Spec. No. 883

SECTION C
DESCRIPTION/SPECIFICATIONS

PROJECT SPECIFICATIONS

GILA-KNOB 230-KV TRANSMISSION LINE REBUILD, PHASE I (STRUCTURES 4/7 TO 5/2)

Existing Gila-Knob Structure 4/8, looking south

ARIZONA

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GILA-KNOB 230-KV TRANSMISSION LINE REBUILD
PHASE 1 (STRUCTURES 4/7 TO 5/2)

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GILA-KNOB 230-KV TRANSMISSION LINE REBUILD
PHASE 1 (STRUCTURES 4/7 TO 5/2)

DIVISION 1 – GENERAL REQUIREMENTS

A. CONTRACT REQUIREMENT

Construct and complete Gila-Knob 230-kV Transmission Line Rebuild Phase I (Structure 4/7 to 5/2), in accordance with the Construction Contract (Standard Form 1442); the Contract Clauses; Western's Construction Standards (September 2013), including Standard 1 – General Requirements, Standard 2 – Sitework, Standard 3 – Concrete, Standard 5 – Transmission Line Steel Pole Structures, Standard 10 – Transmission Line – Electrical, Standard 13 – Environmental Quality Protection, Standard 15 – Drawings; Standard Drawings; and these Project Specifications and Drawings.

If a conflict occurs between the Project Specifications and the Construction Standards, the Project Specifications shall govern. The Project Specifications and Drawings are used to take exceptions or provide additions to the Construction Standards. Some paragraphs in the Construction Standards will not apply to this job.

Western's Construction Standards, Standard Drawings, and Electrical Equipment Standards are available at: https://www.wapa.gov/DoingBusiness/SellingToWestern/Pages/what-western-buys.aspx.

Western's Project Specifications and Construction Standards are explained in Standard 1 – General Requirements, Section 1.1.1., "Standards and Project Specifications".

B. DESCRIPTION OF WORK

This project includes the removal of existing ACSR conductor, overhead groundwire, and wood pole structures; installation of Government-furnished steel structures and ACCR conductor; and providing ACSS conductor, overhead groundwire, optical fiber overhead groundwire, and insulator assemblies as part of the 230-kV rebuild of the Gila-Knob 161-kV Transmission Line, between Structures 4/7 and 5/2, located near the Arizona Public Service's (APS) North Gila Substation. The spans cross under three APS 500-kV approach spans. The line lies on Western right-of-way, wedged between the Gila Gravity Canal and North Gila Substation, and is physically encroached upon by the canal waste bank on the northeast side, and the concrete fill slope (for North Gila Substation) on the southwest. New structures are designed for 230-kV double circuit, however only one circuit of ACSS conductor will be installed during this construction phase. Both circuits of ACCR conductor will be installed under the APS approach spans to avoid future outages.

Paragraphs "Description of Bidding Schedule Items" in Divisions 1, 2, 3, 5, 10, 13, and 15, describe the work to be performed.

The work is located in Yuma County, AZ, north of Gila Substation, shown on Drawing GLA 0015.

C. DESCRIPTION OF BIDDING SCHEDULE ITEM

1. **Bidding Schedule item "Mobilization and Preparatory Work"** includes the following:

    a. Perform mobilization and preparatory work in accordance with Section H of the contract clauses.

    b. Prepare and submit a Construction Schedule and furnish a Safety and Health Program.

    c. Provide jobsite office trailer and the items listed below. Prior to any jobsite work, the Contractor shall provide the office trailer for the exclusive use of Western.

(1) Relocation: If the Contractor changes the location of his office during the term of the contract, then the Contractor shall also move the mobile office trailer provided for Western, simultaneously with the transportation of his own unit.

(a) Installation: Install anchors and tie-downs for the trailer complying with local, State, and Federal regulations. The office trailer shall be grounded. Entry points to the trailer shall be provided with stairways complying with OSHA 29 CFR 1926.1052.

(b) Office Space Requirements:

1) Size and Arrangement: At least 250-square-feet, consisting of two (2) separate rooms (one (1) office and one (1) larger workroom).

2) Heating and Cooling: Heating and cooling unit sized to provide adequate heating and cooling.

3) Lighting and Electrical: Adequate lighting and 110 V electrical outlets.

4) Utilities: Make all arrangements and pay all costs for providing utilities, including potable drinking water, electrical power, and heating and cooling energy.

5) Toilet Facilities: Toilet facilities shall be provided in the immediate vicinity of the office and shall be maintained.

(2) Emergency Equipment: Provide and maintain the following emergency equipment:

(a) First Aid Kit by Affirmed Medical, Inc., Model No. 3503, or equal. Mount to the wall inside the workroom.

(b) Dry chemical fire extinguishers, classified 4-A:60-B:C, one to be located inside each entrance to the trailer.

(3) Window Coverings: Provide adjustable mini-blinds.

(4) Office Furniture: Provide good quality, fully-functional, office furniture as follows:

QUANTITY	DESCRIPTION
5	Folding Office Chairs
1	Office Desk (30-inches by 60-inches minimum)
2	Office Tables (30-inches by 60-inches minimum)
1	Five-drawer File Cabinet
1	Bookcase (30-inches by 48-inches)
12	“Plan Hold” Binders, No. 1CB (including one (1) plan rack)

D. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF THE WORK: Refer to Contract Clause 52.211-10.

2. SUBMITTAL APPROVAL TIME: Except as otherwise provided for specific submittals, Western will require 30-calendar-days for review of drawings or data submitted for approval.

3. OUTAGE RESTRICTIONS: In addition to the restrictions listed in Construction Standard 1, the following outage restrictions shall apply:

   a. One continuous outage will be allowed on the Gila-Knob 230-kV Transmission Line between October 3, 2016 and December 23, 2016.

   b. Outages have been scheduled (subject to system conditions at the time) on the Arizona Public Service Company's (APS) 500-kV transmission lines above the spans, between new Structures 4/8 and 4/9, for November 7, 2016 through November 11, 2016.

