

# DESERT SOUTHWEST REGION

## Customer Prepayment Vote Meeting

### Fiscal Year 2019



*Figure 1 Dome Tap-Gila 161-kV Transmission Line Crossing SR95*

**DECEMBER 3, 2019**

**BUREAU OF LAND MANAGEMENT NATIONAL TRAINING CENTER  
9828 N 31<sup>ST</sup> AVENUE  
PHOENIX, AZ 85051**



**Western Area  
Power Administration**

*POWERING THE ENERGY FRONTIER*



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# 1. MEETING AGENDA

Bureau of Land Management, National Training Center

Room Name: New Mexico

Monday, December 3, 2018 | 2 p.m. to 4 p.m. Mountain Standard Time (Arizona)

## WEBEX VIDEO CONFERENCING AND CALL-IN NUMBER:

- To access the WebEx please click the below link and follow the on-screen prompts

[JOIN THE MEETING](#)

**Meeting number:** 902 522 465

**Meeting password:** euhPbzxm

- To join the conference call, please dial (415)-527-5035. When prompted, enter conference code number 902 522 465 and then enter #.

## OBJECTIVES:

- Present proposed prepayment projects for funding approval
- Report on completed and active prepayment projects

## AGENDA:

- Welcome and Introduction
- Review completed prepayment projects
- Overview of active prepayment project financials
- Review proposed prepayment projects
  - Bouse-Kofa 161-kV rebuild
  - Gila-Dome Tap 161-kV rebuild
  - Kofa-Dome Tap 161-kV rebuild
  - Coolidge-Valley Farms 115-kV rebuild
- Prepayment vote
- 10-Year Plan Next Steps
  - December 10, 2018** WAPA Wide 10-Year Plan Meeting (Denver, CO)
  - March, 2018** DSW Quarterly Parker-Davis & Intertie 10-Year Plan Meeting





## 2. TABLE OF ACRONYMS

ACSR.....	ALUMINUM CONDUCTOR STEEL REINFORCED
ACSS.....	ALUMINUM CONDUCTOR STEEL SUPPORTED
APS.....	ARIZONA PUBLIC SERVICE
AOA.....	ANALYSIS OF ALTERNATIVES
BES.....	BULK ELECTRIC SYSTEM
BOR.....	BUREAU OF RECLAMATION
BSE.....	BOUSE SUBSTATION
CAP.....	CENTRAL ARIZONA PROJECT
CPC.....	CAPITAL PLANNING COMMITTEE
CTC.....	CUSTOMER TECHNICAL COMMITTEE
CX.....	CATEGORICAL EXCLUSION
CIP.....	CRITICAL INFRASTRUCTURE PROTECTION
DOE.....	DEPARTMENT OF ENERGY
DSW.....	DESERT SOUTHWEST REGION
EA.....	ENVIRONMENTAL ASSESSMENT
E&OC.....	ENGINEERING & OPERATING COMMITTEE
EVM.....	EARNED VALUE MANAGEMENT
GFE.....	GOVERNMENT FURNISHED EQUIPMENT
IDC.....	INTEREST DURING CONSTRUCTION
IDIQ.....	INDEFINITE DELIVERY/INDEFINITE QUANTITY
JPA.....	JOINT PLANNING AGREEMENT
KCMIL.....	THOUSANDS CIRCULAR MILS
KV.....	THOUSAND VOLTS
MDCC.....	MAINTENANCE DESIGN CONSTRUCTION COMMITTEE
MVA.....	MEGA VOLT AMP
NEPA.....	NATIONAL ENVIRONMENTAL POLICY ACT
NERC.....	NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
NESC.....	NATIONAL ELECTRICAL SAFETY CODE
NHPA.....	NATIONAL HISTORIC PRESERVATION ACT
NRHP.....	NATIONAL REGISTER OF HISTORIC PLACES
OGW.....	OVERHEAD GROUND WIRE
O&M.....	OPERATIONS AND MAINTENANCE
OPGW.....	OPTICAL OVERHEAD GROUND WIRE
OGW.....	OVERHEAD GROUND WIRE
PCB.....	POLYCHLORINATED BIPHENYL
P-DP.....	PARKER-DAVIS PROJECT
USDA.....	UNITED STATES DEPARTMENT OF AGRICULTURE
RFP.....	REQUEST FOR PROPOSAL
ROM.....	ROUGH ORDER OF MAGNITUDE COST ESTIMATE
ROW.....	RIGHT-OF-WAY
SCE.....	SOUTHERN CALIFORNIA EDISON
TEP.....	TUCSON ELECTRIC POWER
TYP.....	10-YEAR PLAN
WAPA.....	WESTERN AREA POWER ADMINISTRATION

