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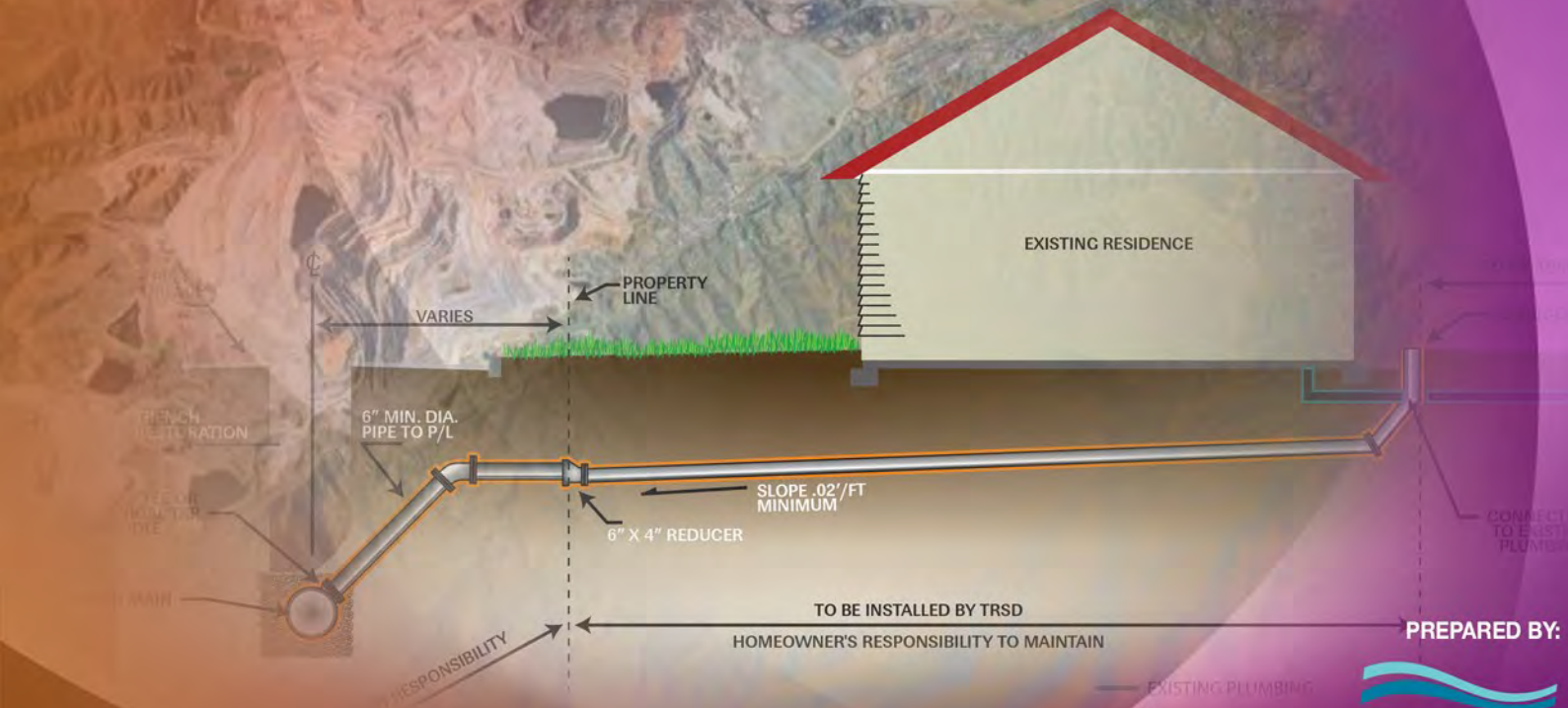
TRI-CITY REGIONAL SANITARY DISTRICT

PRELIMINARY ENGINEERING REPORT (PER) FOR THE WASTEWATER COLLECTION AND TREATMENT

PHASE I OF III



PREPARED BY:

PACE
Advanced Water Engineering

7434 E. MCDONALD DRIVE
SCOTTSDALE, AZ 85250
480.991.3595 | WWW.PACEWATER.COM

PREPARED FOR:

TRI-CITY REGIONAL SANITARY DISTRICT
C/O LAW OFFICES OF WILLIAM L. CLEMMENS
416 WEST SULLIVAN STREET
MIAMI, ARIZONA 85539-1212

&

USDA

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(DECEMBER 2017) - REVISED
(MAY 2017) - REVISED

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Preliminary Engineering Report Update
Wastewater Infrastructure – Phase I of III

Tri-City Regional Sanitary District
Wastewater Collection and Treatment
Gila County, Arizona

April 2018
(December 2017 Revised)

Prepared For:

Tri-City Regional Sanitary District
P.O. Box 2198
Claypool, AZ 85532-2198

Prepared By:

Pacific Advanced Civil Engineering, Inc.
7434 East McDonald Drive, Scottsdale, AZ 85250
Mailing Address: P.O. Box 4805, Scottsdale, AZ 85261
480-991-3595

Expires 12/31/2020

Contact Persons:
Michael G. Krebs, PE
Duong Do, PE

PACE JN A128

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Contact Information

Owner:

Tri-City Regional Sanitary District
P.O. Box 2198
Claypool, AZ 85532-2198
Contact: Mr. Robert J. Zache
928-961-0392

General Counsel:

William L. Clemmens
Law Offices of William L. Clemmens
416 West Sullivan Street
Miami, AZ 85539-1212
928-812-3604

Assessment District Attorney & Bond Counsel:

Fred H. Rosenfeld, Attorney at Law
Gust Rosenfeld P.L.C.
One East Washington Street, Suite 1600
Phoenix, AZ 85004-2553
602-257-7413

Financial Consultant:

Leo V. Valdez, Senior Vice President
Hutchinson, Shockey, Erley & Co.
1702 East Highland Avenue, Suite 316
Phoenix, AZ 85016-4667
602-263-0163

Project Civil Engineer:

Pacific Advanced Civil Engineering, Inc. (PACE)
Project Manager: Michael Krebs, PE

Phoenix Office:
7434 East McDonald Drive
Scottsdale, AZ 85250-6018
480-991-3595
Project Manager: Michael Krebs, PE

Main Office:
17520 Newhope Street, Suite 200
Fountain Valley, CA 92708-8206
714-481-7300

Abbreviations

AAC ..... Arizona Administrative Code
ADEQ ..... Arizona Department of Environmental Quality
AIS ..... American Iron and Steel
AMEC ..... AMEC Earth & Environmental, Inc.
AZPDES ..... Arizona Pollutant Discharge Elimination System
BADCT ..... Best Available Demonstrated Control Technology
BHP ..... BHP Billiton
BNR ..... Biological Nutrient Removal
CAG ..... Central Arizona Governments
CDP ..... Census Designated Places
CSR ..... Continuously Sequencing Reactor
CVSD ..... Cobre Valley Sanitary District
CWA ..... Clean Water Act
DMA ..... Designated Management Area
EA ..... Environmental Assessment
EAAS ..... Extended Aeration Activated Sludge
EDU ..... Equivalent Dwelling Unit
EPA ..... Environmental Protection Agency
ER ..... Environmental Report
FMI ..... Freeport McMoRan Inc.
Globe ..... City of Globe
GPCD ..... Gallons per Capita per Day
GPM ..... Gallons per Minute
GPD ..... Gallons per Day
IGA ..... Intergovernmental Agreement
IPR ..... Improvements on Possessory Rights
LF ..... Linear Foot
MBR ..... Membrane Bioreactors
MGD ..... Million Gallons per Day
Miami ..... Town of Miami
MLSS ..... Mixed-liquor Suspended Solids
NOV ..... Notice of Violation
NPV ..... Net Present Value
O&M ..... Operation and Maintenance
PACE ..... Pacific Advanced Civil Engineering, Inc.
PCWWTF ..... Pinal Creek Wastewater Treatment Facility

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PER.....Preliminary Engineering Report
PPM .....Parts per Million
PSD .....Pinal Sanitary District
RD .....Rural Development
ROI.....Resolution of Intention
ROW .....Right-of-Way
RUS .....Rural Utilities Service
SBR.....Sequencing Batch Reactor
SPPW .....Single Payment Present Worth
SRT.....Solids Retention Time
TRSD .....Tri-City Regional Sanitary District
USACE.....United States Army Corp of Engineers
USDA .....United States Department of Agriculture
USPW .....Uniform Series Present Worth
WIFA.....Water Infrastructure Finance Authority of Arizona
WRF .....Water Reclamation Facility
WWTP .....Wastewater Treatment Plant

Executive Summary

The Preliminary Engineering Report (PER) presents herein the entire project that Tri-City Regional Sanitary District (TRSD) is proposing to complete. TRSD encompasses an area of approximately 5.45 square miles located in Gila County, Arizona between the Town of Miami and City of Globe. The project objective is to provide a wastewater collection and treatment system to its residents to address the public health issues associated with current wastewater treatment methods. Nearly 90% of the residential properties within TRSD have onsite treatment systems (cesspools and substandard septic tanks) in violation of the CWA, AAC, and or ADEQ regulations.

Due to the magnitude of the overall project, it was considered imperative to introduce and summarize the total project to illustrate the undertaking. The project encompasses a three-phase approach based on direction from USDA related to the funding process/availability. The whole proposed project is discussed to present a general overview and then Phase I of III is detailed and analyzed.

For Phase I of III only, this PER evaluates three alternatives to address the public health issues and provides recommendations for wastewater collection and treatment improvements. It is the project examined in Phase I of III that is referenced as the "Project" throughout this PER. The Phase I alternatives were developed to clearly and accurately reflect the conditions and needs of the TRSD. This report describes the work involved with the considered alternatives along with land requirements, environmental impacts, potential construction issues, capital costs estimates and other considerations. Then a life cycle present worth cost analysis examining construction costs, non-construction costs, annual O&M costs, short-lived assets, and salvage values for the viable alternatives is presented.

The following alternatives are considered to address the wastewater issues:

Alternative 1: No Action

Alternative 2: Phase I of III Wastewater Flows would be conveyed to the Miami Water Reclamation Facility (WRF)

Alternative 3: Phase I of III Wastewater Flows would be conveyed to a newly constructed TRSD Water Reclamation Facility (WRF)

Alternative 1 proposes no changes to the current wastewater treatment methods that are posing public health issues in the community. If no changes are made, the condition of the facilities will continue to deteriorate, resulting in the increased potential for existing cesspools and septic tank overflows, tank failures, and the introduction of pollutants into the environment. This alternative also continues to limit the potential uses and ability to sell the existing property located within the TRSD, as well as further the continued abandonment of residential properties. Alternative 1 is not considered a viable option due to the public health and safety risks of not moving forward with these improvements.

Alternative 2 and Alternative 3 are feasible, viable solutions to address the health and safety risks associated with the current onsite treatment and discharge of wastewater within the TRSD. Alternative 2 has a slight advantage when considering the life cycle present worth cost analysis, however due to the magnitude of the project they are virtually equal, coming within <1% of the other.

To undertake this project, TRSD must consider additional factors aside from the technical and costs perspectives. The TRSD Board is committed to providing the residents and businesses with a cost effective, reliable and long-term solution. TRSD must maintain control of the cost of maintenance and operation of the wastewater treatment system once it is in place. It is vital to the TRSD that the well-being (health, safety and financial aspects) of the residents of the TRSD is assured through TRSD control over the management and rate structure to provide reliable and service at a fair cost.

Alternative 2 requires working with the Town of Miami (Miami) to negotiate an intergovernmental agreement (IGA) for the TRSD flows to be conveyed to and treated by the Miami WRF. Through the course of these negotiations, a number of factors that were revealed which render the Alternative 2 not

viable. With further project development and information gathered, major changes in the evaluation have affected the viability of Alternative 2. The major items are as follows:

1) Negotiation of an Intergovernmental Agreement (IGA) with Miami:

   A Special Election was held in November 2015 in which the TRSD voters agreed that the TRSD Board could enter into an IGA with Miami for the purchase of wastewater treatment capacity if negotiations could be reached for terms that are in the best interest of the TRSD customers.

   The TRSD Board and staff have worked diligently for over three (3) years through numerous communications and meetings to develop an acceptable agreement, but the TRSD proposed terms have been rejected by Miami. TRSD Board has openly communicated with Miami in an attempt to come to a mutual agreement on fair conditions of an IGA for the treatment of TRSD wastewater flows. Approximately sixty (60) meetings have taken place in these efforts and these have not been successful.

2) TRSD Receipt of Miami's Audited Financial Statements:

   To be able to accurately estimate the costs to convey the TRSD wastewater flows to the Miami WRF for treatment, TRSD must have full access to the financial records of Miami concerning the operation and maintenance of the facility. Without adequate financial records, the Engineer, Bond Council and TRSD Board cannot appropriately evaluate and recommend reliance on Miami for wastewater treatment without understanding what it costs to run the Miami WRF. It has been impossible to obtain actual treatment costs information. Even after numerous requests for sewer fund budgets and actual costs, to date, no information has been provided by Miami concerning the costs of wastewater treatment at the Miami WRF. Only estimated cost of operations has ever been received from the Miami engineer (HilgartWilson, LLC).

   TRSD remains firm on the position that for a true evaluation of Alternative 2, this financial information must be provided to TRSD. Alternative 2 of this PER for Phase I of III is somewhat unique in that one governmental entity is completely relying on another for wastewater treatment. Without the required Miami financial information, TRSD is unable to assess the reliability of its proposed partner in serving its residents and businesses.

   It should be noted that the cost used for the evaluation in this PER for Miami to treat the TRSD wastewater as billed to TRSD monthly is based on the stated estimated costs of operating the Miami WRF. Additional factors that would affect the evaluation of true cost are the unknowns of the current conditions at the Miami WRF (any required improvements to be able to acquire the TRSD capacity) and the impact to the TRSD treatments costs due to recent rate increases for the Miami WRF customers.

TRSD believes that the ideal solution for the TRSD service area and surrounding areas is to create a true regional solution by joining with the neighboring communities to provide effective and affordable wastewater collection and treatment services to the residents of the area. However, TRSD has made numerous efforts over the years and has recently continued to try for a successful collaboration for joint ownership. TRSD continues to be met with resistance in the sharing and gathering of information sufficient to allow for the development of a PER for such a regional solution.

With the consideration of all current information and unsuccessful Miami negotiations, Alternative 3 is the recommended alternative.

Approximately 1,600 residents will directly benefit from Phase I of this new collection and treatment system and the entire community will begin to see some environmental and economical improvements in the area. This project consist of 58,000+/- linear feet (LF) of gravity sewer lines, 7,500+/- LF of force main, approximately 145 new manholes, 856 new services connections, and a newly constructed 0.25 MGD membrane bioreactor water reclamation facility.

1 Project Planning

1.1 Location

TRSD is located in an unincorporated area bordered on the east side by Globe and on the west by Miami. Phoenix is located approximately 80 miles to the west and Tucson is approximately 110 miles south. TRSD encompasses the properties as defined by the legal description in Appendix A, and is tasked with providing adequate treatment for all wastewater produced within the TRSD DMA boundary. This includes any small areas contained within TRSD currently being serviced by Globe and Miami. The boundaries of the TRSD service area are illustrated in Figure 1 below and Exhibit 1.

Figure 1 – Location Map

1.2 Environmental Resources Present

TRSD encompasses an area of approximately 5.45 square miles located in Gila County between the Town of Miami and City of Globe. TRSD lies within the Upper Pinal Creek watershed, Russell Gulch watershed, Bloody Tanks Wash watershed, and Miami Wash watershed at approximately 3,400 feet above mean sea level. The major stream drainages in the area are the Bloody Tanks wash (southwestern to northeastern flow) and the Miami wash watershed (flows north of the Bloody Tanks Wash and is east of Miami).

The Miami, Globe and TRSD areas were originally established due to the rich bodies of copper ore discovered within the surrounding Webster, Granite, and Pinal Mountains in the late 1800s. Globe was

founded in 1876 and incorporated in 1907, while Miami was established in 1907 and incorporated in 1918. The main economy of the Globe-Miami area remains heavily involved in the mining industry with over 20 percent of its employment related to mining and copper production (Arizona Department of Commerce 2014).

Mean temperatures in Miami range from 49° F in January to 86° F in July. Globe mean temperatures range from 44° F in January to 82° F in July. Annual precipitation in the area of the TRSD averages about 19 inches with a majority of the precipitation occurring in December through March and July through September.

An Environmental Assessment (EA) has been prepared by Logan Simpson Design, Inc. to assess the environmental impacts related to this proposed project. Included in this assessment is a Class I and Class III Cultural Survey, and a biological evaluation.

1.3 Population Trends

To develop a reasonable estimate of the population trends and growth within the TRSD, the growth patterns in Miami and Globe were examined. See Table 1 – Census Designated Places for population trends within the Globe-Miami area.

Table 1 – Census Designated Places

Census Designated Places (CDP)	1990	2000	2010	1990-2010
City of Globe	6,062	7,486	7,157	18%
Town of Miami	2,018	1,936	1,765	-13%
Claypool CDP	1,942	1,794	1,538	-21%
Central Heights-Midland CDP	2,969	2,694	2,534	-15%
Globe-Miami Region CDP's	12,991	13,910	12,994	0%

Note: City of Globe decreased 4% in population from 2000-2010

Miami, Claypool, and Central Heights-Midland City have all experienced a consistent decline in population for the past 20 years. Globe did sharply increase in population between the 1990 and 2000 census, but has since declined in the most recent census. This shows a regional trend of population decline.

The population decrease in these TRSD communities can be attributed to the diminishing conditions, amount of abandoned properties, and/or properties that have had water supply disconnected due to violations of onsite wastewater management. Additionally, mining activity in the region can affect population growth/loss within the region. It is our assumption that if a sewer collection system were installed within TRSD, property owners would have the means and motive to rehabilitate their property. Therefore, historical population trends will not be used to determine future population growth; instead an analysis of new service areas to be provided with collection service will be surveyed to determine maximum build-out wastewater flows. See Section 3-3 – Reasonable Growth for explanation of estimating wastewater flows within the TRSD.

Precise population records for the TRSD are not available, however, information has been gathered from the Environmental Justice Screening and Mapping Tool (EJSCREEN) provided by the Environmental Protection Agency (EPA) to gain an understanding of the affected population for this project by drawing out the boundary to get a more accurate population. Overall, the entire TRSD population is approximately 4,200. The TRSD Phase I affected population based on the 2010 Census is approximately 1,600. The EJSCREEN 2011-2015 growth estimates seem extremely high for the area especially when comparing to the actual trends shown for the Census Designated Places above. For the purposes of this report and evaluation, the Census 2010 Population will be used to illustrate the affected population. See Appendix A for TRSD Legal Description & Affected Population for detailed backup of the data in the following Table 2 - EJSCREEN Population Data.

Table 2 – EJSCREEN Population Data

Data Description	TRSD Phase I
Census 2010 Population	1,586
Census 2010 Housing Units	777
Census 2010 Persons/Housing Units	2.04
ACS 2011-2015 Population Estimate	1,922
ACS 2011-2015 Housing Units Estimate	863
ACS 2011-2015 Persons/Housing Units Estimate	2.23
Population Growth Estimate	336
Population Growth Estimate %	17%

1.4 Community Engagement

As outlined in the Executive Summary, a Special Election was held granting the power to the TRSD Board to approve aspects of the proposed Alternative 2 project for a potential IGA with the Town of Miami. Further, an Assessment District Approval process will be required to allow the District Board to incur debt for the Project. The following sections describe those conditions and the process required for approval.

1.4.1 Special Election to Approve Intergovernmental Agreement (IGA)

Arizona Revised Statutes (A.R.S.) § 48-2017 requires that TRSD obtain approval of any IGA entered into for treatment of wastewater outside its boundaries by the TRSD electors through a special election to approve the agreement or contract. In preparation of the IGA negotiation, TRSD passed and adopted Resolution No. 15-01 in which TRSD Board, pursuant to Arizona Revised Statues 48-2017, called for a special election to determine if TRSD should enter into negotiations with the Town of Miami through an IGA for the purchase of capacity and services for the treatment of its wastewater flows from its proposed collection system. This gave the Board the ability to enter into an IGA agreement if the negotiated terms were in the best interest of the TRSD customers. In November of 2015, a Special Election was held and 70% of the 1,277 voted to give permission to the TRSD Board to enter such into negotiations. The negotiations were not successful as the terms presented by the TRSD Board to the Town of Miami were rejected.

1.4.1.1 Meetings and Presentations

Multiple meetings open to the public have been held to provide information concerning the Project to the residents and businesses within TRSD. These meetings were be held to ensure the public understands the Project details and terms of a potential IGA. IGA negotiations with Miami were unsuccessful and no draft IGA was presented to the public.

1.4.2 Assessment District Process

TRSD intends on incurring debt to fund infrastructure improvements through an Assessment District Process. A Resolution of Intention (ROI) will be created to introduce the proposed improvements, engineer's best estimate of cost, funding options for the project, and estimated user rates and assessment costs.

The Assessment District Process requires TRSD to post signs conspicuously along the proposed improvements and not more than 300 feet apart. The community will be informed about all aspects of the Project through a series of presentations, meetings, open discussion meetings, handouts, posters, articles, and flyers. The outreach will educate the community of the current conditions of wastewater treatment within the TRSD boundaries and the need for the proposed project.

TRSD will mail notice of passage of the ROI to each owner of property fronting on the proposed improvement. Owners with property with frontage will have 15 days to protest the proposed project. Votes will be determined by the length, in feet, of frontage of each individual property. The votes will be counted and majority votes will decide the outcome. If majority protests the project it cannot be re-initiated for at least six months.

2 Existing Facilities

2.1 Location Map

Unincorporated areas of Gila County between Miami and Globe make up the TRSD service area. See Exhibit 1 for the boundary of the TRSD and any existing facilities within the region.

2.2 History

As this area was originally settled, sanitation for the area was handled primarily by outhouses and cesspools, which were constructed on an as-needed basis.

2.2.1 Brief History of TRSD

The first semblance of a sanitary district was created in 1968 when the Cobre Valley Sanitary District (CVSD) was formed. At approximately the same time, the Pinal Sanitary District (PSD) was formed and encompassed the area adjoining CVSD.

In June of 2011, the CVSD and PSD merged to form the TRSD. The newly formed district created by the merger had as its goal the development of a regional wastewater collection and treatment facility. Due to the merger, a TRSD legal description was created by uniting the CVSD and PSD boundaries. See Appendix A for this legal description. As a part of this Project, a recent boundary survey was performed to formally document this boundary. The TRSD Board will officially pass a resolution to accept this as its legal district boundary.

It should be noted that this merger included the uniting of the two Designated Management Areas (DMA). Therefore TRSD has been granted DMA Administrative status over both districts. As a part of this project, TRSD will prepare an amendment to the CAG 208 Water Quality Management Plan. This amendment will include an administrative change to identify TRSD as the DMA of the CVSD and PSD service areas. Arizona Department of Environmental Quality (ADEQ) has formally identified this designation (Appendix B). The TRSD PER identifies a preferred alternative for providing effective regional wastewater management for the foreseeable future.

2.2.2 Brief History of the Town of Miami

In the early 1920s Miami sewage was conveyed to treatment lagoons near the eastern end of Miami which is now referred to as the public works yard. In the 1980s, Miami decommissioned the treatment lagoons and constructed a new passive aerobic lagoon treatment system on top of the southeastern area of the Freeport McMoRan Inc. (FMI) Tailing Impoundment No. 3. The aerobic lagoon treatment system was replaced, financed and constructed by FMI to assist Miami. The original treatment system was replaced with the current 640,000 GPD Miami WRF within the last 5 years.

2.2.3 Brief History of the City of Globe

In the 1920s, Globe sewage was conveyed to treatment lagoons located within the Pinal Creek area to the northwest of Globe. In 1973, the Cities Service Company constructed the Holgate Wastewater Treatment Plant (WWTP) which was deeded to Globe in 1974. Sometime in the late 1980s, the Holgate Plant was converted into a pump station and Globe constructed a new 1.2 million gallons per day (MGD) Pinal Creek Wastewater Treatment Facility (PCWWTF) north of Globe. The Holgate Treatment Plant and later pump station operated by Globe provides wastewater treatment to several commercial businesses adjacent to US 60, the Copper Country Mobile Home Park and Pioneer Hills Subdivision.

2.2.4 Brief History of Regional Studies

Several studies have been conducted to manage or mitigate wastewater flows from within the TRSD areas. The first study began in 1972 and had similar problems that are addressed within this PER. Prior studies are listed below:

- Greater Globe-Miami Wastewater Project (1972)
- Environmental Impact Statement (EIS) – Greater Globe-Miami, Arizona Wastewater Treatment Project (1976)
- CVSD Sewage System Analysis (1981)
- Pinal Sanitary District Wastewater Management Plan (1984)
- Central Arizona Association of Governments (CAAG) 208 Plan Amendment (2017)
- Regional Wastewater Study (2001)

Recommended solutions to solve the ever-growing wastewater treatment concerns within the region proposed in the studies above are relatively similar to those recommended within this PER. In fact all of the studies recommend a regional facility which TRSD has advocated. However, as a sanitary district, TRSD is limited to what it can and cannot do with existing neighboring communities. In preparing this PER the recommendation of TRSD is severely limited as to the best solution for the region by the fact that the neighboring communities have failed to recognize that the wastewater treatment business is a "not-for-profit" venture by failing to join with TRSD to create a true regional solution for the treatment of wastewater. Today is no different than in 1972 when the initial study addressed the same problem 43 years ago.

2.3 Condition of Existing Facilities

2.3.1 Existing Conditions of TRSD

Many of the existing septic systems and cesspools within the TRSD are in poor and failing condition. The use of cesspools was prohibited as stated in the Arizona Administrative Code (AAC) R18-9-A309.A.4. Cesspools were prohibited in the 70's because they were described as a health and safety risk to humans and the environment. Based on recent discussions with Gila County, an analysis of residential properties within the TRSD indicates 89% of the existing facilities are in violation of the Clean Water Act (CWA) and AAC. Also, a study was conducted in 2012 by Gila County to assess sewage treatment within the TRSD named "Sewage Treatment Study, Tri-City Regional Sanitary District" dated November 2012 (2012 Study) by Jake Garrett, PE, Gila County Wastewater Department Manager and Jim Berry, Gila County Wastewater Department Engineering Technician (Appendix C) discussing the use of either cesspools or substandard septic systems for sewage disposal within TRSD.

Gila County has documented the development of residential homes including real property, Improvements on Possessory Rights (IPR), and motor homes since 1905. Most homes constructed from 1905 to 1970 used cesspools as primary means of sewage disposal. In the 1970's, construction of cesspools was prohibited in the United States due to their inability to treat wastewater before discharge. Further regulations were established in 1990 to improve septic system processes and testing. Thus, two major assumptions are used in this report to determine the current conditions of the TRSD existing facilities. All residential homes built between 1905 and 1970 are assumed to currently use cesspools. All residential homes built between 1970 and 1990 are assumed to have substandard septic systems. Therefore, all existing homes constructed between 1905 and 1990 are assumed to violate current standards for sewage disposal. See the following Table 3.

Table 3 - Status of Residential Treatment Systems Throughout TRSD

Total Estimated Residential Properties	**1,827**	
Residential Properties with Cesspools	1,188	65%
Residential Properties with Substandard Septic Systems	434	24%
Total Systems in Violation	1,622	89%
Total Adequate Systems	205	11%

ADEQ has delegated enforcement of the use of cesspools and independent septic systems to Gila County. Gila County does not actively enforce cesspool or septic system violations within Gila County, including TRSD, until a public complaint is filed. Records of complaint case histories are available from mid-2007 to the 2012. See Appendix C which summarizes the 75 parcels with reported violations of onsite sewage system from the available record. It does not reflect the total number of the parcels with substandard systems within the TRSD or that are in violation of current laws and regulations. There are more than 25 recorded Notices of Violation (NOVs) for both sewage and greywater. Many of the NOVs were issued because the cesspool had collapsed and raw sewage was ponding or flowing off the property. Many NOVs were also written for greywater (Merriam-Webster defines as: household wastewater (as from a sink or bath) that does not contain serious contaminants (as from toilets or diapers)) was being actively pumped onto the surface of the adjoining property. Some homeowners with failing cesspools have pumped greywater onto the surface to prevent the cesspool from overflowing. All complaints prior to 2007 were discarded when ADEQ's audit directions changed.