4. CONSTRUCTION RESTRICTIONS: The following restrictions shall apply:

   a. Installation of all ACCR conductors and optical fiber overhead groundwire between Structures 4/8 and 4/9 (both left and right circuits) shall be completed between November 7, 2016 and November 11, 2016.

   b. All work on the Gila-Knob 230-kV Transmission Line shall be completed between October 3, 2016 and December 23, 2016.

5. MAXIMUM AVAILABLE FAULT CURRENT: When protective ground leads are required, the protective ground leads shall be sized as defined below, and shall meet the requirements of Standard 1 – General Requirements, Section 1.4., "Safety and Health", and the following:

   a. The maximum available fault current on the Gila-Knob 161-kV Transmission Line from Western's system is 7641 amps, and the X/R ratio is 6.2 prior to completing construction.

   b. The Contractor is responsible to determine any additional protective grounding needs for work in the vicinity of transmission lines and substations owned or operated by others. APS operates North Gila Substation and transmission lines in the vicinity of this project.

   c. A minimum of one 1/0 AWG copper protective ground lead per phase is required to address the fault current available from Western's system.

6. PROTECTIVE GROUND LEADS: When protective ground leads are required, the protective ground leads shall be sized as defined below, and shall meet the requirements of Standard 1 – General Requirements, Section 1.4., "Safety and Health", as well as Section 1.4.14., "Grounds, Bonds, and Other Protective Devices", and the following:

   a. Protective ground leads shall be 1/0 AWG copper or larger.

   b. Testing and Certification of Protective Ground Leads: Each protective ground lead shall have a permanent identification tag with unique identification number, certified wire size, and test date. Each protective ground lead shall be tested complete with connectors, in accordance with ASTM F 2249. Protective ground leads shall be re-tested and re-certified annually.

      A protective ground lead without an identification tag to relate it to the annual certification of that protective ground lead shall not be used. No protective ground lead shall be longer than 36-feet, unless approved by the COR. Test results shall be submitted to the COR for approval prior to use of the grounds.

When using the DC test method, the Contractor shall submit testing information in the format shown below in the Personal Protective Grounds Test Report. When using the AC test method, the Contractor shall submit testing information in accordance with the test set manufacturer's recommendations.

CABLE ID	CABLE SIZE	CABLE CONDITION	CABLE LENGTH		ASTM RESISTANCE (mΩ)	MEASURED RESISTANCE (mΩ)	PASS/ FAIL
			FT	IN			

Tester's Signature _____

Test Temperature _____

Test Date _____

E. CONSTRUCTION SCHEDULE

1. SUBMITTAL TIME: Refer to Clause 52.236.15, Schedules for Construction Contracts.

2. FORMAT AND DETAIL: Dates for each item of Government-furnished material shall be included in the submitted Construction Schedule. Construction Schedule shall be provided in the Microsoft Project 2007 format, PDF, and shall clearly show a critical patch base line. Do not schedule dates earlier than the estimated delivery dates shown in the "Material" paragraph.

F. MATERIAL

Furnish all material for completing the work, except material furnished by Western as listed below:

ITEM	ESTIMATED WEIGHT (LBS)	ESTIMATED DELIVERY DATE	ESTIMATED COST
1. 5,000 feet 1,334 kcmil 54/19 MARTIN ACCR T-13 bare overhead conductor (Aluminum Conductor Composite Reinforced)	8500	NST 7-01-16 NLT 9-15-16	$70,000
2. Twelve (12) Compression Deadend Terminals for 1,334 kcmil 54/19 MARTIN ACCR T-13 bare overhead conductor	600	NST 7-01-16 NLT 9-15-16	$7,200
3. One (1) 281N-50 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	90,300	NST 7-01-16 NLT 9-15-16	$168,861
4. One (1) 281N-70 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	113,350	NST 7-01-16 NLT 9-15-16	$211,965
5. One (1) 281S-50 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	33,400	NST 7-01-16 NLT 9-15-16	$62,458

ITEM	ESTIMATED WEIGHT (LBS)	ESTIMATED DELIVERY DATE	ESTIMATED COST
6. Two (2) 266M-45 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	45,300 EA	NST 7-01-16 NLT 9-15-16	$84,711 EA
7. One (1) 266M-50 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	48,450	NST 7-01-16 NLT 9-15-16	$90,602
8. One (1) 266M-55 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	51,800	NST 7-01-16 NLT 9-15-16	$96,866
9. One (1) 266M-65 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	61,800	NST 7-01-16 NLT 9-15-16	$115,566
10. One (1) 266M-80 (BP) galvanized steel pole structure with maintenance provisions and anchor bolt cage	75,300	NST 7-01-16 NLT 9-15-16	$140,811
11. Three hundred (300) Left Anchor Plates galvanized – Mark 1FP-5L	1.3 EA	NST 7-01-16 NLT 9-15-16	$6.12 EA
12. Three hundred (300) Right Anchor Plates galvanized – Mark 1FP-5R	1.3 EA	NST 7-01-16 NLT 9-15-16	$6.12 EA

NST – No sooner than.
NLT – No later than.

1. POINTS-OF-DELIVERY: Material furnished by Western will be delivered to Western's facility at Gila Substation, approximately five-miles south, per Drawing GLA 0015. The Contractor shall load, transport, and unload the material at the jobsite. The Contractor shall inspect the equipment and report any damages to the COR immediately.

G. RIGHTS-OF-WAY

1. GENERAL: Transmission line right-of-way is indicated on the Plan and Profile Drawings. Western does not represent that the Contractor can gain access to every structure site, or travel continuously along the transmission line.

   Orient construction methods and equipment to utilize Government-furnished rights-of-way, or obtain additional temporary access, without additional cost to Western. Any additional temporary access acquired by the Contractor shall have prior COR approval, since several areas of the transmission line have travel restricted areas. If additional access to the transmission line is needed, the Contractor shall be responsible for contacting the landowner to obtain written permission to traverse their private road.

