2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

The Proposed Action consists of the issuance of several federal authorizations, including a Right-of-Way Grant that would allow the development of IID's Proposed Project, a new transmission line. The transmission line would connect to a new substation/switching station on the north side of Hobsonway adjacent to the Blythe Power Plant and is designed to connect existing and future system facilities in the vicinity of Blythe, California, to SCE's Devers Substation near Palm Springs, California. The Proposed Project would operate at either 230-kV or 500-kV and would provide increased transmission line capabilities to meet transmission requests.

This section provides a detailed description of the Proposed Project and alternatives. As discussed in Section 1, the Proposed Project transmission line alignment would be located entirely within a BLM-designated utility corridor in areas within the CDCA. As such, the Proposed Project would require approval and a Right-of-Way Grant from the BLM for construction and operation on rights-of-way, but would not require an amendment to, or exemption from, the CDCA Plan. However, certain alternative alignments under consideration are not located entirely within BLM-designated utility corridors in the CDCA and would, therefore, require an amendment of the CDCA Plan or a project-specific exemption to the CDCA Plan. Such federal actions and/or authorizations that would be required for the various project alternatives are also discussed in this section.

The alternatives contained herein are based on an alternative screening analysis conducted to develop a reasonable range of alternatives to the Proposed Project, taking into account the objectives of the Proposed Project as identified in Section 1 of this EIS/EIR. The alternatives screening process is described below in Section 2.6. Based on the screening analysis, five alternatives (including the Proposed Project/Preferred Alternative) are fully analyzed in this document: 1) the Proposed Project/Preferred Alternative (a northern route alternative); 2) Alternative A (a second northern route alternative); 3) Alternative B (a southern route alternative that would include upgrading and use of certain existing transmission facilities); 4) Alternative C (a third northern route alternative with an alignment generally parallel to and north of the Alternative A alignment); and 5) the No Action Alternative. The Proposed Project and each of these alternatives, including certain segment alignment options under consideration, are described in the following sections.

2.2 Proposed Project (Preferred Alternative)

2.2.1 Overview of the Proposed Project

IID proposes to construct, operate, and maintain a new, approximately 118-mile transmission line from a new substation/switching station located on the north side of Hobsonway, west of the existing Blythe Power Plant, approximately 4.5 miles west of Blythe, California, to SCE Devers Substation, approximately 10 miles north of Palm Springs, California. The Proposed Project would operate at either 230-kV or 500-kV and would provide increased transmission line capabilities from the proposed new substation/switching station on Hobsonway to the Devers

Substation to meet transmission requests. For most of its alignment the transmission line would be located adjacent to SCE's existing 500-kV Devers-Palo Verde Transmission Line. In addition, the Proposed Project would include a new substation/switching station located on Dillon Road adjacent to the existing transmission line facilities near Indio, California. This new substation/switching station on Hobsonway would provide a connection point with the Proposed Project transmission line and IID's existing Coachella Substation. The proposed location of the new substations/switching stations, connection facilities, and Proposed Project transmission line route is shown on Figure ES-1. As discussed in Section 1, the Proposed Project transmission line would be located entirely within a BLM-designated utility corridor; therefore, an amendment to the CDCA Plan would not be required. However, a Right-of-Way Grant from the BLM for construction and operation activities associated with the Proposed Project transmission line would be necessary for areas within the CDCA.

2.2.2 Project Components

Table 2-1 summarizes the various components of the Proposed Project. These components are discussed in detail in the following sections that describe the proposed transmission line route, and transmission line, substation/switching station, and communication facilities.

Table 2-1 Summary of Proposed Project Components
Proposed Route and Right-of-Way • Transmission Line Length: approximately 118 miles. • Connection Point: IID's proposed new substation/switching station on Hobsonway. • Connection Point: IID's existing KN-KS line adjacent to Dillon Road near Coachella, CA. • Connection Point: IID's existing Coachella Substation near Coachella, CA. • Termination Point: SCE's Devers Substation near Palm Springs, CA. • Right-of-Way Width: 300 feet. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, adjacent land restrictions, existing roads and highways, and biological and cultural resources). • Total Right-of-Way Acreage: approximately 4,290 acres (does not include construction access roads).
Transmission Line Facilities (single-circuit, 500-kV) • Conductors: One 3-phase AC circuit consisting of two 1.5 to 2-inch ACSR conductors per phase. • Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature. • Shield Wires: Two 1/2 to 3/4-inch diameter wire(s) for steel lattice. • Transmission Line Tower Types: - Steel Lattice Tower along entire route. - Structure Heights (approximate): Steel Lattice – 100 to 180 feet. • Average Distance between Towers: Steel Lattice – 1,400 feet*. • Total Number of Towers (approximate): 430 – 480*.
Transmission Line Facilities (double-circuit, 230-kV) • Conductors: Two 3-phase AC circuits consisting of two 1.5 to 2-inch ACSR conductors per phase. • Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature. • Shield Wires: One for single pole designs and one for steel lattice designs, 3/8 to 3/4-inch-diameter wire(s). • Transmission Line Tower Types: - Steel Lattice Tower along entire route, with the exception of agricultural areas and local areas where Single-Pole steel structures might be used. - Structure Heights (approximate): Steel Lattice and Single Pole – 100 to 195 feet.

Table 2-1 Summary of Proposed Project Components
• Average Distance between Towers: Steel Lattice and Single Pole – 1,200 feet*. • Total Number of Towers (approximate): 500 - 550*.
Transmission Line Facilities (single-circuit, 230-kV) • Conductors: One 3-phase AC circuits consisting of two 1.5 to 2-inch ACSR conductors per phase. • Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature. • Shield Wires: Two 3/8 to 3/4-inch diameter wire(s) for single H-frame designs • Transmission Line Tower Type: - Tubular Steel H-frame - Structure Heights (approximate): 75 to 100 feet. • Average Distance between Towers: 800 feet*. Total Number of Towers (approximate): 8*.
Substation Facilities • A new substation/switching station on Hobsonway, requiring a total area of approximately 25 acres, would be constructed immediately west of the Blythe Power Plant near Blythe, California. The Proposed Project transmission line would connect at this facility which would accommodate two 230-kV circuits, or one 500-kV circuit depending on the final determination of the Proposed Project transmission line configuration. • A new substation/switching station on Dillon Road, requiring a total area of approximately 25 acres, would be constructed west of Dillon Road adjacent to the existing transmission line facilities near Indio, California. The new substation/switching station would provide a connection point with the Proposed Project transmission line and IID's existing Coachella Substation. • Coachella Substation: Upgrades to existing facilities to accommodate increased transmission service. • Devers Substation: Facilities would be expanded at the existing Devers Substation, north of Palm Springs, California, to accommodate interconnection of the Proposed Project transmission line and to reconfigure existing transmission line approaches to the substation to provide the necessary clearances between adjacent transmission lines and other facilities.
Communications Facilities • Systems: Digital Radio System, microwave, VHF/UHF radio, and Fiber Optic Ground Wire (OPGW). • Functions: Communications for fault detection, line protection, SCADA, and two-way voice communication.

*The exact quantity and placement of the structures depends on the final detailed design of the transmission line which is influenced by the terrain, land use, and economics. Alignment options may also slightly increase or decrease the quantity of structures.

2.2.2.1 Proposed Project Transmission Line Alignment

The Proposed Project transmission line alignment is shown in Figure ES-1. The Proposed Project transmission line would be approximately 118 miles in length, and would originate at a new substation/switching station on the north side of Hobsonway west of the Blythe Power Plant near Blythe (also shown on Figure ES-1). The transmission line would proceed southwest along existing transmission line rights-of-way approximately 1.8 miles. At this point the line would turn west and proceed approximately 7 miles to the point where it would intercept SCE's existing 500-kV Devers-Palo Verde Transmission Line. From that point, the line would parallel (on the north side) the Devers-Palo Verde Transmission Line until approximately 3 miles southeast of Desert Center. At this point, the line would shift to the north and parallel Interstate 10 (I-10) (on the south side). The Proposed Project transmission line would cross to the north side of I-10, approximately 2.5 miles east of the Cactus City rest area, and continue west adjacent to the existing transmission lines to the Devers Substation.

As shown on Figure ES-1, a single alignment option, developed from an analysis of the alternatives, is under consideration for the Proposed Project transmission line. Option A-1 provides a slightly different route alignment into the Devers Substation than the Proposed Project. The Devers Substation is currently arranged with the 500-kV facilities located at the northern end of the substation and the 230-kV facilities located at the southern end of the substation. Option A-1 provides a route to the southern end of the substation (the 230-kV facilities). This option would provide a more direct route to the Devers Substation for a distance of approximately 1.5 miles, and would decrease the total length of the transmission line by approximately 0.5 miles.

2.2.2.2 Transmission Line Facilities (Lines and Structures)

2.2.2.2.1 Type of Structures – The types of steel structures that would be used for construction of the Proposed Project are dependent upon the final transmission line configuration and voltage selected. For the double-circuit, 230-kV configuration, steel lattice structures would be used with the exception of agricultural areas and specific locations where 230-kV single pole steel structures would be used. For the single-circuit, 500-kV configuration, steel lattice towers would be used along the entire route. All tower structures would be designed to withstand minimum wind speeds of 90 miles per hour (mph). Meteorological studies would be completed to evaluate maximum wind loading criteria to be used for the final design of the structures.

2.2.2.2.1.1 500-kV Steel Lattice Tower Structures – A single-circuit, self-supporting steel lattice tower structure is proposed for the Proposed Project if configured for 500-kV operation. Figure 2-1 illustrates the typical 500-kV steel lattice tower structure. Tower heights would vary from 100 to 180 feet above the ground surface depending on terrain and associated "span lengths" (i.e., distances between transmission line support structures). The average span length would be approximately 1,400 feet, resulting in about 3.8 towers per mile of line. Span lengths would generally range from a minimum of 400 feet to a maximum of 2,200 feet. However, the exact quantity and placement of the structures would depend on the final detailed design of the transmission line which would be influenced by factors such as terrain, land use, economics, and possible environmental constraints within the right-of-way.

Each tower would support three phases consisting of two conductors per phase. Each tower would be supported by four legs that would be bolted to caisson foundations approximately 22 feet deep and 4 feet in diameter.