Gila County has discontinued the process of actively seeking out properties in violation as the net outcome may result in a large portion of the community being disconnected from water services. This has led to and will continue to lead to increased abandoned buildings and/or hardship to the community. Gila County does not allow expansion or remodeling of any home served by a cesspool, and banks throughout Arizona have been declining to lend on homes served by cesspools. Properties within TRSD have been abandoned or used for storage due to the water service being turned off. Gila County has estimates that 300-400 homes within TRSD have been abandoned.

A majority of the homes within the TRSD do not have enough usable land on which to install a replacement septic system. It is estimated that the average lot size in the TRSD is 5,000 ft^2 while the mining subdivisions have lot sizes of 3,750 ft^2, which equates to an average density of 8.72 to 11.63 homes per acre. Current regulations require any subdivisions with a density of greater than one (1) home per acre to reduce the Nitrogen contribution to the ground in addition to removing the biological contaminants and viruses through advanced treatment systems or a sewer collection and treatment system. Some small lots qualify to use the enhanced sewage treatment qualities of an alternative system to overcome the lot limitations. However, the system cost is normally more than the appraised value of the property. Some multiple lot properties have been able to replace failed cesspools with septic systems. Usually there are multiple cesspools replaced by one septic system.

Bechtel Tract, within the Russell Road Area (southern portion of TRSD), is a 40-home neighborhood currently conveys wastewater to a storage container intended to be used as a septic tank northwest of the neighborhood that discharges its effluent via a subterranean drainage system (leach field). The system was constructed in the 1940's. Due to the deteriorating collection lines and substandard disposal, this system poses significant health and environmental concerns.

From a public health standpoint, without the installation of a wastewater collection and treatment system, the unsanitary conditions will progressively worsen. As more and more cesspools and septic systems fail, homeowners of these small properties will allow wastewater to flow onto the ground until reported. As system failures become more frequent the potential for waterborne illness increases. Children, the elderly, pets and wildlife are at higher risk as they are more vulnerable to contaminated areas that are exposed due to failing systems.

Without the installation of a regional wastewater collection and treatment system, economic hardship will continue. The smaller parcels will progressively be abandoned as the water service is shut off based upon a failed wastewater treatment system, resulting in increased vacancy, declining property values, and economic hardship for the owners who will not be able to sell their properties.

2.3.2 Existing Conditions of Neighboring Wastewater Treatment Systems

2.3.2.1 Town of Miami

The Miami WRF has a permitted maximum treatment capacity of 640,000 GPD. Based on Miami current and projected flows at the facility, 225,050 GPD of that capacity is available for purchase by TRSD. The Miami WRF sits at an approximate elevation of 3,366 ft. above sea level. Effluent from the Miami WRF is

currently being used as a secondary water source by a nearby copper mining operation. The facility is currently permitted to produce Class A+ effluent. Currently, the conditions of the Miami WRF and other sewer infrastructure are unknown as no information and/or service records have been provided by Miami.

The Miami lift station serving the Miami collection system is currently designed for 2030 projected flows and not in conjunction with the Miami WRF design capacity. The pump house was designed to have three operable pumps located in a dry well. The pumping arrangement is designed for an average annual daily flow of approximately 405,000 GPD or 282 gallons per minute (GPM) with one pump operating and a peak daily flow of approximately 880,000 GPD or 613 GPM with two pumps operating. The third pump serves as a redundant standby pump in case one of the other pumps fails.

Discussions with Miami personnel and Miami's consulting engineer have revealed that the pump house has been troubled with multiple pump failures due to high grit volumes. The pumps were previously upgraded with hardened impeller pumps to handle the grit loading. However, even with the hardened impellers the pumps are not able to reach expected life duration and are limiting the pump house to operation with only one or two operable pumps.

The large grit volumes are believed to be caused by the infiltration due to the outdated Miami collection system. It is not confirmed but believed that until a new Miami collection system is constructed, the pump failures will continue to be a concern at the pump house.

The current pumps and force main from the Miami pump house to the Miami WRF (a 6" diameter pipe) are designed to convey Miami 2030 projected flows. The addition of TRSD wastewater flows to the Miami WRF would require the construction of a new parallel force main and lift station.

2.3.2.2 City of Globe

The Globe PCWWTF has a design capacity of 1.2 MGD. Based on current flows being processed at the facility, 600,000 GPD of the 1.2 MGD capacity is available for purchase by TRSD. The PCWWTF sits at an approximate elevation of 3385 ft. above sea level. Currently the permit for the Globe facility allows it to produce Class B effluent, with future plans to upgrade to Class A+. Effluent from the Globe facility is being discharged into the Pinal Creek / Salt River Basin per Environmental Protection Agency (EPA) and ADEQ standards. Based upon our visits to the Globe PCWWTF, the facility is in great need of updating as the current system is not operating as designed. Future costs for updating or upgrading the facility are unknown at this time.

The utilization of the Globe PCWWTF for treatment of wastewater has not been considered in the PER because of the location of TRSD Phase I relative to both the Miami WRF and the proposed TRSD WRF location.

2.4 Financial Status of Any Existing Facilities

2.4.1 Current Wastewater Rates

Currently there is no rate schedule as the TRSD does not serve any customers. Rate schedules will need to be established once improvements have been made. Estimated rates can be seen in Section 6.7 Estimated Sewer and Assessment Rates.

2.4.2 Average Wastewater Rates

The TRSD does not currently serve any customers and therefore does not charge any rates; the average rate is $0.

2.4.3 Annual Operation & Maintenance (O&M) Costs

Since the TRSD does not serve any customers and therefore does not charge any rates the average rate is $0. However, it should be noted that business and homeowners with individual cesspools and septic system will continue to maintain their onsite facilities. The maintenance costs associated with maintaining those systems can vary greatly.

2.4.4 Annual Revenues and Expenditures

The current annual expenditures of the TRSD are minimal, as it does not operate or maintain any wastewater infrastructure. The revenues are currently obtained through Gila County Secondary Tax Assessments. The TRSD annual revenues and expenditures are summarized in the following Table 4.

The tax revenues are secured by Gila County on an annual basis. Since 2015, the State uses one type of property value for taxing purposes, known as the Limited Property Value (LPV). See Appendix D for Gila County TRSD tax information for tax years 2014 through 2017.

Table 4 - TRSD Actual Annual Revenues and Expenditures

Category	2014	2015	2016	2017
Cash on Hand	$ 121,250	$ 148,187	$ 177,776	$ 207,737
Revenues				
Interest	$ 333	$ 923	$ 493	$ 1,205
Secured Taxes	$ 21,432	$ 58,103	$ 109,580	$ 96,668
Unsecured Taxes	$ -	$ -	$ -	$ 1,211
WIFA Planning Grant	$ 29,235	$ 5,745	$ -	$ -
Total Revenues	**$ 51,000**	**$ 64,771**	**$ 110,073**	**$ 99,084**
Expenses				
Legal Fees	$ 17,400	$ 12,767	$ 32,746	$ 31,363
Board Expenses	$ -	$ -	$ -	$ -
Web page	$ -	$ 771	$ 681	$ 725
Publishing / Printing	$ 885	$ -	$ 505	$ 87
Office Supplies / Postage	$ 106	$ 232	$ 114	$ 110
Travel	$ 474	$ 580	$ 484	$ 427
Special Elections - Gila County	$ -	$ -	$ 5,502	$ -
Part Time District Manager	$ -	$ 18,175	$ 900	$ -
Engineering	$ -	$ 13,994	$ 30,002	$ 34,843
WIFA Grant Match	$ 17,441	$ -	$ -	$ -
WIFA Grant (Assessment)	$ 29,235	$ -	$ -	$ -
Insurance – Liability	$ -	$ -	$ 9,185	$ 1,129
Legal / Land / Admin (WIFA Loan)	$ -	$ -	$ -	$ -
Accounting / Bookkeeping	$ 293	$ 521	$ 366	$ 439
Total Expenses	**$ 65,834**	**$ 47,040**	**$ 80,484**	**$ 69,123**

2.4.5 Capital Improvement Programs

The TRSD does not currently have any capital improvement programs in place. Other than the proposed project outlined in this PER, the TRSD does not have any other improvements planned.

2.4.6 Status of Existing Debts and Established Reserve Accounts

The TRSD does not currently have any loans, debts, required service accounts, or other obligations.

2.4.7 Owner Contributions to Project

During the course of the planning of the TRSD Wastewater Collection and Treatment System project, there has been costs incurred by TRSD and shall be considered Owner Contributions. These costs are in addition to the PER project cost and are not included in the PER Proposed Project cost. The following Table 5 details these contributions.

Table 5 - TRSD Current Owner Contributions

Description	Amount
General Election	
IGA General Election	$ 10,000
Engineering	
Original PER by AMEC	$ 154,418
Reimbursable Expenses	$ 19,605
PER Update	$ 16,250
Funding Assistance	$ 24,718
Public Meetings & Preparations	$ 1,809
Parcel Research & Adjoining Communities	$ 10,367
Environmental Assessment (including Biological/Cultural Surveys)	$ 55,001
Assessment District Meetings	$ 6,880
Bechtel Tract Evaluation	$ 13,896
Engineering Subtotal	$ 302,944
Owner Contributions Grand Total	**$ 312,944**

2.5 Water / Energy / Waste Audits

The most recent known completed study to evaluate the condition of the wastewater treatment infrastructure in the TRSD area provides information on facilities in violation with Gila County. It is a 2012 Sewage Treatment Study (Appendix C) that reported multiple cesspools and underperforming septic systems within the TRSD. The key findings reported in the study are discussed in Section 2.3 - Condition of Existing Facilities. The existing conditions of the TRSD are of high health hazard to the public and have a serious impact on the environmental conditions for the region. A collection system needs to be constructed to remove the substandard and outlawed operation of cesspools and underperforming septic systems.

3 Need for Project

3.1 Health, Sanitation, and Security

As discussed in Section 2.3.1 Existing Conditions of TRSD, nearly 90% of the residential properties within TRSD have onsite treatment systems in violation of the CWA, AAC, and or ADEQ regulations. When these systems were constructed, it was believed that these types of systems had the potential to adequately treat wastewater. However, concern over the ongoing potential environmental hazards of these systems has been noted to be evident prior to the 1970s (United States Environmental Protection Agency [EPA] 1976). These systems have since been outlawed, with the exception of current advanced technology. Potential public health, sanitation, and environmental issues are arising from the TRSD's failing wastewater disposal systems. This makes it crucial to implement changes to the current methods of treatment within the TRSD.

One major concern that arises with onsite treatment systems is the release of pollutants, including nitrogen, to underlying groundwater. Effluent from onsite treatment systems can have nitrogen concentrations as high as 60 Parts per Million (PPM) (Canter and Knox 1985); this is six times the drinking water maximum contaminant level (MCL) of 10 PPM. Under ideal design conditions, the high levels of nitrogen within septic tank and cesspool effluent is diluted and converted to ammonia and then converted to NO3 (nitrate) within aerobic soil when it is discharged to the leach field. When systems are poorly sized, located, or maintained; releases from the systems can overwhelm the ability of the land to properly treat the effluent because the volume of effluent being discharged is more than the soil can treat. This results in effluent nitrogen levels that exceed the treatment capacity of the soil, allowing effluent with a high nitrogen concentration to reach groundwater.

Groundwater in the region flows toward the north end of the TRSD boundary in the direction of Theodore Roosevelt Lake. The northern most boundary of the TRSD is only 15.9 miles from the edge of the Roosevelt Reservoir. The main constituent of concern in substandard onsite treatment systems is the potential nitrogen contributions into surface and ground water. Excess nitrogen in surface water causes overstimulation of growth of aquatic plants and algae which eventually leads to eutrophication in lakes. The effects from excessive nitrogen loading on the regions groundwater could then be seen at Theodore Roosevelt Lake, which aside from a significant natural ecosystem also provides water storage for the Salt River Project.

These public health concerns are only growing as the conditions of the onsite disposal systems are worsening and the potential for waterborne illness increases within the TRSD. This poses great risk to the simplest of community activities such as residents going on a hike, children playing outside with pets in their yards, and even the wildlife in the area just seeking food and water. TRSD and Gila County see the risks and are working to provide the best regional improvement solution to protect the health of its residents and ecosystem.

3.2 Aging Infrastructure

As these outlawed onsite cesspools and inadequate septic systems age, the outdated designs and lack of maintenance issues are exacerbated, making system failures and resulting risks to human health and the environment increasingly likely. The majority of infrastructure in the TRSD is failing and is irreparable or is in direct violation of the CWA, AAC, and or ADEQ regulations. This requires the introduction of a collection system to the TRSD that will allow the existing individual infrastructure to be taken out of service and abandoned.

3.3 Reasonable Growth

3.3.1 Methodology

As discussed in Section 1.3 - Population Trends, the Globe-Miami area has seen fluctuation in population and the current EPA population growth estimate is 17% for the TRSD service area. Without precise estimates, the following describes the methodology developed to estimate reasonable growth through an understanding of potential equivalent dwelling units (EDU) and projected wastewater flows.

To develop an accurate estimate of future wastewater flows in the TRSD some assumptions had to be made. The most updated parcel data was obtained from the Gila County Assessor's office in early 2017. The parcel information included Assessor's Parcel Numbers, land use, lot size, parcel maps, owner information, and number of structures. Parcel data and aerial photography were used to determine the current conditions of the TRSD and locate occupied parcels.

Each parcel's location and land use were analyzed to see if the parcel could feasibly be connected to a TRSD wastewater collection system. A preliminary design of the collection system was then developed using this information (Exhibit 2). To further evaluate the new service areas, aerial imagery was used in conjunction with geographic information system (GIS) software to review each parcel. After review of all parcels and properties within the TRSD services area, some parcels were not included in the estimations for various reasons such as land considered undevelopable due to site constraints, etc.

3.3.1.1 Equivalent Dwelling Unit (EDU) Assessment

Each parcel was reviewed in conjunction with the preliminary layout of the new collection system and given a category description to help determine EDUs. Each occupied residential parcel accounted for one EDU and residential parcels with multiple units or structures were quantified with additional EDUs. Note that the EDU count does not always equal the number of new connections. Parcels with "mobile homes", as classified by the Gila County Assessor, were assumed to have one sewer connection per parcel, but each mobile home was assessed 1 EDU. Improvements on Possessory Rights (IPR) parcels were considered to have separate connections for each leased lot within a parcel containing IPR. Commercial, industrial, and vacant properties were estimated on gross acreage of the parcel. The following Table 6 EDU Assessment show the categories, descriptions and EDU calculation factors used in the estimates.

Table 6 – EDU Assessment

Category	Description	
Occupied	Parcels (both with frontage and without) that have at least one EDU and are adjacent to or within 300 ft of the proposed collection line. May be a "ROW parcel" (Parcels that will be requested to grant ROW for other parcels without frontage to receive service) or "Dependent on ROW Parcel" (parcels that require other parcels to grant ROW to receive service).	Residential 1 EDU Commercial 7.5 EDU/acre Industrial 3.75 EDU/acre
Vacant	Uninhibited parcels within the new service area that are adjacent to or within 300 ft of the proposed collection line. May be a ROW parcel or Dependent on ROW Parcel.	Residential <0.33 acre = 1 EDU >0.33 acre = 3.75 EDU/acre

3.3.1.2 Wastewater Flow Calculations

Miami provided historical flow data for single family residences in areas currently served by Miami. Its data shows flows of 52 GPD/capita (HilgartWilson, 2012). Miami also reports that exfiltration from aging infrastructure is a significant loss of flow, estimated to be near 10% and as high as 20% in some areas. If 20% is added to account for the maximum exfiltration, the average flow rate increases to 62 GPD/capita for residential land use. This would present a calculation of 127 GPD/EDU. This flow data provided by Miami has been considered inadequate due to the small sample size and the aging infrastructure.

ADEQ requires a value of 80 gpcpd (gallons per capita per day) per individual residing in a Dwelling for a wastewater collection system under AAC R18-9-E301(D) and AAC R18-9-B301(K), excluding peaking factors. Using this value, a calculation of 164 GPD/EDU

For this PER, to account for any possible errors, a 5% variance is being applied due to the nature of the parcel research method applied. Using this variance and rounding up for purposes of this PER evaluation, 175 GPD/EDU will be used to estimate flow of this proposed new collection system. While the parcel research method accounts for Gila County data as well as aerial surveys, there is the possibility of error in the assumptions made pertaining to the 3,000+ parcels within the TRSD.

3.3.2 TRSD Total Estimated Equivalent Dwelling Units (EDUs) and Wastewater Flow Projections

Using the methodologies described above, EDU estimates for all included parcels were summarized by land use type in the following Table 7.

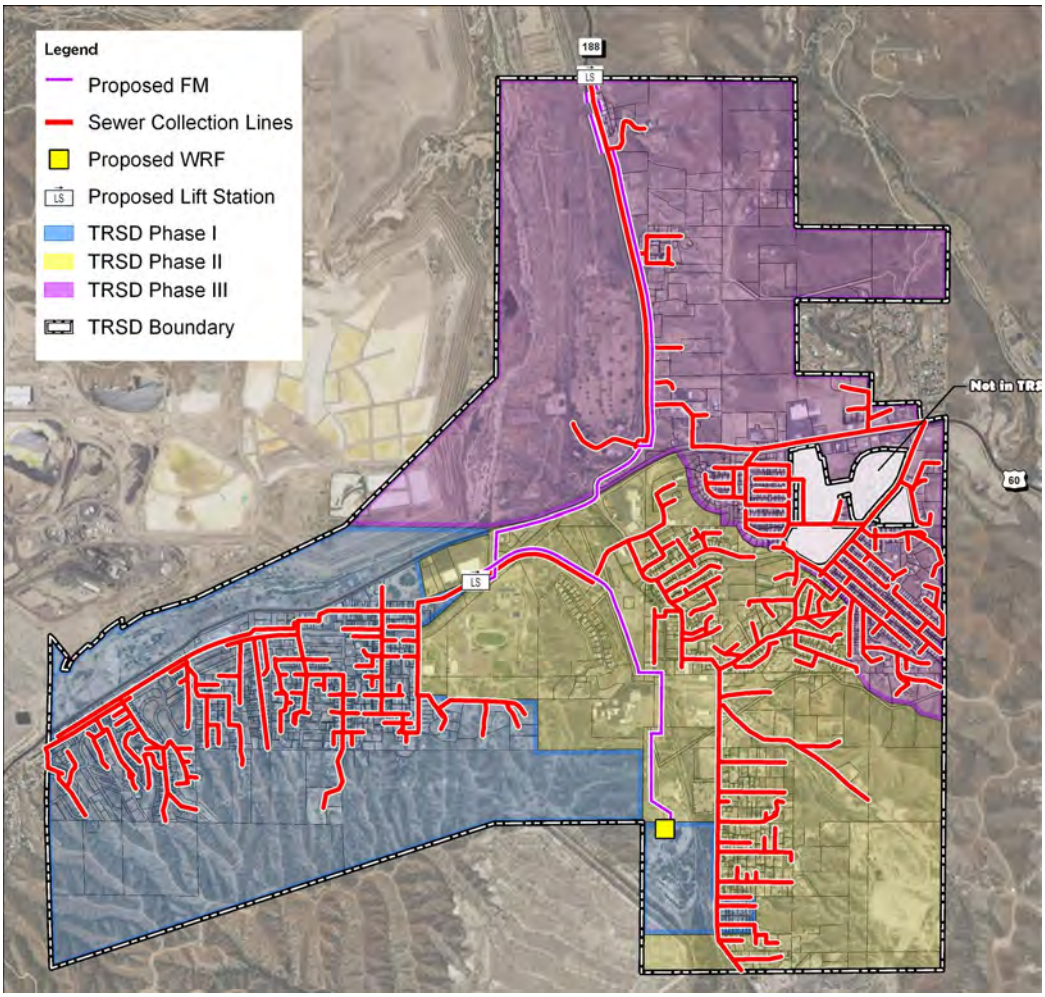
Table 7 – TRSD Total Estimated EDU Count by Land Use Type

Land Use Type	EDU
Residential	1,628
Res Mobile	358
Res IPR	74
Commercial	460
Industrial	93
Vac Mobile	4
Vac IPR	0
Vacant	1,070
Other	38
Totals	**3,725**

3.3.3 Project Phasing

Due to the magnitude of this TRSD Wastewater Collection and Treatment Project, the efforts will be split into three phases. Each phase will include its own PER for alternative evaluations. Figure 2 below (and Exhibit 2) shows the boundaries for each phase.

Figure 2 - TRSD Phasing Plan



3.3.4 TRSD Total EDUs and Wastewater Flow Projections by Phase

Table 8 below shows a summary of projected EDUs and flow rates for each phase of the TRSD wastewater collection and treatment system.

Table 8 - TRSD Total EDUs and Wastewater Flow Projections by Phase

Phase	EDU	Flow Capacity (GPD)
Phase I	1,374	240,450
Phase II	1,251	218,925
Phase III	1,100	192,500
Total	**3,724**	**651,875**

3.3.5 TRSD Phase I Total EDUs by Land Use Type

Table 9 below shows a summary of projected EDUs for Phase I of the TRSD wastewater collection and treatment system.

Table 9 - TRSD Phase I Total EDUs by Land Use Type

Land Use Type	EDU
Residential	648
Res Mobile	84
Res IPR	74
Commercial	174
Industrial	30
Vac Mobile	1
Vac IPR	0
Vacant	339
Other	24
Totals	**1,374**

3.3.5.1 New Service Connections

The parcel research method was used to determine the status and description of each parcel. Using Gila County Parcel Data, aerial imagery, and GIS each parcel was evaluated to determine its designated land use, assumed land use, and number of habitable structures to estimate the number of new service connections. New service connections will include a lateral from the sewer main to the connection at the residence or business, abandonment in place of the existing onsite wastewater treatment system (cesspool, septic tank, leach fields), and restoration of the yard.

Table 10 – New Service Connections by Land Use Type

Land Use Type	Connections
Residential	806[1]
Commercial	19
Industrial	7
Other	24
Totals	**856**

[1]Count includes 33 Bechtel Tract community connections that will be assessed, however these have existing connection infrastructure so they are not included in the "New Service Connections" cost estimate. (Section 4.3 has further detail.)

3.3.5.1.1 Residential Service Connections

The anticipated design approach for this work is to create 3 to 4 standard lateral connection details and have the contractor take the lead in working directly with each property owner to gain right of entry for planning the installation and necessary abandonment of existing onsite systems.

Exhibit 9 illustrates the typical service connection. The maintenance of the portion of the upper sewer lateral on the homeowner's property will be the responsibility of the homeowner. The TRSD will be responsible for the lower portion of the lateral from the property line to the main sewer. The cost for new connections is estimated in the alternative cost estimates.

3.3.6 TRSD Phase I Reasonable Growth Estimates

Through the parcel research methodology used to estimate EDU and flow projections and taking into consideration the status of the community, the reasonable growth estimates presented are based on vacant properties. After review of all parcels and associated occupancy status, right-of-way status, etc., it is anticipated that most all of the Occupied parcels will be able to be connected immediately with the completion of Phase I. To be conservative, it is estimated that the potential growth for this project is dependent on the possibility of connecting the Vacant parcels. Table 11 below shows the calculations of the estimated growth of 24% for Phase I.

Table 11 – TRSD Phase I Reasonable Growth Estimates

Flow Type	**Flow Capacity (GPD)**	**EDU**
Residential	141,050	806
Commercial / Industrial / Other	99,400	568
Total	**240,450[1]**	**1,374**
Parcel Type	**Flow Capacity (GPD)**	**EDU**
Vacant With Frontage	36,750	210
Vacant Without Frontage	22,750	130
Total	**59,500[1]**	**340**
Reasonable Growth		
Vacant Parcels Total Flow Estimate (GPD)		59,500
Total Flow Estimate (GPD)		240,450
Estimated Growth		**25%**

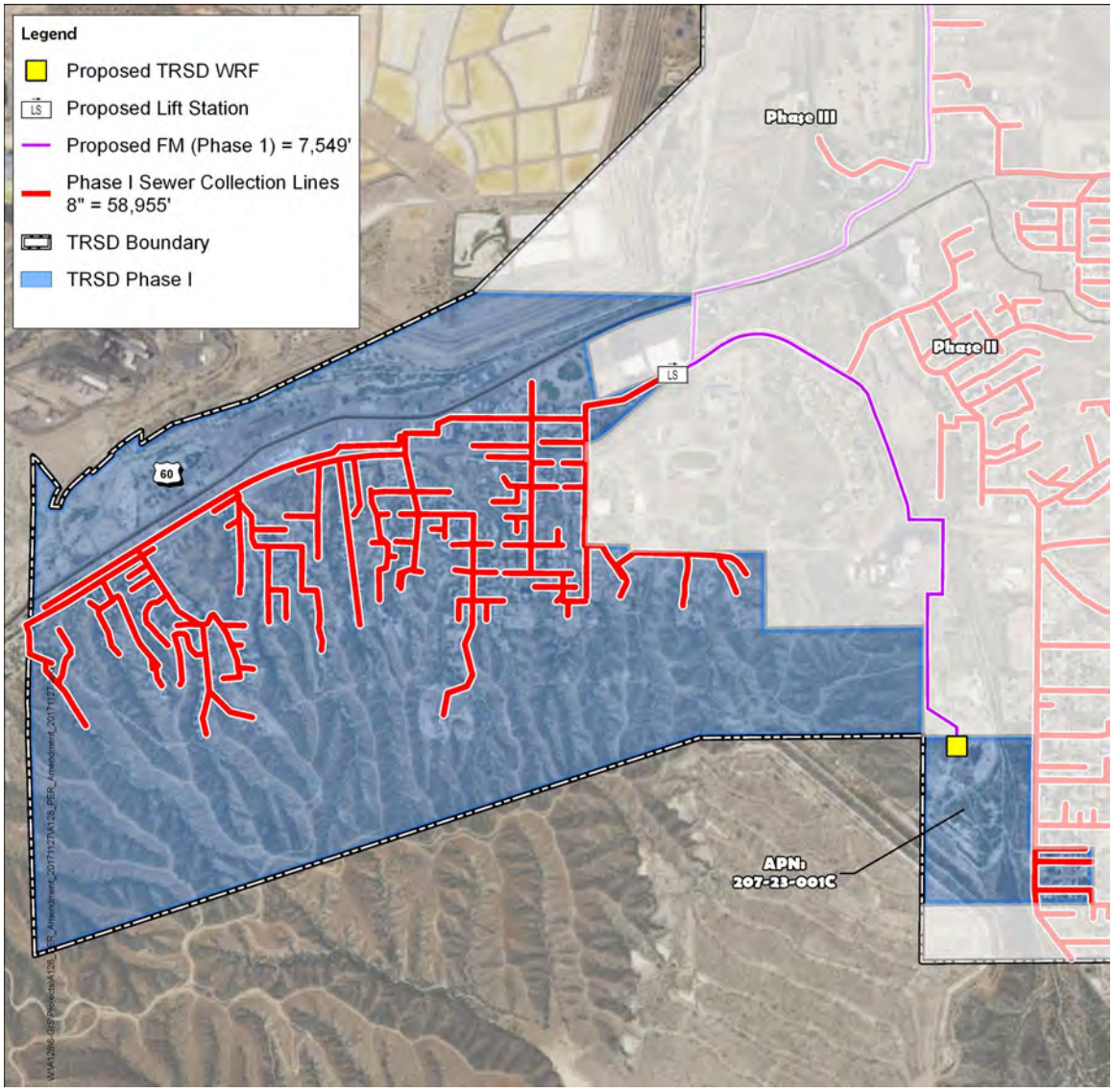
[1]Estimated based on 175 GPD per EDU

4 Alternatives Considered

The following alternatives have been considered for Phase I of the TRSD Wastewater Collection and Treatment System project to address the public health and safety issues present in TRSD.

