtained as part of this project, purchase the items with the highest recovered material content possible unless recovered material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

   Construction Products:

   - Building Insulation Products
   - Carpet
   - Carpet cushion
   - Cement and concrete containing coal fly ash, ground granulated blast furnace slag, cenospheres, or silica fume
   - Consolidated and reprocessed latex paint
   - Floor Tiles
   - Flowable fill
   - Laminated Paperboard
   - Modular threshold ramps
   - Nonpressure pipe
   - Patio Blocks
   - Railroad grade crossing surfaces
   - Roofing materials
   - Shower and restroom dividers/partitions
   - Signage
   - Structural Fiberboard

2. BIOBASED MATERIAL PRODUCTS: If the products listed at http://www.biobased.oce.usda.gov are obtained as part of this project, purchase the items with the highest biobased content possible and no less than the percent indicated for each product unless biobased material products are not available: 1) competitively within a reasonable time frame, 2) meeting reasonable performance standards as defined in the Standards or Project Specifications, or 3) at a reasonable price.
   NOTE: All station service and pole mounted transformers will be bio-based oil. Western exempts purchase of bio-based large transformers rated above 5 MVA until May 13, 2015. Large transformers will be evaluated on a best value basis using life cycle cost analysis.

3. RECOVERED MATERIAL AND BIOBASED MATERIAL PRODUCTS REPORT: Provide the COR the following information for purchases of those items listed above:

   Quantity and cost of listed items with recovered or biobased material content and quantity and cost of listed items without recovered or biobased material content prior to submittal of final invoice.

   Written justification of listed items if recovered material or biobased material products are not available: 1) competitively within a reasonable time frame; 2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or 3) at a reasonable price.

SECTION 13.8--DISPOSAL OF WASTE MATERIAL

1. GENERAL: Dispose or recycle waste material in accordance with applicable Federal, State and local regulations and ordinances. In addition to the requirements of the Contract Clause “Cleaning

Up", remove all waste material from the construction site. No waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.

2. HAZARDOUS, UNIVERSAL, AND NON-HAZARDOUS WASTES: Manage hazardous, universal, and non-hazardous wastes in accordance with State and Federal regulations.

3. USED OIL: Used oil generated from the Contractor activities shall be managed in accordance with used oil regulations.

4. RECYCLABLE MATERIAL: Reduce wastes, including excess Western material, by recycling, reusing, or reprocessing. Examples of recycling, reusing, or reprocessing includes, but is not limited to, reprocessing of solvents; recycling cardboard; and salvaging scrap metals.

5. REFRIGERANTS AND RECEIPTS: Refrigerants from air conditioners, water coolers, refrigerators, ice machines and vehicles shall be reclaimed with certified equipment operated by certified technicians if the item is to be disposed. Refrigerants shall be reclaimed and not vented to the atmosphere. A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR prior to submittal of final invoice.

6. HALONS: Equipment containing halons that must be tested, maintained, serviced, repaired, or disposed must be handled according to EPA requirements and by technicians trained according to those requirements.

7. SULFUR HEXAFLUORIDE (SF6): SF6 shall be reclaimed and shall not be vented to the atmosphere.

8. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR prior to submittal of final invoice.

   (1) Unregulated Wastes (i.e., trash): Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

SECTION 13.10--CONTRACTOR'S LIABILITY FOR REGULATED MATERIAL INCIDENTS

1. GENERAL: The Contractor is solely liable for all expenses related to spills, mishandling, or incidents of regulated material attributable to his actions or the actions of his subcontractors. This includes all response, investigation, cleanup, disposal, permitting, reporting, and requirements from applicable environmental regulation agencies.

2. SUPERVISION: The actions of the Contractor employees and subcontractors shall be properly managed at all times on Western property or while transporting Western's (or previously owned by Western) regulated material and equipment.

SECTION 13.11--POLLUTANT SPILL PREVENTION, NOTIFICATION, AND CLEANUP

1. GENERAL: Provide measures to prevent spills of pollutants and respond appropriately if a spill occurs. A pollutant includes any hazardous or non-hazardous substance that when spilled, will

contaminate soil, surface water, or ground water. This includes any solvent, fuel, oil, paint, pesticide, engine coolants, and similar substances.

2. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Provide the Plan to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Include the following in the Plan:

   (1) Spill Prevention measures. Describe the work practices or precautions that will be used at the job site to prevent spills. These may include engineered or manufactured techniques such as installation of berms around fuel and oil tanks; Storage of fuels, paints, and other substances in spill proof containers; and management techniques such as requiring workers to handle material in certain ways.

   (2) Notification. Most States and the Environmental Protection Agency require by regulation, that anyone who spills certain types of pollutants in certain quantities notify them of the spill within a specific time period. Some of these agencies require written follow up reports and cleanup reports. Include in the Plan, the types of spills for which notification would be made, the agencies notified, the information the agency requires during the notification, and the telephone numbers for notification.

   (3) Employee Awareness Training. Describe employee awareness training procedures that will be implemented to ensure personnel are knowledgeable about the contents of the Plan and the need for notification.

   (4) Commitment of Manpower, Equipment and Material. Identify the arrangements made to respond to spills, including the commitment of manpower, equipment and material.

   (5) If applicable, address all requirements of 40CFR112 pertaining to Spill Prevention, Control and Countermeasures Plans.

3. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Provide a Tanker Oil Spill Prevention and Response Plan as required by the Department of Transportation if oil tankers with volume of 3,500 gallons or more are used as part of the project. Submit the Tanker Oil Spill Prevention and Response Plan to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

SECTION 13.12--PESTICIDES

1. GENERAL: The term “pesticide” includes herbicides, insecticides, rodenticides and fungicides. Pesticides shall only be used in accordance with their labeling and applied by appropriately certified applicators.

2. ENVIRONMENTAL PROTECTION AGENCY REGISTRATION: Use EPA registered pesticides that are approved for the intended use.

3. PESTICIDE USE PLAN: Provide a pesticide use plan that contains: 1) a description of the pesticide to be used, 2) where it is to be applied, 3) the application rate, 4) a copy of the label, and 5) a copy of required applicator certifications. Submit the pesticide use plan to the COR for review and comment 14 days prior to the date of intended application. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after

application, submit a written final report to the COR, including the pesticide applicators report, in accordance with Standard 2 – Sitework, Section 2.1.1_5. “Soil-Applied Herbicide, (4) Final Report”.

SECTION 13.13--TREATED WOOD UTILITY POLES AND CROSSARMS RECYCLING OR DISPOSAL

Whenever practicable, treated wood utility poles and crossarms removed during the project shall be recycled or transferred to the public for some uses. Treated wood utility poles and crossarms transferred to a recycler, landfill, or the public shall be accompanied by a written consumer information sheet for treated wood as provided by Western. Obtain a receipt, part of the consumer information sheet, from the recipient indicating that they have received, read, and understand the consumer information sheet. Treated wood products transferred to right-of-way landowners shall be moved off the right-of-way. Treated wood product scrap, poles, and crossarms that cannot be donated or reused shall be properly disposed in a landfill that accepts treated wood and has signed Western’s consumer information sheet receipt. Submit treated wood utility poles and crossarms consumer information receipts to the COR prior to submittal of final invoice.

SECTION 13.14--PREVENTION OF AIR POLLUTION

1. GENERAL: Ensure that construction activities and the operation of equipment are undertaken to reduce the emission of air pollutants. Submit a copy of permits for construction activities, if required (e.g., “non-attainment” areas, state implementation plans, or Class I air-sheds), from Federal, State, or local agencies to the COR 14 days prior to the start of work.

2. MACHINERY AIR EMISSIONS: The Contractor and subcontractor machinery shall have, and shall use the air emissions control devices required by Federal, State or Local Regulation or ordinance.

3. DUST ABATEMENT: Dust shall be controlled. Oil shall not be used as a dust suppressant. Dust suppressants shall be approved by the COR prior to use.

4. SULFUR HEXAFLUORIDE EMISSIONS:

    1) General: The Contractor shall record quantities of SF6, including:

        Nameplate capacity in pounds of SF_6 containing equipment.

        Record pounds of SF_6 stored in containers, before transferring into energized equipment.

        Record pounds of SF_6 left in containers, after transferring into energized equipment.

        Pounds of SF_6 purchased from equipment manufacturers or distributors.

        Pounds of SF_6 returned to suppliers.

        Scales used to weigh cylinders must be accurate to within +/- 2 pounds and must have current calibration sticker.

    2) CONTRACTOR FIELD QUALITY TESTING AND SF_6 HANDLING:

        The Contractor shall test all functions to verify correct operation and conduct a leak test. No SF6 gas leakage shall be allowed from any equipment or storage containers.

        Atmospheric venting of SF_6 gas is not allowed.

        The Contractor shall remove all empty SF6 gas cylinders and return to supplier.

(3) CERTIFICATES OF DISPOSAL AND RECEIPTS:

1) The Contractor can use Western's Reporting Form for reporting quantities listed above.

2) The Contractor shall provide receipts of SF6 gas returned to supplier.

3) The Contractor shall submit SF6 gas Reporting Forms and copies of receipts to the COR prior to submittal of final invoice.

SECTION 13.15--HANDLING AND MANAGEMENT OF ASBESTOS CONTAINING MATERIAL

1. GENERAL: Obtain the appropriate Federal, State, Tribal or local licenses or certifications prior to disturbing any regulated asbestos-containing material. If a building or portion of a building will be demolished or renovated, obtain an Asbestos Notice of and Permit for Demolition and Renovation from the State or Tribal Department of Environmental Quality, Division of Air Quality (or equivalent). The building(s) shall be inspected by a State-Certified or Tribal accepted Asbestos Building Inspector. The inspector shall certify the presence and condition of asbestos, or non-presence of asbestos, on site as directed on the State or Tribal Demolition and Renovation Notice/Permit. The inspections shall be performed and notifications shall be submitted whether asbestos is present or not. Submit a copy of licenses, certifications, Demolition and Renovation Notifications and Permits for asbestos work to the COR 14 days prior to work. Ensure: 1) worker and public safety requirements are fully implemented and 2) proper handling, transportation, and disposal of asbestos containing material.

2. TRANSPORTATION OF ASBESTOS WASTE: Comply with Department of Transportation, Environmental Protection Agency, and State and Local requirements when transporting asbestos wastes.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificates of disposal for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR prior to submittal of final invoice.