2.2.2.2.1.2 230-kV Steel Lattice Tower Structures – A double-circuit, self-supporting steel lattice tower structure is proposed for the Proposed Project if configured for 230-kV operation. Figure 2-2 illustrates the typical double-circuit 230-kV steel lattice tower structure. Tower heights would vary from 100 to 195 feet above the ground surface depending on terrain and associated span lengths. The average span length would be approximately 1,200 to 1,400 feet or about 4.4 towers per mile of line. Span lengths would generally range from a minimum of 400 feet to a maximum of 1,550 feet. However, the exact quantity and placement of the structures would depend on the final detailed design of the transmission line which would be influenced by site-specific factors such as terrain, land use, and possible environmental constraints within the right-of-way.

Figure 2-1 Typical 500kV Single Circuit Structure

Back page of figure.

Figure 2-2 Typical Double-Circuit 230-kV Steel Lattice Tower Structure

Back page of figure.

The towers would support two vertically configured circuits consisting of three phases each. Each phase of the circuit would consist of two conductors. The towers would be supported by four legs that would be bolted to caisson foundations approximately 25 feet deep and 4 feet in diameter.

2.2.2.2.1.3 230-kV Single Steel Pole Structures - A double-circuit, single-column steel pole structure could be used in agricultural areas, if the Proposed Project transmission line is configured for 230-kV operation, to minimize the effects on agricultural land use. Figure 2-3 illustrates a typical double-circuit, 230-kV, single pole structure. Pole heights would vary from 100 to 150 feet above the ground surface depending on terrain and associated span lengths. Span lengths would range from 400 to 1,600 feet depending on final design and line capacity requirements.

Three horizontal arms would extend from the main pole to support three 230-kV phases consisting of two conductors per phase on each side of the main pole. The horizontal arms would extend approximately 12 feet from each side of the main pole with a vertical spacing of approximately 18 feet. A caisson foundation approximately 35 feet deep and 6 feet in diameter would be used to support each steel pole. A flanged base of each steel pole would be bolted to the caisson foundation.

2.2.2.2.1.4 230-KV Steel Pole H-Frame Structures - A single-circuit, double-column steel H-frame structure would be used as needed for connections with existing facilities and for specific instances where crossing other existing transmission facilities would be required. Figure 2-4 illustrates a typical single-circuit, 230-kV, H-frame structure. Structure heights would vary from 75 to 100 feet.

One horizontal arm, approximately 30 feet in length, would extend over the two columns to support the three 230-kV phases. These three phases would consist of two conductors per phase with one phase at each end and one in the middle centered between the two columns. The columns would be connected to each other with an X-brace to form a frame for increased strength. Two caisson foundations, approximately 15 feet deep and 3.5 feet in diameter, would be used to support each H-frame structure.

2.2.2.3 Substation Facilities

The Proposed Project includes the construction and operation of a new substation/switching station near Blythe and a new substation/switching station near Dillon Road, expansion of the existing Devers Substation at its western terminus, and upgrades to the Coachella Substation.

2.2.2.3.1 New Substation/Switching Station on Hobsonway - Under the Proposed Project, a new substation/switching station on the north side of Hobsonway, west of the Blythe Power Plant, would be constructed. The new substation/switching station would provide a connection point for the Proposed Project transmission line, and would also provide a means of connection to other existing and future power facilities in the Blythe area. System studies are now being completed which would identify connection options. The new substation/switching stations would require approximately 25 acres each of permanent disturbance.

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Figure 2-3 Typical Double-Circuit 230-kV Steel Pole Structure

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Figure 2-4, H-Frame Structure

Back page of figure.

2.2.2.3.2 New Substation/Switching Station on Dillon Road - Under the Proposed Project, a new substation/switching station on Dillon Road, requiring a total area of approximately 25 acres, would be constructed west of Dillon Road adjacent to the existing transmission line facilities near Indio, California. The new substation/switching station would provide a connection point with the Proposed Project transmission line and IID's existing Coachella Substation.

2.2.2.3.3 Devers Substation - Interconnection of the Proposed Project transmission line at the Devers Substation would require modification to existing equipment and installation of new equipment. Such modifications would include installing additional circuit breakers, protection devices, and associated communication equipment to accommodate the new facilities. The current arrangement of the substation would be modified by relocating existing equipment to new locations within the substation perimeter, and by adding new equipment in place of the existing equipment. These modifications would require incorporation of approximately five acres of land adjacent to the Devers Substation.

2.2.2.3.4 Coachella Substation - Connection of the Proposed Project transmission line at the Coachella Substation would require upgrades to existing equipment as well as new equipment. Such modifications may include installing additional circuit breakers, protection devices, and associated communication equipment to accommodate the new facilities.

2.2.2.4 Communication Facilities

IID is proposing to use a digital radio system for basic communication needs along with a relay protection system, and provisions for voice and data communications. The installation of OPGW would be included in the transmission line design to provide an alternative communication system for project related operations and maintenance. Using specialized equipment, the system would provide for automatic high speed interruption of power flow over the transmission line when a fault is detected at the substations. System operation would be monitored through a System Control and Data Acquisition (SCADA) process utilizing the digital radio system and/or the fiber optic links. Similarly, necessary construction, operation, and maintenance communication would be included to ensure the safety of the public and IID employees. The attributes of the proposed communication links are described below.

2.2.2.4.1 Digital Radio System

2.2.2.4.1.1 SCADA System - A SCADA system would be used to monitor system operation, and would consist of remote computers located at the substations. The system would continuously provide information to system operators regarding the quantities of power transmitted through the line, and the control and status indication of circuit breakers and switches in the substations.

2.2.2.4.1.2 Two-Way Communication - Two-way communication would be required for construction, operation, and maintenance personnel. Such communication would be provided by cellular phones or a VHF/UHF two-way radio system. Cellular phone communication would be possible utilizing the services of existing cellular systems, and a conventional VHF or UHF two-way radio system could be possible by utilizing existing communication transmission facilities. It is likely that a combination of these two communication methods would be used to coordinate construction and operation activities.

2.2.3 Preconstruction Activities

Preconstruction activities for the Proposed Project would include preconstruction surveys and right-of-way acquisition as described in the following sections.

2.2.3.1 Preconstruction Survey Activities

Preconstruction survey work would consist of locating the centerline, structure center hubs, right-of-way boundaries, and structure access roads. Intensive surveys would also be necessary prior to construction to determine the presence of cultural resources and special-status species within potentially affected areas. These surveys would be initiated following right-of-way and access road identification and marking. Prior to the initiation of any preconstruction surveys, the necessary survey permits for federal and state land and rights-of-entry to privately owned land would be obtained.

2.2.3.2 Right-of-Way Acquisition

Internal IID requirements, the National Electrical Safety Code (NESC), the Western Energy Coordinating Council (WECC) requirements [California General Order 95], and operational considerations would determine the width of the right-of-way. Specific right-of-way requirements depend on the structure type, height, span, and conductor configuration. IID generally requires rights-of-way that are the height of the structure on either side of the centerline to avoid issues associated with structure failure. An additional right-of-way distance of 50 feet is required to allow equipment access in the event of a collapsed structure. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing structures, existing roads and highways, and biological and cultural resources). The height of the transmission line structures would range from 100 to 180 feet. The overall right-of-way width would be 300 feet which would provide for a typical tip-over range of 125 feet for average height structures and an additional 25 feet on each side for maintenance access results. The Proposed Project transmission line would be located adjacent to the existing Devers-Palo Verde Transmission Line right-of-way. The right-of-way is 450 feet in width to accommodate the existing 500-kV Devers-Palo Verde No. 1 and the future Devers-Palo Verde No. 2 lines. Therefore, an additional right-of-way of 300 feet in width and adjacent to the existing Devers-Palo Verde Transmission Line right-of-way would effectively result in a combined right-of-way width of 750 feet. This is the maximum right-of-way width required to accommodate the Devers-Palo Verde No. 1, the future Devers-Palo Verde No. 2 transmission line, and the Proposed Project transmission line.

On federally managed public land, a Right-of-Way Grant would be required from the BLM. On state managed public land, a Land Use Lease would be required from the California State Lands Commission (CSLC). On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired across their property, and any damages resulting from construction, operation, and maintenance.

2.2.4 Project Construction

Constructing a transmission line includes identifying and constructing access roads, rights-of-way and structure sites clearing (including construction yards, installing foundations, assembling and erecting the structures, clearing, pulling (i.e., stringing transmission line conductors through the structures), tensioning and splicing sites, installing ground wires and conductors, installing counterpoise/ground rods, and cleanup and site reclamation. Various phases of construction may be supported by the use of helicopters to minimize--and eliminate in some cases--the need to travel along the right-of-way. The use of helicopters is especially beneficial for conductor installation activities.

The phases of construction would occur at different locations throughout the construction process. This would require several construction crews operating simultaneously in different locations. Figure 2-5 depicts the typical construction procedures of transmission line structure and wire installations. Table 2-2 lists temporary and permanent disturbance for the Proposed Project.

Table 2-2
Proposed Project Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Structure Sites	914 – 1,020	866 - 966	48 – 54[a]
Access Roads	26[b]	6	20
Staging Areas	28	28	0
Pull Sites[c]	63	63	0
New Substation/Switching Stations (2)	50		50
Devers Substation (expansion)	5		5
Total Estimated	894 – 1,125	767 - 986	127 - 139

[a] Area at structure sites include short spur roads from the existing Devers-Palo Verde Transmission Line maintenance road.
[b] New access roads would be required and some existing roads would require upgrades to allow passage of heavy equipment to set structures and deliver concrete.
[c] Pull sites are areas at which equipment utilized for installation of transmission line wires would be temporarily located during construction.

2.2.4.1 Access Road Construction

The construction, operation, and maintenance of the proposed transmission line would require that heavy vehicles access structure sites along the right-of-way. To the greatest extent possible, use of existing maintenance roads within existing transmission line right-of-ways is planned to minimize potential impacts associated with new access road construction. Where necessary, certain road improvements would be made to allow passage of construction vehicles. Following construction, disturbed road sections would be restored to original contours. Some permanent road improvements may be left in place where necessary for operation or maintenance, or where the landowner or land managing agency requires. Road standards would be addressed specifically in the Construction, Operation and Maintenance (COM) Plan that would be prepared during the engineering phase of the Proposed Project.