Alternative 1 - No Action
Alternative 2 - All Wastewater Flow Conveyed to the Miami WRF
Alternative 3 - Construct a New TRSD WRF

Figure 3 - TRSD Phase I



4.1 Alternative 1 – No Action

4.1.1 Description

The first alternative proposes taking no action to upgrade the existing facilities. Since this alternative proposes no changes, the condition of the facilities described in Section 2.3 Condition of Existing Facilities will continue to deteriorate, resulting in the increased potential for septic tank overflow, septic tank failure, cesspool overflow, and the introduction of pollutants into the environment. This alternative also continues to limit the potential uses and ability to sell the existing property located within the TRSD.

4.1.2 Environmental Impacts

Nearly 90% of the residential properties within the TRSD are in violation of the CWA or ADEQ regulations. The current conditions of the TRSD can lead to health and safety issues as well as potential for groundwater contamination. If this alternative is chosen the impact on human and or the natural environment will continue to increase. Without the efforts to adequately collect and treat the area wastewater, residents will continue to dispose of greywater in the streets, children and pets will play near substandard or failing cesspools and septic systems, and wildlife will be exposed to contaminated water and plants.

4.1.3 Potential Construction Problems

Because Alternative 1 proposes taking no action, no adverse impacts associated with construction have been identified for this alternative. It should be noted, however, that while there are no construction problems, individual homeowners will still be required to repair and replace their failing septic systems. The possibility exists that a homeowner might not have an adequate lot size to replace an old septic system with a new septic system and leach field that would meet the current the Gila County requirements. Furthermore, the cost to update systems including proper installation is not affordable for the homeowners within TRSD. A properly installed system for wastewater treatment which complies with current code can cost between $25,000 and $35,000. Therefore, it is likely that existing noncompliant systems will continue to stay in place and devalue the property. In fact, due to the cost, the homeowners could be forced to abandon their homes.

4.1.4 Cost Estimates

If Alternative 1 is selected, the TRSD will not incur any costs associated with the improvement of the system. The responsibility for maintaining the septic systems would remain with the homeowners, and the need for maintenance would be determined by the homeowner as well. However, the cost to homeowners for replacement of a failing onsite system can range from $25,000 to $30,000 (Decentralized Systems Technology Fact Sheet, EPA 1999). As outlined by EPA, a homeowner should have a septic system professionally inspected at least every three years and pumped every three to five years; those costs would also be incurred by the homeowner.

Table 12 – Summary of Costs for Alternative 1

Description	Engineer's Opinion of Cost
Construction Costs	$0
Non-construction Costs	$0
Annual O&M Cost (Fiscal Year 2013)	$0

4.1.5 Advantages and Disadvantages

Alternative 1 (No Action) has the following advantages over the other alternatives considered for addressing the wastewater system issues:

- The TRSD would not have to obtain funding for constructing a centralized collection system.
- Alternative 1 maintains the status quo, and requires no new sewer service charges.

While Alternative 1 would not require immediate funding for system improvements, it does not address the public health, safety and environmental issues caused by the use of illegal cesspools and sub-standard septic systems. Furthermore, this alternative does not meet the TRSDs financial, managerial and operational resource needs. The disadvantages of Alternative 1 include the following:

- Nearly 90% of the TRSD residential properties have onsite treatment systems in violation of the CWA or are sub-standard systems that will remain in place.
- Potential failure of numerous cesspools and septic systems, which would introduce wastewater into the environment impacting human and natural environments.
- Cost of septic system repairs or replacement must be paid by the homeowner. Septic system maintenance will be left to the discretion of the homeowner, possibly resulting in poorly maintained systems.

- Lack of adequate septic pumping may cause septic tanks to fill up. As a result, wastewater could back up into homes or other buildings, or surface in the leach field.
- Property owners wishing to sell their property are required to install new septic systems that meet current regulatory guidelines so a potential buyer can secure funding from a commercial lending institution. Many of the lots are not adequately sized to construct a new septic system that meets current Gila County standards. This will render the home uninhabitable if a septic system fails.
- Currently there are a number of homes that owners have walked away from because of septic or cesspool issues that have rendered the home uninhabitable.
- Cost of updated septic system technology properly installed to meet standards is very expensive, between $25,000 and $35,000.
- Cost to construct a centralized system will increase as labor and material rates increase over time.
- Continued unauthorized discharge of greywater flows into the yards and down the streets throughout the TRSD.

4.2 Alternative 2 – All Wastewater Flow Conveyed to the Miami WRF

4.2.1 Description

The Miami WRF has a permitted maximum treatment capacity of 640,000 GPD. Based on information provided by the Miami engineer estimates in 2015, approximately 225,050 GPD of that capacity is available for purchase by TRSD. Alternative 2 conveys all TRSD Phase I flows to the Miami WRF. Although the TRSD Phase I flows are estimated at 240,450, part of these flows are calculated from vacant parcels and it is anticipated that the immediate flows can be received at the Miami WRF and it is assumed, for the sake of this alternative, that the additional capacity could be obtained from the Town of Miami at the same rate.

A Special Election was held in November 2015 in which the TRSD voters agreed that the TRSD Board could enter into an IGA with Miami for the purchase of wastewater treatment capacity if negotiations could be reached for terms that are in the best interest of the TRSD customers.

The TRSD Board and staff have worked diligently for over three (3) years through numerous communications and meetings to develop an acceptable agreement, but the TRSD proposed terms have been rejected by Miami. TRSD Board has openly communicated with Miami in an attempt to come to a mutual agreement on fair conditions of an IGA for the treatment of TRSD wastewater flows. Approximately sixty (60) meetings have taken place in these efforts and these have not been successful.

Despite multiple requests, TRSD continues to receive little to no information in regard to the operations and maintenance of the current Miami WRF concerning costs, service logs, etc. The lack of audited financial statements and cost assessments from Miami continue to give TRSD little insight into possible operation and maintenance costs that TRSD may be required to pay if an IGA were to be set in place. TRSD believes that Miami should be able to gather this information and feels that the request for this is not beyond the typical USDA-RD requirements.

For the purposes of this PER evaluation, Miami has presented costs for capacity buy-in, expansion costs, and projected Operation & Maintenance (O&M) costs (provided by engineer estimates, not actual costs from Miami). The cost of purchasing existing capacity in the Miami WRF is based on memos prepared by HilgartWilson regarding the Miami WRF (Appendix E).

- **Capacity Buy-In:** The correspondence (Appendix E) states that existing capacity at Miami WRF is now offered for purchase at $6.50/GPD, however, since receipt of this information, Miami has lowered this price to $5.11/GPD.
- **Miami WRF Expansion:** Miami has indicated expansion of the Miami WRF would cost $13.23/GPD. It should be noted that this expansion estimate is potentially outdated as construction costs have increased over the past few years; this estimate could be off as much as 20%.
- **O&M Costs:** O&M costs would be based on the actual flow generated from TRSD. HilgartWilson provided estimated O&M costs at the Miami WRF for the existing flows to be $1.26 per GPD

(annual average) and with the additional TRSD flows of 222,500 GPD to be $0.88 per GPD (annual average). However, the conservative projected TRSD flows of 240,450 GPD will be directed to the Miami WRF in stages thus the O&M cost could initially be greater until all flows are directed. Due to this understanding, it was determined that $1.00 per GPD (annual average) should be used to provide a more accurate estimate. Please refer to Appendix E for correspondence from Miami in regard to providing wastewater treatment for the TRSD.

- TRSD understands that Miami has recently increased its sewer rates indicating that the costs have increased. This rate increase leads to the belief that the projected cost to treat the TRSD flows would also increase. This increase is not included in this PER evaluation.

Table 13 - Alternative 2 Purchase of Existing Infrastructure and Capacity

Area	Expense	Amount	Total
Miami	Capacity Buy-In	240,450 GPD @ $5.11/GPD (subject to conclusion of negotiations)	$ 1,228,444

4.2.2 Miami Influent Pump House Condition

Alternative 2 will require the installation of a new lift station to convey flows from TRSD Phase I to Miami WRF. Due to the current condition and status of the existing Miami pump house and collection system gathered from the information received from Miami, it is not a viable option for TRSD to jointly use the pump house or the existing force main for the additional TRSD flows. See Section 2.3.2.1 - Town of Miami for the existing condition of the Miami pump house. The Miami pump house and force main have only been sized to convey flows solely from Miami service area and it would require additional pumps and associated appurtenances to be upgraded. It is understood that the existing pump house is not a sufficient size for the necessary additional pumping capacity. These costs would be comparable to constructing a new lift station, as both options require additional pumps and new force main.

Additionally, it is believed that the current grit loading from the Miami collection system is causing multiple pump failures at the pump house. Until the collection system can be updated the conditions are assumed to continue if not worsen.

4.2.2.1 New TRSD Lift Station

After investigation of the existing Miami lift station, it was determined for a number of reasons that it would be more beneficial for TRSD to construct a new lift station and force main to the Miami WRF and the reasons are as follows:

- The existing Miami lift station and force main are not sufficiently sized to handle TRSD flows.
- Potential cost to construct a simple, new TRSD submersible pump lift station would be less expensive than modifying the existing Miami lift station.
- The TRSD and Miami collection system would be completely independent of each other and will provide a clean separation of the collection system.
- Locating a lift station south of Highway 60 will allow more flexibility to convey flows in Phase II and Phase III TRSD improvement alternatives.

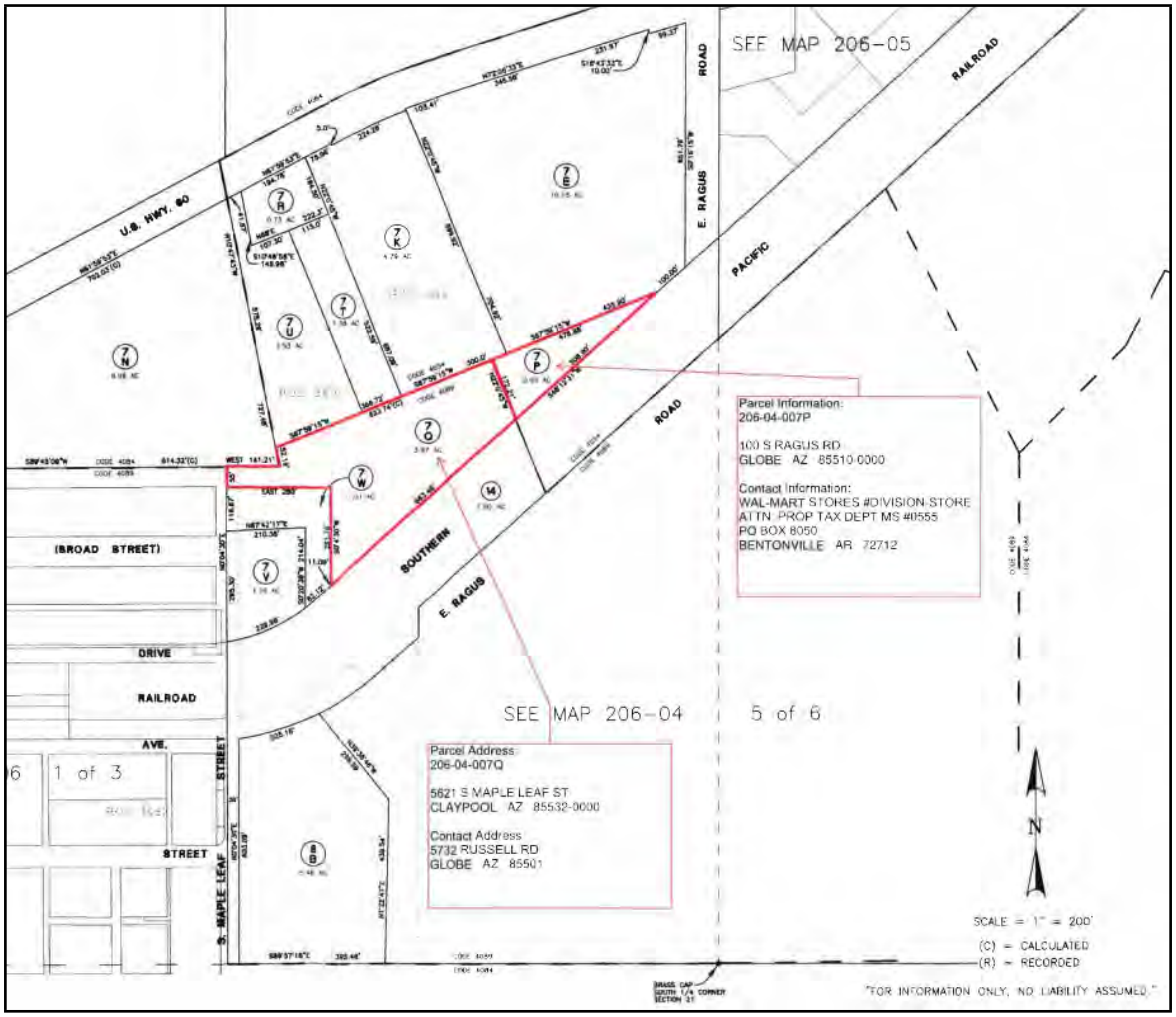
The collection system layout, main lift station layout and location for Alternatives 2 & 3 will be identical. The land located behind the Walmart store provides an excellent location for the New TRSD Lift Station whether it is pumped to the Miami or a new TRSD WRF. For Alternative 2, the new TRSD Lift Station will be required to convey wastewater to the Miami WRF located on FMI property approximately 4,850 +/- feet north of the lift station. This main lift station location will prove to be more beneficial to the overall project due to the fact that the remaining two phases will ultimately pass through this lift station as well. TRSD has entered into preliminary discussions with Walmart to purchase the land that is required for the new TRSD Lift Station. The lift station and force main will be sized to handle the ultimate flow for the entire project.

4.2.2.1.1 New TRSD Lift Station Location Determination

To begin the determination of the lift station location, the entire district was analyzed and the natural flows were evaluated. The goal of locating the lift station was to be able to place it in an area that was most cost effective and efficient, not only the Phase I but the futures phases as well. During the initial evaluation it was determined that the lift station should be located west of E. Ragus Rd. and south of the Eastern Railroad ROW.

Directly north of this area are some commercial properties (including a strip mall, Safeway and Walmart), so it was practical to locate the lift station south of this area. However, the local schools are located on the south side of the railroad tracks and contain densely populated facilities. This specified area contains four parcels existing for the possible lift station location (Figure 4): 206-04-7V, 206-04-7W, 206-04-7Q, and 206-04-7P.

Figure 4 – Lift Station Potential Location Parcel Map



Source: Gila County Assessor Parcel Map 206-04, page 4 or 6

All four parcels lay within the floodplain. Of these parcels, three were privately owned (206-04-7V, 206-04-7W & 206-04-7Q). The last parcel, 206-04-7P, is currently owned by Walmart. Parcels 206-04-7V and 206-04-7W were found to be residential properties and were removed from consideration. The remaining two parcels were further explored.

Both 206-04-7Q and 206-04-7P are both located on the south edge of the floodplain. The impact to the floodplain will be minimal to non-existent as the estimated footprint of the lift station will only be approximately 20ft x 20ft. To accomplish flood protection for this critical facility, the design criteria shall require the top of the lift station to sit a minimum of 2 feet above the 500-year floodplain and then requiring the electrical panel to be installed on post sitting above the top of the lift station.

Another factor considered was access to the lift station site. Parcel 206-04-7P has the ease of access to the new lift station via E. Ragus Rd. After all consideration and evaluation, 206-04-7P was selected as the best option. Contact with Walmart was initiated and negotiations for purchase and use of this parcel for locating the lift station is currently in progress. A preliminary layout including a FEMA overlay is illustrated in Exhibit 6.

4.2.3 Design Criteria

The design criteria used in the development of Alternative 2 includes Rural Utilities Service (RUS) design policies (7 CFR 1780.57), AAC R-18-9, and ADEQ Engineering Bulletin No. 11. Furthermore, the following assumptions were applied in this PER:

- Where sewer lines cross railroads, jurisdictional delineations, and the US 60; pipes will be installed using trenchless technologies such as jack-and-bore with steel casings or directional bore methods. All other sewer installations will be completed by conventional open-trench methods.
- New sewer system installation will include interceptors, laterals and house service connections within the TRSD existing service area.
- The average depth of installation for the new sewer collection lines is estimated to be approximately 6 feet.
- No significant hard materials are anticipated to be encountered. However, some additional costs have been provided for hard dig just in case hard material is encountered during excavation for the sewer line placement. A Geotechnical Evaluation Report must be performed to characterize the soil that will be encountered in the area.
- Additional force main and structures at the existing Miami WRF will be required including:
    - Splitter box with valves and piping to discharge into the Miami WRF
    - Meter box in order to meter the flows into the WRF from TRSD
- Existing onsite septic systems and cesspools would be abandoned left in place and closed in accordance with the closure requirements found in AAC R18-9-A309.
- Estimated construction cost has taken into account estimated material costs needed to comply with the American Iron and Steel Requirements, as defined in RUS Bulletin 1780-35 which provides a list of AIS iron and steel products and construction items.

4.2.4 Map

See the following exhibits:

- Exhibit 1 – Existing Facilities
- Exhibit 2 – Preliminary Collection System
- Exhibit 3 – Phase I Preliminary Collection System
- Exhibit 4 – Phase I West Preliminary Collection System
- Exhibit 5 – Phase I East Preliminary Collection System
- Exhibit 6 – New TRSD Lift Station
- Exhibit 7 – Miami WRF Force Main

4.2.5 Environmental Impacts

Potential environmental impacts and mitigation measures for Alternative 3 have been explored by Logan Simpson Design and are presented in the EA that will assess the environmental impacts related to this proposed project. Based on historical evaluations and the EA, the anticipated environmental impacts include the following:

- No negative effects on land use, wetlands, cultural and biological resources, groundwater quality, and socioeconomic resources
- Minor to no direct or indirect impacts within the 100-year floodplain
- Portions of the collection system may be required to be installed in the floodplain. The Engineer will coordinate with Gila County in regard to the floodplain use permit and also the U.S. Army Corps of Engineers (USACE) 404 permit issues during design.
- The lift station lies within a 100 year floodplain and is located near the boundaries of a 500-year floodplain. Any impact to the floodplain should be minimal. During final design, a 500-year floodplain analysis will be performed to determine impact and elevations to ensure this critical facility is designed to be protected from a 500-year flood event.
- Positive effects to the environment and the quality of life will be experienced including:
    - Reduced risk to the area's groundwater, human/wildlife health due to a collection and treatment system implemented to today's standards
    - Increased property values with the discontinued use of cesspools and substandard septic systems

4.2.6 Land Requirements

Alternative 2 may require the acquisition of additional ROWs or easements along proposed sewer alignments if these alignments do not have existing easements defined when they cross into private property. The TRSD may also have to acquire or lease land from FMI for the installation of a parallel force main adjacent to the existing Miami force main for the Miami Pump House to the WRF. This would require a mutual agreement for easement use between Miami, FMI and TRSD. Additionally, there are potential cultural resource impacts (Exhibit 7) that may require the evaluation of an alternative route to avoid these sites. Alternative 2 will also require the TRSD to acquire land for the New TRSD Lift Station. Preliminary conversations with Walmart have begun to purchase land for the lift station as discussed in section 4.2.3.1 New TRSD Lift Station. The actual land requirements will be determined during the engineering design phase of the improvements.

4.2.7 Potential Construction Problems

While this section addresses many of the issues that may be encountered during the design of the wastewater collection system, it is not intended to address all site-specific design and construction issues that may arise throughout the project. Some key design and constructability problems which will need to be addressed are as follows:

- Special care will need to be exercised with regard to excavation as some challenges may arise with old, abandoned and unrecorded existing utilities.
- Traffic control could pose some potential challenges to the construction schedule and maintaining access for homeowners who live adjacent to construction activities.
- Additional investigation of environmental and Class III Cultural survey and analysis once IGA has been agreed to by all parties to review land that TRSD was unable to assess during these planning stages.
    - Previously recorded sites to have archaeological artifacts and/or remains found to exist along the new parallel force main path may disrupt or halt construction if any more artifacts are uncovered or additional costs may be incurred to reroute the piping to avoid these areas.
    - Cultural and architectural inspector may be required for construction of parallel force main to the existing Miami WRF.
- Floodways
    - Portions of sewer mains will need to be installed within floodways. United States Army Corps of Engineers (USACE) Section 404 permit issues may have to be addressed during final design.
    - Per ADEQ in AAC R-18-9-E301.D.2.c, sewer lines crossing or constructed in floodways need to be installed 2 feet below the 100-year storm scour depth or scour protection provided if the depth cannot be maintained.
- Narrow Streets: Pavement widths are less than 25 feet wide.
    - Many of the sewer lines are within narrow residential streets. This makes access to and from the homes difficult during construction operations.

  - Narrow streets create design and construction difficulties. Care must be taken during the sewer line design to ensure adequate separation is maintained from other utilities like gas, water and electricity that need to be avoided to keep relocation costs low.
  - Potential asphalt variation may create issues.
- Steep Terrain: Much of the TRSD service area is constructed within steep, mountainous terrain. Care must be taken during the design to ensure that the sewer is installed at reasonable slopes.

4.2.8 Sustainability Considerations

4.2.8.1 Water and Energy Efficiency

Alternative 2 will result in additional effluent being sent to the local FMI mining operation. The effluent will offset the use of other water sources either potable or ground water needed during summer operations and therefore reduce the need of regional water resources. Energy efficient pumps and mechanical equipment will be used for the proposed project to decrease operational costs and energy use.

4.2.8.2 Green Infrastructure

While PVC is not considered a green product, the longevity and durability of the product once constructed needs to be considered. Prior standard materials used for collection systems such as clay pipe has had issues with infiltration and exfiltration. Infiltration can lead to issues within lift station mechanical equipment, headwork mechanical equipment, other mechanical systems in the treatment process, and the biological loading of the wastewater. Exfiltration can lead to discharge of wastewater into the environment and soil, potentially leading to contamination. Therefore PVC can be considered to eliminate the need for additional materials in the future and protect the environment from potential contamination and future construction disturbance.

4.2.9 Cost Estimates

The engineer's opinion of cost for Alternative 2 includes the capital construction and non-construction costs associated with the improvements. These costs are summarized in Table 14 below. Detailed costs can be found in Appendix F.

4.2.9.1 American Iron and Steel

estimated construction cost has taken into account estimated material costs needed to comply with the American Iron and Steel Requirements (AIS) as defined in RUS Bulletin 1780-35 which provides a list of AIS iron and steel products and construction items.

Table 14 - Summary of Alternative 2 Engineer's Opinion of Cost

Description	Engineer's Estimate
Construction Costs	
Underground Piping for the Collection System	$ 4,572,606
Lift Station for Collection System	$ 500,000
Excavation and Pavement Restoration	$ 2,778,942
Services Connections (Included in Connection Costs Breakdown)	$ 3,909,250
Construction at Miami WRF	$ 277,500
Additional Construction Costs	$ 3,286,455
Total Construction Costs	**$ 15,324,753**
Non-Construction Costs	
Engineering - Preliminary Studies	$ 903,161
Engineering - District Requirements	$ 208,760
Miami WWTP Requirements	$ 1,303,444
Land Acquisition, ROW, Easements	$ 468,400
Engineering - Permit Applications	$ 95,000
ADEQ & County Permit Fees	$ 60,000
Engineering - Design Information Gathering	$ 630,000
Engineering - Design Collection/LS & WRF	$ 1,951,950
Engineering - Construction Administration	$ 1,043,833
Legal Administration / Financial Advisor	$ 787,086
Total Non-Construction Cost	**$ 7,451,635**
Construction Contingency	$ 2,298,713
Non-Construction Contingency	$ 372,582
Total Construction & Non-Construction Cost	**$ 25,447,683**

[1]Estimate does not include Financing and Interest Costs

4.2.10 O&M Opinion of Cost

The Alternative 2 estimated O&M cost consists of two major portions: 1) the overall TRSD administrative requirements and the collection system O&M cost, and 2) the second will be the treatment of the TRSD wastewater flows by Miami.

Because this is only Phase I of a three-phase project, TRSD will need to utilize a conservative approach to the management of the new collection system. It was determined that the best approach would be to find a person that has an operator's license who can fulfill a dual role of 1) management of TRSD and 2) supervisor of the O&M of the new collection system. Additionally, the labor includes a field tech/laborer to assist the supervisor in the O&M of the collection system. The cost breakdown of labor cost and the proposed Alternative 2 O&M is presented in Appendix F. Please note that all of the cost to support the management of TRSD is covered under the collection system portion of the annual O&M budget. The actual treatment and annual repairs and maintenance cost is provided under the Miami WRF portion.

HilgartWilson provided estimated O&M costs at the Miami WRF for the existing flows to be $1.26 per GPD (annual average) and with the additional TRSD flows of 222,500 GPD to be $0.88 per GPD (annual average). However, the conservative projected TRSD flows of 240,450 GPD will be directed to the Miami WRF in stages thus the O&M cost could initially be greater until all flows are directed. Due to this understanding, it was determined that $1.00 per GPD (annual average) should be used to provide a more accurate estimate. Please refer to Appendix E for correspondence from Miami in regard to providing wastewater treatment for the TRSD.

TRSD understands that Miami has recently increased its sewer rates indicating that the costs have increased. This rate increase leads to the belief that the projected cost to treat the TRSD flows would also increase. This increase is not included in this PER evaluation.

Table 15 - Alternative 2 Engineer's Annual O&M Estimate

O&M Portion	Engineer's Estimate
Collection System Costs	$ 240,370
Miami O&M Cost to Treat Wastewater	$ 252,400
Total Estimated Alternative 2 Annual O&M Cost	**$ 492,770[1]**

[1]Estimate does not include Short Lived Asset Reserve (SLAR) or Debt Reserve

4.2.11 Advantages and Disadvantages

4.2.11.1 Advantages

Alternative 2 has the following advantages over the other alternatives considered for addressing the wastewater system issues:

- This alternative serves as a semi-regional solution for the TRSD / Miami area, noting that a true regional solution would provide TRSD the ability to have control of / influence over the treatment costs incurred by its customers.
- By providing sewer flows to the existing WRF, the operational efficiency of the plant will be improved. This alternative also helps reduce the amount of new infrastructure that would be required.

4.2.11.2 Disadvantages

The disadvantages of Alternative 2 include the following:

- By law, Miami must first treat the wastewater generated within the boundaries of Miami prior to treating wastewater originating outside its boundaries. This means that if for any reason the wastewater originating within the boundaries of Miami reaches the treatment capacity of the Miami WRF, Miami would be forced to terminate the treatment of the TRSD wastewater.
- The estimated flows at full Phase I capacity surpasses Miami available capacity and may require additional Miami WRF improvements to accommodate.
- A.R.S. § 48-2017 requires that the TRSD Board and Miami Town Council must mutually agree on and conditionally approve an IGA for the treatment of the TRSD wastewater while TRSD is not jointly operating or controlling any aspects of the Miami WRF. To date, efforts to come to mutual agreement of terms has been unsuccessful.
- TRSD does not own or have rights to the effluent.
- Previously recorded sites have archaeological artifacts and/or remains found to exist along the new parallel force main path to the Miami WRF may disrupt or halt construction if any more artifacts are uncovered or additional costs may be incurred to reroute the piping to avoid these areas.
- The cost to purchase capacity at the Miami WRF will take away TRSD funds that would otherwise be used to facilitate true TRSD improvements.
- The population of TRSD is over two times larger than the population of Miami and it leaves TRSD customers dependent on the Miami infrastructure and management of the process.

