Title Page

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Proposed Project Title

"Aquifer Storage and Recovery using Reclaimed Water to Preserve the Hueco Bolson through Enhanced Arroyo Infiltration while Creating Wetlands, and Secondarily Reducing Reclaimed Water Demand by Local Power Plant"

Project Proposed for Funding Group I under U. S. Bureau of Reclamation (USBR) Funding Opportunity Announcement No. BOR-DO-17_F003 referred to as "WaterSMART; Development of Feasibility Studies under title XVI, Water Reclamation and Reuse Program, FY 2017"

Project Summary Description:

EPWater proposes to evaluate the feasibility of a comprehensive Aquifer Storage and Recovery (ASR) program using reclaimed wastewater that would be combined with available supplies with conserved reclaimed water from electrical generation for use to recharge the aquifer and contribute to future drinking water supplies. The two sources of reclaimed water have the potential to increase the future available potable water supply by approximately 4,500 to 15,000 acre-feet per year (AFY) at an estimated total cost ranging from approximately $50.00 to $167.00 per AF. Over time, this volume of additional annual water supply could comprise 3 to 10 percent of annual public water demand. Because of the use of arroyo infiltration, the project has the potential to provide approximately 10 to 25 acres of wetland habitat in the dry Chihuahua Desert for the benefit of several listed and endangered species while also potentially reducing the need for an equivalent amount of raw water supply from the U.S. Bureau of Reclamation Rio Grande Project and the Hueco Bolson aquifer.

EPWater is an eligible applicant under this feasibility study program, and the proposed project, with a total cost estimate of $330,000.00 over 17 months is consistent with USBR's purpose and scope. The 17 -month proposed schedule and grant request of $150,000.00 are within USBR's schedule requirements and funding allocation limit of $150,000.00 under Group I of this program. If proven successful at this proposed level of operation, the concept could be expanded to embellish the long-range drought resilience and ground water sustainability program in El Paso. The concept could be expanded to apply to other locations nationally. In particular, the water conservation savings of approximately 25% experienced at the local generating station, could be achieved at other power plants throughout the nation.

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Executive Summary

Date: December 28, 2016
Applicant Name: El Paso Water Utilities Public Service Board
City: El Paso
County: El Paso
State: Texas

Project Summary:

El Paso Water (EPWater) proposes to evaluate a comprehensive program for Aquifer Storage & Recovery (ASR), using treated reclaimed water plus reclaimed water conserved at the El Paso Electric Newman Generating Station. The proposal also calls for investigation into enhanced arroyo infiltration techniques to recharge El Paso's Hueco-Bolson Aquifer, which is a critical resource that is at risk for continued depletion. Further, the study will evaluate the creation of an environmental wetland as well as utilization of secondary membrane treatment techniques to reduce reclaimed water demand currently required by a local power plant thereby expanding available reclaimed waters as part of the project. The project will evaluate further expansion of available reclaimed waters for eventual, additional aquifer injection.

EPWater has been injecting reclaimed water from the Fred Hervey Plant at various locations in Northeast El Paso for approximately 30-years, primarily using deep injection wells which inject the water directly into the Hueco Bolson aquifer. Approximately 15 years ago, EPWater conducted research with the American Waterworks Research Foundation (AWWARF), which concluded that excavated infiltration ponds were a more economical method for recharging the Hueco in terms of both construction and recurring operations and maintenance costs. Since that time, EPWater has constructed a total of four infiltration ponds and reduced its dependency on injection wells, which are more expensive to construct and operate. El Paso Water has learned over the years that proper performance of these infiltration ponds requires periodic drying and scarifying of the ground surface to maintain the desired infiltration rate.

EPWater currently sells approximately 3,500 AFY of Fred Hervey Reclaimed water to El Paso Electric's (EPE's) Newman Station in Northeast El Paso, for use as cooling water for their generators. The usefulness of this water, in terms of the number of cycles permissible through the plant, is limited by the original dissolved solids content and the hardness that is added during each cycle. This cooling water must be discharged to waste when the TDS reaches approximately 6,000 ppm.

In conjunction with the Civil Engineering Department at the University of Texas at El Paso (UTEP), EPWater has conducted numerous meetings with the key staff of El Paso Electric and is confident that inclusion of a large-scale CERRO system within the cooling cycle at Newman Station, would increase the number of cooling cycles for this water at the plant, and thus reduce the overall demand for cooling water. By using the CERRO process at EPE in this manner, preliminary estimates indicate that Newman Station would save approximately 900 AFY, in terms of reclaimed water purchased from EPWater. This 900 AFY of reclaimed water would then be available for recharge by EPWater using the proposed enhanced arroyo infiltration method. This 900 AFY of reclaimed water savings equates to approximately 25% of total plant cooling water demand at Newman Station.

Over the first two to three years of this project, EPWater intends to infiltrate approximately 4,500 AFY of reclaimed water, originating from three sources. These sources include: 1) the 3,000 AFY now available from the Fred Hervey reclaimed flows that is now routinely injected; 2) The estimated 900 AFY in reclaimed water saved from incorporating the CERRO system at the EPE Newman Station; and 3) The approximately 600 AFY in available reclaimed water made available by the upcoming construction of the Fred Hervey Diversion Project, which increases the raw wastewater delivered to the Fred Hervey Plant.

The longer range plan for this project is to use the new, proposed pipeline from the Fred Hervey Plant, to include other source waters for additional Hueco Recharge at the proposed ASR site. These other sources of treated water include desalinated brackish ground water from the Kay Bailey Hutchison (KBH) Desalination Plant, treated wastewaters from the planned Advanced Water Purification Plant, and possibly excess, treated surface waters from the Jonathan Rogers Plant during years of nearly-full allocation. Under these scenarios, the annual volume of water available for this arroyo infiltration project could increase to as much as approximately 15,000 AFY. This larger injection scenario would be implemented to augment EPWater's overall comprehensive aquifer recharge-ground water management program.

The total amortized cost estimate of the project is approximately $30 million, which includes both the amortized cost estimate (over 40 years) of $24 million for the components of the enhanced arroyo infiltration program, plus an estimated $6 million (also over 40-years) for the EPE-CERRO project. Using this total estimated amortized cost of $30 million with an expected 4,500 to 15,000 AFY of water infiltrated, the proposed project cost range estimate is $50.00 to $167.00 per Acre-Foot ($/AF).

Appendix 2 shows a cost comparison of this ASR Alternative with the costs of other alternative source water supplies available to EPWater. The actual, marginal, amortized cost (alone) to inject this project water into the Hueco ranges from $50.00 to approximately $167.00 per AF (depending on the final volume injected) and, as shown, the cost falls between that of producing and treating ground water and surface water. The total full cost for this ASR program, the full cost to treat the wastewater to potable standards, inject it into the aquifer, and pump out later to provide to the public, ranges from approximately $920.00 to $1,040.00 per AF. This higher cost is the full cost for the complete recycling of the water, and falls below the estimated cost to produce water using the Advanced Purified method for treating wastewater to potable standards using membrane and other techniques described in the following section.

This volume of additional, new annual water supply for injection would equate to approximately 1.5 percent of annual public water demand initially, and increase to as much as 10 percent at full build-out and full implementation. In addition, if successful, the project will provide approximately 10 to 25 acres of wetland habitat in the dry Chihuahua Dessert for the benefit of several listed and endangered species and could reduce the need for an equivalent amount of raw water supply from the U.S. Bureau of Reclamation Rio Grande Project and the Hueco and Mesilla groundwater Bolsons combined. In addition, the water conservation savings of approximately 25% experienced at the local generating station, could be achieved at other power plants throughout the nation.

El Paso Water estimates that the entire feasibility study will require approximately 17 months to complete, including all review time required by USBR, for a final completion by October 2018.

Project's Proposed Duration: 17 Months

Estimated Completion Date for Study: November 1, 2018

Background Data

El Paso Water operates the water, wastewater, reclaimed water and stormwater utilities in El Paso, Texas. The entire service territory is located within the El Paso County, and primarily operates within the boundaries of the City of El Paso. EPWater is nationally recognized as a leader in the implementation of water management programs, including water conservation, reclaimed water and water desalination.

The Public Service Board (El Paso Water's governing body) was established in 1952, by City Ordinance No. 752 to completely oversee the management and operations of the water and wastewater system for the City of El Paso. The seven-member board of trustees which make up the Public Service Board consists of the Mayor of the City of El Paso and six El Paso residents, who are appointed by the City Council.

EPWater serves the city of El Paso, located in El Paso County, Texas. Figure 1 below shows the geographical location. Interstate 10 crosses the city of El Paso from West to East.

Figure 1 – Location of EPWater (El Paso, Texas)

The sources of water for EPWater are variable, as shown below, based on drought and Rio Grande surface water availability.

2010 (Typical Year/No drought)	2013 (Serious drought)	2015 (Moderate drought)
Hueco Bolson wells: 28%	Hueco Bolson wells: 61%	Hueco Bolson wells: 44%
Rio Grande: 50%	Rio Grande: 9%	Rio Grande: 31%
Mesilla Bolson wells: 19%	Mesilla Bolson wells: 23%	Mesilla Bolson wells: 20%
Desalinated Water: 3%	Desalinated Water: 7%	Desalinated Water: 5%

The Utility's potable water capacity is approximately 220 million gallons per day (MGD), including groundwater, desalinated brackish groundwater and surface water treatment capacity of 100 MGD. The attached Appendix 3 shows the relative locations of El Paso Water's water and wastewater treatment plants. The surface treatment plants currently process an average of 60,000 acre-feet per year of surface water, or

about 20 billion gallons in a normal year when there is a full supply of surface water from the Rio Grande Project.

The utility owns land in the County of El Paso for the purposes of water rights, and currently leases additional acres for surface water rights. Furthermore, the Utility has third party agreements with El Paso County Water Improvement District #1 and the Bureau of Reclamation that allows for the purchase of additional surface water to supply the Jonathan Rogers water treatment plant.

In addition, the Utility built the KBH Desalination plant in east El Paso that treats brackish groundwater from the Hueco Bolson aquifer to potable standards. This plant can produce 27.5 MGD of potable water, although plans for expanded production are under consideration. The water sources for the desalination plant are large brackish water areas in the Hueco Bolson estimated to hold 20 million acre-feet of water. Figure 2 below shows the location for the sources of water for EPWater. Finally, EPWater also has completed pilot studies and a USBR Title XVI Feasibility Report for the construction of an Advanced Purified Water Treatment Plant, which will utilize advanced treatments and membranes to convert treated wastewater to full-potable standards for direct potable reuse.

Figure 2 - Sources of Water for EPWater

The primary water uses for EPWater customers are municipal, residential, commercial and industrial. The Bureau of Reclamation and Irrigation districts in the area are responsible for the supply and distribution of surface water for irrigation purposes.

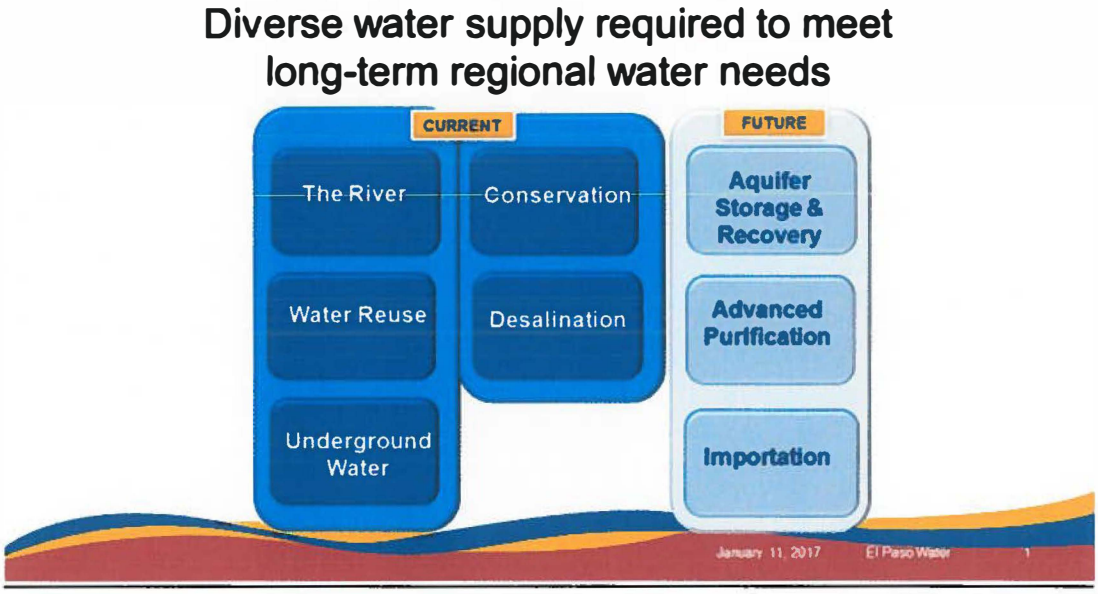
Table 1 below shows a sample of common water system statistics for EPWater.