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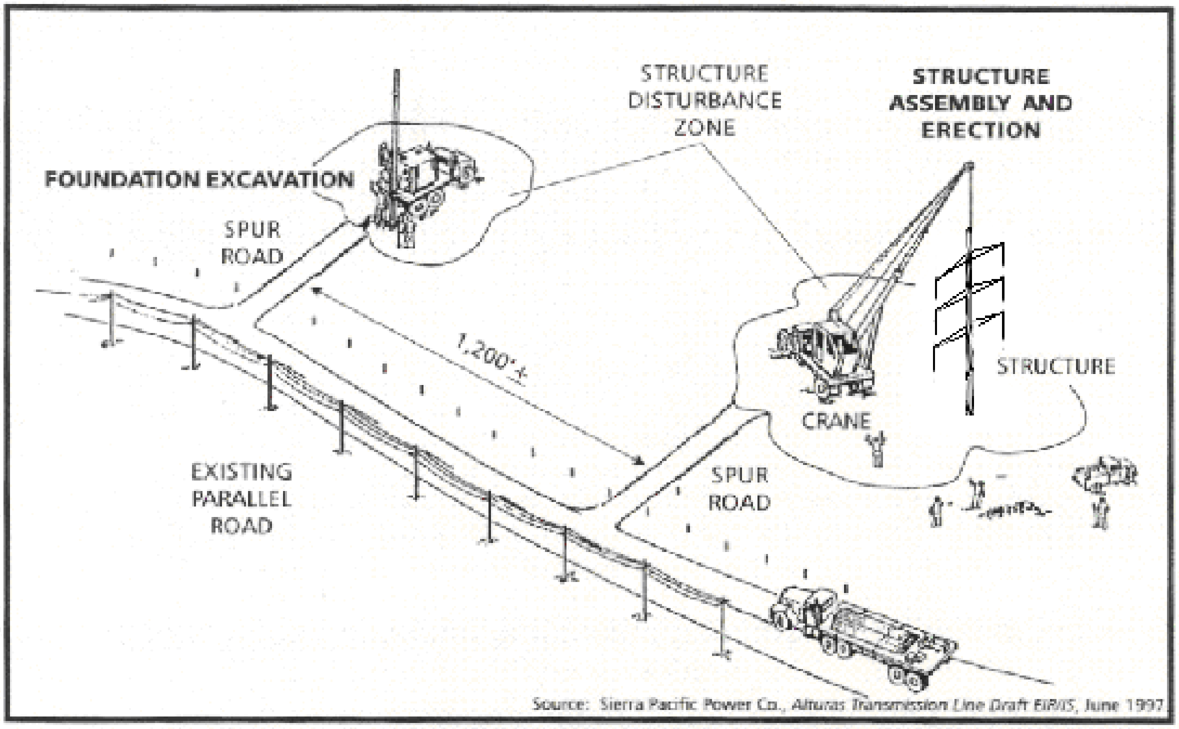
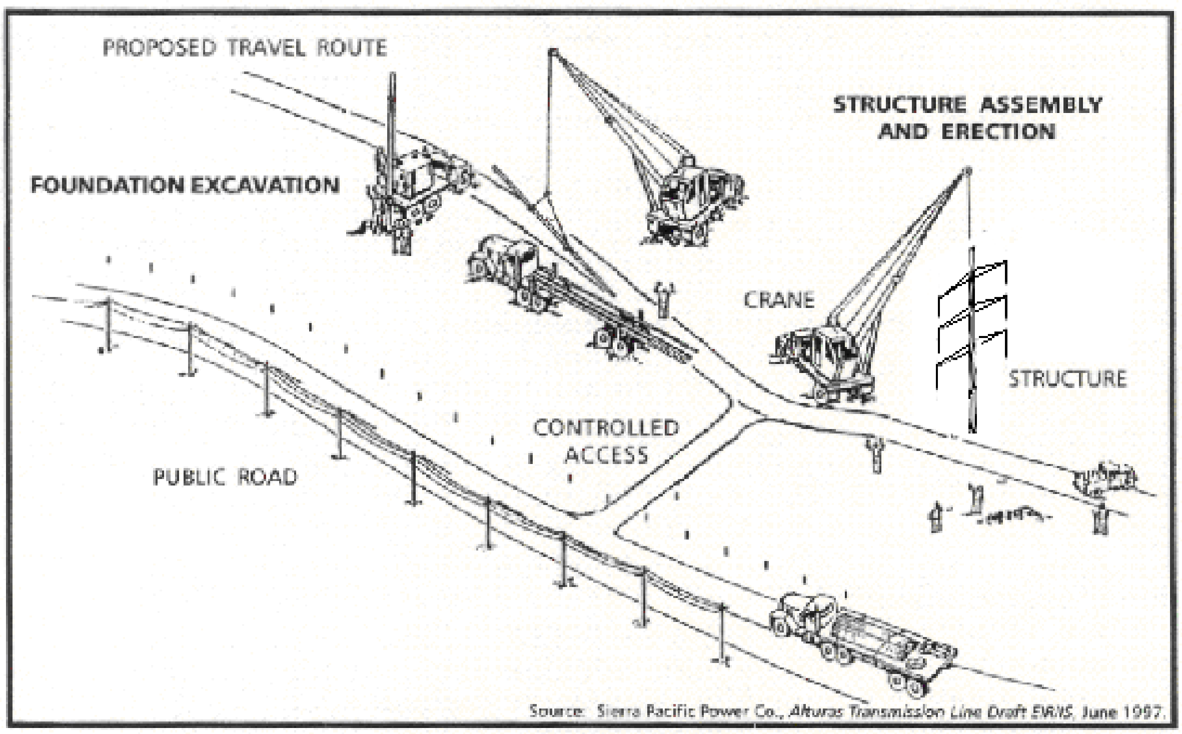
Figure 2-5 Construction Methods Diagram



A. Structure Erection - Type I: Use of Existing Parallel Access Road and Spur Road



B. Structure Erection - Type II: Use Centerline Travel Route

New access roads to the structure sites, typically 24 feet wide, or spur roads may be constructed in the right-of-way from existing transmission line maintenance roads where terrain would prevent access over undisturbed surfaces. Wherever possible, new roads would be built at right angles to existing maintenance roads. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line.

Culverts or other drainage structures would be installed only as necessary to allow passage of heavy equipment across drainages. This type of temporary facility would prevent damage to existing drainage banks by directing all traffic in a specific area. Existing paved and unpaved highways and roads would be used to the greatest extent possible.

In addition, road construction would include dust and erosion control measures in sensitive areas. A road sealant emulsion would be applied to the entire length of the access road to control fugitive dust emissions while minimizing the use of water trucks. Use of water trucks in this area is considered unsuitable because of the limited availability of water within the area, and the potential attraction of wildlife (including desert tortoise) which could increase potential for harm to wildlife during construction (see Section 3.1, Biological Resources).

All roads would be constructed in accordance with IID requirements for transmission line access roads. In the event of a conflict between IID requirements and BLM, USFWS, state or other agencies' requirements, the requirements of the agency with specific land management jurisdiction would take precedence in such areas. Private landowners along the proposed roads would be consulted before construction begins.

The contractor would be required to submit a specific Access Road Use Plan which would be carefully reviewed to ensure consistency with the requirements of local, state, and federal agencies and private land owners. The plan would address use of the existing road network to transport workers, materials, and heavy equipment to the staging areas, structure locations, concrete batch plant sites, and material storage locations. The planned use of existing roads would be evaluated to determine the best approach to mitigate potential impacts to the roads and adjacent construction areas. The installation of culverts and other road improvement amenities would be reviewed and addressed on a site-by-site basis. Construction activities would not be allowed to commence until after the Access Road Use Plan is approved.

2.2.4.2 Structure Sites

At each structure site, leveled areas would be needed to facilitate the safe operation of equipment, such as construction cranes. The leveled area required for the location and safe operation of large cranes would be approximately 30 by 40 feet. At each structure site, a work area of approximately 300 square feet would be required for the structure footing location, structure assembly, and the necessary crane maneuvers. The work area would be cleared of vegetation only to the extent necessary. After line construction, all pads not needed for normal transmission line maintenance would be restored to natural contours to the greatest extent possible and revegetated where required.

2.2.4.3 Clearing and Grading within Right-of-Way

Clearing and grading would be conducted only as necessary at construction areas for safe vehicle movement and construction activities. Estimated land disturbance associated with the Proposed Project by project feature is shown in Table 2-2.

2.2.4.4 Foundation Installation

Transmission line tower structure foundation excavations would be made with power drilling equipment. A vehicle-mounted power auger or backhoe would be used to excavate for the structure foundations. In rocky areas, the foundation holes would be excavated by drilling. Although not expected, in some instances blasting could be necessary because of the specific geologic conditions. In the unlikely event that blasting is necessary, conventional or plastic explosives would be used. Safeguards (e.g., blasting mats) would be employed when adjacent areas require protection (see Section 3.5, Geology and Soils).

Footings would be installed by placing reinforced steel and transmission structure steel components into each foundation hole, positioning the steel components, and encasing them in concrete. Excess spoil material would be used for fill where suitable. Spoil materials that could not be used for fill would be removed to a suitable location by the construction contractor for disposal. The foundation excavation and installation would require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks.

2.2.4.5 Staging Areas and Construction Yards

Construction support areas would be located in previously disturbed sites, wherever possible, off the right-of-way and would be used by the construction contractor for equipment maintenance, material storage, personnel offices, dispatch centers, material assembly, and construction coordination. Facilities would be fenced where necessary and their gates locked. Security guards would be stationed where needed.

Concrete for use in constructing foundations would be dispensed from concrete mixer trucks. Commercial ready-mix concrete is proposed because of the relatively accessible nature to the construction sites. Concrete additives would be used to increase the maximum allowable concrete delivery time.

The sources of the materials would be from existing concrete suppliers in the project area. The water requirement for mixing the concrete for these foundations is estimated to be 1.35 to 1.5 acre-feet.

Final locations of the construction yard sites would be determined through an approval submittal process involving the project proponents, landowners, and land management agencies.

2.2.4.6 Structure Assembly and Erection

Structural steel components and associated hardware would be shipped to each structure site by truck. Steel structure sections would be delivered to tower locations where they would be fastened together to form a complete structure and hoisted into place by a large crane. General information regarding transmission line tower structures is provided in Table 2-3.