- Need to reach an agreement with FMI for easements required to construct the new force main.
- Existing Miami WRF has not been evaluated and no maintenance records have been provided, therefore the service costs are unknown.
- Annual O&M costs are higher in this alternative.
- Loss of revenue estimated at $1,800/month from selling 240,402 GPD of effluent at $0.25/1000gal.
- At the present time TRSD does not have the audited financials from Miami concerning its treatment which is required by USDA-RD's Letter of Conditions. Without cooperation from Miami regarding financial elements, it is difficult for TRSD and its consultants to effectively evaluate and recommend reliance on Miami for wastewater treatment. With only an engineer's estimate, there is no method to accurately evaluate these costs because the financial documents received were not prepared by an independent audit firm. Appropriate audited financial statements have been requested on numerous occasions but only incomplete, unaudited statements have been received. For a true evaluation of Alternative 2, the appropriate financial documentation must be made available. Alternative 2 of this PER is somewhat unique in that one government entity is completely relying on another for the critical need of wastewater treatment. Without the documentation, TRSD cannot make an informed decision concerning the stability and therefore the true cost or reliability of Miami for the treatment of the TRSD wastewater. This is critical to the residents and businesses to be served by TRSD and is the responsibility of the TRSD Board to ensure that any agreements are in the best interest of its customers.

4.3 Alternative 3 – Construct a New WRF for the TRSD Phase I

4.3.1 Description

Alternative 3 proposes the construction of a new WRF to serve the TRSD Phase I service area. The sewer collection system will be virtually the same as alternative two with the exception construction of a new force main from the proposed New TRSD Lift Station to the proposed New TRSD WRF. The general layout of this is illustrated in Exhibit 3.

As in Alternative 2 TRSD would need to design and build a new lift station to convey the Phase I wastewater flows to the new TRSD WRF. For Alternative 3, the new TRSD Lift Station will be required to convey wastewater to the new TRSD WRF located approximately 7,500 +/- feet south of the lift station. This main lift station location will prove to be more beneficial to the overall project due to the fact that the remaining two phases will ultimately pass through this lift station as well. TRSD has entered into preliminary discussions with Walmart to purchase the land that is required for the new TRSD Lift Station. The lift station and force main will be sized to handle the ultimate flow for the entire project.

The WRF will be designed to have an initial treatment capacity of 250,000 GPD for Phase I with the ability to expand for future phases. It is anticipated that the WRF will be a package plant using the membrane bioreactor (MBR) process. The updated membrane filtration technology will provide high quality effluent (meeting ADEQ's Best Available Demonstrated Control Technology and Class A+ Reclaimed Water Standards) that can be used as a reclaimed water source where applicable in the future and an Arizona Pollutant Discharge Elimination System (AZPDES) permit will be obtained for the primary discharge point. This discharge could be beneficial to the region because it will help facilitate the flushing of the Miami Wash to the north. This facility will only require a minimal footprint for development.

TRSD has been working hard to obtain a site for the proposed TRSD WRF. TRSD has been offered Parcel No. 207-23-001C from BHP as a potential site. The parcel is located within the area of Russell Road (southern portion of TRSD). The parcel location and proposed WRF location can be seen in Exhibit 8. TRSD is currently working with BHP to discuss purchasing this parcel for the use of locating the new WRF.

Through collaboration with BHP, the Bechtel Tract area is being proposed as part of the Phase I connections to the wastewater collection and treatment system due to the currently deteriorating collection and disposal system and health concerns. This 40-home neighborhood currently conveys wastewater to a storage container intended to be used as a septic tank northwest of the neighborhood that discharges its effluent via a subterranean drainage system (leach field). The system was constructed

in the 1940's. Due to the deteriorating collection lines and substandard disposal, this system poses significant health and environmental concerns.

BHP has agreed to consider the concept of providing the necessary land and rights-of-way for the location of the TRSD WRF and the collection lines to connect this facility. Furthermore, BHP is considering the contribution of funds to TRSD to support the efforts in taking this aging system out of service and transferring operations and treatment responsibilities to TRSD. In this Phase I, Bechtel Tract flows will be collected via the existing collection piping and then in Phase II these lines will be abandoned in place and replaced with new piping.

With the selection of Alternative 3, the TRSD would be required to complete the appropriate WRF permitting along with the design of the plant. This would include completing and obtaining an Aquifer Protection Permit (APP) and AZPDES from ADEQ, and any other pertinent approvals of construction.

TRSD will prepare an amendment to the CAG 208 Water Quality Management Plan. This amendment will include an administrative change to identify TRSD as the DMA of the CVSD and PSD service areas. Arizona Department of Environmental Quality (ADEQ) has formally identified this designation (Appendix B). In addition to the administrative change, the CAG 208 Amendment will require to include the design plans for the new WRF, outline of the proposed service area for the treatment facility, and will discuss the phasing and future expansion of the collection and treatment system that will encompass the entire district.

4.3.2 Design Criteria

4.3.2.1 Collection System

The design criteria used in the development of Alternative 3 includes RUS design policies (7 CFR 1780.57), AAC R-18-9, and ADEQ Engineering Bulletin No. 11. Furthermore, the following assumptions were applied in this PER:

- Where sewer lines cross railroads, jurisdictional delineations, and the US 60; pipes will be installed using trenchless technologies such as jack-and-bore with steel casings or directional bore methods. All other sewer installations will be completed by conventional open-trench methods.
- New sewer system installation will include interceptors, laterals and house service connections within the TRSD's existing service area.
- The average depth of installation for the new sewer collection lines is estimated to be approximately 6 feet.
- It is believed that no significant hard materials will be encountered during excavation for the sewer line replacement. A geotechnical evaluation must be performed to characterize the soil that will be encountered in the area.
- Existing onsite septic systems and cesspools would be abandoned left in place and closed in accordance with the closure requirements found in AAC R18-9-A309.
- Estimated construction cost has taken into account estimated material costs needed to comply with the American Iron and Steel Requirements, as defined in RUS Bulletin 1780-35 which provides a list of AIS iron and steel products and construction items.

4.3.2.2 Water Reclamation Facility (WRF) Treatment Process Alternative Selection

There are many different wastewater treatment process technologies available and each treatment alternative has advantages and disadvantages; however, not all treatment technologies meet the needs of the TRSD, especially with its evolving conditions such as effluent disposal options, land availability, phasing options, capital funding availability, and operational capabilities. When considering the wastewater treatment process to implement, there are several common goals that the TRSD must accomplish, which include the following:

- Treatment flow capacity
- Effluent water quality
- Operability and efficiency

- Capital costs, operation and maintenance costs, and
- Physical constraints (size of facility, land availability, regulatory setbacks, etc.).

The evaluation of treatment process options evolved as the evaluation of potential WRF sites were identified. The final recommended treatment process is a phased membrane bioreactor (MBR) process providing high quality effluent (meeting ADEQ's Best Available Demonstrated Control Technology and Class A+ Reclaimed Water Standards) that can be used as a reclaimed water source.

This section identifies several treatment and location alternatives that were evaluated illustrating the path to the selection of the MBR. The following treatment alternatives are listed in the actual order that was considered as the TRSD needs evolved over time.

1. Sequencing batch reactors (SBR)
2. Extended aeration activated sludge (EAAS)
3. Schreiber Continuously Sequencing Reactor (CSR) activated sludge process.
4. Membrane bioreactors (MBR)

The comparison of capital and life-cycle costs were also compared in this process. Life-cycle costs were analyzed using only capital costs due to the fact that operational costs for each process explored is essentially the same. The comparison is included in this section for reference.

4.3.2.2.1 Design Treatment Flow Capacity

The WRF capacity has evolved based on the phasing of the TRSD collection system. Wastewater flows were higher during the early stages of the evaluation but have since decreased as TRSD's service area and wastewater flow generation rates have been modified. The current WRF design capacity phasing is 0.25 MGD for Phase I, an addition of 0.25 MGD for Phase 2, and 0.15 MGD for Phase 3. The ultimate build out for the facility with all three phases will be 0.65 MGD. All design capacities are based on Maximum Month Average Daily Flow. Wastewater generation rates and flow projections can be found in Section 3 of this PER.

4.3.2.2.2 Effluent Water Quality Requirements

The State of Arizona Title 18-R18-9-B2014 requires new facilities to meet Best Available Demonstrated Control Technology (BADCT) effluent standards. The BADCT effluent requirements are as follows:

1. BOD5: <30 mg/l
2. TSS: <30 mg/l
3. PH: 6.0 – 9.0
4. TN: <10 mg/l
5. E. Coli: Non-detect in 4 out of 7 daily samples, single sample maximum not to exceed 23 cfu/100mL

For unrestricted irrigation, the effluent quality must meet AZ Title 18 Class A+ Reclaimed Water Standards. Class A+ Standards are similar to BADCT with the additional requirements of tertiary filtration and turbidity limits of less than 2 NTU (nephelometric turbidity units). There may also be additional effluent quality limits imposed on the facility through the Arizona Pollution Discharge Elimination System (AZPDES) Permit if there are surface water discharges to washes or ephemeral streams. Based on the requirements, this may impact the disposal options for excess effluent, requiring the use of other disposal options, such as percolation basins or injection wells.

In addition to the regulatory requirements, TRSD prefers that the new WRF produce the best effluent feasible to demonstrate environmental stewardship in the region.

4.3.2.2.3 Odor, Noise and Aesthetic Setback Requirements

State of Arizona Title 18–R18-9-B201-I identifies noise, odor and aesthetic setback distances for a new WRF facility. The distance of the setback is a function of the treatment capacity of the facility and whether or not the facility has full odor, noise and aesthetic controls. The new WRF will be designed with an open treatment process, process ventilation and some odor, noise and aesthetic controls; however, it

will not have full odor controls. As a result, the facility will have to meet setback requirements assigned to facilities with "No Noise, Odor, or Aesthetic Controls". With an ultimate build out of 0.7 MGD, the noise, odor and aesthetic setback requirements is 750 ft. This setback distance is required for facilities within a treatment capacity range of 0.5 MGD to less than 1.0 MGD.

4.3.2.2.4 Secondary Treatment Process

As previously mentioned, TRSD evaluated several different wastewater treatment technologies. All the considered wastewater treatment technologies are proven with thousands of installations throughout the United States, therefore any of the treatment technologies could be used as long as it was coupled with the proper ancillary treatment such as headworks, filtration, disinfection, etc.; however, as the TRSD's needs evolved, limitations, such as land availability and funding sources, can impact the use of certain treatment alternatives.

4.3.2.2.5 WRF Site Location and Treatment Process Selection

As the planning of this project progressed, the needs evolved over time due to different factors and resulted in evaluation of different types of wastewater treatment alternatives. One of the main factors impacting the treatment process selection is site land area. The size of the site impacts the treatment process and cost of the facility. Larger sites allow for more conventional wastewater treatment options, which are typically lower in cost and easier to operate. Smaller sites require a compact treatment process that may be higher in capital cost and are more complex from a process standpoint, depending on the capacity of the plant and the process technology. At a minimum, the land parcel has to have sufficient area for the treatment process equipment and structures, access for ingress and egress, and area for a maintenance/ office building. The site configuration will also have to comply with the 750-ft setback requirement for noise, odor and aesthetic controls; however, depending on the zoning and permission from adjacent landowners, setback waivers may allow the setbacks to encroach upon the adjacent parcels, which minimizes the actual land requirements.

In addition to the land area, other factors affecting the selection of a site include:

1. Sites within proximity of floodplains
2. Site location relative to service areas

Sites that allow for gravity flow to the treatment facility are ideal to minimize the use of force mains and pump stations; however, most of these sites are at the low lying areas and may be susceptible to floods. All wastewater treatment facilities must be protected from flooding, and new facilities will need to be above the 500-year floodplain elevation. Considering these factors, sites with potential for flooding or within the floodplains were not considered for the new WRF site.

Due to the above criteria, TRSD has reviewed nearly 20 different potential sites. Some of the sites were dismissed quickly for reasons listed above but other sites warranted additional review. The following discussion is related to TRSD's approach in finding a site, as well as a discussion of 13 different specific sites that were evaluated. Additionally, it discusses the different wastewater treatment options evaluated as the potential sites were identified. Appendix G includes a map of parcel locations and documented communication regarding these investigations.

The initial site that was thought to be secured by TRSD in early 2013 was Parcel 205-03-003A. This property owner is the mining company, FMI, and they were in discussions with TRSD to provide the site for the location of the WRF. The site is located about 3,000 feet north of the TRSD northern border along Hwy 188 (Appendix G). It seemed to be an appropriate site as FMI was interested in purchasing effluent water from the proposed WRF to be utilized in the mining operations. The site was visited by the TRSD Staff to survey the terrain and to scope a potential WRF location and configuration. Two treatment alternatives were originally evaluated for the site: 1) Sequencing Batch Reactors (SBR), and 2) Extended Aeration Activated Sludge (EAAS) Process.

4.3.2.2.5.1 Sequencing Batch Reactors (SBR)

SBR is an activated sludge process that treats wastewater in batches. The process typically uses multiple tanks where batch treatment consisting of five modes that occurs in each tank. The modes

consists of fill, react, settling, decant and idle. Wastewater enters the first tank, which is the start of the "fill mode". The fill mode is based on either treatment volume or duration. Once the batch volume or time duration is met, the fill mode is complete and the influent flow switches to the next tank to initiate its fill mode. In the meantime, the first tank enters into the "react mode" where the tank is aerated and mixed to achieve the required biological oxidation of organic matter and nutrients. This may consist of providing both anoxic and aerobic conditions, especially if biological nutrient removal is required. Once the react time is complete, aeration and mixing stop. The process goes into the "settle mode", where to the mixed liquor settles to the bottom of the tank and leaving clear effluent on top. The treated effluent is removed from the tank in the "decant mode". After decant, the tank finally goes in the "idle mode" where it awaits for the next cycle, and the batch process starts over again.

The SBR process has a small site footprint since all the treatment and clarification occur in the tanks without the need for external clarifiers. Process control is more difficult due to the transition between the tanks and within the modes; however, with modern PLC and controls systems, SBRs are no longer as complicated to operate. There are some requirements for process knowledge. SBRs can treat wastewater to produce high quality effluent meeting BADCT requirements. To meet Class A+, the facility will need to have tertiary filtration and disinfection installed following the SBR process.

Table 16 – SBR Capital Cost Estimate

SBR Capital Cost		
Construction Costs	$	4,050,750
Non-Construction Costs	$	415,000
Total Capital Cost	**$**	**4,465,750**

4.3.2.2.5.2 Extended Aeration Activate Sludge (EAAS) Process

The Extended Aeration Activated Sludge (EAAS) Process is an activated sludge process that uses long solids retention time (SRT) of approximately 30 days to create a stabilized biological process for wastewater treatment. A type of EAAS process is the Parkson's Biolac®, which is characterized by the use of swinging aeration chains equipped with fine bubble diffusers to provide simultaneous mixing and aeration. The aeration chains can be individually controlled to create alternating oxic and anoxic zones within the basin, thus providing simultaneous nitrification and denitrification. Outside of the air delivery and mixing method, the Biolac® process follows the typical extended aeration activated sludge process. The mixed liquor from the process will be clarified using typical secondary clarifiers. A small portion of the settled sludge will be wasted from the clarifiers, while the rest of the settled sludge from the clarifiers is recycled back to the Biolac process.

The Biolac® process has been installed at over 800 facilities across the United States and is a proven wastewater treatment system that can produce high quality effluent capable of meeting BADCT standards. Its ability to provide both oxic and anoxic conditions within the treatment basins allows it to perform biological nutrient removal. To meet Class A+, the facility will need to have tertiary filtration and disinfection installed following the Biolac EAAS process.

Due to the long SRT, EAAS process requires large basins that increases its footprint significantly. As a result, this process is only applicable when large land areas are available. From an operational standpoint, the EAAS is a flow through process, which minimizes complex controls. Outside of the proprietary aeration and mixing sequence, the EAAS process is very typical of a conventional activated sludge process with biological nutrient removal that is familiar to most operators.

Table 17 – Biolac® EAAS Capital Cost Estimate

Biolac® EAAS Capital Cost		
Construction Costs	$	3,313,125
Non-Construction Costs	$	415,000
Total Capital Cost	**$**	**3,728,125**

Originally, the SBR treatment process was selected and laid out onto the site; however, after further evaluation, a Biolac® EAAS treatment alternative was selected for the site because of the large land area available, simplicity of the process and the lower construction and operational cost.

On April 15, 2013, the TRSD Board received a letter from FMI indicating that Parcel 205-03-003A was no longer available. A new search started between April 2013 and August 2015. A map of all the available parcels, north of the district along Hwy 188, was utilized in an effort to identify potential site locations. The map excludes land where the slope of the parcels were greater than 20% due to the excessive grading and earthwork requirements. The available sites were evaluated for location, ownership and elevation to determine site potential. The following is a list of those sites north of the district along Hwy 188 that were evaluated for a potential site for the TRSD WRF (Appendix G).

- 203-17-002L – Owner was Cyprus Mines and was not for sale
- 205-02-014A – Owner was private and did not want to sell
- 203-17-02T – Owner was private and willing to sell, but the site was 15,000 lf north of the TRSD, which made it not feasible from a collection system standpoint. Additionally, most of the site is within a floodplain.

The search turned to within the boundaries of TRSD and the following parcels were identified and evaluated.

- 205-01-006N – Owner was private. Facility site layout was performed utilizing a Schreiber Continuously Sequencing Reactor (CSR) treatment process instead of a Biolac due to the long, thin shape of the parcel. The SBR treatment process was not considered due to the higher capital cost of the SBR compared to the CSR process. At about 450 ft wide and with residents living in the south adjacent parcel, setback waivers will be required. The site was not abandoned but set aside as the search continued.

4.3.2.2.5.3 Continuously Sequencing Reactor (CSR)

The Continuously Sequencing Reactor (CSR) is also a biological nutrient removal (BNR) activated sludge process contained in a single basin. Similar to other activated sludge process, it has the ability to create the oxic and anoxic conditions in one basin; however it creates the conditions sequentially and repetitively, over time. During the oxic phase, the entire basin is oxic or aerobic. When the air is turned off, the entire basin becomes anoxic and then ultimately anaerobic. The air is then turned back on and the cycle repeats. The process only requires one circular basin that incorporates both the treatment process and clarification; however, for process redundancy, the second basin is recommended. Similar to a conventional activated sludge, the CSR is a continuous flow process and not a batch process like the SBR.

One type of CSR systems is the Schreiber CSR process. It uses fine bubble air diffusers mounted on a rotating radius-arm assembly that provides aeration and mixing to the basin. Through the use of fine bubbles and deep process tanks, the Schreiber CSR can reduce energy consumption for both aeration and mixing, making it very cost effective from an operating standpoint. Similar to the other treatment alternatives, the CSR can meet all BADCT standards and will require tertiary filtration and disinfection installation to meet AZ Class A+ Reclaimed Water Standards.

Table 18 - CSR Capital Cost Estimate

CSR Capital Cost		
Construction Costs	$	3,803,375
Non-Construction Costs	$	355,000
Total Capital Cost	**$**	**4,158,375**

- 206-08-008G and 206-08-008C – Owner was private. Even though the sites were adjacent to each other, their locations were not as ideal as Parcel 205-01-006N. In addition, they had the same setback issues. These sites were not considered.

In addition to privately-owned sites, TRSD made efforts to talk with the mining companies to determine if they potentially had parcels that could be made available to TRSD for a WRF location. The following meetings took place:

- TRSD met with Capstone Mining Company to discuss potential trade for effluent for potential WRF site locations. None were available.
- TRSD met with Pinto Mining Company to discuss potential trade for effluent for potential WRF site locations. None were available.
- TRSD met with FMI to discuss the possibility of constructing a WRF on FMI property adjacent to the Miami WRF in order to provide for the possibility of common operation staff. Not Available.

Then in February of 2015, TRSD had the opportunity to meet with BHP resulting in a follow-up meeting regarding the possibility of available sites. On August 24, 2015 BHP presented TRSD with three potential sites as follows:

- 206-04-005X – The property was not ideal for a treatment facility because of proximity to residential housing, public schools, and a commercial shopping area. Additionally, the majority of the property is within a floodplain.
- 205-01-050 – The property was not considered because the site was also located in within a floodplain and was 4-5 ft below the floodplain elevation during 100-yr storm events.
- 207-23-001C – This property is a likely potential site due to the large land area away from other existing land owners. Its westerly portion lies outside of the floodplain but is close to a dry wash that has the potential for percolation or an AZPDES discharge. In addition, BHP has a community septage and leach field system in this area that is servicing a small community.

To date, parcel 207-23-001C is the most ideal for the new TRSD WRF. The site is at a similar elevation to the Miami WRF. Therefore, most of the sewage within TRSD will need to be pumped to the new site. The TRSD's new main sewer pump station will be located near the Walmart plaza as currently proposed. The exact location of the proposed WRF is still being determined in partnership with BHP; however, BHP has stressed that the new WRF will need to have the smallest footprint possible in order to allow BHP to utilize a certain portion of the site. The plan is to determine an exact location within the site with the following criteria:

- Identifying and avoiding existing cultural spots as provided in the Class III Cultural Report provided within the EA.
- Identify a location that does not interfere with future BHP work and projects.
- Footprint should be as small as possible.
- Should include room for growth to at least 0.5 MGD.
- Should provide the necessary ADEQ Noise and Odor Setback requirements.
- Identify a location that avoids the floodway and floodplain as much as possible.
- Provides for easy access to the site with a consideration for power, water and communications easements.
- Provides a site that is 5 to 10 Acres in area.

Regardless of the location within the site, the criteria from both TRSD and BHP is to provide a treatment process with the smallest footprint while producing the highest effluent water quality. At this point, PACE evaluated Membrane Bioreactors (MBR) as a wastewater treatment alternative and recommends the MBR as the most viable and feasible option for TRSD.

4.3.2.2.5.4 Membrane Bioreactor (MBR)

The MBR treatment process is similar to traditional activated sludge processes where it uses natural occurring microorganisms for the biological oxidation of organic and nutrient load in the wastewater. However, instead of the traditional clarification process for liquid-solid separation, such as clarifiers, the MBR utilizes submerged in-tank microfiltration membranes to perform the liquid-solid separation. There are several main advantages of the microfiltration membranes. First, the membranes not only performs liquid-solid separation, they also filter the effluent, allowing the effluent to meet tertiary filtration requirements. Microfiltration is a more advanced filtration system than typical tertiary filters, such as sand

or cloth. Microfiltration can remove particles down to less than 1 micron. This allows for the removal of inert and organic particulates, larger microorganisms (i.e., bacteria, crypto sporidium and giardia), turbidity and even some viruses. Typical tertiary filtration systems, on the other hand, can only remove down to 5 microns or larger. With the exception of final disinfection, effluent from an MBR meets AZ Class A+ Reclaimed Water Standards with no additional tertiary treatment.

Another main advantage of the MBR is its ability to maintain high mixed-liquor suspended solids (MLSS) concentration. Typical activated sludge MLSS concentrations range from 2,000 to 4,000 mg/L. MBR's MLSS concentration can be as high as 10,000 mg/L. The higher MLSS concentration allows the treatment volume to be significantly reduced, making the MBR one of the smallest footprint of any wastewater treatment alternative evaluated. Combining the process small footprint with no clarification or tertiary filtration requirements, the MBR complete process can fit within 2,800 sf (not including ingress/ egress requirements or maintenance building).

The main disadvantages of the MBR are the complexity of the membranes and higher equipment capital cost. These disadvantages, however, are becoming less of a concern due to the use of PLC/ control automations and mainstream acceptance of the MBR process. In practice, the MBR process is very similar to the any activated sludge process with the exception of the membranes. MBR companies are providing service maintenance and training as part of the equipment procurement, allowing operators to become familiar with the equipment. The higher process equipment cost can be offset by the reduced infrastructure cost from the smaller footprint and from the elimination of clarification and tertiary filtration. Additionally, the small process footprint allows for MBR systems to be packaged in modular systems, making it very cost effective, especially for small facilities similar to the proposed TRSD. Overall construction for packaged MBRs are less than the more traditional treatment processes.

Table 19 - MBR Capital Cost Estimate

MBR Capital Cost		
Construction Costs	$	2,495,120
Non-Construction Costs	$	250,000
Total Capital Cost	**$**	**2,745,120**

4.3.2.2.6 WRF Common Elements

An influent lift station will not be required since all of the flows will be pumped to the new WRF via offsite sewer lift stations. The wastewater flow will first enter the facility at the headworks system that will consists of screening to remove trash and large inorganic materials. Grit removal and flow equalization may be required depending on treatment process selected, however, this can also be performed at the collection system lift stations.

4.3.2.2.6.1 Filtration

Filtration is required to meet AZ Class A+ Reclaimed Water. There different types of tertiary filters available. Common tertiary filters include sand filter, cloth media filters, and steel mesh filters. Selection of a tertiary filter will be based on providing proper solids capture to meet the turbidity requirements of less than 2 NTU at a maximum flux rate of 6 gpm/sf. In addition, tertiary filters will also need to be California Title 22 approved, which helps to ensure performance. With the exception of the MBR, all of the other treatment alternatives will require tertiary filtration.

4.3.2.2.6.2 Disinfection

There a number of options available for disinfection; however, due to the availability of skilled operators and availability of chemicals and equipment, only chlorination and ultraviolet (UV) disinfection were considered. The advantages and disadvantages of both systems are opposing. UV disinfection requires very small footprint but has a higher capital and O&M costs. Chlorination requires a larger footprint to achieve the required contact time but has much lower capital and O&M costs. Selection of either process will depend on the available site area, treatment alternative and effluent disposal option. For example, discharges to surface waters or percolation to groundwater may have trihalomethane limits that may favor UV over chlorination.

4.3.2.2.6.3 Effluent Disposal

There are a number of different options available for the disposal of the effluent. The region has a great need for reclaimed water. The following are some of the proposed effluent disposal options for the high quality effluent that would be produced by the TRSD WRF:

- A number of the mining companies in the area have expressed interest in utilizing the facility's effluent within their operations. Any discussions of this usage would include the mining company providing pumps and piping to convey the effluent to the desired locations. The anticipated permitting required will be an ADEQ Aquifer Protection Permit (including associated hydrology studies) and an ADEQ Reuse Permit.
- The local golf course, Cobre Valley County Club (CVCC) has expressed interest in obtaining the effluent for irrigation of the course. CVCC struggles to obtain enough water to keep the course green. Any discussions of this usage would include CVCC providing pumps and piping to convey the effluent to the golf course. The anticipated permitting required will be an ADEQ Aquifer Protection Permit (including associated hydrology studies) and an ADEQ Reuse Permit.
- Due to the ongoing flushing process of Pinal Creek, one mining company, FMI, has expressed interest in the flows to be discharged into Russell Gulch which is a contributor to Pinal Creek. This would contribute to the overall environmental cleaning within the region. The anticipated permitting required will be an ADEQ Arizona Pollutant Discharge Elimination System (AZPDES) permit. The utilization of Class A+ effluent would provide for improved ability for this discharge with ADEQ.
- Another approach to conveying effluent into Russel Gulch would be to install Vadose Zone wells or a percolation pond along the creek. The construction of the wells would be costly whereas a percolation pond would be much less expensive even though it would require more land but would provide the same results. In addition, a study of the area and the soils by an engineer to determine if Vadose Zone Wells or a percolation pond would even be a viable option. This study would be required to determine the size of the basin and the number of wells. As a result, it is difficult to determine the cost of this alternate at this time. The anticipated permitting required will be an ADEQ Aquifer Protection Permit (including associated hydrology studies) and an ADEQ Reuse Permit.
- There has also been discussions of utilizing the effluent to create a lake whereby a regional park would be constructed around the lake for use by all who live with in the area. It would provide an amenity for the region. The cost of the lake and park would not be bore wholly by TRSD, but by a number of interested groups in the region including the Gila County. The anticipated permitting required will be an ADEQ Aquifer Protection Permit (including associated hydrology studies) and an ADEQ Reuse Permit.