   The Contractor shall obtain a signed agreement from the landowner, granting permission to use their road for the duration of the project. Permission must be obtained, and the required agreements forwarded to the COR, prior to the work commencing on-site. During the contract period, Western reserves the right to use Contractor-obtained access.

2. ACCESS EASEMENTS: Western has acquired access easements from existing public roads to the transmission line, and some off-right-of-way access along the transmission line. This off-right-of-way route provides access to the transmission line structure sites.

3. WORK ON THE RIGHT-OF-WAY:

   a. General: Perform work on Western's rights-of-way necessary for access to or along the transmission line. Only that excavation, dozing, or blading absolutely necessary will be allowed. Excavation, dozing, and blading for ease of travel may only be performed after field review and approval by the COR. Unauthorized excavation, dozing, or blading shall immediately be repaired, or Western will have the damage repaired and back-charge the Contractor for all costs involved.

   b. Ease of Travel and Crane Landings: Excavation, dozing, or blading done for ease of travel on any easement or for crane landings shall be restored to the original contour of the land, and shall be compacted to a dry density not less than the natural in-place dry density of the surrounding earth. The use of water may be required to obtain the required density. Topsoil shall be stockpiled and spread on cuts prior to completion of work. The restored site should be compacted in accordance with Standard 2 – Sitework.

H. GEOLOGIC INVESTIGATIONS

Geologic logs of subsurface explorations included in the Project Drawings constitute the information and records of geologic investigations for the work. Locations of subsurface investigations are shown on Drawing GLA-KNB 8000. Boring Logs are shown on Drawings GLA-KNB 8001 through 8008.

Samples and cores of recovered material were not retained. Bidders shall obtain their own samples and perform tests on the material to evaluate properties which they believe to be significant. Western does not guarantee that the geologic information and records show the conditions that will be encountered in performing the work, but only that the geologic information and records show conditions encountered at the particular point and time the information and records were obtained. The geologic information may not indicate variations, such as those caused by seasonal fluctuations in rainfall and other factors, which may affect the water level. The Contractor shall determine the nature of material to be excavated, the difficulties of making and maintaining required excavations, and doing other work affected by geology and ground water elevations at the worksite.

I. ELECTRIC POWER FOR CONSTRUCTION PURPOSES

The Contractor shall furnish electric power for construction purposes.

J. ACCESS AND RESTRICTIONS

The Contractor shall contact the COR if access is required on or near the canal access road adjacent to the work site.

K. WATER FOR CONSTRUCTION PURPOSES

Furnish water for construction purposes. Make arrangements for obtaining the water, and provide for conveying the water to the points of use.

L. EXPLOSIVES AND BLASTING

Explosives shall not be used.

M. SUBMITTALS

1. GENERAL: Submittals must be provided in accordance with the Construction Standards and Project Specifications. The Contractor shall furnish submittals electronically (i.e. e-mail), unless otherwise specified by the COR. Submittals shall be sent to: DSW-G5600-CS@wapa.gov in standard PDF or electronic CAD "*.dwg" (AutoCAD 2010) formats. All submittals shall include the contract number, project title, Contractor's transmittal/submittal number, Western's standard reference (CLIN), and corresponding item number. Refer to the Submittal Log for the list of required submittals. This list may not be all-inclusive, and it remains the Contractor's responsibility to ensure conformance to the individual Specifications for possible additional submittal requirements. The submittal cover sheet in Microsoft Word or PDF format shall also be included.

   In addition to the submittals required in the attached Submittal Log, the Contractor shall submit the following to DSW-G5600-CS@wapa.gov:

   a. Payrolls
   b. Sub-Contractor List/Forms
   c. Citizenship Forms
   d. Environmental Submittals
   e. Request For Information (RFI)
   f. Request for Equitable Adjustment (REA)
   g. Any questions related to the project.

   A submittal is required if the item is used in the performance of this contract.

2. APPROVAL TIME: Approval time for submittals shall be in accordance with the "Commencement, Prosecution, and Completion of Work" paragraph.

3. TRANSMITTAL: The Contractor shall forward specified non-electronic submittals to the following address:

   Western Area Power Administration
   ATTN: G5600
   P.O. Box 6457
   Phoenix, AZ 85005-5313

DIVISION 2 – SITEWORK

A. GENERAL

1. **Bidding Schedule item "Miscellaneous Sitework"** includes the following:

   a. Clearing and grubbing.

   b. Replace and protect the existing gravel surfacing.

   c. Provide a soil-applied herbicide where gravel surfacing is placed.

   d. Dispose of excess waste material from excavation, not necessary or suitable for construction, as determined by COR.

B. DESCRIPTION OF BIDDING SCHEDULE ITEMS

1. **Bidding Schedule item "Remove Existing Transmission Line"** includes the following:

   a. Remove electrical items and wood pole structures. Locations are on the existing Gila-Knob 161-kV Transmission Line.

   b. Approximate quantities are listed in Tables 2-1 and 2-2. The Contractor shall determine the actual quantities to be removed and, regardless of the quantities removed, payment will only be made for the lump sum price bid in the Bidding Schedule. Fully remove the conductors and overhead groundwires, complete with accessories.

TABLE 2-1
ELECTRICAL ITEMS TO BE REMOVED

MATERIAL	QUANTITY
Three (3) approximately 477-kcmil ACSR conductors	0.7-miles
Two (2) 7/16-inch, 7-strand steel overhead groundwires	0.7-miles
Conductor and Groundwire suspension assemblies	25
Conductor and Groundwire tension assemblies	20

   c. Remove the wood pole structures, complete with guys and anchors, listed in Table 2-2 located from Station 157+79 to Station 196+14, on Drawing GLA-KNB T400. Remove seven (7) wood pole structures complete with guys and anchors.

TABLE 2-2
WOOD POLE STRUCTURES TO BE REMOVED

STRUCTURE TYPE	QUANTITY
3T-2	2
3A	2
HS	3

2. **Bidding Schedule does not contain separate items for the following.** Include these items in applicable Bidding Schedule items.

   a. Clear, as directed by the COR.

   b. Grade for structure and line clearance, as directed by the COR.

   c. Excavations for foundations.

   d. Case excavations, if required.

   e. Unwater excavations, if required.

   f. Dispose of excavated material.

   g. Restore the right-of-way to its original condition.