Table 1 - Relevant Statistics for EPWater System

Item	2011	2012	2013	2014	2015
Maximum water supply capacity in acre-feet per day	675	675	675	675	675
Maximum daily water demand in acre-feet	502	501	494	483	481
Daily average consumption in peak week in acre-feet	468	467	460	460	430
Water customers, retail and wholesale	210,987	214,254	217,406	220,570	224,656
Water pumped in acre-feet	120,900	120,890	114,607	114,543	115,043
Water metered, retail and wholesale in acre-feet	113,942	111,417	107,665	105,229	104,253
Percent of water billed to water pumped	94.2%	94.0%	94%	92%	90.6%
Miles of water mains in place	2,544	2,561	2,593	2,615	2635

The following Figure 3 is a graphical display of EPWater's current and future, intended, diverse water supply mix.

Figure 3:



Technical Proposal: Technical Study Description

The component parts of this proposed project are shown graphically on the Site Plans attached Appendix 4 at the end of this application. These components include a total of approximately nine-miles of new, 16-inch and 30-inch diameter pipe, combined, associated valves and controls, ground preparation and related constructed weirs or dams associated with the enhanced arroyo infrastructures and wetlands, water discharge points, SCADA monitoring, and all concrete, signage, security and lighting required for the nature trails and public accommodations.

The Fred Hervey Water Reclamation Plant was constructed in 1985 and incorporates a conventional wastewater treatment plant that conforms to all permit standards, with the final effluent then processed using conventional surface water techniques (flocculation, sedimentation, disinfection and lime softening), in series, to produce a reuse water supply that meets all drinking water standards as enforced by EPA and TCEQ. Appendix 5 portrays the Year 2014 end-uses of the Fred Hervey reclaimed water in terms of an annual pie chart, plus as a monthly bar graph.

EPWater has been injecting reclaimed water from the Fred Hervey Plant at various locations in Northeast El Paso for approximately 30-years, primarily using deep injection wells which inject the water directly into the Hueco Bolson aquifer. Approximately 15 years ago, EPWater conducted research with the American Waterworks Research Foundation (AWWARF), and concluded that excavated infiltration ponds were a more economical method for recharging the Hueco in terms of both construction and recurring operations and maintenance costs. Since that time, EPWater has constructed a total of four infiltration ponds and reduced the dependency on injection wells, which are more expensive to construct and operate.

The attached Appendix 6 portrays the history of aquifer injections associated with the Fred Hervey Reclaimed water. Historically, aquifer recharge has been a second priority behind the demands for reclaimed water by parks, Painted Dunes Golf Course, EPE's cooling water, and other requirements. EPWater is shifting priorities to place greater emphasis on aquifer recharge for drought protection as part of improved water resource management of the Hueco Bolson. Also important to this effort is to increase the resilience of the Hueco Bolson through greater prevention of brackish water intrusion into the fresh water zones. Appendix 6 also contains a photo of an existing, active infiltration pond.

Appendix 7 shows a sample, schematic diagram of the CERRO process used to remove fresh water from concentrate at Reverse Osmosis desalination plants, to produce a new stream of fresh water (permeate) and a very concentrated stream of concentrate. Such systems have been proven to increase the overall recovery of desalination facilities from approximately 75% to nearly 96% overall, thus increasing the overall effectiveness of the desalination process. EPWater, under USBR Contract No. R14AP00086, has completed the first confirmation unit at Well # 412 in El Paso, proving that this technology is sound and economically viable. Well # 412 is one of nine wells owned by EPWater that have become brackish over time and have been equipped with Well-head RO-units to render the ground water potable. Preparations are now underway with USBR to initiate construction of three, full-scale units for installation at three more wells in El Paso.

EPWater currently sells approximately 3,500 AFY of Fred Hervey Reclaimed water to EPE's Newman Station in Northeast El Paso, for use as cooling water for their generators. The usefulness of this water, in terms of the number of cycles permissible through the plant, is limited by the original dissolved solids content and the hardness that is added during each cycle. This cooling water must be discharged to waste when the TDS reaches approximately 6,000 ppm.

In conjunction with the UTEP Civil Engineering Department, EPWater has conducted numerous meetings with key EPE staff and is confident that inclusion of a large-scale CERRO system within the cooling cycle at Newman Station, would increase the number of cooling cycles for this water at the plant, and thus reduce the overall water demand for cooling water. Preliminary estimates are that using the CERRO process at EPE in this manner would save Newman Station approximately 900 AFY of reclaimed water purchased from EPWater. This 900 AFY would then be available for recharge by EPWater using the proposed enhanced arroyo infiltration method. Attached Appendix 8 contains documentation indicating EPE's interest in pursuing this CERRO technology and reducing their demand for cooling water.

Over the first two to three years, EPWater intends to infiltrate approximately 4,500 AFY of reclaimed water, originating from three sources. These sources are: 1) the 3,000 AFY now available from the Fred Hervey Reclaimed flows that is now routinely injected; 2) the estimated 900 AFY in reclaimed water saved from incorporating the CERRO system at the EPE Newman Station; and 3) approximately 600 AFY in additional, available reclaimed water made available by the upcoming construction of the Fred Hervey Diversion Project, which increases the raw wastewater delivered to the Fred Hervey Plant. This Fred Hervey Diversion Project is now approved for construction using USBR Title XVI Funds under Contract No. R16AP00217.

The long range plan for this project will be to use the new pipeline from the Fred Hervey Plant, to include other source waters for additional Hueco Recharge at the proposed ASR site. These other sources of treated water include desalinated brackish ground water from the KBH Plant, treated wastewaters from the planned Advanced Water Purification Plant, and possibly excess, treated surface waters from the Jonathan Rogers Plant during years of nearly-full allocation. Under these scenarios, the annual volume of water available for this arroyo infiltration project could increase to as much as approximately 15,000 AFY. This larger injection scenario would be implemented as a compliment to EPWater's overall comprehensive aquifer recharge-groundwater management program.

Using an equivalent, amortized cost estimate (over 40 years) of $24 million for the components of the enhanced arroyo infiltration program, plus an estimate of $6 million (also over 40-years) for the EPE-CERRO project, yields a total amortized cost estimate of approximately $30 million. Using this total estimated amortized cost of $30 million, and a range of 4,500 to 15,000 AFY in terms of water infiltrated, yields a cost range estimate for the proposed project of $50.00 to $167.00 per Acre-Foot ($/AF).

Flooding of the arroyo bed and ponding areas at the proposed project site will recharge the shallow, very permeable sediments and the recharge water will percolate downward to the deeper deposits of the Hueco Bolson aquifer below the water table, with reclaimed water of potable quality. This recharge supply can be recovered later, when needed, using existing deep recovery wells as shown on the site plan map in Appendix 4, and disinfected for distribution to the public.

In addition, the feasibility study will assess environmental benefits achieved through creation of wetlands and quality of life improvements to the area using enhanced arroyo infiltration techniques for recharge. Infiltration techniques using general pre-existing arroyo paths will be evaluated for feasibility of introducing the additional 4,500 to 15,000 AFY of flows. Area wetland development concepts will be incorporated to promote a habitat for various waterfowl in the dry Chihuahua Dessert for the benefit of several listed and endangered species.

The wetland habitats enhanced and established through this project will provide important cover, resting areas and diverse food supplies for Central Flyway migrants, including the priority species and other waterfowl. By providing wintering and migratory habitats needed to return these species (Threatened and Endangered) to their northern breeding grounds in good physiological condition, the project will contribute to achieving Management objectives, especially for **the Southwest Willow Flycatcher, Yellow-Billed Cuckoo, White-Faced Ibis, Peregrine Falcon, Scaled Quail, Harris Hawk, Lark Sparrow, and others as listed in the attached letter from UTEP contained in Appendix 9.** Also, Steve Kelley, Environmental Consultant from Georgetown, Texas, adds the Least Tern and Northern Aplomado Falcon to the list of species potentially benefiting from these wetlands.

The proposed project will make water available to the arroyo wetlands throughout the year. This change will enable development of palustrine emergent marsh in some areas within the impoundments, allow moist-soil management of other areas, and promote establishment of riparian-forest habitat along the 1-2 mile long stretch of the project. As a result:

- habitat suitable for migrating and wintering waterfowl will be present for a longer period each year;
- the quality of that habitat will be higher and will support greater numbers of birds; and
- suitable habitat may be present for nesting.

Infrastructure to be constructed will include installation of transmission pipelines from the various reclaimed water supply sources (as shown in Appendix 4) to the enhanced arroyo locations, along with appurtenant valves, gates, meters, monitoring, controls, and so forth. The project will require approximately 50,000 linear feet of new pipelines consisting of approximately 8-inch through 30-inch diameter. In addition, secondary membrane technology techniques will be evaluated with the objective of reducing the reclaimed water demand required for the area power plant (EPE's Newman Power Plant) that will then be available for aquifer recharge purposes.

Information collected from EPWater, other agencies, and via field investigations will be reviewed to assess water quality conditions, ASR water flows from the various supply sources, and available land and infrastructure features located at the proposed ASR infiltration site(s) to support implementation of the ASR expansion project. Historical reclaimed water quality and quantity analysis for the various supply sources (current condition and future flow increase conditions) along with the evaluation of the new secondary membrane treat technologies at the power plant will be assessed. The consultant will coordinate with TCEQ and the U. S. Army Corp of Engineers as required, and coordinate with other agencies/institutions to identity:

- State and local requirements for implementation of the ASR reuse project.
- El Paso Electric Company for plant cooling tower water needs and potential secondary membrane treatment upgrades that would reduce their reclaimed water need.
- Relevant water rights for the project.
- Other agency concerns/considerations regarding the potable reuse project, including the appropriate historical, cultural and archaeological agencies.

Other Issues relevant to this Proposal:

Means by which the Project Contributes to the Overall Goals of the USBR:

1) : **Water Conservation:** Approximately 900 ***Acre-Feet per Year (AFY) of additional, new water, initially, through the incorporation of the CERRO system at Newman Station. This equates to a 25% reduction in cooling water demand. Eventually, after all pipeline components of the proposed project are completed and full aquifer management process are in place, this project could provide up to 15,000 AFY of new drought-resistant water to the Hueco.***

2) **Benefits to Endangered Species:** ***It is anticipated that the 10 to 25 acres of wetlands produced by this project will provide habitat to numerous wildlife species common to this area, plus some listed or endangered species such as the Willow Flycatcher, Yellow-billed Cuckoo, White-Faced Ibis, and Peregrine Falcon. The Least Tern and Northern Aplomado Falcon may also benefit. Also, many birds, mammals and reptiles that commonly visit the Ro-Bosque area could also migrate to this area for watering, sanctuary, nesting and breeding purposes.***

3) : **Water Marketing:** **Up to 15,000** ***AFY of water eventually available for sale to El Paso Water Customers through well recovery, based on demand and availability during drought or periods of low surface water allocation from the Rio Grande Project.***

This project could be considered a water "banking" scheme, using the Hueco Bolson under the operation of El Paso Water, for service to the El Paso customers. In a larger, watershed-basis sense, the 15,000 AFY of water "banked" by this project could translate into an equal volume of water per year that will not have to be diverted from surface water from the Rio Grande Project during periods of surface water drought.