SECTION 13.16--MATERIAL WITH LEAD-BASED PAINT

1. GENERAL: Comply with all applicable Federal, State and local regulations concerning work with lead-based paint, disposal of material painted with lead-based paint, and management of these materials. OSHA and General Industry Standards apply to worker safety and right-to-know issues. Federal EPA and State agencies regulate waste disposal and air quality issues.

2. TRANSFER OF PROPERTY: If lead-based paint containing equipment or material is to be given away or sold for reuse, scrap, or reclaiming, the contractor shall provide a written notice to the recipient of the material stating that the material contains lead-based paint and the Hazardous Waste regulations may apply to the waste or the paint in some circumstances. The new owner must also be notified that they may be responsible for compliance with OSHA requirements if the material is to be cut, sanded, abraded, or stripped of paint. Submit a copy of lead paint notices with contractor and recipient signatures to the COR prior to submittal of final invoice.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificates of disposal for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR prior to submittal of final invoice.

SECTION 13.17--PREVENTION OF WATER POLLUTION

1. GENERAL: Ensure that surface and ground water is protected from pollution caused by construction activities and comply with applicable regulations and requirements. Ensure that streams, waterways and other courses are not obstructed or impaired unless the appropriate Federal, State or local permits have been obtained.

2. PERMITS: Ensure that:

   (1) A National Pollutant Discharge Elimination System (NPDES) permit is obtained from the US Environmental Protection Agency or State as appropriate if the disturbed construction area equals 1 acre or more. Contractor is responsible for preparation and implementation of the associated Storm Water Pollution Prevention Plan (SWPPP). Disturbed areas include staging, parking, fueling, stockpiling, and any other construction related activities. Refer to www.epa.gov/npdes/stormwater for directions and forms.

   (2) A dewatering permit is obtained from the appropriate agency if required for construction dewatering activities.

   (3) Copies of permits and plans, approved by the appropriate regulating agencies, are submitted to the COR 14 days prior to start of work.

3. EXCAVATED MATERIAL AND OTHER CONTAMINANT SOURCES: Control runoff from excavated areas and piles of excavated material, construction material or wastes (to include truck washing and concrete wastes), and chemical products such as oil, grease, solvents, fuels, pesticides, and pole treatment compounds. Excavated material or other construction material shall not be stockpiled or deposited near or on streambanks, lake shorelines, ditches, irrigation canals, or other areas where run-off could impact the environment.

4. MANAGEMENT OF WASTE CONCRETE OR WASHING OF CONCRETE TRUCKS: Do not permit the washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water. Concrete wastes shall be disposed in accordance with all Federal, State, and local regulations. Concrete wastes shall not be disposed of on any Western property, right-of-way, or easement; or on any streets, roads, or property without the owner's consent.

5. STREAM CROSSINGS: Crossing of any stream or other waterway shall be done in compliance with Federal, State, and local regulations. Crossing of some waterways may be prohibited by landowners, Federal or State agencies or require permits.

SECTION 13.18--TESTING, DRAINING, REMOVAL, AND DISPOSAL OF OIL-FILLED ELECTRICAL EQUIPMENT

1. SAMPLING AND TESTING OF INSULATING OIL FOR PCB CONTENT: Sample and analyze the oil of electrical equipment (which includes storage tanks) for PCB's. Use analytical methods approved by EPA and applicable State regulations. Decontaminate sampling equipment according to documented good laboratory practices (these can be contractor developed or EPA standards). Use only laboratories approved by Western. The COR will furnish a list of approved laboratories.

2. PCB TEST REPORT: Provide PCB test reports that contain the information below for disposing of oil-filled electrical equipment. Submit the PCB test report for COR approval prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

   - Name and address of the laboratory
   - Description of the electrical equipment (e.g. transformer, breaker)

- Serial number for the electrical equipment.
- Date sampled
- Date tested
- PCB contents in parts per million (ppm)
- Unique identification number of container into which the oil was drained (i.e., number of drum, tank, tanker, etc.)

3. OIL CONTAINING PCB: Comply with the Federal regulations pertaining to PCBs found at Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. REMOVAL AND DISPOSAL OF INSULATING OIL AND OIL-FILLED ELECTRICAL EQUIPMENT: Once the PCB content of the oil has been identified from laboratory results, the oil shall be transported and disposed, recycled, or reprocessed according to 40 CFR 761 (if applicable), Resource Conservation and Recovery Act (RCRA) “used oil”, and other applicable regulations. Used oil may be transported only by EPA-registered used oil transporters. The oil must be stored in containers that are labeled “Used Oil.” Use only transporters and disposal sites approved by Western.

5. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed to the COR prior to submittal of final invoice.

SECTION 13.19--REMOVAL OF OIL-CONTAMINATED MATERIAL

1. GENERAL: Removing oil-contaminated material includes excavating, stockpiling, testing, transporting, cleaning, and disposing of these material. Personnel working with PCBs shall be trained in accordance with OSHA requirements. Submit employee training documentation records to the COR 14 days prior to the start of work.

2. CLEANUP WORK MANAGEMENT PLAN: Provide a Cleanup Work Management Plan that has been approved by applicable Federal, State, or Local environmental regulation agencies. Submit the plan to the COR for review and comment 14 days prior to the start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. The plan shall address on-site excavation of contaminated soil and debris and include the following:

   - Identification of contaminants and areas to be excavated
   - Method of excavation
   - Level of personnel/subcontractor training
   - Safety and health provisions
   - Sampling requirements including quality control, laboratory to be used
   - Management of excavated soils and debris
   - Disposal methods, including transportation to disposal

3. EXCAVATION AND CLEANUP: Comply with the requirements of Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. TEMPORARY STOCKPILING: Excavated material, stockpiled on site during construction, shall be stored on heavy plastic and covered to prevent wind and rain erosion at a location designated by the COR.

5. SAMPLING AND TESTING: Sample contaminated debris and areas of excavation to ensure that contamination is removed. Use personnel with experience in sampling and, in particular, with

experience in PCB cleanup if PCBs are involved. Use analytical methods approved by EPA and applicable State regulations.

6. TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIAL: The Contractor shall be responsible and liable for the proper loading, transportation, and disposal of contaminated material according to Federal, State, and local requirements. Use only transporters and disposal sites approved by Western.

7. POST CLEANUP REPORT: Provide a Post-Cleanup Report that describes the cleanup of contaminated soils and debris. Submit the report to the COR prior to submittal of final invoice. The report shall contain the following information:

   - Site map showing the areas cleaned
   - Description of the operations involved in excavating, storing, sampling, and testing, and disposal
   - Sampling and analysis results including 1) Name and address of the laboratory, 2) sample locations, 3) sample dates, 4) analysis dates, 5) contents of contaminant (e.g. PCB or total petroleum hydrocarbons) in parts per million (ppm)
   - Certification by the Contractor that the cleanup requirements were met
   - Copies of any manifests, bills of lading, and disposal certificates
   - Copies of correspondence with regulatory agencies that support completion of the cleanup

SECTION 13.20—CONSERVATION OF BIOLOGICAL RESOURCES

1. GENERAL: Federal law prohibits the “take” of endangered, threatened, proposed or candidate wildlife and plants, and destruction or adverse modification of designated Critical Habitat. Federal law also prohibits the “take” of birds protected by the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. “Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct with a protected animal or plant or any part thereof, or attempt to do any of those things without a permit from U.S. Fish and Wildlife Service. The Contractor will take precautions to avoid harming other wildlife species. Contractor shall restrict all ground disturbing activities to areas that have been surveyed by Western for natural resources and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.

2. KNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: Following issuance of the notice to proceed, and prior to the start of construction, Western will provide training to all contractor and subcontractor personnel and others involved in the construction activity if there is a known occurrence of protected species or habitat in the construction area. Untrained personnel shall not be allowed in the construction area. Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These sensitive areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground by Western. If access is absolutely necessary, the contractor shall first obtain written permission from the COR, noting that a Western and/or other Federal or state government or tribal agency biologist may be required to accompany personnel and equipment. Ground markings shall be maintained through the duration of the contract. Western will remove the markings during or following final inspection of the project.

3. UNKNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: If evidence of a protected species is found in the project area, the contractor shall immediately notify the COR and provide the location and nature of the findings. The contractor shall stop all activity within 200 feet of the protected species or habitat and not proceed until directed to do so by the COR.

Appendix G

Paleontological Resources Report

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd., Pasadena, CA
91107-3414
(626) 578-0119

September 12, 2014

Mr. Tom Murphy
Vice President
Aspen Environmental Group
8801 Folsom Blvd., Suite 290
Sacramento, CA 95826

RE: Paleontological Resource Overview of the San Luis Transmission Project, Alameda, San Joaquin, Stanislaus, and Merced Counties, California

Dear Mr. Murphy:

At your request, on behalf of Western Area Power Administration (Western), Applied EarthWorks, Inc. (*Æ*) has performed a preliminary assessment of the paleontological resource setting of the proposed San Luis Transmission Project (Project) within the counties of Alameda, San Joaquin, Stanislaus, and Merced. The scope of work included a museum records search and paleontologic/geologic literature review of the proposed Project area. This letter serves as a summary of our findings.

PROJECT DESCRIPTION

Western proposes to construct, own, operate, and maintain a new 500-kilovolt (kV) transmission line from the Tracy to Los Banos Substations (62 miles in length), a 70-kV transmission line between the San Luis and O'Neill Substations (5 miles), a 230-kV transmission line between the San Luis and Los Banos Substations (3 miles), and a 230-kV transmission line between the San Luis and Dos Amigos Substations (18 miles). The transmission line will be located along the eastern flank of the Diablo Range and western Central Valley, roughly parallel to Interstate 5. Western will also consider the following corridor alternatives: Patterson Pass to Horseshoe Road 500-kV line (50 miles), West of Cemetery 500-kV line (7 miles), West of O'Neill Forebay 70-kV line (7 miles), Los Banos to Dos Amigos 230-kV line (6 miles), and Jasper Sears Road 230-kV line (14 miles). The underlying geology of the alternatives was considered under the umbrella of the proposed Project for this resource assessment. The proposed Project is located on land owned by the Bureau of Reclamation (USBR), California Department of Fish and Wildlife, California Department of Parks and Recreation, and privately-held land. Additional Project components would include construction of breaker terminal bays for the Tracy, San Luis, Las Banos, and Dos Amigos Substations, as well as associated facilities, access roads, and improvements. The proposed Project is intended to minimize costs and improve power delivery associated with the San Luis unit.