DIVISION 3 – CONCRETE

A. GENERAL

1. MATERIAL:

   a. Cement: Type IIA cement in accordance with ASTM C 150.

   b. Compressive Strength: 4,000 psi at 28-days for concrete foundations.

   c. Water-Cement Ratio: Net water-cement ratio, exclusive of water absorbed by the aggregates, shall not exceed 0.52 by weight.

   d. Type A and D water-reducing and retarding admixtures may be used, if approved by the COR.

   e. Use of flyash is required in concrete, in accordance with Standard 3.

2. TEST FOR POTENTIAL REACTIVITY OF SAND AND COARSE AGGREGATE: Perform tests for potential reactivity for the sand and coarse aggregate. If the tests determine the aggregate(s) to be unsuitable as a concrete aggregate, a suitable source will be obtained by the Contractor.

B. DESCRIPTION OF BIDDING SCHEDULE ITEM

1. **Bidding Schedule item "Concrete Foundations"** includes providing the following:

   a. Assemble Government-furnished anchor bolts into cages, as shown on the steel pole shop drawings.

   b. Construct concrete foundations for the nine (9) steel pole structures listed in Table 3-1, as shown on Drawings GLA-KNB 2101 and 2102, with Government-furnished anchor bolts.

TABLE 3-1
STRUCTURES REQUIRING CONCRETE FOUNDATIONS

STRUCTURE NO.	STRUCTURE TYPE & HEIGHT "H"
4/7	281N-70 (BP)
4/8 L	266M-65 (BP)
4/8 R	266M-80 (BP)
4/9 L	266M-45 (BP)
4/9 R	266M-45 (BP)
4/10 L	266M-50 (BP)
4/10 R	266M-55 (BP)
5/1	281S-50 (BP)
5/2	281N-50 (BP)

c. Concrete construction includes earthwork, formwork, reinforcement, material used in concrete, curing, finishing, joints, and other related work and material needed to complete the required concrete construction, in accordance with Standard 3.

d. Un-water auger excavations, if required.

e. Case auger excavations, if required.

f. Measurement for quantities will be made on the basis of concrete quantities shown on Drawings GLA-KNB 2101 and 2102. Regardless of concrete quantities actually placed, payment will be based on the quantities shown on the drawings.

DIVISION 5 – TRANSMISSION LINE STEEL POLE STRUCTURES

A. GENERAL

A total of nine (9) steel pole structures shall be installed for this project. Two (2) Type 281N (BP), one (1) Type 281S (BP), and six (6) Type 266M (BP) will be delivered to Gila Substation, as shown on Drawing GLA 0015.

All structures shall be base-plated and anchor-bolted on concrete foundations.

Structure components include pole shaft sections, davit arms, anchor bolts, nuts, washers, and templates, fixed climbing rung sections and rungs, connection bolts, nuts, and locknuts. Steel pole shop drawings will be furnished when they are available.

B. DESCRIPTION OF BIDDING SCHEDULE ITEMS

1. **Bidding Schedule items for "Install Anchor-bolted Government-furnished Transmission Line Steel Pole Structures on Concrete Foundations"** includes assembling and installing the steel pole structures listed in Table 5-1, complete with the following:

   a. Connection bolts, nuts, and locknuts.

   b. All pole shaft sections shall be jacked together in accordance with the manufacturer's recommendations, as shown on the steel pole shop drawings.

   c. Attach rungs and install fixed climbing rung sections on all structures with bolts, nuts, and locknuts.

   d. Install the structures listed in Table 5-1 on concrete foundations.

TABLE 5-1
STRUCTURES TO BE INSTALLED ON CONCRETE FOUNDATIONS

STRUCTURE NO.	STRUCTURE TYPE[1]	ESTIMATED NO. OF POLE SHAFT SECTIONS
4/7	281N-70 (BP)	3
4/8 L	266M-65 (BP)	4
4/8 R	266M-80 (BP)	4
4/9 L	266M-45 (BP)	2
4/9 R	266M-45 (BP)	2
4/10 L	266M-50 (BP)	4
4/10 R	266M-55 (BP)	4
5/1	281S-50 (BP)	2
5/2	281N-50 (BP)	2

[1] The last two (2) digits of the type designation indicate the height (FT) portion of the structure from base plate (BP) to bottom insulator attachment.

2. **Bidding Schedule Items for "Install Transmission Line Steel Pole Structures" also** includes providing structure signs as follows:

   a. Provide structure number signs on both the ahead and back span side of all structures in accordance with Standard Drawing 41 9027. Structure numbers shall be as shown on the Plan and Profile Drawings. Eighteen (18) structure number signs are required. The Contractor shall furnish all mounting hardware.

      Structure number signs and mounting provisions for all structures shall be in accordance with the 1- and 2-digit-mile number detail on Standard Drawing 41 9027, except structure number signs and mounting provisions for Structures 4/8 L, 4/8 R, 4/9 L, 4/9 R, 4/10 L, and 4/10 R, which shall be in accordance with the 3-digit-mile number detail.

   b. Provide two aerial patrol mile marker signs on the first structure of each mile section, in accordance with Standard Drawing 41 9027 and the Plan and Profile Drawings. Two (2) aerial patrol mile marker signs are required with 5-digits. The Contractor shall furnish all mounting hardware.

A. DESCRIPTION OF BIDDING SCHEDULE ITEMS

1. **Bidding Schedule item for "Furnish and Install Single-string Suspension Insulator Assemblies Type SI11-B suitable for 1,272 kcmil PHEASANT/ACSS/MA2"** includes furnishing material and performing work and tests to provide insulator assemblies shown on Standard Drawing 41 1020. Assemblies shall have a cushioned grip-type suspension with bolt, nut, and key hardware suitable for high temperature (482-degrees-Fahrenheit / 250-degrees-Celsius) continuous operation instead of conventional suspension shoes. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004. The quantities shown on Drawing GLA-KNB 1004 are the total required for permanent installation of both circuits. Suspension insulator assemblies shall be installed on all unused conductor attachments of the future circuit for vibration dampening.