4) : **Additional Non-Federal Funding:** ***EPWater is proposing to pay for 55 % of the*** **Feasibility** ***Project.***

5) : **Connection to an Existing U. S. Bureau of Reclamation (USBR) Project:**
EPWater annually purchases raw surface water from the USBR-Rio Grande Project

Evaluation Criteria

Evaluation Criterion 1: Statement of Problem and Needs (10 points)

Describe in Detail the water resource management problems and needs in the area and explain how water reclamation and reuse may address these problems and needs. Elaborate on the watershed-based aspects of the solution, and address the impacts of climate change:

Meeting the municipal water demands of the El Paso public has historically relied on the combined water mix of ground water and treated surface water supplied by the USBR Rio Grande Surface Water Project. As the river drought in the West continues, the available water supply from the Rio Grande has become increasingly less reliable. In addition, longer term, the water plan under state requirements, shows demand possibly exceeding supply within approximately 30 years. With forethought in mind, it is apparent that EPWater needs to explore new sources of water supply beyond the historic, straightforward use of surface and ground water.

Review of the attached bar graph in Appendix 10 from the Texas State Water Plan, shows that the projected water demand for El Paso Water will exceed supply by approximately the Year 2045 unless additional measures are taken to increase supply, other than conservation and expanding the capacity of the KBH Plant considerably. This proposed project, with its resultant buffer of adding an additional 4,500 to 15,000 AFY of recharge to the aquifer for later withdrawal, provides the opportunity to make up for this shortfall in water supply to meet demand, over the time frame in question.

Since the State Water Plan water demands are based on current and future per capita consumption, the accuracy of the projection is susceptible to any variations in the actual population increase experienced. This further exemplifies the vulnerability of the future water supply to the population growth, thus possibly further supporting the need for projects such as ASR.

In terms of drought, changing weather patterns and even potential climate change, the reader is asked to refer to Appendix 11, which characterizes the water volume in storage in Elephant Butte Reservoir since its completion, plus an aerial-visual representation of the water surface during full capacity level, versus during the recent drought. El Paso is located within the overall river-based watershed of the Rio Grande Project, both physically and administratively. As the reader can easily observe, years of drought, and partial river supply-allocation, are the rule, in general, for the Rio Grande Project, compared to the years of exception, when there is a full supply. The reservoir has only reached the full-capacity stage twice in its approximately 100-year history. Therefore, El Paso Water needs to be prepared for recurring drought conditions and maintain a fully-charge aquifer for periods of short river supply.

These two referenced problems should clarify the statement of problem and need for the proposed project.

This project could be considered a water "banking" scheme, using the Hueco Bolson under the operation of El Paso Water, for service to the El Paso customers. In a larger, watershed-basis sense, the 15,000 AFY of water "banked" by this project could translate into an equal volume of water per year that will not have to be diverted from surface water from the Rio Grande Project during periods of surface water drought.

EPWater has been a leader in water conservation and water reuse and reclamation. This comprehensive program combines advanced treatment of wastewater for potable use, along with aquifer recharge for later recovery and use by the public, and creation of wildlife habitat and a recreational facility for the public utilizing reclaimed water, all to increase the available potable water supply during drought and times of low surface water allocation by approximately 4,500 to 15,000 acre-feet per year (AFY) at an estimated total cost of approximately $ 50.00 to $ 167.00 per AF. This volume of additional annual water supply equates to as much as approximately 10 percent of annual public water demand.

Bert Cortez and Mike Landis at the El Paso office of USBR have informed EPWater that the USBR-Rio Grande Project is located within one of the "WaterSmart Basin Studies". The proposed project is within EPWater's service area, and EPWater annually purchase raw surface water from the Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1. In addition, Joshua German of the Denver Office of USBR has informed EPWater that the Upper Rio Grande Basin Study is now complete.

Additionally, in order to balance available water supplies to meet water demands, EPWater will still also need to reduce net per capita consumption from the current level of approximately 129 gallons per day per person (gpcd) to approximately 118 gpcd over the next twelve years. This calculation is documented in the approved Texas State Water Plan for the Far West Texas Region. This equates to approximately a 10%

effective, net demand reduction for El Paso. At full build-out, this proposed project can essentially meet that requirement.

Due to the simplicity and transportability of this technology, it is eminently transferrable to any location within other watersheds that exhibit similar source water constraints, the ability to treat raw wastewater to potable standards, plus an infiltration area suitable for flooding and creation of wetlands and recreational park for the public.

Evaluation Criterion 2: Water Reclamation and Reuse Opportunities (15 points)

1) ❑Describe how the feasibility study will investigate potential uses for reclaimed water (e.g., environmental restoration, fish and wildlife, ground water recharge, municipal, domestic, industrial, agricultural, power generation, and recreation).

2) ❑Describe the potential water markets available to use any recycled water that might be produced upon completion of a water reuse project, as well as potential methods to stimulate recycled water demand and/or methods to eliminate obstacles for use of reclaimed water.

3) ❑Describe the sources of water to be investigated for potential reclamation, including impaired surface and ground waters.

One of the expressed purposes of this project is to create man-made flows within the arroyo as part of the infiltration process for the direct purpose of providing 10 to 25 acres of wetlands for environmental habitat creation, and recreational nature trails for the public. It is anticipated that the 10 to 25 acres of wetlands produced by this project will provide habitat to numerous wildlife species common to this area, plus some listed or endangered species such as the Willow Flycatcher, Yellow-billed Cuckoo, Ibis and Peregrine Falcon. Also, many birds, mammals and reptiles that commonly visit the El Paso and Rio Bosque areas located in southern El Paso could also migrate to this area for watering, sanctuary, nesting and breeding purposes. Appendix 9 contains a letter description from John Sproul, the Director of the Rio Bosque Wetlands Park, further elaborating on the particular threatened and endangered species that would likely benefit from this project, including those of interest to Texas Parks and Wildlife.

As previously described the intended CERRO process installed at the local generating station should be able to save as much as 900 AFY in terms of generation cooling water demand reductions. This is essentially a 25% reduction in cooling water demand at this location and represents new, or conserved, water that will be available for recharge to the aquifer and eventual reuse by the public during time of need. Also, the information shown in Appendix 7 indicates that the energy recovery system (booster pump enhancements) contained within the CERRO system itself will recover approximately 20% of the electricity used to operate the CERRO system, thus an equivalent reduction in electrical demand compared to standard RO systems.

In terms of water markets, this project could be considered a water "banking" scheme, using the Hueco Bolson under the operation of El Paso Water, for service to the El Paso customers. In a larger, watershed-basis sense, the 15,000 AFY of water "banked" by this project could translate into an equal volume of water

per year that will not have to be diverted from surface water from the Rio Grande Project during periods of surface water drought. With proper permissions, this water is potentially available for marketing among the agricultural and municipal communities under the current Operating Agreement among the Bureau of Reclamation, El Paso County Water Improvement District No.1, and Elephant Butte Irrigation District.

In terms of other sources of water to be investigated, the project will evaluate other supply sources that could potentially be delivered to the arroyo for infiltration from sources such as the KBH Desalination Plant, which produces potable water from the RO process using brackish Hueco groundwater as its source, and water from the future, proposed Advanced Purified Water Plant located in the lower valley near the Bustamante Wastewater Plant, which will treat wastewater to potable standards for direct reuse using advance treatment techniques including RO. Other sources of water to be evaluate will include additional reclaimed water from expansion to the Fred Hervey Plant, available storm water, standard system water generally available within the distribution system, which includes other ground waters, and could include excess treated surface water from the Jonathan Rogers Treatment Plant during periods of average to high runoff when water rights are sufficient.

Evaluation Criterion 3: Description of Potential Alternatives (15 points)

Describe the pertinent water supply alternatives.

1) *=Describe the objectives that all Alternatives will be designed to meet. What other water supply alternatives will be investigated as part of the feasibility study?*

2) *=Provide a general description of the proposed project that will be the subject of the feasibility study.*

3) *=Describe the alternative measures or technologies for water reclamation, distribution, and reuse that will be investigated as part of the feasibility study.*

The concept for the ASR Project is to treat effluent from the Fred Hervey Water Reclamation Plant to drinking water quality, and use existing arroyos to create infiltration wetlands for recharging the Hueco Bolson aquifer beneath El Paso Water property in the Northeast El Paso area adjacent to the El Paso Electric Newman Generating Station. The water infiltrated will be the volume remaining after meeting customer demands at the power plant, golf course, and parks. The concept also includes additional treatment the reclaimed cooling water at of EPE to increase the number of cycles through the plant before discharge to waste, thus reducing the cooling water consumption at the plant by approximately 900 AFY.

All alternatives evaluated will conform to the guidelines of the Title XVI Program feasibility requirements. These will include definition of measurement criteria, identification of utility problem and need for a solution, cost analyses to include capital costs and total project life-cycle costs, full technical descriptions of the alternatives, and finally, a ranking scheme to select a preferred alternative. The permitting and regulatory requirements will also be evaluated for each alternative.

Alternatives for the CERRO system that will be evaluated for the 900 AFY worth of water conserved will include the cost of providing this equivalent volume of water from the regular Fred Hervey supply and the consequential cost of not having that 900 AFY available for recharge. Where costs are available, a

comparison will also be made of alternate methods to the CERRO system for desalinating the cooling water on site in a similar manner to the CERRO system. For example, El Paso Electric has in the past experimented with other membrane methods for extending the number of cycles through the plant before the cooling water must be discharged to waste.

Alternative sources of water supply that will be evaluated for the proposed ASR project will include the KBH Desalination Plant, which produces potable water from the RO process using brackish Hueco groundwater as its source, and water from the future, proposed Advanced Purified Water Plant located in the lower valley near the Bustamante Wastewater Plant, which will treat wastewater to potable standards for direct reuse using advance treatment techniques including RO. Other sources of water to be evaluate will include additional reclaimed water from expansion to the Fred Hervey Plant, available storm water, standard system water generally available within the distribution system, which includes other ground waters, and could include excess treated surface water from the Jonathan Rogers Treatment Plant during periods of average to high runoff when water rights are sufficient.

The objective of all noted alternatives will be to maximize Hueco Bolson groundwater recharge in the most cost-effective manner through using the various supply source options. Sources for recharge may vary depending on excess water availability depending on time of year specifics for each alternative which will be part of the evaluation for defining best management operational practices. Each of the alternative source supply options will be evaluated to assess infiltration methods using enhanced arroyo techniques.

The consultant will coordinate with TCEQ and the U. S. Army Corp of Engineers as required, and coordinate with other agencies/institutions to Identity State and local requirements for implementation of the ASR reuse project.

Evaluation Criterion 4: Stretching Water Supplies (15 points)

Proposal must demonstrate that it helps to secure or stretch water supplies.

1) / *Describe the potential for the project to reduce, postpone, or eliminate the development of new or expanded water supplies.*

2) / *Describe the potential for the project to reduce or eliminate the use of existing diversions from natural watercourses or withdrawals from aquifers.*

3) / *Describe, if applicable, the potential for the project to reduce the demand on existing Federal water supply facilities.*

This project opens the opportunity to capture, store and eventually beneficially use a variety of source and supply waters not currently being used for either municipal (or possibly even agricultural) uses. These waters include the current reclaimed supply now being recharged into the Hueco, the 900 AFY of new water conserved by installing the CERRO system at El Paso Electric, the KBH Desalination Plant waters, which produces potable water from the RO process using brackish Hueco groundwater as its source, and water from the future, proposed Advanced Purified Water Plant located in the lower valley near the Bustamante Wastewater Plant, which will treat wastewater to potable standards for direct reuse using advance treatment techniques including RO. Other sources of water to be evaluate will include additional reclaimed water from expansion of the Fred Hervey Plant, stormwater, water generally available within the

distribution system, which includes other ground waters, and could include excess treated surface water from the Jonathan Rogers Treatment Plant during periods of average to high runoff when water rights are sufficient.

One of the major advantages inherent in this project is the demonstration that a cooling water savings of as much as 25% is achievable at electrical generating stations throughout the country using the proposed CERRO system within the cooling water loop. Considering that cooling water demands for electrical generation are a major consumer of fresh water supplies nationally, this will have a major, beneficial impact on the cost and water demand for this industry.

In terms of existing diversions and reducing demand on federal water supplies, this project could be considered a water "banking" scheme, using the Hueco Bolson under the operation of EPWater, for service to the El Paso customers. In a larger, watershed-basis sense, the 15,000 AFY of water "banked" by this project could translate into an equal volume of water per year that will not have to be diverted from surface water from the Rio Grande Project during periods of surface water drought. With proper permissions, this water is potentially available for marketing among the agricultural and municipal communities under the current Operating Agreement among the Bureau of Reclamation, El Paso County Water Improvement District No.1, and Elephant Butte Irrigation District.