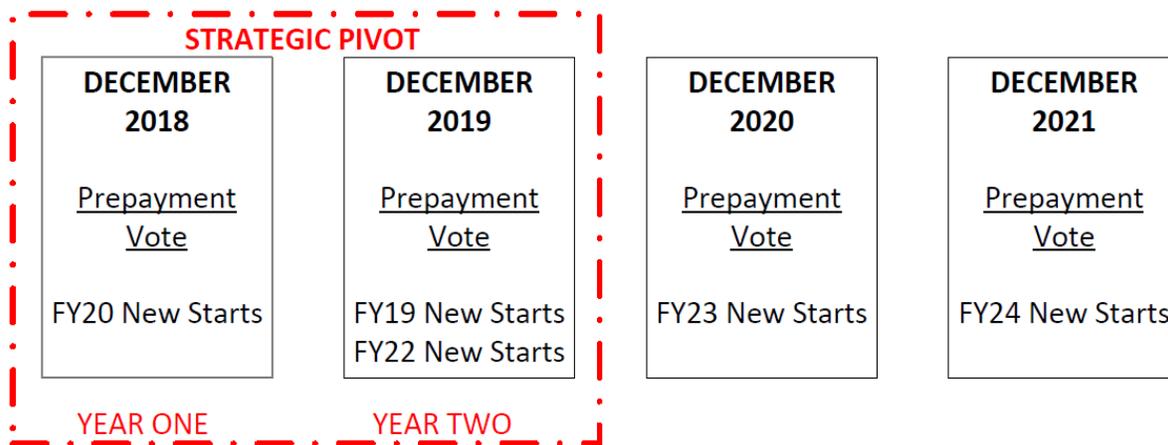




## 3. PIVOT STRATEGY OVERVIEW

### 3.1 What Is The 10-Year Plan Pivot?

The pivot is a strategic one-time shift in the 10-Year Plan process that requires simultaneous approval of multiple upcoming capital improvement projects. The pivot will span two 10-Year Plan cycles (two calendar years) and incorporate simultaneous prepayment funding approvals across fiscal year 2019 - 2022. A successful pivot will conclude in December 2019 at the Prepayment Vote Meeting. Upon Completion, the 10-Year Plan will be in alignment with the Government's Budget Formulation Process such that prepayment funding will be approved two years in advance of the start of new projects.



*Pivot strategy - Prepayment Vote Schedule Four Year Look Ahead*

### 3.2 Why Do We Need to Pivot?

The Federal Government Budget Formulation process begins two fiscal years prior to the execution year (current year). Historically, conducting the prepayment funding vote in the same year as the proposed construction start creates inconsistencies and unpredictability in the execution of DSW's annual budget, which is formulated two years prior. The result is last minute modifications to resource allocations in order to compensate for budgetary swings. Historically the two year grace period between budget formulation and prepayment funding approval was prone to changes and fluctuation due to competing priorities and uncertainty of approved prepayment funding. By aligning the customer prepayment vote with the budget formulation process, DSW can improve accuracy, consistency, and predictability in its budget formulation and execution. Aligning capital planning with budget formulation is imperative to the success of the 10-Year Plan.

### 3.3 Customer Benefits

As a result of a successful pivot, the customers will gain additional input into Analysis of Alternatives (AOA) study prioritization, planning, and results. Previously the AOAs were being performed concurrent with budget formulation processes, such that opportunities for customer input/engagement were limited. The strategic plan to pivot will provide customers with capital planning information in advance of budget formulation, therefore allowing sufficient time for WAPA to develop diverse, viable, and economical investment alternatives for customer consideration.



## 4. COMPLETED PREPAYMENT PROJECTS

### 4.1 Tucson Substation Rebuild

**Power System:** Parker-Davis Project

Originally constructed in 1951, the Tucson Substation facilities and equipment were found to be well beyond expected service life. Due to the risk posed by the age and condition of the yard, WAPA's customers voted to approve funding that allowed for a new facility to be constructed adjacent to the existing yard. The principal components of the project included: the demolition of an existing warehouse and pump house, construction of a new three-breaker ring bus with two 115-kV bays spaced to 230-kV standards, a new control building, and three (3) new approach spans. All work has now been completed and project is in the financial closeout phase.

Funding Type	Original Budget	Budget Adjustments	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 7,000,000	\$ -	\$ 7,000,000	\$ 7,266,475	\$ (266,475)
Appropriations	\$ -	\$ 1,905,827	\$ 1,905,827	\$ 1,905,827	\$ -
<b>TOTAL</b>	<b>\$ 7,000,000</b>	<b>\$ 1,905,827</b>	<b>\$ 8,905,827</b>	<b>\$ 9,172,302</b>	<b>\$ (266,475)</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*

### 4.2 Mesa Substation Remediation

**Power System:** Parker-Davis Project

The 9.22 acre Mesa substation site entered the Arizona Department of Environmental Quality (ADEQ) Voluntary Remediation Program (VRP) in 2012. The substation, which has long-since been decommissioned, is now located in a relatively populated residential area. As an initial step to comply with the VRP, WAPA contracted out a remedial work plan that was approved by ADEQ in summer 2014. The ultimate goal of the remediation effort is to return the site to residential standards, for potential disposal of the property through the Government Services Administration (GSA).

The demolition and remediation was completed on July 21, 2017. All yard equipment, including support structures, buildings, concrete foundations, and underground oil piping that were left in place have now been fully removed from the site. In the event the property is sold, the revenue realized for the property will be determined. Should land be disposed of, WAPA has inquired about possible land swap options and will continue to seek a land disposal option that maximizes the benefit to the Parker-Davis Project.

