Wildfire and Fuels Technical Report

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1.0 INTRODUCTION

The City of Los Angeles Department of Water and Power (LADWP) is proposing the Barren Ridge Renewable Transmission Project (BRRTP or Project) to access clean, renewable resources in the Tehachapi Mountains and Mojave Desert areas, and to improve reliability and upgrade transmission capacity.

LADWP, the US Department of Agriculture, Forest Service (USFS or Forest Service) and the U.S Department of the Interior, Bureau of Land Management (BLM) are preparing a joint Environmental Impact Statement (EIS) / Environmental Impact Report (EIR) for the proposed BRRTP. LADWP is the California Environmental Quality Act (CEQA) Lead Agency, while the USFS and BLM are the federal Co-Lead Agencies under the National Environmental Policy Act (NEPA). An EIS/EIR is an informational disclosure document used to inform agency decision makers and the public of the potential significant environmental effects of a project, identify possible ways to eliminate or minimize the potential significant effects, and describe reasonable alternatives to the Proposed Action /Project.

This Wildfire and Fuels Technical Report is structured to assess potential risks related to the construction and operation of the Proposed Action or an Alternative within the assessment area. This report is focused solely on the Proposed Action and Alternatives that are physically proposed within the wildfire and fuels assessment area. Portions of the Proposed Action and/or Alternatives that lie outside the wildfire and fuels assessment area were excluded from the evaluations in this technical report.

This report on the Proposed Action and Alternatives is supported by empirical data, scientific literature, and collected field samples to determine potential wildfire risk. The Wildfire and Fuels Risk Assessment will discuss, illustrate, and analyze the potential wildfire risks that the proposed Project may have within the proposed Project area. The purpose of this Wildfire and Fuels Technical Report is to serve as the basis for the development of an EIS/EIR impact analysis for the lead agencies that will be carried forward for detailed consideration of the Proposed Action and Alternatives.

1.1 STUDY PERSONNEL

Tom Amesbury, Section Project Manager –
Mr. Amesbury is a Registered Professional Forester (#2253), licensed by the California Department of Forestry and Fire Protection. He was trained and served as an Interagency Firefighter dispatched out of the BLM Fire Center in Boise, Idaho. Mr. Amesbury was the principal author for the Wildfire and Fuels Section for the 2008 Sunrise Powerlink Project EIR/EIS. He has over 30 years experience in environmental project management and has completed numerous assessments for the permitting of natural resource and wildfire prevention projects in addition to rural community developments and other utility ROW projects. Mr. Amesbury is the Project Manager for the BRRTP Wildfire and Fuels Technical Report.

Ryan Willis, Project Level Forester and GIS Analyst –
Mr. Willis is a Registered Professional Forester (#2812), licensed by the California Department of Forestry and Fire Protection. He is a graduate of California State University, Humboldt with a BS degree in Forestry and minor in Environmental Ethics in 2001. He was the principal author for the EIR/EIS Wildfire and Fuels Section for the 2008 approved Sunrise Powerlink Project currently under construction by the San Diego Gas and Electric Company. He compiled field inventory results and data into GIS computer-analytical processes for the production of cartographic products, illustrations, and reports contained in this BRRTP Wildfire and Fuels Technical Report.

Eric Sutera, Forestry Field Technician –
Mr. Sutera trained and served the Oregon Department of Forestry as a Type 2 Firefighter, serving three seasons fighting fires in Oregon, Washington and Alaska. He is a graduate of Washington State
University, with a BS degree in Forestry Management in 2004. His work experience covers the Western United States including Washington, Oregon, and California. He is familiar with a wide range of natural resource inventories and has specialized in professional forestry inventory analysis, sustainable timber management, and inventory modeling for the past four years. He conducted field investigations, technical analysis, research, and writing for this BRRTP Wildfire and Fuels Technical Report.

Sara McBee, Staff Assistant –
Ms. McBee is a graduate of Florida State University in 2009, with a BS degree in Biology and a minor in Chemistry. She is U.S. Forest Service trained in the identification, biology and treatments of wildland invasive and noxious weeds. She conducted field investigations, technical analysis, research, and writing for this BRRTP Wildfire and Fuels Technical Report.

Christian Eggleton, GIS Analyst –
Mr. Eggleton graduated from UC Berkeley in 2008 and 2010 with a BA in Environmental Economics and Policy and Masters of City Planning. His thesis and professional work has involved field GIS data surveying and post-processing, modeling and analysis, and cartographic representation. His work experience also includes vegetation, biomass, and timber fuels inventory. He is currently pursuing an Associate Degree in Fire Ecology and is involved in the technical and geospatial analysis, research, and writing for the BRRTP Wildfire and Fuels Technical Report.

1.2 PROJECT DESCRIPTION
The BRRTP would be located in Kern and Los Angeles counties. As proposed by LADWP, it would be approximately 76 miles in length extending from the Barren Ridge Switching Station to Rinaldi Substation, and extending approximately 12 miles from the Castaic Power Plant to the proposed Haskell Canyon Switching Station. As shown in Figure 1-1, the proposed BRRTP would include the following:

1) Construction of approximately 61 miles of a new 230 kilovolt (kV) double-circuit transmission line from the LADWP Barren Ridge Switching Station to Haskell Canyon;
2) Addition of approximately 12 miles of a new 230 kV circuit on the existing double-circuit structures from Haskell Canyon to the Castaic Power Plant;
3) Reconductoring of approximately 76 miles of the existing Barren Ridge-Rinaldi (BR-RIN) 230 kV transmission line with larger capacity conductors between the Barren Ridge Switching Station and the Rinaldi Substation;
4) Construction of a new switching station in Haskell Canyon;
5) Expansion of the existing Barren Ridge Switching Station.
FIGURE 1-1. LADWP’S PROPOSED ACTION COMPONENTS
1.2.1. Construction of New 230 kV Double-Circuit Transmission Line

The proposed double-circuit 230 kV transmission line component of the BRRTP would consist of two alternating current (AC) circuits from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station in Haskell Canyon.

The proposed structures for the new transmission line would primarily be self-supporting double-circuit steel lattice towers fabricated from galvanized steel members, as shown on the left side of Figure 1-2. Depending on the environmental conditions of the surrounding terrain, the height of the proposed lattice structures would range from 110 to 195 feet, with an average tower-to-tower span of 1,000 to 1,100 feet. Appendix A lists the structure specifications for the number of structures per mile, average span length, and average heights for towers and components. Exact structure placement would be determined during engineering surveys and detailed design studies for the selected Alternative route following the Record of Decision (ROD) on the EIS/EIR. A variety of engineering, constructability, existing access, and environmental issues would be considered during detailed structure siting within the permitted ROW.

“Dead-end” towers of self-supporting, steel-lattice design would be required periodically to add longitudinal strength along the line. Dead-end towers would also be used at turn (angle) locations along the line, at heavily loaded tower locations, and at specific utility crossings (e.g., other transmission lines) for added safety. Dead-ended towers are of the same basic configuration as suspension towers (non-angle structures), the difference being in the tower “arms,” insulator systems, and tower weights.

**Figure 1-2. Types of Towers**

Self-supporting, tubular steel poles (TSP) have been proposed by LADWP as an available mitigation structure where appropriate to reduce potential impacts, such as conflicts with cultivation on agricultural lands. The TSPs can reduce impacts in some cases due to a smaller footprint than the proposed self-supporting steel lattice structures; however, more TSPs per mile are necessary due to a shorter average span between structures. The TSPs would have an average height range between 95 and 180 feet, depending on the conditions of the surrounding terrain, with an average tower-to-tower span of 700 to 800 feet. Refer to Figure 1-2 for an illustration of the double-circuit poles.
For the majority of the alignment, the two new 230 kV circuits would be placed on new double-circuit transmission towers, but for approximately 1.5 miles, the circuits would be placed on existing four-circuit structures that are located just north of the proposed Haskell Canyon Switching Station. Between where the existing BR-RIN crosses Dry Canyon to the intersection of the Castaic transmission lines, LADWP has existing four-circuit towers with three vacant positions. The existing towers would be utilized in this section for the proposed 230 kV double circuit transmission line instead of constructing new towers. See Figure 1-3 for the location and illustration of the existing four-circuit towers to be utilized.
Figure 1-3. Four-Circuit Towers To be Utilized
The self-supporting steel lattice structures and TSPs would utilize concrete foundations. Steel lattice structures would require four footings (one for each leg); TSPs would require single footings. Footings would be steel-reinforced concrete pier type and be cast in place. The typical design for the concrete footings for lattice structures would be between 2.5 and 5.0 feet in diameter, with an average depth of 20 feet depending on soil conditions. Typical design for single foundations for TSPs would include augured holes approximately five to seven feet in diameter and 15 to 30 feet deep, depending on conditions. Formwork steel reinforcing would be assembled in the hole prior to casting concrete in place. Reinforcing steel would become integral to the lower leg of the steel lattice structure during assembly. An above-ground concrete form placed over each hole would result in a final concrete foundation height of 0.5 to 2.0 feet above ground level.

As illustrated in Figure 1-4, Typical Tower Components, each tower carries conductors (“wires”), insulators, and ground wires. The conductor being considered for the new double-circuit 230 kV transmission line and installation of the Castaic – Haskell Canyon #4 circuit on existing structures is a bundled 715.5 kcmil “Starling” ACSS/AW. The reconductoring of the BR-RIN transmission line between Barren Ridge Switching Station and Rinaldi Substation would require a bundled 1,433.6 kcmil “Merrimack” ACSS/TW/HS conductor.

**Figure 1-4. Typical Tower Components**

Each circuit would consist of three phases (“wires”) as illustrated in Figure 1-4. To increase the current-carrying capability of the transmission lines and reduce power loss, the Proposed Action (Alternative 2) would utilize bundled conductors installed for each phase. The bundled conductors would consist of two conductor cables connected by a spacer. The new 230 kV double-circuit transmission line would consist of a total of six double-bundled (12 individual) wires.

Minimum conductor height above the ground, under normal operation of the line, is 30 feet. Greater clearances may be required in certain areas to allow for clearances over trees or other vegetation that
could pose a risk to the operation of the transmission line. Minimum conductor clearance would dictate the exact height of each tower based on topography and safety clearance requirements.

Insulators are used to provide the physical connection of conductors to structures. These system components are made of very low conducting materials (polymer insulators) that inhibit the flow of electric current from energized conductors to ground or to other energized system elements. Insulators and their associated hardware are to be configured in an “I” assembly to support conductors while maintaining required distances between phases and grounded structures. Each “I” string would consist of six-inch diameter insulators between six and eight feet long.

To shield conductors from hazard of direct lightning strikes by transferring lightning currents into the ground, overhead ground wires (shield wires) or fiber optic ground wire would be installed on top of new structures.

Construction of a transmission line involves the following general sequence of events: surveying activities; identifying and constructing access roads; clearing ROW and tower sites (including construction yards and batch plants); installing foundations; assembling and installing the towers; clearing, pulling, tensioning, and splicing; installing ground wires and conductors; installing counterpoise; switching station tie-in; and site upkeep and site reclamation. Various phases of construction would occur at different locations throughout the construction process for the BRRTP. This would require several contractors operating at the same time and in different locations. Refer to Appendix A for a description of each construction activity.

Existing paved and unpaved highways and roads would be used where possible. Roads along existing utility corridors would also be used where possible to minimize new access road construction. In locations where existing roads could be used, that are located in close proximity to the proposed or existing ROW centerlines, only new spur roads to the tower sites would be constructed. The specific locations and design of all new access and spur roads would be determined during final Project design.

It is anticipated that one or two construction yards or staging areas would be required for materials storage, construction equipment, construction vehicles, and temporary construction offices. Staging areas would be approximately five acres in size, and located centrally or near each end of the transmission line route. The staging areas would likely be located on previously disturbed land and would be level and surfaced with crushed aggregate base. The LADWP would negotiate with landowners for specific locations of the staging areas.

Routing

In 2007, a siting analysis was conducted to identify appropriate sites for a new 230 kV transmission line. Over 200 miles of routing opportunities were identified and referred to as Segments A through I (see Figure 1-5). These segments were then combined to create end-to-end routing “alternatives” as discussed in Section 6.2. All routing Segments were identified assuming the need for a 200-foot ROW for the new 230 kV transmission line and the use of conventional transmission line construction. However, as discussed in Section 6.2, the end-to-end alternatives have included specific mitigation measures to reduce certain impacts. These mitigation measures would eliminate the need for new ROW in some locations and would require the use of helicopters for tower assembly in designated areas on the ANF. Also, to the maximum extent possible, all existing access and spur roads would be utilized for the construction, operation, and maintenance of the BRRTP. Below is a brief description of each segment.
FIGURE 1-5. PRELIMINARY ROUTING SEGMENTS
Segment A is 13 miles long and runs from LADWP’s Barren Ridge Switching Station to the unincorporated community of Mojave, California. It would traverse four miles of BLM managed public lands and parallel LADWP’s existing 230 kV Barren Ridge – Rinaldi Transmission Line (BR-RIN) and the 500 kV Pacific Direct Current Intertie (PDCI). It traverses four miles of BLM-managed lands.

Segment B is 27 miles long and starts just north of the unincorporated community of Mojave, California and travels south to a point one mile east of the Antelope Valley California Poppy Reserve. This segment parallels LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines for its entire length.

Segment C is 22 miles long and begins at the location as Segment B, north of the unincorporated community of Mojave, California. Segment C parallels the Los Angeles Aqueduct in a southwest direction to Cottonwood Creek. No existing transmission lines are located within the aqueduct corridor; however, Southern California Edison’s (SCE’s) Tehachapi Renewable Transmission Project’s (TRTP) Alternative 10A is also proposed along the same corridor.

Segment D is 48 miles long and would traverse 16 miles of National Forest System (NFS) lands. This segment generally parallels the Los Angeles Aqueduct in a southwest direction, beginning near Cottonwood Creek and traveling to Lancaster Road. It then travels west to the Interstate 5 freeway utility corridor and continues southeast along LADWP’s existing Castaic – Rinaldi corridor to the proposed Haskell Canyon Switching Station. Five high voltage transmission lines are located along the Interstate 5 section of the segment. Oil and gas pipelines are also located in the same I-5 corridor. Continuing further south near Castaic Power Plant, Segment D would be located to the south of two existing LADWP double-circuit 230 kV transmission line towers until reaching the proposed Haskell Canyon Switching Station.

Segment E is 11 miles long and begins near Cottonwood Creek at the intersection of Segments C and D. Segment E travels in a southeast direction and intersects Segment B one mile east of the Antelope Valley California Poppy Reserve. Three existing high voltage transmission lines (Midway-Vincent 500 kV, Antelope-Vincent 230 kV, and Antelope-Mesa 230 kV) are located within the corridor that Segment E would parallel. SCE’s proposed TRTP Segment 4 is also proposed adjacent this same corridor.

Segment F is the shortest segment, at four miles in length, and begins at the intersection of Segments B and E one mile east of the Antelope Valley California Poppy Reserve. Three existing high voltage transmission lines (Midway-Vincent 500 kV, Antelope-Vincent 230 kV, and Antelope-Mesa 230 kV) are also located parallel to this segment.

The 115th Street Segment was proposed as a modification to avoid impacts to residents in the Antelope Valley near Segments F and H, described below. It begins mid-way within Segment F near SCE’s Antelope Substation and parallels 115th Street south to the California Aqueduct. No existing transmission lines occur within this corridor; however, TRTP’s proposed Segment 4 would be located along this alignment. This segment would split Segments F and H as shown in Figure 1-5 creating these Segments into F1, F2, H1 and H2.

Segment G is 21 miles long. Thirteen miles traverse National Forest System (NFS) lands. It travels south from the intersection of Segments B and F one mile east of the Antelope Valley California Poppy Reserve to the proposed Haskell Canyon Switching Station, located near the southern boundary of the ANF. It is a designated utility corridor containing LADWP’s existing 230 kV BR-RIN and 500 kV PDCI lines. The BRRTTP proposes to use its existing four-circuit structures for two miles, from towers 234-3 to 236-2 (see Figure 1-3).

Segment 2a is seven miles long. It would bypass the unincorporated community of Green Valley and follow an existing fire road through ANF. Segment 2a would not parallel existing transmission facilities, and a new utility corridor would be required.
Segment H is 20 miles long and would parallel SCE’s Antelope-Pardee line. It starts near SCE’s Antelope Substation at the intersection of Segments F and I and traverses 13 miles of NFS lands to the proposed Haskell Canyon Switching Station. As requested by the USFS, all portions of this segment that fall within the northern and southern borders of the ANF would be constructed entirely by the use of helicopters. The helicopter construction requirement was established by the USFS for consistency of transmission line construction within the existing Antelope-Pardee transmission line corridor. No new access roads would be constructed except those required for pulling and tensioning sites or staging locations for construction materials. The addition of the 115th Street Segment, described above, splits the Segment into H1 (northern portion) and H2 (southern portion).

Segment I is 32 miles long. It begins near the Antelope Substation at the intersection of Segments F and H, and heads southeast through the City of Palmdale, parallel SCE’s existing high voltage transmission lines (Midway-Vincent 500 kV, Antelope-Vincent 230 kV, and Antelope-Mesa 230 kV). The segment continues directly south to an existing LADWP transmission line corridor, then continues in a southeast direction to the proposed Haskell Canyon Switching Station, parallel LADWP’s existing high voltage transmission lines (Victorville-Rinaldi 500 kV and Adelanto-Rinaldi 230 kV). A majority of this segment would be located outside of NFS lands. Two miles would be located on NFS lands.

Segment J is located parallel to the southern portion of Segment D. Segment J would consist of a new single 230 kV circuit to be placed on existing double-circuit towers between Castaic Power Plant and the proposed Haskell Canyon Switching Station (see discussion in Section 1.2.2 below).

Three-Circuit Tower Mitigation

In areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is proposing to construct three-circuit towers within the existing ROW to carry the existing BR-RIN circuit and the two proposed Barren Ridge to Haskell Canyon (BR-HC) circuits. This would avoid various impacts, including the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6), and Elizabeth Lake and Green Valley (milepost 44.6 to 51.7). Refer to Figure 1-6 for an illustration of three-circuit tower types, and to Figure 1-7, the Three-Circuit Tower Mitigation Map, for proposed locations.
FIGURE 1-7. THREE-CIRCUIT TOWER MITIGATION
LADWP must maintain the electrical service along the existing BR-RIN transmission line to avoid impacts to the hydroelectric power plants north of the Barren Ridge Switching Station. Therefore, a temporary transmission line would be constructed to keep the BR-RIN circuit energized during construction of the three-circuit towers. After the temporary line is constructed, the existing BR-RIN single-circuit towers would be removed to allow the new three-circuit towers to be constructed within the existing ROW. Once construction of the three-circuit towers is completed, the temporary transmission line would be removed. The temporary transmission line is expected to be in place from six to nine months.

The temporary transmission line would be 7.5 miles long and would consist of wood and steel single poles with an average height of 95 feet, a 3-foot by 3-foot footprint, and an average of eight poles per mile. Construction would occur within a new temporary 80- to 100-foot ROW. The majority of the temporary transmission line would be constructed along San Francisquito Road. Portions would also be constructed along Elizabeth Lake Road and Johnson Road. Pole placement would be adjacent to public roadways wherever possible. If necessary, temporary ROW on private property would be needed where poles could not be placed within public road ROW. The majority of poles would be direct-embedded when set in place and would not require a permanent foundation. Where additional strength is necessary at larger angle points, steel poles would be required, which could require an excavation approximately 6 feet in diameter by 20 feet deep to accommodate the concrete pier foundation that would be cast in place. Once all the poles have been constructed and the conductor installed, the existing BR-RIN circuit would be connected into the temporary line and energized. The construction would require establishment of a staging area, work areas around poles, and pull and tension sites. Access to pole sites and pull and tension sites would be from the adjacent roadways.

Approximately seven miles of the existing BR-RIN single-circuit towers would be removed, with existing ROW utilized to access the existing towers. The new three-circuit towers would be placed within the existing ROW, utilizing existing access roads. Helicopter Mitigation, as described in this section below, would be applied in steeper terrain if additional access is required. The new three-circuit tower would require a 25-foot by 30-foot structure footprint and an average of seven structures per mile; the average structure height would be 170 feet, with a maximum tower-to-tower span length of 780 feet. The construction process for the new three-circuit towers would be the same as the double-circuit towers discussed above. After completion of construction of the three-circuit towers, the temporary transmission line would be removed and all temporary staging and work area land disturbances would be restored as close to previous conditions as possible and revegetated as required.

**Helicopter Mitigation**

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed with the use of helicopters (such as the Hughes 500 or Bell 212, or Sikorsky Skycrane). Although no specific locations for this mitigation have been identified for the Proposed Action, as defined, it is expected USFS would require the helicopter mitigation for construction in any area more than 300 feet from an existing road and with slopes greater than approximately 25 percent. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas and associated access roads, tower structure vegetation clearing, guard structures at major crossings, and access road pullouts.

Temporary 24-foot wide access roads would be required to access the helicopter fly yards/staging areas. The transmission line materials (tower steel, conductor reels, structure hardware, etc.) would be delivered by truck to the helicopter fly yards/staging areas. Vegetation clearing may be required at these sites to ensure safe working conditions. The fly yards/staging areas would serve as helicopter support yards for
fueling and maintenance, as well as for the transport of materials and personnel. Towers may also be assembled in sections at these yards prior to delivery to the tower sites. Heavy lift helicopters would then fly the towers from the yards to the tower sites.

Portable landing pads would be located at each tower site. These pads would allow helicopters to load and unload personnel, tools, and equipment necessary for construction of foundations and assembly of tower structures. Helicopter-constructed towers that would not be in close proximity to existing access roads would utilize micropile foundations. For each tower leg, micropile foundations would use a group of three to eight 6- to 9-inch diameter casings that would be drilled and grouted into the ground. The exposed portion of the pile group would be encased in a reinforced concrete cap from the top of the casings to a depth anywhere from one to eight feet below the ground surface, depending on the terrain.

Conductor installation would proceed in the same manner as the double-circuit tower installation. The equipment necessary for conductor installation would be large, heavy construction equipment that could only be brought in by truck. Some NFS roads could need maintenance or improvement to allow pulling and tensioning, but no new access or spur roads would be created for conductor installation on the helicopter-constructed towers. After Project completion, any maintained access roads to helicopter fly yards/staging areas to would be reduced to 16 feet.

1.2.2. Addition of New 230 kV Circuit

Between the proposed Haskell Canyon Switching Station and the existing Castaic Power Plant, LADWP proposes the addition of 12 miles of a new 230 kV transmission circuit onto existing Castaic – Olive 230 kV Transmission Line structures. The circuit would cross the unincorporated communities of Castaic and Saugus and the city of Santa Clarita. A total of 300 feet of BLM-managed public lands and four miles of NFS lands would be traversed; however, the new circuit would not require a new or additional ROW. This new circuit would be called Castaic – Haskell Canyon #4 and would utilize the same conductor (bundled 715.5 kcmil “Starling” ACSS/AW [aluminum conductor steel supported/aluminum-clad steel wire]) as that proposed for the new 230 kV transmission line between Barren Ridge and Haskell Canyon Switching Stations.

The addition of a new circuit on existing towers would require many of the same construction activities associated with a new transmission line (refer to Appendix A for a description of each construction activity). However, all work would be within existing ROW and no new towers would be constructed. Some towers may need to be modified or reinforced to carry the additional weight of the new conductor. Specific towers requiring reinforcement would be determined following detailed design of the Project. Tower reinforcement would not alter the general design or the location of the structures. This process would generally include reinforced foundations or steel member replacements. Refer to Figure 1-1 for a map showing the location of the new 230 kV circuit.

1.2.3. Reconductoring of Existing Transmission Line

LADWP proposes the reconductoring of 76 miles of the existing BR-RIN 230 kV transmission line with larger conductors from the Barren Ridge Switching Station to Rinaldi Substation. Four miles of BLM-managed public lands, 13 miles of National Forest System (NFS) lands, and 44 miles of private property would be traversed. The existing conductors (954/2,312 kcmil) would be replaced with a new 1,433.6 kcmil “Merrimack” ACSS/TW/HS (aluminum conductor steel supported/trapezoidal wires/high strength) conductor. The new conductor would have a larger diameter that allows for greater electrical capacity.

The upgrade of the existing BR-RIN would also require many of the same activities of the new transmission line (surveying of right-of-way [ROW], rehabilitation of existing access and spur roads, clearing of ROW, conductor installation, and cleanup). Removal of the existing conductor would be used to string a pulling line, and this line would then be used to pull in the new conductor. All work would remain within the existing 250-foot-wide ROW, with no additional ROW required. Some of the towers
would need to be modified, replaced, and/or have foundations reinforced or replaced to carry the additional weight of the new heavier conductor. Refer to Figure 1-1 for the location of the reconductoring.