Finally, additional expansions of area groundwater supplies through ASR by up to 15,000 AFY will ultimately delay the need for EPWater to initiate importation from areas east of El Paso. Currently, the 50-Year State Water Plan delineates the need for future groundwater importation from other communities (i.e. Dell City, Texas, and Valentine, Texas).

Evaluation Criterion 5: Environment and Water Quality (15 points)

Describe how the project will improve surface, ground water, or effluent quality, restore or enhance habitat for non-listed species, or provide water for critical habitat for federally listed or threatened or endangered species.

1) *Describe the potential for the project to improve the quality of surface or ground water, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

2) *Describe the potential for the project to improve flow conditions in a natural stream channel, including a description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

3) *Describe the potential for the project to improve habitat for federally listed threatened or endangered species, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

Since the KBH facility started operation in August 2007, the feed water TDS has increased to between 3000 and 4000 mg/L resulting in in decreased plant production. The recurring problem with pumping fresh ground water from the Hueco Bolson has been the resulting intrusion of brackish water into those areas that have been historically heavily pumped. EPWater has in the past been forced to retire several fresh water wells each year as a result of this "brackish water intrusion" phenomena. The decreased production from

the plant resulting from the water quality changes in the source wells and the limited production in the source wells, has resulted in both reduced permeate production and a lower raw water/permeate blend ratios than the original facility design capacity. Groundwater flow models have been developed for the Hueco Bolson since the 1970s. These models have not only been useful for evaluating the effects of pumping but they have also provided a foundation for ground-water management initiatives in El Paso and Juarez, Mexico. These models confirm and substantiate the brackish water intrusion phenomena, and highlight the need for additional injection of fresh waters to decrease this condition. This ASR project will provide the addition of new, fresh water into the aquifer to fill part of the water table depression left by prior pumping, thus adding new supplies to the aquifer and decreasing the problem of brackish water intrusion.

In terms of natural stream flows, this project will create new flow releases of reclaimed and other waters within the existing arroyo to generate a new flow for the benefit of nature and public recreation. Pilot studies will be conducted as part of the design phase (after the feasibility phase) to determine the seepage-infiltration rate, water balance, and targeted flow rates to best achieve a balance of reduced evaporation versus creation of wetlands to benefit nature. The permanent source of water for the new park will initially be treated reclaimed wastewater from EPWater's Fred Hervey Plant, followed later by the additional source waters to be evaluated during this study.

This project opens the opportunity to capture, inject, and beneficially use a variety of source waters not currently being used for aquifer injection when available. This annual volume of up to 15,000 AFY of water recharged into the Hueco Bolson by this project translates into an equal volume of water per year that can serve to reduce the detrimental impacts of this brackish water intrusion. The injected water will be available at later dates during times of surface water drought, for recovery and use by the public as needed when surface waters are less plentiful. This will essentially improve the quality of the remaining groundwater in the Hueco and reduce the stress on the Rio Grande Project surface waters during time of scarcity.

Area groundwater conditions will benefited through recharge thus providing more sustainable groundwater supply solution to the area. Through the use of enhanced arroyos, treated and reclaimed waters will be discharged in a manner that would create a steady water stream which would terminate in a potential created wetland as part of this project. Infiltration techniques will be investigated to maximize aquifer recharge while still considering ability to create wetland improvements that benefit the area habitat.

Through the creation of man-made flows within the arroyo as part of the infiltration process, approximately 10 to 25 acres of wetlands for environmental habitat creation, and recreational nature trails for the public will be provided. It is anticipated that the 10 to 25 acres of wetlands produced by this project will provide habitat to numerous wildlife species common to this area, plus some listed or endangered species such as the Willow Flycatcher and Yellow-billed Cuckoo. Also, many birds, mammals and reptiles that commonly visit the El Paso and Rio Bosque areas located in southern El Paso could also migrate to this area for watering, sanctuary, nesting and breeding purposes. Retainage of the new arroyo flows during recharge, will aid in clarification and nutrification of the new in-stream flows for the benefit of the wetlands and the eventual water recharging the aquifer.

The wetland habitats enhanced and established through this project will provide important cover, resting areas and diverse food supplies for Central Flyway migrants, including the priority species and other waterfowl. By providing wintering and migratory habitats needed to serve these species (Threatened and Endangered), towards good physiological condition, the project will contribute to achieving management

objectives, especially for **the Southwest Willow Flycatcher, Yellow-Billed Cuckoo, White-Faced Ibis, Peregrine Falcon, Scaled Quail, Harris Hawk, Lark Sparrow, and others.** Appendix 9 is a thorough description by John Sproul, Director of the Rio Bosque Wetlands Park, relating those species that could potentially benefit from the respective wetlands area. Also, Steve Kelley, Environmental Consultant from Georgetown, Texas, adds the Least Tern and Northern Aplomado Falcon to the list of species potentially benefiting from these wetlands.

Evaluation Criterion 6: Legal and Institutional Requirements (10 points)

Points will be awarded based on the extent to which the proposal demonstrates that the feasibility study will address legal or institutional requirements or barriers to the implementation of a project, including water rights issues and any unresolved issues associated with implementation of a water reclamation and reuse project.

EPWater estimates that up to 15,000 AFY of reclaimed water may be legitimately available for delivery to the ASR project. EPWater currently owns all the property for which the ASR project would be implemented. EPWater also currently has all required wastewater treatment and injection permits that would be associated with portions of the ASR project with intent of expanding its capabilities.

Since El Paso Water already retains this waters in its possession, legally and institutionally, through the current possession of original surface water rights, and through the Texas groundwater Law of Capture, El Paso Water does not foresee any water rights barriers to this project. The waters are already within the possession of the Utility at all times after original diversion, and will be injected directly into property owned by El Paso Water, without ever being discharged into the jurisdiction of any other agency or owner. Of course, all applicable permits will be obtained where needed, as described later in this proposal. Because the project will generate wetlands for the benefit of nature and recreational features for use by the public, credible intervention by concerned citizens is not anticipated. EPWater has active and operational Water Conservation and Drought Contingency Plans that are available for review on request.

In addition, EPWater, in conjunction with the UTEP Civil Engineering Department, has conducted numerous meetings with the administrative and operations staff of El Paso Electric, and is confident that inclusion of a large-scale CERRO system within the cooling cycle at Newman Station, would increase the number of cooling cycles for this water at the plant, and thus reduce the overall water demand for cooling water. Preliminary estimates are that using the CERRO process at EPE in this manner would save Newman Station approximately 900 AFY, in terms of reclaimed water purchased from EPWater. This 900 AFY of reclaimed water would then be available for recharge by EPWater using the proposed enhanced arroyo infiltration method. EPWater is jointly working with EPE regarding the proposed CERRO project elements as part of this study and therefore do not foresee any barriers with its implementation at this time.

The consultant will coordinate with TCEQ and the U. S. Army Corp of Engineers; however, as part of this study to ensure the project planned improvements are properly coordinated and vetted by governing agencies as well as will coordinate with other agencies/institutions to identity:

- State and local requirements for implementation of the ASR reuse project. c
- c El Paso Electric Company for plant cooling tower water needs and potential secondary membrane treatment upgrades that would reduce their reclaimed water need.
- c State Historical Preservation Office c
- c Relevant water rights for the project. c
- c Other agency concerns/considerations regarding the potable reuse project.

Evaluation Criterion 7: Renewable Energy and Energy Efficiency (10 points)

Points will be awarded based on the extent to which the proposal demonstrates that the feasibility study will address methods to incorporate the use of renewable energy or will otherwise address energy efficiency aspects of the water reclamation and reuse project being investigated.

The standard design of the CERRO system to be evaluated at El Paso Electric utilizes an equivalent electrical energy recovery system which captures the kinetic energy released at the discharge point of the membranes in the form of excess pressure. This excess pressure is diverted back to the original feed water supply at the entry to the membranes, thus helping to boost the entry pressure of the feed water and reducing the needed capacity of the original feed pumps. Without such a system, the energy contained within the excess discharge water pressure, would merely be released into the atmosphere. This system is sometimes referred to as "booster pump energy recovery".

The energy savings potentially available through this recovery mechanism can equal as much as 20% of the total electrical costs to pressurize the water treated via the RO membranes. Appendix 7 contains a progress meeting memo regarding the testing of the original CERRO Confirmation Unit at EPWater's Well 412. This memorandum states that the system generates a savings of 20% at this location. Such an electrical energy equivalent savings is also achievable at the proposed CERRO system planned for the Newman Station cooling water supply.

Solar panels will be installed to power and operate the remote monitoring data stations for flow and water levels for this project, as well as to operate area lighting improvements at the new wetland park along proposed enhanced arroyo trailheads.

Another relevant energy savings to mention occurs at the future time when the stored, or banked, water is pumped and returned to the delivery system when needed. Since this recovered water can be produced at the ground water cost of $163.00/AF, it will be much less expensive to produce (at that future time) than producing new surface water at the current price of $300.00/AF, or less than new, desalinated water at $508.00/AF. These costs are shown graphically on Appendix 2.

Evaluation Criterion 8: Watershed Perspective (10 points)

Points will be awarded based on the extent to which the proposal demonstrates that the feasibility study will address alternatives that promote and apply a regional or watershed perspective to water resource management.

Bert Cortez and Mike Landis at the El Paso office of USBR have informed EPWater that the USBR-Rio Grande Project is considered to be located within one of the "WaterSmart Basin Studies". The proposed project is within EPWater's service area, and EPWater annually purchase raw surface water from the Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1. In addition, Joshua German of the Denver Office of USBR has informed EPWater that the Upper Rio Grande Basin Study is now completed.

In terms of water resources management, the longer range plan for this project, is to use the new pipeline from the Fred Hervey Plant, to include other source waters for additional Hueco Recharge at the proposed ASR site. These other sources of treated water include desalinated brackish ground water from the KBH Plant, treated wastewaters from the planned Advanced Water Purification Plant, and possibly excess, treated surface waters from the Jonathan Rogers Plant during years of nearly-full allocation. Under these scenarios, the annual volume of water available for this arroyo infiltration project could increase to as much as approximately 15,000 AFY. This larger injection scenario would be implemented as a compliment to EPWater's overall comprehensive drought management plan including, aquifer recharge and ground water recovery as a part of overall, effective water management.

The 15,000 AFY of water eventually generated by this project could translates into an equal volume of water per year that will not have to be diverted from surface water from the Rio Grande Project (or from other groundwater sources) during times of drought (or otherwise) low allocations from the Rio Grande Project. This could be considered to equate to a decrease in demand on the watershed of an equal annual volume of water during such severe periods of time. The watershed in this case could be considered to be the area within the Rio Grande Project below Elephant Butte Reservoir in New Mexico to basically the Hudspeth County line in Texas. In terms of water resources management, the parties affected, Elephant Butte Irrigation District, EPCWID and EPWater all have mechanisms in place to administratively account for and distribute these conserved waters among each other, and the appropriate water rights holders.

On a more localized, watershed basis, this proposed project may be able to utilize the existing El Paso Stormwater Master Plan to evaluate the volume and availability of capturing stormwater runoff from the upstream reaches of the subject arroyo. Such flows originate in the upland areas west of the project site in the upstream reach of the arroyo. The City Stormwater Masterplan may provide an estimate of the volume and frequency for storm events.

Required Permits or Approvals

EPWater currently operates the existing wells and wastewater treatment plants that accommodate the existing ASR program under the applicable permits for groundwater protection and wastewater effluent discharges issued by the Texas Commission for Environmental Quality (TCEQ) under the pertinent standards of the Environmental Protection Agency (EPA). The final project direction will be further coordinated with the TCEQ. The consultant will coordinate with TCEQ and the U.S. Army Corp

of Engineers as required for the wetland proposed improvements, and coordinate with other agencies/institutions to identity:

- State and local requirements for implementation of the ASR reuse project. {
- { El Paso Electric Company for plant cooling tower water needs and potential secondary membrane treatment upgrades that would reduce their reclaimed water need.
- Relevant water rights for the project. {
- { Other agency concerns/considerations regarding the potable reuse project, including State Historical, Cultural and Archaeological offices.