TRSD is interested in using its effluent for use in the future, however, at this time, the proposed solution will be to have the effluent discharged into Russell Gulch (third option above). These efforts will assist in the ongoing regional cleanup of Pinal Creek. As a result, TRSD will pursue an AZPDES permit with ADEQ.

4.3.2.2.6.4 Biosolids Process Handling and Disposal

Biosolids will be produced by the proposed WRF. Since all the process evaluated utilizes activated sludge, the quantify produce will be very similar. In Phase I (0.25 MGD), it is anticipated at the facility will produce approximately 400 lbs per day. At Phase III buildout, the facility will produce approximately 1,200 lbs per day. The biosolids will be unclassified and will be dewatered for disposal in a landfill. Land application is a future possibility; however, this option is not being considered at this time.

4.3.2.2.6.5 Operations and Maintenance Building

The building will include areas for operations and maintenance, including storage and a maintenance/repair shop. It is estimated that this building will be between 2,500 and 3,000 sf in floor space. It is anticipated that this building will not be constructed until Phase III unless there are available funds in the Phase I portion of the project.

4.3.2.2.7 WRF Treatment Process Cost Comparison and Selection

After investigations of WRF locations and consideration of all objectives of the new TRSD WRF, the following four processes were evaluated. Below is a comparison of the capital costs for each. More detailed breakdown of the capital cost can be found in Appendix G.

Table 20 - Treatment Process Cost Estimate Comparison

Capital Cost	SBR	EAAS	CSR	MBR
Construction Costs	$ 4,050,750	$ 3,313,125	$ 3,803,375	$2,495,120
Non-Construction Costs	$ 415,000	$ 415,000	$ 355,000	$ 250,000
Total Cost	**$ 4,465,750**	**$ 3,728,125**	**$ 4,158,375**	**$2,745,120**

Capital cost for each process was developed based on quotations from different treatment process vendors. Unlike larger WWTP (1 MGD or greater), smaller facilities can be modularized and packaged to significantly reduce capital cost. This is especially true for the MBR process due to its extremely small footprint. Capital cost can be reduced by using a containerized epoxy-coated, steel tanks (or stainless steel tanks). This significantly reduces the capital and construction labor cost. As a result, the MBR process has the lowest capital cost. The cost for the MBR included containerized, stainless steel tanks and equipment.

The SBR process can also be packaged; however, when the flow exceeds 200,000 gpd, the process tankage becomes too large and the capital cost savings are not as significant. SBR vendors will provide the process equipment but the process tanks will need to be constructed by the contractors.

Similarly, the CSR process can be modularized but based on standard circular steel tank dimensions. At 200,000 gpd or higher, cost savings are not as significant as with the MBR. The EAAS process requires a much longer retention time (as much as 30 hrs), and as a result, its footprint is much larger than the other processes, reducing the ability to save capital cost by modularize the process in package tanks.

As stated previously, the comparison of the processes did not include O&M due to similar operating cost at small flow facilities. The majority of the O&M cost will be for the operations staff. The operation of the facility will typically require one operator to oversee the process and perform daily tasks. A part-time operator will be required to assist the lead operator for maintenance tasks. Small flow facilities will typically have much smaller equipment, such as pumps and blowers, making it easier for the operations staff to maintain without the need of heavy machinery.

The complexity of the process will be similar for all four processes. The EAAC process will be the least complex; however, with the use of PLC and SCADA, the complexity for the other three process is greatly reduced. Regardless of the treatment process, the lead operator will require specialized technical knowledge of activated sludge because all four processes are Biological Nutrient Removal (BNR) Process. As a result, all four treatment processes will require the lead operator to be, at a minimum, a licensed AZ Grade 3 Operator.

In summary, the solution that addresses all of the TRSD requirements is the MBR process. This is the selected option for this WRF for the following reasons:

- Lowest capital cost and comparable O&M cost
- Smallest footprint satisfying the BHP requirement for the use of its parcel (size of facility, land availability, regulatory setbacks, etc.)
- Addresses current treatment capacity requirements and allows for easy, affordable expansion for future flows
- Provides highest water quality effluent

4.3.3 Map

See the following exhibits:

- Exhibit 1 – Existing Facilities
- Exhibit 2 – Preliminary Collection System

- Exhibit 3 – Phase I Preliminary Collection System
- Exhibit 4 – Phase I West Preliminary Collection System
- Exhibit 5 – Phase I East Preliminary Collection System
- Exhibit 6 – New TRSD Lift Station
- Exhibit 8 – New TRSD WRF

4.3.4 Environmental Impacts

Potential environmental impacts and mitigation measures for Alternative 3 have been explored by Logan Simpson Design and are presented in the EA that will assess the environmental impacts related to this proposed project. Based on historical evaluations and the EA, the anticipated environmental impacts include the following:

- No negative effects on land use, wetlands, cultural and biological resources, groundwater quality, and socioeconomic resources
- Minor to no direct or indirect impacts within the 100-year floodplain
- Portions of the collection system may be required to be installed in the floodplain. The Engineer will coordinate with Gila County in regard to the floodplain use permit and also the USACE 404 permit issues during design.
- The lift station lies within a 100 year floodplain and is located near the boundaries of a 500-year floodplain. Any impact to the floodplain should be minimal. During final design, a 500-year floodplain analysis will be performed to determine impact and elevations to ensure this critical facility is designed to be protected from a 500-year flood event.
- The WRF is located near the boundaries of a 500-year floodplain. During final design, a 500-year floodplain analysis will be performed to determine impact and elevations to ensure this critical facility is designed to be protected from a 500-year flood event.
- Positive effects to the environment and the quality of life will be experienced including:
    - Reduced risk to the area's groundwater, human/wildlife health due to a collection and treatment system implemented to today's standards
    - Increased property values with the discontinued use of cesspools and substandard septic systems

The connection of Bechtel Tract to the TRSD collection system will significantly reduce the potential negative environmental impacts due to the current subterranean discharge of septic waste. This 75 year old dilapidated system is outdated and does not meet today's standards.

Updated technology that will be implemented into the new TRSD WRF will significantly improve water quality of the effluent. Currently it is purposed that membrane bioreactor technology will be utilized to produce Class A+ quality effluent.

4.3.5 Land Requirements

Alternative 3 may require the acquisition of additional ROW or easements along proposed sewer alignments if these alignments do not have existing easements defined when they cross into private property. TRSD has identified potential collection line ROW issues where existing roads are not on public ROWs. TRSD and its consultants have discussed these issues with Gila County. The County has agreed to help resolve these issues and TRSD will support the County as required.

Land will need to be acquired for the installation of the new TRSD WRF and the construction of the regional lift stations and the neighborhood lift stations. The actual land requirements will be determined during the engineering design phase of the improvements.

In reference to the TRSD WRF land requirements, it is not unusual at this stage of a project to not have the facility site location completely finalized, as funding is not yet available. However, TRSD has been working hard to obtain a site for the proposed TRSD WRF. TRSD has been offered Parcel No. 207-23-001C from BHP as a potential site. The parcel is located within the area of Russell Road (southern portion of TRSD). The parcel location and proposed WRF location can be seen in Exhibit 8. TRSD is currently working with BHP to discuss purchasing this parcel for the use of locating the new WRF.

Alternative 3 will also require TRSD to purchase land to construct a New Lift Station, similar to Alternative 2. TRSD has entered into preliminary discussions with Walmart to purchase the land that is required to for the new TRSD Lift Station. Section 4.2.3.1.1 New TRSD Lift Station Location Determination describes the process of selecting a potential site location. Exhibit 6 shows the preliminary site layout.

4.3.6 Potential Construction Problems

With 85% of the project work consisting of the collection system, the potential construction problems are similar to Alternative 2. While this section addresses many of the issues that may be encountered during the design of the wastewater collection and treatment system, it is not intended to address all site-specific design and construction issues that will arise throughout the project. Some key design and constructability problems which will need to be addressed are as follows:

- Special care will need to be exercised with regard to excavation as some challenges may arise with old, abandoned and unrecorded existing utilities.
- Traffic control could pose some potential challenges to the construction schedule and maintaining access for homeowners who live adjacent to construction activities.
- Floodways:
    - Portions of the sewer mains and the WRF may be required to be installed within floodways. USACE Section 404 permit issues may have to be addressed during final design.
    - Per ADEQ in AAC R-18-9-E301.D.2.c, sewer lines crossing or constructed in floodways need to be installed 2 feet below the 100-year storm scour depth or scour protection provided if the depth cannot be maintained.

- Narrow Streets: Pavement widths are less than 25 feet wide.
    - Many of the sewer lines are within narrow residential streets. This makes access to and from the homes difficult during construction operations.
    - Narrow streets create design and construction difficulties. Care must be taken during the sewer line design to ensure adequate separation is maintained from other utilities like gas, water and electricity that need to be avoided to keep relocation costs low.
    - Potential asphalt variation may create issues.
- Steep Terrain: Much of the TRSD service area is constructed within steep, mountainous terrain. Care must be taken during the design to ensure that the sewer is installed at reasonable slopes.

4.3.7 Sustainability Considerations

4.3.7.1 Water and Energy Efficiency

Alternative 3 immediate plans for the effluent produced by the new TRSD WRF proposes to discharge into Russell Gulch which is a contributor to Pinal Creek. Due to the ongoing flushing process of Pinal Creek, one mining company (FMI) has expressed interest in the flows to be discharged into Russell Gulch to contribute to the overall environmental cleaning within the region.

Alternative 3 may result in the possibility of potential future effluent reuse within the region, more specifically the Cobre Valley Country Club golf course. The effluent could offset the use of other water sources, either potable or ground water needed during summer operations, and therefore reduce the amount of use of regional water resources.

Energy efficient pumps and mechanical equipment will be used for the proposed project to decrease operational costs and energy use.

The TRSD WRF design will include the best available energy efficient equipment and reduction of overall site work and materials needed for construction.

4.3.7.2 Green Infrastructure

While PVC is not considered a green product, the longevity and durability of the product once installed needs to be considered. Prior standard materials used for collection systems such as clay pipe has had issues with infiltration and exfiltration. Infiltration can lead to issues within lift station mechanical

equipment, headwork mechanical equipment, other mechanical systems in the treatment process, and the biological loading of the wastewater. Exfiltration can lead to discharge of wastewater into the environment and soil, potentially leading to contamination. Therefore, PVC can be considered to eliminate the need for additional materials in the future and protects the environment from potential contamination

Proposed TRSD WRF facility will produce ADEQ Class A+ effluent that has the potential for unrestricted reuse.

4.3.8 Cost Estimates

The engineer's opinion of cost for Alternative 3 includes the capital construction and non-construction costs associated with the improvements. These costs are summarized in Table 21 below. Detailed costs can be found in Appendix F.

4.3.8.1 American Iron and Steel

estimated construction cost has taken into account estimated material costs needed to comply with the American Iron and Steel Requirements (AIS) as defined in RUS Bulletin 1780-35 which provides a list of AIS iron and steel products and construction items.

Table 21 - Summary of Alternative 3 Engineer's Opinion of Cost

Description	Engineer's Estimate	
Construction Costs		
Underground Piping for the Collection System	$	4,694,106
Lift Station for Collection System	$	500,000
Excavation and Pavement Restoration	$	2,778,942
Services Connections (Included in Connection Costs Breakdown)	$	3,909,250
Construction of TRSD WRF	$	2,366,000
Additional Construction Costs	$	3,889,785
Total Construction Costs	**$**	**18,138,083**
Non-Construction Costs		
Engineering - Preliminary Studies	$	840,661
Engineering - District Requirements	$	208,760
Land Acquisition, ROW, Easements	$	468,400
Engineering - Permit Applications	$	179,500
ADEQ & County Permit Fees	$	90,100
Engineering - Design Information Gathering	$	630,000
Engineering - Design Collection/LS & WRF	$	2,011,950
Engineering - Construction Administration	$	1,087,333
Legal Administration / Financial Advisor	$	787,086
Total Non-Construction Cost	**$**	**6,303,791**
Construction Contingency	$	2,720,713
Non-Construction Contingency	$	315,190
Total Construction & Non-Construction Cost	**$**	**27,477,776**

[1]Estimate does not include Financing and Interest Costs

4.3.8.2 O&M Cost Estimate

The Alternative 3 estimated O&M cost consists of two major portions: 1) the overall TRSD administrative requirements and the collection system O&M cost, and 2) the second will be the treatment of the TRSD wastewater flows with the newly constructed TRSD WRF.

Because this is only Phase I of a three-phase project, TRSD will need to utilize a conservative approach to the management of the new collection system. It was determined that the best approach would be to

find a person that has an operator's license who can fulfill a dual role of 1) management of TRSD and 2) supervisor of the O&M of the new collection system. In addition, the labor includes a supervisor's assistant for management/clerical purposes and a higher paid field tech/laborer to assist the supervisor in the O&M of the collection system and TRSD WRF. The cost summary breakdown of labor cost and the proposed Alternative 3 O&M is presented in Appendix F. Please note that all of the cost to support the management of TRSD is covered under the collection system portion of the annual O&M budget. The actual treatment, addition of an assistant and an upgraded field tech/laborer is provided under the WRF portion.

Table 22 includes the projected O&M cost for the first year following the completion of the proposed improvements. Please refer to Appendix F to compare the annual O&M costs for Alternative 3 with those of other alternatives.

Table 22 - Alternative 3 Engineer's Annual O&M Estimate

O&M Portion	Engineer's Estimate
Collection System Costs	$ 239,980
TRSD WRF Costs to Treat Wastewater	$ 171,741
Total Estimated Alternate 3 Annual O&M Cost	**$ 411,721[1]**

[1]Estimate does not include Short Lived Asset Reserve (SLAR) or Debt Reserve

4.3.9 Advantages and Disadvantages

Alternative 3 has the following advantages over the other alternatives considered for addressing the wastewater system issues:

- TRSD has rights to the effluent and the capability to sell the effluent and create an additional revenue stream for the TRSD to offset operational costs.
- The proposed WRF could be used to pump effluent to the mines for reuse or the Cobre Valley Country Club Golf Course.
- Effluent flows will be discharged into Russell Gulch to contribute to the overall environmental cleaning for Pinal Creek.
- TRSD has control regarding decisions that affect customers.
- Minimal coordination with Miami allowing TRSD to have more control over the schedule.
- No potential construction issues related to archaeological previously recorded sites because no parallel force main will be constructed to the existing Miami WRF.
- No more project delays in negotiations with local municipalities.
- No requirement to purchase Miami WRF capacity provides funds for use in the construction of the new TRSD WRF.
- Preliminary estimates of phasing costs are showing that over the course of the three phases, the TRSD WRF phased expansion will be more cost effective than the phased expansion of the Miami WRF in Alternative 2.
- BHP has offered to consider contributing funds toward the TRSD WRF for assuming the responsibility of existing system decommissioning (including related clean closure).
- Improved groundwater conditions by removing the current subterranean drainage system at the BHP-owned Bechtel Tract site.
- The new TRSD WRF will use a minimal footprint and updated technology.
- O&M costs are lower than Alternative 2.
- All O&M activities would be controlled by the TRSD. TRSD would not have to pay Miami administrative fees as required in Alternative 2. TRSD can hire its own staff to operate the WRF, contract with a private company, or share operations staff costs with Miami or Globe for operation services.
- An IGA is not required between the TRSD and Miami for this Alternative. Therefore, TRSD will not be impacted by the financial or managerial unknowns that may arise by partnering with Miami.

The disadvantages of Alternative 3 include the following:

- This alternative requires the construction of a new WRF.
- Both Miami and Globe are projected to have excess capacity available in their treatment facilities.

5 Selection of an Alternative

This PER considered three alternatives to address improving the public health issues associated with wastewater treatment within the TRSD for Phase I of the TRSD Wastewater Collection and Treatment System project.

5.1 Life Cycle Present Worth Analysis

The life cycle present worth cost analysis examined construction costs, non-construction costs, annual O&M costs, short-lived assets, and salvage values. To determine the present worth of the O&M costs, short-lived assets, and salvage values; a Real Federal Discount Rate of 0.5 percent was used per the OMB Circular No. A-94 dated November 2016 (see Appendix H). Following are the factors used in the analysis.

Table 23 – O&M Present Worth

Item	Alternative 2	Alternative 3
Total Annual Cost	$ 492,770[1]	$ 411,721[1]
Present Worth Factor	18.9874	18.9874
O&M Present Worth	**$ 9,356,000**	**$ 7,818,000**

[1]Estimate does not include Short Lived Asset Reserve (SLAR) or Debt Reserve

Table 24 – Short-Lived Asset Reserves (SLAR) Present Worth

Wastewater Treatment Asset	Est. Lifespan (yrs)	Est. Expense in Today's $	Annual Reserve Alt. 2	Annual Reserve Alt. 3
Collection System and Lift Stations				
Collection LS Pumps	15	$ 35,000	$ 2,333	$ 2,333
Collection LS Motors	10	$ 10,000	$ 1,000	$ 1,000
Pump Controls & Security	10	$ 10,000	$ 1,000	$ 1,000
Valves	15	$ 10,000	$ 667	$ 667
Emergency Generator	15	$ 15,000	$ 1,000	$ 1,000
Water Reclamation System				
Valves	15	$ 12,000	$ 600	$ 800
WRF Pumps	10	$ 80,000	$ 6,000	$ 8,000
WRF Motors,	10	$ 25,000	$ 1,875	$ 2,500
Flow Meters	15	$ 10,000	$ 500	$ 667
Field/Process Inst Equip	10	$ 12,000	$ 900	$ 1,200
Disk Filters	5	$ 10,000	$ 1,500	$ -
Membranes	10	$ 118,000	$ -	$ 11,800
Actuators	10	$ 7,500	$ 563	$ 750
Headworks Screening & Grit	5	$ 10,000	$ 1,500	$ 2,000
Emergency Generator	15	$ 45,000	$ 2,250	$ 3,000
Air Compressor	10	$ 5,000	$ 375	$ 500
Aerators	10	$ 25,000	$ 1,875	$ 2,500
Chlorine Dosing System	15	$ 25,000	$ 1,250	$ 1,667
Dechlorination System	15	$ 10,000	$ 500	$ 667
Annual SLA Reserve Required			**$ 25,688**	**$ 42,050**
SLA Reserve 20 Year Amount			**$ 513,750**	**$ 841,000**

Table 25 – Short-Lived Asset Reserves (SLAR) Present Worth

Value	Alternative 2	Alternative 3
Years	20	20
Total Cost Replacement/Repair	$ 513,750	$ 841,000
Annual Cost	$ 25,688	$ 42,050
Present Worth Factor	18.9874	18.9874
Short-Lived Asset Reserves (SLAR) Present Worth	**$ 488,000**	**$ 798,000**

Table 26 – Salvage Value Present Worth

Item	Alternative 2	Alternative 3
Collection System		
Useful Life (years)	50	50
Construction Cost - Collection System	$ 14,334,996	$ 14,489,665
Salvage Value (assume straight-line of construction cost)	$ 8,600,998	$ 8,693,799
Lift Station		
Useful Life (years)	25	25
Construction Cost	$ 636,500	$ 636,500
Salvage Value (assume straight-line of construction cost)	$ 127,300	$ 127,300
Water Reclamation Facility		
Useful Life (years)	20	25
Construction Cost	$ 353,258	$ 3,011,918
Salvage Value (assume straight-line of construction cost)	$ -	$ 602,384
Total Construction Cost	$ 15,324,753	$ 18,138,083
Total Salvage Value	$ 8,728,298	$ 9,423,483
Present Worth Factor	0.9051	0.9051
Salvage Value Present Worth	**$ 7,900,000**	**$ 8,529,000**

Table 27 below is a summary of the life cycle cost comparison.

Table 27 – Life Cycle Present Worth Analysis Comparison

Item	Alternative 2	Alternative 3
Capital Cost	$ 25,447,683	$ 27,477,776
Annual O&M (Present Worth)	$ 9,356,000	$ 7,818,000
Annual SLA (Present Worth)	$ 488,000	$ 798,000
Salvage Value (Present Worth)	$ 7,900,000	$ 8,529,000
Present Worth Cost	**$ 27,391,683**	**$ 27,564,776**

The life cycle cost analysis shows that the alternatives are virtually equal, coming within <1% of each other.

5.2 Non-Monetary Factors

Non-monetary factors were also considered in addition to the estimated project costs. Impacts on the environment, public health, and benefit to the community were all included in the determination of a recommend alternative. A method commonly used by engineers to determine the best value is by factoring in monetary and non-monetary attributes in a rating matrix. A rating matrix was used to select a recommended alternative by including contributing attributes of the project and applying a weight factor for each attribute. Then each alternative is given a score of 1 to 5 with a 1 being a low and undesirable score, and 5 being a high and desirable score. The score is multiplied by the attribute weight to determine a weighted score. All weighted scores are summarized for each alternative. The highest

overall score represents the best value alternative for both monetary and non-monetary attributes. See Table 28 below for the overall best value alternative.

Table 28 – Alternatives Rating Matrix

Attribute	Weight	Alternative 1		Alternative 2		Alternative 3	
		No Action		To Miami		New TRSD WRF	
		Score	Wt. x Score	Score	Wt. x Score	Score	Wt. x Score
Effluent as Potential Revenue	**1**	1	**1**	1	**1**	5	**5**
Land Acquisition / Easements	**1**	5	**5**	3	**3**	3	**3**
Constructability	**3**	5	**15**	3	**9**	2.5	**7.5**
Capital Cost	**4**	5	**20**	3	**12**	2.5	**10**
O&M	**4**	5	**20**	2	**8**	3	**12**
Environmental Impacts	**4**	1	**4**	5	**20**	5	**20**
Public Health Impacts	**4**	1	**4**	5	**20**	5	**20**
Street Impacts	**1**	5	**5**	3	**3**	3	**3**
TRSD Oversight	**4**	1	**4**	2	**8**	5	**20**
Community Benefit	**4**	1	**4**	5	**20**	5	**20**
Schedule	**1**	5	**5**	3	**3**	2.5	**2.5**
Total Score			**87**		**107**		**123**

Both Alternatives 2 and 3 are acceptable based on the rating matrix analysis; Alternative 3 displays an advantage over Alternative 2.

Alternative 2 and Alternative 3 are feasible, viable solutions to address the health and safety risks associated with the current onsite treatment and discharge of wastewater within the TRSD. Alternative 2 has a slight advantage when considering the life cycle present worth cost analysis, however due to the magnitude of the project they are virtually equal, coming within <1% of the other. Alternative 3 has the advantage when considering non-monetary factors.

Furthermore, to undertake this project, TRSD must consider additional factors aside from the technical and costs perspectives. The TRSD Board is committed to providing the residents and businesses with a cost effective, reliable and long-term solution. TRSD must maintain control of the maintenance and operation of the wastewater treatment system once it is in place. It is vital to the TRSD that the well-being (health, safety and financial aspects) of the residents of the TRSD is assured through TRSD control over the management and rate structure to provide reliable and service at a fair cost.

Alternative 2 requires working with the Town of Miami (Miami) to negotiate an intergovernmental agreement (IGA) for the TRSD flows to be conveyed to and treated by the Miami WRF. Through the course of these negotiations, a number of factors that were revealed which render the Alternative 2 not viable. With further project development and information gathered, major changes in the evaluation have affected the viability of Alternative 2. The major items are as follows:

1) Negotiation of an Intergovernmental Agreement (IGA) with Miami:

   A Special Election was held in November 2015 in which the TRSD voters agreed that the TRSD Board could enter into an IGA with Miami for the purchase of wastewater treatment capacity if negotiations could be reached for terms that are in the best interest of the TRSD customers.

The TRSD Board and staff have worked diligently for over three (3) years through numerous communications and meetings to develop an acceptable agreement, but the TRSD proposed terms have been rejected by Miami. TRSD Board has openly communicated with Miami in an attempt to come to a mutual agreement on fair conditions of an IGA for the treatment of TRSD wastewater flows. Approximately sixty (60) meetings have taken place in these efforts and these have not been successful.

2) TRSD Receipt of Miami's Audited Financial Statements:

To be able to accurately estimate the costs to convey the TRSD wastewater flows to the Miami WRF for treatment, TRSD must have full access to the financial records of Miami concerning the operation and maintenance of the facility. Without adequate financial records, the Engineer, Bond Council and TRSD Board cannot appropriately evaluate and recommend reliance on Miami for wastewater treatment without understanding what it costs to run the Miami WRF.

It has been impossible to obtain actual treatment costs information. Even after numerous requests for sewer fund budgets and actual costs, to date, no information has been provided by Miami concerning the costs of wastewater treatment at the Miami WRF. Only estimated cost of operations has ever been received from the Miami engineer (HilgartWilson, LLC).

TRSD remains firm on the position that for a true evaluation of Alternative 2, this financial information must be provided to TRSD. Alternative 2 of this PER for Phase I of III is somewhat unique in that one governmental entity is completely relying on another for wastewater treatment. Without the required Miami financial information, TRSD is unable to assess the reliability of its proposed partner in serving its residents and businesses.

It should be noted that the cost used for the evaluation in this PER for Miami to treat the TRSD wastewater as billed to TRSD monthly is based on the Town's Engineer's estimated costs of operating the Miami WRF. Additional factors that would affect the evaluation of true cost are the unknowns of the current conditions at the Miami WRF (any required improvements to be able to acquire the TRSD capacity) and the impact to the TRSD treatments costs due to recent rate increases for the Miami WRF customers.

TRSD believes that the ideal solution for the TRSD service area and surrounding areas is to create a true regional solution by joining with the neighboring communities to provide effective and affordable wastewater collection and treatment services to the residents of the area. However, TRSD has made numerous efforts over the years and has recently continued to try for a successful collaboration for joint ownership. TRSD continues to be met with resistance in the sharing and gathering of information sufficient to allow for the development of a PER for such a regional solution.

With the consideration of all current information and unsuccessful Miami negotiations, Alternative 3 is the recommended alternative.

6 Proposed Project (Recommended Alternative)

Alternative 3 is the recommended alternative to resolve the health and sanitary issues within Phase I of III of the TRSD Wastewater Collection and Treatment System. Of the three alternatives presented in this PER, Alternative 3 has been selected as the alternative that will provide the best value to those being served by TRSD.

6.1 Preliminary Project Design

Plans, specifications and the necessary documents will be prepared prior to starting construction on this project. The cost estimate for this project is based on 250,000 GPD design capacity of a new TRSD WRF, one main lift station and a collection system servicing Phase I areas. Force mains are estimated to be 6-inch in diameter and gravity sewer mains range between 6-inch and 10-inch in diameter. The infrastructure layout is depicted on Exhibits 3, 4, 5, 6 and 8.

6.1.1 Collection System

Nearly 90% of the properties within TRSD are currently served by either septic systems or cesspools. A centralized collection system will be designed and constructed to facilitate the abandonment of the existing cesspools and septic systems. It is anticipated that the collection system will be installed within existing road ROWs with the main lines running along Locomotive Avenue. In those areas where it is not feasible to install the sewer system in a ROW, it will be necessary to secure an easement from the property owner.

It is estimated that 58,000+/- linear feet (LF) of gravity sewer lines, 7,500+/- LF of force main and approximately 145 new manholes will need to be constructed for the collection system. See Appendix F for summation of construction quantities. If terrain warrants, individual lift station and pumps may be used for specific parcels within the new service area.

6.1.2 Lift Station and Force Main

A main lift station and force main of approximately 7,500+/- LF will be needed to convey flows to the new TRSD WRF. The new lift station would consist of a wet well equipped with two submersible pumps with space for future pumps. Each pump would be sized to convey Phase I peak-hour flows independently to allow for full redundancy. It is estimated that Phase I peak-hour flow will be approximately 415 GPM. During the design process of the collection system the sizing of the force main will need to be determined in order to allow it to handle the flows of all three phases.