Table 2-3
General Transmission Line Characteristics

Description of Design Component	500-kV Configuration	230-kV Configuration	
	Steel Lattice Structure	Steel Lattice Structure	Single Steel Pole
Voltage (kV)	500	230	230
Right-of-Way Width (feet)	300	300	300
Number of Circuits Supported by Structure	1	2	2
Circuit Configuration	Horizontal	Vertical	Vertical
Average Span (feet)	1,400	1,200-1,400	1,200-1,400
Average Height of Structures (feet)	100 - 180	100 - 195	100 - 195
Average Number of Structures (per mile)	3.4	4.4	4.4
Temporary Disturbance Area at Each Pole (acres)	2	2	2
Permanent Disturbance (square feet)	1,400	1,400	154
Number of Guard Structures	16 - 20	16 - 20	16 - 20
Temporary Guard Structure Disturbance Area (acres)	75	75	75
Permanent Guard Structure Disturbance Area (acres)	0	0	0
Minimum Ground Clearance Beneath Conductors (feet)	27	27	27
Maximum Height of Machinery that could be Operated Safely Under Line (feet)	17	17	17

2.2.4.7 Conductor Installation

After the structures are erected, insulators, hardware, and stringing sheaves would be delivered to each structure site. The structures would be rigged with insulator strings and stringing sheaves at each ground wire and conductor position.

For public protection during wire installation, guard structures would be erected adjacent to highways, railroads, power-lines, structures, and other obstacles. Guard structures would consist of H-framed wood poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, or equipment from falling on an obstacle, and would be removed following the completion of conductor installation. Ground disturbance associated with guard structures is presented in Table 2-3. Equipment for erecting guard structures would include augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or other areas where suitable safety measures such as barriers, flagmen, or other traffic controls could be used.

Pilot lines would be pulled (strung) from structure to structure and threaded through the stringing sheaves at each structure. This phase of the work may be accomplished through the use of helicopters to minimize or otherwise eliminate the need to traverse the right-of-way along the ground from structure to structure. Following pilot lines, a larger diameter, stronger line would be attached to conductors to pull them onto structures. This process would be repeated until the ground wire or conductor is pulled through all sheaves.

The shield wire and conductors would be strung using powered pulling equipment at one end and powered braking or equipment tensioning at the other end of each conductor stringing segment. Sites for tensioning equipment and pulling equipment would be approximately 2 miles apart. This distance would be essentially doubled where it is prudent to do so by pulling in two sets of conductors back to back.

Each tensioning site would be approximately 300 feet by 600 feet. Tensioners, line trucks, wire trailers, and tractors needed for stringing and anchoring the ground wire or conductor would be necessary at each tensioning site. The tensioner, in concert with the puller, would maintain tension on the shield wires or conductors while they are pulled through the structures. The pulling site would require approximately half the area of the tension site. A puller, line trucks, and tractors needed for pulling and temporarily anchoring the shield wires and conductor would be necessary at each pulling site.

2.2.4.8 Ground Rod Installation

Part of standard construction practices prior to wire installation would involve measuring the resistance of structure footings. If the resistance to remove earth for each transmission structure is greater than 25 ohms, additional ground rods would be installed to lower the resistance.

2.2.4.9 Cleanup

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Approved enclosed refuse containers would be used throughout the project. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils or chemicals would be hauled to a disposal facility authorized to accept such materials. No open burning of construction trash would occur without agency approval.

2.2.4.10 Hazardous Materials within Corridor

Petroleum products such as gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents would be present within the transmission line corridor during construction. These products would be used to fuel, lubricate, and clean vehicles and equipment, and would be transported in containerized trucks or in other approved containers. When not in use, hazardous materials would be properly stored to prevent drainage or accidents.

Totally enclosed containment shall be provided for all hazardous waste. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.

All construction, operation, and maintenance activities would comply with all applicable federal, state, and local laws and regulations regarding the use, transportation and disposal of hazardous substances.

The construction or maintenance crew foreman would ensure compliance with all applicable laws and regulations. In addition, an on-site inspector would be present during construction to ensure that all hazardous materials are used and stored properly. A health and safety plan would be developed as part of the COM Plan during the engineering and preconstruction phase of the project. In the event of a hazardous materials spill, notification and clean-up would be undertaken by construction contractors' certified personnel in an expeditious manner.

2.2.4.11 Site Reclamation

The right-of-way would be restored as required by the property owner or land management agency. All practical means would be made to restore the land to its original contour and to restore natural drainage patterns along the right-of-way. Because revegetation would be difficult in many areas of the project as precipitation is minimal, it would be important to minimize disturbance during the construction. The Reclamation Plan in Appendix E outlines the methods for restoration of disturbed areas.

2.2.4.12 Fire Protection

All applicable fire laws and regulations would be observed during the construction period. All personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires.

2.2.5 Operation, Maintenance, and Abandonment

2.2.5.1 Operational Characteristics

The nominal voltage for the Proposed Project transmission line would either be single-circuit, 500-kV AC or double-circuit, 230-kV AC, dependent upon the final configuration selected. Minor variations of up to five percent above or below the nominal voltage level may occur depending upon load flow.

2.2.5.2 Permitted Uses

After the transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the right-of-way. Incompatible land uses within the right-of-way include construction and maintenance of inhabited dwellings, and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would be permitted adjacent to the right-of-way. Compatible uses of the right-of-way on public land would require approval by the appropriate agency. Permission to use the right-of-way on private land would have to be obtained from IID.

2.2.5.3 Safety

Safety is a primary concern in the design of the proposed transmission line and related facilities. The transmission line would be protected with power circuit breakers and related line relay protection equipment. Lightning protection would be provided by overhead ground wires (or shield wires) along the line. Electrical equipment and fencing at the substation would be grounded. All existing fences, metal gates, pipelines, etc. that cross or are within the transmission line right-of-way would be grounded to prevent electrical shock.

Design and construction would be coordinated with utilities operating facilities along the project alignment to ensure prudent safety requirements are met. Specific crossing permits from these utilities would be obtained where necessary.

2.2.5.4 Maintenance

The transmission line would be inspected on a regular basis by both ground and aerial patrols. Maintenance would be performed as needed. When access is required for non-emergency maintenance and repairs, IID would adhere to the same precautions identified for original construction.

Emergency maintenance would involve prompt movement of crews to repair or replace any damaged equipment. Crews would be instructed, in accordance with specific IID maintenance plans and procedures, to protect crops, vegetation, wildlife, and other resources of significance. Specific training would be provided to all IID maintenance crews instructing them on IID plan and procedures policy requirements. Restoration procedures following completion of repair work would be similar to those prescribed for original construction. The comfort and safety of local residents would be provided for by limiting noise, dust, and the danger caused by maintenance vehicle traffic. Details would be provided in the COM Plan prior to line construction.

Substation maintenance activities would include routine scheduled equipment, groundskeeping, and emergency maintenance in the event of equipment failure. Substation maintenance would be performed by project personnel or approved contractors.

2.2.5.5 Abandonment

The Proposed Project transmission line would have a projected operational life of at least 50 years. At the end of the useful life of the project, if the facility were no longer required, the transmission line would be removed from service. At such time, conductors, insulators and hardware would be dismantled and removed from the right-of-way. Structures would be removed and foundations broken off below ground surface.

Following abandonment and removal of the transmission line from the right-of-way, any areas disturbed during line dismantle would be restored and rehabilitated as near as possible to their original condition, and would be available for the same uses that existed prior to construction of the project.

2.2.6 Construction Work Force and Equipment

General activities, number of personnel, and length of time to complete various construction activities for the Proposed Project is provided in Table 2-4. Table 2-5 lists the type and purpose of major equipment that would be used during construction of the transmission line.

2.2.7 Construction Schedule

The Proposed Project is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

Table 2-4
Proposed Project Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	7
Environmental Resource Surveys	20	20 miles	6
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	7
Structure Sites	16	10 miles	12
Hole Excavation and Foundation Installation	72	4 miles	30
Construction Yards and Material Staging	32	8 miles	15
Structure Assembly and Erection	48	4 miles	30
Shieldwire and Conductor Stringing	68	6 miles	20
Cleanup	24	12 miles	10
Rehabilitation	24	12 miles	10

a. Assumes two construction divisions with full crews in each.

Table 2-5
Major Equipment Used During Construction

Equipment	Purpose
3/4 ton pickup trucks	Transport construction personnel
1 ton crew trucks	Transport construction personnel
2 ton flat bed trucks	Haul materials
Flat bed boom truck	Haul and unload materials
Rigging truck	Haul tools and equipment
Mechanic truck	Service and repair equipment
Shop vans	Store tools
Office van	House the office
D-8 bulldozer	Blade access roads, platforms
D-6 bulldozer	Pull hardline and rangeland drill
Truck mounted digger	Excavate foundations
Crawler backhoe	Excavate foundations
Small mobile cranes (< 12 tons)	Load and unload materials
Large mobile cranes (> 75 tons)	Erect structures
Transport	Haul structure components
Drill cat	Drill holes for blasting
Puller	Pull conductor and wire
Tensioner	Pull conductor and wire
Wire reel trailer	Haul wire
Semi tractor trailers	Haul structure components
Air compressors	Operate air tools
Air tampers	Compact soil around poles
Rangeland drill	Sow seed

2.3 Alternative A – Second Northern Route Alternative

Alternative A would be similar in design and structure to the Proposed Project. This alternative would include the construction of a new substation/switching station on the north side of Hobsonway west of the Blythe Power Plant near Blythe (also shown on Figure ES-1), and would include the construction of an approximately 119-mile long transmission line to the Devers Substation that would follow the same alignment as the Proposed Project except that the Alternative A route would follow Route Option A-2 west of Desert Center. Option A-2 would shift the alignment to the south to parallel the north side of the Devers-Palo Verde Transmission Line. As with the Proposed Project, Alternative A transmission line configurations under consideration include both a double-circuit 230-kV configuration and a single-circuit 500-kV configuration.

As with the Proposed Project, the Alternative A transmission line would be located entirely within a BLM-designated utility corridor; therefore, a CDCA Plan amendment would not be required. The Alternative A transmission line alignment is shown on Figure ES-1. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.3.1 Alternative A Components

With the exceptions discussed in the following section, the structural components for Alternative A would be the same as those described for the Proposed Project (see Table 2-1).