1.2.4. **Construction of New Switching Station**

As a component of the BRRTP, LADWP proposes the construction of a new switching station in Haskell Canyon, south of the Angeles National Forest (ANF) on LADWP-owned property at the convergence of several existing and proposed 230 kV transmission lines (the existing BR-RIN, the proposed double-circuit Barren Ridge – Haskell Canyon, existing Castaic – Northridge, Castaic – Sylmar, Castaic – Olive, and the proposed Castaic – Haskell Canyon). Refer to Figure 1-1 for the location of the new switching station.

The station would be approximately 500 feet by 600 feet to accommodate the necessary circuit positions, which are made up of equipment, such as steel support structures, circuit breakers, disconnect switches, and associated equipment, and a relay house and control house containing control and protective relaying equipment. The relay and control houses would each be approximately 30 feet long by 12 feet wide by 10 feet high and constructed of gray concrete block. The station yard would include a paved internal access road approximately 16 feet wide and would be enclosed by chain-link fencing with barbed-wire extension for security. The preliminary grading plan for the station is located in Appendix A.

Necessary pre-construction geotechnical investigation on-site would include six borings by a drill rig to investigate bedrock and soil stability and four cone penetration test locations after site grading to determine friction resistance for piers. The cone penetration test rig would be a small truck with a hydraulic ram assembly mounted on the back, which is used to push a 2.5-inch diameter cone into the ground to a depth up to 50 feet. Existing roads would be used to access the site.

Construction of the new Haskell Canyon Switching Station would consist of preconstruction surveys, clearing and grading of access roads, site grading and drainage development, installation of concrete foundations and steel support structures, installation of below- and above-ground electrical conduits for equipment power and control, installation of above-grade grounding conductors, and installation of control and relay houses. Equipment required for station construction would include graders and excavators, backhoes, drill rigs, water trucks, scrapers, sheep’s foot compactors, front end loaders, concrete trucks, trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks would also be required. Construction would require an estimated 12 months with approximately 60 workers.

Site preparation work for the station would involve clearing and grading of access roads, clearing of the switchyard site, the cut and fill grading of the site, and placement and compaction of structural fill that would serve as a base for switching station facilities. The site would be graded to maintain current drainage patterns as much as possible. A 16-foot-wide paved road and a 100-foot by 100-foot gravel parking area would be required. The yard would be covered with crushed-rock aggregate. Native vegetation would be re-established where possible outside the switchyard fence.

Following site grading and development, reinforced concrete foundations would be installed to support the steel structures and electrical equipment and control facilities. It is estimated that 1,500 cubic yards of concrete would need to be delivered to the switching station site for the foundations. Foundation work would require approximately 180 trips to the site by 40-ton, 10-yard capacity concrete trucks over a 120-day working period. Subsequent to the foundation installation, trenches would be dug to facilitate placement of copper conductors for the station grounding mat.

Multiple transmission lines would be terminated into the switching station (i.e., the new and existing Barren Ridge – Haskell and Castaic – Haskell Canyon transmission lines) and would need support and require the installation of galvanized steel structures. An existing 115 kV transmission line may need to
be relocated around the proposed station. High-voltage bus work consisting of aluminum jumpers and tubing would be installed within the station.

1.2.5. Expansion of Existing Switching Station

LADWP proposes expansion of the existing Barren Ridge Switching Station to the east side by 235 feet by 500 feet, for a total station size of 485 feet by 500 feet (approximately 5.6 acres). The expansion area of the station would include electrical structures and equipment for the addition of transmission lines, a material staging area, roadway within the station, and a drainage area. The preliminary design layout for the station may be found in Appendix A. Refer to Figure 1-1 for the location of the existing switching station.

Expansion of the existing switching station would be very similar to the construction of the Haskell Canyon Switching Station as described above. Expansion would consist of preconstruction surveys, site preparation and grading, installation of reinforced concrete foundations, installation of electrical conduits for equipment power and control, and installation of structures and equipment.

Necessary pre-construction geotechnical on-site investigation would include two test pits excavated by a backhoe to investigate soil density and settlement, and four cone penetration test locations on-site to determine friction resistance for piers. The cone penetration test rig would be a small truck with a hydraulic ram assembly mounted on the back, which is used to push a 2.5-inch diameter cone into the ground to a depth up to 50 feet. Existing roads would be used to access the site.

It is estimated that 700 cubic yards of concrete would need to be delivered to the switching station site for the foundations. Foundation work would require approximately 80 trips to the site by 40-ton, 10-yard capacity concrete trucks over a 90-day working period. Equipment required for station construction would include graders and excavators, backhoes, drill rigs, water trucks, scrapers, sheep’s foot compactors, front end loaders, concrete trucks, trucks, and flatbed trailers. Cranes, man-lifts, portable-welding units, line trucks, and mechanic trucks would also be required. An estimated eight months with approximately 60 workers would be required to expand the station.

1.2.6. Project-Wide Mitigation Measures

To address potential impacts of the Proposed Project to multiple resource areas as discussed above, the following project-wide mitigation measure would be applied:

Three-Circuit Tower Mitigation (THREE-CIRCUIT) – A three-circuit lattice tower design would be implemented as described in Section 1.2.1 of this Technical Report, at the locations shown in Figure 1-7, Three-Circuit Tower Mitigation Map.

Helicopter Mitigation (HELICOPTER) – Helicopter Mitigation shall be implemented, as described in Section 1.2.1 of this Technical Report, in steep areas of the ANF where access is limited. For Alternatives 1 and 2a, implementation would occur at the locations shown on Figure 6-2, Identified Helicopter Mitigation Map. During final design of the Project, areas other than those shown on Figure 6-2, including Alternatives 2 and 3, may potentially require helicopter construction of the towers. This determination would generally be made where tower sites have no existing access roads within 300 feet and slopes are greater than 25 percent. Final identification of these tower sites would be determined and agreed upon by USFS, BLM and LADWP.

1.2.7. Construction Work Force and Schedule

The NEPA Record of Decision and CEQA Notice of Determination (anticipated in the early part of 2012) must be made before construction could begin. Therefore, construction of the BRRTP is anticipated to
begin no sooner than summer 2012, with a target in-service date of early 2015. These dates are subject to change based on actual completion of design.

The following construction estimates were based on preliminary engineering and the number of workers and construction duration values are estimates; therefore, they are subject to change based on final engineering and design. The new double-circuit 230 kV transmission line from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station would require 12.5 months and 134 workers. The installation of a 230 kV circuit on existing double-circuit towers from the Castaic Power Plant to the proposed Haskell Canyon Switching Station would require a month and a half and 35 workers. The upgrade and reconductoring of the existing BR-RIN would require eight months and 155 workers. The construction of a new 400-foot by 600-foot Haskell Canyon Switching Station would require 12 months and 60 workers. The expansion of the existing Barren Ridge Switching Station would require eight months and 60 workers.

The BRRTP components are anticipated to be constructed in the staggered sequence illustrated below in Tables 1-1 and 1-2. The construction of all Project components would take approximately two years and 447 total workers, with 173 workers at the peak of construction. Table 1-2 summarizes the BRRTP’s anticipated construction workforce and schedule based on the most current information available. To allow for any delays in the Project, three weeks of float time were included for the new 230 kV transmission line and reconductoring efforts, and an additional two weeks of float time were included for the stringing of the second circuit between Castaic Power Plant and Haskell Canyon.

**Table 1-1. Anticipated Construction Sequence**

<table>
<thead>
<tr>
<th>PROJECT COMPONENT</th>
<th>ANTICIPATED CONSTRUCTION SEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of Barren Ridge Switching Station</td>
<td>Weeks 8 – 73</td>
</tr>
<tr>
<td>New Haskell Canyon Switching Station</td>
<td>Weeks 1 – 67</td>
</tr>
<tr>
<td>New 230 kV Transmission Line</td>
<td>Weeks 42 – 113</td>
</tr>
<tr>
<td>Reconductor BR-RIN</td>
<td>Weeks 55 – 88</td>
</tr>
<tr>
<td>Addition of 230 kV Circuit</td>
<td>Weeks 51 – 56</td>
</tr>
</tbody>
</table>

**Table 1-2. Construction Workforce and Schedule**

<table>
<thead>
<tr>
<th>PROJECT COMPONENT</th>
<th>CONSTRUCTION (START AND END WEEKS)</th>
<th>CONSTRUCTION DURATION (MONTHS)</th>
<th>TOTAL # OF WORKERS</th>
<th>PEAK # OF WORKERS AT ANY GIVEN TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of Barren Ridge Switching Station</td>
<td>8 – 73</td>
<td>15</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>New Haskell Canyon Switching Station</td>
<td>1 – 67</td>
<td>15.4</td>
<td>63</td>
<td>38</td>
</tr>
<tr>
<td>New 230 kV Transmission Line</td>
<td>42 – 113</td>
<td>16.5</td>
<td>134</td>
<td>131</td>
</tr>
<tr>
<td>Reconductor BR-RIN</td>
<td>55 – 88</td>
<td>9</td>
<td>155</td>
<td>120</td>
</tr>
<tr>
<td>Addition of 230 kV Circuit</td>
<td>51 – 56</td>
<td>1.5</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

| ALL COMPONENTS                        | Weeks 1 – 113                      | 26.1 months                     | 447 Total Workers  | 173* Peak Workers                  |

*The value represents the total for the staggered construction of the Project components; it is not reflective of the sum of all the components.
2.0 **WILDFIRE PREVENTION REGULATORY FRAMEWORK**

This section summarizes the Project applicant, federal, state, and local regulations, plans, and standards relevant to fire management and fire prevention. Fire prevention around electric transmission systems is focused on vegetation management and clearance of nearby fuels and vegetation. These requirements are summarized in the sections below.

### 2.1 PROJECT APPLICANT PRACTICES

LADWP follows the Federal Energy Regulatory Commission (FERC) guidelines/codes and California Public Resources Codes (PRC) 4291, 4292, and 4293 for transmission line clearances and vegetation management. LADWP reports that transmission lines are inspected twice annually by helicopter and also inspected by ground patrols once annually. Lines can be de-energized for safety purposes or if any imminent threat exists to the lines, associated facilities, or the public. LADWP also requires the clearance and abatement of trash and weeds located along property lines between residences and fee property in compliance with federal and state vegetation management plans. See Federal and State Regulations below for detailed descriptions.

### 2.2 FEDERAL REGULATIONS

#### 2.2.1. Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. According to the 2004 FERC report, the vast majority of transmission owners follow the National Electrical Safety Code (NESC) rules or American National Standards Institute (ANSI) guidelines, or both, when managing vegetation around transmission system equipment. The NESC establishes electric safety rules, including transmission wire clearance standards, whereas the applicable ANSI code regulates the practice of pruning and removal of vegetation. However, in California, the California Public Utilities Commission (CPUC) has adopted General Order (GO) 95 rather than NESC as the key electric safety standard for the state.

**North American Electric Reliability Council Standards (NERC)**

The mission of NERC is to ensure the reliability of the bulk power system in North America. To achieve that, they develop and enforce reliability standards; assess reliability annually via 10-year and seasonal forecasts; monitor the bulk power system; and educate, train, and certify industry personnel. NERC is a self-regulatory organization, subject to oversight by the U.S. Federal Energy Regulatory Commission (FERC) and governmental authorities in Canada. As of June 18, 2007, the U.S. Federal Energy Regulatory Commission granted NERC the legal authority to enforce reliability standards with all U.S. users, owners, and operators of the bulk power system, and made compliance with those standards mandatory and enforceable.

As a result of the recommendations following the August 14, 2003 blackouts on the East Coast, NERC was charged with developing a vegetation management standard that would be applicable to all utilities and that would provide greater specificity than the NESC and ANSI standards. Standard FAC-003-1, Transmission Vegetation Management Program, became effective April 7, 2006 and mandatory for all utilities, pursuant to Section 1211 of the Energy Policy Act of 2005. This standard applies to all transmission lines operated at 200 kV and above and to any lower voltage lines considered critical to the reliability of the electric system in the region. The transmission owner must prepare, and keep current, a formal transmission vegetation management program (TVMP). The TVMP must identify and document clearances between vegetation and overhead, ungrounded supply conductors, taking into consideration transmission line voltage, the effects of ambient temperatures on conductor sag under maximum design loading, and the effects of wind velocities on conductor sway. Minimum clearance distances must be no less than those set forth by the Institute of Electrical and Electronics Engineers (IEEE) Standard
Associations. IEEE is a leading authority in setting standards for the electric power industry. Standard 516-2003, Guide for Maintenance Methods on Energized Power Lines, provides minimum vegetation-to-conductor clearances to maintain electrical integrity, in which 230 kV requires 13 feet of clearance.

### 2.2.2. National Electric Safety Code

The National Electrical Safety Code: The National Fire Protection Association code NFPA-70 addresses proper electrical systems and equipment installation. This code aims to protect people and property from hazards arising from the use of electricity in buildings and structures. Published exclusively by the IEEE, the National Electrical Safety Code (NESC) sets the ground rules for practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. The NESC contains the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions. The NESC must be adopted by states, and the State of California has adopted its own standard (GO 95; discussed in Section 2.3) governing overhead transmission lines within the State.

### 2.2.3. National Fire Plan

The National Fire Plan (NFP), which is a product of a joint effort by the U.S. Department of the Interior and the U.S. Department of Agriculture, was developed in August 2000 with the intent of actively responding to severe wildland fires and their impacts to communities, while ensuring sufficient firefighting capacity for the future. The NFP addresses five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability.

1. Assuring that necessary firefighting resources and personnel are available to respond to wildland fires that threaten lives and property.
2. Conducting emergency stabilization and rehabilitation activities on landscapes and communities affected by wildland fire.
3. Reducing hazardous fuels (dry brush and trees that have accumulated and increase the likelihood of unusually large fires) in the country’s forests and rangelands.
4. Providing assistance to communities that have been or may be threatened by wildland fire.
5. Committing to the Wildland Fire Leadership Council, an interagency team created to set and maintain high standards for wildland fire management on public lands.

### 2.2.4. United States Department of Agriculture Land Management Plan

The revised 2005 Forest Plan guides forest managers in site-specific planning and decision at the broad program-level for managing the land and its resources over the next 10 to 15 years. The purpose of the revised Land Management Plan (LMP) is to articulate the long-term vision and strategic management direction for each southern California national forest and to facilitate the development of management activities that will contribute toward the realization of the national forests’ desired conditions. The goals of the four Southern California National Forests (Angeles, Cleveland, Los Padres, and San Bernardino National Forests) are responsive to both national priorities and the management challenges identified in Part 1 of the LMP Revision. Detailed descriptions can be found in Part 1 of the LMP, pages 19 – 47.

### 2.2.5. Angeles National Forest Fire Management Plan

Four Southern California National Forests completed their LMPs together; each Forest is responsible for documenting its individual fire management program in its own Fire Management Plan (FMP). The FMP documents the fire management program on the ANF. This FMP is a fundamental strategic document that guides the full range of fire management related activities to meet the needs for the ANF. It provides a framework for the management of wildland fire and prescribes fire and hazard fuel reduction, as a tool to safely accomplish the resource protection and management objective of the ANF as described in the 2005 Land Management Plan (LMP).
FMP Goals and Desired Condition:
The ANF Service Strategic Plan (2003 Revision) provides a framework for accomplishing the agency’s mission and incorporates actions to resolve four major threats to America’s Forests and grasslands. The “Four Threats” are:
1. Prevent severe wildland fires.
2. Stop the introduction, establishment, and spread of invasive species.
3. Reduce the conversion of Forests and grasslands that lead to fragmentation of rural landscapes through subdivision.
4. Manage impacts of motorized recreation vehicles by restricting use to designated roads and trails.

Forest Service leadership is committed to removing the “Four Threats” from the national landscape. This is a necessary action in order to achieve long-term outcomes: clean air, clean water, conserving wildlife, and protecting communities from wildland fire. The goals of the ANF FMP are described below:

1. Fire Prevention
   a) Preventing wildfire ignitions within the wildland-urban interface (WUI).
   b) Prohibit campfires outside of developed recreation areas.
   c) Implement activity restrictions and access to National Forest System lands dependent upon fuel and weather conditions and the availability of fire suppression resources.

2. Direct Community Protection
   a) Ongoing effort to reducing the amount of high to moderate fire risk areas within the WUI by mechanical or prescribed burning of hazardous fuels.
   b) Promote the removal of diseased and dying trees adjacent to structures and access/evacuation routes.

3. Fire Suppression Emphasis
   a) Improve wildland fire suppression capability within the WUI by promoting coordination with other fire agencies.
   b) During periods of limited firefighting resource availability, communities within the national forest direct protection area should be given highest priority for initial attack.

4. Firefighter and Public Safety
   a) Integrate fire management activities with other fire agencies in a cost effective manner.
   b) Conduct inspections that ensure defensible space requirements (PRC 4291) are met around structures within ANF jurisdiction.
   c) Coordinate with local Fire Safe Councils to support evacuation and community fire protection plans.

5. Fuelbreaks and Indirect Community Protection
   a) Maintain system of fuelbreaks to minimize fire size.
   b) Pre-plan fire suppression activities to avoid further disruption of sensitive areas and the spread of invasive and/or noxious weeds.

Project Activity Level (PAL)
The Project Activity Level (PAL) is a scientifically based system used to regulate all industrial and contractual activities on National Forest lands in California. The PAL is designed to reduce the risk of large damaging wildfires and the legal vulnerability of the agency, contractors, or permittees. The system is fire danger and climatology based, using Energy Release Components (ERC) and Ignition Components (IC) to determine ratings. It provides a single decision support matrix for regulating industrial and service activities on the ANF.

Under the Industrial Operations and Fire Precautions of the FMP, the ANF has adopted the PAL for the management of industrial activities on the Forest. A PAL would be generated for daily operational guidance of the BRRTP for fire prevention and activities at the job site. The Forest maintains an Activity Level Hotline that establishes work hours for industrial activities. An Activity Level of 5 will shut down all operations. A level of 4 requires that operations stop prior to 1300 hours. PAL associations are discussed further on page 50 in the ANF FMP.
2.2.6. **Bureau of Land Management (BLM) Fire Plan**

The fire plan for the Bureau of Land Management Antelope Valley Fire Management Unit states that its highest priority is to ensure the safety of fire-fighting personnel and other publics in the area. The BLM states that it will take any action necessary to prevent loss of life or substantial real property being taken. Secondly, all wildfires will be suppressed in grazing allotments. Further details of the BLM Antelope Valley fire management plan is discussed in the Fire Management Unit document located at the BLM Ridgecrest field office.

2.2.7. **United States Department of Transportation: Federal Aviation Administration**

Title 14 CFR Section 91.137, Temporary Flight Restrictions in the Vicinity of Disaster/Hazard Areas, allows an administrator to issue a Notice to Airmen (NOTAM) designating an area within which temporary flight restrictions (TFR) apply. When a NOTAM is issued, no person may operate an aircraft within the designated area unless that aircraft is participating in the hazard relief activities and is being operated under the direction of the official in charge of on-scene emergency response activities. During a wildfire, all helicopter construction and maintenance equipment would be prohibited from flying in the designated hazard area.

2.3 **STATE REGULATIONS**

2.3.1. **California Public Utilities Commission: General Order 95**

GO 95: Rules for Overhead Electric Line Construction is the key standard governing the design, construction, operation, and maintenance of overhead electric lines in the State. It was adopted in 1941 and updated most recently in 2006. GO 95 includes safety standards for overhead electric lines, including minimum distances for conductor spacing, minimum conductor ground clearance, standards for calculating maximum sag, and vegetation clearance requirements. The latter, governed by rule 35, is summarized here.

GO 95: Rule 35, Tree Trimming, defines minimum vegetation clearances around power lines. Rule 35 guidelines require:

- 10 feet radial clearances are required for any conductor of a line operating at 10,000 Volts or more, but less than 300,000 Volts

2.3.2. **California Department of Forestry and Fire Protection (CAL FIRE)**

CAL FIRE has a primary objective of reducing wildfire occurrence and enforcing fire hazard clearance standards around structures and utilities in order to protect the public from loss of life, property, and resources. Within CAL FIRE jurisdiction areas, the LE-38 Fire Safety Inspection Program is implemented for community outreach enforcement of fire safe codes. These laws include the California Public Resources Codes (PRC) 4292, and 4293 that define defensible space clearance requirements around aboveground power lines. California Code of Regulations (CCR) Title 14 Section 1254 applies to minimum clearances around utility poles. CAL FIRE inspections of utility facilities entail making notes on violations and defects in the infrastructure. Joint inspections of electrical facilities by CAL FIRE and the utility company are encouraged for the mutual benefit of fire prevention on the part of each entity. Listed below are the clearance requirements pursuant to the California Public Resource Code:

*PRC 4292, Powerline Hazard Reduction*, requires a minimum 10-foot clearance from around the base of dead-end or corner poles.

*PRC 4293, Powerline Conductor Clearance*, requires a 10-foot clearance for any line that is operating at 110 kV or greater.
2.3.3. California Code of Regulations (CCR) Title 14 Section 1254

Diagram 2.3.3a is a graphical representation of Section 1254 showing the minimum clearances required around a non-exempt utility pole.

The firebreak clearances required by PRC 4292 are applicable within an imaginary cylindrical space surrounding each pole or tower on which a switch, fuse, transformer or lightning arrester is attached and surrounding each dead-end or corner pole, unless such pole or tower is exempt from minimum clearance requirements by provisions of 14, CCR, 1255 or PRC 4296. The proposed Project structures would be primarily exempted from the clearance requirements set forth in PRC 4292, with the exception of cable poles and dead-end structures. The radius of the cylindroid is 3.1 m (10 feet) measured horizontally from the outer circumference of the specified pole or tower with height equal to the distance from the intersection of the imaginary vertical exterior surface of the cylindroid with the ground to an intersection with a horizontal plane passing through the highest point at which a conductor is attached to such pole or tower. Flammable vegetation and materials located wholly or partially within the firebreak space shall be treated as follows:

a) At ground level – remove flammable materials including, but not limited to, ground litter, duff and dead or desiccated vegetation that will propagate fire.

b) From 0 to 2.4 m (0 to 8 feet) above ground level remove flammable trash, debris or other materials, grass, herbaceous and brush vegetation. All limbs and foliage of living trees shall be removed up to a height of 2.4 m (8 feet).

c) From 2.4 m (8 feet) to the horizontal plane of the highest point of the conductor attachment, remove dead, diseased or dying limbs and foliage from living sound trees and any dead, diseased or dying trees in their entirety.

2.4 LOCAL REGULATIONS

2.4.1. Los Angeles County General Plan

The Safety Element (December 1990), one of the required elements in the County of Los Angeles General Plan, is the policy document that outlines fire protection standards. Specific fire protection standards are set forth in the County Fire Code, which is the mechanism that implements the policies and goals outlined in the Safety Element. Applicable to the proposed Project would be the County of Los Angeles Fire Department Transmission Line Guidelines, which set forth minimum clearance requirements around transmission line structures identical to those set forth in CCR 14 Section 1254.

2.4.2. LA County Fire Plan

The State Board of Forestry and the CAL FIRE have drafted a comprehensive update of the fire plan for wildland fire protection in California. The planning process defines a level of service measurement, considers assets at risk, incorporates the cooperative inter-dependent relationships of wildland fire protection providers, provides for public stakeholder involvement, and creates a fiscal framework for policy analysis. The County of Los Angeles Fire Department is one of six Contract Counties that maintain
a contractual relationship with CAL FIRE and utilizes the California Fire Plan within Los Angeles County as the primary wildland fire protection plan.

The County of Los Angeles Fire Department must define and provide a particular level of service; the County Fire Department (as the California Department of Forestry and Fire Protection’s agent in Los Angeles County) must, at a minimum, deliver a fire protection system that provides an equal level of protection to lands of similar type in State Responsibility Area (SRA). The legislature has charged the State Board of Forestry and CAL FIRE with providing this equal level of protection to lands of similar type (PRC 4130) in SRA.