All work has now been completed and project is in the financial closeout phase.

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2016	Budget Adjustments Fiscal Year 2018	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 1,025,000	\$ 2,510,000	\$ (1,379,481)	\$ 2,155,519	\$ 566,978	\$ 1,588,541
Appropriations	\$ -		\$ 1,379,481	\$ 1,343,263	\$ 1,343,263	\$ -
<b>TOTAL</b>	<b>\$ 1,025,000</b>	<b>\$ 2,510,000</b>	<b>\$ -</b>	<b>\$ 3,498,782</b>	<b>\$ 1,910,241</b>	<b>\$ 1,588,541</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*



### 4.3 Gila-Knob 161-kV Rebuild

**Power System:** Parker-Davis Project

Located near the Arizona Public Service’s (APS) North Gila Substation and includes the removal and disposal of existing ACSR conductor, overhead ground wire, and wood pole structures; installation of Government-furnished single and double-circuit steel structures and ACCR conductor; and providing ACSS conductor, optical ground wire (OPGW), and insulator assemblies as part of the 230-kV rebuild of the Gila-Knob 161-kV Transmission Line from structures 4/9 through 5/2. The project includes reattaching existing conductor and overhead ground wire (OGW), moving OGW at structure 4/8 and adding signs at structure 4/6. Two circuits of ACCR Martin conductors and one OPGW will be installed between structures 4/9L and 4/10L; and 4/9R and 4/10R under the APS 500-kV approach spans and shall be completed with the lines energized.

All work has now been completed and project is in the financial closeout phase.

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2017	Budget Adjustments Fiscal Year 2018	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 2,000,000	\$ 2,030,573	\$ (1,302,415)	\$ 2,728,158	\$ 1,577,052	\$ 1,151,106
Appropriations	\$ -	\$ 647,960	\$ 1,302,415	\$ 1,950,375	\$ 1,950,375	\$ -
<b>TOTAL</b>	<b>\$ 2,000,000</b>	<b>\$ 2,678,533</b>	<b>\$ -</b>	<b>\$ 4,678,533</b>	<b>\$ 3,527,427</b>	<b>\$ 1,151,106</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*

### 4.4 Parker-Headgate Rock & Parker-Bouse 161-kV Rebuild (CANCELED)

**Power System:** Parker-Davis Project

Transmission line re-build project consisted of replacing the existing line from Parker substation to Headgate Rock substation (part of the Parker to Blythe system) and partial rebuild from Parker substation to Bouse substation (part of the Parker to Gila system). The rebuild was replace the existing wood pole structures with steel structures. A majority of the transmission line structures are showing signs of advanced degradation or have far surpassed the recommended life cycle.

WAPA is pursuing the Bouse Upgrade Project as an alternative to the canceled Parker-Headgate Rock & Parker-Bouse 161-kV Rebuild Project. The details of the project cancelation and the proposed Bouse Upgrade Project were discussed on Thursday, June 7, 2018 in a Special Working Session Customer meeting. Those meeting materials are available here:

<https://www.wapa.gov/regions/DSW/Pages/10-year-capital-program.aspx>

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2016	Budget Adjustments Fiscal Year 2018	Budget Adjustments Fiscal Year 2019	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 17,954,000	\$ (334,176)	\$ (384,730)	\$ (16,704,185)	\$ 530,909	\$ 530,910	\$ -
Appropriations	\$ -	\$ 334,176	\$ 384,888	\$ 0	\$ 719,064	\$ 719,064	\$ -
<b>TOTAL</b>	<b>\$ 17,954,000</b>	<b>\$ -</b>	<b>\$ 158</b>	<b>\$ (16,704,185)</b>	<b>\$ 1,249,973</b>	<b>\$ 1,249,974</b>	<b>\$ -</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*





## 5. ACTIVE PREPAYMENT PROJECTS

### 5.1 Gila Substation 161-kV Rebuild

**Power System:** Parker-Davis Project

The Gila Substation (161-kV, 69-kV, 34.5-kV and 4.16-kV) was originally constructed in 1949. Many components in the yards present safety risks to equipment and personnel. The lack of proper spacing and clearance distances is forcing WAPA to take outages to conduct routine maintenance work in its current configuration. The rebuild of the 161-kV yard to current standards will increase worker safety, lessen the possibility of equipment flashover and failure, while eliminating outages to conduct routine maintenance work.

The Gila Substation Rebuild Project was initiated in 2013 and since inception, numerous vital design changes were necessitated to ensure the reliability of present and future customer's needs. This project will completely rebuild the Gila 161-kV Substation. The new yard will be built to 230-kV standards, operated at 161-kV. The rebuild of the 161-kV substation will increase reliability and will also replace aged components that have become unreliable and a detriment to the WAPA System. In addition, a new control building will be constructed to accommodate all needs for the substation. The existing 161-kV yard will be demolished once the new 161-kV system is operational to create space for the future reconstruction of the 69-kV and 34.5-kV yards.