System for Award Management

EPWater is now registered on the System for Awards Management (SAM) and a copy of this registration notice is attached as Appendix 12 of this Proposal.

Letters of Project Support

EPWater and USBR will be the primary parties involved in this project at the feasibility stage. The Attached official EPWater Resolution, located in Appendix 13, will also serve as EPWater's letter of support or participation. Attached as Appendix 8 is a copy of EPE's letter of support for the proposed project. EPE will not be a funding partner for the feasibility stage of this project.

Official Resolution

EPWater placed the required Board of Directors Resolution on the agenda for the December 14, 2016 Board Meeting. Attached as Appendix 13 is EPWater's signed resolution showing that El Paso Water's Board of Directors is committed to the cost, expenses and terms and conditions cited in this proposal.

Project Budget

The project budget includes: Funding Plan, Budget Proposal, Budget Narrative and Budget Form. The Proposed Project Budget in the Recommended USBR Format is included on Page 30.

1) {How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments). **EPWater's cash and in-kind contributions will be provided from revenues either currently approved in the current year budget, or to be approved by the Board of Directors in the FY 2017-2018 budget within the Capital and O&M budgets.**

2) {Describe any pre-award costs incurred before the anticipated project start date that you seek to include as project costs. Include:

   a) {What project expenses have been incurred: approximately **$100,000.00 for consultant evaluation of ASR** from August 1, 2016 to present.

b) ƒ How they benefitted the project: **Evaluations have identified available reclaimed water volumes, existing site conditions at selected location, locations of project features, estimated project costs, and preliminary assessment of ground preparation likely needed to improve infiltration.**

c) ƒ The amount of the expense: approximately **$100,000.00.**

d) ƒ The date of cost incurrence: **August 1, 2016, through January 2017.**

3) ƒ Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment: **EPWater is the only funding partner.**

4) ƒ Describe any funding requested or received from other Federal partners. Note: other ƒ sources of Federal funding may not be counted towards your 50 percent cost share unless ƒ otherwise allowed by statute: **None.** ƒ

5) ƒ Describe any pending funding requests that have not yet been approved, and explain how ƒ the project will be affected if such funding is denied: **Not Applicable.** ƒ

Table 1 below summarizes the respective proposed non-Federal and Federal (USBR) funding source components. "In-kind" contributions are designated with an asterisk (*). Review of this table reveals that the total Federal funding component (Reclamation) does not exceed 50 percent of the total estimated project cost. On a Total Project Cost Basis, EPWater is proposing to pay for 55 percent of the project expenses in terms of both cash and in-kind services. On a cash-only basis, EPWater is proposing to pay for 50 percent of the total project.

Table 1. Summary of non-Federal and Federal funding sources.

Funding Sources	Funding Amount
Non-Federal Entities	
1. El Paso Water (EPWater)	$150,000.00*
2. El Paso Water (EPWater)	$30,000.00**
3.	
Non-Federal Subtotal:	$180,000.00
Other Federal Entities	
1. NA	
2.	
3.	
Other Federal Subtotal:	-0-
Requested Reclamation Funding:	$150,000.00*
Total Project Funding:	$330,000.00

Explanation:
*Includes $50,000.00 in Pre-Award costs.
**In-Kind Contributions ($30,000.00)

Since this application is being submitted in accordance with the requirements of Funding Group I, Table 2 is offered to summarize the funding requested by year from USBR.

Table 2. Funding Group I Funding Request.

Funding Group I Request			
	Year 1 (FY 2017)	**Year 2 (FY 2018)**	**Year 3 (FY 2015)**
Funding Requested from USBR	$110,000.00	$40,000.00	-0-

Funding Plan and Letter of Commitment (Resolution):

On December 14, 2016, the EPWater Board of Directors approved by Resolution a total of $150,000.00 in cash over 17 months to fund this project's local match, plus $30,000.00 in terms of In-Kind Contributions as shown in the Budget Form on Page 30. Of this cash amount, $110,000.00 is available now from EPWater's budget revenues. At the end of calendar year 2017, EPWater's Board will approve an additional $ 40,000.00 in cash for expenditure between March 1, 2018 and October 2018, if the project is funded by USBR. This funding disbursement process is represented on the previous Tables above. The in-kind services, worth $30,000.00, are available on an as-needed basis without restrictions, if the project proceeds. Therefore, there are essentially no time-constraints on the availability of EPWater's funds

Budget Narrative:

Please refer to the attached Budget Form on Page 30:

Salaries and Wages (in-kind)

The following EPWater personnel will be involved in this project. The respective roles and value of their in-kind services is described as follows:

John Balliew is the President and CEO of EPWater and will function as the official Lead Manager for this proposed Project. He will be responsible for overall project oversight and has the authority to advance the objectives of the study and assure its completion within budget and on schedule. Anticipated time commitment is less than two percent.

Hector Gonzalez, who officially serves as Government Affairs Manager, will function as the Assistant Project Manager. Mr. Gonzalez will oversee daily and routine activities. Anticipated time commitment is less than two percent

Mike Fahy, as the Grant Project Manager, will be responsible for adherence to project budgets and all necessary routine reporting to USBR. Mr. Fahy will be the initial point of contact with USBR for regular, routine questions about project scheduling and reporting. It is estimated that Mr. Fahy will spend approximately 12 percent of his time overall on the project over the seventeen month duration.

Mr. Balliew, Mr. Gonzalez, and Mr. Fahy all work together in close proximity at EPWater's headquarters building and are all accessible, as needed, for USBR representatives.

Alan Shubert is the Vice President of Operations and Technical Services, will have a role in ultimate review of consultant selection, contracting and monitoring overall project progress. Anticipated time commitment is less than two percent.

Gilbert Trejo is the Chief Technical Officer, and he will also have responsibility for approval and review of consultant selection, contracting and monitoring overall project progress to verify conformance with the original intended goals and objectives. Anticipated time commitment is less than two percent.

Javier Dominguez is a Project Engineer and will be responsible for direct contract supervision of the consultant and any other contractors during the project. He will maintain day to day communications with the selected consultant to trouble-shoot any problems that arise and assure that the project stays on schedule. Anticipated time requirement will equal approximately four percent of labor during the project duration.

Felipe Lopez will be the Engineering Supervisor for Mr. Dominguez and will provide routine supervision and act as intermediary with Gilbert Trejo. Mr. Lopez will review the weekly progress of the consultant with Mr. Dominguez and provide necessary technical and managerial guidance as needed. Anticipated time commitment is two percent during the project duration.

Scott Reinert is the Water Resources Manager and will be responsible for assuring that all project reports are technically sound with respect to hydrologic and geologic criteria and that all conclusions are consistent with Utility criteria and conditions contained in the Texas State Water Plan. Anticipated time commitment is less than three percent on this project.

Irma Finlay will be the staff accountant responsible for oversight of all funds and cash reimbursements required for the proposed project. She will maintain the project spreadsheet recording all expenses incurred, both cash and in-kind, and assure that all contracted invoices are paid. She will also compile EPWater's reimbursement requests after expenses are paid and submit them to USBR for back payment to EPWater. Anticipated time commitment is estimated at three percent over the course of the project.

Jeff Tepsick is Ms. Finlay's immediate supervisor and will check and verify all invoice payments and reimbursement requests. Anticipated time commitment is one percent for the project.

Maureen Hankins will assist in monitoring project expenses and requesting reimbursements. Anticipated time commitment is one percent for the project.

Fringe Benefits (in-kind)

The in-kind fringe benefits for EPWater personnel involved in this project were computed on a "Fringe" basis and were derived by subtracting the hourly salary rate cost for designated EPWater staff from the loaded value per hour.

Travel (in-kind, and cash for consultant)

The travel costs included in this project are for mileage by EPWater field personnel for travelling between the office and the proposed project location. The total mileage is expected to be 725 miles, and at a cost of $0.50/mi, the total project cost is estimated at $362.50 for in-kind travel for EPWater staff. In terms of travel costs in cash for the consultant, these are calculated at a total of $6,000.00, based on a total of six-trips equivalent, at approximately $1,000.00 each.

Contractual

EPWater uses the Qualifications-based method for selection of a qualified and experienced consulting engineering firm to perform evaluations and assemble the required documents. There are several qualified engineering firms located in El Paso to choose from and all are very familiar with basic water treatment, hydrogeology, membrane processes for water treatment, hydrology and stormwater studies, and EPWater's requirements and procedures for competitive bidding of engineering and feasibility studies. These firms would include CH2M Hill, Parkhill, Smith and Cooper, CDM, Moreno-Cardenas, ARCADIS, and others. The budget estimate of $194,000.00 for the Engineering Consultant was derived using the anticipated number of man-hours required by discipline and the estimated hourly rate as shown on the attached Budget Form on Page 30.

The professional engineering services anticipated are described below:

The purpose of the contracted engineering services is to provide planning and preliminary engineering services for preparation of an Aquifer Recharge and Storage (ASR) Feasibility Study that is completed in accordance with the US Department of Interior Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program general guidelines. The consultant will prepare the study that documents the evaluation of various ASR concepts (aka managed aquifer concepts for this project specifically) for expanding EPWater's current ASR program in pursuit of Title XVI funding support. Additional water supply sources, specifically the potential for an additional 10,000 to 15,000 ac-ft. of combined added supply from such sources as new Fred Hervey Water Reclamation Plant (FHWRTP) capacity, added supply available from CERRO technologies, added supply from KBH Desalination Water Treatment Plant (DWTP), stormwater, and possibly treated surface water from Jonathon Rogers Water Treatment Plant (JRWTP) during years of full allocation, will be considered. Infiltration methods utilizing enhanced arroyo(s) will be incorporated into the study.

Anticipated Project Tasks (utilizing EPWater's standard Purchasing Dept. structure):

100.01 Develop/Establish Project Management Systems - Includes scope and work breakdown structure, project work plan, task schedules and budgets, project account, project files, and monthly reporting per EPWater requirements.

100.02 Kickoff & Title XVI Funding Application Preparation Meetings – attend kickoff and multiple coordination/progress meetings with EPWater staff to coordinate preparation of Title XVI Feasibility Study Report funding application request.

100.03 Informal Coordination Meetings – Meetings not covered under specific milestone meetings will be conducted with the Owner's representatives. Meetings will be held throughout the course of the project to ensure proper design coordination.

100.04 Quality Assurance/Quality Control (QA/QC) – Apply QA/QC measures and consultant program for each scheduled submittal of the Study documents; including detailed checks and independent technical reviews.

Task 200 – Title XVI Feasibility Study Report

200.01 Title XVI Feasibility Study – coordinate with EPWater to facilitate preparation of the required project alternative evaluation requirements.

200.02 Title XVI Feasibility Study Draft – prepare Study in accordance with Title XVI requirements. Study to include alternative analysis of the following ASR water supply sources:

a. l Expanded FHWRTP reclaimed water
b. l Advanced Purified Project Water
c. l Excess EPE reclaimed water available as identified via CERRO study secondary membrane techniques.
d. l KBH Desalination water
e. l Stormwater
f. l JRWTP (treated surface water during selected periods of ample runoff).

Prepare and submit five (5) copies of the Draft Study summarizing evaluation/assessment findings and recommendations. Assessment will include environmental considerations and potential effects review. Consultant will prepare a cost estimate for the various alternatives in compliance with Title XVI Guidelines. Attend review meeting with EPW to obtain Draft review comments. Incorporate Draft review comments and finalize Study for EPW submittal to Bureau of Reclamation. Provide supplemental support to help address and/or clarify Bureau of Reclamation review comments.

Budgetary cost estimates and life-cycle costs will be developed for each of the supply alternatives previously mentioned including the proposed alternative, in compliance with U.S. Bureau of Reclamation, Title XVI Guidance Requirements. All alternatives evaluated will conform to the guidelines of the Title XVI Program feasibility requirements. These will include definition of measurement criteria, identification of utility problem and need for a solution, cost analyses to include capital costs and total project life-cycle costs, full technical descriptions of the alternatives, permitting and regulatory requirements, and finally, a ranking scheme to select a preferred alternative. The permitting and regulatory requirements will also be evaluated for each alternative.