Goals and Objectives

The overall goal is to reduce total cost and losses from wildland fire in California by protecting assets at risk through focused pre-fire management prescriptions and increased initial attack success. The California Fire Plan has five strategic objectives:

1. To create wildfire protection zones that reduces the risks to citizens, firefighters and overall public safety.
2. To assess all wildlands. Analyses will include all wildland fire service providers – federal, state, local government and private. The analysis will identify high risk, high value areas, and develop information on and determine the responsible party, the responding agency, and the entity paying for wildland fire emergencies.
3. To analyze and identify key policy issues and develop recommendations for changes of public policy. Analysis will include alternatives to reduce total cost and losses by increasing the fire protection system effectiveness.
4. To have a strong fiscal policy focus and monitor the wildland fire protection system in fiscal terms. This will include all public and private expenditures and economic losses.
5. To translate this analysis into public policy.

2.4.3. LA County Fire Department Prescribed Fuels Management Program

LA County Fire Department Fuel Management Program outlines the following five vegetation management procedures:

1. Prescribed Fire: The confined application of fire to a preselected area of land in order to minimize the amount of fuel in the area. Prescribed fires are carried out only under specific weather and fuel conditions, and are used to mimic nature’s own process of regeneration.
2. Mechanical Brush Removal: The use of mechanical equipment to reduce vegetation in an area. Equipment consists mainly of a bulldozer, in combination with a “brush crusher,” a brush rake, disk, or anchor chain, which crushes or removes the vegetation.
3. Chemical Application: The application of growth inhibitors, defoliators, or killers to reduce highly flammable herbaceous or poisonous plants, such as annual grasses or poison oak.
4. Biological Control: The reduction of plant volume using grazing or browsing animals, such as goats, to hold growth back and maintain low fuel volume.
5. Hand Clearing: The use of manual labor to remove brush with an assortment of tools including the Pulaski, hand axe, Grubbing hoe, chainsaw, handsaw, and others to modify vegetation arrangement. This is the most common method used by property owners to meet Fire Code requirements.

2.4.4. LA County Code, Title 32—Fire Code

Title 32 of the Los Angeles County Code relevant to power line clearance Sections 317.1.1 and 317.1.2 are identical to State PRC Sections 4292 and 4293, respectively.
3.0 REGIONAL SETTING OF SOUTHERN CALIFORNIA’S WILDFIRE ECOSYSTEM

3.1 WILDFIRE LANDSCAPE HISTORY

Climate, topography, and vegetation characteristics of Southern California exhibit some of the worst fire conditions in the world. The historic wildfires of Southern California, combined with human settlement, have altered the landscape into what it is today. The wildfire landscape history could be categorized into three distinct time periods: Native American Era, Mission Era, and Gold Rush Era. These time periods have had significant influences on Southern California’s wildfire ecology which has shaped today’s landscape.

The settlement of Native Americans in Southern California opened the door for the utilization of fire as a basic land management tool. Native American tribes used fire for the maintenance of the land’s natural resources. Tribes effectively controlled shrub and chaparral communities for the supply of food, shelter, and protection. The dependence on fire to burn plant communities became essential for the tribe’s survival. Native Americans burned evergreen shrubs such as chaparral cherry (*Prunus ilicifolia*), scrub oak (*Quercus berberidifolia*), toyon (*Heteromeles arbutifolia*), and manzanita (*Arctostaphylos* spp.). Tribes found that burning these shrubs induced seed germination and sprouting for the next life cycle, thus providing them with a consistent supply of food. Fire also served in removing dense patches of chaparral which reduced vegetation competition for water resources, and decreased the potential of wind driven fire events. Using fire to burn less resourceful vegetation eliminated hiding cover for predators and tribal enemies. Burning natural, dense vegetation provided open travel paths for local tribes and game, thereby increasing hunting opportunities.

In the late 18th century, settlers from Spain embarked to Southern California with a goal to expand its North American empire. In 1769, the Spanish landed in Southern California, establishing 21 missions. From 1769-1823, Spanish mission camps were established throughout California, from San Diego stretching north into Sonoma. The Mission Era influenced Southern California’s fire landscape through the introduction of livestock. The livestock grazed the native lands, consuming the local food supply that was once maintained and used by Native American tribes. By 1823, more than 400,000 cattle grazed on one sixth of California’s land. Intense grazing introduced non-native plants onto the native land which altered and out-competed native flora and fauna once utilized by Native American tribes for survival. This introduction of non-native species altered native plant communities, contributing to an increase in fire frequency. The loss of native vegetation starved fauna and non-missionary tribes that depended on the native habitat. As stated by Stevens and Suihara, Spanish settlers altered the fire landscape regime through the introduction of livestock and non-native plants.33

As the Mission Era came to a conclusion, California’s population of non-indigenous settlers exploded. The Gold Rush of 1849 presented advancements in technology and new land management regimes. Fire was used as a tool to clear land for grazing livestock and the search of gold. Miners developed a railroad system for better access to the gold mines, which increased fire ignitions in remote areas. Railroad construction commenced logging practices, allowing the removal of large amounts timber lands to improve the access to the gold mines. New settlers moved into remote areas of the state, altering fire regimes in the mountains to support livestock forage. During this time, fire suppression efforts were primarily to protect structures and towns within the local community. The result of burning in remote lands, logging, and a new railroad system altered the structure and composition of the landscape, native habitats, and fire regimes.

The population of Southern California has increased significantly in the 19th and 20th centuries, precluding a modern fire regime. An empirical study conducted by Keeley confirmed that the bio-diversity in chaparral is compromised from increasingly high levels of fire frequency, emphasizing the need for established fire regimes and effective fire suppression management.16. The lack of a natural fire regime is associated to the increase of wildfire frequency currently observed today. From 1990 to 2008, the US Census Bureau reported a population increase from 8.8 million to 9.8 million people in Los Angeles...
Increases in human population have resulted in increased human mobility and dispersion into previously isolated landscapes, providing a greater potential for wildfire ignitions. The establishment of a wildland-urban interface (WUI), where large human populations reside adjacent to fuel-laden wildlands, increases wildfire ignitions and threatens human safety. In addition, increasing populations add to the greater probability of ignitions during Santa Ana wind events.

3.2 LARGE CATASTROPHIC WILDFIRE HISTORY

Wildfires greater than 100,000 acres can be categorized as catastrophic wildfires. These large wildfires affect the local communities, firefighter safety, and natural resources in a variety of ways. In the event of a wildfire, local communities are often inundated with smoke, road closures, and damages to structures and homes. These large fires pose a general public safety hazard that may require evacuation of entire communities, subsequently causing severe disruption to businesses and households. Firefighters also put their own lives at risk when attempting to protect life and property during these catastrophic wildfire events. For example, firefighters assume extreme risk while driving on hazardous roads with poor visibility adjacent to these catastrophic wildfires, as strong winds have the potential to change the direction of the fire at any time, putting firefighters directly in its path. Aerial firefighting attacks are also often obstructed by intense smoke and winds, which may cause equipment failures. Long-term adverse effects to natural resources are often incurred following these catastrophic wildfires as well. Mud slides are among the most common consequences following intense wildfires in Los Angeles County, as they often occur when burned hillsides stripped of vegetation endure heavy winter rain events. Hydrophobic soils do not allow rain to penetrate, and mass erosion follows. This may cause high risk to life and property, as well as affect other resources, such as wildlife and water quality.

California has experienced three recorded catastrophic wildfires that have occurred due to downed and/or faulted subtransmission (115 kV and less) and distribution power lines: the 2007 Witch Fire, the 1970 Clampitt Fire, and the 1970 Laguna Fire. These wildfires provide empirical examples of potential fire hazards associated with power lines. The Witch Fire was caused by arcing when faulted lines from San Diego Gas & Electric (SDG&E) collided during a windstorm on October 21, 2007. CAL FIRE officials reported that the downed 69 kV subtransmission line dropped hot particles that ignited grassy fuels below, starting a blaze intensified by Foehn (“Santa Ana”) winds. The Witch Fire was contained on October 31, 2007, after consuming approximately 198,000 acres of the Cleveland National Forest, at an approximate suppression cost of 18 million dollars. Two civilian fatalities occurred, and 1,141 homes and 509 outbuildings were destroyed.

The Clampitt Fire and Laguna Fire were also caused by downed/faulted power lines. The Clampitt Fire, which burned approximately 105,212 acres in LA County, was a result of high winds that blew down a section of an electrical distribution line. The Laguna Fire burned approximately 175,000 acres in the Laguna Mountains of San Diego County and was ignited when trees fell across an electrical distribution line.

Between 1910 and 1950, Los Angeles County experienced 357 wildfires, and from 1951 to 1997, 1,392 wildfires were recorded. The first catastrophic wildfire recorded was in 1889 and consumed more than 300,000 acres in Orange County17. Table 3.2.1a depicts the 50-year recorded catastrophic wildfire history of Southern California.
Eight of Southern California’s recorded catastrophic wildfires have taken place within the last 50 years. More significantly, five of the recorded seven catastrophic wildfires have occurred within the last decade. All of these wildfires, with the exception of three, have occurred during autumn months in the presence of Santa Ana winds, which are prevalent in the seasonal weather patterns. The 2006 Day Fire and the 2009 Station Fire are the recent catastrophic wildfires that have occurred within closed proximity to the BRRTP assessment area. Figure 2 depicts both fires in relation to the BRRTP.

The **Day Fire** of 2006 encompassed over 161,000 acres of the Los Padres National Forest in Ventura County. The Day Fire was started on September 4, 2006 by a transient in a remote area of Piru Canyon in the Ojai Ranger District. The federally managed Type 1 fire was fully contained almost one month later on October 2, 2006. The Day Fire caused 18 injuries and destroyed 11 structures. The total cost of the Day Fire was approximately 101,600,000 dollars.

The **Station Fire**, ignited in Los Angeles County on August 26, 2009, grew into the tenth largest fire in California history, engulfing over 160,000 acres of the ANF. The federally managed Type 1 fire burned for weeks on the slopes of the Mt. Wilson Wilderness and the backside of the Santa Clara divide before it was fully contained on October 16, 2009. The total cost associated with the fire was approximately 95,300,000 dollars. The Station Fire destroyed 89 residences, 26 commercial buildings, and 94 outbuildings, and damaged 13 residences, 22 commercial buildings, and 22 outbuildings. Two firefighter fatalities occurred, and arson was the suspected cause of the Station Fire.
Figure 2. Recent Large Catastrophic Wildfires
Both the Station Fire and the Day Fire occurred adjacent to the BRRTP assessment area located in the Angeles and Los Padres National Forests. The Station Fire and the Day Fire share similarities in topography, vegetation, and climate with the BRRTP assessment area. Therefore, the identification and assessment of vegetation, topography, and climate within the study area of the Proposed Action and Alternatives provides empirical data for risk assessment and illustrates the potential for large catastrophic wildfire occurrences.

### 3.3 WILDFIRE BEHAVIOR CONDITIONS

Southern California is characterized as one of the most fire-prone landscapes in the world due to the presence of dense, dry fuels and a warm, arid climate. Factors influencing wildfire behavior and magnitude include forest structure, fuel conditions, climate, and the source of ignition. Wildfire behavior constituents may be anthropogenic and/or biophysical. Anthropogenic components include human ignitions and fuel alteration, and biophysical aspects include unaltered fuels, climate, lightning ignitions, and topography.

**3.3.1. Wildfire Weather**

Weather is one of the most significant biophysical factors of wildfire behavior. The summer months of Southern California are arid and warm, with very little precipitation. Studies have shown that large, high-intensity wildfires in chaparral ecosystems usually increase in severity under adverse weather conditions. During autumn months (September-December), cool air rises from the ocean, creating high off-shore winds that mix with the hot, arid desert air, producing a seasonal weather event called a Foehn wind, commonly known in the Southern California region as the Santa Ana Occurrence (SAO). High pressure builds in the desert and forms a strong pressure gradient with low pressure in the coastal ranges, creating winds that blow into the valleys. The SAO has a dramatic effect on the fire regime and rates of spread in Southern California, with winds exceeding 60 miles per hour. Drought and SAO are weather conditions endemic to Southern California that drive catastrophic wildfires.

Southern California has an ongoing drought history that is closely tied to the fire history. In 2003, a wildfire breakout occurred following a three year drought. These wildfires were driven by extremely dry conditions, including low moisture content in the vegetation and dead fuels, thereby increasing wildfire ignition probabilities and wildfire propagation. Similar conditions were witnessed in 2009 as California approached another three year drought.

**3.3.2. Fuels**

Fuels are organic material (living or dead) in and/or on the ground or in the air that will ignite and burn. Fuel conditions are considered a bipartite element of wildfire behavior having anthropogenic and biophysical components. Anthropogenic influences on fuel conditions are a result of active vegetation management (i.e., mastication, prescribed burning, brush removal, or eradication of non-native species) which alters its composition and structure. Moisture content, above-ground biomass, and fuel structure and composition are biophysical components of fuel conditions.

Most vegetation management practices are focused to the WUI, rights-of-way, and heavily created areas. Mastication and brush removal clear dense live and dead fuels that drive wildfire behavior. However, most plant lifecycles depend on fire intervals to induce seed germination. Prescribed burning assists to restore fire regimes by burning fuels that have unbalanced fire intervals. The eradication of fire-prone noxious weeds allows for the chemical application of herbicide, which alters the composition of fuels. Most fire-prone noxious weeds have fire intervals that are more frequent than native fuels. If left untreated, it could result in a type-conversion of non-native vegetation, thus affecting the biota that is dependent on the native habitat.
Moisture content is determined by weather conditions. In warm, dry summer months, when there is little precipitation, the likelihood of a plant to ignite is greatly increased. Thus, fire increases when dry air decreases dead and living fuel moisture via transpiration and diffusion. Above-ground biomass conditions affect the rate of spread and strength of wildfires. For example, a dense quantity of litter and debris increases propagation and intensity of a wildfire. Another variable affecting wildfire behavior is the vegetation structure and composition. If a forest stand is sparsely mixed with tall conifers and low-lying grass, the fire would be contained to the ground and remain at a low intensity. However, a forest stand containing tall, heavy fuel loads increases the potential of the wildfire to spread up into the upper branches and leaves of trees, otherwise known as tree crowns. Tree crown wildfires are categorized as high-intensity fires that spread quickly over the landscape.

3.3.3. Topography

One of the biophysical components of wildfire behavior is topography. The topography of a given area integrates slope, aspect, and elevation. The influence on fire behavior escalates as the slope steepens and increases in complexity. Large upland ridges burn more frequently when compared to valleys, swamps, or riparian areas. Steep slopes promote the preheating of fuels, which leads to a rapid upslope fire spread. Difficult terrain reduces the effect of fire suppression efforts and often creates barriers for firefighters, aerial attacks, and fire engines. The aspect describes the horizontal direction of a mountain slope. If a mountain slope faces north, it has a northerly aspect and may contain more moisture than a south-facing slope. The biota differs at various elevations. High elevations may contain reduced fuel loads, while mid-elevations may allow for the growth of dense forests and chaparral communities. Slope, aspect, and elevation comprise the topography of a geographical area and are highly influential on wildfire behavior.

3.3.4. Ignitions

Ignitions include both anthropogenic and biophysical components of wildfire behavior. Human intervention would most likely occur around or in highly recreated areas and rights-of-way. This anthropogenic element comprises arson and human negligence. Arson is deliberate and has caused most of the catastrophic wildfires, for example the 2009 Station Fire. Arsonists select prime conditions for wildfires usually during the months of SAO. Human negligence could be a scheduled prescribed burn during red flag conditions producing an unmanageable fire, shooting guns, improperly extinguishing a campfire, cigarettes, or exhaust sparks from off-highway vehicles (OHV), etc. Lightning is the only biophysical ignition source. Lightning ignitions occur at random, and could be threatening to all areas under extreme wildfire conditions.

3.4 POTENTIAL ENVIRONMENTAL EFFECTS OF WILDFIRES

3.4.1. Air Quality

Fires account for approximately one-fifth of the total global emissions of carbon dioxide, releasing NO, CO, and CO₂ into the air. In California, the average annual level of carbon dioxide (CO₂) emissions from fires is approximately 24 million metric tons CO₂ (MMTCO₂) per year, or about 6% of the fossil fuel burning emission. Estimates from the National Science Foundation indicate that fires emitted 7.9 million metric tons of carbon dioxide in just a one-week period, equivalent to 25 percent of the monthly emissions from all fossil fuel burning throughout California. The year 2003 marked a record high for catastrophic wildfire events in Southern California: 750,000 acres of land were burned, and 3,500 structures were destroyed, displacing approximately 100,000 people. During this event, the local health board advised people to stay indoors to avoid excessive exposure to harmful chemicals that were emitted from the fires.

Smoke from a wildfire comprises carbon dioxide, water vapor, carbon monoxide, particulate matter, hydrocarbons and other organics, nitrogen oxides, ozone, and trace minerals. The composition of smoke varies with fuel type: different types of vegetation are composed of varying amounts of cellulose, lignin, tannins and other polyphenolics, oils, fats, resins, waxes, and starches that produce different compounds.
when burned. Particulate matter (PM) is a mixture of solid particles and liquid droplets found in the air which are directly related to an individual’s health when compared to its size. The EPA states that PM less than 10 micrometers are of the most concerning because of its capability and likelihood to enter the lungs via air passages. In general, PM is the major pollutant of concern from wildfire smoke. Other hazardous air pollutants and contaminants also present in smoke are acrolein, benzene, and formaldehyde.

The rate of wildfire emissions is subject to large seasonal variation, with the ratio of carbon dioxide emissions from wildfire to emissions from fossil fuel burning in September and October reaching 50% in many years. Emissions from wildfires depend on the quantity of wildland fuels, meteorological conditions, and topographic features that interact to modify the burning behavior as the fire spreads. Variability in fuel type, fuel loading, and moisture content affects the combustibility of fuels. Emission quantities could be directly related to the intensity and direction (relative to the wind) of the wildfire. However, much of this data is obtained from laboratory experiments due to the complications of safely monitoring emissions close to a wildfire.

Fires and fossil fuel emissions have entirely different effects on atmospheric carbon dioxide levels. The short-term rise in carbon dioxide levels from fires are counteracted by CO₂ sequestered by plants and trees over the long-term through post-fire forest regrowth. In contrast, carbon emissions from fossil fuels result in a net increase in atmospheric carbon over these time scales. Increased fire frequency, however, may postpone carbon sequestration by cutting short forest regrowth, resulting in a net increase in atmospheric carbon from fire over many decades. During major fire events, air quality is often reduced to hazardous levels, and at times remains impaired for many days after an event. Air quality has declined as the frequency and duration of wildfires become more prevalent, producing increased emissions over a shorter time period and increasing the number of days of poor air quality in the basin.

### 3.4.2 Biological Resources

Wildfires are an integral part in the biodiversity of plant and animal ecosystems in Southern California. The chaparral-shrubland community is highly tolerant to the disturbance of fire and will generally dominate a burned site several decades after a fire. The ability for chaparral plant communities to recover from fire is highly favorable, contributing to plant succession by influencing the germination of seeds and the stimulation of spouting seedlings. Early successional plant species, including native and non-native grasses and perennials, will generally dominate a burned site for the first several years after a fire. However, negative impacts have also been associated with the increase in frequency of Southern California’s large fires.

Increased fire frequency on the same site tends to favor vegetative type conversion to early successional species. Changes in dominant vegetation communities dramatically affect the habitat for plant and animal species. For example, the coastal California gnatcatcher is dependent primarily on coastal sage scrub vegetation. If this vegetation is burned too many times, it may convert to non-native grassland or a disturbed habitat that would preclude its use by the gnatcatcher. The introduction of non-native species in recent burn areas significantly affects forest and rangeland ecosystems. Non-native invasive grass species such as Bromus tectorum (Cheat Grass) favors disturbed areas and establishes itself strongly, out-competing native plant habitat. These introduced annuals cure early and remain flammable during a long fire season, thereby increasing the frequency of wildfire because of the abundance of early cured fine fuels. Earlier curing, faster recovery, and continuity alterations are a result of a non-native habitat that allows the fire season to begin in late spring, thus reducing fire return intervals, and increasing the size of wildfires.

Fires often cause a short-term increase in productivity, availability, or nutrient content of forage. These changes can contribute to substantial increases in herbivore populations, but potential increases are moderated by animals’ ability to thrive in the altered, often simplified, structure of the post-fire environment. Large, high-intensity fires that denude the landscape of many shrubs and trees reduce
habitat quality for species that require dense cover and improve it for species that prefer open sites. Thus, habitat changes (e.g., alteration of cover protection and available food resources) occurring from a wildfire could be more detrimental to faunal populations and communities than fire itself. In many desert and semi-desert habitats, the history of wildfire occurrences are fairly infrequent because of sparse fuels. Many animals in these ecosystems are poorly adapted to avoid fire or use resources in post-fire communities.37

3.4.3. Water and Soil Quality

Wildfire impacts water and soil quality in adverse ways, dependent upon variables such as fire intensity, duration, size, and precipitation. For example, increased rates of erosion and sedimentation from denuded hillsides, water temperature increases from a decreased vegetative stream shade, and alterations in water chemistry (e.g., increased levels of chemical pollutants from fire retardant) affect aquatic biota and water sources for terrestrial species. These impacts have become more severe as the frequency and intensity of wildfire increases.

Erosion and sedimentation: Watersheds that have been severely denuded of vegetation by wildfire are vulnerable to accelerated rates of soil erosion, and therefore yield large amounts of post-fire sediment. Post-fire increases suspended sediment concentrations and turbidity that may result from erosion and overland flow, channel scouring due to the increased streamflow discharge, and creep accumulations in stream channels. Post-fire turbidity levels in stream water are affected by the steepness of the burned watershed, with steeper slopes depositing higher sediment levels. In addition, post-fire may increase the opportunity for landslide and mudslide events.

Water Temperature: The removal of streambank vegetation by burning can cause water temperature to rise, causing thermal pollution to occur. When riparian (streamside) vegetation is removed by fire, the stream surface is exposed to direct solar radiation, and stream temperatures increase.

Water Chemistry: Postfire streamflow may transport solid and dissolved materials that adversely affect the quality of water for human, agricultural, or industrial purposes. The most obvious effects are produced by sediments. The acidity of water affected by ash depositions immediately after a fire could cause a significant decrease in the pH of water, violating water quality standards. Dissolved nitrogen may increase after fires due to accelerated mineralization and nitrification. However, the level of nitrogen is generally low and does not usually violate water quality standards. Low but increased levels of dissolved phosphorus, sulfur, chloride, and total dissolved solids can also follow fires, but studies have shown no violations of water quality standards where standards exist.

Fire Retardant: The water quality impacts of fire retardant are not a direct result of fire, but the use of fire retardant to suppress wildfires in an effort to protect communities in the area. Ammonium-based fire retardants used in fire suppression efforts (diammonium phosphate, monoammonium phosphate, ammonium sulfate, or ammonium polyphosphate) may affect water quality and could be toxic to aquatic biota.

3.5 POTENTIAL POWER LINE RELATED FIRE HAZARDS

Points of ignition and wildfire suppression conflicts related to power lines outline the potential hazards and circumstances that could arise due to the presence, construction, and maintenance of power lines.

3.5.1. Points of Ignition

Ignition sources related to power lines can be categorized into operational points of ignition and construction and maintenance points of ignition. The vast majority of operational power line-associated ignitions historically have occurred in relation to two types of power lines: lower voltage transmission (subtransmission) and distribution power lines. A lower voltage or subtransmission power line is typically
considered as less than 115 kV. Distribution power lines are typically operated at 12 or 4 kV and provide service directly to residential and commercial locations and/or other customers as the need may be. The energized conductors for distribution of lower-voltage transmission lines are much closer together (as close as two feet) compared with higher-voltage transmission lines (16 to 23 feet for 230 kV, depending on structure type)\textsuperscript{29}. Operational wildfire ignitions have occurred along larger transmissions (greater than 115 kV) power lines, but at a much lower incident rate than subtransmission and distribution power lines.

**Operational Ignition Sources**

The primary source of ignitions associated with the operation of a power line occurs through a process known as electrical arcing. Electrical arcing occurs when an energized conductor makes contact with another conductor or a grounded object. Grounded objects could include or be caused by the following:

- Floating or wind-blown vegetation debris contact with conductors or insulators
- Conductor-to-conductor contact (otherwise known as line slap)
- Bullets, airplane, helicopters, lightning contact, and birds

Other types of ignition points that may originate during the operation of power lines may include:

- Collapse of towers and/or wood poles
- Component failures
- Indirect ignition by natural disasters (e.g. earthquakes, landslides)
- Indirect ignition by increased public use of power line rights-of-way (e.g., arson, smoking, recreation)

Both distribution and transmission systems are designed to withstand high winds. It is extremely rare that higher-voltage transmission structures blow over. When high winds do occur, the protection system on a transmission line is designed to shut off power flow in a fraction of a second. Power line structure failures are infrequent; however, due to their placement in narrow corridors in close proximity to trees and other tall vegetation, they may be forced down during extreme weather conditions by wind-blown trees or other hazardous debris. In addition, failure to trim or remove trees that are located very close to transmission line conductors could result in wildfire ignitions when trees or branches are blown onto conductors.