2.3.1.1 Alternative A Transmission Line Alignment

The Alternative A transmission line alignment is shown on Figure ES-1. The Alternative A transmission line would be approximately 119 miles in length, and would originate west of the City of Blythe at the new substation/switching station proposed as part of this project (also shown on Figure ES-1). The transmission line would follow the same alignment as the Proposed Project with the exception being that the Alternative A route would follow Route Option A-2 west of Desert Center. Option A-2 would shift the alignment to the south to parallel the north side of the Devers-Palo Verde Transmission Line. The Proposed Project transmission line would cross to the north side of I-10 approximately 2.5 miles east of Cactus City, and continue west to the Devers Substation.

As shown on Figure ES-1, a second alignment option, developed from an analysis of the alternatives, is under consideration for the Proposed Project transmission line. Option A-1 provides a different route into the Devers Substation. The Devers Substation is currently arranged with the 500-kV facilities located at the northern end of the substation and the 230-kV facilities are located at the southern end of the substation. Option A-1 provides a route to the southern end of the substation (the 230-kV facilities). This option would provide a more direct route to the Devers substation for a distance of approximately 1.5 miles, and would decrease the total length of the transmission line by approximately 0.5 miles.

2.3.1.2 Alternative A Transmission Line Facilities (Lines and Structures)

As with the Proposed Project, the type of tower structures that would be used for the Alternative A transmission line would be dependent upon the final transmission line configuration and voltage selected. For the double-circuit, 230-kV configuration, steel lattice structures would be used with the exception of agricultural areas where 230-kV single-column, steel pole structures would be used. For the single-circuit, 500-kV configuration, steel lattice towers would be used along the entire route. All tower structures would be designed to withstand minimum wind speeds of 90 mph. Meteorological studies would be completed to evaluate maximum wind loading criteria to be used for the final design of the structures. Each of these tower types would be the same as those described for the Proposed Project in Section 2.2.2.2.

2.3.1.3 Substation Facilities

Substation facilities used for Alternative A would be the same as those described for the Proposed Project in Section 2.2.2.3.

2.3.1.4 Communication Facilities

Communication facilities and systems used for Alternative A would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.3.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative A would be the same as those described for the Proposed Project.

2.3.2.1 Right-of-Way Acquisition

The right-of-way required for Alternative A would be approximately 300 feet, based on allowance for a topple distance of 125 feet and an additional 25-foot maintenance access zone on either side (the same as those described for the Proposed Project in Section 2.2.3.2). The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

On federally-managed public land, a Right-of-Way Grant would be required from the BLM. On state managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired throughout their property, and any damages resulting from construction, operation, and maintenance.

2.3.3 Project Construction

With the exceptions discussed in the following section, project construction activities associated with Alternative A would be the same as those described for the Proposed Project (see Section 2.2.4). Estimated land disturbance would be the same as that identified for the Proposed Project (see Table 2-2).

2.3.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative A transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.3.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time required to construct the Alternative A transmission line would be the same as the Proposed Project (see Table 2-4). Table 2-5 lists the type and purpose of major equipment that would be used during construction of the transmission line.

2.3.6 Construction Schedule

Alternative A is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

2.4 Alternative B – Southern Route Alternative

Alternative B includes the construction of the new substation/switching station on the north side of Hobsonway as described for the Proposed Project, and the construction of a new approximately 79-mile, 230-kV transmission line between the new substation/switching station and the existing Midway Substation near Niland. In addition to the construction of the new substation/switching station, the new transmission line, and the equipment upgrades at the Midway Substation, Alternative B would require upgrading segments of IID's existing KN-KS transmission line and related facilities between the existing Coachella and Mirage Substations and between the Mirage and Devers Substations. This upgrade would enable the final interconnection between the new substation/switching station and the Devers Substation commensurate with the Proposed Project.

Approximately 40 miles of the new transmission line right-of-way would be located within a BLM-designated utility corridor. However, 38 miles of the right-of-way would not be located within a BLM-designated utility corridor; therefore, an amendment to the CDCA Plan would be required. Figure ES-1 shows the locations of the new substation/switching station on Hobsonway, the Alternative B transmission line alignment, and the section of IID's existing KN-KS transmission line that would be upgraded. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.4.1 Alternative B Components

Table 2-6 summarizes the various components of Alternative B. The structural components of Alternative B are discussed in the following sections.

Table 2-6
Summary of Alternative B Components

Proposed Route and Right-of-Way • Route Length: 79 miles (plus upgrades to an additional 35 miles of existing transmission lines). • System Interconnection Point: New substation/switching station on Hobsonway. • Termination Point: Midway Substation near Niland, CA. (Upgrades to segments of existing transmission lines between Coachella, Mirage, and Devers substations would achieve "interconnection" with Devers Substation.) • Right-of-Way Width: 300 feet. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources). • Total Right-of-Way Acreage: 2,790 acres (does not include construction access roads).

Transmission Line Facilities (double circuit, 230-kV)
• Conductors: Two, 3-phase AC circuits consisting of one or two 1-inch ACSR conductors per phase.
• Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
• Shield Wires: One for single pole designs and two for H-frame designs of 3/8 to 3/4-inch-diameter wire(s).
• Transmission Line Tower Types:
  - Single-pole steel structures entire route, with the exception of other transmission line crossings.
  - Structure Heights (approximate): Single Pole – 100 to 125 feet; H-frame – 45 to 65 feet.
• Distance between Towers (approximate): Single Pole – 800 to 1,200 feet.
• Total Number of Towers (approximate): 354 - 465 depending on final design.
• Total Number of Towers to be upgraded (approximate): 121
• Number of New "Inset" Towers in Upgrade Segments: 7

Substation Facilities Expansion of existing facilities at substations would be necessary for Alternative B. The following modifications at existing substations, or at substations being completed as part of other projects, would be necessary: • A new substation/switching station on Hobsonway, requiring a total area of approximately 25 acres, would be constructed west of the Blythe Power Plant near Blythe, California. The Proposed Project transmission line would connect at this facility which would accommodate two 230-kV circuits, or one 500-kV circuit depending on the final determination of the Proposed Project transmission line configuration. • Midway Substation near Niland, CA: Existing facilities would be expanded at the existing Midway Substation to accommodate the new transmission line and to rearrange existing transmission line approaches to the substation to provide the necessary clearances between adjacent lines and other facilities. • Coachella Substation: Existing facilities would be upgraded. All improvements would be within the existing footprint of the substation. • Mirage Substation: Existing facilities would be expanded. All improvements would be within the existing footprint of the substation. • Devers Substation: Facilities would be expanded at the existing Devers Substation, north of Palm Springs, California, to accommodate interconnection of the Proposed Project transmission line, reconfigure existing transmission line approaches to the substation, and provide the necessary clearances between adjacent transmission lines and other facilities.
Communications Facilities • Systems: Digital Radio System, VHF/UHF radio. • Functions: Communications for fault detection, line protection, SCADA, and two-way voice communication.

2.4.1.1 Alternative B Transmission Line Alignment

The Alternative B transmission line alignment would originate just west of the City of Blythe at the new substation/switching station. It would proceed along existing transmission line rights-of-way to the southwest paralleling IID's F Line to the point where it intercepts Western's existing 161-kV transmission line. At that point, the line would parallel the Western transmission line, crossing SR-78 and turning southwest to parallel SR-78. From that point the line would parallel SR-78 on the north, passing south of the Chocolate Mountains Aerial Gunnery Range (CMAGR) and continuing southwest to intercept the Southern Pacific Railroad (SPRR) right-of-way near Glamis, California. The alignment would then turn northwest to parallel the SPRR tracks and continue to Iris, California, where it would turn towards and continue to the Midway Substation near Niland.

As shown on Figure ES-1, one segment alignment option is under consideration for the Alternative B transmission line. Option B-1 would shift the transmission line alignment eastward for a distance of approximately 14 miles, increasing the total length of the transmission line by approximately 4 miles. This segment of the Alternative B transmission line alignment was originally conceived to follow the approved right-of-way for the North Baja Pipeline Project (NBP). The right-of-way for Option B-1 would not be located within a BLM-designated utility corridor.

As discussed above, Alternative B would also require upgrading segments of two existing transmission lines that interconnect the Coachella and Mirage Substations, and Mirage and Devers Substations (see Sections 2.4.1.2.1 and 2.4.1.2.2). Upgrading segments of these existing transmission lines would enable transmission interconnection between the new substation/switching station on Hobsonway and the Devers Substation similar to what would be achieved by the Proposed Project.

2.4.1.2 Alternative B Transmission Line Facilities (Lines and Structures)

The Alternative B transmission line would utilize double-circuit, single-column steel pole support structures along its entire route between the proposed Hobsonway Substation and the Midway Substation, with the exception of two pairs of H-frame structures that would be necessary for undercrossing an existing 500-kV transmission line.

The single steel pole structure design for Alternative B would be the same as those described for the Proposed Project (see Section 2.2.2.2 for a complete description of these structure types). Steel H-frame structures would be used for the Alternative B transmission line when undercrossing the existing SCE 500-kV transmission line. A diagram of a typical H-frame structure is provided in Figure 2-4. Each H-frame structure would support three conductors (i.e., one circuit). As such, two parallel pairs of H-frame structures would be necessary. Each pair of H-frame structures would be placed perpendicular to one another in relation to the transmission line alignment, and would be separated by a distance of 70 feet (center to center). The H-frame structure heights would vary from 75 to 100 feet with span lengths ranging from 600 to 800 feet, passing under the 500-kV transmission line. Each H-frame structure would have a ground footprint of 4 feet by 28 feet that includes the two poles, ground rods, and other hardware. Caisson foundations approximately 30 feet deep by 7 feet diameter would be used to support each H-frame structure.

In addition to construction of the new 230-kV transmission line between the proposed Hobsonway Substation and the Midway Substation, Alternative B would require upgrading approximately 25 miles of an existing transmission line between the Coachella and Mirage Substations, and upgrading approximately 15 miles of an existing transmission line between the

Mirage and Devers Substations. These two segments are referred to herein as Upgrade Segment 1 and Upgrade Segment 2, and are discussed in more detail in the following sections (See Figure ES-1).