2. **Bidding Schedule item for "Furnish and Install Double-string Tension Insulator Assemblies Type T21-C suitable for 1,272 kcmil PHEASANT/ACSS/MA2"** includes furnishing material and performing work and tests to provide insulator assemblies shown on Standard Drawing 41 1023. Type T21-C assemblies shall have bolt, nut, and key hardware, and be suitable for high temperature (482-degrees-Fahrenheit / 250-degrees-Celsius) continuous operation. Tension assemblies will be furnished complete with terminal connectors for jumper loop installations. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004. The quantities shown on Drawing GLA-KNB 1004 are the total required for permanent installation of both circuits.

   The Contractor shall furnish and use high-temperature joint inhibitor compound to complete all compression installations.

3. **Bidding Schedule item for "Furnish and Install Double-string Tension Insulator Assemblies Type T21-C suitable for 1,334 kcmil MARTIN ACCR T13"** includes furnishing material and performing work and tests to provide insulator assemblies shown on Standard Drawing 41 1023. Compression deadends will be supplied as Government-furnished equipment. Type T21-C assemblies shall have bolt, nut, and key hardware, and be suitable for high temperature (482-degrees-Fahrenheit / 250-degrees-Celsius) continuous operation. Tension assemblies shall be provided complete with 1,272 kcmil ACSS terminal connectors for jumper loop installations. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

   The Contractor shall furnish and use high-temperature joint inhibitor compound to complete all compression installations.

4. **Bidding Schedule item for "Furnish and Install Double-string Tension Insulator Assemblies Type T21-C suitable for 300 kcmil Anaconda Copper Type 178/R2"** includes furnishing material and performing work and tests to provide insulator assemblies shown on Standard Drawing 41 1023. Type T21-C assemblies shall be furnished complete with strain clamp-type terminal connectors. Splices to aluminum conductor shall be made in the jumper loops. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

TABLE 10-1
CONDUCTOR CHARACTERISTICS

CONDUCTOR DESIGNATION	ANACONDA 300 KCMIL COPPER TYPE 178/R2 (HOLLOW "I-BEAM")
Overall Diameter (IN)	0.750
Strands (number)	12
Strand Diameter (IN)	0.1507

5. **Bidding Schedule item for "Furnish and Install Station Post Insulator Assemblies Type SP-2 suitable for 1,272 kcmil PHEASANT/ACSS/MA2 complete with Polymer Insulators and Flange End Fittings"** includes furnishing material and performing work and tests to provide insulator assemblies shown on Standard Drawing 41 1033. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

6. **Bidding Schedule item for "Furnish and Install Type OGW-SL Overhead Groundwire Assemblies for ½-inch-diameter High Strength 7-Strand Steel"** includes furnishing material and performing work and tests to provide overhead groundwire assemblies shown on Standard Drawing 41 1018. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

7. **Bidding Schedule item for "Furnish and Install Type OGW-TV Overhead Groundwire Assemblies ½-inch-diameter High Strength 7-Strand Steel"** includes furnishing material and performing work and tests to provide overhead groundwire assemblies shown on Standard Drawing 41 1018. An estimate of material quantities for each type of structure is shown on drawing GLA-KNB 1004.

8. **Bidding Schedule item for "Furnish and Install Type OPGW-SL Overhead Groundwire Assemblies for 0.465-inch-diameter, 48-fiber Overhead Optical Groundwire"** includes furnishing material and performing work and tests to provide overhead groundwire assemblies shown on Standard Drawing 41 1031. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

9. **Bidding Schedule item for "Furnish and Install Type OPGW-TV Overhead Groundwire Assemblies for 0.465-inch-diameter, 48-fiber Overhead Optical Groundwire"** includes furnishing material and performing work and tests to provide overhead groundwire assemblies shown on Standard Drawing 41 1031. An estimate of material quantities for each type of structure is shown on Drawing GLA-KNB 1004.

10. **Bidding schedule item for "Furnish and Install Three (3) 1,272 kcmil PHEASANT/ACSS/MA2 Conductors"** includes stringing, splicing, repairing, sagging, and clipping in the conductors; installing jumper loops; and installing material to complete the conductor installations, except for material installed as a part of insulator assemblies and accessories. Install material, including conductor and conductor joints, if necessary. The steel structures are designed for 230-kV double circuit. The ACSS conductors shall be installed on the right circuit (looking ahead on line). As noted under other bid items, suspension insulators shall be installed on all unused conductor attachments for vibration dampening.

    Furnish and install high temperature joint inhibitor compound required to complete conductor installation, in accordance with the conductor manufacturer's recommendations. Measurement for stringing conductors will be made horizontally along the centerline of the transmission line.

The conductor shall be standard-strength type ACSS, suitable for high temperature (482-degrees-Fahrenheit / 250-degrees-Celsius) continuous operation. The conductor shall comply with the characteristics of Table 10-2.

TABLE 10-2
CONDUCTOR CHARACTERISTICS

CONDUCTOR CODE WORD	PHEASANT/ACSS/MA2
Completed conductor size (circular mils)	1,272,000
Ultimate strength, as computed for the strength of the individual strands, not less than (LBS)	34,100
Aluminum strands (number)	54
Diameter (IN)	0.1535
Steel strands (number)	19
Diameter (IN)	0.0921

11. **Bidding schedule item for "Install Three (3) Government-Furnished 1,334 kcmil, MARTIN ACCR T13 Conductors"** includes stringing, splicing, repairing, sagging, and clipping in the conductors; providing jumper loops (using 1,272 kcmil ACSS conductor); bonding and grounding the conductors of the unused circuit at structure 4/9L; and installing material to complete the conductor installations, except for material installed as a part of insulator assemblies and accessories.