Transmission line protection and control systems are designed to detect faults (such as arcing from debris contacting the line) and rapidly shut off power flow in 1/60 to 3/60 of a second. Because higher voltage lines are designed to be more sensitive to faults, they are typically mounted on tall structures to provide an adequate distance from vegetation.

Other operational power line-related ignition sources may include airborne objects (Mylar balloons, kites) coming into contact with conductors or insulators. Accidents related to guns, airplanes, and helicopters coming into contact with conductors, poles, and towers may also cause ignitions.

Ignition sources related to power lines could originate from wildlife, for example large birds. Condors are the largest flying avian species in North America and are listed as an endangered species. Condors possess a wingspan of more than 9.5 feet. Condor activity occurs within the Project study area. The Sespe Condor Sanctuary lies within adjacent corridors to the proposed Project assessment area. Bird-caused flashovers (a “flashover” is an unintended electric arc) are possible on low-voltage distribution and transmission lines where conductors are closely spaced, which is not expected for the proposed Project. Birds perched on power poles or flying between poles can simultaneously contact two conductors, causing an electrical flashover. This electrocutes the bird and occasionally causes the feathers to catch fire and potentially fall to the ground, igniting nearby vegetation. Hopper Mountain Wildlife Refuge Complex reported five cases in which condors have collided with power lines; there were no reports of these collisions causing a wildfire ignition\textsuperscript{4}.

Furthermore, the introduction of power line access roads may provide increased access onto wildlands for the public, increasing the threat of ignitions (i.e., smoking, campfires, and arson).
Construction and Maintenance Points of Ignitions

During construction and maintenance activities, the potential for wildfire ignitions may also occur. Activities such as pad clearing, road building, vegetation removal, helicopter use, tower construction, conductor stringing, and insulator, tower, conductor, road and vegetation maintenance activities provide a possible point of ignition. The following are potential construction and maintenance ignition sources:

- Equipment operations
- Vehicular Related
- Chainsaw operation
- Vegetation removal and/or treatments
- Welding and blasting
- Human Causes (e.g., smoking, warming fires)
- Accidental Contact with energized conductors

Equipment accidents are potential ignition threats associated with higher-voltage transmission lines. For example, human-caused accidents/incidents during construction and/or maintenance from blasting, the use of equipment such as chainsaws, and the presence of personnel that smoke in the vicinity of transmission lines may inadvertently ignite fires.

System component failures during maintenance routines could cause line faults that result in fires on transmission lines of any voltage, depending on system components. Examples are static line failure due to high winds and corrosion at the point of attachment, guy wire failure and subsequent conductor contact, broken crossarms causing conductor-to-conductor contact, and pole or tower collapse. In addition, poor maintenance that allows dirt to build up on insulators may result in flashovers and ignitions.

Wildfire Suppression Conflicts

When wildfires are ignited in the vicinity of distribution or transmission power lines, conflicts and risks are placed on wildfire suppression tactics. Power line conflict hazards, such as electrical shock and/or reduced aerial and ground tactics, have potential impacts to wildfire suppression efforts and firefighter safety. This section describes the suppression conflicts associated with power lines.

When power lines are present within a wildfire, aerial and ground attacks are restricted. Aerial operations are complicated by the risk of aircraft and/or water buckets colliding with towers and/or conductors during smoky, reduced-visibility conditions. Conditions are especially hazardous when transmission lines are placed on ridge tops, reducing the proximity of fire retardant and water drops via aircraft. During a wildland fire, it is recommended that ground attacks not be made within at least 500 feet of a power line conductor and that ground-based firefighters maintain a clearance from downed, energized power lines equal to the distance between two towers. This firefighting safety “rule of thumb” encompasses all jurisdictions to ensure firefighter safety. Wildland firefighters working around energized power lines are exposed to electrical shock hazards including direct contact with downed power lines, contact with electrically charged materials and equipment due to broken lines, contact with smoke that can conduct electricity between lines, and the use of solid-stream water applications around energized lines. Between 1980 and 1999 in the U.S., 10 firefighter fatalities occurred due to electrical structure contact during wildfire suppression.
4.0 **FIELD INVENTORY METHODS AND GIS DATA**

4.1 **FIELD INVENTORY**

The BRRTP Proposed Action and Alternatives were field-verified for existing wildfire and fuels attributes and conditions. The length of the Proposed Action and the Alternatives was surveyed in half-mile segments within the borderzone. The borderzone is designated as the area where potential wildfire risks exist. The borderzone extends a quarter-mile outward on both sides of the centerline associated with the Proposed Action and the Alternatives. Half-mile square segments centered on the proposed transmission line Alternatives represent the study corridor for the proposed BRRTP.

Sets of 11x17 maps of the Proposed Action, and Alternatives with GIS shapefile overlays were created using GIS spatial data. The map overlays included historical fire boundaries and ignitions, topography, vegetation, roads, assets at risk, and existing power line facilities of the Proposed Action and Alternatives. Each half-mile segment of the Proposed Action and Alternatives was visually inspected, although some segments were not accessible due to private property boundaries. In those circumstances where access was limited, segments were observed using binoculars from nearby ridges or high access points. Global positioning system (GPS) locations of field photo points were taken using a Trimble GeoXT or GeoXH GPS device. Field surveys and GPS photo points were GPS-PhotoLink to create a GIS layer for the EIS/EIR Wildfire and Fuels Technical Report.

Six wildfire and fuel attributes were identified in the study corridor analysis. Attributes and conditions of topography, fuels and vegetation, roads, wildfire containment conflicts, assets at risk, and new line/existing segments along the study corridor were GPS recorded and documented. The six attributes of the Wildfire and Fuels Technical Report analysis are discussed below:

1. Topography of the line segments was examined and ground-verified for GIS accuracy. The topography of the segments provides valuable tools in assessing potential wildfire hazards that a new transmission line may add to the landscape. Features of interest included areas where transmission lines would be built on ridge tops or below existing transmission lines, or would pose fire suppression conflicts.

2. Fuels were documented and photographed along each segment of the study corridor for the Proposed Action and Alternatives. Native and non-native plant samples were identified and assessed along the study corridor. Fuels were classified/ranked using the Scott and Burgan *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel’s Surface Fire Spread Model*.

3. Roads within the study corridor of the Proposed Action and Alternatives were documented. The presence and condition of roads (e.g., paved, gravel, gated) could potentially increase the likelihood of human caused ignition. Conversely, well-maintained paved roads could serve as an access point for fire suppression efforts.

4. Potential wildfire containment conflicts were observed, documented, and GPS recorded. Primary containment conflicts included existing wooden power line poles that could potentially impact the Proposed Action or Alternatives. Areas where the proposed transmission lines create transmission line bounded islands were documented. “Transmission line bounded islands” are identified when a transmission line departs from an existing transmission line and then remerges with it, creating an enclosed bounded area. Transmission line bounded islands that are created by the Proposed Action and/or Alternatives would substantially reduce the effectiveness of fire suppression efforts by creating an expanded safety perimeter that would be inaccessible for firefighting tactics, thereby increasing fire spread and intensity.

5. Assets at risk were inspected along the study corridor of the BRRTP Proposed Action and Alternatives. Assets at risk included unidentified homes, structures, businesses, public facilities, or
biological areas. To ground-truth the GIS database, the study corridor was inspected for any assets present within each segment. Any assets that were not displayed on the GIS layer were documented and GPS recorded.

6. All portions of the Proposed Action and Alternatives where new lines are to be constructed in an undisturbed area were field surveyed. New line segments of the Proposed Action and Alternatives were inspected for all attributes listed in this section.

Below is a photo taken along the Proposed Action alignment within the ANF looking northward depicting the vegetation fuel loads and wooden power line poles adjacent to the Proposed Action route and existing transmission lines.

4.2 GIS DATA

In addition to the field inventory, other research was performed to acquire data contributing to the fireshed analysis of existing conditions. Additional data was received from the ANF, CAL FIRE Fire and Resource Assessment Program, and LANDFIRE. 2009 satellite imagery was also used for verification of existing assets, infrastructure, and the presence of roads when field verification was not possible.
5.0 **AFFECTED ENVIRONMENT**

5.1 **FIRESHED ASSESSMENT AREA**

Firesheds are regional landscapes that are delineated for the purposes of a wildfire and fuels environmental assessment. A fireshed is developed from fire history, fire regime, vegetation, topography, and potential wildfire behavior. Firesheds are useful assessment tools for identifying high fire risk areas and predicting future fire behavior, an objective of reducing fire risk and protecting communities. Firesheds are conceptually analogous to watersheds and are referred to as an ignition that escapes containment at the top of the fireshed that could spread to the limits of the fireshed under extreme weather conditions. An individual fireshed encompasses an area with similar fire risk and where prevention and response strategy could influence the wildfire outcome.

For the purposes of this technical report, a BRRTP fireshed assessment area has been created. The BRRTP fireshed is approximately 495,654 acres, covering multiple land ownerships. The BRRTP fireshed encompasses a diversity of fuels, weather patterns, biophysical traits, and land use types. The Project fireshed supports dense, drought-adapted shrublands that are highly flammable, which is extremely significant in the fall as fuel moistures reach very low levels. The annual precipitation within the fireshed ranges from 8 inches annually at the lowest elevations to 27.5 inches annually at the highest elevations. Most critically, Santa Ana winds originating from the Great Basin create extreme fire weather conditions that are characterized by low humidity, sustained high-speed winds, and strong gusts. Santa Ana winds typically travel from the northeast over the Peninsular Range to meet low pressure from the Coastal Ranges. In addition to the SAO, the fireshed is influenced by the variation in elevation. The elevation in the BRRTP fireshed ranges from 926 vertical feet in the valleys and basins to 5,790 vertical feet at peak mountain ranges. Figure 5.1.1 on the following page illustrates the Proposed Action and Alternatives in relation to the BRRTP fireshed. Areas of the Proposed Action and Alternatives outside the BRRTP fireshed were assessed and determined to pose a negligible risk for wildfire and fuel risks.
FIGURE 5.1.1. FIRESHED ASSESSMENT AREA
Wildland fires have been present throughout the history of the fireshed, covering all spatial scales. The BRRTP fireshed has experienced various levels of wildfire activity throughout the past 50 years. The 1960s and 2000s have been recorded as the most active, with the 2000 decade burning approximately 150,000 acres of the fireshed. The translocation of people from the city of Los Angeles to the suburbs of Los Angeles could be the cause of the spike in wildfires in the 2000 decade (Table 5.1a).

**TABLE 5.1A. ACRES OF FIRESHED BURNED BY DECADE**

<table>
<thead>
<tr>
<th>Decade</th>
<th>Acres of Fireshed Burned (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960's</td>
<td>150</td>
</tr>
<tr>
<td>1970's</td>
<td>140</td>
</tr>
<tr>
<td>1980's</td>
<td>130</td>
</tr>
<tr>
<td>1990's</td>
<td>120</td>
</tr>
<tr>
<td>2000's</td>
<td>110</td>
</tr>
</tbody>
</table>

The fireshed has had portions burned by both small and large fires (Table 5.1b). The largest of the burned areas occurred during the 1968 Liebre Fire, which burned 48,512 acres of the fireshed. Within the last fifty years, there have been nine fires that have burned over 10,000 acres within the fireshed. Half of the recorded wildfires in the fireshed, comprising over 100,000 acres, have occurred within the past fifteen years. One of the recent large wildfires was the 2007 Buckweed Fire, which burned approximately 40,000 acres of the fireshed east of Santa Clarita to north of State Route 14. The Crown Fire in July 2010 burned 13,000 acres west of Desert View Highlands.
The ANF manages 218,087 acres (44%) of the BRRTP fireshed. 253,781 acres (55%) of the fireshed is managed by the State—Los Angeles, Kern, and Ventura Counties—and Local Agencies (City of Santa Clarita). The remaining 1%, approximately 23,000 acres, of the fireshed is managed by the Bureau of Land Management, the California Department of Parks and Recreation, and the California Department of Fish and Game (Chart 5.1).

**CHART 5.1. BRRTP FIRESHED LAND OWNERSHIP**

**5.1.1. BRRTP Eco-regions**

The BRRTP fireshed encompasses portions of Los Angeles, Kern, and Ventura Counties and is broken into seven distinct eco-regions: 1) High Desert plains and hills, 2) Los Angeles plain, 3) Simi Valley-Santa Susana Mountains, 4) San Gabriel Mountains, 5) San Rafael-Topatopa Mountains, 6) Sierra Pelona-Mint Canyon, 7) Northern Transverse Ranges. This section describes the seven eco-regions of the BRRTP fireshed, illustrating vegetation composition, topography, and climate (Figure 5.1.2).
High desert plains and hills

The high desert plains and hills span approximately 87,887 acres along the northern portion of the fireshed. This eco-region consists of the western Mojave Desert and exhibits a desert climate. The level of precipitation in the eco-region ranges from 4 to 10 inches annually. Moreover, this region experiences a high pressure gradient that primes the Santa Ana wind events. The soils predominantly comprise alluvial plain and pediment with small hills. Within the eco-region boundary, the vegetation composition is predominantly shrubs, comprising approximately 53,000 acres. The vegetation composition is approximately 61.4% shrub; 22.2% grass; 9.1% grass-shrub; 2.2% bare ground; 2.1% agricultural; 1.9% timber; 0.7% urban; and 0.6% water. The most common vegetation series are the *Larrea tridentata* (Creosote bush), *Yucca brevifolia* (Joshua tree), and *Artemisia californica* (California Sagebrush) at lower elevations. At higher elevations (3,000 feet) *Juniperus californica* (California juniper) and *Ceanothus* spp. (Sugar Brush) series are the most common.

Northern Transverse Ranges

The Northern Transverse Ranges run horizontally across the fireshed, encompassing approximately 202,512 acres. The Northern Transverse Range is characterized by broad fault blocks and alleviated lowlands, and is dissected by granitic uplands. The eco-region is characterized by its high elevation setting and the influence from upper level weather patterns in the west, decreasing to mid-elevation ranges along the eastern section. Along the southern end of the eco-region, the high-elevation mountain range transcends into the foothills of the Santa Clarita Valley. This eco-region has a lower annual average relative humidity than the lower elevation eco-regions, and is not heavily impacted by the SAO that is generated in the Mojave Desert. The Northern Transverse Ranges would be the first to display the effects of atmospheric abatement. Long periods of hot, dry weather are not uncommon at the high elevations of the Northern Transverse Ranges. The US Weather Bureau Station is located in the northwest section of the eco-region, just south of Quail Lake and east of Interstate 5. The fire season for the Northern Transverse Ranges is highly dependent on the winter snowpack and spring weather conditions. Precipitation ranges from 6-40 inches annually throughout the eco-region. Within the eco-region boundary, the vegetation composition is predominantly shrubs, approximately 137,000 acres. The vegetation composition is approximately 67.7% shrub; 12.7% grass; 9.5% timber; 7.2% grass-shrub; 1.7% urban; 0.7% water; and 0.5% bare ground. The eco-region is dominated by mixed chaparral series with a sparse mixture of deciduous and pine forests, decreasing in density as the elevation drops into the Santa Clarita Valley and Los Angeles Basin. Predominant plant species include *Juniperus californica* (California juniper), *Pinus coulteri* (Coulter pine), *Pinus sabiniana* (Gray pine), *Quercus* spp. (Oak species), *Ceanothus* spp. (Sugar Brush), *Arctostaphylos glauca* (Big Berry Manzanita), and *Adenostoma fasciculatum* (Chamise).

Sierra Pelona-Mint Canyon

The Sierra Pelona-Mint Canyon eco-region comprises 152,762 acres of the fireshed. The eco-region is defined by its location east of Interstate 5 and bordering the WUI of Santa Clarita Valley, the Los Angeles Basin, and the Palmdale suburbs. The eco-region is characterized by mid-elevation foothills and urban development. The soils are well drained and have xeric characteristics; underlying rock is sedimentary with portions of granite. Significantly, Santa Ana winds formed in the desert advance toward the low pressure of the Coastal Ranges, and sweep through the Santa Clarita Valleys and Los Angeles Basin of this eco-region. Annual precipitation in the region ranges from 12-20 inches. Within the eco-region boundary, the vegetation composition is predominantly occupied by 43,583 acres of shrub, 31,922 acres of mix grass-shrub, and 28,254 acres of timber. The vegetation composition is approximately 28.5% shrub; 20.9% grass-shrub; 18.5% timer; 14.5% urban; 11.8% grass; 3.8% bare ground; and 2.0% water. The dominant plant communities are *Adenostoma fasciculatum* (Chamise), *Arctostaphylos glauca* (Big Berry Manzanita), *Ceanothus* spp. (Sugar Brush), *Heteromeles arbutifolia* (Toyon), *Quercus agrifolia* (Coastal live oak), and mixed shrublands.
San Rafael-Topatopa Mountains

The San Rafael-Topatopa Mountains eco-region is approximately 22,460 acres, spanning west of Interstate 5, adjacent to the southwestern portion of the Northern Transverse Ranges and northwestern section of the Sierra Pelona-Mint Canyon eco-regions. This eco-region does not contain the Proposed Action or Alternatives. The region is characterized by the mid-low elevation foothills transcending into the West Central Valley. The slopes of the mountains are steep with narrow canyons and the soils are well drained with the soil moisture regime being xeric. The climate is similar to that of the Sierra Pelona-Mint Canyon with SAO during the autumn months. Precipitation in the region ranges from 20-40 inches annually. Included in the eco-region are portions of Lake Piru. This eco-region is highly recreated because of its vicinity to the WUI and Lake Piru. Between 200,000 and 600,000 people visit Lake Piru each year. The vegetation composition within the eco-region is predominantly timber, comprising 9,682 acres, along with 8,500 acres of grasslands. The vegetation composition is approximately 43.1% timber; 37.9% grass; 10.2% grass-shrub; 7.3% shrub; 0.7% bare ground; 0.5% urban; and 0.2% water. The plant communities include stands of *Juniperus californica* (California juniper), *Pinus coulteri* (Coulter pine), *Pinus sabiniana* (Gray pine), and *Quercus* spp. (Oak species). Chaparral series in the region include *Adenostoma fasciculatum* (Chamise), *Ceanothus* spp. (Sugar Brush), and mixed-shrub.

Simi Valley-Santa Susana Mountains

The Simi Valley-Santa Susana Mountains eco-region comprises 5,222 acres of the fireshed. This region comprises a small portion west of San Fernando and north of Granada Hills. The eco-region is characterized by steep mountains transcending into the gently sloping floodplains of the WUI. The vegetation composition within the region comprises 1,931 acres of shrub and 1,536 acres of timber. The vegetation composition is approximately 37.0% shrub; 29.5% timber; 12.4% urban; 7.7% grass-shrub; 7.6% bare ground; and 5.8% grass.

San Gabriel Mountains

The San Gabriel Mountains comprise 9,204 acres of the fireshed. The eco-region boundary includes the western edge of the San Gabriel Mountains, situated to the north of Sylmar. It is adjacent to the east side of the Simi Valley-Santa Susana Mountains eco-region and to the south side of the Sierra Pelona-Mint Canyon eco-region. The underlying geology contains mostly granitic rock on steep to very steep slopes. Due to lower elevations, the soils are somewhat mesic. The predominant vegetation is a mix of *Pinus spp.* (Pine species) and Mix Oak series. Other plant communities present consist of *Adenostoma Fasciculatum* (Chamise), *Ceanothus spp.* (Sugar Brush), and grasslands. The vegetation composition is predominantly 2,866 acres of grass-shrub and 4,855 acres of timber. The vegetation composition is approximately 52.8% timber; 31.2% grass-shrub; 9.2% shrub; 3.7% grass; 1.7% urban; 1.3% bare ground; and 0.1% water.

Los Angeles Plain

The Los Angeles Plain is the southernmost eco-region, comprising 15,602 acres of the fireshed. This eco-region is located within a small portion of the fireshed and is bordered by the eco-regions of the Simi Valley-Santa Susana Mountains and San Gabriel Mountains in the San Fernando Valley. The climate is hot and moderately humid and is influenced by the Pacific Ocean’s marine layer. Precipitation ranges over the eco-region from 12-20 inches annually. The region is similar to the San Gabriel Mountains in geology. The region is characterized by floodplains levels/terraces and very gently sloping to sloping alluvial fans. The soils are well drained and soil moisture regimes are xeric. Approximately 13,270 acres...
of the eco-region is urban development. The vegetation composition is approximately 85.1% urban; 5.7% grass; 3.7% timber; 1.9% bare ground; 1.4% water; 1.3% grass-shrub; and 1.0% shrub. The predominant vegetative communities are *Artemisia californica* (California sagebrush), *Eriogonum fasciculatum* (California buckwheat), *Quercus agrifolia* (Coastal live oak) and *Juglans californica* (California walnut) series, and *Platanus racemosa* (California sycamore) occurs in riparian areas.
FIGURE 5.1.2. ECO-REGIONS
5.1.2. Angeles National Forest Land Use Zones

The ANF is located near a population of approximately 10 million people for year-round recreation. Land use zones are utilized by the ANF for the purpose of identifying and mapping appropriate management types and uses that are consistent with the desired conditions described in Part 1 of the revised Forest Plan. These land use zones are used to help demonstrate the agency’s intent of use and to indicate the anticipated level of public land use in any area of the national forest. Out of the eight land use zones for the ANF, six fall into the BRRTP fireshed. Chart 5.1.2a illustrates the percentage of USFS land use zones within the fireshed and Table 5.1.2a shows the activity and use of the six different land use zones.

**Chart 5.1.2a. BRRTP Fireshed USFS Land Use Zones by Acre**

**Table 5.1.2a. ANF Land Use Zone Summary Table**

<table>
<thead>
<tr>
<th>Activity or Use</th>
<th>Developed Areas Interface</th>
<th>Back Country</th>
<th>Back Country Motorized Use Restricted</th>
<th>Back Country Non-Motorized</th>
<th>Critical Biological</th>
<th>Existing Wilderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Protection Areas</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
<td>By Exception</td>
<td>By Exception</td>
</tr>
<tr>
<td>Fuelbreak Construction including type conversion</td>
<td>Suitable</td>
<td>Suitable</td>
<td>By Exception</td>
<td>By Exception</td>
<td>By Exception</td>
<td></td>
</tr>
<tr>
<td>Wildfire</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>Use Strategy</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Suitable</td>
</tr>
</tbody>
</table>

*Developed Area Interface (DAI)*

This zone encompasses 48,980 acres of the fireshed and includes areas adjacent to subdivisions, business communities, and heavily traffic/recreated areas. The DAI contains concentrated use areas and developed sites with more scattered or isolated community infrastructure. The level of human use and infrastructure is significantly higher than compared to other zones. The DAI contains populated communities such as
Green Valley, Paradise Ranch, Lake Hughes, and Elizabeth Lake that fall into the forest boundaries and within the BRRTP fireshed. A number of highly popular developed and non-developed recreation facilities are included in this zone, such as Rowher Flat OHV Area. The level of development within this zone varies between areas that are highly developed to areas where no development has occurred. The DAI zone is managed for motorized public access. However, there is evidence that motorized use occurs year-round. The DAI land use zone has the highest potential as a source of fire ignition in the BRRTP fireshed. Within the DAI, there are increased historical occurrences of fire ignitions compared to the rest of the fireshed. The DAI includes the highest traffic areas in the fireshed, such as Interstate-5 (I-5), Lake Hughes Road, Elizabeth Lake Road, and San Francisquito Road.

**Back Country**

The Back Country comprises 73,885 acres of the fireshed and includes areas of the national forest that are generally undeveloped with few roads. Most of the national forest’s remote recreation and administrative facilities are found in this zone. The level of human use and infrastructure is generally low to moderate; hence, wildfire ignition in the Back Country portion of the BRRTP fireshed is relatively low.

The zone is managed for motorized public access on designated roads and trails. Approximately 45.5 percent of the National Forest System and non-system roads are found in this zone, including 44 miles of unclassified road. Some roads within this zone may be closed to public access. The majority of National Forest System roads and other road systems that interconnect areas of concentrated development are found in this zone. A network of low standard Back Country roads provide access for a wide variety of dispersed recreation opportunities in remote areas, such as camping and access to trailhead facilities for hiking or biking. Although this zone generally allows a broad range of uses, the ANF intent is to retain the natural character inherent in this zone and limit the level and type of development.