[redacted]

Environmental and Regulatory Compliance Costs

The Lump Sum estimate of $6000.00 was inserted for this task, and is based on the cost from prior USBR Grants of a similar nature in which USBR performed the work, and concluded that there would be no significant environmental impacts.

Other Expenses

No other expenses are shown.

Indirect Costs

There are no indirect costs shown. The in-kind services for EPWater's labor were calculated on a "loaded", fringe basis.

Total Costs:

The total cost of the project is $330,000.00. The Bureau of Reclamation share is $150,000. EPWater's contribution will be $150,000.00 in cash, and $30,000.00 for in-kind services.

List of Appendices

EPWater Proposal for 2017 WaterSmart Feasibility Study Program

"Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017"

FOA # BOR-DO-17-F003

Appendix Number	Title
1.	Project Approval Letter from the Council of Governments
2.	Bar Graph showing Costs of Alternative Supplies, EPWater
3.	Location of Water and Wastewater Plants in El Paso
4.	Site Plans showing Features for Proposed ASR Project
5.	Historic Uses of Fred Hervey Reclaimed Water Supplies
6.	History of Fred Hervey Injections, Sample Infiltration Pond
7.	CERRO Schematic/Design, Energy Conservation Reference
8.	Project Support Letter from El Paso Electric
9.	UTEP Letter re. Benefits to Threatened, Endangered Species
10.	State Water Plan Bar Graph; Future Water Supply vs. Demand
11.	Drought Representation, Historic Storage-Elephant Butte Res.
12.	Proof of SAM Registration
13.	Board of Directors' Resolution Approving Application to USBR

Annette Gutierrez - Executive Director
8037 Lockheed, Ste. 100
El Paso, Texas 79925

Phone: (915) 533-0998
Fax (915) 532-9385
www.riocog.org

December 19, 2016

Mr. Matthew Reichert
Grants Management Specialist
Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Re: El Paso Water Utilities' Proposal to Bureau of Reclamation titled "WaterSMART: Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Program (FY) 2017"

Dear Mr. Reichert:

The Rio Grande Council of Governments' staff has reviewed the El Paso Water Utilities' Proposal to Bureau of Reclamation titled "WaterSMART: Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Program (FY) 2017" as submitted by the El Paso Water Utilities Public Service Board. The Council is providing favorable comment to the application and does not see that there is an apparent duplication of services in the area.

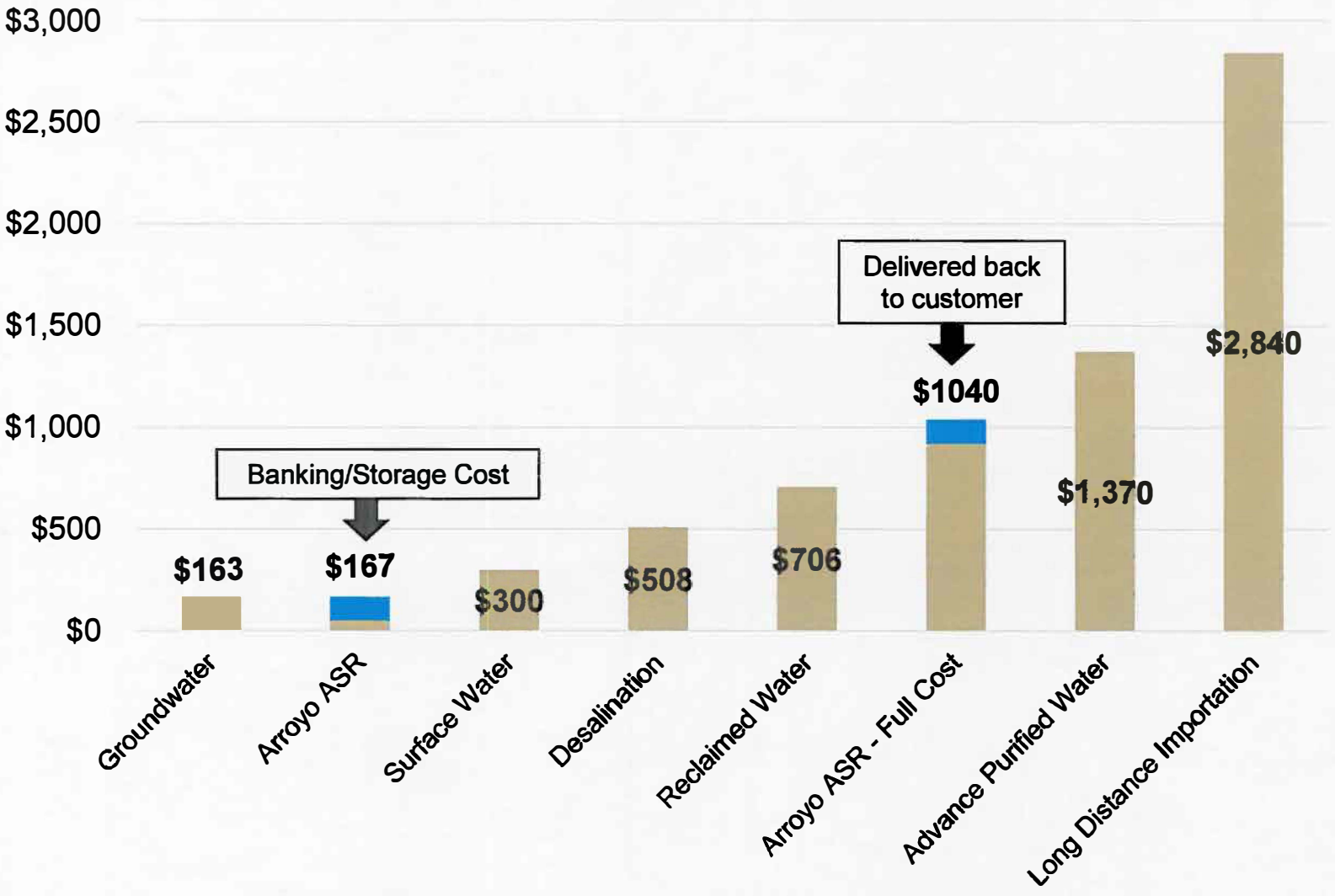
Everything is in order. However should something be missing please don't hesitate to contact me at Marisag@ricog.org or at 915.533.0998 x 119.

Sincerely,

Marisa Guirnalda
Regional Services Director

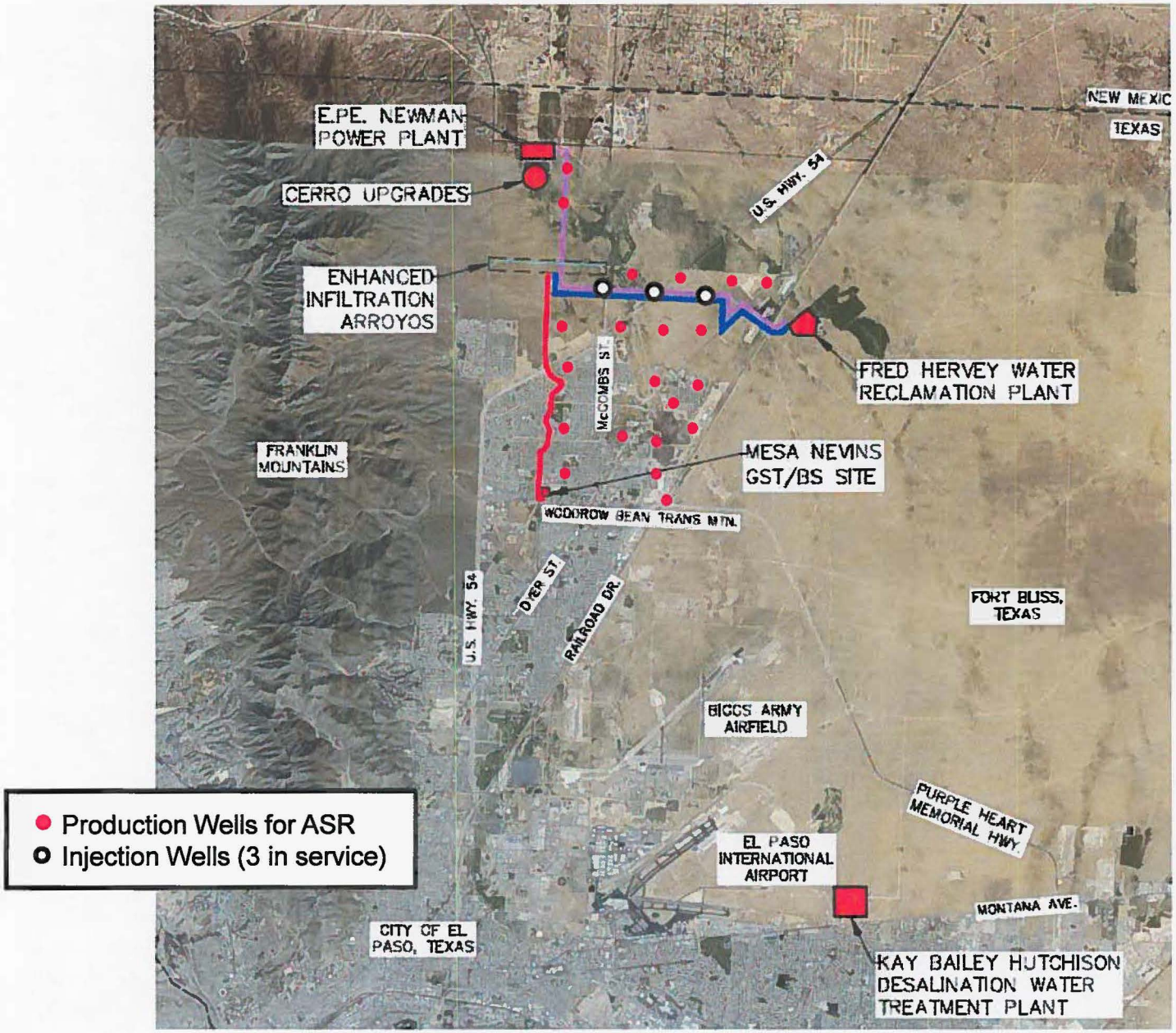
Cc: *Mr. Mike P. Fahy*
EPWU, Grant Manager