REGULATORY CONTEXT

Federal

Paleontological resources (i.e., fossils) are the prehistoric remains of once-living organisms and are considered to be nonrenewable scientific resources. As such, paleontological resources are

afforded protection under the various federal laws and regulations including the Antiquities Act of 1906, the Federal-Aid Highway Act of 1935, the National Environmental Policy Act (NEPA) of 1969, the Federal Land Policy and Management Act of 1976, and Title 43 of the Code of Federal Regulations, among others. Additionally, the Paleontological Resources Protection Act (PRPA) was recently enacted as a result of the passage of the Omnibus Public Lands Management Act of 2009. The PRPA requires federal land management agencies to manage and protect paleontological resources and affirms the authority of existing policies already in place. Federal laws and regulations apply when projects are located on federal lands or federally managed lands, or when they are federally funded. Portions of the proposed Project area traverse lands managed by the USBR and other federal agencies; therefore, federal laws will apply.

State

Paleontological resources are also protected under various state and local laws and regulations including the California Environmental Quality Act (CEQA). Specifically, CEQA (Public Resources Code [PRC] 21000–21889) encourages the protection of all aspects of the environment by requiring state and local agencies to prepare multidisciplinary analyses of the environmental impacts of a proposed project, and to make decisions based on the findings of those analyses.

The procedures, types of activities, persons, and public agencies required to comply with CEQA are defined in the Guidelines for the Implementation of the California Environmental Quality Act (CEQA Guidelines; Title 14, California Code of Regulations [CCR], Chapter 3, Section 15000 et seq.). These guidelines define a historical resource as any object or site that "has yielded or may be likely to yield information important in prehistory" (14 CCR 15064.5[a][3][D]), which is typically interpreted as including fossil materials and other paleontological resources (Association of Environmental Professionals [AEP] 2012). More specifically, destruction of a unique paleontological resource or site or unique geologic feature constitutes a significant impact under CEQA (CEQA Guidelines, Appendix G). CEQA does not provide an explicit definition of a "unique paleontological resource," but a definition is implied by comparable language within the act relating to archeological resources (PRC 21083.2[g]): "An artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it . . . contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information." One of the questions listed in the Environmental Checklist Form (CEQA Guidelines, Appendix G, Section V[c]) is: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

Treatment of paleontological resources under CEQA is generally similar to treatment of cultural resources, requiring evaluation of resources in the project; assessment of potential impacts on significant or unique resources; and development of mitigation measures for potentially significant impacts, which may include avoidance, monitoring, or data recovery excavation.

Additionally, PRC 5097.5 affirms that no person shall willingly or knowingly excavate, remove, or otherwise destroy a vertebrate paleontological site or paleontological feature without the express permission of the overseeing public land agency. A violation of this code is a misdemeanor, punishable by a fine not exceeding ten thousand dollars ($10,000), or by

imprisonment in a county jail not to exceed 1 year, or by both. The code further states under PRC 30244 that any development that would adversely impact paleontological resources shall require reasonable mitigation. These regulations apply to projects located on land owned by or under the jurisdiction of the state or any city, county, district, or other public agency.

Local

Alameda, Stanislaus, San Joaquin, and Merced Counties do not have mitigation requirements that specifically address potential adverse impacts to paleontological resources.

THRESHOLDS FOR DETERMINING SIGNIFICANCE

According to CEQA, the threshold of significance for a negative impact to paleontological resources is reached when a project is determined to disturb or destroy a significant paleontological resource. Significant paleontological resources are defined by the Society of Vertebrate Paleontology (SVP) (2010) as "identifiable" vertebrate fossils, uncommon invertebrate, plant, and trace fossils that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, or biochronological data. These data are important because they are used to examine evolutionary relationships, provide insight on the development of and interaction between biological communities, establish time scales for geologic studies, and for many other scientific purposes (Scott and Springer 2003; SVP 2010).

In general, the Bureau of Land Management (BLM) guidelines are useful for the management of paleontological resources on certain federally-managed or federally-owned land. The BLM defines a significant paleontological resource as follows:

> Any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be scientifically important because it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has identified educational or recreational value. Paleontological resources that may be considered to not have paleontological significance include those that lack provenience or context, lack physical integrity because of decay or natural erosion, or that are overly redundant or are otherwise not useful for research [BLM 2008:1-18].

METHODOLOGY

To determine whether or not fossil localities have been previously discovered within a project area or a particular rock unit, a search of pertinent local and regional museum repositories for paleontological localities within and nearby the area of question is performed. For the proposed Project area, a museum records search was performed utilizing the University of California Museum of Paleontology's (UCMP's) online database, which contains paleontological records for Alameda, San Joaquin, Stanislaus, and Merced Counties. The records review was supplemented by a literature and geologic map review to determine the geologic setting and identify known significant paleontological localities in the area.

REGIONAL GEOLOGY

The proposed Project area is situated within the Coast Ranges and Great Valley geomorphic provinces of California (Norris and Webb 1976). A geomorphic province is a region of unique topography and geology that is readily distinguished from other regions based on its landforms and diastrophic history. The Coast Ranges extend about 600 miles from the Oregon border south to the Santa Ynez River in Santa Barbara County and are characterized by numerous north-south–trending peaks and valleys that range in elevation from approximately 500 feet above mean sea level (amsl) to 7,581 feet amsl at the highest summit (Norris and Webb 1976). The width of the range averages 50 miles, and it is bounded on the west by the Pacific Ocean and to the east by the Great Valley geomorphic province; a north-northwest–trending asymmetric structural trough roughly 400 miles long and 50 miles wide (Bartow and Nilsen 1990).

The geology of the Coast Ranges and Central Valley is exceptionally diverse. Although their geomorphological differences are distinct, the two provinces share a common geologic history. The region of the present-day Coast Ranges and Great Valley was covered by marine waters through the Mesozoic and into the Cenozoic (Bartow and Nilsen 1990). During this time, forearc (i.e., the deep marine region between a volcanic arc and the associated subduction zone) marine and nonmarine shale, sandstone, and conglomerate of the Cretaceous Central Valley Sequence were deposited coeval with the accretion of the Franciscan Assemblage (Bartow and Nilsen 1990). Into the late Mesozoic and much of the Cenozoic, unconformable Paleocene to Pliocene marine continental shelf sedimentary rocks were deposited above the Great Valley Sequence within the actively subsiding Central Valley region (Barron 1989; Graymer et al. 1996; Harden 1998). As of the Late Miocene to the Late Pliocene, most of the marine waters in the Great Valley were drained and an orogenic (i.e., mountain-building) episode occurred in the vicinity of the present-day Coast Ranges, resulting in their uplift above sea level (Weissmann et al. 2005). Subsequently, from the Late Pliocene to Holocene, extensive deposits of terrestrial material, including alluvial fans and fluvial sediments, were deposited in the Great Valley and southern Coast Ranges (Norris and Webb 1976). Tectonic activity and extensive faulting continued to occur during the Quaternary period, further uplifting and deforming the Coast Ranges.

The majority of the proposed Project area is situated on the eastern flank of the Diablo Range within the Coast Ranges geomorphic province. The Diablo Range extends approximately 200 miles from Contra Costa County south to Monterey County, and generally consists of rolling hills and grasslands (Norris and Webb 1976). Structurally, the Diablo Range is characterized by anticlinal folds orientated en echelon (i.e., a stepped pattern consisting of parallel structures oblique to the trend), separated by synclinal folds that contain younger sedimentary rocks (Fossen 2010; Norris and Webb 1976). In the vicinity of the proposed Project area, the Diablo Range is highly faulted and transected by many major active or recently active faults, including the northwest-trending Tesla-Ortigalita Fault Zone and the Greenville strike-slip fault (Graymer et al. 1996).

PROPOSED PROJECT AREA GEOLOGY AND PALEONTOLOGY

The proposed Project area is mapped at a scale of 1:24,000 by a series of geologic maps authored by Thomas W. Dibblee Jr. and John A. Minch (2006a-c, 2007a-g). According to these published maps, the proposed Project area is underlain by Cretaceous to Quaternary age terrestrial and marine sedimentary deposits. The lithology, stratigraphy, and paleontology of these units are described in the following sections.

The Cretaceous Great Valley Sequence: Panoche Formation and Moreno Formation

The Panoche Formation and Moreno Formation are members of the Great Valley Sequence, which is extensively exposed throughout the proposed Project area. The Great Valley Sequence records a thick (10,000- to 30,000-foot) accumulation of Jurassic to Paleogene marine mudstone and sandstone deposited within a forearc basin flanked by the Sierra Nevada Batholith to the east and the Franciscan Complex to the west (Harden 1998). The lithology of the Great Valley Sequence reflects the evolution of the Sierran magmatic arc and the unroofing of the Sierran plutons (Bartow and Nilsen 1990). In the eastern Diablo Range, the Cretaceous Panoche Formation rests unconformably on the Coast Range ophiolite and represents the base of the Great Valley Sequence. The Panoche Formation is up to 3,000 feet thick and consists of laterally variable deposits of mudstone and siltstone beds with local sandstone and boulder conglomerate lenses. The unit coarsens upwards into a fine- to medium-grained quartzo-feldspathic sandstone-rich deposit, indicative of a regression sequence (Dibblee and Minch 2006a-c; 2007a-g). The Panoche Formation is light gray to light brown in color, moderately to well-bedded, and well-indurated. The overlying Moreno Formation is up to 1,300 feet thick and was deposited conformably on the Panoche Formation during the Late Cretaceous to Paleocene epochs (Throckmorton 1988). The Moreno Formation consists of fine-grained sediments and is composed of commonly laminated, gray to brown micaceous shale with subordinate selenite gypsum, limestone lenses, and fine- to medium-grained grayish-tan arkose (Throckmorton 1988). The Panoche and Moreno Formations were originally defined by Anderson and Pack (1915) for their type section in the Panoche Hills and are continuously exposed for at least 75 miles throughout the eastern Diablo Range. Sedimentation of the Panoche and Moreno Formations occurred in a diverse marine environment; facies include shallow marine shelf, submarine slope, fluvio-deltaic, and deep-sea fan (Bartow and Nilsen, 1990). The Moreno Formation includes an occurrence of the K-P (Cretaceous-Paleogene) boundary; a chronostratigraphic boundary between the Mesozoic and Cenozoic Eras at 66 million years ago (Ma), during which a global mass extinction event occurred, including the disappearance of large reptiles (Bartow and Nilsen, 1990; Shulte et al. 2010).