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2016	Budget Adjustments Fiscal Year 2017	Budget Adjustments Fiscal Year 2018	Budget Adjustments Fiscal Year 2019	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 12,000,000	\$ (1,075,597)	\$ 6,299,184	\$ (111,826)	\$ (758,880)	\$ 16,352,881	\$ 14,972,611	\$ 1,380,270
Appropriations	\$ -	\$ 1,075,597	\$ 684,633	\$ 111,826	\$ 758,880	\$ 2,630,936	\$ 2,630,936	\$ -
<b>TOTAL</b>	<b>\$ 12,000,000</b>	<b>\$ -</b>	<b>\$ 6,983,817</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 18,983,817</b>	<b>\$ 17,603,547</b>	<b>\$ 1,380,270</b>

\*Cost = All executions, obligations, & commitments through 9/30/18

### 5.2 Crossman Peak New Microwave Facility

**Power System:** Parker-Davis Project

The scope of this project includes the construction of a WAPA owned microwave communication site on Crossman Peak, adjacent to an existing non-WAPA communication site. Crossman Peak is located east of Lake Havasu City. The new site will support the primary microwave communications between WAPA's existing Christmas Tree Pass and Metal Mountain communication sites. This project includes land acquisition, equipment shelter, communication tower, backup generator with fuel tanks, a distribution power line for primary power, and an access easement.

Funding Type	Original Budget	Budget Adjustments	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 4,525,000	\$ -	\$ 4,525,000	\$ 1,359,871	\$ 3,165,129
Appropriations	\$ -	\$ -	\$ -	\$ -	\$ -
<b>TOTAL</b>	<b>\$ 4,525,000</b>	<b>\$ -</b>	<b>\$ 4,525,000</b>	<b>\$ 1,359,871</b>	<b>\$ 3,165,129</b>

\*Cost = All executions, obligations, & commitments through 9/30/18





### 5.3 Liberty Series Capacitor Bank Replacement

**Power System:** Intertie Project

The Liberty 345-kV Cap Bank replacement project is currently in the procurement phase. The existing capacitor bank (PU1A) was made by Westinghouse and is rated at 345-kV, 110-MVar, and 850 Amps (508 MVA). This station equipment was commissioned in 1969 and has degraded significantly due to its age. Capacitor Bank award was made in August 2017 and requires a 1 year lead time for delivery. Appropriated funds were delegated to DSW in which WAPA utilized approximately \$3.7 million for the purchase of the capacitor bank.

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2017	Budget Adjustments Fiscal Year 2019	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 10,372,000	\$ (3,776,632)	\$ (1,650,000)	\$ 4,945,368	\$ 1,732,545	\$ 3,212,823
Appropriations	\$ -	\$ 3,776,632	\$ 1,650,000	\$ 5,426,632	\$ 5,426,632	\$ -
<b>TOTAL</b>	<b>\$ 10,372,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 10,372,000</b>	<b>\$ 7,159,177</b>	<b>\$ 3,212,823</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*

### 5.4 Gila-Wellton Mohawk 161-kV Rebuild (I-8 Crossing)

**Power System:** Parker-Davis Project

The Gila-Wellton Mohawk (GLA-WML) 161-kV transmission line rebuild project was initiated at the beginning of FY17 as part of the Seed Funding Pilot Program. WAPA kicked off the project and began design work to rebuild 2.8 miles of the original wood structures along GLA-WML. The line was erected in 1956 and the structures are well beyond the recommended lifespan and rehabilitation efforts are no longer viable. Many of the poles display visual symptoms of advanced external shell rot, along with weathering and large cracks.

During 2017, a majority of the GLA-WML structures were replaced by WAPA maintenance personnel; however, the stretch of transmission line that traverses rugged, mountainous terrain was not replaced. This was due in part because many of the structures have no existing access roads and those that do require significant roadwork for vehicular travel. In conjunction with the rebuild effort, WAPA will reestablish access roads where economically feasible to reduce the potential for helicopter only access. In addition, overhead optical ground wire will be installed between GLA-WML.

Funding Type	Original Budget	Budget Adjustments Fiscal Year 2018	Current Budget	*Cost To Date	Remaining Funds
Prepayment	\$ 7,520,654	\$ -	\$ 7,520,654	\$ 6,286,369	\$ 1,234,285
Appropriations	\$ -	\$ 277,713	\$ 277,713	\$ 277,713	\$ -
<b>TOTAL</b>	<b>\$ 7,520,654</b>	<b>\$ 277,713</b>	<b>\$ 7,798,367</b>	<b>\$ 6,564,082</b>	<b>\$ 1,234,285</b>

*\*Cost = All executions, obligations, & commitments through 9/30/18*





## 6. PROPOSED PREPAYMENT PROJECTS

### 6.1 Prepayment Voting Ballot

Project Name	Prepayment Vote Amount
Bouse-Kofa 161-kV Rebuild	\$26,520,000
Gila-Dome Tap 161-kV Rebuild	\$7,130,000
Kofa-Dome Tap 161-kV Rebuild	\$4,830,000
Coolidge-Valley Farms 115-kV Rebuild	\$1,505,000
<b>TOTAL PREPAYMENT VOTE PACKAGE</b>	<b>\$39,985,000</b>