    Furnish and install high-temperature joint inhibitor compound required to complete conductor installation in accordance with the conductor manufacturer's recommendations. Measurement for stringing conductors will be made horizontally along the centerline of the transmission line.

    Bond the three unused circuit conductors together by connecting permanent jumpers to the deadend terminal pads at Structure 4/9L. Ground the unused circuit by connecting a permanent jumper from the deadend terminal pad of the center phase to a structure crossarm center jumper mechanical attachment. On the structure side of the jumper, use a bonding clip assembly, as shown on Standard Drawing 41 1012.

    The conductor will be round wire ACCR, suitable for high temperature (410-degrees-Fahrenheit /210-degrees-Celsius) continuous operation. The conductor will comply with the characteristics of Table 10-3.

TABLE 10-3
CONDUCTOR CHARACTERISTICS

CONDUCTOR DESIGNATION	MARTIN ACCR T13
Manufacturer (3M) Descriptor	ACCR_1334-T13
Completed conductor size (circular mils)	1,351,000
Completed conductor diameter (IN)	1.415
Ultimate strength (LBS)	45,300
Aluminum strands (number)	54
Diameter (IN)	0.157
Core strands (number)	19
Diameter (IN)	0.094

12. **Bidding Schedule item "Furnish and Install ½-inch-diameter High Strength, 7-Strand Steel Overhead Groundwire"** includes stringing, splicing, repairing, sagging, and clipping in the overhead groundwire; and installing material to complete the overhead groundwire installation, except for material installed as a part of overhead groundwire assemblies and accessories.

13. **Bidding Schedule item "Furnish and Install 0.465-inch-diameter, 48-fiber Overhead Optical Groundwire"** includes stringing, splicing, sagging, and clipping in the optical overhead groundwire, to complete the optical overhead groundwire installations, except for material furnished and installed as a part of suspension and tension assemblies for optical overhead groundwires.

    a. Coil approximately 75-feet of extra length, per OPGW wire, at each splice location with tails fixed in the optical splice enclosure.

    b. Install one optical overhead groundwire, as shown on Plan and Profile Drawings, between Structures 4/7 and 5/2. The OPGW shall contain 48-single-mode optical fibers. The optical fibers will be compliant with, or exceed, the requirements of ITU-T G.652.D. OPGW shall meet all IEEE-1138-1994 (r2002) standard requirements, and be SFPOC Type SFSJ-J-6797, or equivalent.

    c. Stringing shall strictly adhere to procedures recommended by the manufacturer. Ensure that the allowable bending radius limitation of the fiber optic cable is not violated at any time.

    d. OPGW wires shall be routed down and attached to steel structures and the take-off structure using guide clamps, as shown on the drawings.

    e. Fiber Optic Testing: Perform fiber optic testing in accordance with the following:

        (1) Pre-installation Field Tests of OPGW: The OPGW will be tested by the supplier upon delivery to ensure the cable was not damaged during shipment and handling. These test results will be made available to the Contractor upon request. The Contractor may, at its own discretion, retest the reels of OPGW before taking possession for installation. In the post-installation field tests, the Contractor will be responsible to show that the end-to-end fiber link, after installation, is complete and in working condition.

(2) Post-Installation Field Tests: Contractor shall notify the COR at least seven-days prior to the post-installation field tests to enable Western observers to be present. Perform end-to-end tests for each fiber after all splices have been completed and all splice enclosures have been returned to their permanent position, except for those enclosures that have to be open to gain access to bare-ended fiber for the tests. These tests shall include:

(a) OTDR charts (hardcopies) at 1550 nm showing launch conditions and all other parameters used in setup (specify length of launch cable), plus time and date. These charts shall illustrate and quantify the losses at each splice, length of fiber, and stress points on the fiber. Review the traces carefully and explain unusual discontinuities in detail. OTDR measurements shall be made in both directions, and the splice loss results bi-directionally averaged. Bi-directional averaged values shall be clearly displayed in a separate table that identifies each splice location by STRUCTURE NUMBER and direction of measurement. Bi-directionally averaged splice loss shall not exceed 0.10 dB. A one-kilometer launch fiber will be spliced to the fiber under test. OTDR results shall be submitted for every fiber of the completed fiber system. The OTDR testing and waveforms shall be stored on an optical disk and included with the required submittals. If the OTDR testing is performed using equipment other than Wavetek or Tektronics, the Contractor shall supply Western with the software necessary to view the test results.

(b) Instrument Calibration: All test equipment shall be calibrated with certification traceable to the National Institute of Standards and Technology relative to their intended use.

(3) Qualifications of Splicing and Testing Personnel: The Fiber Optic Tester shall have a minimum of one-year testing and operations experience with the OTDR test equipment used for tests required in these Specifications, and shall be able to use all necessary test equipment, without reference to test equipment instruction books, while performing the required tests specified herein. All personnel performing splicing shall be certified to do so by the Electronic Technician Association, or equivalent training program.

(4) Fiber Optic Communication Drawings and Data: All drawings and technical data required to be furnished by the Contractor shall be in English, all dimensions on the drawings shall be in feet and inches, and all weight in pounds. The drawings and data shall be complete and accurate in their content. Originals and all copies shall be legible.

Western shall have the right to require the Contractor to make any changes in the drawings and data that may be necessary to show the equipment furnished conforms to the requirements of these Specifications. The design and co-ordination of the fiber optic communication equipment shall be the responsibility of the Contractor, and Western assumes no responsibility to approve or review drawings and data that are submitted.

Table 10-4 summarizes the drawings and data required under these Specifications.

TABLE 10-4
DRAWINGS AND DATA SCHEDULE FOR FIBER OPTIC MATERIAL

TYPE OF DRAWINGS AND DATA	DELIVERY TIME	TYPE OF MATERIAL	QTY TO COR
OPGW and splice box material data	40-days after first notice to proceed	Catalog Sheets	3
Post-Installation Field Test Results	14-days after completion of tests	OTDR Charts and Disk	3
Certification of testing personnel	30-days prior to fiber testing	Copy of Certification	3

14. **Bidding Schedule item "Furnish and Install Optical Splice Enclosures"** includes furnishing and installing the enclosures on the various types of steel pole structures.