Cost Per Acre-foot Comparison

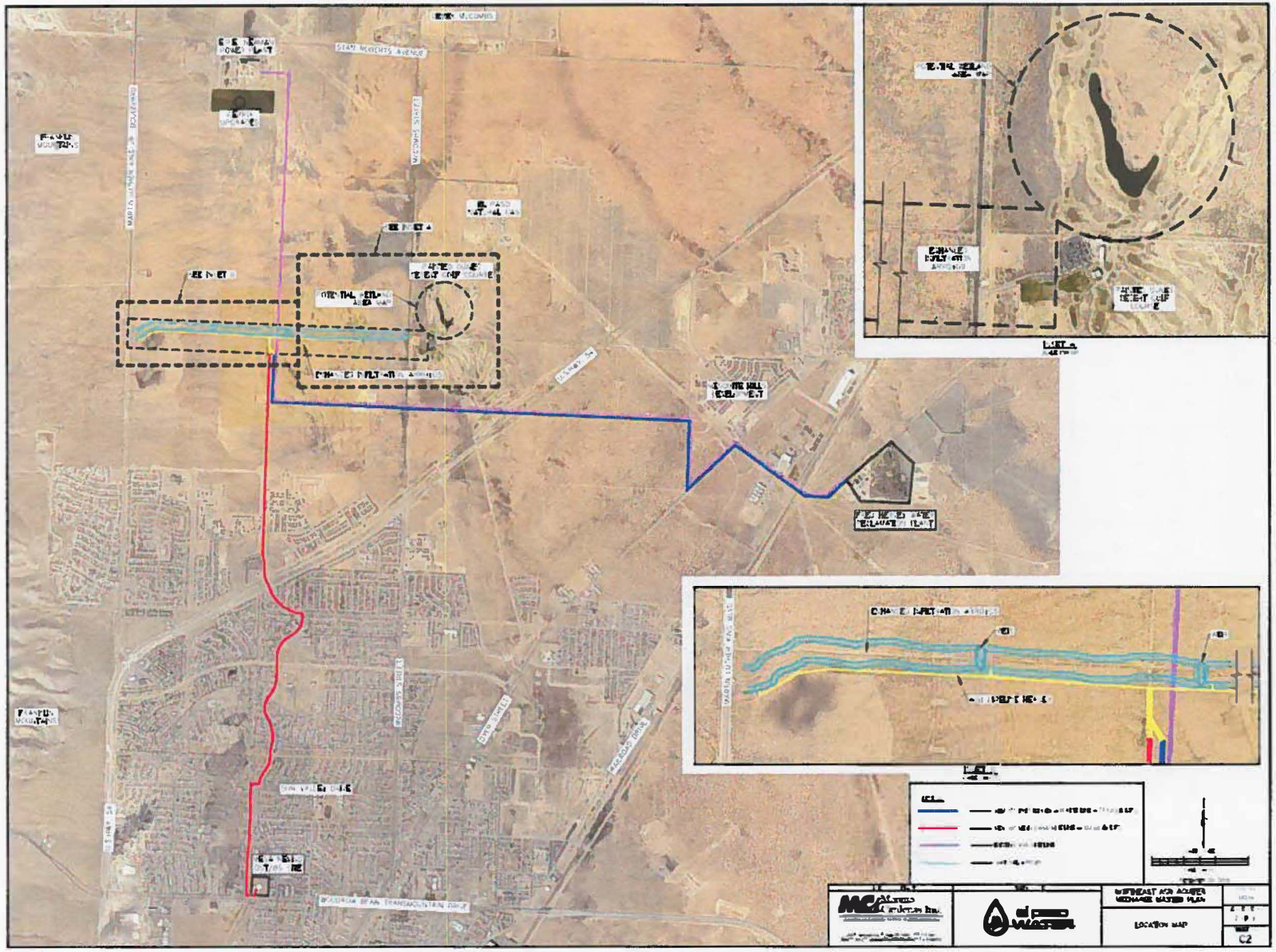


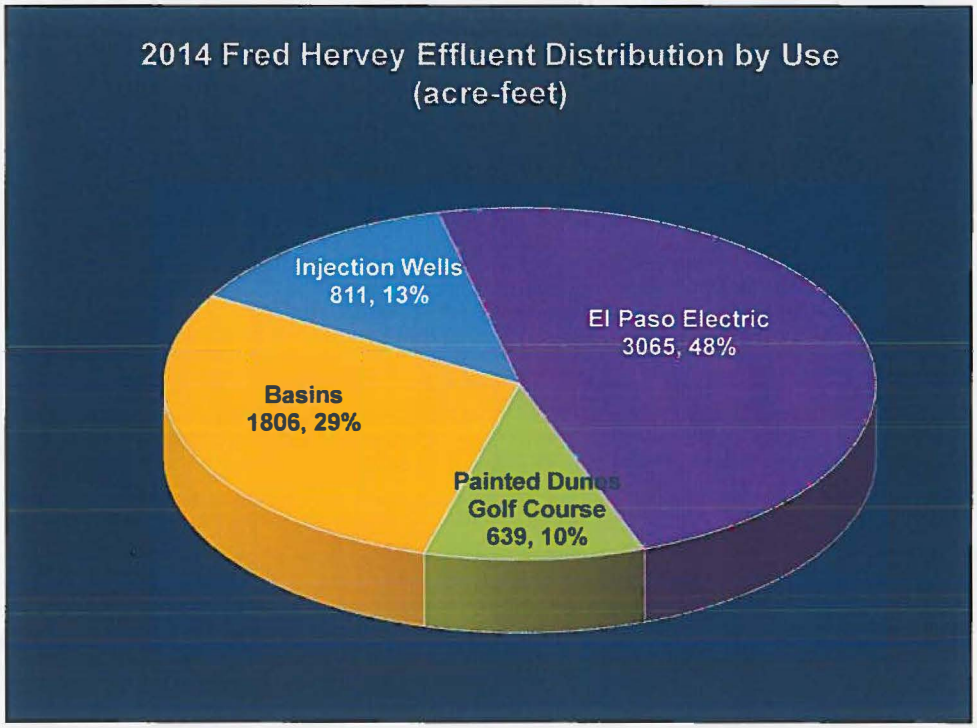
Water and Wastewater Treatment Plants

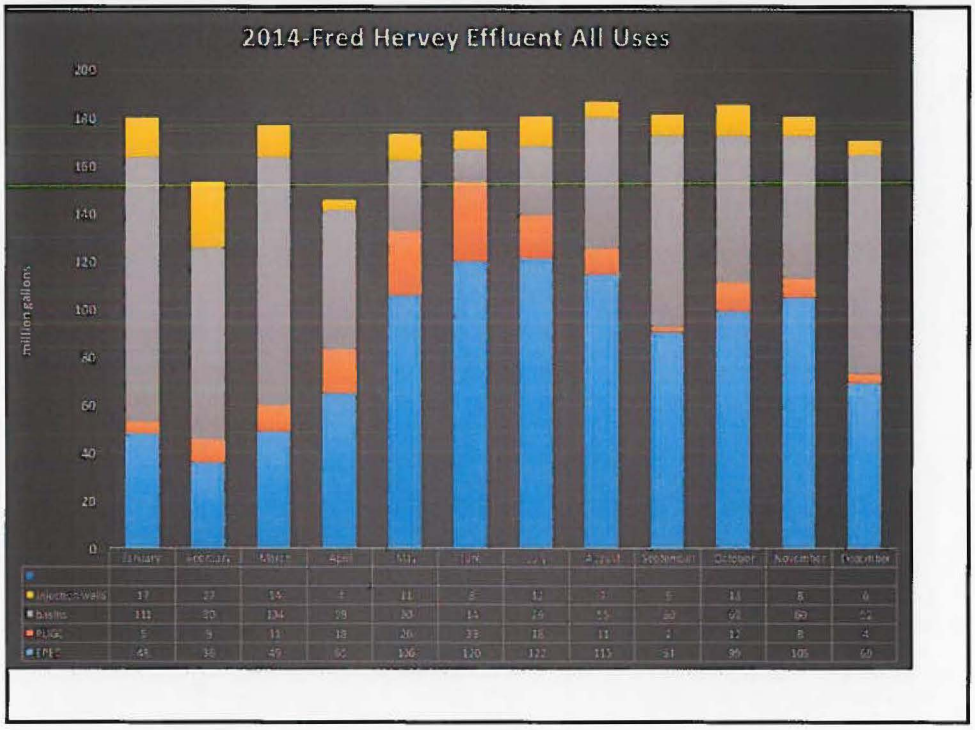
ASR-Detailed Site Plan

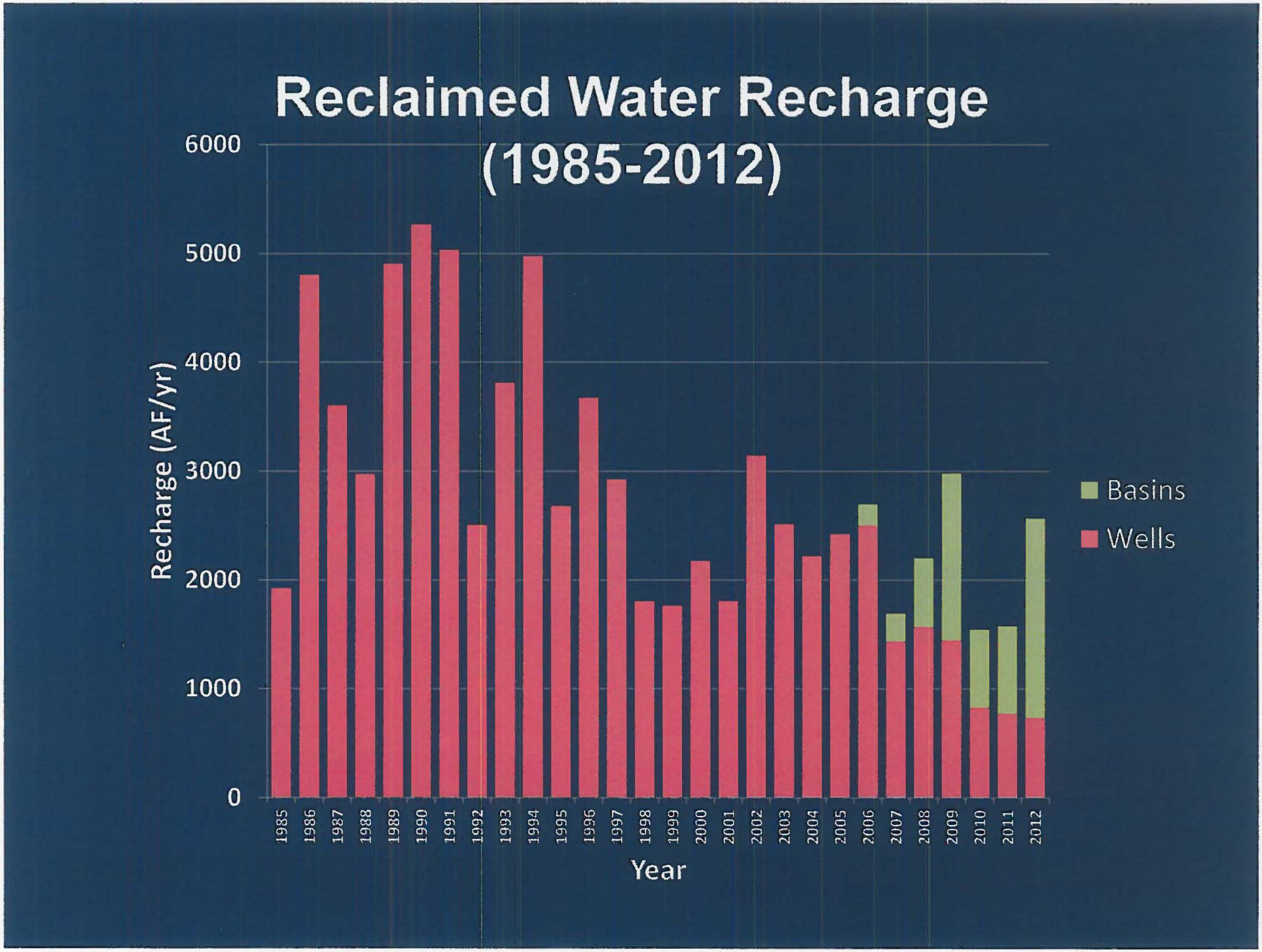


Proposed ASR Site Plan with Enlarged Inserts of Enhanced Arroyo Features and Location of Potential Golf Course Wetland