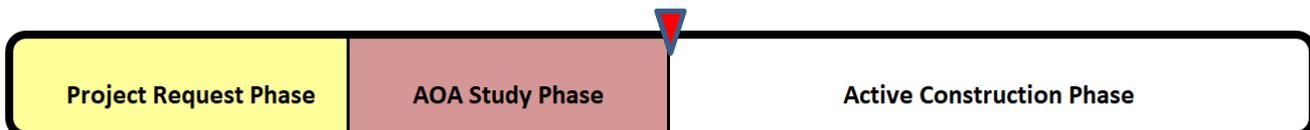
### 6.2 Prepayment Funding Sources & Uses

Fiscal Year	Action	Project Name	Sources	Uses
13	Cancel	Parker-Headgate Rock & Parker Bouse 161-kV Rebuild	\$16,704,185	
14	Reprogram	Gila Substation 161-kV Rebuild	\$758,880	
16	Reprogram	Liberty Series Capacitor Bank	\$1,650,000	
19	Proposed	Bouse-Kofa 161-kV Rebuild Phase 1 & 2		\$26,520,000
19	Proposed	Gila-Dome Tap 161-kV Rebuild		\$7,130,000
19	Proposed	Kofa-Dome Tap 161-kV Rebuild		\$4,830,000
19	Proposed	Coolidge-Valley Farms 115-kV Rebuild		\$1,505,000
<b>NEW PREPAYMENT FUNDING NEEDED</b>			<b>\$20,871,935</b>	
<b>FY19 PREPAYMENT</b>			<b>\$39,985,000</b>	<b>\$39,985,000</b>

### 6.3 Bouse-Kofa 161-kV Rebuild (Pivot Project)

#### Pivot Strategy

DSW’s 10-Year Plan pivot strategy requires the full funding of the Bouse-Kofa 161-kV rebuild effort, which includes two separate construction project efforts, phases 1 and 2, respectively, in December of 2018. This funding requirement is necessary to achieve the goal of aligning the 10-Year Plan with the budget formulation process. Although the project will not be subject to the seed funding mechanism, partially funding the preliminary design effort, the customers will still be updated on the revalidated scope, schedule, and cost estimate at the completion of year one, when the design package is 50-75% complete.





### Background

The Bouse (BSE) to Kofa (KOF) 161-kV transmission line is a single circuit, 84.3 mile line segment of the overall Parker-Gila 161-kV Transmission Line originally built in 1943.

The BSE-KOF line is located in western Arizona running south from Bouse substation to Kofa substation. Bouse substation is located just north of the junction of AZ Highways 72 and 95 in La Paz county. Kofa substation is located approximately 16 miles northeast of the city of Yuma in Yuma County. The terrain along the line is mostly low desert with multiple wash crossings and low rises. Toward the south end of the transmission line the terrain becomes more mountainous across the Castle Dome Mountains near Dome Tap.

The line was originally 78.9 miles long, constructed with three 300 kcmil hollow core copper conductors (Anaconda R178R2). Most of the wood H-Frame structures have been replaced with light-duty steel H-Frame structures, and only 82 wood structures remain. In 2006 a portion of the line was rerouted around the town of Quartzsite. The reroute replaced 3.3 miles of the existing line through Quartzsite with 8.4 miles of three 954 kcmil ACSR conductors supported on single circuit steel monopoles.



*Figure 2 Bouse-Kofa Existing Wood H-Frame Structure, February 2018*

### Project Justification

An Analysis of Alternatives (AOA) Study was performed in 2017 to identify various performance gaps and deficiencies associated with this line segment and to identify viable, diverse, and economical alternatives.



#### Performance gaps and deficiencies:

- NERC/NESC violations have been identified and need to be corrected
- Noted deterioration and unsafe structures are significant
- Access road(s) and right-of-way availability and conditions are sub-par
- Install fiber optic ground wire to meet current and future protection, control, communication, and security requirements

#### NERC/NESC Violations:

NERC requires all transmission line owners/operators to perform a Facility Rating Analysis of all transmission lines over 100-kV in order to determine the as-built condition and de-rate the line to that condition, or to mitigate the condition to achieve the design rating. There are 106 cases of phase-to-ground clearances and one phase-to-OGW of a crossing line clearance not meeting the minimum clearance required by the National Electrical Safety Code (NESC) and NERC.

#### Transmission Line Conditions:

There are 17 structures identified by maintenance forces as needing replacement with more expected when detailed ground inspection is completed.

#### Access Roads and ROW:

According to maintenance field inspection reports, there are numerous cases of access roads and right-of-way paths requiring improvement to facilitate construction and maintenance activities. In some cases access roads need to be created. A lack of prompt access for appropriate resources presents reliability, safety, and cost risks.

#### Communications Requirements:

Installing Optical Overhead Ground Wire (OPGW) provides an alternate and physically independent path for protection, control, and communication. Currently microwave provides the only communication path and the addition of an OPGW will allow for the future communication bandwidth needs to be met. Those needs include security, which is currently in the process of installing live feed video cameras and IT networks at substations. The addition of these systems will tax and soon bypass the current communications bandwidth provided by microwave.

#### Alternatives Studied

There were a total of five alternatives that were explored to provide a diverse range of viable, economically feasible design options. The feasibility/value of these alternatives was explored in regards to Compliance, Reliability and Economy. A detailed breakdown of each alternative can be found below.