2.4.1.2.1 Upgrade Segment 1 - Approximately 25 miles of IID's existing KN-KS 230-kV transmission line between IID's Coachella Substation and SCE's Mirage Substation would be upgraded. Tower upgrades would include expanding concrete tower foundations and adding structural steel members to existing lattice towers. These modifications would be necessary to increase the wind-loading capability of the existing transmission line towers from 60 to 108 mph, as required by IID. Replacing conductors of Segment 1 would entail replacing an existing single conductor with a doubled, bundled, multi-wire conductor.

2.4.1.2.2 Upgrade Segment 2 - Approximately 15 miles of IID's existing KN-KS 230-kV transmission line between SCE's Mirage and Devers Substations would undergo upgrades. The transmission line improvements would consist of adding 7 new inset steel lattice towers or steel poles at selected locations within the existing easement and increasing the height of 21 existing towers. The increases in tower heights would range between 5 and 48 feet with an average increase of 30 feet. Inset towers and height increases are needed to prevent tower overloads and to obtain required electrical clearances, including ground clearances.

2.4.1.3 Substation Facilities

The Alternative B transmission line would interconnect with the new substation/switching station and the Midway Substation. The new substation/switching station on Hobsonway would be constructed as described under the Proposed Project in Section 2.2.2.3.

Facility modifications necessary to accommodate the Alternative B transmission line at the Midway Substation would include installing additional circuit breakers and protection devices and associated communication equipment to accommodate the new facilities. The current arrangement of the substation would be modified by relocating existing equipment to new locations and adding new equipment in place of the existing equipment. These modifications would be made within the existing substation perimeter and would not require additional land acquisition or disturbance of undisturbed land.

Upgrades at the Coachella, Mirage, and Devers Substations would also be necessary in association with improvements that would be made to Upgrade Segments 1 and 2 transmission line.

2.4.1.4 Communication Facilities

Communication facilities and systems used for Alternative B would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.4.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative B would be the same as those described for the Proposed Project.

2.4.2.1 Right-of-Way Acquisition

The right-of-way required for the Alternative B transmission line would be approximately 300 feet wide, based on allowance for a topple distance of 125 feet plus a 25-foot maintenance access zone on either side. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

On federally-managed public land, a Right-of-Way Grant would be required from the BLM (the Right-of-Way Grant would be issued following the adoption of the CDCA Plan amendment that would be necessary under this alternative). On state-managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired for property, and any damages resulting from construction, operation, and maintenance.

2.4.3 Project Construction

Project construction activities associated with Alternative B would be similar to those described for the Proposed Project in Section 2.2.4. Construction methods associated with Upgrade Segments 1 and 2 under this alternative are described below. Table 2-7 lists estimated land disturbance for Alternative B.

Table 2-7
Alternative B Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Structure Sites	494 - 657	469 - 624	25 – 33[a]
Existing Access Roads	11[b]	9	2
New Access Roads[c]	24	12	12
Staging Areas	30	30	0
Pull Sites	43	43	0
New Substation/Switching Station	25		25
Upgrade Segment 1	25	25	0
Upgrade Segment 2	10	8	2
Devers Substation (expansion)	5		5
Total Estimated	667 – 830	596 - 751	71 – 79

[a] Area at structure sites includes short access road from the existing maintenance roads.
[b] Existing roads would require upgrades to allow passage of heavy equipment to set structures and deliver concrete.
[c] Approximately 10 miles of new roads, 20 feet wide, would be required to access structure sites for construction. It is estimated that 50 percent of the roads would be restored.

2.4.3.1 Upgrade Segment 1 Construction

Towers between the IID Coachella and SCE Mirage Substations (approximately 100 towers) would receive structural and foundation reinforcement, as described below. Towers would be accessed by an existing road within the utility corridor right-of-way.

The existing lattice towers in Segment 1 would require foundation work and tower reinforcement work. Foundation work would entail adding concrete to the foundation of each tower leg. A temporary construction zone (including lay-down area) of approximately 100 feet by 100 feet would be required for each tower (approximately 0.25 acre per tower). Tower reinforcement work would require unbolting and lowering the tower arms to the ground by crane where they would be reinforced with structural steel, then raised and bolted back into position. Similar reinforcement would be performed on the main structure and legs of the lattice towers.

Following foundation work and tower reinforcement, the towers would be restrung with new conductors. Replacing conductors would require removal of existing conductors, and restringing new conductors in a manner similar to that described in Section 2.2.4. Replaced conductors would be removed from the site and recycled or disposed at an appropriate receiving site.

2.4.3.2 Upgrade Segment 2 Construction

Temporary construction zones (including lay-down areas) approximately 200 feet by 200 feet would be necessary for construction of each new inset tower and for each tower raising (approximately one acre per site). Construction equipment and vehicles would use existing access roads within the utility corridor, although a minimal amount of grading may be necessary to accommodate construction equipment. For new inset towers, short spur roads may need to be constructed from the existing access road to each tower site. Locations of new spur road construction would be situated to avoid areas determined to be environmentally sensitive.

Temporary disturbance around each tower requiring new foundation would be limited to a 100-foot-radius around the foundation which would be contained within the 200-foot by 200-foot construction zone. Material removed during the excavation process would be set aside and disposed according to applicable laws. Disturbance would consist of soil compaction from placement of crane outrigger pads and vehicle tracks, and excavation that may be necessary for foundation improvements. Erection of steel poles or lattice towers would be as described in Section 2.2.4. Foundation improvements may be necessary for some of the towers to be raised, and a final determination would be made during final design. Replacing conductors would consist of removing existing conductors, and restringing new conductors in a manner similar to that described in Section 2.2.4. The typical distance between pulling and tensioning equipment is 2 to 3 miles: However, some locations may require equipment separation to be limited to several thousand feet. Temporary disturbance at each pulling site area is estimated at 50 feet by 100 feet, and disturbance at each tensioning site would be approximately 100 feet by 300 feet.

2.4.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative B transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.4.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time to complete various construction activities for the Alternative B transmission line are shown in Table 2-8. Construction equipment required to build the transmission line would be similar to that identified for the Proposed Project.

2.4.6 Construction Schedule

Alternative B is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

Table 2-8
Alternative B Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	6
Environmental Resource Surveys	20	20 miles	6
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	6
Structure Sites	16	10 miles	11
Hole Excavation and Foundation Installation	72	4 miles	28
Construction Yards and Material Staging	32	8 miles	14
Structure Assembly and Erection	48	4 miles	28
Shieldwire and Conductor Stringing	68	6 miles	19
Cleanup	24	12 miles	9
Rehabilitation	24	12 miles	9

[a] Assumes two construction divisions with full crews in each.

2.5 Alternative C – Third Northern Route Alternative

Alternative C would be similar in design and structure to the Proposed Project. This alternative would include the construction, operation, and maintenance of a new, approximately 117-mile-long, transmission line from a new substation/switching station located on the north side of Hobsonway west of the Blythe Power Plant, approximately 4.5 miles west of Blythe, California, to SCE's Devers Substation, approximately 10 miles north of Palm Springs, California (also shown on Figure ES-1). However, Alternative C would generally parallel I-10 for much of its length (the Alternative C transmission line alignment is located at varying distances – approximately 1 to 4 miles – north of the Proposed Project transmission line alignment). As with the Proposed Project, the Alternative C transmission line configurations under consideration include both a double-circuit, 230-kV configuration and a single-circuit, 500-kV configuration.

As with the Proposed Project, the Alternative C transmission line would be located entirely within a BLM-designated utility corridor in areas of the CDCA; therefore, a CDCA Plan amendment would not be required. The Alternative C transmission line alignment is shown on Figure ES-1. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.5.1 Alternative C Components

Table 2-9 summarizes the various components of Alternative C. The structural components of Alternative C are discussed in the following sections. Note that many of the components would be similar to those described for the Proposed Project.

Table 2-9
Summary of Alternative C Components

Proposed Route and Right-of-Way

- Transmission Line Length: approximately 117 miles.
- Connection Point: IID's proposed new substation/switching station on Hobsonway, and local transmission needed for interconnection to existing facilities near Blythe, CA.
- Connection Point: IID's existing KN-KS line adjacent to Dillon Road near Coachella, CA.
- Connection Point: IID's existing Coachella Substation near Coachella, CA.
- Termination Point: SCE's Devers Substation near Palm Springs, CA.
- Right-of-Way Width: 300 feet. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, adjacent land restrictions, existing roads and highways, and biological and cultural resources).
- Total Right-of-Way Acreage: approximately 4,250 acres, including construction access roads and staging areas.

Transmission Line Facilities (single-circuit, 500-kV)

- Conductors: One 3-phase AC circuit consisting of two 1.5 to 2-inch ACSR conductors per phase.
- Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
- Shield Wires: Two 1/2 to 3/4-inch-diameter wire(s) for steel lattice.
- Transmission Line Tower Types:
  - Steel Lattice Tower along entire route.
  - Structure Heights (approximate): Steel Lattice – 100 to 180 feet.
- Average Distance between Towers: Steel Lattice – 1,400 feet*.
- Total Number of Towers (approximate): 405 – 440*.

Transmission Line Facilities (double-circuit 230-kV)

- Conductors: Two 3-phase AC circuits consisting of two 2-inch ACSR conductors per phase.
- Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
- Shield Wires: One for single pole designs and one for steel lattice designs of 3/8 to 3/4-inch-diameter wire(s).
- Transmission Line Tower Types:
  - Steel Lattice Tower along entire route, with the exception of agricultural areas and local areas where Single-Pole steel structures might be used.
  - Structure Heights (approximate): Steel Lattice and Single Pole – 100 to 195 feet.
- Average Distance between Towers: Steel Lattice and Single Pole – 1,200 feet*.
- Total Number of Towers (approximate): 525 - 560*.

Substation Facilities

- A new substation/switching station on Hobsonway, requiring a total area of approximately 25 acres, would be constructed immediately west of the Blythe Power Plant near Blythe, California. The Proposed Project transmission line would connect at this facility which would accommodate two 230-kV circuits, or one 500-kV circuit depending on the final determination of the Proposed Project transmission line configuration.
- A new substation/switching station on Dillon Road, requiring a total area of approximately 25 acres, would be constructed west of Dillon Road adjacent to the existing transmission line facilities near Indio, California. The new substation/switching station would provide a connection point with the Proposed Project transmission line and IID's existing Coachella Substation.
- Coachella Substation: Upgrades to existing facilities to accommodate increased transmission service.
- Devers Substation: Facilities would be expanded at the existing Devers Substation, north of Palm Springs, California, to accommodate interconnection of the Proposed Project transmission line and to reconfigure existing transmission line approaches to the substation to provide the necessary clearances between adjacent transmission lines and other facilities.