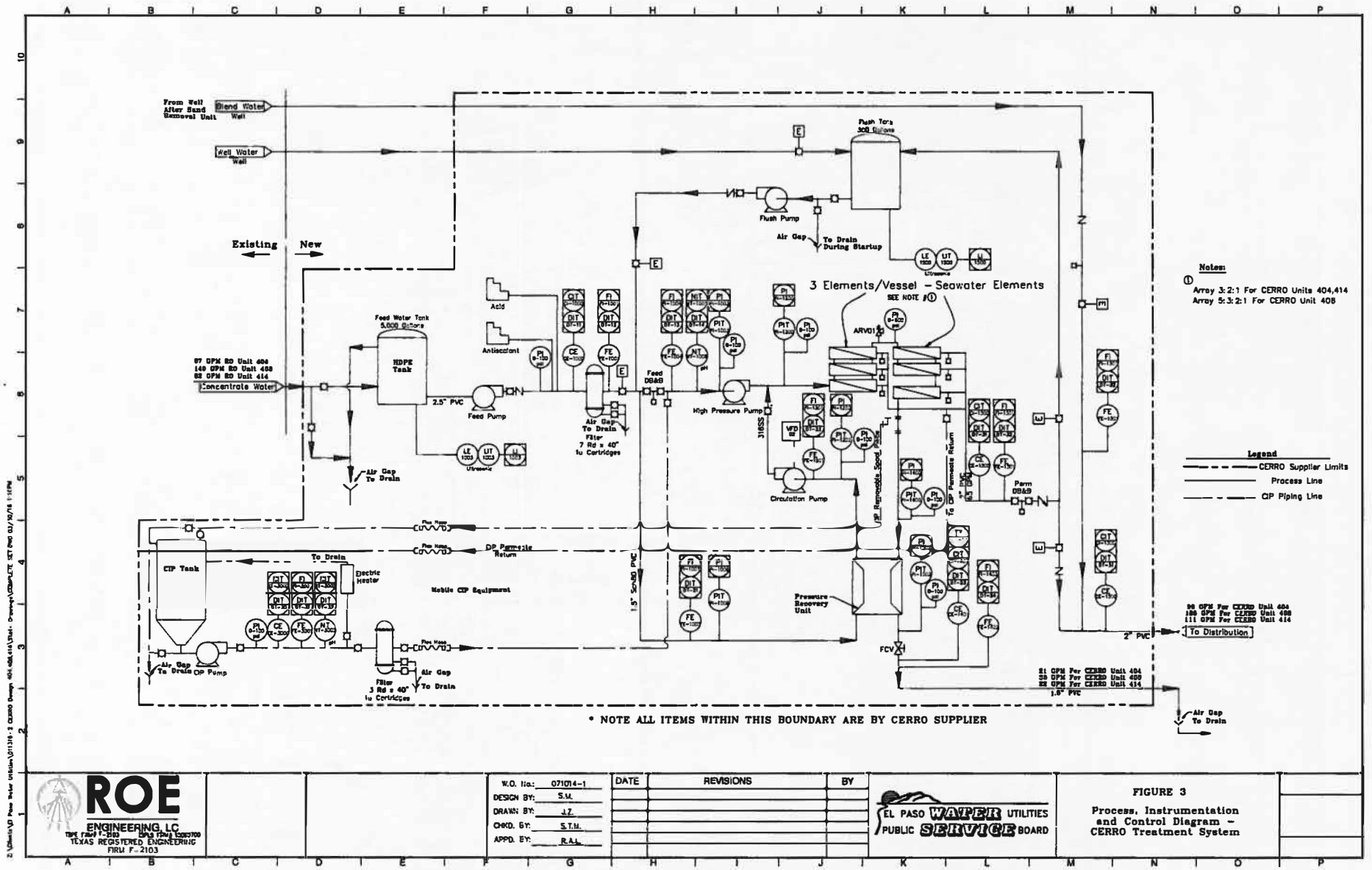



2014 Fred Hervey Effluent Distribution by Use
(acre-feet)
Injection Wells
811, 13%
El Paso Electric
3065, 48%
Basins
1806, 29%
Painted Dunes
Golf Course
639, 10%


2014-Fred Hervey Effluent All Uses
million gallons
200
180
160
140
120
100
80
60
40
20
0


Reclaimed Water Recharge
(1985-2012)
Recharge (AF/yr)
6000
5000
4000
3000
2000
1000
0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year
Basins
Wells

Example of Existing EPWater Infiltration Basin for Fred Hervey Reclaimed Water



ROE ENGINEERING, LC
TEXAS REGISTERED ENGINEERING FIRM F-2103

W.O. No.:	071014-1
DESIGN BY:	S.M.
DRAWN BY:	J.Z.
CHKD. BY:	S.T.H.
APPD. BY:	R.A.L.

DATE	REVISIONS	BY

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

FIGURE 3
Process, Instrumentation and Control Diagram – CERRO Treatment System

Figure 3 - Process, Instrumentation and Control Diagram - CERRO Treatment System

El Paso Electric

December 21, 2016

Mr. Michael Fahy
El Paso Water
PO Box 511
El Paso, TX 79961-0511
mpfahy@EPWU.org

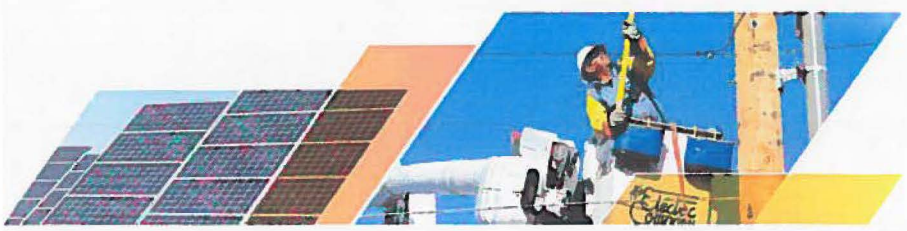
Re: EPWater Proposal to U.S. Bureau of Reclamation Funding Opportunity Announcement No. BOR-DO-17-F003
"Aquifer Storage and Recovery using Reclaimed Water to Preserve the Hueco Bolson through Enhanced Arroyo Infiltration while Creating Wetlands, and Secondarily Reducing Reclaimed Water Demand by Local Power Plant."

El Paso Electric Company (EPE) submits this letter of support for an El Paso Water (EPWater) Proposal to the U.S. Bureau of Reclamation (USBR) for the above referenced funding opportunity.

EPE is a public utility that generates, transmits and distributes electricity across a 10,000 square mile service territory in the Rio Grande Valley of west Texas and south central New Mexico. EPE currently operates three different electric generating stations in Texas. These stations are composed of different electric generation technologies, including: three natural gas-fired boilers; a combined-cycle system comprised of two natural gas-fired combustion turbines (with the associated heat recovery steam generator); four natural-gas fired simple cycle aero derivative gas turbines in peaking/intermediate service; and, a simple cycle natural gas combustion turbine peaker. A substantial majority of EPE's water use provides for system operational cooling with a smaller portion being utilized for environmental control systems.

The EPE Newman Power Station uses reclaimed water from EPWater's Fred Hervey Plant. Recirculation within the cooling cycle is limited by concentration of total dissolved solids (TDS). EPE and EPWater have entertained discussions of a pilot project to install a Concentrate Enhanced Recovery Reverse Osmosis (CERRO) batch treatment process at the Newman Power Station to measure the success, if any, of TDS minimization, increased cooling tower cycling, and ultimate reduction in consumptive water use.

Although EPE cannot predict whether the CERRO process will achieve the goals outlined above, or otherwise comport with our system operations, and can make no commitments regarding long term changes to operations that may be proposed as a result of this investigation, EPE supports the evaluation. As a significant consumer of water, EPE is conscious of the role we play in the regional water equation. As a utility we can positively contribute by always considering the water balance and efficiencies in our operations and we support this cooperative effort with EPWater.



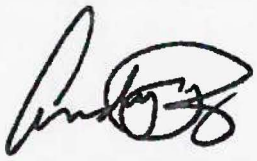
P.O. Box 982, El Paso, Texas 79960
100 N. Stanton, El Paso, Texas 79901
1-800-592-1634 | (915) 543-5711 | epelectric.com

El Paso Electric

December 21, 2016

EPE appreciates USBR's favorable consideration of EPWater's proposal and looks forward to continued partnerships. If you have any questions, please contact me directly at 915.543.4065 or andy.ramiriez@epelectric.com.

Sincerely,



Andy Ramirez
Vice President, Power Generation
El Paso Electric Company

RESOLUTION

A RESOLUTION AUTHORIZING THE PRESIDENT/CEO TO SIGN AND SUBMIT AN APPLICATION TO THE U. S. BUREAU OF RECLAMATION (USBR) FOR UP TO $150,000.00 IN GRANT FUNDS (OVER SEVENTEEN MONTHS) FROM THE 2017 WATERSMART: TITLE XVI FEASIBILITY STUDY PROGRAM, TO EVALUATE THE FEASIBILITY OF ENHANCED ARROYO INFILTRATION TECHNIQUES AND MEMBRANE TEQNIQUES FOR REDUCTION IN COOLING WATER DEMAND BY EL PASO ELECTRIC FOR IMPROVED AQUIFER STORAGE AND RECOVERY (ASR) USING FRED HERVEY RECLAIMED WATER. AND AFFIRMING THE EL PASO WATER UTILITIES PUBLIC SERVICE BOARD'S (EPWATER) COMMITMENT OF AN EQUIVALENT AMOUNT IN CASH PLUS IN "IN-KIND" SERVICES BY EPWATER FOR STAFF MANPOWER AND SUPPLIES REQUIRED.

WHEREAS, the El Paso Water Utilities Public Service Board (EPWater), was established on May 22, 1952, by Ordinance No. 752 of the City of El Paso for the purpose of providing potable water and wastewater collection and treatment for the City of El Paso, and,

WHEREAS, EPWater has historically worked with grant agencies to obtain funds for the research and implementation of water treatment, water conservation, expanding the base of useable water resources, management of membrane treatment processes, and potable water and energy improvement projects to benefit the residents of the City and County of El Paso, to improve the quality and reliability of their water services, and to promote the conservation of water and use of reclaimed water within the service area of El Paso; and,

WHEREAS, EPWater has historically applied for and received USBR grant funds for numerous water resource expansion, conservation, water storage and recovery, reverse osmosis and other water treatment research, infrastructure, supply, monitoring, and reclaimed water projects; and,

WHEREAS, EPWater has budgeted funds for the evaluation of the feasibility of improving the sustainability of the Hueco Bolson using enhanced arroyo infiltration techniques for ASR in northeast El Paso, including preparation of a technical and cost feasibility study according to the USBR Guidelines under the Title XVI Program, which would make the ASR project eligible for 25% federal funding for future design and construction; and,

WHEREAS, EPWater estimates that approximately 3,000 acre feet per year (AFY) of treated reclaimed water from the Fred Hervey Water Reclamation Plant is available for environmental habitat improvements and ASR for eventual use by the public, and an additional 900 AFY of water that could be saved at the Newman Electrical Generating Station for ASR using improved membrane techniques within the cooling water cycle, and both of these annual volumes will increase over time with the expansion of the El Paso population; and,

WHEREAS, EPWater has identified the need for ASR using reclaimed water from the Fred Hervey Plant for future use by the public to conserve water, and preserve the water resources available from the Hueco Bolson during times of river drought within the El Paso area; and,

WHEREAS, EPWater now owns and manages the land in the area of the Northeast Masterplan, and has worked with engineering consultants, researchers, land managers, and manufacturers of purified water treatment equipment, and professionals that are experienced with the design, installation and operation of such state-of-the-art equipment, and such engineers, researchers and manufacturers have expressed their interest in participation in such a project; and,

WHEREAS, El Paso Electric and EPWater have expressed their interests in working jointly to study the membrane methods to reduce cooling water demands at the Newman Generating Station for the mutual benefit of both parties plus the general public; and,

WHEREAS, EPWater will approve the fiscal year (FY 2017-2018) Budget including funds for water resource feasibility studies and capital investment for improving water supplies and treatment at EPWater's facilities; and,

WHEREAS, USBR has released Funding Opportunity Announcement No. BOR-DO-17-F003 soliciting proposals for project funding under their WaterSMART; Development of Feasibility Studies under Title XVI, Water Reclamation and Reuse Program for Fiscal Year 2017, and USBR requires a resolution of this type for submittal of a formal application for grant funds; and,

NOW, THEREFORE, BE IT RESOLVED BY THE PUBLIC SERVICE BOARD OF THE CITY OF EL PASO, TEXAS:

Section 1. That the findings and recitations set out in the preamble to this Resolution are found to be true and correct and are hereby adopted by the Public Service Board (PSB) and made a part of this Resolution for all purposes.

Section 2. That the PSB hereby authorizes the President/CEO to sign any and all documents required for application for USBR feasibility study funds in the amount of up to $150,000.00, and affirms the total commitment of an equivalent amount in local cash plus approximately "in-kind" services, towards the study of the feasibility of enhanced arroyo recharge, water balance for ASR, power generation cooling water reductions, and site locations and requirements within the framework of the land use Masterplan for recharge and recovery of conserved source waters and Hueco Bolson Sustainability using reclaimed water. This action will be in accordance with the U. S. Bureau of Reclamation WaterSMART; Title XVI Feasibility Study Program Grant requirements, applied for as stated hereinabove.

Section 3. That the PSB agrees to conduct this project, if awarded, according to all of the water conservation, water resource development and planning, environmental, engineering, and renewable energy reporting, and accounting procedures required by the U. S. Bureau of Reclamation.

PASSED AND APPROVED at the regular meeting of the Public Service Board, this 14th day of December, 2016, at which meeting a quorum was present, held in accordance with the provisions of Texas Government Code, Sections 551.001, et. seq.

EL PASO WATER UTILITIES
PUBLIC SERVICE BOARD

_____
Chair

ATTEST:

_____
Secretary-Treasurer

APPROVED AS TO FORM

_____
Lee Ann B. Koehler, General Counsel