- Alternative 1- Status Quo (Maintenance only)
- Alternative 2- Re-conductor and replace failing wood poles in-kind
- Alternative 3- Re-conductor and replace remaining wood structures with light-duty steel H-frame structures
- Alternative 4- Rebuild to 230-kV Standards operated at 161-kV using light-duty steel H-Frame structures
- Alternative 5- Inset Structures as needed to mitigate NERC/NESC violations

#### Preferred Alternative: Alternative #3- Rebuild with Light-Duty Steel H-Frame Structures

WAPA will replace 75.6 miles of three 300 kcmil Anaconda hollow core copper conductors with three 336.4 kcmil Oriole ACSS conductors, replace one steel OGW with OPGW, and install light-duty steel H-frame structures to replace the 82 wood structures left in the line segment. New light-duty steel H-frame steel structures will be installed as needed to correct clearance issues not corrected by stringing new ACSS conductor. Access roads will be improved as needed to facilitate construction.





Conceptual Project Estimate

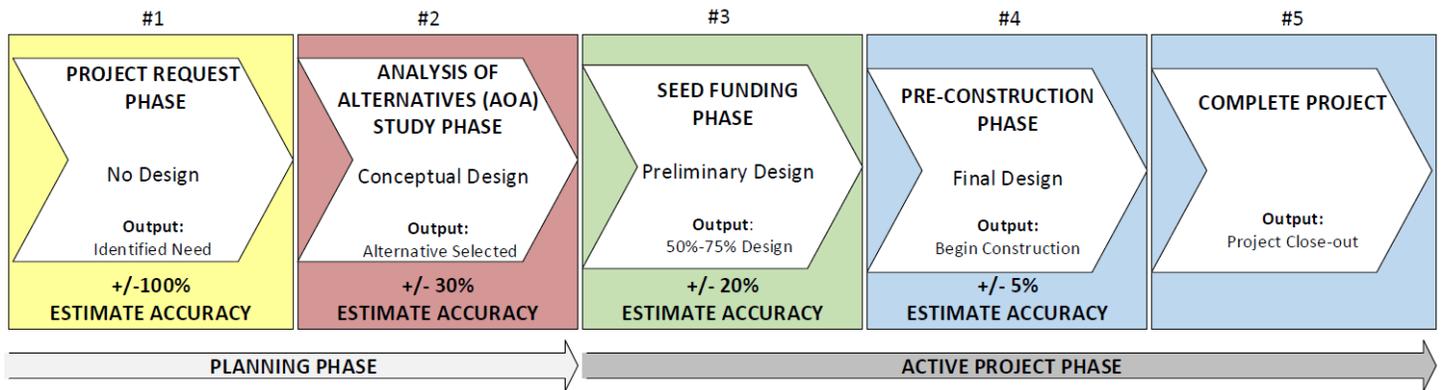


Figure 4 Project Life Cycle with Estimate Accuracy Progression

The below estimate was developed in the AOA study phase and is considered a conceptual design estimate. The \$26,520,000 is the total estimated cost for the entire line segment, BSE to KOF. The BSE-KOF transmission line segment will be designed in its entirety from terminal end to terminal end. However, at the completion of design the line will be bifurcated into two separate project phases. The final design will determine the actual phasing split in terms of transmission line miles per phase. Each phase will be constructed as separate construction projects, each with its own budget reflective of the total line miles and degree of effort in that phase.

Funding Type	Project Estimate [A]	Seed Funds Applied [B]	Remaining Funds Required [C]
Prepayments	\$26,520,000	*\$0	\$26,520,000
Appropriations	\$0	*\$0	\$0
<b>TOTAL</b>	<b>\$26,520,000</b>	<b>*\$0</b>	<b>\$26,520,000</b>

\*Critical to the success of the 10-Year Plan pivot, phase 1 and 2 of the project must be fully approved in the prepayment vote

Cost Category	Project Phase 1 [A]	Project Phase 2 [B]	Total [C]	% of Budget
Administrative	\$305,000	\$305,000	\$610,000	2%
Earned Value Management (EVM)	\$0	\$0	\$0	0%
Design	\$150,000	\$150,000	\$300,000	1%
Environmental	\$295,000	\$295,000	\$590,000	2%
Land and Land Rights	\$155,000	\$155,000	\$310,000	1%
Government Furnished Equipment (GFE)	\$2,030,000	\$2,030,000	\$4,060,000	16%
Construction	\$9,545,000	\$9,545,000	\$19,090,000	76%
Commissioning Activity	\$150,000	\$150,000	\$300,000	1%
<b>Subtotal</b>	<b>\$12,630,000</b>	<b>\$12,630,000</b>	<b>\$25,260,000</b>	
Management Reserve (5%)	\$630,000	\$630,000	\$1,260,000	
<b>TOTAL</b>	<b>\$13,260,000</b>	<b>\$13,260,000</b>	<b>\$26,520,000</b>	

[A]+[B] = [C]

\*Total Project Budget reflects current market value to salvage the existing copper conductor and related hardware.