Wildland/Urban Interface Threat Zones are characteristic in this zone. Managers anticipate locating community protection vegetation treatments that require permanent road access (such as fuelbreaks see Section 5.2.3) within the Back Country land use zone.

**Back Country (Motorized Use Restricted)**

This zone includes 10,931 acres of the fireshed and consists of areas within the national forest that are generally undeveloped with few roads. Few facilities are found in this zone, but some may occur in remote locations. The level of human use and infrastructure is low to moderate. As with the Back Country zone, human wildfire ignitions are relatively low. The zone will be managed for non-motorized (mechanized, equestrian, and pedestrian) public access. The intent is to use temporary roads or gated permanent roads while management is occurring and then gate the permanent roads or remove the temporary routes when done. Limited access to the public in this manner should reduce the potential for human-caused ignitions. A network of low standard Back Country roads provides access for a wide variety of non-motorized dispersed recreation opportunities, including camping, hiking, biking, hunting and fishing. Designated OHV use is not suitable in this zone. Although this zone allows a range of low-intensity land uses, the management intent is to retain the natural character of the zone and limit the level and type of development. Some roads will be constructed and maintained, but the intent is to manage the zone for no increase or a very low level of increase in system development.

Wildland/Urban Interface Threat Zones are characteristic in this zone. Managers anticipate locating community protection vegetation treatments that require permanent road access (such as fuelbreaks, see Section 5.2.3) within the Back Country Motorized Use Restricted land use zone.

**Back Country Non-Motorized**

This zone comprises approximately 83,177 acres of the fireshed and includes areas of the national forest that are undeveloped with few, if any, roads. Developed facilities supporting dispersed recreation activities are minimal and generally limited to trails and signage. The level of human use and
infrastructure is low; because of the low levels of access, the historic human wildfire ignitions in the zone are low. The zone is managed for a range of non-motorized uses that include mechanized, equestrian, and pedestrian public access. Administrative access (usually for community protection) is allowed by exception for emergency situations and for short duration management purposes (such as fuel treatment). A network of low standard Back Country trails provide public access for a wide variety of non-motorized dispersed recreation opportunities, including remote area camping, hiking, mountain biking, hunting and fishing. No designated OHV routes are located in this zone.

Wildland/Urban Interface Threat Zones may occur in this zone. Managers anticipate locating community protection vegetation treatments that require only temporary road access (such as mechanical thinning of trees or prescribed burning) within the Back Country Non-Motorized land use zone.

Critical Biological

This zone includes the most important areas on the national forest to manage for the protection of species-at-risk, making up approximately 645 acres of the fireshed. Facilities are minimal to discourage human use. The level of human use and infrastructure is low to moderate.

Wildland/Urban Interface Threat Zones may occur in this zone. Community protection vegetation treatments within the Critical Biological land use zone may occur by exception. In these cases, managers will consider species and habitat needs. The management intent is to retain the natural character and habitat characteristics in this zone and limit the level of human development to manage for protection of species-at-risk. Activities and modification to existing infrastructure are allowed if they are beneficial or neutral to the species for which the zone was primarily designated. See Table 5.1.2b for Angeles NF Critical Biological Land Use Zones present in the fireshed. Human uses are more restricted in this zone than in Back Country Non-Motorized zones in order to protect species needs, but are not excluded. Low impact uses, such as hiking, mountain biking, and hunting, are generally allowed. Motorized use of existing National Forest System roads is allowed.

<table>
<thead>
<tr>
<th>TABLE 5.1.2B. CRITICAL BIOLOGICAL LAND USE ZONES SUMMARY TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisquito Canyon</td>
</tr>
<tr>
<td>California red-legged frog, unarmored three-spine stickleback,</td>
</tr>
<tr>
<td>Berberis nevini</td>
</tr>
<tr>
<td>Santa Clara Canyons</td>
</tr>
<tr>
<td>Access to the old Saint Francis dam site is retained. Because of</td>
</tr>
<tr>
<td>it historical context, and to avoid use conflicts associated with</td>
</tr>
<tr>
<td>visitor use at the dam site, the Critical Biological Land Use Zone</td>
</tr>
<tr>
<td>is disconnected at this location for a short distance.</td>
</tr>
<tr>
<td>Castaic Arroyo toad Santa Clara Canyons</td>
</tr>
<tr>
<td>Administrative access on USFS Road 6N13 will be retained with</td>
</tr>
<tr>
<td>restrictions on night-time use. Grazing has been discontinued.</td>
</tr>
<tr>
<td>Fish Canyon Arroyo toad Santa Clara Canyons</td>
</tr>
<tr>
<td>Administrative access on USFS road 6N32 will be retained with</td>
</tr>
<tr>
<td>restrictions on night-time use. Grazing has been discontinued.</td>
</tr>
<tr>
<td>Cienega Campground will remain closed and facilities removed.</td>
</tr>
</tbody>
</table>

Existing Wilderness

This zone includes congressionally designated wildernesses and is approximately 758 acres of the fireshed. Only uses consistent with all applicable wilderness legislation and with the primitive character are allowed in existing and recommended wilderness. Road access is limited to uses identified in the specific legislation designating the wilderness. The management intent is to administer this zone for the use and enjoyment of people while preserving its wilderness character and natural conditions.

Wildland/Urban Interface Threat Zones may occur in this zone. Community protection vegetation treatments within the existing wilderness zone may occur by exception. In these cases, managers will consider wilderness needs.
5.1.3. ANF Fire Management Units

A Traditional Fire Management Unit (FMU) is any land management area definable by objectives, land features, access, values to be protected, political boundaries, fuel types, major fire regimes, or special management areas designated by agency policy or congressional action.

Four FMUs have been established for the ANF, each representing unique fire management challenges. Only three of the four FMUs are discussed in relation to the BRRTP fireshed. The units were established to allow analysis of specific fire management needs and issues. Fire management directions provided for each FMU is consistent with direction found for the associated management areas².

**CHART 5.1.3A. BRRTP FIRESHED USFS FIRE MANAGEMENT UNITS**

<table>
<thead>
<tr>
<th>Wildness</th>
<th>0.2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Wilderness</td>
<td>55.3%</td>
</tr>
<tr>
<td>Wildland-Urban Interface</td>
<td>44.5%</td>
</tr>
</tbody>
</table>

**FMU-1 – Wildland-Urban Interface (WUI)**

This FMU is characterized by lower elevation shrub- and grass-dominated fuels systems and includes the majority of the urban wildland interface areas. The Unit is based on the MTZ (Mutual Threat Zone) for the fire cooperators with the ANF. A report of a fire within the MTZ or “green line” initiates an automatic response from the cooperating departments. The responses can include ground and aerial resources and rapidly add to the complexity of the fire management situation. This FMU has the highest number of ignitions on an annual basis when compared to other FMUs. A major source of the ignitions comes from the transportation routes included in the FMU. Interstate 5 and State Highway 14 are located within the FMU and the BRRTP fireshed.

Fuels within the FMU have been under constant change due to the high frequency of fires. This has lead to lower fuel loading and the presence of a greater quantity of finer fuels, including true grasslands. This lower fuel loading and openness of the shrub canopy makes the application of retardant and aerial delivery of water effective. The steep slopes can act to limit the capabilities of mechanized equipment during the firefighting efforts. The primary tactics are based on aerial resources to support ground crews and slow the forward spread of the fire, key in providing firefighter and public safety, and minimizing property and resource damage. The density of the urbanization in the FMU dictates that fire prevention activities will be centered on maintaining defensible space around improvements. Fuels treatments will be strategically placed in the landscape to interrupt fire spread and enhance tactical fire suppression opportunities. While protection of private property will remain a key suppression objective, the ability to take aggressive perimeter control actions is as important to mitigating the threat to property as defensive structure protection actions are.
This FMU is unique and requires cooperation between fire agencies as key to success for suppression, prevention, and fuels treatment. The ability to take action across jurisdictional boundaries allows all entities to increase their fire ground capabilities. The density of suppression resources available from the Forest Service and cooperating agencies allows for an aggressive and effective initial attack. This FMU contains areas designated under the LMP and Critical Biology, and Incident Managers need to be aware of the presence of these species and the potential effects of suppression operations on habitat areas. Additionally, historic and cultural resources are present within the FMU and need to be considered by the Incident Managers.

**FMU-2 – Non-Wilderness**

The FMU fuels are characterized by the density of the fuels and the canopy closure in this mid-elevation range. With increasing elevation, the lower grasslands transition into denser and larger chaparral vegetation types. The FMU consists of an urban intermix consisting of private property, structures, and federal facilities.

This FMU exhibits the necessary fuel characteristics for the effective use of prescribed fire and other vegetation management treatments. Within the unit there also exist established suppression control features, such as the Santa Clara and Sierra Pelona fuelbreaks. These features need to be maintained through the use of prescribed fire, mechanical, or biological means. Fire suppression tactics will continue to focus on aggressive initial attack in attempts to minimize acres burned during wildfire. Aerial firefighting resources are less effective due to the closure of the canopy and increased fire intensity. Flanking tactics utilized on fires starting in the lower elevations tend to push fire spread into this unit. Fire prevention activities and mitigation work will assist in developing and maintaining defensible space around improvements, with prevention patrols focused on areas of high public use or clusters of historic enhanced tactical fire suppression opportunities.

Steep slopes and heavily bisected topography limit control opportunities within the FMU. Mechanized equipment is restricted in many areas due to the primary ridge systems. Fires under typical weather patterns run to the ridge tops, where changes in the alignment of the fire spread allow for successful suppression operations to be conducted. Lateral spread is a function of winds and fuel moistures. As live fuel moisture decreases, lateral spread increases in the chaparral fuel type; this lateral spread often allows a fire to reposition for rapid upslope fire runs. This FMU contains areas designated under the LMP and Critical Biology, and Incident Managers need to be aware of the presence of these species and the potential effects of suppression operations on habitat areas. Additionally, historic and cultural resources are present within the FMU and need to be considered by the Incident Managers.

**FMU-4 – Wilderness**

Only 750 acres of land is designated Sespe wilderness within the BRRTP fireshed. The FMU is best characterized by tactical limitations to fire suppression and LMP direction for Wilderness Management. From a fuels and vegetation perspective, the unit is a combination of FMUs 2 and 3. Limited access to the area requires that the Forest rely on aerial firefighting and detection methods to operate within this Unit.

**5.1.4. BRRTP Fire Regime and Condition Class**

The fire regime throughout the BRRTP fireshed falls into four generalized condition classes. The Fire regime is described as the frequency and intensity of wildfire prevalence in an ecosystem. The condition class is referred to as the general deviation of an ecosystem from its pre-settlement natural fire regime and measures the sensitivity of fire damage to key elements of ecosystem health. The BRRTP fireshed was identified using the latest available dataset from 2003 CAL FIRE Fire Regime and Condition Class (Chart 5.1.4a below).
Code 2 represents approximately 40% of the fireshed, comprising a moderately altered fire regime and moderate risks of key ecosystem components. Code 3 consists of 18.5% of the fireshed and has the potential for high risk alteration of key ecosystem components.

5.2 FIRE SUPPRESSION MANAGEMENT

5.2.1. Responsibility Areas

Wildland fire suppression efforts are dependent on wildfire behavior and could potentially be extremely complex and expensive. Fire suppression in the WUI typically involves a multi-agency firefighting response that involves hundreds of firefighters participating in coordinated air and ground operations. The firefighting responsibility areas involved in responding to a wildfire within the BRRTP fireshed are described in this section.

The ANF and BLM are responsible for almost one half (45% of acreage) of the BRRTP fireshed, encompassing 223,290 acres. California Department of Forestry (CDF) contract counties Los Angeles County, Kern County, and Ventura County are responsible for approximately 157,000 acres (32%) surrounding the federal forest managed areas. The remaining 23% comprises local responsibility, which includes the Lancaster Fire Department, Palmdale Fire Department, and Santa Clarita Fire Department. The local responsibility areas are adjacent to the perimeter of the state responsibility areas in the urban cities. Figure 5.2.1 also illustrates agency fire responsibility jurisdiction in the context of the Project area.

Wildfire suppression efforts are dependent on conditional variables including weather, topography, fuel loads (structure, volume, and moisture content), access, and timing of ignition. The first attempt at control and suppression is called the initial attack. Efficient wildfire suppression is dependent upon a quick and aggressive initial attack, which is ultimately dependent on the availability of firefighting resources, success in coordination among responding fire agencies, the existence of defensive fuel breaks across the landscape, and—most critically—weather conditions. If fires are not controlled within the first two or three hours, additional firefighting resources are usually called in, beginning the extended attack phase. With the onset of evening, fire intensity is typically reduced, assisting firefighters in containing the fire within a single burning period. When extended attack fails and thousands of acres burn, the incident is classified as a major event. As experienced in the 2006 Day, 2007 Witch, and 2009 Station Fires,
incidents could become a major event within a matter of hours during severe fire weather conditions. Major events involving thousands of acres do the most damage, usually occurring between October and January during severe weather conditions including SAO. Fire suppression activities during the time of adverse wind conditions are usually only effective along the flanks, or sides, of the fire. High wind-driven wildfires are difficult to contain regardless of firefighting resources, and run their course until weather conditions change, becoming more favorable for fire suppression. Firefighting objectives during major events focus on evacuation efforts until wind conditions change.

5.2.2. **Available Resources**

During the fire season, the availability and response time for fire suppression resources varies according to the number of other emergencies in the area and the availability of volunteer firefighters. It is important for all participating agencies to have an adequate number of available equipment resources and fire stations to ensure accurate wildfire suppression efforts. This section will describe the ANF and Los Angeles County Fire Department available resources and fire stations within the fire shed.

**Angeles National Forest**

A single dispatch level has been established for the Forest. All reported vegetation fires receive a standard response initiated by the Emergency Communication Center (ECC). During times of modified staffing, this dispatch may not meet standards and will be modified to reflect limited resource availability by the ECC. The ANF states that a “standard” vegetation fire response includes two chief officers, two patrols, and two fire crews. The ANF houses up to five fire stations in the fire shed. Table 5.2.2a outlines the fire station IDs and names located within the fire shed. Table 5.2.2b lists the equipment the ANF has available.

<table>
<thead>
<tr>
<th>Station ID</th>
<th>Name</th>
<th>Base ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Texas Canyon Work Center</td>
<td>TCDZ</td>
</tr>
<tr>
<td>28</td>
<td>Texas Canyon</td>
<td>TCHQ</td>
</tr>
<tr>
<td>26</td>
<td>San Francisquito</td>
<td>SFS</td>
</tr>
<tr>
<td>22</td>
<td>Oak Flat</td>
<td>OFS</td>
</tr>
<tr>
<td>14</td>
<td>Green Valley</td>
<td>GVS</td>
</tr>
</tbody>
</table>

**Los Angeles County Fire Department**

Los Angeles County Fire Department (LACFD) has 12 fire stations, with two fire suppression camps located within the BRRTP fire shed (refer to Tables 5.2.2c and 5.2.2d). Two paid fly crews with assistance from the Department’s Air Operations Section and four to five dozer teams are staffed during fire season and placed strategically around the county. The resources in the camp section fulfill a significant role in the California Wildland Fire Fighting arsenal and are utilized throughout the state for wildland fire fighting.
TABLE 5.2.2C. LA COUNTY FIRE DEPARTMENT FIRE STATIONS WITHIN THE BRRTP FIRESHED

<table>
<thead>
<tr>
<th>Station Number</th>
<th>City</th>
<th>Station Number</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>073</td>
<td>Newhall</td>
<td>149</td>
<td>Castaic</td>
</tr>
<tr>
<td>104</td>
<td>Santa Clarita</td>
<td>081</td>
<td>Agua Dulce</td>
</tr>
<tr>
<td>126</td>
<td>Santa Clarita</td>
<td>140</td>
<td>Leona Valley</td>
</tr>
<tr>
<td>111</td>
<td>Valencia</td>
<td>157</td>
<td>Green Valley</td>
</tr>
<tr>
<td>156</td>
<td>Valencia</td>
<td>078</td>
<td>Palmdale</td>
</tr>
<tr>
<td>108</td>
<td>Santa Clarita</td>
<td>112</td>
<td>Lancaster</td>
</tr>
</tbody>
</table>

TABLE 5.2.2D. LA COUNTY EQUIPMENT RESOURCES

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopters</td>
<td>3</td>
</tr>
<tr>
<td>Airplanes</td>
<td>5</td>
</tr>
<tr>
<td>Dozers</td>
<td>10</td>
</tr>
<tr>
<td>Loaders</td>
<td>3</td>
</tr>
<tr>
<td>Motorgraders</td>
<td>4</td>
</tr>
<tr>
<td>Transports</td>
<td>8</td>
</tr>
<tr>
<td>Trailers</td>
<td>15</td>
</tr>
<tr>
<td>Heli-Tender</td>
<td>1</td>
</tr>
<tr>
<td>Fuel Tender</td>
<td>1</td>
</tr>
</tbody>
</table>

LACFD air suppression resources consist of three Sikorsky S-70 Firehawks (civilian versions of the UH-60 Blackhawk), four Bell 412s (twin-engine, four-bladed Hueys), and a Bell 206 JetRanger. The Sikorsky Firehawk is equipped with a 1000-gallon water tank that uses a “constant flow” delivery system as compared to the “two door” 360 gallon tank on the medium category Bell 412. The Bell 206 is used for command, mapping, FLIR (Forward Looking Infrared), photography, and HELCO (Helicopter Coordinator) duties. Both the Sikorsky and the Bell 412 are also used as Air Squads in the county’s Emergency Medical Services (EMS) system. These aviation resources respond anywhere in the geographical boundaries of the county, some 4000 square miles. During the designated Fire Season, an additional Fire Ship and the HELCO aircraft are staffed daily to augment the three Air Squads.

Helicopters and airplanes are often the fastest resources to reach a wildfire. Almost anywhere in California, a firefighting aircraft can reach a wildfire within 20 minutes, depending on wind conditions that could ground an aircraft if winds are too strong. Land suppression (e.g., fire engines, dozers, fire crews) resources could take an hour or more to reach a wildland fire, especially in remote areas. Both aerial and land attacks work in conjunction with each other when fighting a fire. Aerial firefighting attacks are effective during initial attacks for extinguishing small fires and protecting homes. On large fires, aerial attacks are used for specific tactical suppression objectives, such as reinforcing an established fire line. Identifying and extinguishing spot fires outside the fire line is also a critical job executed by aircraft.
5.2.3. Regional Fire Prevention

Los Angeles County Fire Department

The LACFD, in coordination with Fire Safe Councils and local municipalities, plans to treat thousands of acres within the BRRTLP fireshed. Projects listed in the 2004 LACFD Pre-Fire Management Plan related to fuels management within the BRRTLP fireshed boundary include the following:

- **PITCHESS DETENTION CENTER**: This project is located in the Santa Clarita area and consists of the treatment of 1,045 acres using manual (crews) and prescribed fire. This is a Coordinated Resource Project with the Los Angeles County Sheriff’s Department. This project provides fire protection to the Pitchess Ranch Detention Center. A secondary benefit to the project is the annual training of firefighters on firing operations and grass fire fighting.

- **HATHAWAY**: The Hathaway Project is a 6,226-acre area located northwest of the City of Santa Clarita. The County of Los Angeles Fire Department has determined the need for a Vegetation Management Plan to provide long-term mitigation for the hazardous wildfire problem affecting the communities in Hasley and Oak Canyons, and the communities of Castaic, Piru, Del Valle, and Valverde. Fuel reduction zones in open space areas within the Hathaway property will substantially reduce the potential hazard posed by airborne embers. Embers have been documented to cause 40 to 60 percent of structure losses in catastrophic wildfires. The following treatment methods will be used throughout this project: biological: strategic recycling, grazing; manual: clearing, mowing, thinning, multi-cutting; equipment: brush crusher and prescribed fire.

- **PLACERITA CANYON STATE PARK**: This project is located in the Santa Susana Mountains and consists of the treatment of 200 acres using biological: strategic recycling, grazing; manual: clearing, mowing, thinning, multi-cutting; mechanical: brush crusher and prescribed fire methods. This is a Coordinated Resource Project with the California State Parks. This project provides fire protection to the Placerita Canyon State Park, the City of Santa Clarita, and the ANF. An additional benefit will be the enhancement of native vegetation growth and reduction of non-native vegetation. A secondary benefit to the project is the annual training of firefighters on control of brush fires.

LACFD as of March 2010 has indicated that there are no fuelbreaks or other fuel reductions projects in the planning stages or the foreseeable future. LACFD’s Pre-Fire Management Plan will be updated some time in 2010. Although there are no planned projects, LACFD does work with regional Fire Safe Councils in assisting with 100ft fuel clearances around homes. At present there are no set planning activities for fuelbreaks or fuel reduction projects, LACFD did indicates that they are looking at a fuel reduction project in the Quail Lake area, although the size, scope and location have not been finalized.

**Regional Fire Safe Councils**

California Fire Safe Councils’ mission is to mobilize Californians to protect their homes, communities, and environments from wildfire. Sand Canyon Fire Safe Council and Angeles Forest Valleys and Lakes Fire Safe Council are located within the fireshed and actively participate in:

- Weed and Brush Abatement
- Tree Trimming
- Sandbagging
- Emergency Site Set-up
- Manning, Large and Small Animal Evacuation
- Elderly/Disabled Evacuation
- Defensible Space Requirements under PRC 4291
California State Parks

The BRRTP Fireshed encompasses portions of three California State Parks/Recreation Areas. The largest of the state parks is the Hungry Valley State Vehicular Recreation Area (SVRA). The two other parks within the fireshed are the Castaic Lake State Recreation Area and the smaller Placerita Canyon State Park. The Angeles District of the California State system has a general policy of maintaining 100ft clearance around structures as well as homes on adjacent properties. Wildland firefighting activities in the state parks falls under the LACFD jurisdiction. During a wildfire on State Park lands a representative may be in contact with the incident command in order to assist with local knowledge or to assist in preserving special resources.

Hungry Valley SVRA has experienced an altered fire regime primarily due to the influence of increased ignition from the adjacent Interstate Highway 5. This recreation area does have a Wildfire Management Plan, and depending on the qualifications of the rangers that are on staff, some firefighting personnel and water tenders are available. In addition to those resources the park also maintains the OHV trail system. Fire suppression activities near these trails have utilized them as fuelbreaks during past fire events. This extensive OHV trail system provides extensive access throughout the park for emergency firefighting vehicles. Furthermore, LACFD maintains staff and firefighting resources at Station 77, which is in close proximity to the park.

Bureau of Land Management

Portions of the BRRTP Fireshed reside within the BLM’s Antelope Valley Fire Management Unit (FMU). The Antelope Valley FMU planning document does not designate specific fuelbreak locations or fuel management prescriptions. The Antelope Valley FMU document does provide general guidelines for prioritizing the defense of WUI communities and the protection of grazing allotments during a wildfire. Additionally, the document allocates areas within the FMU that would be allowed to burn during a wildfire. The goal of these “let-burn” areas would be to emulate the natural fire cycle. BLM maintains a minimal wildland firefighting staff where limited resources would be available for a wildfire event within the Antelope Valley FMU.

Angeles National Forest

As part of carrying out the mission of the ANF, agency resource specialists develop proposals that will enhance or maintain resource values on public lands, as well as generate products. In addition, the public may submit proposals for various uses such as rights-of-way, land exchanges, and recreational events. A necessary part of the planning for these is the environmental analysis and documentation, pursuant to the National Environmental Policy Act (NEPA) and agency direction. The Schedule of Proposed Actions (SOPA) provides to the public a list of proposals that will begin or are undergoing environmental analysis and documentation. The SOPA includes proposals whose decisions are expected to be documented in a Decision Memo, Decision Notice, or Record of Decision, pursuant to NEPA and agency direction. The SOPA is published in January, April, July, and October. Table 5.2.3 below summarizes proposals related to fuels management from 2004 to 2010 within the BRRTP fireshed.

**TABLE 5.2.3. ANF SOPA REPORT RELATED TO FUELS MANAGEMENT, OCTOBER 2009**

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Project Purpose</th>
<th>Planning Status</th>
<th>Decision</th>
<th>Expected Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Clara/ Mojave River Fuelbreak Treatments</td>
<td>Fuels Management</td>
<td>03/2004</td>
<td>04/2008</td>
<td>05/2008</td>
</tr>
<tr>
<td>Santa Clara/ Mojave River Defensible Space Project</td>
<td>Fuels Management</td>
<td>03/2004</td>
<td>04/2008</td>
<td>05/2008</td>
</tr>
<tr>
<td>Santa Clara/Mojave River Fuelbreak Establishment Project</td>
<td>Fuels Management</td>
<td>03/2004</td>
<td>04/2008</td>
<td>05/2008</td>
</tr>
<tr>
<td>Sawmill Liebre Forest Health Project</td>
<td>Fuels Management</td>
<td>10/2009</td>
<td>08/2010</td>
<td>03/2011</td>
</tr>
</tbody>
</table>
5.2.4. ANF Fuelbreak Program

Overview

Fuelbreaks have been used for decades on the ANF and have been widely used in California as an important resource management and protection measure. Fuelbreaks are considered a proactive action for wildfire management, and presently remain a resource management priority on the ANF, in accordance with agency direction. The ANF currently has a number of fuelbreak proposals and projects on record in the SOPA relevant to the BRRTP.