The new TRSD Lift Station proposed location is behind the Walmart store on existing Walmart property. This main lift station location will prove to be more beneficial to the overall project due to the fact that the remaining two phases will ultimately pass through this lift station as well. TRSD has entered into preliminary discussions with Walmart to purchase the land that is required to for the new TRSD Lift Station.

6.1.3 New TRSD WRF

All Phase I wastewater flows will be conveyed to the new TRSD WRF which will be designed to have treatment capacity of 650,000 GPD at full buildout. The Phase I WRF will be designed for a capacity of 0.25 MGD. The preliminary location and layout can be seen is Exhibit 8. Treatment and effluent use will be managed and operated by the TRSD. It is anticipated that the WRF will be a package plant using the membrane bioreactor (MBR) process. The updated membrane filtration technology will provide high quality effluent (meeting ADEQ's Best Available Demonstrated Control Technology and Class A+ Reclaimed Water Standards).

TRSD will obtain an AZPDES permit will be obtained for a discharge point. This discharge could be beneficial to the region because it will help facilitate the flushing of the Pinal Creek. With this high quality effluent, it could be used as a reclaimed water source in the future. This facility will only require a minimal footprint for development.

6.1.3.1 TRSD WRF Procurement

It is the intent of TRSD to use the Performance-Based Specification process to procure the WRF package plant. Performance-Based Specifications clearly define process design criteria and identifies key process components upfront during the design stage. Due to advances in technology, wastewater treatment facilities are becoming more proprietary "black-boxed" and it is increasingly difficult to provide a complete unit process design for bid without essentially sole-sourcing the major equipment. In a typical project, where the facility is designed around one type of equipment, there is a high probability that the final cost of the project will be higher than if competitive bidding were performed. However, waiting until the design is completed to allow competitive bidding on the equipment reduces the interest of potential suppliers and typically requires substantial re-design to implement.

The use of Performance-Based Specifications in the equipment selection process allows clients to obtain open competitive bids that assist in evaluation capital and operational costs and operational performance prior to finalizing the design. The major advantage of Performance-Based Specifications is that the project team can proceed to design knowing the cost and equipment they will be using in the project without losing the benefit of a competitive market. Additionally, TRSD could choose to order equipment in advance to lock in pricing to avoid any cost increases due to scheduling. This process has been successfully utilized on a number of projects throughout Arizona and California. The process has proven to be very beneficial to the overall project and meets the USDA-RD Open Competition requirements.

6.1.3.2 Land / Easement Acquisition

The project may require the acquisition of additional ROW or easements along proposed sewer alignments if these alignments do not have existing easements defined when they cross into private property. TRSD has identified potential collection line ROW issues where existing roads are not on public ROWs. TRSD and its consultants have discussed these issues with Gila County. The County has agreed to help resolve these issues and TRSD will support the County as required.

TRSD will need to purchase land to construct a New Lift Station. TRSD has entered into preliminary discussions with Walmart to purchase the land that is required to for the new TRSD Lift Station. Exhibit 6 shows the preliminary site layout.

The New TRSD WRF will require land acquisition of approximately 5-10 acres for the WRF and to satisfy setback requirements. TRSD has been working hard to obtain a site for the proposed TRSD WRF. TRSD has been offered Parcel No. 207-23-001C from BHP as a potential site. The parcel is located within the area of Russell Road (southern portion of TRSD). The parcel location and proposed WRF location can be seen in Exhibit 8. TRSD is currently working with BHP to discuss purchasing this parcel for the use of locating the new WRF.

6.1.4 Cost Escalation

It is estimated that the time frame between today and when the project would be constructed will not require cost escalation assuming each phase of construction would take about one year. Therefore, no escalation factor was applied to the cost estimates.

6.2 Project Schedule

The project is estimated to take approximately 14 to 16 months to construct. The projected schedule for Phase I has been included in Appendix I.

6.3 Permit Requirements

Several permits will be required for the selected alternative. For the purposes of this analysis, an allowance has been provided to cover permitting fees. A breakdown of cost estimates is included in Appendix F. These fees will help to cover submissions to ADEQ for the APP and AZPDES permits, submitting the CAG 208 Water Quality Management Plan Amendment, obtaining permits for the Arizona Eastern Railroad crossings, etc. It is important to note that the permit fees change periodically, therefore the actual permit costs may differ from the allowance included in this conceptual opinion of probable cost.

6.4 Sustainability Considerations

6.4.1 Water and Energy Efficiency

The immediate plans for the effluent produced by the new TRSD WRF proposes to discharge into Russell Gulch which is a contributor to Pinal Creek. Due to the ongoing flushing process of Pinal Creek, one mining company, FMI, has expressed interest in the flows to be discharged into Russell Gulch to contribute to the overall environmental cleaning within the region.

This project may result in the possibility of potential future effluent reuse within the region, more specifically the Cobre Valley Country Club golf course. The effluent could offset the use of other water sources, either potable or ground water needed during summer operations, and therefore reduce the amount of use of regional water resources.

Energy efficient pumps and mechanical equipment will be used for the proposed project to decrease operational costs and energy use.

The TRSD WRF design will include the best available energy efficient equipment and reduction of overall site work and materials needed for construction.

6.4.2 Green Infrastructure

While PVC is not considered a green product, the longevity and durability of the product once installed needs to be considered. Prior standard materials used for collection systems such as clay pipe has had issues with infiltration and exfiltration. Infiltration can lead to issues within lift station mechanical equipment, headwork mechanical equipment, other mechanical systems in the treatment process, and the biological loading of the wastewater. Exfiltration can lead to discharge of wastewater into the environment and soil, potentially leading to contamination. Therefore, PVC can be considered to eliminate the need for additional materials in the future and protect the environment from potential contamination.

Proposed TRSD WRF facility will produce ADEQ Class A+ effluent that has the potential for unrestricted reuse.

6.5 Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

The total project cost estimate for implementing the selected alternative is included in Appendix F of this report. The Engineer's Opinion of Cost for the proposed alternative is as follows:

Table 29 – TRSD Phase I Proposed Project Cost Estimate

Description	Phase I WRF Engineers Opinion of Cost	Collection System	Water Reclamation System	Residential Service Connections
Construction Costs		**Construction Costs**		
Underground Piping for the Collection System	$ 4,694,000	$ 4,694,000	$ -	$ -
Lift Station for Collection System	$ 500,000	$ 500,000	$ -	$ -
Excavation and Pavement Restoration	$ 2,779,000	$ 2,779,000	$ -	$ -
Services Connections	$ 3,909,000	$ -	$ -	$3,909,000
Construction of TRSD WRF	$ 2,366,000	$ -	$2,366,000	$ -
Additional Construction Costs	$ 3,890,000	$ 2,177,000	$ 646,000	$1,067,000
Total Construction Costs	**$18,138,000**	**$10,150,000**	**$3,012,000**	**$4,976,000**
Non-Construction Costs		**Non-Construction Costs**		
Engineering - Preliminary Studies	$ 841,000	$ 841,000	$ -	$ -
Engineering - District Requirements	$ 209,000	$ 209,000	$ -	$ -
Land Acquisition, ROW, Easements	$ 468,000	$ 443,000	$ 25,000	$ -
Engineering - Permit Applications	$ 180,000	$ 93,000	$ 87,000	$ -
ADEQ & County Permit Fees	$ 90,000	$ 50,000	$ 40,000	$ -
Engineering - Design Information Gathering	$ 631,000	$ 536,000	$ 95,000	$ -
Engineering - Design Collection/LS & WRF	$ 2,012,000	$ 1,480,000	$ 299,000	$ 233,000
Engineering - Construction Administration	$ 1,087,000	$ 598,000	$ 196,000	$ 293,000
Legal Administration / Financial Advisor	$ 787,000	$ 440,000	$ 131,000	$ 216,000
Total Non-Construction Cost	**$ 6,305,000**	**$ 4,690,000**	**$ 873,000**	**$ 742,000**
Construction Contingency	$ 2,721,000	$ 1,523,000	$ 452,000	$ 746,000
Non-Construction Contingency	$ 314,000	$ 176,000	$ 52,000	$ 86,000
Total Construction & Non-Construction Cost	**$27,478,000**	**$16,539,000**	**$4,389,000**	**$6,550,000**
Financing & Interest	$ 752,000	$ 414,000	$ 128,000	$ 211,000
Total Cost	**$28,230,000**	**$16,953,000**	**$4,517,000**	**$6,761,000**

Note: All line items in cost above have been rounded to the nearest thousands and therefore may slightly different than the detailed cost sheets.

With the addition of the Bechtel Tract, BHP may contribute funds to TRSD in the efforts to take this aging system out of services and transfer operations and treatment responsibilities to TRSD. The estimated contribution is not included in the cost as this has not been confirmed.

After the completion of the proposed project, if there is any7 remaining unused budget, TRSD would like to request USDA-RD to consider contributing fund toward the following items:

- Cost of the administrative building
- Procurement of vehicles, tools and other required equipment

6.6 Annual Operating Budget

6.6.1 Income

Under the selected alternative, it is anticipated that the sewer rate will consist of the following two components: 1) Wastewater collection and treatment O&M Fee and 2) Administrative and Billing Fee. The Estimated Sewer and Assessment Rates are discussed in Section 6.7 of this PER.

TRSD may determine to continue with taxation through Ad Valorem/Secured Taxes to cover administrative costs, however this action is still under consideration.

6.6.2 Annual O&M Costs

O&M costs for this PER were estimated for TRSD based on similar rural PACE projects throughout Arizona. A breakdown of the O&M costs is provided in Appendix F.

The TRSD O&M fee will be distributed between the residents based on the equivalent dwelling units of their property. Per A.R.S. 48-2027(G)(5) an availability fee may be charged to vacant parcels that lie adjacent to sewer lines. This fee is limited to 50% of the user fee. A more detailed rate distribution will be necessary prior to wastewater service. The detailed rate study will add/confirm/remove EDUs of each parcel to be connected to the collection system.

6.6.3 Debt Repayments

TRSD is pursuing primary funding for the project through the USDA-RD RUS program. It is also anticipated that TRSD may be able to secure a short-term bridge loan issued by Arizona's Water Infrastructure Finance Authority (WIFA) to get the project from PER approval through bid services and construction contract execution. TRSD will need to establish service fees sufficient to cover system O&M and reserves. The actual assessment installments will be established at the time the loans are closed and will be based on construction costs, grant funding received and reserve funds.

6.6.4 Colonia Funding

The project is in a Colonia area with a Median Household Income (MHI) of approximately $26,000. Colonia grant funding through USDA-RD should be utilized to the maximum extent wherever it is applicable throughout the project. It is anticipated that Colonia funds could be used for the following to reduce the cost of the project by not incurring the Service Connections Costs in the cost estimate.

- The abandonment in place of existing cesspools and septic systems
- Installation of laterals from existing homes to the new sewer mains
- Connecting the laterals to the new sewer mains

6.6.5 Reserves

The USDA-RD Reserve Requirement will be collected by the Gila County Treasurer as part of the annual property tax bills, see A.R.S. § 48-2076.

6.6.5.1 USDA-RD Reserve Requirement

Debt Reserve funds are not allowed in accordance with State of Arizona statues concerning Sanitary Districts and will not be included in the cost of this project.

6.6.5.2 Repair and Replacement Reserve

The proposed monthly operating costs for the wastewater collection system includes a reserve fund for short-lived assets. As outlined in USDA RUS Bulletin 1780-2, these assets include pump and motor replacement, non-routine maintenance such as painting, and small equipment replacement. The costs summarized in the following Table 30 below includes a short lived asset reserve. It is anticipated that these funds will be used to cover the costs of the non-routine repair of the lift station, TRSD WRF, and other unexpected repairs throughout the system. Future value of equipment is estimated with a 0.5% interest rate over the lifespan of the asset.

Table 30 - Short-Lived Asset Reserve

Wastewater Treatment Asset	Anticipated Lifespan (years)	Estimated Expense in Today's $	Annual Reserve
Collection System and Lift Stations			
Collection LS Pumps	15	$ 35,000	$ 2,333
Collection LS Motors	10	$ 10,000	$ 1,000
Pump Controls & Security	10	$ 10,000	$ 1,000
Water Reclamation System			
Valves	15	$ 10,000	$ 667
Emergency Generator	15	$ 15,000	$ 1,000
Valves	15	$ 12,000	$ 800
WRF Pumps	10	$ 80,000	$ 8,000
WRF Motors,	10	$ 25,000	$ 2,500
Flow Meters	15	$ 10,000	$ 667
Field/Process Inst Equip	10	$ 12,000	$ 1,200
Disk Filters	5	$ 10,000	$ -
Membranes	10	$ 118,000	$ 11,800
Actuators	10	$ 7,500	$ 750
Headworks Screening & Grit	5	$ 10,000	$ 2,000
Emergency Generator	15	$ 45,000	$ 3,000
Air Compressor	10	$ 5,000	$ 500
Aerators	10	$ 25,000	$ 2,500
Chlorine Dosing System	15	$ 25,000	$ 1,667
Dechlorination System	15	$ 10,000	$ 667
		Annual SLA Reserve Required	**$ 42,050**

6.7 Estimated Sewer and Assessment Rates

6.7.1 Estimated Sewer and Assessment Rates Values

The following table summarizes the values to be used for estimated sewer and assessment rate calculations.

Table 31 – TRSD Phase I Estimated Values for Sewer and Assessment Rate Calculations

Item	Amount
Loan Amount	$ 28,230,000
Annual Payment	$ 1,054,725
Annual O&M	$ 411,721
Other Costs	$ -
Short Lived Assets	$ 42,050
Yearly Operating Budget	$ 1,508,496

6.7.2 EDU Count for Estimated Sewer and Assessment Rates

6.7.2.1 TRSD Phase I EDUs for Debt Repayment

For the majority of the TRSD this will be the first wastewater collection fees imposed upon the property owners within the TRSD. As discussed in Section 3.3.6 TRSD Phase I Reasonable Growth, the total Phase I EDU number of 1,374 was used in determining the wastewater flows estimation. However, there are some properties that will require rights-of-way. It is anticipated that most will be acquired and able to be connected to the new collection system. Therefore, when considering the estimated sewer and assessment rates, it was determined that it would be responsible to use a conservative number of EDUs to account for any properties that may not be able to be immediately connected. There are approximately 340 of the 1,374 EDUs which are vacant properties and 130 of which do not have frontage.

Table 32 – TRSD Phase I EDUs for Debt Repayment

Land Use Type	Total New Connections	Total Phase I EDUs	Debt Repayment EDUs
Residential	806	806	806
Commercial	19	174	174
Industrial	7	30	30
Vacant	0	340	210
Other	24	24	24
Totals	**856**	**1,374**	**1,244**

6.7.2.2 TRSD Phase I EDUs for Operations & Maintenance (O&M) Payments

The TRSD O&M fee will be distributed between the residents based on the equivalent dwelling units of their property. Per A.R.S. 48-2027(G)(5) an availability fee may be charged to vacant parcels that lie adjacent to sewer lines. This fee is limited to 50% of the user fee. Therefore, Vacant with Frontage parcels sewer rates are calculated at 50% of the fee for occupied parcels.

Table 33 – TRSD Phase I EDUs for O&M Payments

Land Use Type	Total New Connections	Total Phase I EDUs	Debt Repayment EDUs	Allowed User Fee %	O&M Payment EDUs
Residential	806	806	806	100%	806
Commercial	19	174	174	100%	174
Industrial	7	30	30	100%	30
Vacant	0	340	210	50%	105
Other	24	24	24	100%	24
Totals	**856**	**1,374**	**1,244**		**1,139**

7 Conclusions and Recommendations

Tri-City Regional Sanitary District (TRSD) encompasses an area of approximately 5.45 square miles located in Gila County, Arizona between the Town of Miami and City of Globe. The project objective is to provide a wastewater collection and treatment system to its residents to address the public health issues associated with current wastewater treatment methods. Nearly 90% of the residential properties within TRSD have onsite treatment systems (cesspools and substandard septic tanks) in violation of the CWA, AAC, and or ADEQ regulations.

Due to the magnitude of the overall project, it was considered imperative to summarize the total project to illustrate the undertaking. The project encompasses a three-phase approach based on direction from USDA related to the funding process/availability. The whole proposed project was presented, and then an in-depth evaluation was performed for Phase I of III.

The following alternatives were considered to address the TRSD wastewater issues:

Alternative 1: No Action
Alternative 2: Wastewater Flows conveyed to the Miami Water Reclamation Facility (WRF)
Alternative 3: Wastewater Flows conveyed to a new TRSD Water Reclamation Facility (WRF)

Alternative 1 proposes no changes to the current wastewater treatment methods that are posing public health issues in the community. If no changes are made, the condition of the facilities will continue to deteriorate, resulting in the increased potential for septic tank overflow, septic tank failure, cesspool overflow, and the introduction of pollutants into the environment. This alternative also continues to limit the potential uses and ability to sell the existing property located within the TRSD. Alternative 1 is not considered a viable option due to the public health and safety risks of not moving forward with these improvements.

Alternative 2 and Alternative 3 are feasible, viable solutions to address the health and safety risks associated with the current onsite treatment and discharge of wastewater within the TRSD. Alternative 2 has a slight advantage when considering the life cycle present worth cost analysis, however due to the magnitude of the project they are virtually equal, coming within <1% of the other.

Alternative 2 requires working with Miami to negotiate an intergovernmental agreement (IGA) for the TRSD flows to be conveyed to and treated by the Miami WRF. Through the course of these negotiations there was a lack of overall cooperation to agree on fair terms for a true regional solution. Without maintenance records, audited financial information and accurate operating costs, the TRSD Board and its consultants cannot appropriately evaluate and recommend reliance on Miami for wastewater treatment.

Alternative 3 has the advantage when considering non-monetary factors. To undertake this project, TRSD must consider additional factors aside from the technical and costs perspectives. The TRSD Board is committed to providing the residents and businesses with a cost effective, reliable and long-term solution. TRSD must maintain control of the maintenance and operation of the wastewater treatment system once it is in place. It is vital to the TRSD that the well-being (health, safety and financial aspects) of the residents of the TRSD is assured through TRSD control over the management and rate structure to provide reliable and service at a fair cost.

Approximately 1,600 residents will directly benefit from Phase I of this new collection and treatment system and the entire community will begin to see some environmental and economical improvements in the area. This project consist of 58,000+/- linear feet (LF) of gravity sewer lines, 7,500+/- LF of force main, approximately 145 new manholes, 856 new services connections, and a newly constructed 0.25 MGD membrane bioreactor water reclamation facility.

References

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DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

PACE
Advanced Water Engineering

Exhibits

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

TRI-CITY REGIONAL SANITARY DISTRICT

Gila County AZ

Legend

- Existing PCWWTF / WRF
- Existing Sewer Main
- Connected to Globe
- Connected to Miami
- TRSD Boundary

0 850 1,700 3,400 Feet

PACE Advanced Water Engineering

Date: 9/12/2018

Job Number A128 | Drawn By sfifield

Exhibit 1

EXISTING FACILITIES

188
Vertical Heights
Pinal Creek
Existing Globe Pinal Creek Wastewater Treatment Facility (PCWWTF)
Existing Miami Water Reclamation Facility (WRF)
Tailings Point Number 3
Bloody Tanks Wash
Pioneer Hills
60
Miami Gardens
Not in TRSD
Gordon Street Area
Miami Junior/Senior High School
Elementary Schools
Midland City & Central Heights
Claypool
Lower Miami
Cobre Valley Community Hospital
City of Globe
60
Town of Miami
Little Acres
Solitude Tailings Pond
Landfill

USDA FSA, DigitalGlobe, GeoEye, CNES/Airbus DS

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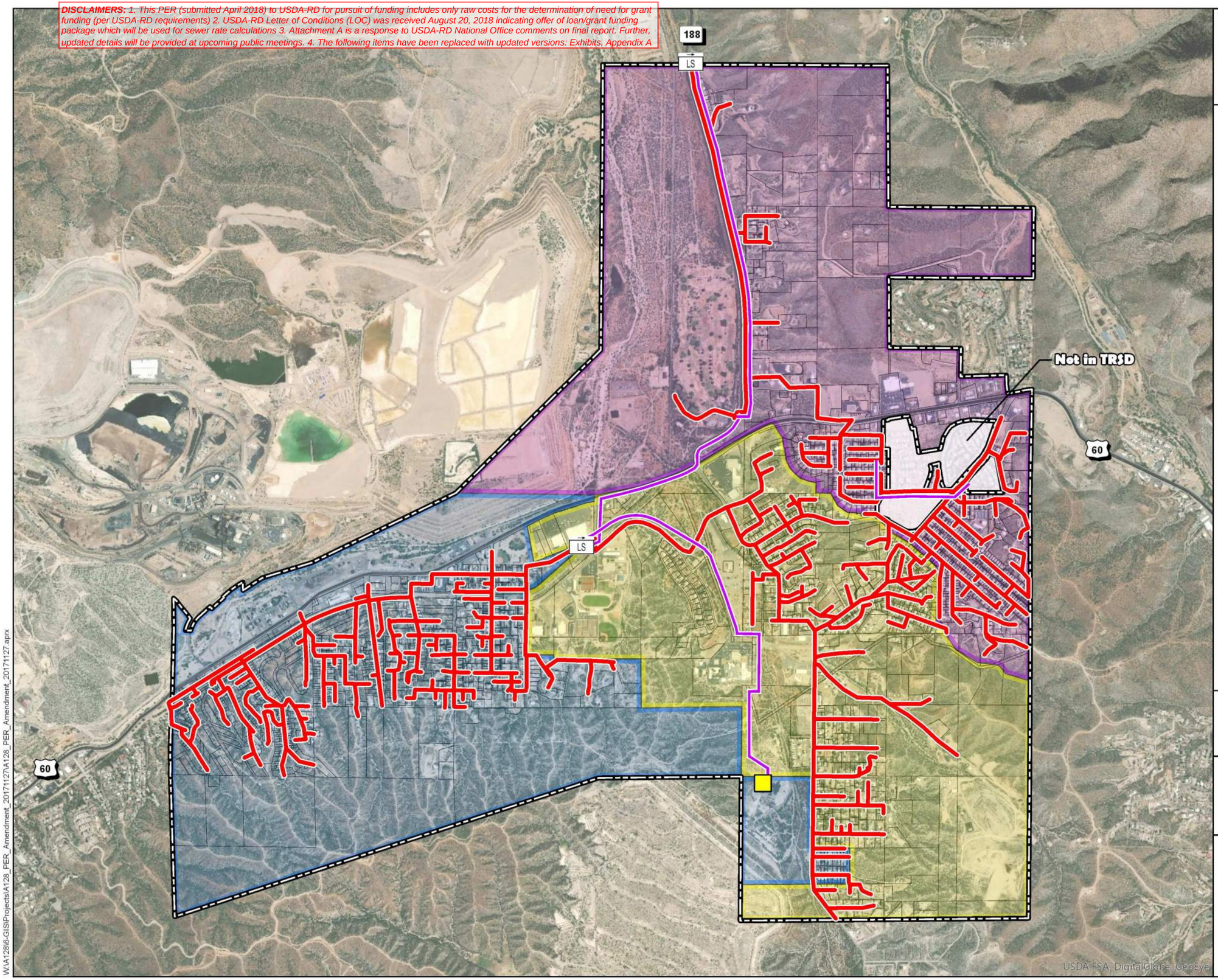
DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



TRI-CITY REGIONAL SANITARY DISTRICT

Gila County AZ

Legend

- Proposed Force Main
- Proposed Gravity Main
- Proposed WRF
- Proposed Lift Station
- TRSD Phase I
- TRSD Phase II
- TRSD Phase III
- TRSD Boundary

0 850 1,700 3,400 Feet

PACE Advanced Water Engineering

Date: 9/12/2018

Job Number A128 | Drawn By sfifield

Exhibit 2

PRELIMINARY COLLECTION & TREATMENT SYSTEM

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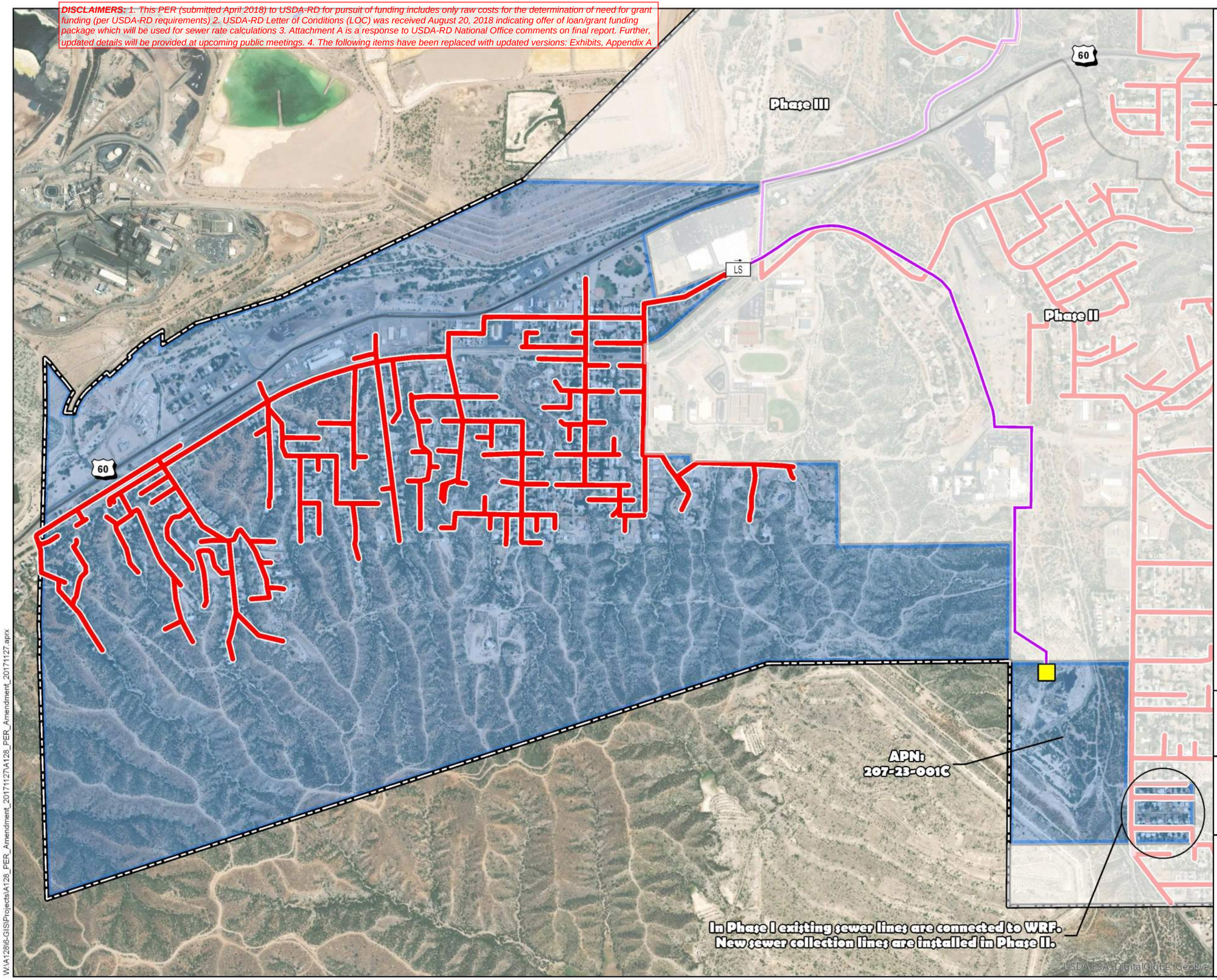
DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



TRI-CITY REGIONAL SANITARY DISTRICT

Gila County AZ

Legend

- Proposed TRSD WRF
- Proposed Lift Station (LS)
- Proposed Force Main (Phase 1) = 7,549'
- Phase I Gravity Main 8" = 63,295'
- TRSD Boundary
- TRSD Phase I

0 500 1,000 2,000 Feet

PACE Advanced Water Engineering

Date: 9/12/2018

Job Number A128 | Drawn By sfifield

Exhibit 3

PHASE I PRELIMINARY COLLECTION SYSTEM

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DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

Legend

- WTP — Proposed WRF
- LS — Proposed Lift Station
- Proposed Force Main

Proposed Gravity Mains

- 8" - No Easement Needed
- 10" - No Easement Needed
- 8" - Easement Needed
- 10" - Easement Needed

TRSD Parcels

- Parcel Has Frontage
- Parcel Need Easement for Frontage

E RAILROAD AVE
E HAMILTON LN
E MONROE LN
E MICHAELS WAY
S SMILEY HILL
E ELAM AVE
S MACKEY'S HILL
S DAIRY CANYON
S MARION CVN
S MARION ST
S SPUERTO RICO AVE
S WASHINGTON AVE
S CALLE DE LOMA
E BANCROFT WAY
S CLEVELAND AVE
E JEFFERSON ST
S CALLE DE LOMA
S MORROW AVE
S KINNEMUR AVE
S BERRY WAY
S RUTH AVE
E GREER ST
S RANSBERGER HILL
S ROWER CVN RD
S AVENIDA DE ED PASTOR
S PINEWAY ST
E WILSON ST
E COPPER ST
LONG ST AL
LONG ST
COPPER LN
E HAMMOND ST
S SELCAMINO
S OBSCURE WAY
S BOARD DR
E GLOBE AVE
S DAWDY ST
S MAPLE LEAF ST
E CALLE PEQUENA
E UPPER WILSON ST
S STARVIEW RD
E LOCOMOTIVE AL
E LOCOMOTIVE DR
E BROADWAY
S OLD OAK ST
REAR BROADWAY ALLEY
E RAILROAD AVE
S HOSPITAL DR
LS
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E12
E13
E15
E16
E17

Match Line Exhibit 5

0 350 700 1,400 Feet

PACE
Advanced Water Engineering

Exhibit 4
PHASE 1 WEST
PRELIMINARY COLLECTION SYSTEM

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DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

Legend

- WTP — Proposed WRF
- LS — Proposed Lift Station
- Proposed Force Main

Proposed Gravity Mains

- 8" - No Easement Needed
- 10" - No Easement Needed
- 8" - Easement Needed
- 10" - Easement Needed

TRSD Parcels

- Parcel Has Frontage
- Parcel Needs Easement for Frontage

Match Line Exhibit 4

In Phase I existing sewer lines are connected to WRF. New sewer collection lines are installed in Phase II.