An abundant Cretaceous age flora and fauna has been recorded within the deposits of the Great Valley Sequence (UCMP 2014). Numerous localities have been recorded within the Panoche and Moreno Formations, which have yielded marine and terrestrial fossils, including specimens of mollusk, foraminifera, diatoms, ammonite, shark, fish, amphibian, and large reptile, conifer wood, and the remains of flowering plants (BLM 2014; Elder and Miller 1993; Haggart and Ward 1984; UCMP online database 2014). The remains of several large marine reptiles have been recovered within the Moreno Formation from within the eastern Diablo Range, including *Plotosaurus bennisonii* (mosasaur), *P. tuckeri* (mosasaur), and *Plesiotylosaurus crassidens* (mosasaur), *Hydrotherosaurus alexandrae* (plesiosaur), *Fresnosaurus drescheri* (plesiosaur),

and *Aphrosaurus furlong* (plesiosaur), and *Saurolophus* sp. (hadrosaur; terrestrial dinosaur) (Paleobiology Database 2014). In the Panoche Hills, the nearly fully articulated holotype specimen of the plesiosaur *Morenosaurus stocki* was recovered from within the Moreno Formation. In addition, fossilized wood from the Moreno conifer (*Margeriella cretacea*) has been exceptionally well preserved within the Moreno Formation (BLM 2014). Fossilized plant remains recovered from within the Moreno Formation include taxa of *Palmoxylon* sp. (palm), *Ulminium mulleri* (elm), *U. pattersonensis* (elm), *Plataninium platanoides* (sycamore), *Plataninium californicum* (sycamore), *Magnolioxylon panochensis* (magnolia), and *Tetracentronites panochensis* (shrub) (BLM 2014). On the basis of sedimentological and stratigraphic field studies, Elder and Miller (1993) report that many of the macrofossils within the Great Valley Sequence were identified as nearshore fauna transported by turbidity currents into a deep marine environment. Numerous invertebrate remains have been preserved inside reworked sandy clasts within the fine-grained matrix of conglomerate beds. The sandy clasts and fossils are typically only slightly older than the finer matrix and were likely transported and reworked soon after original deposition and cementation.

Tesla Formation and Laguna Seca Formation

The Eocene Tesla Formation is exposed throughout the proposed Project area, where it is unconformable with the underlying Moreno Formation and overlying Domengine Formation (Bartow 1984, 1991; Dibblee and Minch 2006a-c, 2007a-g). The Tesla Formation is up to 675 feet thick near its type section and was first described by Anderson and Pack (1915) and later redescribed by Huey (1937) based on an exposure near the old coal-mining town of Tesla. The Tesla Formation consists of a light gray to light brown arkose, siltstone, claystone, brown carbonaceous shale, and coal deposits, which were mined during the 19th Century. Carbonaceous material and plant fragments are widespread within the siltstones and sandstones. Common sedimentary structures include trough and planar crossbeds, ripple laminations, cross laminations, and convolute bedding (Throckmorton 1988).

South of the San Luis reservoir, Dibblee and Minch (2006a-c, 2007a-g) map the Tesla Formation as the Laguna Seca Formation, to which they assign an older Paleocene to Eocene age. The provenance and depositional environment of the Laguna Seca Formation is comparable to the Tesla Formation and the two units share a similar lithology; however, their correlation is not certain (Throckmorton 1988). Exposures of the Laguna Seca Formation appear to be restricted to the area south of the San Luis Reservoir. The Laguna Seca Formation was named by Briggs (1953) for its type section near Laguna Seca Creek and is composed of well-lithified, light gray to tan, fine-grained arkosic sandstone and pebbly, grayish-yellow sandy conglomerate with interbedded gray argillaceous shale (Paleobiology Database 2014).

In addition to well-preserved plant material and burrows, the Tesla and Laguna Seca Formations have yielded several Paleocene to Eocene age invertebrate localities from paralic deposits near the proposed Project area (Throckmorton 1988; UCMP 2014). Brackish and shallow water marine fauna, including bivalve, gastropod, schaphopod (tusk shell), and coral have been recovered from the siltstone, sandstone, and mudstone beds (Paleobiology Database 2014).

Domengine Formation

The middle Eocene Domengine Formation is intermittently exposed throughout the proposed Project area where it unconformably overlies the Tesla Formation and Cretaceous rocks of the Franciscan Assemblage and Great Valley Sequence (Bartow 1991). The Domengine Formation records a marine transgression during the early Paleogene and was first described by Anderson and Pack (1905) for exposures north of Coalinga (National Geologic Map Database [NGMDB 2014]). The marine unit is extensively exposed throughout central California and is composed of massive, greenish-gray, medium-grained calcareous sandstone and pebble conglomerate. Green glauconitic sand, typically indicative of slow deposition in a continental shelf environment, is locally abundant within the Domengine Formation and is commonly associated with preserved mollusk shells (Pettijohn et al. 1987). The conglomerate beds consist of pebble to cobble size clasts of Franciscan detritus within a medium- to coarse-grained sandy matrix (Bartow 1991; Oakeshott 1958).

The Domengine Formation has yielded hundreds of gastropod and bivalve fossils characteristic of the Domengine west coast molluscan stage (late early Eocene through early middle Eocene) (Throckmorton 1988). In addition, the UCMP online database (2014) reports that at least one vertebrate locality has been recorded within the Domengine Formation within Fresno County, which yielded specimens of shark and bony fish.

Kreyenhagen Formation

The Eocene Kreyenhagen Formation conformably overlies the Domengine Formation and is discontinuously exposed throughout the eastern Diablo Range and proposed Project area (Bartow 1990; UCMP 2014). The Kreyenhagen Formation was defined by Anderson and Pack (1905) for its type section near Canoas Creek in southwestern Fresno County. The unit records a widespread marine transgression during the Eocene and consists of deep marine sediments composed of laminated white diatomaceous shale; porcelaneous mudstone; and brown argillaceous shale with subordinate interbeds of siltstone, limestone, and pebbly green sand (Bartow 1990; NGMDB 2014). In addition, the Kreyenhagen Formation underlies the Great Valley at depth and is a major source of oil and gas in the San Joaquin Valley (Blueford 1984). Over 400 invertebrate, plant, and microfossil localities have been recorded within the Kreyenhagen Formation in Stanislaus, Merced, Fresno, Contra Costa, Monterey, San Benito, Santa Clara, Kern, and Kings Counties. The localities yielded specimens of echinoderm, brachiopod, bivalve, gastropod, foraminifera, and diatom fossils. In addition, five vertebrate localities were recorded within Fresno County, which yielded unspecified vertebrate remains (UCMP 2014).

The San Pablo Group: the Briones Formation, Cierbo Formation, and Neroly Formation

The Miocene San Pablo Group is exposed in the proposed Project area and extends throughout Contra Costa, Alameda, Stanislaus, and Santa Clara Counties (Graymer et al. 1996). In the proposed Project area, the Briones Formation is conformably overlain by the Cierbo Formation and unconformably underlain by the Tesla Formation. The Briones Formation is the oldest member of the San Pablo Group, which includes the overlying Cierbo and Neroly formations (Carpenter et al. 1984; NGMDB 2014). The Briones Formation was first described by Lawton (1914) for its type section near present-day Briones Regional Park in Contra Costa County and

was later assigned to the San Pablo Group by Clark (1930), on the basis of stratigraphic and faunal correlation (Hall 1958; NGMDB 2014). The shallow marine deposit is up to 2,300 feet thick near its type section and consists of indistinctly bedded fine-grained quartz sandstone, lithic wacke, gray to brown conglomerate, interbedded silty claystone, and resistant shell conglomerate (Chetelat 1995; Graymer et al. 1996; NGMDB 2014). Thin interbeds of well-bedded indurated light gray sand and siltstone are locally present near its base. Conglomerate clasts include black and red chert, quartzite, andesite, argillite, siltstone, basalt, felsic tuff, and quartz grains (Graymer et al. 1996). The Briones Formation has yielded an abundant and diverse invertebrate fauna throughout Contra Costa, Alameda, Stanislaus, and Santa Clara Counties, including taxa of bivalve, gastropod, crustacean, echinoid, and brittle stars. In addition, the deposit has yielded numerous vertebrate localities, including specimens of large land mammals, reptiles, fish, birds, sharks, and mollusks (UCMP 2014). Within Alameda County, at least three localities have been reported from within the Briones Formation, which yielded several fossils of *Desmostylus hesperus* (extinct hippopotamus-like herbivorous mammal) from deposits near Pleasanton and San Jose, including a type specimen.

The Miocene Cierbo Formation was named by Clark (1921) for its type section near the Carquinez straits (NGMDB 2014). The Cierbo Formation consists of poorly to moderately consolidated white to pale yellow brown quartz sandstone interbedded with thin pebble conglomerate lenses and brown shale deposits (Carpenter et al. 1984). The lithology is fine- to coarse-grained, massive to thickly bedded, and moderately friable to indurated. The sandstone is locally crossbedded and is composed of quartz feldspar sand, lithic gravel, and biotite crystals (Barlock 1988). Limonite (an iron oxide-hydroxide mineral that forms due to secondary alteration), black chert, tuff deposits, and carboniferous shale appear locally. The Cierbo Formation is up to 650 feet thick and is mapped as a discontinuous exposure throughout the Coast Ranges, from Solano County in the north to Santa Barbara County in the south (Graymer et al. 1996; UCMP 2014). The fine to coarse lithology indicates a transitional depositional environment that ranged from nearshore to estuarine to terrestrial (Fox 1983). The Cierbo Formation has yielded abundant fossil specimens of Late Miocene invertebrate fauna, including bivalve (clam), gastropod (snail), echinoidea (sea urchin), and scleractinia (stony coral) (UCMP 2014). The Cierbo Formation is especially known for its abundant *Ostrea* (oyster), often found in the coarse sandstone deposits (Graymer et al. 1996). Additionally, the Cierbo Formation has yielded unnamed vertebrate fossils from within its coarse conglomeritic deposits in Contra Costa County (Fox 1984; UCMP 2014).