Definition

A fuelbreak is a barrier or a change in fuel type from highly flammable to less flammable fuels. A fuelbreak may be natural (e.g., a talus slope, a river, or a deciduous stand) or man-made. Anthropogenic fuelbreaks are strategically located to protect values at risk and are generally wide blocks or strips on which a cover of dense, heavy, or flammable vegetation has been permanently changed to one of lower fuel volume and/or reduced flammability.

Fire Behavior Theory

There is consensus that modification of forest fuels will alter wildland fire behavior (Agee et al. 2000, Alexander and Lanoville 2004, Fites and Henson 2004, Hirsch et al. 2001, Martinson and Omi 2003, Martinson and Omi 2006, Omi et al. 2006 and others) and so, with all fuel treatments, the primary reason for fuelbreaks is to change fire behavior as it enters the fuel-altered zone. Fuelbreaks can be used as anchor points for indirect attack on wildfire as well as prescribed fire (Omi 1977, Salazar and Gonzalez-Caban 1987). Suppression forces can create firelines or firebreaks within established fuelbreaks more quickly (Bevers et al. 2004) and fuelbreaks can provide safe access for ground suppression crews (Salazar-Caban 1987). Reduced canopy cover in a fuelbreak allows a greater penetration to surface fuels of fire retardants dropped from the air (Agee et al. 2000).

(excerpt from Fuelbreak Effectiveness: state of the knowledge)

Fuelbreak Construction

There are no absolute standards for fuelbreak width or fuel manipulation (Agee et al. 2000). Fuelbreaks need to be tailored to the terrain, fuels, historic fire regimes and expected weather conditions of the landscape in which they are placed (Green and Schimke 1971, Agee et al. 2000, Omi 1996, Williston 1970, Martinson and Omi 2003). The use of mechanical and manual means, prescribed fire, grazing and herbicides have all been used to create and maintain fuelbreaks (Schimke and Green 1970, Vollmer 2005, Green and Newell 1982).

In general, a wider fuelbreak will make the job of holding a fire on it easier and safer. Fuelbreaks should be wide as possible to achieve maximum usefulness in controlling big fires under hazardous conditions (Green and Schimke 1971, Agee et al. 2000).

(excerpt from Fuelbreak Effectiveness: state of the knowledge)
Angeles National Forest Fuelbreaks

Fuelbreak Construction

Most of the planned fuelbreaks are along roads and ridgetops and are proposed for limiting wildland fire patch size. While most fuelbreaks are constructed with machinery, some are built by hand or by using prescribed fire. Herbicides may be used to kill resprouting chaparral, and then fire is used to maintain the fuelbreak over time. Fuelbreaks are sometimes constructed near communities to provide some level of future protection in cases where land ownership patterns or topography limit the applicability of the Wildland/Urban Interface Defense and Threat Zones concept (Angeles LRMP Part 2, page 27).

Fuelbreak Maintenance

Existing fuelbreaks are generally maintained using prescribed fire, masticating machines or hand work. Most of the fuelbreaks are in high hazard chaparral areas and are designed to limit wildland fire size, as well as provide firefighter access and improved firefighter safety. A few of the fuelbreaks are in coniferous forest and serve to limit fire spread from or towards communities or timber stands in poor condition. Most of the existing fuelbreaks are on ridgetops or along roads (Angeles LRMP Part 2, page 27).

Maintenance on individual fuelbreaks rely on:
1. Condition of the fuelbreak
2. Funding available
3. Severity of risk in that area.

In general, fuelbreaks are maintained every 5 to 10 years to keep them viable. There are numerous fuelbreaks around the forest that have been left unmaintained since their importance has fallen below others and funding has not been available.

Cost of Fuelbreaks

The average cost to construct a new fuelbreak tends to be $1,100 to $1,400 (2011 Dollars) per acre. To maintain an existing fuelbreak, $500 to $750 per acre is a reasonable estimation of cost for a five-year maintenance regime. There is a lot of variability going into the cost of a project.
- If there are more acres it tends to drive the cost down, and vice versa.
- Competition between contractors can be stiff one year, thereby lowering the costs, and result in only one bid the next year, thereby increasing the cost.
- Costs also include environmental review (NEPA).

Relevant ANF Fuelbreaks to Proposed BRRTP Alternatives

A number of existing ANF fuelbreaks have been identified within proximity of the BRRTP Alternatives. Table 5.2.4 below summarizes these relevant fuelbreaks. On the following page, Figure 5.2.1 shows these fuelbreaks in context of the BRRTP area and agency jurisdictions.

<p>| TABLE 5.2.4. ANF FUELBREAKS RELEVANT TO PROPOSED BRRTP ALTERNATIVES |
|----------------|----------------|----------------|
| <strong>Route</strong>      | <strong>Name</strong>       | <strong>Length</strong>     | <strong>Acres</strong>** |
| Alternative 1  | 8N04           | 96,835 ft      | 666.9        |
|                | 6N43           | 13,970 ft      | 96.2         |
|                | <strong>Subtotal</strong>   | <strong>763</strong>        |              |
| Alternative 2  | Tule Ridge     | 26,410 ft      | 181.9        |
|                | Burns          | 15,055 ft      | 103.7        |
|                | Jupiter        | 19,620 ft      | 135.1        |
|                | Leona Divide   | 32,285 ft      | 222.4        |
|                | Spunky Canyon  | 10,855 ft      | 74.8         |</p>
<table>
<thead>
<tr>
<th>Route</th>
<th>Name</th>
<th>Length</th>
<th>Acres**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 2a</td>
<td>Tule Ridge</td>
<td>26,410 ft</td>
<td>181.9</td>
</tr>
<tr>
<td></td>
<td>Burns</td>
<td>15,055 ft</td>
<td>103.7</td>
</tr>
<tr>
<td></td>
<td>Lake Hughes</td>
<td>13,465 ft</td>
<td>92.7</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td></td>
<td><strong>717.9</strong></td>
</tr>
<tr>
<td>Alternative 3*</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

* Strategic Fuelbreaks relative to Alternative 3 have not been addressed at the time of the Technical Report publication (April 2011) due to its location off of the ANF where it traverses private land ownership under LA County and Local Fire jurisdiction.

** A standardized fuelbreak design width of 300 feet was utilized to calculate acres to be treated in the ANF fuelbreaks listed above.
FIGURE 5.2.1. MAP OF ANF FUEL BREAKS RELEVANT TO PROPOSED BRRTIP ALTERNATIVES
6.0 **ALTERNATIVES**

NEPA and CEQA both require consideration of a reasonable range of alternatives to the Proposed Action that would feasibly attain most of the basic objectives of the Project, but avoid or substantially lessen any of the significant or adverse effects of the Project.

6.1 **DEVELOPMENT OF ALTERNATIVES**

A range of alternatives were identified through a siting analysis, the scoping process, and supplemental studies and consultations. A full discussion of alternatives development can be found in the Alternatives Development Report (POWER 2010).

The regional siting analysis identified nine routing opportunities (Segments A through I) for the new 230 kV transmission line between Barren Ridge Switching Station and the proposed Haskell Canyon Switching Station. Some of the routing opportunities or segments were adjusted or modified based on public input and preliminary environmental review, and preliminary electrical system studies. Several of these segments were not used in the formation of alternatives as discussed below.

Segment E was recommended for elimination from analysis in the EIS/EIR. The Segment would require an additional 6.5 miles of transmission line in comparison to the Proposed Action and would not significantly reduce or avoid impacts to air quality, biological, cultural, visual, and water resources. Segment H was also recommended for elimination, due to increased impacts to air quality and noise, along with safety concerns, related to helicopter construction. Cumulative effects for the Project would also increase because of the further disturbance of revegetated and rehabilitated areas and potential for impacts from three transmission line projects in the same vicinity.

Eight routing opportunities (Segments A, B, C, D, F, G, 2a, and I) were combined to create end-to-end routing alternatives for the proposed double-circuit 230 kV transmission line between Barren Ridge Switching Station and the proposed Haskell Canyon Switching Station. In addition to routing segments, each Alternative discussed within this section would include other Project components as discussed earlier within this report. These include the addition of a new circuit on existing towers between Castaic Power Plant and Haskell Canyon, reconductoring of the existing BR-RIN transmission line, construction of a new Haskell Canyon Switching Station, and expansion of the existing Barren Ridge Switching Station. Descriptions and risk assessment of the routing alternatives follow in the sections below.

6.2 **ALTERNATIVES DESCRIPTION**

The following alternatives were identified as a reasonable range of alternatives to the Project that would feasibly attain most of the basic objectives of the Project, but avoid or substantially lessen any of the significant or adverse effects of the Project.

6.2.1. **Action Alternatives**

In addition to a new double-circuit 230 kV transmission line between the Barren Ridge and Haskell Canyon switching stations, whose route would vary among the action Alternatives, the four action Alternatives would include the following common components: the expansion of the existing Barren Ridge Switching Station, construction of a new Haskell Canyon Switching Station, reconductoring of the existing 230 kV transmission line from the Barren Ridge Switching Station to Rinaldi Substation, and the addition of a new 230 kV circuit on existing towers between the Castaic Power Plant and Haskell Canyon Switching Station. Refer to Figure 6-1.
FIGURE 6-1. ACTION ALTERNATIVES

Proposed Action and Alternatives

Alternative Routes for 230 kV Transmission Line
- Alternative 1
- Alternative 2 - Proposed Action
- Alternative 2a
- Alternative 3

A - K Original Segment Labels

Project Components Applicable for each Alternative
- New 230 kV Circuit
- Reconducting of Existing
- 230 kV Transmission Line (Barren Ridge - Rinaldi)
- Expansion of Existing Switching Station
- New Switching Station

BARREN RIDGE RENEWABLE TRANSMISSION PROJECT
Alternative 1 (Segments A, C, and D)

The Alternative 1 230 kV double-circuit transmission line comprises the preliminary routing Segments A, C, and D, and is the longest Alternative, at 83 miles long. It would run from the Barren Ridge Switching Station to the city of the unincorporated community of Mojave, while paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It would continue south-southwest to parallel the Los Angeles Aqueduct to Lancaster Road, where it would travel west to the I-5 utility corridor. It would then run southeast along LADWP’s existing Castaic – Rinaldi corridor to the proposed Haskell Canyon Switching Station.

Helicopter Mitigation

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed with the use of helicopters (such as the Hughes 500 or Bell 212, or Sikorsky Skycrane). Refer to Figure 6-2, the Identified Helicopter Mitigation Locations Map, which illustrates the identified locations for this mitigation. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas, tower structure vegetation clearing, guard structures at major crossings, wire stringing sites, pullouts, and temporary access roads.
FIGURE 6-2. IDENTIFIED HELICOPTER MITIGATION LOCATIONS
Alternative 2 (Segments A, B, and G) – LADWP’s Proposed Action

Alternative 2, LADWP’s Proposed Action, comprises Segments A, B, and G and is 61 miles long. It begins at the Barren Ridge Switching Station and runs south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It travels south from the unincorporated community of Mojave, California through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing onto National Forest System lands and ending at the proposed Haskell Canyon Switching Station. The entire route would remain within designated utility corridors and would parallel existing transmission lines. Refer to Section 1.2, Project Description, for a full description of this Alternative.

Alternative 2a (Segments A, B, G and 2a)

The 230 kV double-circuit transmission line in Alternative 2a comprises the preliminary routing Segments A, B, and G, but includes a re-route (Segment 2a) avoiding the unincorporated community of Green Valley. It is 63 miles long and would be very similar to the Proposed Action (Alternative 2), with 56 miles of the same alignment. Alternative 2a would begin at the Barren Ridge Switching Station and run south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It would travel south from the unincorporated community of Mojave through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing onto NFS lands and ending at the proposed Haskell Canyon Switching Station. The route would remain within designated utility corridors and would parallel existing transmission lines, with the exception of the nearly seven miles that would be routed around the unincorporated community of Green Valley. Segment 2a would create a new utility corridor through the ANF. The re-route would rejoin Segment G south of the unincorporated community of Green Valley before continuing south and ending at the proposed Haskell Canyon Switching Station.

Three-Circuit Tower Mitigation

In areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is proposing to construct three-circuit towers to carry the existing BR-RIN circuit and two new BR-HC circuits. This would avoid various impacts including the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6), and Elizabeth Lake and Green Valley (milepost 44.6 to 46 and milepost 50.8 to 51.7). This mitigation would be utilized in the same areas that were identified for Three-Circuit Tower Mitigation for the Proposed Project, with the exception of approximately five miles through the unincorporated community of Green Valley, which would not utilize this mitigation. These areas are illustrated in 1-7, the Three-Circuit Tower Mitigation Map.

Helicopter Mitigation

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed by the use of helicopter. Refer to Figure 6-2, Identified Helicopter Mitigation Locations, which illustrates the identified locations for this mitigation. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas, tower structure vegetation clearing, guard structures at major crossings, wire stringing sites, pullouts, and temporary access roads. The estimated sizes of these auxiliary sites (temporary and permanent) and additional construction information is detailed above in the description of the Proposed Action (Alternative 2) and in Appendix A.
Alternative 3 (Segments A, B, F, and I)

The proposed 230 kV double-circuit transmission line in Alternative 3 comprises preliminary routing Segments A, B, F, and I. It is 76 miles long and would begin at the Barren Ridge Switching Station and run south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI lines. It would travel south from the unincorporated community of Mojave through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing southeast past SCE’s Antelope Substation. The route would then travel toward the city of Palmdale, parallel to SCE’s existing high-voltage transmission lines. It would make a sharp turn to the south to parallel LADWP’s existing Victorville – Rinaldi 500 kV and Adelanto – Rinaldi 230 kV transmission lines. This Alternative would then parallel these transmission lines west, crossing two miles of the ANF. The Alternative would then parallel LADWP’s 500 kV PDCI line north to the proposed Haskell Canyon Switching Station.

Three-Circuit Tower Mitigation

In areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is proposing to construct three-circuit towers to carry the existing BR-RIN circuit and two new BR-HC circuits. This would avoid various impacts including the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6). Please refer to the small inset map on Figure 1-7.

Avenue L Re-route

To avoid acquisition of private property, a portion of Alternative 3 from mile marker 45.2 to 46.7 was moved to parallel a smaller distribution line south along 90th Street West and then east along West Avenue “L.” Refer to Figure 6-3, Avenue L Re-route on Alternative 3.
FIGURE 6-3. AVENUE L RE-ROUTE ON ALTERNATIVE 3

Alternative Routes For New 230kV Transmission Line
- Alternative 2 (Proposed Action)
- Alternative 3
- Former Alignment

Project Component Applicable for Each Alternative
- Reconductoring of Existing 230kV Transmission Line (Barren Ridge - Rinaldi)
6.2.2. **No Action Alternative**

Under the No Action Alternative, the construction of a new 230 kV transmission line, the addition of a new circuit on existing structures from Haskell Canyon to the Castaic Power Plant, the reconductoring of the existing BR-RIN transmission line, the construction of a new Haskell Canyon Switching Station, and the expansion of the existing Barren Ridge Switching Station would not occur. LADWP currently maintains an estimated 147 miles of existing access roads in the Project area, 97 of which are located within the ANF. Current, on-going operation and maintenance activates for existing facilities in the Project area would continue. The EIS/EIR must address the resulting environmental effects from taking no action and compare them to the effects of permitting the Proposed Action or an Alternative to the Proposed Action.

6.3 **PROPOSED ACTION AND ALTERNATIVE ROUTE LAND USE UNITS**

This section aims to describe the Proposed Action and Alternative Route responsibility areas, ownerships, land use zones, and fire management units as they fall into the BRRTP fireshed. A detailed overview of each proposed route will outline landmarks, major roadways, and miles of proposed transmission line.

6.3.1. **Alternative 1**

Alternative 1 runs from the Barren Ridge Switching Station to Mojave, California, while paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It continues south-southeast to parallel the Los Angeles Aqueduct to Lancaster Road, where it travels west to the Interstate 5 freeway utility corridor. It then runs southeast along LADWP’s existing Castaic – Rinaldi corridor to the proposed Haskell Canyon Switching Station. Alternative 1 runs 32.45 miles through the BRRTP fireshed. The Responsibility Areas are composed of 16.1 of federal and 16.4 miles of State. Land ownership for Alternative 1 within the fireshed is split between 15.9 miles of the Angeles National Forest, 0.3 miles of California Department of Fish and Game, and 16.3 miles of other (private, county, and city properties). This proposed Alternative transects over three USFS Land Use Zones, including 7.6 miles of Developed Areas Interface, 8.2 miles of Back Country, and 0.8 of miles Back Country Motorized-Use Restricted; the remaining 14.7 miles of transmission line are located outside the Land Use Zones under non-federal jurisdiction. The FMUs of Alternative 1 consist of 17.7 miles of Forest Non-Wilderness and 14.3 miles of Wildland Urban Interface.

6.3.2. **Alternative 2 (Proposed Action)**

Beginning at the Barren Ridge Switching Station, Alternative 2 (Proposed Action) runs south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It travels south from Mojave, California to the Antelope Valley California Poppy Reserve. It continues south into National Forest System lands, remaining within designated utility corridors, and terminates at the proposed Haskell Canyon Switching Station. Alternative 2 runs 27.4 miles through the BRRTP fireshed. The Responsibility Areas are composed of 13.3 miles Federal, 7.4 miles State, and 6.7 miles of Local. Land ownership for Alternative 2 within the fireshed is split between 13.9 miles of the Angeles National Forest and 13.4 miles of other (private, county, and city properties). This proposed Alternative transects over two USFS Land Use Zones including 6.2 miles of Developed Areas Interface and 8.6 miles of Back Country; the remaining 12.6 miles is located outside Land Use Zones under non-federal jurisdiction. The Fire Management Units (FMUs) of Alternative 2 consist of 14.8 miles of Forest Non-Wilderness, 2.5 miles of Wildland Urban Interface, with the remaining 10.1 miles outside FMUs.

6.3.3. **Alternative 2a**

Alternative 2a comprises Segments A, B, G, and 2a. It begins at the Barren Ridge Switching Station and runs south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It travels south from Mojave towards the Antelope Valley California Poppy Reserve. It continues south into National Forest System lands, bypasses the community of Green Valley, and travels over the ridge along
an existing fire road. The routing modification (Segment 2a) would be within ANF lands, but outside the Forest Service 1,000-foot designated utility corridor. The Alternative connects back to Segment G south of Green Valley, and ends at the proposed Haskell Canyon Switching Station. Alternative 2a runs 28.8 miles through the BRRTP fireshed. The Responsibility Areas are composed of 15.4 miles Federal, 6.0 miles of State, and 7.4 miles Local. Land ownership for Alternative 2a within the fireshed is split between 15.4 miles of the Angeles National Forest, and 13.4 miles of other (private, county, and city properties). This proposed Alternative transects over two USFS Land Use Zones including 13.2 miles of Back Country and 1.9 miles of Developed Areas Interface; the remaining 13.8 miles is located outside Land Use Zones under non-federal jurisdiction. The FMUs of Alternative 2a consists of 15.5 miles of Forest Non-Wilderness, 3.3 miles of Wildland Urban Interface, with the remaining 10.1 miles outside FMUs.

6.3.4. **Alternative 3**

Alternative 3 begins at the Barren Ridge Switching Station and runs south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI lines. It travels south from Mojave, California to the Antelope Valley California Poppy Reserve. It then travels southeast past SCE’s Antelope Substation to Palmdale, paralleling SCE’s existing high-voltage transmission lines. It makes a sharp turn to the south-southwest to Haskell Canyon while paralleling LADWP’s existing Victorville-Rinaldi 500 kV and Adelanto-Rinaldi 230 kV transmission lines. Alternative 3 runs 40.26 miles through the BRRTP fireshed. The Responsibility Areas are composed of .3 miles of Federal, 20.7 miles of State, and 16.8 miles of Local. Land ownership for Alternative 3 within the fireshed is split between 2 miles of the Angeles National Forest and 39.6 miles of other (private, county, and city properties). This proposed Alternative transects over one USFS Land Use Zone consisting of 2.1 miles of Back Country; the remaining 38.8 miles is located outside the Land Use Zones under non-federal jurisdiction. The FMUs of Alternative 3 consist of 14.4 miles of non-federal units, 2.8 miles of Forest Non-Wilderness, and 24.4 miles of Wildland Urban Interface.

6.3.5. **Reconductoring of Existing 230 kV Transmission Line**

LADWP proposes the reconductoring of approximately 75 miles of the existing BR-RIN 230 kV transmission line with larger conductors from the Barren Ridge Switching Station to Rinaldi Substation (towers 176-1 through 251-1). The existing conductors (954/2,312 kcmil) would be replaced with a new 1,433.6 kcmil “Merrimack” ACSS/TW/HS conductor. The reconductoring of the existing 230 kV transmission line that runs from the Barren Ridge Switching Station to the Proposed Haskell Canyon Switching Station has the same responsibility areas, FMUs, Land Use Zones, and ownership as Alternative 2.

The reconductoring of the transmission line from the proposed Haskell Canyon Switching Station to the Rinaldi Substation is represented by Segment K. Segment K is composed of 15.4 miles of the BRRTP fireshed. The Responsibility Areas designated under Segment K are composed of 4.9 miles of State and 10.5 miles of Local. No portion of Segment K is located within the ANF, the entire 15.4 miles are within private, county, and city properties. Segment K does not fall within a USFS designated Land Use Zone. The FMUs of this segment consist of 2.9 miles outside FMUs, .5 miles of Forest Non-Wilderness and 12 miles of Wildland Urban Interface.

6.3.6. **New 230 kV Circuit**

Between the proposed Haskell Canyon Switching Station and the existing Castaic Power Plant, LADWP proposes the addition of approximately 12 miles of a new 230 kV transmission circuit onto existing Castaic – Olive 230 kV Transmission Line structures (towers 1-1 through 12-1). This new circuit would be called Castaic – Haskell Canyon #4 and would utilize the same conductor (2,156 kcmil “Bluebird” ACSS/AW) as that proposed for the new 230 kV transmission line. The new 230 kV circuit is composed of 11.97 miles of the BRRTP fireshed. The Responsibility Areas designated for the new 230 kV circuit are composed of 3.7 miles of Federal and 8.3 miles of State. Land ownership for the new 230 kV circuit is split between 3.6 miles of the Angeles National Forest, .05 miles of BLM, and 8.3 miles of other (private,
county, and city properties). The new circuit transects over 10 miles of non-federal jurisdiction outside USFS Land Use Zones, 1.9 miles of Back Country Non-Motorized Use, and .1 miles of Back Country Motorized-Use Restricted. The FMUs of the new circuit consist of 3.7 miles of Forest Non-Wilderness and 8.3 miles of Wildland Urban Interface.

6.3.7. Proposed Haskell Canyon Switching Station

As a component of the BRRTP, LADWP proposes the construction of a new switching station in Haskell Canyon, south of the ANF on LADWP-owned property at the convergence of several existing and proposed 230 kV transmission lines (the existing BR-RIN, the proposed double-circuit Barren Ridge-Haskell Canyon, existing Castaic-Northridge, Castaic-Sylmar, Castaic-Olive, and the proposed Castaic to Haskell Canyon). The proposed Haskell Canyon Switching Station is comprised of 100% LADWP ownership. The Proposed Haskell Canyon Switching Station is within a State Fire Suppression Responsibility Area. It also lies within the Los Angeles County General Plan land use zone.
7.0 WILDFIRE AND FUELS RISK ASSESSMENT

7.1 METHODOLOGY

Risk assessment was assessed for two scenarios within the BRRTP fireshed: “Existing Conditions” and conditions resulting from the construction of any Project Alternative, known as “Post-Project Conditions.” The risk assessment areas focused on a quarter-mile distance on each side of the existing transmission line rights-of-way (ROWs) or Project Alternative ROWs. These study corridors, otherwise known as “borderzones,” were the basis for three wildfire risk assessment models relating to the three significance criteria listed in section 7.1.1. Borderzones were delineated into half-mile linear segments along the route, allowing for sections of the study corridor to be analyzed independently, and are referred to by their location in relation to the EIS/EIR mile markers. Field data, coupled with spatial historic wildfire/ignition data, existing transmission line data, existing wildfire condition data, fire regime condition classification, and professional judgment, was utilized within each segment of line to assess wildfire and fuels related risks.