Communications Facilities

- Systems: Digital Radio System, microwave, VHF/UHF radio.
- Functions: Communications for fault detection, line protection, SCADA, two-way voice communication.

*The exact quantity and placement of the structures depends on the final detailed design of the transmission line, which is influenced by the terrain, land use, and economics. Alignment options may also slightly increase or decrease the quantity of structures.

2.5.1.1 Alternative C Transmission Line Alignment

The Alternative C transmission line alignment is shown on Figure ES-1. The Alternative C transmission line would be approximately 117 miles in length, and would originate west of the City of Blythe at the new substation/switching station (also shown on Figure ES-1). The transmission line would proceed southwest along existing transmission line right-of-ways approximately 1 mile. At this point the line would turn west and proceed approximately 3 miles to a point where it turns northwest, and crosses I-10. From that point, the line would parallel I-10 (crossing I-10 one time along this segment). From approximately 2.5 miles east of Cactus City continuing west to Devers Substation, the Alternative C transmission line alignment is the same as that of the Proposed Project.

As shown on Figure ES-1, a second alignment option, developed from an analysis of the alternatives, is under consideration for Alternative C. Option A-1 provides a different route into the Devers Substation. The Devers Substation is currently arranged with the 500-kV facilities located at the northern end of the substation and the 230-kV facilities located at the southern end of the substation. Option A-1 provides a route to the southern end of the substation (i.e., the 230-kV facilities). This option would provide a more direct route to the Devers substation for a distance of approximately 1.5 miles, and would decrease the total length of the transmission line by approximately 0.5 miles.

2.5.1.2 Alternative C Transmission Line Facilities (Lines and Structures)

As with the Proposed Project, the type of tower structures that would be used for the Alternative C transmission line would be dependent upon the final transmission line configuration and voltage selected. For the double-circuit, 230-kV configuration, steel lattice structures would be used with the exception of agricultural areas where 230-kV single pole steel structures would be used. For the single-circuit, 500-kV configuration, steel lattice towers would be used along the entire route. All tower structures would be designed to withstand minimum wind speeds of 90 mph. Meteorological studies will be completed to evaluate maximum wind loading criteria to be used for the final design of the structures. Each of these tower types would be the same as those described for the Proposed Project in Section 2.2.2.2.

2.5.1.3 Substation Facilities

Substation facilities used for Alternative C would be the same as those described for the Proposed Project in Section 2.2.2.3.

2.5.1.4 Communication Facilities

Communication facilities and systems used for Alternative C would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.5.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative C would be the same as those described for the Proposed Project.

2.5.2.1 Right-of-Way Acquisition

The right-of-way required for Alternative C would be approximately 300 feet, based on allowance for a topple distance of 125 feet and an additional 25-foot maintenance access zone on either side (the same as those described for the Proposed Project in Section 2.2.3.2). The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

On federally-managed public land, a Right-of-Way Grant would be required from the BLM. On state-managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired throughout their property, and any damages resulting from construction, operation, and maintenance.

2.5.3 Project Construction

Project construction activities associated with Alternative C would be similar to those described for the Proposed Project in Section 2.2.4. Table 2-10 lists estimated land disturbance for Alternative C.

Table 2-10
Alternative C Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Structure Sites	701 – 936	665 - 888	36 – 48[a]
Access Roads	20[b]	7	13
Staging Areas	28	28	0
Pull Sites	63	63	0
New substation/switching station	50		50
Devers Substation (expansion)	5		5
Total Estimated	892 - 1127	763 - 986	129 - 141

[a] Area at structure sites include short access road from the existing maintenance roads.
[b] Existing roads will require upgrades to allow passage of heavy equipment to set structures and deliver concrete.

2.5.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative C transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.5.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time to construct the Alternative C transmission line would be the same as the Proposed Project (see Table 2-11).

Table 2-11
Alternative C Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	8
Environmental Resource Surveys	20	20 miles	7
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	8
Structure Sites	16	10 miles	15
Hole Excavation and Foundation Installation	72	4 miles	37
Construction Yards and Material Staging	32	8 miles	19
Structure Assembly and Erection	48	4 miles	37
Shieldwire and Conductor Stringing	68	6 miles	25
Cleanup	24	12 miles	12
Rehabilitation	24	12 miles	12

[a] Assumes two construction divisions with full crews in each.

2.5.6 Construction Schedule

Alternative C is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

2.6 No Action Alternative

Under the No Action Alternative, the BLM would not issue a Right-of-Way Grant for the construction of the Proposed Project. Without the project, it is likely that in the future it would be necessary to occasionally shed some load to avoid overloading circuits and transformers and unacceptable low voltages in various IID service areas. The No Action Alternative does not address the current or growing demand for electricity and could result in shortages of electricity within IID's service areas. Under this alternative, structures and hardware would continue to be repaired and/or replaced as required during regular maintenance operations and in response to emergency outages on the transmission lines and at the substations. These repairs would also have to be made with increasing frequency as the facilities increase in age.

2.7 Alternatives Overview and Screening

2.7.1 NEPA Requirements for Alternatives

One of the most important aspects of the environmental review process is the identification and assessment of reasonable alternatives to the proposed action that would avoid or minimize adverse effects [40 C.F.R. § 1500.2(e)]. The CEQ NEPA regulations set forth the following requirements for the analysis of alternatives in an EIS, at 40 C.F.R. § 1502.14.

[The alternatives] section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (§ 1501.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. In this section, agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

In the context of licensing and permitting actions by federal agencies, the CEQ has advised that "[r]easonable alternatives include those that are *practical or feasible* from the technical and economic standpoint and using common sense." 48 Federal Regulations 34263, 34267 (July 28, 1983).

2.7.2 CEQA Requirements for Alternatives

Section 15126(d) of the State CEQA Guidelines requires a discussion of a reasonable range of alternatives to the Project, or to the location of the Project, which would feasibly attain most of the basic objectives of the Project. The comparative merits of the alternatives should also be presented. CEQA provides the following guidelines for discussing alternatives to a Proposed Project:

- If there is a specific Proposed Project or a preferred alternative, explain why the other alternatives were rejected in favor of the proposal if they were considered in developing the proposal.
- The specific alternative of "No Project" shall also be evaluated along with the impacts of this alternative. If the environmentally superior alternative is the No-Project Alternative, the EIR shall also identify the environmentally superior alternative among the other alternatives.
- The discussion of alternatives shall focus on alternatives which are capable of avoiding or substantially lessening any significant effects of the Project, even if these alternatives would impede to some degree the attainment of the Project objectives, or would be more costly.
- If an alternative would cause one or more significant effects in addition to those that would be caused by the Project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the Project as proposed.

- The range of alternatives required in an EIR is governed by the "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and informed public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

2.7.3 Alternatives Screening Methodology

Since the Federal actions associated with the development of the Proposed Project are limited primarily to the issuance of applicable permits necessary for the construction and operation of the Project, alternatives to these actions are similarly limited. However, a range of potential alternatives to the Proposed Project were considered and evaluated, as discussed below, to consider alternatives projects that may avoid or minimize potential adverse effects of the Proposed Project. Potential alternatives to the Proposed Project were identified on the basis of issues and concerns identified during the NEPA and CEQA scoping process.

The alternatives screening process consisted of three steps:

Step 1:
Identify the basic objectives of the Proposed Project.

Step 2:
Identify the primary environmental issues associated with the construction and operation of the Proposed Project.

Step 3:
Identify a reasonable range of potential alternatives and evaluate each alternative using the following criteria:

- Potential to provide a clear environmental advantage over the Proposed Project;
- Technical and regulatory feasibility; and
- Consistency with IID's objectives, the project's purpose and need, and public policy objectives.

Alternatives that met the screening criteria of Step 3 were carried forward for detailed analysis in the Draft EIS/EIR. Those alternatives that did not meet both criteria were not evaluated further. The particular reasons for removing them from consideration are provided in Table 2-12.

2.7.3.1 Objectives of the Proposed Project

The basic objectives of the Proposed Project are:

Objective-1:
Ensure access to competitive generation sources that would allow IID to minimize the market price spikes, which adversely affect the region's customers.

Objective-2:
Provide direct transmission access to new generation sources (e.g., the Griffith Energy Project, the South Point Energy Project, and the Blythe Power Plant) to meet the increased demands for electrical power in IID's service area.

Objective-3:
Enhance system reliability by providing additional transmission line capacity and thus improve loading situations on other transmission lines.

Objective-4:
Improve operational flexibility during normal as well as contingency situations.

2.7.3.2 Environmental Issues Identified with the Proposed Action

Issues and concerns that have been identified as part of the NEPA and CEQA scoping process include those associated with the potential effects on: 1) biological, cultural, and visual resources; 2) land use and recreation; 3) traffic and transportation; and 4) noise, public health and safety, and air quality. A discussion of these issues and concerns and how they were addressed through project design modifications or the development of mitigation measures is included in the Environmental Consequences section of each resource section (see Section 3).

2.7.4 Summary of Screening Results

2.7.4.1 Alternatives Analyzed in this Draft EIS

Sections 2.3 and 2.4 describe the alternatives that met the screening criteria and were carried forward for detailed analysis in this Draft EIS/EIR. The No Action Alternative, while not meeting the objectives of the Proposed Project, was described in Section 2.5 and was considered in this Draft EIS/EIR as required by NEPA and CEQA.