Exhibit 5

PHASE 1 EAST PRELIMINARY COLLECTION SYSTEM

0 350 700 1,400 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PACE Advanced Water Engineering

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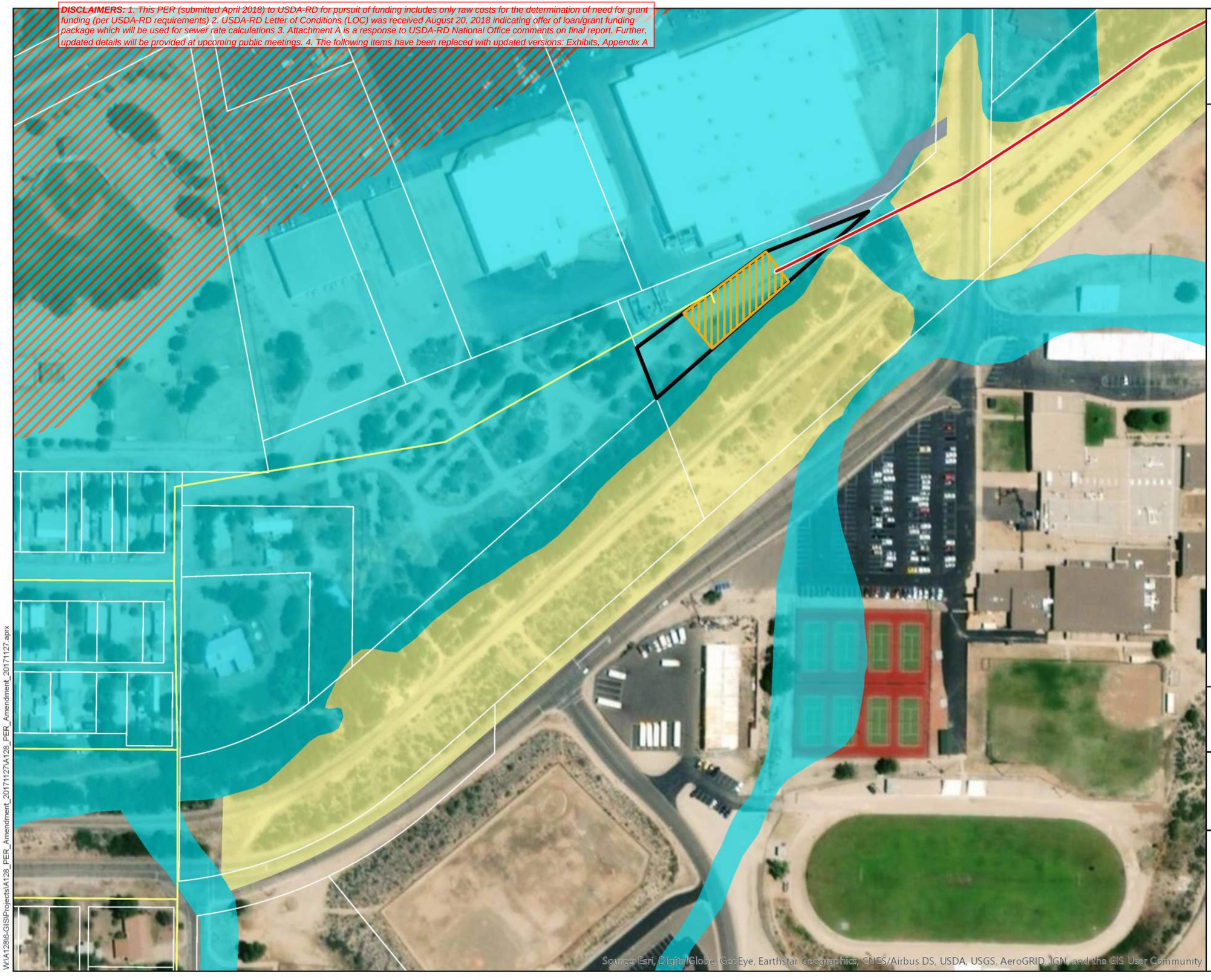
DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



TRI-CITY REGIONAL SANITARY DISTRICT

Gila County AZ

Legend

- Proposed Force Main
- Proposed Gravity Main
- Lift Station Parcel
- Potential Area of Proposed Lift Station

Flood Hazard Zones

- 1% Chance Annual Flood Hazard
- 0.2% Chance Annual Flood Hazard
- Regulatory Floodway

0 75 150 300 Feet

PACE Advanced Water Engineering

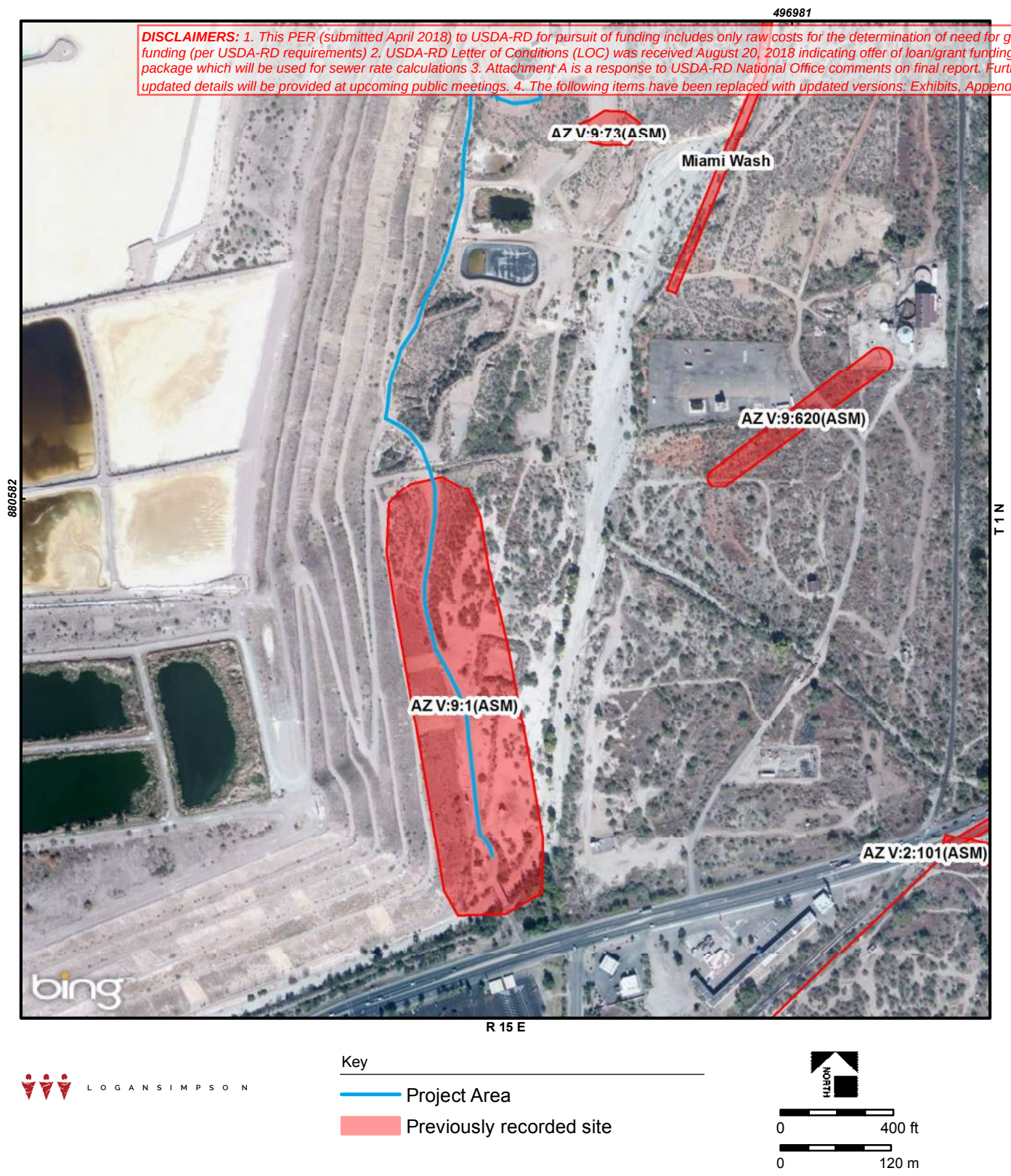
Date: 9/12/2018

Job Number A128 | Drawn By sfifield

Exhibit 6

PHASE 1 NEW TRSD LIFT STATION

W:\A128\6-GIS\Projects\A128_PER_Amendment_20171127\A128_PER_Amendment_20171127.aprx


496981
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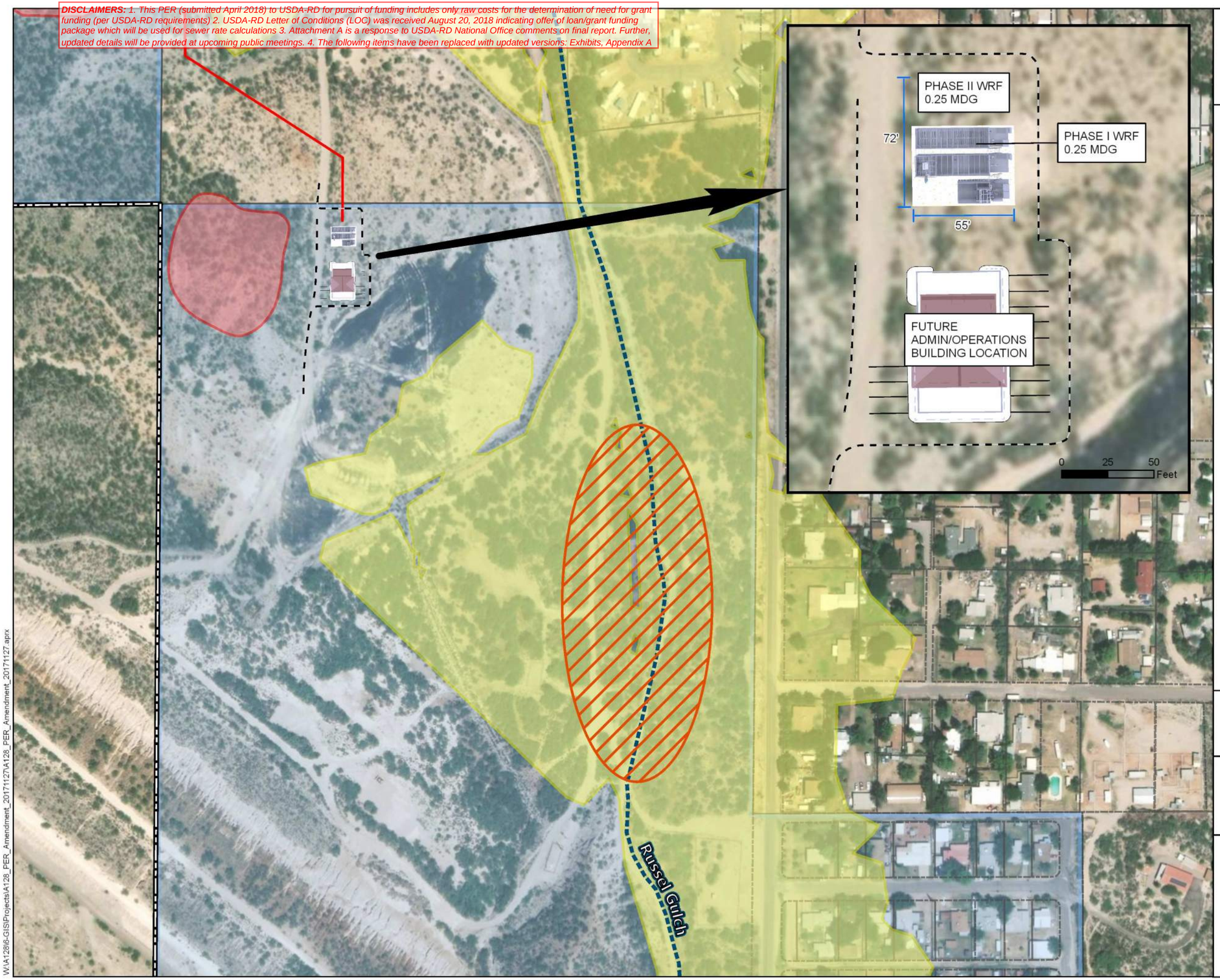
T 1 N
R 15 E
DISCLAIMERS: 1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for g
funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding
package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Furt
updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendi
AZ V:9:73(ASM)
Miami Wash
AZ V:9:620(ASM)
AZ V:9:1(ASM)
AZ V:2:101(ASM)
bing
LOGANSIMPSON
Key
Project Area
Previously recorded site
NORTH
0
400 ft
0
120 m

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



TRI-CITY REGIONAL SANITARY DISTRICT

Gila County AZ

Legend

- Russel Gulch
- Proposed Force Main
- Culture Sites
- HEC-RAS 500-Year Flood
- TRSD Phase I
- Parcel Boundaries
- TRSD Boundary
- Proposed Effluent Discharge Location

0 100 200 400 Feet

PACE Advanced Water Engineering

Date: 9/12/2018

Job Number A128

Drawn By sfifield

Exhibit 8

PHASE I NEW TRSD WRF

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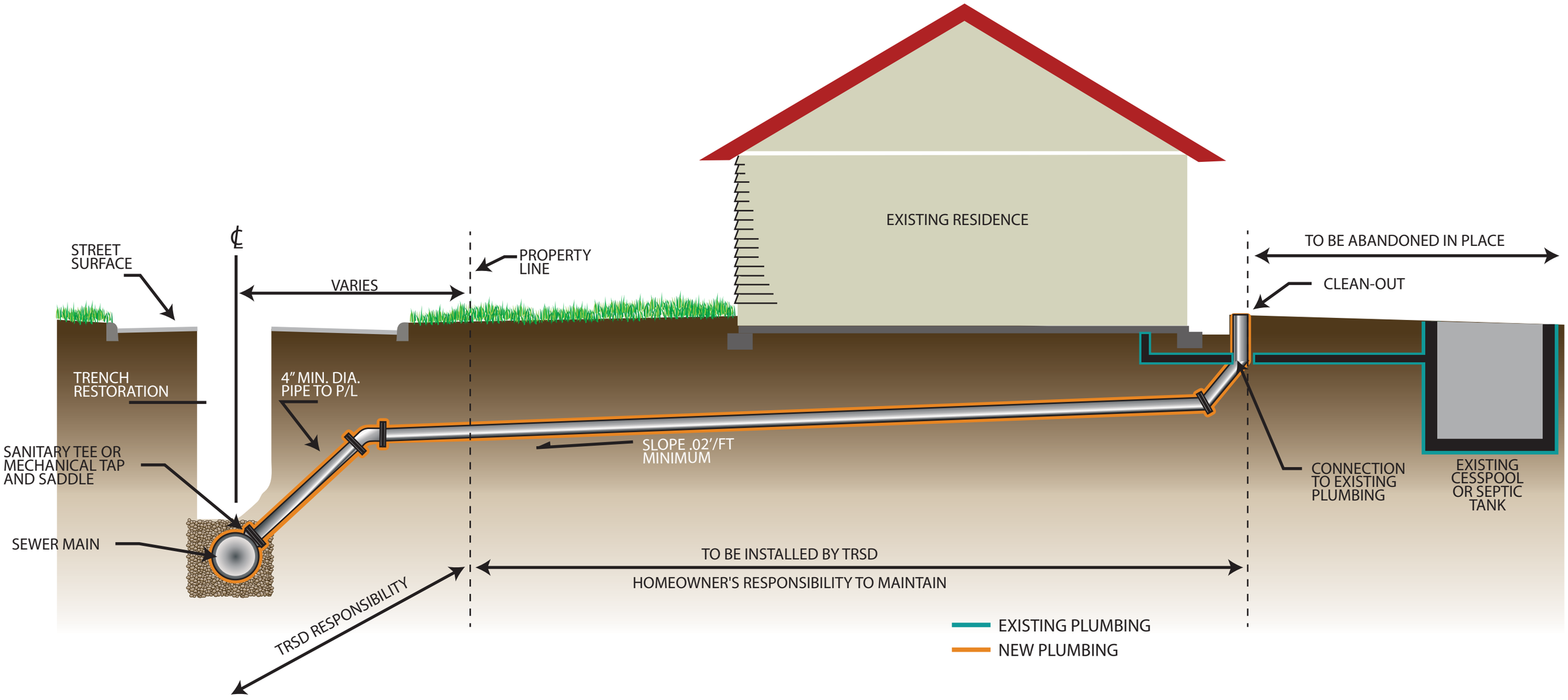
EXHIBIT 9 - TYPICAL LATERAL CONNECTION



PACE

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PACE
Advanced Water Engineering

Appendix A - TRSD Legal Description & Affected Population

Boundary Description
Tri-City Regional Sanitary District

A tract of land being portions of Sections 15, 16, 20, 21, 22, 27, 28 and 29, in Township 1 North, Range 15 East of the Gila and Salt River Meridian, in Gila County, Arizona, more particularly described as follows:

Beginning at the Southwest Corner of said Section 29;
Thence northerly along the west line of said Section 29 to the Northwest Corner of said Section 29;
Thence northeasterly to the East Quarter Corner of said section 20;
Thence northeasterly to the North Quarter Corner of said Section 21;
Thence northerly along the north-south mid-section line of said Section 16 to the North Quarter Corner of said Section 16;
Thence Easterly along the north lines of said Section 16 and Section 15 to the North Quarter Corner of said Section 15;
Thence southerly along the north-south mid-section line of said Section 15 to the Center Quarter Corner of said Section 15;
Thence easterly along the east-west mid-section line of said Section 15 to the East Quarter Corner of said Section 15;
Thence southerly along the east lines of said Section 15, Section 22 and Section 27 to the Southeast Corner of said Section 27;
Thence westerly along the south line of said Section 27 to the Southwest Corner of said Section 27;
Thence northerly along the west line of said Section 27 to the West Quarter Corner of said Section 27;
Thence westerly along the east-west mid-section line of said Section 28 to the Center Quarter Corner of said Section 28;
Thence southwesterly to the Southwest Corner of said Section 29 and the Point of Beginning.

Except any portion of the above-described tract of land within the plat of Pioneer Hills Subdivision, recorded in Map Numbers 519, 519A and 519B, in the records of Gila County, Arizona.

Also except any portion of the above-described tract of land within the plat of Chaparral Estates, recorded as Map Number 455, in the records of Gila County, Arizona.

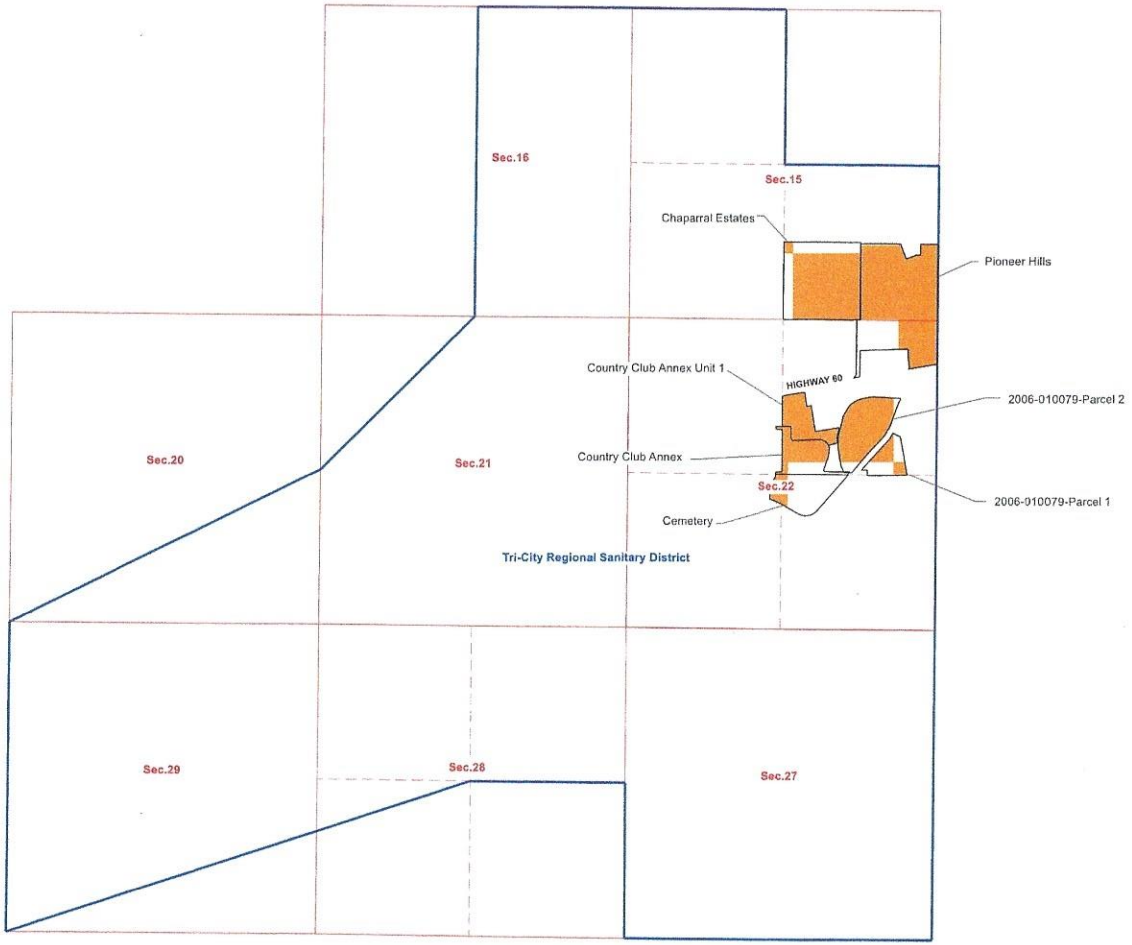
Also except and portion of the above-described tract of land within the plat of Country Club Annex, recorded as Map Numbers 615 and 615A in the records of Gila County, Arizona.

Also except any portion of the above-described tract of land within the plat of County Club Annex Unit 1, recorded as Map Numbers 688, 688A, 695 and 695A in the records of Gila County, Arizona.

Also except any portion of the above-described tract of land within Parcel No. 1 and also except any portion of the above-described tract of land within Parcel No. 2 as described in Document Number 2006-010079 in the records of Gila County, Arizona.

Also except any portion of the above-described property within the cemetery tract, more particularly described as follows: bounded on the north by the north line of the south half of said Section 22; bounded on the east and south by the plat of Central Heights, recorded as Map Number 52 in the records of Gila County, Arizona; bounded on the west by the plat of Country Club Manor Unit 2, recorded as Map Number 146 in the records of Gila County, Arizona.

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



LEGEND

- TRI-CITY REGIONAL SANITARY DISTRICT BOUNDARY
- PUBLIC LAND SURVEY SYSTEM LINES
- TRI-CITY REGIONAL SANITARY DISTRICT EXCLUDED AREAS

MAP OF BOUNDARY

OF THE
TRI-CITY REGIONAL SANITARY DISTRICT
IN T.1N., R.15E., G.&S.R.M.
GILA COUNTY, ARIZONA

SCALE: 1000 Ft/In DATE: 4-30-2018

NOTES:
1. BOUNDARY PLOTTED FROM RECORD LAND DESCRIPTIONS AND PUBLIC LAND SURVEY SYSTEM SECTION LINES CALCULATED FROM RECORD GLO PLAT. NO FIELD SURVEY WAS PERFORMED.

AJAX, Ltd
5981C W. Electric Drive
Globe, AZ 85501
(928) 425-5005

PROJECT NO. 18013

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

When Recorded, Mail to:

William L. Clemmens
Law Offices of William L. Clemmens
416 W Sullivan St
Miami AZ 85539-1212

THE GREAT SEAL OF GILA COUNTY ARIZONA
CITY CREEK
1881

Caption Heading/Title: Resolution 18-001

Do Not Remove This Sheet, It Is Part Of The Recorded Document

RESOLUTION NO. 18-001

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TRI-CITY REGIONAL SANITARY DISTRICT, GILA COUNTY, STATE OF ARIZONA ADOPTING AND APPROVING THE OFFICIAL BOUNDARY FOR THE TRI-CITY REGIONAL SANITARY DISTRICT OF GILA COUNTY, ARIZONA.

RECITALS:

WHEREAS, the Tri-City Regional Sanitary District ("TRSD"), Gila County, is an Arizona Sanitary District formed and operating under the laws of the State of Arizona as set forth in Arizona Revised Statutes ("ARS") §48-2001 et seq. and formed by the merger of the Pinal Sanitary District and the Cobre Valley Sanitary District by an election held on May 17, 2011; and approval by the Gila County Board of Supervisors; and,

WHEREAS, the legal description for the boundary of the TRSD and map were prepared at the time of the merger; and,

WHEREAS, Staff of Gila County have raised questions about the legal boundary of TRSD because the legal description of the boundary was never recorded with the Gila County Recorder; and,

WHEREAS, it is the desire of the Board of Directors of TRSD to resolve all issues regarding the TRSD boundary.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the TRSD as follows:

THAT, the legal description and map attached hereto are hereby adopted as the official description of the TRSD boundary; and,

THAT, TRSD staff is directed to record the legal description of the boundary with the Gila County Recorder.