7.1.1. Wildfire Risk Assessment Criteria

Specific Significance Criteria have been developed for use in determining Wildfire Impact Significance within the EIS/EIR document. Each criterion is the basis for three wildfire risk assessment models applied to each Alternative and Segment J.

Criterion 1: “The presence of the Project, as well as construction and maintenance activities, may compromise firefighter safety and create obstructions to fire suppression efforts.”

Criterion 2: “The Project construction and/or maintenance activities may adversely affect public safety through an increased risk of wildfire.”

Criterion 3: “Activities associated with project construction and/or maintenance may result in native vegetation alteration due to the introduction of fire prone weeds and increase in potential for wildfire.”

7.1.2. Wildfire Risk Assessment Models

Wildfire risk assessment models were developed for the Project to address each of the listed criteria. They were derived from the attributes and relationships utilized in the California Fire Plan and are specifically calibrated to the BRRTP. Each wildfire risk assessment model corresponds numerically to each criterion listed above. The components of each model are the intersection or proximity of a borderzone with a particular spatial datum representing an attribute related to fire risk. These attributes and their geographic locations were acquired from field surveys, GIS data from concerned agencies such as the ANF, GIS data from other federal or State agencies, or GIS data provided by POWER Engineers, Inc. This approach combined with professional judgment and expertise results in a categorical index to describe specific fire risk as it relates to each Significance Criterion.

The purpose of these models is to illustrate how the BRRTP may affect the existing wildfire risk conditions with an understanding that wildfire risks are present in the existing environment. The sum total of weighted fire risk attribute scores unique to each model create a “Total Existing Conditions Score.” The “Total Post-Project Conditions Score” is generated by adding the sum total of weighted fire risk attribute scores incurred by the construction, maintenance, and presence of a Project Alternative to the “Total Existing Conditions Score.” “Post-Project” results present a sum total accumulation of the “Existing Conditions” with the potential effects of the introduction of a Project Alternative. Model results are then translated from total scores to four categories: low, moderate, high, and very high based on statistical distribution. The index that defines the score ranges for each category are unique to each model, but applied uniformly to each Project Alternative and existing and Post-Project conditions.
The wildfire risk categories for both the “Total Existing Conditions Score” and “Total Post-Project Conditions Score” were separated into ranking classes for the purposes of analysis. The ranking classes (low, moderate, high and very high) were delineated utilizing the “Jenks Natural Breaks Data Optimization” methodology for each borderzone segment by analyzing the distribution of the composite scores on a per-model basis. The Jenks Natural Breaks methodology seeks to minimize the variance within each category while maximizing the variance between categories. This effectively isolates the composite scores’ grouping of like values while creating a uniform ranking methodology based on clusters of composite scores. This ranking methodology was developed for each of the three models and was applied uniformly to all action Alternatives.

The Jenks Natural Breaks methodology best represents the nature of wildfire risk analysis from a results-driven approach where it is required to evaluate a linear project, such as BRRTP, over a large, highly variable geographic area. The resultant risk rankings mitigate the potential for losing the importance of differences among borderzone cell composite scores that may occur by placing an arbitrary classification scheme on the model outputs before the analysis is performed. Additionally, it is important that the individual borderzone ranking categories of low, moderate, high and very high consider the relative importance to each other as opposed to predetermined uniform ranges. This classification scheme also represents the similarity in rankings among adjacent or continuous borderzone segments as opposed to other methods, where there is high variability within rankings and the potential for borderzone outliers along the length of an action Alternative. While the model ranking categories provide a location-specific assessment of wildfire risk, which can provide insight into exact risks in particular areas, it is the accumulation of overall risk associated with the entire length of each action Alternative that dictates the degree of Potential Wildfire Impacts to be discussed in Chapter 4 of the EIS/EIR.

### 7.2 EXISTING TRANSMISSION LINE CONDITIONS

There are approximately 750 miles of existing transmission lines throughout the entire BRRTP fireshed. The location and ROW width of these lines in relation to many factors such as historical wildfires, vegetation, voltage (see table 7.2.1 below), and proximity to homes is essential to evaluating impacts to firefighting suppression activities and safety, along with other environmental effects.

**Table 7.2.1. Existing Transmission Lines within the BRRTP Fireshed**

<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>Length</th>
<th>Percent within Fireshed</th>
</tr>
</thead>
<tbody>
<tr>
<td>69 kV</td>
<td>41.1 miles</td>
<td>5.5%</td>
</tr>
<tr>
<td>115 kV</td>
<td>56.0 miles</td>
<td>7.5%</td>
</tr>
<tr>
<td>230 kV</td>
<td>347.6 miles</td>
<td>46.8%</td>
</tr>
<tr>
<td>500 kV</td>
<td>230.3 miles</td>
<td>30.9%</td>
</tr>
<tr>
<td>500 kV (DC)</td>
<td>39.5 miles</td>
<td>5.3%</td>
</tr>
<tr>
<td>Unknown</td>
<td>29.9 miles</td>
<td>4.0%</td>
</tr>
<tr>
<td>Total</td>
<td>744.4 miles</td>
<td></td>
</tr>
</tbody>
</table>

The following conditions were evaluated when determining the existing transmission line condition relevance to wildfire and fuels risk:

1. *Existing Transmission Line Characteristics*
   - Existing Transmission Line ROWs and Corridors
   - Existing Transmission Line Height
   - Existing Transmission Line Voltage
   - Existing Transmission Bounded Islands
   - Existing Wooden Pole Transmission Line Structure
For example, the fireshed contains many routes of existing parallel transmission lines. The width of these corridors present varied obstructions to firefighting suppression efforts, in addition to risk compounded by the presence of multiple lines.

*Wooden Pole Contact:* Areas along the Proposed Action and Alternatives that intersect with existing wooden pole structures and could potentially be struck by a wooden pole were evaluated. These areas could decrease firefighter suppression activities by creating an additional safety hazard during firefighting activities.

2. *Other Anthropogenic Attributes*
   - Roads
   - Fuelbreaks
   - Assets at Risk (such as homes, businesses, or infrastructure)
   - Special Land Use Zones

For example, the presence of roads can be positive for fire suppression efforts, as they provide access for personnel and related equipment. However, roads provide greater public access and the potential for wildfire ignitions.

3. *Fire History*
   - Historic Fire Areas (1960-2010)
   - Fire Suppression Boundaries
   - Historic Anthropogenic Fire Ignitions (YEARS)
   - Historic Lightning Fire Ignitions (YEARS)

For example, areas with greater fire history may be prone to more fire events in the future.

4. *Landform and Vegetation Considerations*
   - Aspect
   - Slope and Topographic Characteristics (such as ROW perpendicular intersection with ridgelines or parallel to ridgetops)
   - Scott and Burgan Fuel Ranking
   - Fire Regime and Condition Class

For example, a slope with a Southwest aspect has greater exposure to the sun and results in drier fuels.

The Scott and Burgan Fuel Ranking and Fire Regime Condition Class are essential in explaining the overall fire history of an area and types of vegetation and fuels present. Fuels for all segments of the Proposed Action and Alternatives, study corridors were classified using the Scott and Burgan *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel’s Surface Fire Spread Model.* Based on fuel density, size, and composition, these were ranked into high, moderate, and low categories. Spatial data coupled with field data determined fuel classifications within the borderzones.

Fire regime and condition class is defined as the frequency and intensity with which wildfire is present in an ecosystem. The CAL FIRE Fire and Resource Assessment Program (FRAP) 2003 dataset was used to define areas into three classifications:

1. Fire regime within or near historical range: Risk of key ecosystem loss from wildfire is low.
2. Fire regime moderately altered from historical range: Risk of key ecosystem loss from wildfire is moderate.

3. Fire regime significantly altered from historical range: Risk of key ecosystem loss from wildfire is high.

Other components of this data set illustrate the degree to which the fire regime has been altered from its historical range, providing insight into the degree to which the existing vegetation is presently altered.

7.3 POST-PROJECT CONDITIONS

Project conditions are represented by the aggregation of existing conditions and the factors that affect wildfire risk introduced by any of the Project Alternatives. There is potential for increased risk to firefighter safety and suppression efforts, potential for wildfire and associated risk to public safety, and potential for native vegetation alteration with any of the proposed Project Alternatives. The relationship of each proposed Alternative to existing conditions was a particular consideration, especially in areas where new transmission lines are proposed that do not parallel existing transmission lines, which may create additional wildfire risk due to construction and maintenance activities that did not exist before. In addition, overbuild of a smaller transmission line may cause an additional obstruction to aerial firefighting suppression activities, resulting in an increased wildfire suppression threat.
The following attributes were considered in the building of a new transmission line:

1. **Access**
   - New roads associated with the construction or maintenance of the Project
   - Helicopter construction
2. **New Transmission Lines**
   - ROW width
   - Relationship to existing transmission line corridor (potential creation of a transmission bounded island)
   - New transmission line height

The majority of the Proposed Project and Alternatives would parallel existing transmission lines. In these areas, the exposure to increased wildfire risk activity due to an additional transmission line is substantially lower. The obstruction to firefighting suppression activities already exists and the new line will not create additional obstruction. Maintenance operations within the ROW of the existing line already exist, and would only be increased incrementally by adding an adjacent transmission line. The degree of incremental expansion of the width of an existing transmission line corridor is also considered such that a new transmission line built parallel to one existing transmission line has a greater effect than one built parallel to four adjacent lines.

### 7.4 WILDFIRE RISK ASSESSMENT RESULTS

This section describes the results of the wildfire risk assessment results for the Proposed Project and Alternatives for the Existing Conditions and Project Conditions. The results are summarized in a table, followed by a brief description of the results.

#### 7.4.1. Alternative 1

Alternative 1 runs approximately 83 miles from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station. Starting from the Barren Ridge Switching Station, Alternative 1 heads southwest towards Quail Lake, adjacent to the Los Angeles Aqueduct. The Route enters the BRRTP Fireshed at Mile Marker 50.5 and passes Quail Lake to the west and makes a sharp turn southeast, briefly paralleling Interstate 5 and terminating at the proposed Haskell Canyon Switching Station. Alternative 1 is adjacent to heavily public use regions such as Interstate 5 and Castaic Lake. Within the BRRTP fireshed, Alternative 1 is approximately 32 miles. There are approximately eight miles of Helicopter Construction for the new 230 kV double circuit line that is being proposed as mitigation where there is limited access and steep terrain within the ANF. Of Alternative 1, 51 miles lie outside the BRRTP fireshed in an arid region of southern Kern County. Transmission lines within this region of Kern County were not integrated into this assessment due to minimal historic fire history, low population density, and low level of fuels. The results of the wildfire risk assessment for Existing Conditions and Project Conditions are summarized in the table below:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Mod</td>
<td>High</td>
<td>V H</td>
<td>Low</td>
<td>Mod</td>
<td>High</td>
<td>V H</td>
<td>Low</td>
</tr>
<tr>
<td>Existing Conditions</td>
<td>21%</td>
<td>29%</td>
<td>28%</td>
<td>22%</td>
<td>20%</td>
<td>35%</td>
<td>31%</td>
<td>14%</td>
<td>5%</td>
</tr>
<tr>
<td>Post-Project</td>
<td>0%</td>
<td>15%</td>
<td>54%</td>
<td>31%</td>
<td>2%</td>
<td>23%</td>
<td>51%</td>
<td>24%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Significance Criterion 1 is quantified by Model 1: “The presence of the Project, as well as construction and maintenance activities, may compromise firefighter safety and create obstructions to fire suppression efforts.” In Alternative 1, Existing Conditions exhibit about 3.5 miles of existing wooden pole contact, which creates the potential for the Alternative to be struck by a wooden pole. These areas could decrease firefighter suppression activities by creating an additional safety hazard during firefighting activities. Additionally, about 14.5 miles of the existing transmission lines to which Alternative 1 would be parallel form transmission bounded islands, which create a considerable obstruction for fire suppression efforts and create an area that poses a threat to firefighter safety. Other attributes listed in section 7.2 account for the categorization of each borderzone segment for Model 1.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 1 Post-Project Conditions for Alternative 1 include an increase in parallel ROWs: Alternative 1 would include about 28 miles of new transmission line adjacent to one or more existing transmission lines. The incremental increase in parallel ROWs creates an obstruction of fire suppression efforts but is not as substantial where there are no existing transmission lines. Alternative 1 would include about 4.5 miles of new transmission line that does not parallel an existing facility; a new line that does not parallel an existing facility poses the greatest risk to fire suppression efforts and firefighter safety because a new line is present where there was no previous obstruction. Additionally, the Alternative introduces about 1.5 miles of new transmission bounded island, which severely limits access to areas during a wildfire event and poses a risk to fire fighter safety. Alternative 1 also introduces about eight miles of increased transmission line height adjacent to existing facilities, posing an obstruction to firefighting suppression efforts and increasing risk to firefighter safety, especially for aerial suppression efforts. This attribute was quantified with respect to an incremental increase adjacent to existing facilities or the introduction of a new transmission line that does not parallel any existing facilities. Finally, while these are negative effects toward firefighter safety and create obstructions to fire suppression efforts, about four miles of Alternative 1 would require new road construction, presenting a positive opportunity by increasing access for firefighting suppression efforts.

Significance Criterion 2 is quantified by Model 2: “The Project construction and/or maintenance activities may adversely affect public safety through an increased risk of wildfire.” Existing Conditions exhibit about 23.5 miles borderzone that intersect an historic fire event that occurred within the last 50 years; about 12.5 miles have witnessed more than one fire event in the last 50 years. Those areas in which a fire has previously occurred have a greater potential of experiencing another wildfire event in the future and may adversely affect public safety through an increased risk of wildfire. Historic locations of fire ignition also play an important role and jeopardize public safety because these are the areas that have the greatest potential to burn due to their proximity to the ignition source; about 15.5 miles of the borderzones of Alternative 1 intersect a historic ignition point. Assets at risk including homes, businesses, and infrastructure are also a key component when considering public safety during a wildfire event, as these are often the most important factor in developing a plan to fight a wildfire and ensure public safety; about eight miles of the borderzone of Alternative 1 encompass at least one asset at risk.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 2 Project Conditions for Alternative 1 include an increase in parallel ROWs: Alternative 1 would include about 28 miles of new transmission line adjacent to one or more existing transmission lines. The presence of a transmission line mainly increases the potential for wildfire events, which can adversely affect public safety due to the potential of wildfire ignitions from the transmission line and the ignition potential from maintenance activities or non-transmission related use of access roads. Areas where a new transmission line is introduced where it does not parallel an existing transmission line corridor exhibit an increased adverse affect on public safety through an increased risk of wildfire, because there is the introduction of access to a new area, increasing ignition potential to an area where previously only lightning ignitions could occur. Areas where a new transmission line does not parallel an existing facility also increase the potential for the public to access areas previously more difficult to get to, increasing persons’ safety risk if they are located in these areas during a wildfire event. New transmission facilities that do not parallel existing lines would occur for about 4.5 miles of...
Alternative 1. Finally, new roads would be required for about four miles of the construction of Alternative 1 and would increase the risk of wildfire, as they provide greater access to areas near the Alternative, increasing the potential for accidental or intentional ignitions or the risk for public who may be located in these areas during a wildfire event.

Significance Criterion 3 is quantified by Model 3: “Activities associated with project construction and/or maintenance may result in native vegetation alteration due to the introduction of fire prone weeds and increase in potential for wildfire.” Existing Conditions of the vegetation of the borderzones along Alternative 1 exhibit considerable fire-related characteristics. The Scott and Burgan Fuel Ranking applied to the model identifies the areas where fuels would encourage the quickest spread of wildfire; about 20 miles of Alternative 1 are ranked “High” for this attribute. The FRAP Fire Regime and Condition Class Data (2003) indicates canopy density of the existing vegetation, fire regime in relation to its historical range, and frequency of historical fire events. Where there is a greater frequency of fire events, there is greater potential for the introduction of fire-prone weeds and subsequent wildfire. About six miles of Alternative 1 borderzones are ranked high in terms of their fire regime; 26 miles are ranked moderate.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 3 Project Conditions for Alternative 1 include an increase in parallel ROWs where Alternative 1 would include a new transmission line adjacent to one or more existing transmission lines, which would occur for about 28 miles of the Alternative; 4.5 miles of Alternative 1 would include a new transmission line that does not parallel an existing transmission line corridor. Portions where Alternative 1 is not adjacent to an existing transmission line corridor present a higher fire risk because these areas would not have been previously accessed for transmission line construction or maintenance. The presence of a new transmission line increases the risk for introduction of non-native plants species that may be more fire-prone than the existing plant species. Finally, new roads would be required for about four miles of the construction of Alternative 1 and would increase the risk of native vegetation alteration, as they provide greater access to areas near the Alternative.
FIGURE 7.4.1A. ALTERNATIVE 1 MODEL 1 (FIREFIGHTER SAFETY AND OBSTRUCTION TO SUPPRESSION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
Figure 7.4.1B: Alternative 1 Model 2 (Potential for Wildfire) Results: Existing Conditions and Post-Project Conditions
Figure 7.4.1C: Alternative 1 Model 3 (Native Vegetation Alteration) Results: Existing Conditions and Post-Project Conditions
7.4.2. Alternative 2 (Proposed Action)

A proposed multi-circuit mitigation measure for Alternative 2 (Proposed Action) has been incorporated into this Technical Report to model the Wildfire and Fuels data attributes associated with the mitigation and to report the potential Wildfire and Fuels risks. The proposed multi-circuit mitigation has been designed to reduce adverse Wildfire/Fuels risks and minimize acquisition of private property due to the expansion of ROW for Alternative 2 (Proposed Action). LADWP is proposing to construct three-circuit towers to carry the two new Barren Ridge to Haskell Canyon (BR-HC) circuits and the existing Barren Ridge – Rinaldi (BR-RIN) circuit. Forty-six of the existing BR-RIN single-circuit towers would be removed and replaced with three-circuit towers within the existing ROW. The new three-circuit towers would require a 25-foot by 30-foot structure footprint, average height of 170 feet, average of seven structures per mile, and maximum tower-to-tower span length of 780 feet. The new three-circuit towers would be constructed within the existing ROW and utilize existing access roads.

Additionally, the construction of the multi-circuit towers would require the installation of a temporary bypass transmission line, in order to minimize disruption of electrical service along the existing BR-RIN transmission line to avoid impacts to hydroplants north of the Barren Ridge Switching Station. LADWP proposes to construct a temporary transmission line bypass to maintain electrical service. The temporary transmission line would consist of wooden poles with an average height of 95 feet, 3-foot by 3-foot footprint, and average of eight poles per mile. Construction would occur within a temporary 80 to 100-foot ROW in Elizabeth Lake and Green Valley and would be approximately 7.5 miles long: a majority of the temporary transmission line would be constructed along San Francisquito Road. To construct the wooden poles just north of Johnson Hill, the area would be accessed by temporary gravel roads that would be decommissioned and restored after removal of the temporary transmission line. All other pole locations would be accessed via San Francisquito Road or Johnson Hill Road. The towers would be set in place. Once all the poles have been constructed, the existing BR-RIN circuit would be relocated onto the temporary poles. After completion of construction of the three-circuit towers, the BR-RIN transmission line would be relocated onto the multi-circuit towers and the temporary transmission line would be removed.

Alternative 2 would run approximately 61 miles from Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station. Within the BRRTP fireshed, the Proposed Action post multi-circuit mitigation route would be slightly shorter (about 27.5 miles) than the alignment without this mitigation, which paralleled the existing BR-RIN line with the exception of the departures that would have created “Transmission Bounded Islands” in the Green Valley area, which are a considerable wildfire suppression obstruction. The proposed Multi-Circuit mitigation eliminates the “Transmission Bounded Islands” as well as reduces the overall ROW width of the Proposed Action within the critical wildfire severity topology of Elizabeth Lakes, Green Valley and the ANF. An additional fire hazard reduction benefit of reducing the additive ROW width of the Proposed Action is that, by co-locating the new and existing transmission lines onto the multi-circuit towers, several Distribution/Service wooden pole contact points would also be eliminated, further lowering the Proposed Action’s fire risk assessment.

The multi-circuit mitigation would introduce additional wildfire suppression and ignition complexities. Multi-circuit towers may be up to 80 feet taller than the existing structures they would replace. This is of critical Aerial Firefighting importance, as it presents a taller obstacle to be avoided where the transmission line crosses over exposed ridge lines that are very often used as tactical fire containment boundaries. Furthermore, the additional two to three tower structures per mile necessary to support the heavier multi-circuit lines would require the addition of access roads, tower pads, points of construction activities, and more frequent long-term maintenance activities. Each of these elements introduce additional points of wildfire ignition whether they are directly or indirectly associated with the Project. Alternative 2 post multi-circuit mitigation wildfire behavior models have been generated to quantify, analyze and assess all relevant potential wildfire and fuels management risks.
Approximately 34 miles lie in an arid region of southern Kern County. Transmission lines within the region of Kern County were not integrated into this assessment due to minimal historic fire history, low population density, and low levels of vegetative fuels.

### TABLE 7.4.2. ALTERNATIVE 2: FIRE RISK ASSESSMENT MODEL RESULTS EXISTING CONDITIONS AND POST-PROJECT CONDITIONS

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<th>Model 2</th>
<th></th>
<th></th>
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<td>9%</td>
<td>15%</td>
<td>59%</td>
<td>20%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Significance Criterion 1 is quantified by Model 1: “The presence of the Project, as well as construction and maintenance activities, may compromise firefighter safety and create obstructions to fire suppression efforts.” In Alternative 2, the Proposed Action, Existing Conditions exhibit about 2.5 miles of existing wooden pole contact, which creates the potential for the Proposed Action to be struck by a wooden pole. These areas could decrease firefighter suppression activities by creating an additional safety hazard during firefighting activities. Additionally, about 6.5 miles of the existing transmission lines to which the Proposed Action would be parallel form transmission bounded islands, which create a considerable obstruction for fire suppression efforts and create an area that poses a threat to firefighter safety. Other attributes listed in section 7.2 account for the categorization of each borderzone segment for Model 1.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 1 Post-Project Conditions for the Proposed Action include an increase in parallel ROWs: the Proposed Action would include about 19 miles of new transmission line adjacent to one or more existing transmission lines. The incremental increase in parallel ROWs creates an obstruction of fire suppression efforts but is not as considerable where there are no existing transmission lines. The Proposed Action would parallel an existing transmission line for its entire alignment. The Proposed Action includes about 8.5 miles of reconductoring of existing towers, resulting in a line height increase adjacent to existing facilities, but no expansion in the number of parallel ROWs of transmission lines. The increase in line height adjacent to an existing line poses an obstruction and safety risk, especially to aerial suppression efforts as described above. Additionally, the Proposed Action introduces only about one mile of new transmission bounded island, which severely limits access to areas during a wildfire event and poses a risk to fire fighter safety. Finally, while these are negative effects toward firefighter safety and create obstructions to fire suppression efforts, about one mile of the Proposed Action would require new road construction, presenting a positive opportunity by increasing access for firefighting suppression efforts.

Significance Criterion 2 is quantified by Model 2: “The Project construction and/or maintenance activities may adversely affect public safety through an increased risk of wildfire.” Existing Conditions exhibit about 18 miles borderzone that intersect an historic fire event that occurred within the last 50 years; about 11.5 miles have witnessed more than one fire event in the last 50 years. Those areas in which a fire has previously occurred have a greater potential of experiencing another wildfire event in the future and may adversely affect public safety through an increased risk of wildfire. Historic locations of fire ignition also play an important role and jeopardize public safety because these are the areas that have the greatest potential to burn due to their proximity to the ignition source; about 16 miles of the borderzones of the Proposed Action intersect a historic ignition point. Assets at risk including homes, businesses, and infrastructure are also a key component when considering public safety during a wildfire event, as these are often the most important factor in developing a plan to fight a wildfire and ensure public safety; about 7.5 miles of the borderzone of Alternative 2 encompass at least one asset at risk.
Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 2 Project Conditions for the Proposed Action include an increase in parallel ROWs: the Proposed Action would include about 19 miles of new transmission line adjacent to one or more existing transmission lines. The presence of a transmission line mainly increases the potential for wildfire events, which can adversely affect public safety due to the potential of wildfire ignitions from the transmission line and the ignition potential from maintenance activities or non-transmission related use of access roads. The Proposed Action’s new 230 kV double-circuit transmission line would parallel an existing transmission line corridor for its entire alignment. Finally, new roads would be required for about one mile of the construction of the Proposed Action and increase the risk of wildfire, as they provide greater access to areas near the Alternative, increasing the potential for accidental or intentional ignitions or the risk for public who may be located in these areas during a wildfire event.