2.7.4.2 Alternatives Eliminated from Detailed Analysis in this Draft EIS

Table 2-12 describes the alternatives that did not meet both screening criteria and were eliminated from further analysis in this Draft EIS/EIR and provides the reasons for removing alternatives from further analysis.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
TRANSMISSION ALTERNATIVES	
Construct a New 230-kV Line that would parallel or replace IID's existing F Line into the Midway Substation, with a 161-kV Tap Line from the Midway Substation to the Niland Substation – This alternative includes the construction of a new 230-kV transmission line to the Midway Substation. The existing 161-kV F Line could remain in operation or be removed. A 161-kV tap line would need to be constructed from the Midway Substation to the Niland Substation.	This alternative was eliminated from further consideration because the U.S. Navy has stated that a new transmission line would not be allowed through the CMAGR.
Upgrade the existing F Line for 230-kV operation - This option considers the coordinated removal of the existing single-circuit, 161-kV transmission line facilities for replacement along the same alignment with a double-circuit, 230-kV line.	This alternative was eliminated from further consideration because it is unclear at this time whether the U.S. Navy would allow the upgrade of the F-Line to a double-circuit, 230-kV line.
TRANSMISSION ROUTE ALTERNATIVES	
Construct a new 230-kV line along different route (s) than the Proposed Project or Alternatives A and B.	Alternative routes for this transmission line other than those analyzed in detail within this Draft EIS/EIR were not considered. Only routes that utilized existing rights-of-way were considered viable options for connecting the project end-points.
Construct a new 230-kV line along an alignment within BLM-designated utility corridor(s).	IID considered the alternative of following designated utility corridors early in its planning process and discussed it at length with BLM representatives. One alternative route, the Proposed Project (Alternative A) is considered fully in this EIS/EIR.
GENERATION ALTERNATIVES	
Hydroelectric - This alternative assumes that an electric turbine could be installed on a local water resource or the Colorado River to generate hydroelectric power to supplement existing sources of electricity. The proposed hydroelectric alternative would generate only a few MW. These additional MW would be used when electrical demand could not be met.	This alternative was eliminated for a number of reasons. First, it is technically unfeasible due to the limited water resources available to generate hydroelectric power in IID's service area. Second, this alternative would be unable to generate enough electricity to recoup costs for construction, operation, and maintenance. Third, this alternative source would also rely on consistent releases or flows from the reservoir which are currently determined by downstream water rights. Depending on who developed the hydroelectric facility, water rights would have to be obtained. This could impact the availability of water for downstream agricultural uses. If consistent flows through a dam were required to generate electricity, water may need to be released which could result in sending water downstream when it cannot be used for agricultural uses. Fourth, the biological impacts associated with effects to fish and fish habitat would also have to be considered. Fifth, this alternative would require the construction of a dam or reservoir. Permitting the construction of this type of facility is very time consuming and would result in a delay in supplying much needed electrical power to IID's service area. Additionally, there is an increasing resistance by the public, agencies, and environmental groups regarding the construction of new dams.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
Energy Storage - Battery energy storage in the IID area represents another alternative source of power to be considered. Batteries would charge while the demand for electricity was low, and provide power while the demand for electricity was high.	This alternative was eliminated for primarily technical reasons, because the technology is not very well developed at this time and, therefore, unreliable. Additionally, several battery storage areas would have to be located in the IID service area. After batteries discharge their rated capacity for one hour, their actual capacities are reduced to 60 percent of their rated capacities. Additional batteries could be added to allow discharge over a longer period, but larger storage areas would be required.
Photovoltaic - This alternative uses the energy of the sun to generate electrical power. A very large area would be required to harness sufficient energy to meet peak loads for the IID service area.	This alternative was eliminated from further analysis for both environmental, technical, and economic reasons. A centralized solar energy project using the parabolic trough technology would require approximately five acres per MW. To generate 300 MW of electricity, a solar project would require approximately 1,500 acres of permanently disturbed land, which is approximately 62 times more permanent disturbance than the Proposed Project.
Wind - This alternative uses wind to generate electrical power. Electrical power is produced by wind turning large propellers. To supply sufficient energy to meet the project needs would require a large number of these wind propelled generator systems over a vast area. Additionally, this alternative depends upon wind to be available during peak demand periods.	Harnessing energy from the wind requires a major investment and large acreage of land. In addition, this alternative has significant impacts associated with visual aesthetics and noise. The source of energy for this technology cannot be depended upon to be available during periods of high electrical demand, when they would be required. While alternative sources of energy such as wind would be useful for reducing the consumption of non-renewable sources of energy, it would not be consistently available during times of high electrical demand. The high cost and low reliability of this kind of technology cannot meet the goals of the Project, therefore, this alternative has been eliminated from further analysis.
Natural Gas-Fired Generation Station - This alternative assumes that a natural gas-fired combustion turbine generator could be constructed and located in the IID service area to supplement the electrical capability. This alternative would require the construction of support facilities, such as underground natural gas pipelines and upgrades to local substations and transmission line. The opportunities associated with this alternative include the benefits that would result from bringing natural gas to this area. Natural gas represents an inexpensive alternative to heating homes and businesses as compared to utilizing electricity and propane.	This alternative was eliminated from further consideration for environmental and economic reasons. Additionally, this alternative was eliminated because new generating facilities are either operating, under construction, or in the permitting stage with the California Energy Commission (CEC) north and east of the IID service area. The main IID constraints in obtaining this power is transmission line capacity. This alternative would create a new stationary pollutant source operating year round in Imperial County that would continue to increase emissions as local loads grow. Although the turbines could meet ambient air quality standards for nitrogen oxides and carbon monoxides, they could pose a visibility concern. The biological and visual impacts, and habitat fragmentation associated with construction of a natural gas pipeline would also have to be considered with this alternative. The costs associated with this alternative are expensive when compared to the costs of the other alternatives being considered in this EIS/EIR.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
	Construction and operation of electrical generation alternatives have various concerns associated with them. These concerns include siting, emissions, and costs that continue beyond the 20-year present value analysis. Selecting multiple sites in proximity to the IID load area that are close to the existing transmission line and satisfactory to landowners would be a continuing problem with potentially significant cost. Any distributed generation alternative must also be tied back to the regional transmission system by means of a transmission line to ensure unit stability and to provide adequate frequency and voltage control. In essence, this would create a significant stationary air pollutant source that would increase as native loads grow. Permitting for nitrous oxide and carbon monoxide emissions would be a challenge that could prevent siting and permitting activities to be successful. The environmental impacts and costs associated with this alternative have eliminated the need to further evaluate it.
ALTERNATIVE TRANSMISSION TECHNOLOGIES	
Voltages - The maximum voltage used for major AC transmission lines throughout the western United States is 500 kV. The Proposed Project would operate at either 230-kV or 500-kV.	Higher and lower transmission line voltages are being considered for environmental and economic reasons. These voltage options are considered fully in this EIS/EIR.
Direct Current Transmission - Direct current or DC transmission is rarely suitable for projects of this voltage or length. A 230-kV AC system was selected because it has a shorter construction schedule, substantially lower cost, and would allow more flexibility for future connections to other systems.	This alternative was eliminated from further evaluation because DC transmission lines require a longer time to construct than AC lines and at a substantially higher cost because each DC terminal installation (i.e., stations that convert AC power to DC power and vise versa) is a unique and highly technical installation. Because of these unique and expensive DC terminal installations, there would also be considerable difficulty and expense to connect the DC system to any intermediate AC systems in the future.
Underground Construction - Because visual issues were identified during the scoping phase of the project, IID considered constructing the transmission line underground. The following paragraphs include the advantages and disadvantages associated with this alternative method of construction. Burying transmission lines is often perceived as a way to accomplish the electrical objective of a project while minimizing visual impacts. However, there would be significant economic, technological, and environmental considerations associated with constructing a transmission line underground. Underground construction is frequently used with distribution lines that operate at 25 kV or less. At these relatively low voltages, the problems of electrically insulating each phase and of dissipating the	The environmental impacts of underground transmission lines differ from those of overhead lines and consequently, the siting considerations also differ. The impacts of underground transmission lines on soils, cultural sites, surface water, vegetation, and wildlife resources may be greater than those of a similarly located overhead line. The reason for these impacts is that underground construction would require a continuous trench 4 feet wide by 5 feet deep with intermediate vaults 7 feet wide by 20 feet long every 2,000 to 3,000 feet. Additionally, to install an underground line, construction equipment and vehicles must travel the entire length of the right-of-way. All gullies or washes along the route must be crossed with equipment and have the trench excavated through them to the required specification and to avoid damage by flash floods. An overhead line, in contrast, only requires excavation at each structure site, approximately 600 to 1,400 feet apart.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
heat generated by the conductors are not a concern. With lines of greater voltage (e.g., 230-kV line) the material costs, construction costs, and the heating of the transmission line cable all become a greater concern. The two types of underground transmission technologies are the pipe type and the solid dielectric type. The pipe type underground transmission lines have three oil impregnated paper insulated conductors in a steel pipe under high pressure with dielectric fluid (synthetic oil) as the pressurizing medium. The fluid serves to maintain the insulating properties of the oil impregnation on the paper insulation. Pressurizing plants must be placed every 3 to 5 miles depending on the terrain traversed by the line. Solid dielectric types of underground lines are insulated with either crosses link polyethylene or low-density polyethylene. Three cables are required, one per phase, and each cable is placed in a plastic duct. No dielectric fluid and, hence, no pressurizing plants are required for solid dielectric cables.	Heat generated by the underground transmission line would also have the effect of drying the surrounding soil, which may impact vegetation. Heat dissipation is a difficult and expensive impact of underground transmission to overcome and is one reason for the high cost of such lines. Clear cutting of the entire width and length of the trench and right-of-way for the construction equipment would be required for an underground line to facilitate construction and overland travel of equipment. This could have a severe impact on soils, surface water, cultural resources, vegetation and wildlife habitat, and visual resources. By contrast, the right-of-ways for an overhead line would only require selective clearing and trimming, preserving as much of the native vegetation and wildlife habitat as possible. Location of poles could also be changed to avoid sensitive wildlife, washes, and cultural resources locations. The visual impacts of structures and conductors associated with overhead lines could be completely avoided with an underground line. However, other types of visual impacts would result from an underground line, particularly in steep and desert terrain. The additional impacts would result from increased excavation, road construction, and the need for continuous clearing of vegetation along the right-of-way. Desert terrain is very slow to recover after it has been disturbed. There would also be a visual impact from the pressurizing plants required at intermediary points along the line for a high pressure oil system, or from the large riser pole transition structures required for a solid dielectric system. By far the greatest factor to consider when evaluating overhead versus underground transmission is cost. Experience shows that costs for constructing a 230-kV underground transmission lines is five to ten times more costly than an equivalent overhead line. The reliability of underground lines is comparable to overhead lines. Although underground lines are immune to the effects of weather or lightning, the duration of an outage on an underground line can be weeks since failures are more difficult to locate and repair. In contrast, overhead line outages, while more frequent, can be corrected or repaired within hours.