The Neroly Formation is the youngest member of the San Pablo Group and was first described by Clark and Woodford (1927) for exposures near Mount Diablo. The unit is up to 1,800 feet thick in the northern Diablo Range and is characterized by its distinctive blue-gray sandstone derived from the andesitic eruptions to the east within the Sierra Nevada (Bartow 1984; Throckmorton 1988). The medium-grained sandstone has a massive texture and is predominately composed of andesite fragments, quartz, feldspar, and mica minerals, and exhibits a local brown color. Subordinate lithology within the Neroly Formation includes blue-gray andesite-bearing pebble conglomerate and tuffaceous shale beds (Carpenter 1984). Sedimentation of the Neroly Formation occurred in a shelf to deltatic environment during the Late Miocene and numerous marine and terrestrial invertebrate, vertebrate, and plant fossils of have been recovered from within the Neroly Formation in Stanislaus and San Joaquin Counties (Graymer et al. 1996). Mammal remains of Clarendonian age (Middle to Late Miocene) have been well preserved

within the Neroly Formation. Recovered taxa include canid, *Martinogale alveodens* (primitive skunk), *Serridentinus productus* (proboscidean), antilocaprid, *Merycodus* (pronghorn), *Eucastor lecontei* (primitive beaver), and *Copemys barstowsensis* (primitive New World mouse) (Throckmorton 1988). Additional fossil remains recovered within the Neroly Formation include horse, ground squirrel, eagle ray, gastropod, bivalve, scaphopod, coral, crab, sea urchin, and plants (UCMP 2014).

Oro Loma Formation

The Miocene to Pliocene Oro Loma Formation is exposed within the eastern portion of the proposed Project area where it is unconformable with the underlying Neroly Formation and the overlying Tulare Formation. The Oro Loma Formation was originally defined by Briggs (1953) for its type section near Oro Loma Creek in the Laguna Seca Hills (Graymer et al. 1996; NGMDB 2014). In the vicinity of the Proposed Project area, Dibblee and Minch (2006a-c, 2007a-g) restrict the Oro Loma Formation to Alameda and San Joaquin Counties and refer to similar deposits in Stanislaus and Merced Counties as "unnamed non-marine deposits of Pliocene age." The two lithostratigraphic units are correlative and will be considered as the same unit for this report (Kelly and Stewart 2008). The Pliocene age deposits of the Oro Loma Formation are up to 300 feet thick near the type section and consist of unconsolidated to moderately consolidated red siltstone, sandstone, and pebble conglomerate interbedded with greenish-gray claystone. Local exposures of cross-bedded calcareous sandstone are common (Graymer et al. 1996; NGMDB 2014).

The Oro Loma Formation has yielded several fossil localities within the eastern Diablo Range (Kelly and Stewart 2008). Although the UCMP database only has one record for a vertebrate locality within Stanislaus County near the proposed Project area, the remains of several terrestrial mammals have been recovered in neighboring Fresno County. During excavations for a power line along Monocline Ridge in Fresno County, between Los Banos and Coalinga, five vertebrate localities (LACM 7664-7668) were identified within the Oro Loma Formation, which yielded four new vertebrate fossils assemblages of Middle to Late Miocene age (Clarendonian to Hemphillian North American Land Mammal Age [NALMA]). Recovered specimens include *Hipparion tehonense* (horse), *Neohipparion leptode* (horse), *Dinohippus* sp. (horse), and *Alforjas* sp. (camel) (Kelly and Stewart 2008; Paleobiology Database 2014).

Tulare Formation

The Late Pliocene to Early Pleistocene Tulare Formation is exposed in Stanislaus, San Joaquin, and Alameda Counties in the vicinity of the proposed Project area (Dibblee and Minch 2006a-c, 2007a-g). The Tulare Formation was defined by Woodring et al. (1940) for exposures in the Kettleman Hills near the old shoreline of Tulare Lake (NGMDB 2014). Near its type section, the Tulare Formation is conformable with the underlying Pliocene San Joaquin Formation; however, near the proposed Project area, the Tulare Formation unconformably overlies the Great Valley Sequence (Page 1983). The Tulare Formation consists of westward-thickening alluvial fan conglomerate, fluvial sandstone, and interbedded lacustrine siltstone and clay deposits, which drained from the Coast Ranges during the Pliocene to Early Pleistocene (Bartow 1990). Near the proposed Project area, the sediments of the Tulare Formation are moderately lithified and composed of thickly-bedded, white to tan marl, massive gray claystone, and local gypsum and

other fresh water evaporates (Dibblee and Minch 2006a-c, 2007a-g). The unit is approximately 1,700 to 3,500 feet thick and is intermittently exposed from the eastern flank of the Diablo Range to the center of the Great Valley, where it interfingers with the Sierran-fed Turlock Lake Formation (Bartow 1991).

Numerous vertebrate localities have been recovered from within the fine-grained sediments of the Tulare Formation within Alameda, San Joaquin, Kern, and Kings Counties, which yielded specimens of horse, cat, bird, dolphin, shark, fish, reptile, and rodent (UCMP 2014). In addition, Woodring et al. (1940) describes a large invertebrate fossil assemblage of freshwater clams and snails recovered from the Tulare Formation near the Kettleman Hills in Kings County (Page 1983). Further, according to the UCMP online database (2014), the remains of several well preserved plants, including taxa of *Sequoiadendron* sp. (giant sequoia), pine, manzanita, fir, and walnut, were recovered during excavations at the Turlock Walnut Energy Center in Stanislaus County.

Quaternary Older Alluvium

Quaternary alluvial deposits of Pleistocene age have proven to yield significant vertebrate fossil localities throughout Alameda, San Joaquin, Stanislaus, and Merced Counties. Pleistocene age alluvial fan and fluvial deposits are exposed in the eastern and northern portions of the proposed Project area. These deposits consist of unconsolidated coarse to fine sand and silt with abundant pebbles and cobbles, which drained from the Coast Ranges during the Quaternary period. On the eastern flank of the Diablo Range, the Pleistocene age sediments are typically elevated relative to younger alluvial deposits, with well developed soil and dissection by channels that are partially filled with Holocene age alluvium (Helley and Graymer 1997). The total thickness of the Pleistocene deposits varies locally, but is up to 150 feet thick in the vicinity of the proposed Project area (Barlock 1988). The Pleistocene age alluvial sediments have preserved a characteristic Ice Age vertebrate fauna of large land mammals, including specimens of ground sloth, mammoth, horse, bison, camel, tapir, ungulate, mastodon, rabbit, vole, and gopher. During excavations associated with the Delta-Mendota Canal in Alameda, San Joaquin, and Stanislaus Counties, at least 20 vertebrate localities were recorded, which yielded numerous specimens of mammals and birds. The depth of fossil recovery is unreported (UCMP 2014).

Quaternary Alluvium

Holocene age alluvial deposits are widely exposed in the proposed Project area (Dibblee and Minch 2006a-c, 2007a-g). The younger Quaternary deposits consist of alluvial gravel and sands that drained from neighboring highlands. Holocene deposits near the proposed Project area generally consist of alluvial fan facies comprised of unconsolidated brown to tan gravely sand and silt and fluvial facies of brown sand and silty clay (Helley and Graymer 1997). In addition, stream channel deposits composed of poorly to well-sorted sand, silt, gravel, and pebbles are exposed in active washes and embankments within the proposed Project area. Holocene deposits are generally considered too young to contain fossilized remains, but may shallowly overlie older, paleontologically sensitive deposits.

RECORDS SEARCH RESULTS

For this assessment, paleontological locality records maintained by the UCMP online database were reviewed to determine if any previously recorded paleontological resources occur within the proposed Project boundaries or vicinity. The UCMP does not provide specific location data within its online locality database; however, the names of the localities often describe the general area of their recovery. The search indicated that although there are no records for vertebrate fossil localities directly within the corridor of the proposed Project, at least 43 localities have been recovered from within Cretaceous to Pleistocene age deposits near the proposed Project area. The UCMP database contains five locality records for vertebrate fossil remains within the Late Cretaceous to Paleogene Moreno Formation, which yielded specimens of dinosaur, mosasaur, plesiosaur, and fish from Stanislaus and Merced Counties. Additional UCMP locality records for Cenozoic fauna include unspecified vertebrates recovered from within the Panoche Formation in Merced County. At least eight vertebrate localities have been recorded within the Miocene age deposits throughout Alameda, San Joaquin, and Stanislaus Counties, including one from within the Oro Loma Formation, four from within the Briones Formation, and three from the Neroly Formation. Recovered Miocene-age specimens include horse, *Desmostylus* sp. (hippopotamus-like mammal), tortoise, turtle, canid, and ungulate. Further, the Pliocene-Pleistocene Tulare Formation yielded several fish, bird, and terrestrial mammal specimens from four localities near California Aqueduct in the vicinity of the proposed Project area. Lastly, UCMP collections indicate that at least 26 vertebrate localities have been recorded within Quaternary age sedimentary deposits near the proposed Project area, which yielded specimens of mammoth, horse, bison, ground sloth, mastodon, tapir, rodent, bird, rabbit, and turtle. The UCMP online database also contains records for numerous invertebrate localities for the geologic units that underlie the proposed Project area. Although not typically significant, these invertebrate localities have yielded numerous fossils of bivalve, gastropod, cephalopod, and foraminifera, including several type specimens. Depth for each locality is unreported. The results of the museum records search are presented below in Table 1 (UCMP online database 2014).