    The optical splice enclosures shall include an optical splice organizer that shall hold at least 48-single-mode fusion splices. The organizer shall allow for sufficient bend radius for the fibers as recommended by the cable/fiber manufacturer. Each optical splice enclosure shall have the following characteristics:

    a. Compatible with the sizes and types of fiber optic cables to ensure proper mechanical attachment.

    b. Bullet resistant.

    c. External strain relief for optical overhead groundwire and other optical cables.

    d. External cable storage bracket.

    e. The enclosure shall be airtight and moisture-proof. The splice enclosure shall be re-enterable and re-sealable.

    f. The optical splice enclosures shall be Opti-Guard Splice Enclosure from Alcoa Fujikura, Ltd. or equal. The splice enclosures for splices along the transmission line shall have at least two (2) ports, to accept each OPGW wire. The optical splice enclosures shall be located as indicated on Drawing GLA-KNB 4207, and mounted according to Standard Drawing 41 1028.

15. **Bidding Schedule item "Furnish and Install Vibration Dampers"** includes performing all work required to install vibration dampers for each wire of each span of conductor, overhead groundwire and overhead optical groundwire. Vibration damper quantity and spacing requirements shall be in accordance with Drawing GLA-KNB 1005.

16. **Bidding Schedule item "Furnish and Install Marker Balls"** includes furnishing and installing aerial marker balls with clamps suitable for use with ½-inch, high strength steel overhead groundwire, and 0.465-inch-diameter optical overhead groundwire, as detailed on the Plan and Profile Drawings, in accordance with Standard Drawing 41 9029, and as listed in the table below.

MARKER BALL			
STRUCTURE NUMBER	**DISTANCE FROM STRUCTURE (FT)**	**DIRECTION FROM STRUCTURE**	**DESCRIPTION**
4/6	25	South West	One (1) – 36-inch White Marker Balls
4/7	25	South West	One (1) – 36-inch Red / White Marker Balls
4/8L	25	South West	One (1) – 36-inch Red Marker Balls
4/9L	25	South West	One (1) – 36-inch Red Marker Balls
4/10L	25	South West	One (1) – 36-inch Red / White Marker Balls
5/1	25	South West	One (1) – 36-inch White Marker Balls

DIVISION 13 – ENVIRONMENTAL QUIALITY PROTECTION

A. DESCRIPTION OF THE BID ITEMS

1. **The Bidding Schedule does not contain separate items for the following requirements.** Include these items in the applicable Bidding Schedule items:

   a. Contractor-Furnished Data (Standard 13.2)
   b. Environmental Requirements (Standard 13.3)
   c. Landscape Preservation (Standard 13.4)
   d. Preservation of Cultural and Paleontological Resources (Standard 13.5)
   e. Noxious Weed Control (Standard 13.6)
   f. Recycled Materials Quantities (Standard 13.7)
   g. Use of Recovered Material and Biobased Material Products (Standard 13.8)
   h. Disposal of Waste Material (Standard 13.9)
   i. Contractor's Liability for Regulated Material Incidents (Standard 13.10)
   j. Pollutant Spill Prevention, Notification, and Cleanup (Standard 13.11)
   k. Pesticides (Standard 13.12)
   l. Treated Wood Utility Poles and Crossarms Recycling or Disposal (Standard 13.13)
   m. Prevention of Air Pollution (Standard 13.14)
   n. Prevention of Water Pollution (Standard 13.17)
   o. Conservation of Biological Resources (Standard 13.20)

B. SPECIAL REQUIREMENTS

In addition to the requirements of Standard 13, the following special conditions shall apply:

1. AIR QUALITY:

   a. Contractor shall minimize land disturbance. At all proposed work areas, the Contractor shall limit the mechanical disturbance of previously undisturbed areas (including soils) to the greatest extent practicable. In new impact areas, the Contractor shall limit the mechanical disturbance to the greatest extent practicable.

   b. Machinery Air Emissions: The Contractor and Sub-contractor machinery shall have, and shall use, the air emissions control devices required by Federal, State, or local regulation or ordinance.

   c. Dust abatement: The Contractor shall implement BMP's (Best Management Practices) to minimize dust at the construction site. The Contractor shall follow suggested dust control methods listed by Yuma County Environmental Programs Division. Refer to: http://www.yumacountyaz.gov/departments-and-services/development-services/divisions/environmental-programs/air-quality

   d. Oil shall not be used as a dust suppressant. Dust suppressants shall be approved by the COR prior to use.

(1) Contractor shall minimize standing water within desert shrub-land habitat. The Contractor shall use the minimal amount of water needed to meet safety and air quality standards in order to prevent the formation of puddles that could attract wildlife to construction sites.

e. Speed:

(1) The Contractor shall limit speeds to 25-miles-per-hour on stabilized unpaved roads, and lower it if dust emissions are visible.

f. The Contractor shall cover trucks when hauling soil.

g. The Contractor shall minimize soil track-out.

h. The Contractor shall stabilize the surface of soil piles.

i. The Contractor shall create windbreaks in areas highly susceptible to fugitive dust.

j. The Contractor shall re-vegetate any disturbed land not used.

k. The Contractor shall remove unused material.

2. CULTURAL:

Requires that, in the event that archaeological resources or human remains are discovered during construction of the project, all activities must cease in the immediate vicinity of the discovery, and the COR must be immediately notified. Work shall not resume until the COR has indicated in writing that the work may proceed.

3. BIOLOGY:

a. Co-ordination for Pre-construction Surveys and Avoidance.

(1) The Contractor shall provide a Construction Schedule to Western a minimum of two-weeks in advance. Western will use this to schedule a pre-construction biological survey no more than two-days in advance of any ground- or vegetation-disturbing activities in any location, due to the possibility that special-status species (Burrowing Owls) and nesting birds may be found in the project area.

(2) The Contractor shall co-ordinate with the COR on identifying planned or on-going activities, and any specific pre-construction survey needs.