### Conceptual Project Phasing

For the purposes of planning in advance of the final design, DSW has split the total line segment budget in half to create place holders for each individual project phase. The budget estimate for each individual phase will be updated once the preliminary design is completed at the end of year one of the project. The project phases will be staggered by one year to aid in optimal constructability around outage windows. As a result the completion of each project phase will also be staggered by one or more years such that the cumulative rate impact of the entire line segment is minimized.

### Conceptual Schedule Milestones

Conceptual Schedule Milestones	Project Phase 1	Project Phase 2
75% Design Package	September 2019	September 2019
Begin Construction	November 2020	November 2021
Complete Construction	April 2022	April 2023
Financial Closeout	October 2022	October 2023

### Conceptual Phase 1 Scope

Design and construct 31.25 miles of 161-kV transmission line from structure 70-2 to Kofa Substation. Design includes replacing 43 wood structures, and selecting a new conductor that can be installed on existing and new light-duty steel H-Frame structures to eliminate NERC/NESC violations to the extent possible. It is anticipated some existing light-duty steel H-Frame structures will be replaced with taller structures. Preliminary design will analyze installing steel dead-end structures every 5 to 10 miles to prevent cascading failure.

### Conceptual Phase 2 Scope

Design and construct 44.25 miles of 161-kV transmission line from Bouse Substation to structure 70-2. Design includes replacing 40 wood structures, and selecting a new conductor that can be installed on existing and new light-duty steel H-Frame structures to eliminate NERC/NESC violations to the extent possible. It is anticipated some existing light-duty steel H-Frame structures will be replaced with taller structures. Preliminary design will analyze installing steel dead-end structures every 5 to 10 miles to prevent cascading failure.





Figure 3 Bouse-Kofa Conceptual Project Phasing Map





## 6.4 Gila-Dome Tap 161-kV Rebuild



Funding Type	Project Estimate [A]	Seed Funds Applied [B]	Remaining Funds Required [C]
Prepayments	\$7,630,000	\$0	\$7,130,000
Appropriations	\$0	\$500,000	\$0
<b>TOTAL</b>	<b>\$7,630,000</b>	<b>\$500,000</b>	<b>\$7,130,000</b>

[A]-[B] = [C]

Cost Category	Project Budget	Percent of Budget
Administrative	\$540,000	7%
Earned Value Management (EVM)	\$0	0%
Design	\$180,000	2%
Environmental	\$130,000	2%
Land and Land Rights	\$180,000	2%
Government Furnished Equipment (GFE)	\$1,470,000	20%
Construction	\$4,730,00	65%
Commissioning Activity	\$30,000	0%
<b>Subtotal</b>	<b>\$7,260,000</b>	
Management Reserve (5%)	\$370,000	
<b>TOTAL PROJECT BUDGET</b>	<b>\$7,630,000</b>	

Gila (GLA) to Dome Tap (DME) is a single circuit, 7.6 mile, 161-kV transmission line segment of the overall Parker-Gila 161-kV line built in 1943. The line runs through agricultural, residential, and commercial property as well as hills and flat low desert terrain. The northern line section crosses Highway 95, the Union Pacific Railroad, and the Wellton Mohawk Canal.

Originally constructed with wood H-frame structures, maintenance activities have replaced all but 16 of the structures with light-duty steel. Ten NESC/NERC violations have been identified along the 300 kcmil hollow core copper conductor.

Project Scope (Based on 75% design package):

- Replace 7.6 miles of 300 KCMIL hollow core copper conductors with 336.4 kcmil ACSS conductors
- Install light-duty steel H-frame structures, replacing the remaining 17 wood structures on the line
- Three Light-duty steel structures will be replaced with new taller structures to rectify NESC/NERC clearance issues
- Replace one steel OGW in-kind
- Upgrade one steel OGW to OPGW to improve communications
- Replace all insulators and hardware
- Clear ROW access roads and pads
- Replace two take-off structures inside Dome-Tap substation





### Conceptual Schedule Milestones

- Prepayment Customer Vote: December 2018
- 100% Design Package: March 2019
- Begin Construction: November 2019
- Complete Construction: May 2020
- Financial Closeout: November 2020





## 6.5 Kofa-Dome Tap 161-kV Rebuild



Funding Type	Project Estimate [A]	Seed Funds Applied [B]	Remaining Funds Required [C]
Prepayments	\$5,330,000	\$0	\$4,830,000
Appropriations	\$0	\$500,000	\$0
<b>TOTAL</b>	<b>\$5,330,000</b>	<b>\$500,000</b>	<b>\$4,830,000</b>

[A]-[B] = [C]

Cost Category	Project Budget	Percent of Budget
Administrative	\$480,000	9%
Earned Value Management (EVM)	\$0	0%
Design	\$180,000	4%
Environmental	\$130,000	3%
Land and Land Rights	\$30,000	1%
Government Furnished Equipment (GFE)	\$320,000	6%
Construction	\$3,750,000	74%
Commissioning Activity	\$190,000	4%
<b>Subtotal</b>	<b>\$5,080,000</b>	
Management Reserve (5%)	\$250,000	
<b>TOTAL PROJECT BUDGET</b>	<b>\$5,330,000</b>	

Kofa (KOF) to Dome Tap(DME) is a single-circuit, 7.3-mile, 161-kV transmission line segment along the Parker-Gila 161-kV line built in 1943. The KOF-DME Transmission Line is located in western Arizona running south from the Kofa substation to the Dome Tap substation. The line was originally constructed with 300 kcmil hollow-core-copper conductor. Most of the wood H-Frame structures have been replaced with light-duty steel H-Frame structures, and only seven wood structures remain in service.