Table 1
Vertebrate Localities Reported from within Geologic Units in the Vicinity of the Proposed Project Area in Alameda, San Joaquin, Stanislaus, and Merced Counties[a]

Locality No.	Geologic Unit	Age	Taxa
UCMP D715	Panoche Formation	Late Cretaceous	Unspecified vertebrates
UCMP V6418	Moreno Formation	Late Cretaceous to Paleogene	*Morenosaurus stocki* (plesiosaur), *Encodus ferox* (“saber-toothed” bony fish)
UCMP V67238	Moreno Formation	Late Cretaceous to Paleogene	Mosasauridae (mosasaur), Elasmosauridae (plesiosaur), Osteichthyes (bony fish)
UCMP V72116	Moreno Formation	Late Cretaceous to Paleogene	Unspecified vertebrates
UCMP V3622	Moreno Formation	Late Cretaceous to Paleogene	Hadrosaurinae (hadrosaurid dinosaur), *Plotosaurus tuckeri* (mosasaur)
UCMP V3718	Moreno Formation	Late Cretaceous to Paleogene	*P. bennisoni* (mosasaur)
UCMP V93153	Oro Loma Formation	Miocene	*Pliohippus* sp. (horse)
UCMP V3108	Briones Formation	Late Miocene	*Desmostylus* sp. (hippopotamus-like herbivorous mammal)

Table 1 (Continued)
Vertebrate Localities Reported from within Geologic Units in the Vicinity of the Proposed Project Area in Alameda, San Joaquin, Stanislaus, and Merced Counties[a]

Locality No.	Geologic Unit	Age	Taxa
UCMP V65415	Briones Formation	Late Miocene	*D. hesperus* (Type specimen)
UCMP V6534	Briones Formation	Late Miocene	*D. hesperus*
UCMP V4957	Briones Formation	Late Miocene	Cryptodira (suborder of tortoises and turtles)
UCMP V71106-V71107 (2)	Neroly Formation	Late Miocene	*Borophagus* sp. (canid), *Nannippus* sp. (extinct horse), *Capromeryx* sp. (small ungulate)
UCMP V94011	Neroly Formation	Late Miocene	Unspecified vertebrates
UCMP V7079-V7080 (2)	Tulare Formation	Pliocene to Pleistocene	*Orthodon microlepidotus* (Sacramento blackfish), *Acipenser* sp. (sturgeon), *Archoplites interruptus* (Sacramento perch), Actinopterygii (ray-finned fish), *Branta* sp. (black geese), Equidae (horse), rodent
UCMP V70122-V70123 (2)	Tulare Formation	Pliocene to Pleistocene	Osteichthyes
UCMP V5005	Unspecified Quaternary age deposit	Pleistocene	*Equus* sp. (horse)
UCMP V6808	Unspecified Quaternary age deposit	Pleistocene	*Equus* sp.
UCMP V93152	Unspecified Quaternary age deposit	Pleistocene	Leporidae (family of rabbits and hares)
UCMP V3823	Unspecified Quaternary age deposit	Pleistocene	Pilosa (order includes sloths and anteaters)
UCMP V4727-V4728, V4801-V4803, V4816-V4818, V4859-V4862, V69166 (13)	Unspecified Quaternary age deposit	Pleistocene	*Bison* sp., Elephantidae (mammoths and elephants), *Microtus* sp. (vole), *Mammuthus* sp. (mammoth), *Equus* sp., *Glossotherium* (Harlan's ground sloth), Camelidae (camel), *Tapirus merriami* (tapir)
UCMP V3315	Unspecified Quaternary age deposit	Pleistocene	*Camelops hesternus* (camel)
UCMP V66150	Unspecified Quaternary age deposit	Pleistocene	*Megalonyx jeffersonii (giant ground sloth)*
UCMP V4807-V4811, V4819 (6)	Unspecified Quaternary age deposit	Pleistocene	*Mammut* sp. (mastodon), *Thomomys* sp. (smooth-toothed pocket gopher), Equidae, *Bison* sp., Artiodactyla (even-toed ungulate)
UCMP V6321	Unspecified Quaternary age deposit	Pleistocene	Camelidae, *Equus* sp., Aves (bird), *Mammuthus columbi*

a - UCMP 2014.

FINDINGS AND RECOMMENDATIONS

Based on the literature review and museum records search results, the geologic units underlying the proposed Project area have a paleontological resource potential ranging from low to high in accordance with the SVP (2010) and BLM's (2008) Potential Fossil Yield Classification (PFYC) system. The Panoche, Moreno, Oro Loma, Briones, Neroly, and Tulare Formations, as well as the Quaternary older alluvium, are considered to have a high paleontological resource potential in accordance to SVP's tripartite sensitivity scale, equivalent to PFYC Class 4, because they have proven to yield vertebrate fossils near the proposed Project area and throughout California. Although the UCMP contains no vertebrate localities for the Kreyenhagen, Domengine, and Cierbo Formations within Alameda, San Joaquin, Stanislaus, or Merced Counties, these units have yielded intermittent vertebrate localities elsewhere in California; as such, they are assigned to PFYC Class 3 (moderate paleontological resource potential). The Tesla Formation and Laguna Seca Formations are assigned a low paleontological resource potential (PFYC Class 2); although they contain a number of invertebrate localities, they have not yielded significant vertebrate fossils. In addition, Holocene age alluvial deposits have a low paleontological resource potential recommendation (PFYC Class 2) because they are generally too young to preserve fossilized remains; however, these alluvial deposits may shallowly overlie older intact fine-grained Pleistocene-age sediments. Therefore, their paleontological resource potential is low to high, increasing with depth.

In general, the potential for a given project to result in negative impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project; thus, the higher the amount of ground disturbances within geological deposits with a known paleontological sensitivity, the greater the potential for negative impacts to paleontological resources. Since this Project entails construction of a new transmission line, new ground disturbances are anticipated. Consequently, the likelihood of impacting scientifically significant fossils because of Project development is high. Therefore, a qualified paleontologist should be retained to develop and implement a Paleontological Resource Mitigation Plan. The following mitigation measures have been developed in accordance with SVP and BLM guidelines; if implemented, these measures will satisfy the requirements of CEQA and NEPA. These measures have been used by professional paleontologists for many years and have proven to be effective in reducing or eliminating adverse impacts to paleontological resources as a result of private and public development projects throughout California and elsewhere.

Preconstruction Survey

It is recommended that a qualified paleontologist be retained to conduct a field reconnaissance survey of the Project area prior to any ground-disturbing activities. Any required permits should be obtained prior to the survey. The purpose of the field survey will be to visually inspect the ground surface for exposed fossils or traces thereof and to evaluate geologic exposures for their potential to contain preserved fossil material at the subsurface. Only Project areas classified as having a PFYC Class 3 or higher will be subject to a pedestrian walkover. Particular attention will be paid to rock outcrops, both inside and in the vicinity of the Project area, and any areas where geologic sediments are well exposed. Areas determined to have a PFYC Class 1 or 2, or areas that are heavily disturbed or otherwise obscured by heavy vegetation will not require a field survey.

All fossil occurrences observed during the course of fieldwork, significant or not, should be adequately documented and recorded at the time of discovery. The data collected for each fossil occurrence should include, at minimum, the following information: Universal Transverse Mercator (UTM) coordinates, approximate elevation, description of taxa, lithologic description, and stratigraphic context (if known). In addition, each locality should be photographically documented with a digital camera. If feasible, with prior consent of the landowner(s), all significant or potentially significant fossils should be collected at the time they are observed in the field. If left exposed to the elements, fossil materials are subject to erosion and weathering. If the fossil discovery is too large to collect during the survey (e.g., a dinosaur skeleton or bone bed) and requires a large-scale salvage effort, then it will be documented and a mitigation strategy will be devised pursuant to SVP (2010) guidelines.

Worker's Environmental Awareness Training

Prior to the start of the proposed Project activities, all field personnel will receive a worker's environmental awareness training module on paleontological resources. The training will provide a description of the fossil resources that may be encountered in the Project area, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist and on-site monitor(s). The training will be developed by the Project Paleontologist and may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.).

Paleontological Mitigation Monitoring

Prior to the commencement of ground-disturbing activities, a qualified and professional paleontologist will be retained to prepare and implement a Paleontological Resource Mitigation Plan for the proposed Project. Initially, full-time monitoring will be required during ground-disturbing activities in the areas of the Project with a recommended paleontological resource potential of Class 4 or higher (i.e., Panoche Formation, Moreno Formation, Oro Loma Formation, Briones Formation, Neroly Formation, Tulare Formation, and Quaternary older alluvium). Part-time monitoring or spot checking will occur in areas of the Project underlain by geologic units with a recommended paleontological resource potential of Class 3. In addition, spot checking will also occur in Project areas underlain by Quaternary alluvial deposits in order to determine if underlying sensitive geologic units are being impacted by construction, and at what depth.

Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected. All paleontological work on federally managed land must be conducted under the appropriate permit.

Monitoring should include matrix screening for the presence of microfossils, the frequency of which will be determined by the Project Paleontologist. Monitoring is largely a visual inspection of sediments; therefore, the most likely fossils to be observed will be macrofossils of vertebrates (bones, teeth, tusk) or invertebrates (shells). At the discretion of the Project Paleontologist, the monitor will periodically screen sediments to check for the presence of microfossils that can be

seen with the aid of a hand lens (i.e., microvertebrates). Should microvertebrate fossils be encountered during the screening process, then bulk matrix samples will be taken for processing off site. For each fossiliferous horizon or paleosol, a standard sample (4.0 cubic yards or 6,000 pounds) will be collected for subsequent wet-screening per SVP (2010) guidelines.

Fossil Preparation, Curation, and Reporting

Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped paleontology laboratory to a point ready for curation. Preparation will include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossils specimens will be identified to the lowest taxonomic level, cataloged, analyzed, and curated. The fossil specimens must be delivered to the accredited museum repository identified on the permit and receipt(s) of collections will be submitted to Western. This delivery should be made as soon as practical but no later than 60 days after all fieldwork is completed. The cost of curation is assessed by the repository and will be the responsibility of Western.

At the conclusion of laboratory work and museum curation, a Paleontological Mitigation Report will be prepared describing the results of the paleontological mitigation monitoring efforts associated with the Project. The report will include a summary of the field and laboratory methods, an overview of the Project area geology and paleontology, a specimen inventory of all taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, the signed receipt of confirmation of museum deposition, and recommendations. The report should be submitted to the designated repository, Western, and any other interested state or federal agencies involved within 45 days following completion of monitoring and laboratory work.

It has been a pleasure assisting you with this Project. If you have any questions, please do not hesitate to contact Jessica DeBusk at jdebusk@appliedearthworks.com or (626) 578-0119.

Sincerely,

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Appendix H

SHPO Correspondence

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NOV 3 2014

Ms. Carol Roland-Nawi, Ph.D.
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Ms. Roland-Nawi, Ph.D.:

The Western Area Power Administration (Western), Sierra Nevada Region (SNR), is a power marketing administration with the U.S. Department of Energy. SNR markets power in northern and central California and portions of Nevada to wholesale and Federal end-use customers such as towns, rural electric cooperatives, public utility and irrigation districts, Federal, state, and military agencies, Native American tribes, power marketers, and Bureau of Reclamation (Reclamation) water customers. Most power that SNR markets is generated by power plants owned and operated by Reclamation as part of the California Central Valley Project (CVP), including those at Shasta, Folsom, Trinity and New Melones dams. Marketing and ensuring the delivery and reliability of electrical resources to customers is SNR's primary function. In addition, Western operates and maintains 18 substations and 884 miles of 69- to 500-kilovolt (kV) CVP transmission lines.