(3) The Contractor shall not conduct any ground- or vegetation-disturbing activities until Western conducts a pre-construction biological survey.

(4) The Contractor shall avoid any active bird nests and buffer areas, as established by Western's Biological Monitor.

b. Contractor personnel shall attend a Western-led employee training session to ensure that all field workers at the project site are aware of all applicable conservation measures for biological resources. During the training, Western's instructor will briefly discuss special-status species that may occur in the work areas, their habitats, and requirements to avoid or minimize impacts. In addition, all workers will be informed of the civil and criminal penalties for violations of the Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act.

c. The Contractor shall not bring pets to the jobsite.

d. The Contractor shall not feed, harm, approach, harass, or handle wildlife.

e. The Contractor shall place all trash and food materials in vehicles or closed refuse bins while on the site, and regularly remove bins from the site (at least on a weekly basis) for proper disposal. All refuse from project activities shall be removed from each worksite upon completion of maintenance work. Raw cement, concrete, or washings thereof, asphalt, paint, oil, solvents, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, shall not be disposed of on-site or allowed to spill onto soil. Clean-up of any spilled material shall begin immediately.

f. The Contractor shall securely cover all water containers (i.e. tanks or trailers) to prevent wildlife from entering the containers and becoming trapped.

g. The Contractor shall securely cover all excavations, or provide an escape ramp at 2:1 slope, while construction activities are not taking place (i.e. overnight) to prevent wildlife from falling in and becoming trapped.

h. The Contractor shall minimize any potential electrocution hazard for Golden Eagles or other large birds, by separating energized and ground conductors and hardware by 60-inches or more, or adding covers.

4. NOISE:

The Contractor shall co-ordinate construction activities with landowners, including notification of the Construction Schedule and planned activities.

5. COMPLIANCE:

a. Treated wood utility poles and crossarms recycling consumer information sheet receipt:

(1) Submit treated wood utility poles and crossarms consumer information sheet receipts to the COR prior to submittal of the final invoice (see Standard 13.13., “Treated Wood Utility Poles and Crossarms Recycling or Disposal”). Final payment will be withheld until this submittal is received.

6. WATER POLLUTION PREVENTION:

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

b. The Contractor shall obtain a Stormwater Construction General Permit, and be responsible for the preparation and implementation of the associated Storm Water Pollution Prevention Plan (SWPPP). A Stormwater Construction General Permit shall be obtained from the Arizona Department of Environmental Quality (ADEQ), as appropriate, if the disturbed construction area equals one-acre or more. Disturbed areas include staging, parking, fueling, stockpiling, and any other construction related activities. The Contractor shall submit to ADEQ a Notice of Intent Application and appropriate fees (depending on total surface area disturbed). Refer to: http://www.azdeq.gov/environ/water/permits/cgp.html for directions and forms.

c. If a General Permit is required, then the Contractor must develop and implement a SWPPP that satisfies the conditions of the permit. The SWPPP shall be kept on-site during the construction activities. The SWPPP is site specific, and shall meet the following conditions listed below:

(1) Identifies potential sources of stormwater pollution at the construction site.

(2) Describes practices to reduce pollutants in stormwater discharges from the construction site. Reduction of pollutants is often achieved by controlling the volume of stormwater run-off (e.g., taking steps to allow stormwater to infiltrate into the soil).

(3) Identifies procedures the operator will implement to comply with the terms and conditions of a construction General Permit.

d. A de-watering permit is obtained from the appropriate agency, if required for construction de-watering activities.

e. Copies of permits and plans, approved by the appropriate regulating agencies, shall be submitted to the COR 14-days prior to the start of work.

7. IDENTIFICATION OF NEW WORK AREAS – ENVIRONMENTAL REVIEWS:

a. Borrow Sources:

(1) The Contractor shall notify the COR of the borrow source location prior to excavating or obtaining materials. Contractor's notice shall include a site map for each borrow location on a USGS 7.5-minute quadrangle map, or better, estimate the area needed, the estimate the amount of fill needed, and identify the landowner and operator. Western will require a minimum of 60-days to perform environmental, biological, and cultural surveys and reviews of the proposed sites, in accordance with the National Environmental Policy Act and the National Historic Preservation Act. If environmental, biological, and cultural surveys were previously performed for a borrow source, the Contractor shall submit documentation to the COR for approval at least 14-days prior to the start of borrow work. Borrow sources certified by the Arizona Department of Transportation usually have such documentation.

b. Laydown Yards:

(1) The Contractor shall notify the COR of a Contractor-proposed laydown location prior to use. Contractor's notice shall include a site map for each location on a USGS 7.5-minute quadrangle map, or better, estimate the area needed, and identify the landowner. Western will require a minimum of 60-days to perform environmental, biological, and cultural surveys and reviews of the proposed site, in accordance with the National Environmental Policy Act and the National Historic Preservation Act. If environmental, biological, and cultural surveys were previously performed for the yard, the Contractor shall submit documentation to the COR for approval at least 14-days prior to use.

Message from the Administrator

At Western, we show our commitment to safety every day through the actions we take, the training we offer and the work conditions we provide. We expect the same commitment to safety from each of our Contractors who provide products or services to Western. In performing work for Western, all Contractors must make the right decisions to ensure that the work environment is as safe as possible.

Our Safety Program is based on four points:

- Safety procedures or common sense must be applied by each Federal and Contract employee. Safety should not be set aside to meet a project schedule or for personal convenience.

- Employees and Contractors must believe that they have the right and the responsibility to identify and take action to reduce, if not eliminate, hazardous work environments and hazardous work practices.

- Managers and Supervisors must lead by example and execute their responsibility to ensure each job is accomplished in a safe and healthy way.

- Safety is a personal responsibility. Each individual makes the decision on what action to take to accomplish a task.

By integrating these principles into every task we take, together we can ensure Western is a safe place to work.

Mark A. Gabriel
Administrator

DEPARTMENT OF ENERGY
UNITED STATES OF AMERICA