Significance Criterion 3 is quantified by Model 3: “Activities associated with project construction and/or maintenance may result in native vegetation alteration due to the introduction of fire prone weeds and increase in potential for wildfire.” Existing Conditions of the vegetation of the borderzones along the Proposed Action exhibit considerable fire-related characteristics. The Scott and Burgan Fuel Ranking applied to the model identifies the areas where fuels would encourage the quickest spread of wildfire; about 16 miles of the Proposed Action are ranked “High” for this attribute. The FRAP Fire Regime and Condition Class Data (2003) indicates canopy density of the existing vegetation, fire regime in relation to its historical range, and frequency of historical fire events. Where there is a greater frequency of fire events, there is greater potential for the introduction of fire-prone weeds and subsequent wildfire. About one mile of the Proposed Action borderzones is ranked high in terms of the fire regime; 20.5 miles are ranked moderate. One borderzone segment, about one half mile, of the Proposed Action was eliminated from Model 3 because it is nearly all agricultural and not subject to vegetation analysis.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 3 Project Conditions for Alternative 2 include an increase in parallel ROWs where Alternative 2 would include a new transmission line adjacent to one or more existing transmission lines, which would occur for about 19 miles of the Proposed Action. The presence of a new transmission line increases the risk for introduction of non-native plants species that may be more fire-prone than the existing plant species. All portions of the Proposed Action would parallel an existing transmission line except for 8.5 miles of reconductoring, which effectively exhibits no change between Existing Conditions and Post-Project Conditions for Criterion 3 as described above. Finally, new roads would be required for about one mile of the construction of the Proposed Action and would increase the risk of native vegetation alteration, as they provide greater access to areas near the Alternative.
FIGURE 7.4.2A. ALTERNATIVE 2 (PROPOSED ACTION) MODEL 1 (FIREFIGHTER SAFETY AND OBSTRUCTION TO SUPPRESSION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
FIGURE 7.4.2B. ALTERNATIVE 2 (PROPOSED ACTION) MODEL 2 (POTENTIAL FOR WILDFIRE) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
FIGURE 7.4.2C. ALTERNATIVE 2 (PROPOSED ACTION) MODEL 3 (NATIVE VEGETATION ALTERATION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
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7.4.3. Alternative 2a

Alternative 2a would run approximately 63 miles from Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station. This Alternative includes approximately 6.5 miles that bypass the unincorporated community of Green Valley onto National Forest System lands. Within the BRRTP fireshed, Alternative 2a would consist of approximately 29 miles of newly constructed 230 kV transmission line running south, crossing the San Portal Ridge through the communities of Elizabeth Lake and Lake Hughes. The newly constructed line would parallel and transect San Francisquito Canyon Road, southwest of Green Valley, terminating at the proposed Haskell Canyon Switching Station. There are approximately four miles of Helicopter Construction for the new 230 double circuit line that are being proposed as mitigation where there is limited access and steep terrain within the ANF. Approximately 34 miles of Alternative 2a lie in arid regions of southern Kern County. Proposed transmission lines within this region were not assessed due to minimal historic fire history, low population density, and low level of vegetative fuels.

**TABLE 7.4.3. ALTERNATIVE 2A: FIRE RISK ASSESSMENT MODEL RESULTS EXISTING CONDITIONS AND POST-PROJECT CONDITIONS**

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</tr>
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<td>Post-Project</td>
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<td>19%</td>
<td>40%</td>
<td>8%</td>
<td>7%</td>
<td>47%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Significance Criterion 1 is quantified by Model 1: “The presence of the Project, as well as construction and maintenance activities, may compromise firefighter safety and create obstructions to fire suppression efforts.” In Alternative 2a, Existing Conditions exhibit about 2.5 miles of existing wooden pole contact, which creates the potential for the Alternative to be struck by a wooden pole. These areas could decrease firefighter suppression activities by creating an additional safety hazard during firefighting activities. Additionally, about 6.5 miles of the existing transmission lines to which Alternative 2a would be parallel form transmission bounded islands, which create a considerable obstruction for fire suppression efforts and create an area that poses a threat to firefighter safety. Other attributes listed in section 7.2 account for the categorization of each borderzone segment for Model 1.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 1 Post-Project Conditions for Alternative 2a include an increase in parallel ROWs: Alternative 2a would include about 14 miles of new transmission line adjacent to one or more existing transmission lines. The incremental increase in parallel ROWs creates an obstruction of fire suppression efforts, but is not as considerable where there are no existing transmission lines. Alternative 2a would include about 6.5 miles of new transmission line that avoids the community of Green Valley and does not parallel an existing facility; a new line that does not parallel an existing facility poses the greatest risk to fire suppression efforts and firefighter safety because a new line is present where there was no previous obstruction. Additionally, the Alternative introduces about one mile of new transmission bounded island, which severely limits access to areas during a wildfire event and poses a risk to firefighter safety. Alternative 2a also introduces about 10.5 miles of increased transmission line height adjacent to existing facilities, posing an obstruction to firefighting suppression efforts and increasing risk to firefighter safety, especially for aerial suppression efforts. This attribute was quantified with respect to an incremental increase adjacent to existing facilities or the introduction of a new transmission line that does not parallel any existing facilities. Finally, while these are negative effects toward firefighter safety and create obstructions to fire suppression efforts, about one mile of Alternative 2a would require new road construction, presenting a positive opportunity by increasing access for firefighting suppression efforts.
Significance Criterion 2 is quantified by Model 2: “The Project construction and/or maintenance activities may adversely affect public safety through an increased risk of wildfire.” Existing Conditions exhibit about 17 miles borderzone that intersect an historic fire event that occurred within the last 50 years; about 10 miles have witnessed more than one fire event in the last 50 years. Those areas in which a fire has previously occurred have a greater potential of experiencing another wildfire event in the future and may adversely affect public safety through an increased risk of wildfire. Historic locations of fire ignition also play an important role and jeopardize public safety because these are the areas that have the greatest potential to burn due to their proximity to the ignition source; about 12 miles of the borderzones of Alternative 2a intersect a historic ignition point. Assets at risk including homes, businesses, and infrastructure are also a key component when considering public safety during a wildfire event, as these are often the most important factor in developing a plan to fight a wildfire and ensure public safety; about 4.5 miles of the borderzone of Alternative 2a encompass at least one asset at risk.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 2 Project Conditions for Alternative 2a include an increase in parallel ROWs: Alternative 2a would include about 14 miles of new transmission line adjacent to one or more existing transmission lines. The presence of a transmission line mainly increases the potential for wildfire events, which can adversely affect public safety due to the potential of wildfire ignitions from the transmission line and the ignition potential from maintenance activities or non-transmission related use of access roads. Areas where a new transmission line is introduced where it does not parallel an existing transmission line corridor exhibit an increased adverse affect on public safety through an increased risk of wildfire because there is the introduction of access to a new area, increasing ignition potential to an area where previously only lightning ignitions could occur. Areas where a new transmission line does not parallel an existing facility also increase the potential for the public to access areas previously more difficult to get to, increasing persons’ safety risk if they are located in these areas during a wildfire event. New transmission facilities that do not parallel existing lines would occur for about 6.5 miles of Alternative 2a. Finally, new roads would be required for about one mile of the construction of Alternative 2a and would increase the risk of wildfire, as they provide greater access to areas near the Alternative, increasing the potential for accidental or intentional ignitions or the risk for public who may be located in these areas during a wildfire event.

Significance Criterion 3 is quantified by Model 3: “Activities associated with project construction and/or maintenance may result in native vegetation alteration due to the introduction of fire prone weeds and increase in potential for wildfire.” Existing Conditions of the vegetation of the borderzones along Alternative 2a exhibit considerable fire-related characteristics. The Scott and Burgan Fuel Ranking applied to the model identifies the areas where fuels would encourage the quickest spread of wildfire; about 15 miles of Alternative 2a are ranked “High” for this attribute. The FRAP Fire Regime and Condition Class Data (2003) indicates canopy density of the existing vegetation, fire regime in relation to its historical range, and frequency of historical fire events. Where there is a greater frequency of fire events, there is greater potential for the introduction of fire-prone weeds and subsequent wildfire. About one mile of Alternative 2a borderzones is ranked high in terms of the fire regime; 23 miles are ranked moderate. One borderzone segment, about one half mile, of Alternative 2a was eliminated from Model 3 because it is nearly all agricultural and not subject to vegetation analysis.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 3 Project Conditions for Alternative 2a include an increase in parallel ROWs where Alternative 2a would include a new transmission line adjacent to one or more existing transmission lines, which would occur for about 14 miles of the Alternative; about 6.5 miles of Alternative 2a would include a new transmission line that does not parallel an existing transmission line corridor. Portions where Alternative 2a is not adjacent to an existing transmission line corridor are more noteworthy because these areas would not have been previously accessed for transmission line construction or maintenance. The presence of a new transmission line increases the risk for introduction of non-native plants species that may be more fire-prone than the existing plant species. Finally, new roads would be required for about one mile of the construction of Alternative 2a and would
increase the risk of native vegetation alteration, as they provide greater access to areas near the Alternative.
Figure 7.4.3A: Alternative 2A Model 1 (Firefighter Safety and Obstruction to Suppression) Results: Existing Conditions and Post-Project Conditions
FIGURE 7.4.3B. ALTERNATIVE 2A MODEL 2 (POTENTIAL FOR WILDFIRE) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
FIGURE 7.4.3C. ALTERNATIVE 2A MODEL 3 (NATIVE VEGETATION ALTERATION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
7.4.4. Alternative 3

Alternative 3 is approximately 76 miles in length, originating at the Barren Ridge Switching Station. From the Barren Ridge Switching Station, Alternative 3 parallels Alternative 2 and enters the BRRTP fireshed at Mile Marker 33.5, continuing south to Mile Marker 40 where Alternative 3 splits to the east, west of the city of Lancaster. Heading southeast, Alternative 3 crosses the San Portal Ridge into the Sierra Pelona Valley and takes a sharp turn to the west just before reaching Highway 14. The route passes through the Agua Dulce community into Soledad Canyon, adjacent to Highway 14, and terminates at the proposed Haskell Canyon Switching Station. On Alternative 3, approximately 34 miles fall into an arid region of southern Kern County. Transmission lines within this region of Kern County were not integrated into this assessment due to minimal historic fire history, low population density, and low level of fuels. There are no helicopter construction practices proposed for Alternative 3.

**TABLE 7.4.4. ALTERNATIVE 3: FIRE RISK ASSESSMENT MODEL RESULTS EXISTING CONDITIONS AND POST-PROJECT CONDITIONS**

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<tr>
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<td>51%</td>
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Significance Criterion 1 is quantified by Model 1: “The presence of the Project, as well as construction and maintenance activities, may compromise firefighter safety and create obstructions to fire suppression efforts.” In Alternative 3, Existing Conditions exhibit about 13 miles of existing wooden pole contact, which creates the potential for the Alternative to be struck by a wooden pole. These areas could decrease firefighter suppression activities by creating an additional safety hazard during firefighting activities. Additionally, about 7.5 miles of the existing transmission lines to which Alternative 3 would be parallel form transmission bounded islands, which create a considerable obstruction for fire suppression efforts and create an area that poses a threat to firefighter safety. Other attributes listed in section 7.2 account for the categorization of each borderzone segment for Model 1.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 1 Post-Project Conditions for Alternative 3 include an increase in parallel ROWs: Alternative 3 would include about 42 miles of new transmission line adjacent to one or more existing transmission lines, the entire portion within the BRRTF fireshed. The incremental increase in parallel ROWs creates an obstruction of fire suppression efforts but is not as noteworthy where there are no existing transmission lines. Additionally, the Alternative introduces no new transmission bounded islands and actually eliminates about 1.5 miles of an existing transmission bounded island, south of the proposed Haskell Switching Station, by being located between two existing transmission lines. The area with this existing transmission bounded island is effectively less accessible with the introduction of Alternative 3, such that fire suppression efforts in this area are essentially eliminated. Alternative 3 does not introduce and increase in transmission line height adjacent to existing facilities, posing no additional obstruction to firefighting suppression efforts. Finally, while these are negative effects toward firefighter safety and create obstructions to fire suppression efforts, about three miles of Alternative 3 would require new road construction, presenting a positive opportunity by increasing access for firefighting suppression efforts.

Significance Criterion 2 is quantified by Model 2: “The Project construction and/or maintenance activities may adversely affect public safety through an increased risk of wildfire.” Existing Conditions exhibit about 27 miles borderzone that intersect an historic fire event that occurred within the last 50 years; about 17 miles have witnessed more than one fire event in the last 50 years. Those areas in which a fire has previously occurred have a greater potential of experiencing another wildfire event in the future and may adversely affect public safety through an increased risk of wildfire. Historic locations of fire
ignition also play an important role and jeopardize public safety because these are the areas that have the greatest potential to burn due to their proximity to the ignition source; about 11 miles of the borderzones of Alternative 3 intersect a historic ignition point. Assets at risk including homes, businesses, and infrastructure are also a key component when considering public safety during a wildfire event, as these are often the most important factor in developing a plan to fight a wildfire and ensure public safety; about 15.5 miles of the borderzone of Alternative 3 encompass at least one asset at risk.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 2 Project Conditions for Alternative 3 include an increase in parallel ROWs: Alternative 3 would include about 42 miles of new transmission line adjacent to one or more existing transmission lines. The presence of a transmission line mainly increases the potential for wildfire events, which can adversely affect public safety due to the potential of wildfire ignitions from the transmission line and the ignition potential from maintenance activities or non-transmission related use of access roads. Finally, new roads would be required for about three miles of the construction of Alternative 3 and would increase the risk of wildfire, as they provide greater access to areas near the Alternative, increasing the potential for accidental or intentional ignitions or the risk for public who may be located in these areas during a wildfire event.

Significance Criterion 3 is quantified by Model 3: “Activities associated with project construction and/or maintenance may result in native vegetation alteration due to the introduction of fire prone weeds and increase in potential for wildfire.” Existing Conditions of the vegetation of the borderzones along Alternative 3 exhibit considerable fire-related characteristics. The Scott and Burgan Fuel Ranking applied to the model identifies the areas where fuels would encourage the quickest spread of wildfire; about 27 miles of Alternative 3 are ranked “High” for this attribute. The FRAP Fire Regime and Condition Class Data (2003) indicates canopy density of the existing vegetation, fire regime in relation to its historical range, and frequency of historical fire events. Where there is a greater frequency of fire events, there is greater potential for the introduction of fire-prone weeds and subsequent wildfire. About 1.5 miles of Alternative 3 borderzones are ranked high in terms of their fire regime; 35.5 miles are ranked moderate.

Post-Project Conditions exhibit an increased wildfire risk because Project-induced attributes are added to the risk posed by the existing conditions. Model 3 Project Conditions for Alternative 3 include an increase in parallel ROWs where Alternative 3 would include a new transmission line adjacent to one or more existing transmission lines, which would occur for about 42 miles of the Alternative, the entire length. The presence of a new transmission line increases the risk for introduction of non-native plants species that may be more fire-prone than the existing plant species. Finally, new roads would be required for about four miles of the construction of Alternative 3 and would increase the risk of native vegetation alteration, as they provide greater access to areas near the Alternative.
FIGURE 7.4.4A. ALTERNATIVE 3 MODEL 1 (FIREFIGHTER SAFETY AND OBSTRUCTION TO SUPPRESSION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
Figure 7.4.B: Alternative 3 Model 2 (Potential for Wildfire) Results: Existing Conditions and Post-Project Conditions
FIGURE 7.4.4C. ALTERNATIVE 3 MODEL 3 (NATIVE VEGETATION ALTERATION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS
7.4.5. Segment J

Between the proposed Haskell Canyon Switching Station and the existing Castaic Power Plant, LADWP proposes the addition of 12 miles of a new 230 kV transmission circuit onto existing Castaic – Olive 230 kV Transmission Line structures. This alignment is designated as Segment J. Approximately 300 feet of BLM-managed public lands and four miles of NFS lands would be traversed; however, the new circuit would not require a new or additional ROW. This new circuit would be called Castaic – Haskell Canyon #4 and would utilize the same conductor (bundled 715.5 kcmil “Starling” ACSS/AW) as that proposed for the new 230 kV transmission line between Barren Ridge and Haskell Canyon Switching Stations.

When applied to Segment J, all three Models representing the three Significance Criteria exhibit no change between Existing Conditions and Post-Project Conditions. The addition of a new circuit on existing towers would require many of the same construction activities associated with a new transmission line (refer to Appendix A for a description of each construction activity). However, all work would be within existing ROW and no new towers would be constructed, leaving no lasting post-Project change related to the fire risk assessment. Some towers may need to be modified or reinforced to carry the additional weight of the new conductor, but tower reinforcement would not alter the general design or the location of the structures. All post-Project impacts would be the result only of the construction activities, but pose no change in post-Project conditions. Because there is still significant risk associated with the construction proposed on Segment J, all appropriate fire risk mitigations related to construction activities and maintenance regime should be applied to Segment J as described in the next section.

### Table 7.4.5. Segment J: Fire Risk Assessment Model Results Existing Conditions and Post-Project Conditions

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
<th></th>
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<tr>
<td></td>
<td>Low</td>
<td>Mod</td>
<td>High</td>
<td>V H</td>
<td>Low</td>
<td>Mod</td>
<td>High</td>
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<td>Low</td>
<td>Mod</td>
<td>High</td>
<td>V H</td>
<td>Low</td>
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<tr>
<td>Existing Conditions</td>
<td>8%</td>
<td>72%</td>
<td>16%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>56%</td>
<td>44%</td>
<td>0%</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Post-Project Conditions</td>
<td>8%</td>
<td>72%</td>
<td>16%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>56%</td>
<td>44%</td>
<td>0%</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 7.4.5A. SEGMENT J MODEL 1 (FIREFIGHTER SAFETY AND OBSTRUCTION TO SUPPRESSION) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS

Route J - Existing Conditions: Firefighter Safety and Obstruction to Suppression

Route J - Post-Project Conditions: Firefighter Safety and Obstruction to Suppression

Ranking Distribution

Ranking Distribution

April 2011

New 230 kV Transmission Line Alternatives
- Alternative 1
- Alternative 2 (Proposed)
- Localized Alternative 2A
- Alternative 3

Existing Transmission Lines
- LADWP
- So Cal Edison

Other Applicable Project Components
- Proposal选址
- Switching Station
- BRRTP Finished Assessment Boundary

Jurisdictional Land Ownership
- U.S. Forest Service
- Bureau of Land Management
- Department of Defense
- CA State Lands
- Federal

Wildfire Risk Assessment
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

1:110,000
FIGURE 7.4.5B. SEGMENT J MODEL 2 (POTENTIAL FOR WILDFIRE) RESULTS: EXISTING CONDITIONS AND POST-PROJECT CONDITIONS

Route J - Existing Conditions: Potential for Wildfire

Route J - Post-Project Conditions: Potential for Wildfire

<table>
<thead>
<tr>
<th>New 230 kV Transmission Line Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
</tr>
<tr>
<td>Alternative 2 (Proposed)</td>
</tr>
<tr>
<td>Localized Alternative 2A</td>
</tr>
<tr>
<td>Alternative 3</td>
</tr>
</tbody>
</table>

Existing Transmission Lines
- LADWP
- So-Cal Edison

Other Applicable Project Components
- Proposed Haskell Switching Station
- BRRTP Fished Assessment Boundary

Jurisdictional Land Ownership
- U.S. Forest Service
- Bureau of Land Management
- Department of Defense
- CA State Lands
- City Boundaries

Wildfire Risk Assessment
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

1:100,000

Forester's Co-Op
Professional Forestry & GIS Services
(562) 273-4536
www.forester.com
Figure 7.4.5C. Segment J Model 3 (Native Vegetation Alteration) Results: Existing Conditions and Post-Project Conditions

Route J - Existing Conditions: Native Vegetation Alteration

Route J - Post-Project Conditions: Native Vegetation Alteration

Forrest's Co-Op
Professional Forestry & GIS Services
(760) 271-4526
www.BRRTP.com

BRRTP EIR/EIS
8.0 **BIBLIOGRAPHY AND PERSONS CONSULTED**

*References cited in Wildfire and Fuels Technical Report:*


3. Angeles LRMP Part 2, page 27 (Diane Travis, ANF, Reference)


12. _____. 2007. *Fire and Resources Assessment Program (FRAP).*


16. Fites and Henson 2004 (Diane Travis, ANF, Reference)


19. Hirsch* et al.* 2001 (Diane Travis, ANF, Reference)


31. Martinson and Omi 2003 (Diane Travis, ANF, Reference)

32. Martinson and Omi 2006 (Diane Travis, ANF, Reference)


37. Omi 1977 (Diane Travis, ANF, Reference)


39. Omi et al. 2006 (Diane Travis, ANF, Reference)


50. Travis, Diane, Fuels Officer - Angeles National Forest, Big Pines Visitor Center, PO Box 1011 Wrightwood, CA 92397 (760) 249-6005 – 2010 BRRTP Wildfire Technical Report Consultations
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9. Karen Baumen, USFS District Fuels Officer
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11. Glenn Harris, BLM, Natural Resource Specialist
12. Kim Mathews, Senior Environmental Scientist, CA State Parks
13. Lori Bonnett, Superintendent, Castaic Lake State Recreation Area
14. Ruthann Levison, Communications Chair, Sand Canyon Fire Safe Council
15. Laura Vernetti, Secretary/Treasurer, Angeles Forest and Valleys Fire Safe Council
## 9.0 ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in the Wildfire and Fuels Technical Report.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>AC</td>
<td>Alternating Current</td>
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<tr>
<td>ACSS/AW</td>
<td>aluminum conductor steel supported/aluminum-clad steel wire</td>
</tr>
<tr>
<td>ACSS/TW/HS</td>
<td>aluminum conductor steel supported/trapezoidal wires/high strength</td>
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<td>ANF</td>
<td>Angeles National Forest</td>
</tr>
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<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>BAER</td>
<td>Burned Area Emergency Response Program</td>
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<tr>
<td>BC</td>
<td>Back Country</td>
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<tr>
<td>BLM</td>
<td>U.S. Department of the Interior, Bureau of Land Management</td>
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<td>BR-RIN</td>
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<td>BRRTP</td>
<td>Barren Ridge Renewable Transmission Project</td>
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<td>CAL FIRE</td>
<td>California Department of Forestry and Fire Protection</td>
</tr>
<tr>
<td>CCR</td>
<td>California Code of Regulations</td>
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<tr>
<td>CDF</td>
<td>California Department of Forestry</td>
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<td>CEQA</td>
<td>California Environmental Quality Act</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CPUC</td>
<td>California Public Utilities Commission</td>
</tr>
<tr>
<td>DAI</td>
<td>Developed Area Interface</td>
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<tr>
<td>DBH</td>
<td>Diameter at breast height</td>
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<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>ECC</td>
<td>Emergency Communications Center</td>
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<td>EIR</td>
<td>Environmental Impact Report</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>EMS</td>
<td>Emergency Medical Services</td>
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<td>ERC</td>
<td>Energy Release Components</td>
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<td>FERC</td>
<td>Federal Energy Regulatory Commission</td>
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<td>FLIR</td>
<td>Forward Looking Infrared</td>
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<td>FMP</td>
<td>Fire Management Plan</td>
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<td>Fire Management Unit</td>
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<tr>
<td>FONSI</td>
<td>Finding of No Significant Impacts</td>
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<td>FRA</td>
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<tr>
<td>FRAP</td>
<td>California Department of Forestry and Fire Protection’s Fire and Resource Assessment Program</td>
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<tr>
<td>FRCC</td>
<td>Fire Regime Condition Classification</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<td>GO</td>
<td>General Order</td>
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<td>GPS</td>
<td>Global positioning system</td>
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<td>Helicopter Coordinator</td>
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<td>Ignition Components</td>
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<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
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<tr>
<td>kcmil</td>
<td>Thousand circular mil (formerly MCM)</td>
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<tr>
<td>kV</td>
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<td>Acronym</td>
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<td>Off-highway vehicle</td>
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<td>PG&amp;E</td>
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<td>Particulate matter</td>
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<td>SAO</td>
<td>Santa Ana Occurrence</td>
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<td>WUI</td>
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