In cooperation with Reclamation and the San Luis & Delta Mendota Water Authority (Authority) Western is in the very early planning stages of preparing a joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) document to consider and analyze the potential environmental impacts of a proposed new transmission line(s) construction project between Tracy and San Luis and/or Los Banos, California. The Proposed Project (Undertaking) is referred to as the San Luis Transmission Line Project (SLTP). The purpose of the Proposed SLTP Undertaking is to connect existing CVP facilities into Western's CVP transmission line system. For the purposes of compliance with NEPA and CEQA, Western and the Authority are joint lead agencies. Western is designated the lead federal agency for NEPA compliance and the Authority is the lead state agency for CEQA compliance. The resulting document will be a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR) scheduled to be finalized at the end of 2016. The first public draft of the EIS/EIR is scheduled to be completed February 2015.

At this time we are writing to initiate consultation with you pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 US Code §470, as amended 2006) and its implementing regulations, 36 CFR Part 800 *Protection of Historic Properties,* (as amended 8/5/2004), regarding the Proposed SLTP Undertaking. Pursuant to §800.2(a)(2), Western is

designated Lead Federal agency for the purposes of Section 106 consultation. The Proposed SLTP Undertaking requires the Authority under CEQA and the California Public Resource Code (PRC) §5024(f) and 5024.5 to provide notification and submit documentation to you regarding any potential adverse effects to state-owned historical resources or historical resources on or eligible for inclusion in the California Register of Historical Resources (CRHP). In order to reduce duplicatory consultation requirements between NHPA and CEQA for the same Undertaking, Western will be conducting and/or coordinating all required identification and evaluation steps in consultation with you to satisfy NHPA and CEQA requirements in cooperation with the Authority. Please let Western know if you have any objections or concerns regarding this approach.

1. Project Background

The San Luis Reservoir Unit (SLU), a water pumping and power generation plant located in Merced County, was authorized on June 3, 1960 under CVP, and included construction of needed transmission and distribution facilities. Western owns and operates most of the transmission lines constructed under the CVP and in addition has the statutory responsibility to make the necessary arrangements to deliver electrical transmission power to all federally authorized facilities constructed as part of CVP. Since 1965, the United States has had a contract with the Pacific Gas and Electric Company (PG&E) to transmit power between Western's Tracy Substation and SLU utilizing PG&E's own transmission/distribution systems. This contract expires in 2016 and will not be extended or replaced. As a result, transmission service is expected to be provided by the California Independent System Operator (CAISO) starting April 1, 2016 (moving Federal power through CAISO controlled grid to SLU generation loads). The cost to SLU users to receive this service from the CAISO is expected to increase by $10 million per year.

Reclamation owns, operates, and manages dams, power plants and canals in California that were constructed under CVP. Reclamation is also a water management agency and is the largest wholesaler of water in the country. Reclamation holds water contracts with their water customers. The Authority, established in 1992, consists of water agencies representing approximately 2,100,000 acres of 29 federal and exchange water service contractors within the western San Joaquin Valley, San Benito, and Santa Clara counties. As a Reclamation customer, the Authority operates and maintains certain Reclamation CVP facilities including SLU.

Reclamation's purpose and need of the Proposed SLTP Undertaking is to continue to economically pump, store, convey, and deliver federal water resources through the SLU when the current contract with PG&E expires. To meet this need, Reclamation requested Western to investigate various transmission service arrangements that would allow Reclamation to continue economic delivery of federal water when the current contract with PG&E expires. Reclamation submitted to Western a request for electrical transmission service to interconnect several key SLU facilities into Western's CVP transmission line system. Western must respond to Reclamation's transmission request consistent with Western's Open Access Transmission Tariff as well as other existing laws and statutory responsibilities.

Reclamation's water contractors have a direct interest in Western's transmission service arrangements to serve the SLU. The Authority must decide on how to participate in the proposed transmission of Federal power from Western's Tracy Substation to the SLU.

2. Description of the Undertaking

Under the Proposed SLTP Undertaking, Western would construct, own, operate, and maintain about 85 miles of new transmission lines that cross Alameda, San Joaquin, Stanislaus, and Merced counties along the foothills to the west of the San Joaquin Valley. Western would also upgrade or expand existing substations or construct two new substations to accommodate the terminations for these new transmission lines. New substations could be constructed adjacent to the existing Tracy and Los Banos substations. Enclosure 1, ***Cultural Resources Background and Field Strategy Report for the San Luis Transmission Project (SLTP), Alameda, San Joaquin, Stanislaus, and Merced Counties, California, June 2014*** provides you with an overview map of the Proposed SLTP Undertaking (*Figure 1-1).*

The Proposed SLTP Undertaking would consist of four new transmission line segments. For the purposes of NEPA/CEQA evaluation and analysis of the affected environment, Corridor Study Areas (CSA) ranging from 220 feet to 4,000 feet wide were established for all transmission line segments where a final transmission line right-of-way (ROW) would be considered. The CSA is wider than then what a required ROW would eventually be (125-200 feet width for 230 and 500-kV transmission lines) to allow flexibility in siting the transmission structures to minimize environmental impacts or to accommodate engineering constraints. Below are the proposed (Proposed Project Corridors) CSA routes. Much of the proposed transmission line corridors would follow existing high-voltage transmission line corridors in the vicinity.

- Tracy to Los Banos 500-kilovolt (kV) Corridor. A single-circuit 500-kV transmission line, about 62 miles long connecting the Tracy and Los Banos Substations.
- Los Banos to San Luis 230-kV Corridor. A 230-kV transmission line about 1.4 miles long connecting the San Luis and Los Banos Substations.
- San Luis to O'Neill 70-kV Corridor. A single-circuit 70-kV transmission line, about 5 miles long connecting the San Luis and O'Neill Substations.
- San Luis to Dos Amigos 230-kV Corridor. A 230-kV transmission line about 18 miles long connecting the San Luis and Dos Amigos Substations.

In addition to the Proposed Project corridors, a number of Alternative corridors are also being examined. For complete descriptions of the Proposed and Alternative corridors please refer again to enclosure 1, Section 1.0, pages 1-6.

The Proposed SLTP Undertaking would also include ancillary facilities, such as communication facilities for control and protection and improvements to existing access roads, construction of new permanent access roads, and temporary access roads. Construction staging areas and helicopter landing zones would also be required. Other activities would include, clearing the ROW of vegetation, excavation and grading for new pole structures, and stringing of conductor lines.

In accordance with §800.4 (a) and (b), we have initiated steps to define the APE for the SLTP Undertaking and to identify the presence of historic properties and historical resources within the APE.

3. Area of Potential Effects

The Area of Potential Effects (APE) for the Undertaking is defined in accordance with §800.16(d). For the purposes of §800.4, we are currently defining the potential direct effects (DE) to be all Proposed and Alternative CSA and all ancillary areas required for construction of the proposed transmission lines.

Potential indirect effects (IE) include visual and noise intrusions that could diminish the historic or aesthetic values of certain types of cultural resources within the purview of the proposed SLTP transmission lines. The APE for IE is defined as extending up to 1/4 miles outside of the CSA. The CSA parallel several existing transmission line structures with a few exceptions to short segments of Alternatives corridors. Enclosure 2 describes the types of surface and subsurface impacts associated with the construction of the Proposed SLTP Undertaking.

4. IDENTIFICATION OF HISTORIC PROPERTIES AND HISTORICAL RESOURCES WITHIN THE APE.

Native American Consultation

By letter of January 22, 2014, we contacted the Native American Heritage Commission (NAHC) and requested a current contact list of all Native American groups who might have an interest in the proposed SLTP project area (enclosure 3). We also requested that they conduct a search of their Sacred Lands file to determine the presence of any sacred sites or traditional cultural properties and landscapes within the APE. By letter of January 29, 2014, NAHC responded with a list of contacts and a negative result of the Sacred Lands search (enclosure 4). By letter of March 3, 2014, we contacted all Native American groups on the list provided by the NAHC (enclosure 5). As of this time we have received one response from the California Valley Miwok Tribe who states they have no issues, but request to be notified in the event of any inadvertent discoveries associated with Miwok artifacts and/or human remains (enclosure 6). Another individual, Mr. Don Hankins contacted us with suggestions for mitigation measures should the Proposed SLTP Project impact sites or areas important to Native Americans, specifically, the Miwok Tribe. We will continue to keep all of the Tribal contacts informed of any changes to the Proposed SLTP Undertaking and will continue to be responsive to any future requests for consultation. The APE for the Proposed SLTP Undertaking does not cross tribal reservations or Native American Trust territories. This consultation complies with California State policy as defined in Executive Order B-10-11.

Class I Inventory Archival and Records Search

In further efforts to identify potential historic properties within the APE, Western has completed an archival records check at the appropriate California Information Centers of the California Historical Resources Information System (CHRIS). This report entitled, ***Cultural Resources Background and Field Strategy Report for the San Luis Transmission Project (SLTP), Alameda, San Joaquin, Stanislaus, and Merced Counties, California, June 2014*** is enclosed for your review along with the appendices (enclosure 1). Both a hard copy and electronic copy are provided. In sum, the report presents the environmental and cultural setting of the Proposed SLTP Undertaking and provides the results of a Class I Inventory of previous studies and known cultural resources within the Proposed Project Corridors and Alternative corridors, and a one-quarter mile radius outside of the corridors as defined in the APE.