WAPA will replace existing copper conductor with 336.4 kcmil ACSS conductor, replace one steel overhead ground wire (OGW) with an optical overhead ground wire (OPGW), and install light-duty steel H-frame structures to replace the seven wood structures remaining in the line segment. WAPA will also install new light-duty steel H-frame steel structures as needed to correct NESC/NESC clearance issues not corrected by stringing new ACSS conductor. Access roads will be improved as needed.





Project Scope (Based on 75% design package):

- Replace 7.3 miles of 300 kcmil copper conductor with 336.4 kcmil ACSS conductor
- Replace remaining wood pole structures with light-duty steel structures
- Replace one steel OGW in-kind
- Upgrade one steel OGW to OPGW to improve communications
- Replace all insulators and hardware
- Correct all NESC clearance violations
- Replace both structures inside Dome-Tap substation
- Clear ROW access roads and pads as required for construction and maintenance

Conceptual Schedule Milestones

- Prepayment Customer Vote: December 2018
- 100% Design Package: March 2019
- Begin Construction: November 2020
- Complete Construction: May 2021
- Financial Closeout: November 2021





## 6.6 Coolidge-Valley Farms 115-kV Rebuild



Funding Type	Project Estimate [A]	Seed Funds Applied [B]	Remaining Funds Required [C]
Prepayments	\$2,305,000	\$800,000	\$1,505,000
*Appropriations	\$1,045,000	\$0	\$0
<b>TOTAL</b>	<b>\$3,350,000</b>	<b>\$800,000</b>	<b>\$1,505,000</b>

\*WAPA DSW was notified in late October that Appropriations are available for Fiscal Year 2019, reducing the amount of Prepayment funds required.

Cost Category	Project Budget	Percent of Budget
Administrative	\$240,000	8%
Earned Value Management (EVM)	\$0	0%
Design	\$200,000	6%
Environmental	\$210,000	7%
Land and Land Rights	\$70,000	2%
Government Furnished Equipment (GFE)	\$110,000	3%
Construction	\$2,220,000	70%
Commissioning Activity	\$130,000	4%
<b>Subtotal</b>	<b>\$3,180,000</b>	
Management Reserve (5%)	\$170,000	
<b>TOTAL PROJECT BUDGET</b>	<b>\$3,350,000*</b>	

\*Total Project Budget reflects current market value to salvage the existing copper conductor and related hardware.

Coolidge to Valley Farms (COL-VAF) is a single circuit, 6.1-mile, 115-kV transmission line segment of the Coolidge to Oracle (COL-ORA) 45-mile transmission line. The existing structures are mainly wood H-frame structures with a 4/0 copper conductor and two overhead ground wires (OGW). The rebuild effort will include the replacement in-kind of existing deteriorated wood pole structures. Replacement of the new wood poles will be located in the same location as the existing poles to avoid environmental and access concerns.

The existing copper conductor rated at 88 MVA will be upgraded to Cardinal 954 kcmil aluminum conductor steel reinforced (ACSR) conductor rated at approximately 180 MVA with the addition of one new overhead optical ground wire (OPGW) and one standard OGW.

The scope also includes minor substation work at the terminal ends of the line to upgrade or replace equipment required to achieve the increased capacity on the conductor. This includes but is not limited to jumper replacements. Work at each substation also includes communication upgrades in the control rooms to land and integrate the new OPGW.





Project Scope (Based on 50% design package):

- Replace 6.1 miles of 4/0 copper conductor with 954 kcmil ACSR conductor and new insulators and hardware
- Replace one steel OGW in-kind
- Upgrade one steel OGW to OPGW to improve communications
- Replace wood structures in-kind where replacements are required or to support the new conductor
- Upgrade deteriorated cross arms assemblies with glue-laminated (glulam) cross-arms
- Install new steel angle, 4" x 3 1/2" x 5/16" x 14'-6" long (pole-to-pole ties) between H-frame structures to support new OPGW and OGW
- Clear ROW access roads and pads as required for construction and maintenance
- Correct all NESC/NERC clearance violations

Conceptual Schedule Milestones

- Prepayment Customer Vote: December 2018
- 100% Design: February 2019
- Begin Construction: October 2019
- Complete Construction: March 2020
- Financial Closeout: October 2020



# 7. 10-YEAR PLAN LOOK AHEAD



## DSW 10-Year Capital Plan Annual Program Cycle Parker-Davis & Intertie Project Customers

Red – Quarterly Customer Meeting  
 Green – Study Activities  
 RRADs – Retirements, Replacements, Additions, & Deletions  
 MDCC- Maintenance, Design, Construction, Committee  
 AOA – Analysis of Alternatives Study  
 WIP – Work in progress