The report includes six sections as well as a series of appendices. Sections include an introduction to the SLTP, specifically its geographic and regulatory setting; a brief overview of

the environmental setting of the Class I Inventory Study Area; and an outline of the cultural history of the Class I Inventory Study Area. The results of the archival and records search are presented, followed by a discussion of factors likely to influence future field investigations. Maps and tables depicting the locations of known cultural resources and previous cultural resource studies are included as appendices, along with copies of confidential cultural resource records and full or partial copies of previous cultural resource studies (electronic copies only provided). Finally, based on the results of the Class I Inventory, recommendations and conclusions are presented regarding implementation of a Class III field inventory (pedestrian survey) as are maps of recommended field inventory areas. Appendices A, B, and C are bound together in a separate document with enclosure 1 and include:

- **Appendix A**: Maps of known cultural resources and previous cultural resource study locations
- **Appendix B**: Tables of previous cultural resource studies and known cultural resources
- **Appendix C**: Recommended field inventory areas
- **Appendix D:** DPR forms 523 for known cultural resources within the Class I inventory study area (**electronic copy only**)
- **Appendix E**: Reports or report sections for previously conducted studies within the Class I inventory study area (**electronic copy only**)

The Class I Inventory shows that a total of 117 previous cultural resource studies have been undertaken within this propose Undertaking's APE. The studies encompassed a wide array of investigations, including archival and records search reviews; broad or area-specific effects assessments or environmental impact documents; opportunistic or reconnaissance level surveys involving limited or unsystematic pedestrian survey; "windshield surveys" involving no pedestrian inventory; regional overviews or overview studies focused on particular resource types such as rock art sites or historic period structures; excavation, monitoring, and/or evaluation reports; and studies involving intensive pedestrian inventories, typically conducted in conjunction with archival and records search reviews and/or reconnaissance level surveys.
A total of 54 known cultural resources have been formally recorded within the Class I Inventory APE. Those resources include 11 prehistoric sites; seven prehistoric isolated finds; 11 historic period sites; 21 historic period resources encompassing buildings, structures, or objects; two historic period districts; one California Historical Landmark (CHL); and one multi-component resource. Twenty of the 54 known cultural resources within the Class I Inventory Study Area intersect the Proposed Project corridor and 17 intersect the Alternative corridor. In addition to formally recorded cultural resources, six additional resources were noted in previous studies but not formally documented, including two isolated finds, two segments of the Delta-Mendota Canal, one Western Pacific Railroad alignment, a possible historic period foundation, and a possible prehistoric quartzite cobble quarry. All but the isolated finds appeared to intersect the Proposed Project or Alternative corridors. Potential cultural resources were also noted through an examination of historic period maps. Those potential resources include three historic period railroad alignments as well as 36 buildings or structures. Though none of those resources have been formally recorded, at least eight structures and all three railroad segments were noted within the Proposed Project or Alternative corridors and may be encountered during the course of a field inventory.

We are currently in the process of completing a Class III intensive pedestrian survey of the APE and will continue consultation with you regarding the results of the field investigations, NRHP and CRHR recommendations and the potential effects of the SLTP Undertaking on any historic properties and historical resources identified within the APE.

At this time, Western is requesting your comments and or concerns pursuant to §800.4 regarding our definition of the APE for the Proposed SLTP Undertaking and initial efforts to identify known cultural resources and potential historic properties or historical resources for the Proposed SLTP Undertaking.

Although Western is implementing steps to identify historic properties currently known, the exact physical locations of certain components, such as construction staging areas and access roads would not be identified until such time that a Record of Decision and a Notice of Determination for the EIS/EIR is made and pre-construction activities begin. The results of the environmental analysis for all affected resources could potentially have some impact on the current APE. In addition, most of the APE is on private property and Western does not have access to all portions of the proposed and alternative corridors at this time. Western would need to conduct cultural resource surveys as access is (or if is) granted. Final assessment of effects on all historic properties and historical resources would need to be deferred until all project components are finalized. Western would need to implement a phased identification and evaluation approach to fully identify historic properties and historical resources within the Proposed SLTP Undertaking's APE.

Western believes that a Programmatic Agreement (PA) pursuant to§800.4(b)(2) and §800.14(b)(ii)&(v) would be an appropriate procedure to fully implement our Section 106 responsibilities for this Proposed Undertaking and in conjunction with the EIS/EIR. The PA would stipulate Western's responsibilities regarding the level of effort to continue to identify historic properties and historical resources within the APE for the entire Proposed Undertaking, determine the Proposed Undertaking's effect on historic properties and historical resources, and the appropriate mitigation measures to avoid or lessen potential adverse effects to such properties and resources prior to the implementation of the Proposed Undertaking. The PA would also assist with Western's Section 106 responsibilities regarding any current unforeseen engineering design changes or access issues that may require altering the APE as well as stipulating Western's responsibilities under 800.13(a)(1), Post Review Discoveries for the duration of the Proposed Project.

Western would prefer to meet with you regarding the Proposed SLTP Undertaking and discuss our determination of a PA to satisfy our Section 106 responsibilities. Please contact me at our SNR office in Folsom at (916) 353-4035 or email at waldear@wapa.gov.

For more information regarding the proposed project you can visit: http//sltpeis-eir.com. Your continued assistance and cooperation are appreciated.

Sincerely,

Cherie Johnston-Waldear

Cherie Johnston-Waldear
Regional Preservation Official
Sierra Nevada Region

6 Enclosures

cc:
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Appendix I

Air Quality Emission Calculations

Appendix I - Air Quality Emission Calculations

AQ-GHG Emissions: Overview and Summary Totals

		Emission Rates						GWP AR4:	25	298
		NOx	VOC	PM10	PM2.5	CO	SOx	CO2	CH4	N2O
		(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(MTCO2e)	(MTCO2e)	(MTCO2e)
Emissions by year from CalEEMod v 2013.2.2	Year 1 (2018) : Transmission ROW : Subtotal	11.0	0.6	27.0	3.9	13.9	0.03	2,242.7	0.5	0.0
Emissions by year from CalEEMod v 2013.2.2	Year 1 (2018) : Substations : Subtotal	15.2	0.9	2.9	1.8	19.8	0.04	3,141.1	0.8	0.0
	Year 2 (2019) : Transmission ROW : Subtotal	13.2	0.8	36.4	5.2	16.8	0.03	2,701.9	0.6	0.0
	Year 2 (2019) : Substations : Subtotal	12.9	0.8	2.8	1.7	16.8	0.03	2,650.4	0.7	0.0
	Year 3 (2020) : Transmission ROW : Subtotal	3.9	0.2	9.7	1.4	4.9	0.01	810.9	0.2	0.0
	Helicopters : Subtotal	2.7	3.3	0.1	0.1	4.1	---	1,306.3	0.9	12.6
		NOx	**VOC**	**PM10**	**PM2.5**	**CO**	**SOx**	**CO2e**		
		(ton)	**(ton)**	**(ton)**	**(ton)**	**(ton)**	**(ton)**	**(MTCO2e)**		
	Year 1 : Subtotal	**26.2**	**1.6**	**29.9**	**5.6**	**33.7**	**0.07**	**5,385.1**		
	Year 2 : Subtotal	**26.1**	**1.6**	**39.2**	**6.8**	**33.6**	**0.06**	**5,353.6**		
	Year 3 : Subtotal	**6.6**	**3.5**	**9.8**	**1.5**	**9.0**	**0.01**	**2,130.9**		
	Total (Full Duration Construction)	**58.8**	**6.6**	**78.8**	**14.0**	**76.3**	**0.1**	**12,869.6**	---	---

Subtotal AQ-GHG : Construction Helicopter Activity

Helicopters

	Count	Power	Mean Op.	Mean Op.		Fuel Use per #		NOx	HCs	PM10	PM2.5	CO	SOx	CO2	CH4	N2O
	(# units)	(hp)	(%) Power	(hp)	(kg f/sec)	(kg f/hr)	(gal/hr)	(g/kg f)	(g/kg f)	(g/kg f)	(g/kg f)	(g/kg f)	(g/kg f)	(kg/gal)	(kg/gal)	(kg/gal)
Hughes/MD500 (SHP < 600)	1	420	0.80	336	3.119E-02	112.3	36.4	5.74	7.13	0.18	0.18	8.88	---	9.57	0.00027	0.00031

	Emission Rates								
	NOx	HCs	PM10	PM2.5	CO		CO2	CH4	N2O
	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	---	(lb/hr)	(lb/hr)	(lb/hr)
Hughes/MD500 (SHP < 600)	1.42	1.77	0.04	0.04	2.20	---	767.97	0.02	0.02

Overall Use/Activity			in service	NOx	HCs	PM10	PM2.5	CO		CO2	CH4	N2O
375	days		(hr per #)	(ton)	(ton)	(ton)	(ton)	(ton)	---	(MT)	(MT)	(MT)
10	hr/day	Helicopters : Subtotal	3750	2.7	3.3	0.1	0.1	4.1	---	1,306.3	0.0369	0.0423

Ref: Swiss Confederation, DETEC and FOCA "Guidance on the Determination of Helicopter Emissions", 2009
GHG Factors: http://www.eia.gov/oiaf/1605/coefficients.html
Jet fuel : 6.8 lb/gal

Appendix I - For Input to CalEEMod: Phasing and Typical Personnel and Equipment							2018	2018	2018	2019	2019	2019	2019	2020	2020
Activity	**Personnel / Typical Fleet**	**Typ Heavy Duty Equipment**	**Typ Haul Trips Daily**	**Sum Haul Trips**	**Start**	**Phasing Days**	**2Q**	**3Q**	**4Q**	**2019-1Q**	**2Q**	**3Q**	**4Q**	**2020-1Q**	**2Q**
Right-of-Way (access roads and vegetation clearing)	2 to 4 equipment operators	4 pcs	4	1,500	3/1/2018	375	X	X	X	X	X				
Excavation for foundations	4 to 8 laborers/equipment operators	8 pcs	8	3,000	6/1/2018	375		X	X	X	X	X			
Foundation installation (anchor bolt/rebar cages)	4 to 6 laborers/equipment operators and 3 to 5 ironworkers	12 pcs	20	7,500	6/1/2018	375		X	X	X	X	X			
Structure assembly and erection	4 to 6 linemen/laborers and crane operators	6 pcs	8	3,600	6/1/2018	450		X	X	X	X	X	X		
Helicopter use	1 pilot and 1 ground person fueler	[est 10 hr/day]			3/1/2019	375					X	X	X	X	X
Conductor stringing	20 to 25 linemen/groundmen	10 pcs	20	4,500	10/1/2019	225							X	X	X
Disturbance area restoration (Cleanup and Revegetation)	3 to 6 laborers	4 pcs	4	900	10/1/2019	225							X	X	X
Substation improvements and expansion	20 to 25 electricians, linemen, laborers, equipment, operators, and ironworkers	18 pcs	14	6,300	3/1/2018	450	X	X	X	X	X	X			
Substation construction (Tracy East and Los Banos West)	20 to 40 electricians, linemen, laborers, equipment, operators, and ironworkers	20 pcs	14	7,350	3/1/2018	525	X	X	X	X	X	X	X		