PASSED AND ADOPTED this 30th day of April, 2018 by the Board of Directors of the Tri-City Regional Sanitary District, Gila County, State of Arizona.

ATTEST:

Robert J. Zache, President

Mary Anne Moreno, Secretary

CERTIFICATION

I, Mary Anne Moreno, the duly appointed Secretary of the Board of Directors of the Tri-City Regional Sanitary District of Gila County, Arizona, do hereby certify that the above and foregoing Resolution No. 18-001 was duly passed and adopted by the Board of Directors at a meeting held on April 30, 2018 and the vote was 3 aye's, 0 nay's 0 abstained, 2 were absent, and 3 Board Members were present at such meeting.

Mary Anne Moreno, Secretary

Boundary Description
Tri-City Regional Sanitary District

A tract of land being portions of Sections 15, 16, 20, 21, 22, 27, 28 and 29, in Township 1 North, Range 15 East of the Gila and Salt River Meridian, in Gila County, Arizona, more particularly described as follows:

Beginning at the Southwest Corner of said Section 29;
Thence northerly along the west line of said Section 29 to the Northwest Corner of said Section 29;
Thence northeasterly to the East Quarter Corner of said section 20;
Thence northeasterly to the North Quarter Corner of said Section 21;
Thence northerly along the north-south mid-section line of said Section 16 to the North Quarter Corner of said Section 16;
Thence Easterly along the north lines of said Section 16 and Section 15 to the North Quarter Corner of said Section 15;
Thence southerly along the north-south mid-section line of said Section 15 to the Center Quarter Corner of said Section 15;
Thence easterly along the east-west mid-section line of said Section 15 to the East Quarter Corner of said Section 15;
Thence southerly along the east lines of said Section 15, Section 22 and Section 27 to the Southeast Corner of said Section 27;
Thence westerly along the south line of said Section 27 to the Southwest Corner of said Section 27;
Thence northerly along the west line of said Section 27 to the West Quarter Corner of said Section 27;
Thence westerly along the east-west mid-section line of said Section 28 to the Center Quarter Corner of said Section 28;
Thence southwesterly to the Southwest Corner of said Section 29 and the Point of Beginning.

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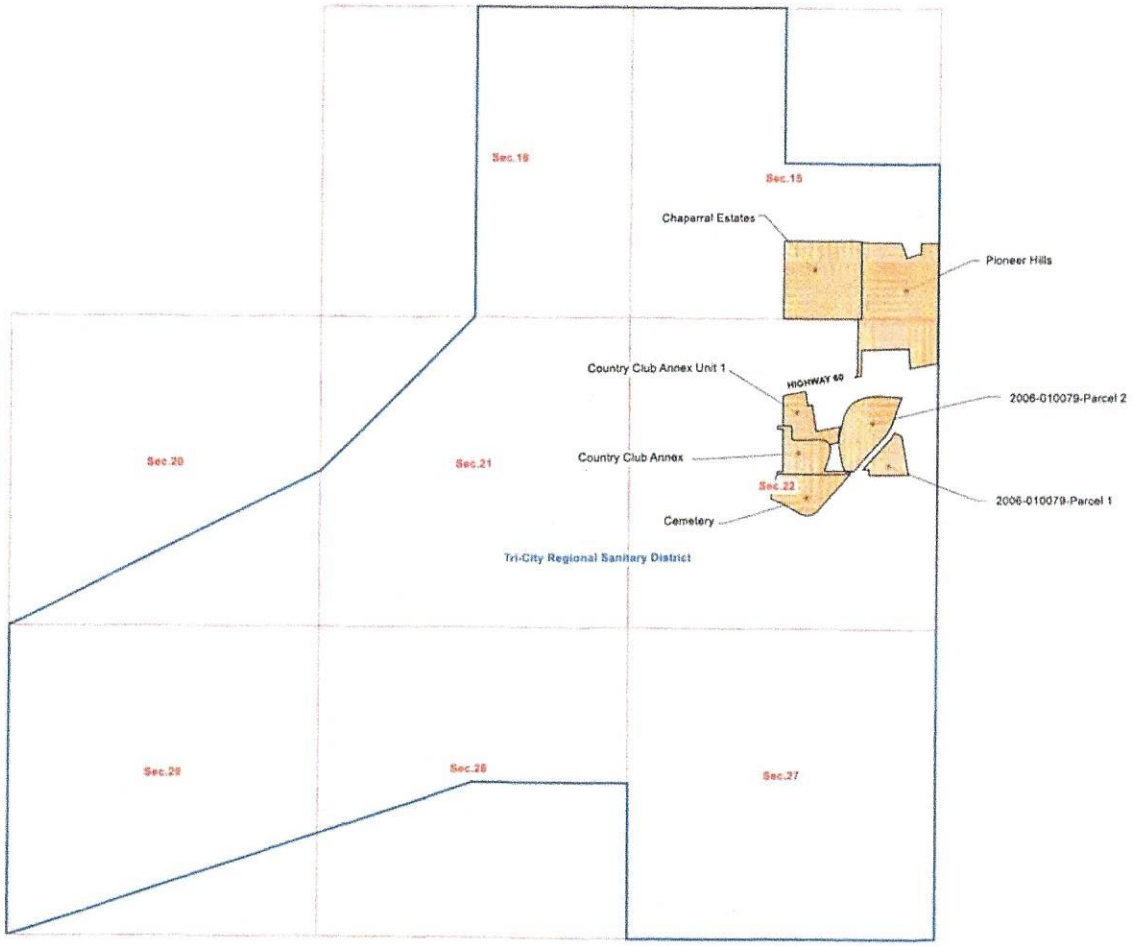

MAP OF BOUNDARY

OF THE
TRI-CITY REGIONAL SANITARY DISTRICT
IN T.1N., R.15E., G.&S.R.M.
GILA COUNTY, ARIZONA

SCALE: 1000 Ft/in DATE: 4-20-2018

AJAX, Ltd
598 1/2 W. Electric Drive
Globe, AZ 85501
(928) 425-5005

PROJECT NO. 189

PLOTTED FROM RECORD LAND DESCRIPTIONS
PUBLIC LAND SURVEY SYSTEM SECTION LINES
RECORD GLO PLAT NO FIELD SURVEY WAS

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

EJSCREEN Census 2010 Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description: TRSD Phase I

Summary	Census 2010
Population	1,586
Population Density (per sq. mile)	980
Minority Population	659
% Minority	42%
Households	644
Housing Units	777
Land Area (sq. miles)	1.62
% Land Area	99%
Water Area (sq. miles)	0.01
% Water Area	1%

Population by Race	Number	Percent
Total	1,586	-------
Population Reporting One Race	1,552	98%
White	1,315	83%
Black	14	1%
American Indian	32	2%
Asian	6	0%
Pacific Islander	0	0%
Some Other Race	186	12%
Population Reporting Two or More Races	34	2%
Total Hispanic Population	599	38%
Total Non-Hispanic Population	987	62%
White Alone	927	58%
Black Alone	14	1%
American Indian Alone	28	2%
Non-Hispanic Asian Alone	6	0%
Pacific Islander Alone	0	0%
Other Race Alone	2	0%
Two or More Races Alone	11	1%

Population by Sex	Number	Percent
Male	752	47%
Female	834	53%

Population by Age	Number	Percent
Age 0-4	93	6%
Age 0-17	387	24%
Age 18+	1,199	76%
Age 65+	303	19%

Households by Tenure	Number	Percent
Total	644	
Owner Occupied	507	79%
Renter Occupied	137	21%

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, Census 2010 Summary File 1.

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EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description: TRSD Phase I

Summary of ACS Estimates	2011 - 2015
Population	1,922
Population Density (per sq. mile)	1,188
Minority Population	660
% Minority	34%
Households	696
Housing Units	863
Housing Units Built Before 1950	356
Per Capita Income	17,719
Land Area (sq. miles) (Source: SF1)	1.62
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.01
% Water Area	1%

	2011 - 2015 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	1,922	100%	507
Population Reporting One Race	1,895	99%	738
White	1,795	93%	508
Black	0	0%	12
American Indian	0	0%	20
Asian	0	0%	42
Pacific Islander	0	0%	12
Some Other Race	100	5%	144
Population Reporting Two or More Races	28	1%	30
Total Hispanic Population	660	34%	252
Total Non-Hispanic Population	1,262		
White Alone	1,262	66%	450
Black Alone	0	0%	12
American Indian Alone	0	0%	12
Non-Hispanic Asian Alone	0	0%	42
Pacific Islander Alone	0	0%	12
Other Race Alone	0	0%	12
Two or More Races Alone	0	0%	12
Population by Sex			
Male	987	51%	300
Female	936	49%	246
Population by Age			
Age 0-4	160	8%	95
Age 0-17	491	26%	162
Age 18+	1,432	74%	293
Age 65+	449	23%	128

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race. N/A means not available.
Source: U.S. Census Bureau, American Community Survey (ACS) 2011 - 2015.

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EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description: TRSD Phase I

	2011 - 2015 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	1,262	100%	300
Less than 9th Grade	88	7%	80
9th - 12th Grade, No Diploma	201	16%	154
High School Graduate	354	28%	110
Some College, No Degree	508	40%	155
Associate Degree	134	11%	87
Bachelor's Degree or more	111	9%	74
Population Age 5+ Years by Ability to Speak English			
Total	1,762	100%	509
Speak only English	1,411	80%	410
Non-English at Home[1+2+3+4]	351	20%	176
[1]Speak English "very well"	286	16%	146
[2]Speak English "well"	22	1%	36
[3]Speak English "not well"	0	0%	17
[4]Speak English "not at all"	44	2%	73
[3+4]Speak English "less than well"	44	2%	73
[2+3+4]Speak English "less than very well"	65	4%	78
Linguistically Isolated Households*			
Total	7	100%	22
Speak Spanish	7	100%	19
Speak Other Indo-European Languages	0	0%	12
Speak Asian-Pacific Island Languages	0	0%	12
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	696	100%	175
< $15,000	106	15%	87
$15,000 - $25,000	135	19%	72
$25,000 - $50,000	211	30%	84
$50,000 - $75,000	173	25%	117
$75,000 +	71	10%	104
Occupied Housing Units by Tenure			
Total	696	100%	175
Owner Occupied	523	75%	177
Renter Occupied	173	25%	85
Employed Population Age 16+ Years			
Total	1,459	100%	394
In Labor Force	772	53%	283
Civilian Unemployed in Labor Force	114	8%	84
Not In Labor Force	687	47%	243

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race. N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2011 - 2015.

*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 0-mile radius
Description: TRSD Phase I

	2011 - 2015 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	1,762	100%	509
English	N/A	N/A	N/A
Spanish	N/A	N/A	N/A
French	N/A	N/A	N/A
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	N/A	N/A	N/A
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	N/A	N/A	N/A
Chinese	N/A	N/A	N/A
Japanese	N/A	N/A	N/A
Korean	N/A	N/A	N/A
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	N/A	N/A	N/A
Other Asian	N/A	N/A	N/A
Tagalog	N/A	N/A	N/A
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	N/A	N/A	N/A
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	N/A	N/A	N/A
Total Non-English	N/A	N/A	N/A

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race. N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2011 - 2015.
*Population by Language Spoken at Home is available at the census tract summary level and up.

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PACE
Advanced Water Engineering

Appendix B - ADEQ DMA Certification

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

June 3, 2016

Mr. Alan Urban
Central Arizona Governments
Community Development Manager
1075 S. Idaho Road, Suite 300
Apache Junction, AZ 85119

Re: DMA Status of Sanitary Districts in Gila County

Dear Mr. Urban:

The letter is in response to your February 12, 2016 request for clarification as to the current status of the Pinal Sanitary, Cobre Valley Sanitary and Tri-City Regional Sanitary Districts as designated management agencies under Section 208 of the Clean Water Act.

The *Central Arizona Association of Governments 208 Areawide Water Quality Management Plan Update, September, 1994* identifies both the Pinal Sanitary District and Cobre Valley Sanitary District as designated management agencies (DMA). Pinal and Cobre Valley received their DMA designations in 1983 and 1985, respectively, in order to address serious water quality issues in their areas including failing septic systems and use of cesspools.

In 2011, the Tri-City Regional Sanitary District (TRSD) was formed through the merger of the Pinal and Cobre Valley Sanitary Districts. In the next 12-18 months, TRSD will be preparing a 208 Water Quality Management Plan amendment to the *2016 CAG Areawide Water Quality Management Plan* requesting approval to be the DMA for the areas currently assigned to the Pinal Sanitary and Cobre Valley Sanitary Districts and to identify TRSD's plan to address the water quality issues within the District. Until such time as an amendment is processed through CAG and ADEQ and approved by the EPA, Pinal and Cobre Valley remain the recognized DMAs but are being administered by TRSD.

ADEQ apologizes for the delayed response to your request. This particular situation has no precedent that we are aware of, so it has taken some additional time for both historical and legal review. If you have any additional questions, please contact me directly at 602.771.2321.

Sincerely,

Trevor Baggiore, Director
Water Quality Division

cc: Jared Vollmer, U.S. Environmental Protection Agency, Region 9
Bob Zache, President, Tri-City Regional Sanitary District

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PACE
Advanced Water Engineering

Appendix C - 2012 Sewage Treatment Study & Notices of Violations

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APPENDIX C INDEX

2012 Sewage Treatment Study & Notices of Violations

The following are included within this appendix:

1. 2012 Sewage Treatment Study
2. Notices of Violation

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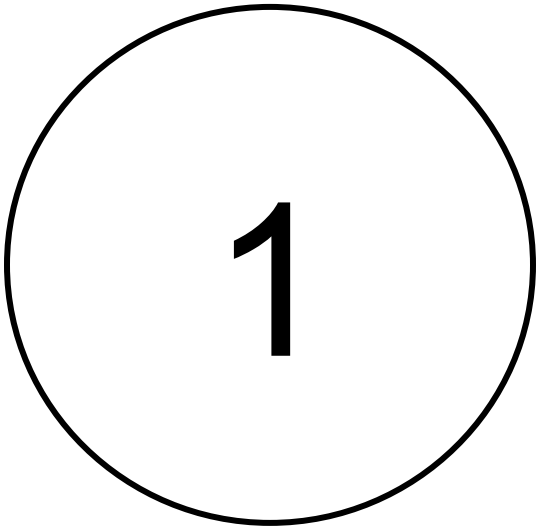
2012 SEWAGE TREATMENT STUDY



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745 N Rose Mofford Way
(Mail to: 1400 E Ash St)
Globe Arizona 85501
(928)425-3231 Ext. 4224
FAX (928)425-0829

608 E. Hwy 260
Payson, Arizona 85541
(928)474-9276
FAX (928)474-0802

GILA COUNTY COMMUNITY DEVELOPMENT

Robert Gould, Director
Joe Mendoza, Deputy Director

SEWAGE TREATMENT STUDY
TRI-CITY REGIONAL SANITARY DISTRICT
NOVEMBER 2012

by
Jake Garrett, PE,
Gila County Wastewater Department Manager
Jim Berry
Gila County Wastewater Department Engineering Technician

Why the Maps: The project originally started as a visual method of identifying areas of concern for catastrophic failure of sewage handling and major public health concerns. It now demonstrates the predominance of cesspool use within Tri-City Regional Sanitary District (TRSD).

The Data for the Maps: Every property file in the possession of the Gila County Wastewater Department was examined to find sewage system permits of any type and citizen complaints for surfacing sewage or gray water leaving the property. A former Health Department Director told us that the earliest Gila County records for septic system permits are dated in 1979, that by 1984 Gila County had become "good" at seeing that septic systems were permitted, that permit requests were made by mail and that data provided was minimal and accuracy was lacking. As a result, by policy, Gila County does not recognize any percolation test results for tests conducted prior to 1990 due to the crude percolation test methods used.

Only 5 years of complaint data is available beginning in mid-2007. Prior to that time the Arizona Department of Environmental Quality (ADEQ) required that all complaint data be filed by street address rather than parcel number for auditing purposes. Consequently that information was not part of the property file and was discarded when ADEQ's audit directions changed in 2007.

A complaint is resolved and the public health hazard corrected when the property owner stops sewage from surfacing and/or gray water from ponding on or leaving his property and the contaminated area is properly cleaned and disinfected. If the property owner does not respond in 24 hours an escalating, 3-step, 3-day written violation process is begun which culminates in a Notice of Violation and Demand for Compliance. Should the owner not comply with the Demand for Compliance water service to the home is discontinued per Arizona Statute.

The Area: Tri-City Regional Sanitary District encompasses the unincorporated area between the Town of Miami and the City of Globe in southern Gila County, Arizona. The majority of this area was developed for housing during the first ½ of the 20th century mining boom. Subdivisions featured lots 25' x 150' (3750 ft²) with a small area in the

bottom of the canyon that was suitable for home and cesspool construction with the rear portion of the lot rising very steeply uphill. In addition the ground transitioned from runoff deposited loose material to a very hard and nonporous Gila Conglomerate as the building site approached the foot of the slope. Today most of these homes have nowhere close to enough usable land in which a replacement septic system can be installed. A few of these properties might qualify to use the enhanced sewage treatment qualities of an alternative system to overcome the lot limitations. In those cases the system cost is normally more than the appraised value of the property.

Cesspool Facts: Interviews with Gila County Health Department personnel and local septic system contractors with personal knowledge about the construction practices, public attitudes and permitting during the time period from late 1950's through the early 2000's produced the following recollections:

- In 1976 the *USE* of cesspools was prohibited by Engineering Bulletin 12, the Arizona Department of Health Service guidance document for the design and installation of septic and alternative systems.
- Homes served by cesspools were constructed beginning in 1907 or earlier. These cesspools are now 105 years old ... or new cesspools were constructed to replace those that filled or failed (probably multiple times) until the mid to late 1980's when permitting became expected by a majority of citizens.
- As of this date no action has been taken by the State of Arizona to enforce the prohibition on the use of cesspools in areas where pollution of ground or surface waters cannot be proven. Absent statewide enforcement the use of cesspools by an individual home in these areas has been allowed to continue until it fails either structurally or hydraulically.
- By policy Gila County does not allow expansion or remodeling of any home served by a cesspool.
- A former Gila County Health Department Director told us that:
  - Public attitudes shifted toward installing septic systems rather than cesspools in 1979
  - At that time most permits were mailed to the Globe Health Department offices.
- A local contractor stated that his business got busy installing septic systems in early 1970.
- No permits were ever issued for cesspools however they are referenced in the building files upon occasion. Those mentioned are shown on the maps.
- Banks throughout Arizona are now and have been for 3-5 years declining to lend on homes served by a cesspool.
- It is estimated that the average lot size within the TRSD boundary is 5,000 ft^2 while the mining subdivisions had lot sizes of 3,750 ft^2. These lot sizes equate to an average density of 8.72 to 11.63 homes per acre. Current regulations would require any subdivision with a density of greater than one (1) home per acre to reduce the Nitrogen contribution to the ground in addition to removing the biological contaminants and viruses through advanced treatment systems or a sewer collection and treatment system.

Conclusions that can be drawn from the maps:

- There are very few permitted septic systems within the TRSD boundary.
- Very few unpermitted septic systems have been found in the building files.
- Cesspools are likely used for sewage disposal on all lots that do not have either a permitted or unpermitted system. This represents vast majority of homes within TRSD.
- Some multiple lot properties have been able to replace failed cesspools with septic systems. Usually there are multiple cesspools replaced by one septic system.
- Some functioning cesspools have been identified in the last 5 years.
- Several cesspools have failed and the properties have become unusable.
- Gray water complaints represent properties that are experiencing cesspool problems. Homeowners usually remove their gray water from the cesspool in an effort to extend its life. Many of these properties have a history of multiple complaints in the last 5 years indicating that their cesspool is nearing failure. .

- All lots that do not show a permitted system (since 2001 rule) are in danger of failure as is evidenced by the number of surfacing sewage complaints and Notices of Violation (NOV's)
- Based on the sewage and gray water complaint and NOV properties it is estimated that between 5% and 10% of the homes within TRSD have experienced cesspool problems within the last 5 years

Estimate of homes within TRSD using cesspools and sub-standard septic systems: This estimate is presented in support of the maps and conclusions that are presented above. An estimate of the number of homes served by cesspools and substandard septic systems within the TRSD boundary was made from the 2000 U.S. Census Bureau data for Gila County by logical reasoning and the following assumptions:

- Percentages of homes constructed in southern Gila County is represented by the sum of
  Globe and Miami home construction and those in northern Gila County is represented by Payson home construction.
- Cesspool use stopped in 1969.
- Substandard septic systems were installed through 1989 when an updated Bulletin 12 was introduced by the Arizona Department of Environmental Quality.

From these rough calculations it is reasonable to assume that there are at least 1342 operating cesspools and 266 operating substandard septic systems within the TRSD boundary. **This estimate would then say that there are 1608 homes within TRSD that are served by cesspools or substandard septic systems**.

Jake Garrett
Wastewater Department Manager
November 14, 2012

745 N Rose Mofford Way
(Mail to: 1400 E Ash St)
Globe Arizona 85501
(928)425-3231 Ext. 4224
FAX (928)425-0829

608 E. Hwy 260
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GILA COUNTY COMMUNITY DEVELOPMENT

Robert Gould, Director

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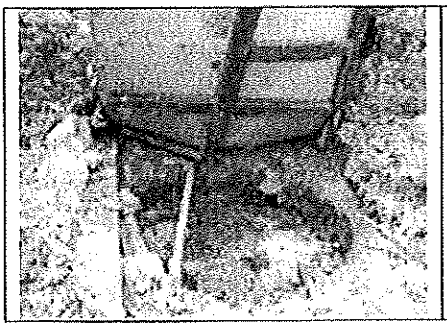
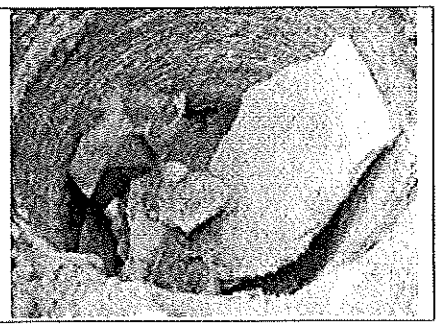


Cesspools: Water Quality and Your Property Value



The Hard, Cold Facts about Cesspools:

A cesspool is an outhouse with running water. Cesspools discharge untreated waste into the soil that will ultimately contaminate the ground water. ***Cesspools have not been approved for use in Arizona since 1976 because they are a major source of ground water contamination.*** No permits for the construction of new cesspools have been issued since that time.

Cesspools may not be repaired in any way. When a cesspool fails it must be replaced by an approved Onsite Wastewater Treatment and Disposal System or the property must cease to be occupied. Replacement is very difficult or impossible due to small lot size, poor soils, proximity to streams and other severe lot constraints.

In current ADEQ regulations cesspools are not a permitted method of wastewater disposal and are prohibited expressly under R18-9-A309(A)(4) and R18-5-408(D). Because of this fact many financial institutions are not lending on properties serviced by a cesspool.

Cesspool Definition:

Underground pit into which raw household wastewater is discharged and from which the liquid seeps into the surrounding soil; may or may not be partially lined.

How a cesspool functions:

A cesspool is a covered hole or pit for receiving sewage from a house. Another way of thinking about a cesspool is that it is an outhouse with running water. Usually the walls are constructed out of concrete, brick or concrete blocks and the top cover is usually a poured concrete slab or timbers. The constructions of the sidewalls are loose to allow the effluent water to penetrate through the holes, allowing the water to pass into the native soil while the solids build up in the pit.

This solid waste, very similar to what you see in outhouse pits, may partially crumble into smaller pieces over time and be partially carried into the environment in a totally untreated state by the new liquids entering the cesspool. This material is a host for many disease-causing viruses, bacteria, and parasites.

Unlike septic systems, cesspools provide no treatment of the raw sewage and thus discharge untreated human waste into the soil and ultimately contaminate the ground water.

By contrast, septic systems remove 100% of the disease-causing viruses, bacteria, and parasites. In a properly designed and installed septic system the tank retains 60 to 70% of the solids, oil, and grease that pass into the system and provides some treatment. The partially treated wastewater is then discharged into the leach lines, where the surrounding soil provides final treatment of the sewage prior to its discharge into the environment.

Cesspools in Gila County:

Cesspools were the preferred method of waste disposal in Gila County through the late 1960's. At that time, a transition to installation of septic systems started and by 1984 all permitted installations were septic systems. Based on US Census 2000 information, it is estimated that there are nearly 3,000 cesspools still in operation in Gila County. Most properties utilizing cesspools for human waste disposal are located in dense unincorporated areas in southern Gila County and the forest subdivisions of northern Gila County, Tonto Basin and Young. Dense from an on-site sewage system point of view means greater than 2 homes per acre. Most of these densely populated areas have 8-10 homes per acre. Many of these areas are along and very close to flowing streams and are major contributors to stream pollution.

Cesspool Failure:

When a cesspool's lid, sides or structural members deteriorate or collapse and sewage comes to the surface or backs up into the home, it is determined to have failed and must be corrected immediately. Possible corrective actions include:

- Ceasing use of the home or
- Install an appropriate wastewater treatment system.

Most cesspools are located on extremely small lots. In addition, these lots usually have very poor soil conditions and steep slopes and/or large retaining walls and may be very near running streams. *These conditions will almost always preclude installation of a conventional septic system.* In many cases installation of a more costly alternative sewage treatment system that treats sewage to a much higher degree, requires less disposal area and overcomes many site specific obstacles will not be possible.

Arizona Department of Environmental Quality (ADEQ) Cesspool Statement:

"ADEQ recognizes that a number of residential cesspools remain in operation in Gila County and across the state. However, since their operation is generally prohibited and .... They unacceptably endanger water quality and the public health and safety ... their continued operation should not be encouraged. ADEQ believes that home inspectors and on-site transfer inspections that may occur should encourage potential buyers to require the installation of a permitted facility."

Gila County Policy Statement

The current Gila County Wastewater Department policy regarding ***waste systems installed prior to 1976*** is stated in the Gila County Health Department letter dated 12/9/1996 and partially quoted here:

> "**Any** system that was installed prior to 1976 including but not limited to cesspools, homemade septic tanks, or other sewage disposal hybrid devices would be grandfathered in until these "systems" fail or the residence plumbing is modified."

In support of this policy the following practices were implemented:

Nuisance Complaint Investigation:

Should failure be discovered through the complaint process, while investigating a possible Environmental Nuisance or during any normal business activity undertaken by Gila County, the failure must be immediately corrected. Possible corrective actions include:

- Ceasing use of the home or
- Install an appropriate wastewater treatment system.

(Failure means any structural or hydraulic failure and is evidenced by such things as collapsed lids, deterioration of sidewall structural components, back-up of sewage into the home, groundwater contamination or surfacing of sewage.)

Building Clearance:

The Wastewater Department will not approve the submittal of building plans for any property served by a cesspool if those plans expand the footprint of buildings or structures on the property or alter the wastewater flow characteristics (bedrooms or plumbing fixtures) of the property.

In April, 2008 in response to ADEQ's cesspool statement, the clearance practice was modified to state that only life-safety remodel projects in homes served by cesspools will be cleared for building plan submittal provided that the cesspool does not meet the definition of failure and the life-safety changes do not expand the home footprint. Life-safety remodel projects are those projects required by the building code to correct safety or health hazards.

Conclusion:

Don't let your dependence on a cesspool get you into a hole that you can't dig yourself out of!

Jake Garrett, P.E.
Wastewater Department Manager

March 31, 2011

1400 East Ash Street
Globe Arizona 85501
(928)425-3231 Ext. 8512
FAX (928)425-0829

714 S. Beeline Hwy, Suite 200
Payson, Arizona 85541
(928)474-9276
FAX (928)474-0802

GILA COUNTY COMMUNITY DEVELOPMENT

Robert Gould, Director

June 17, 2008

Wastewater Department Policy Statement
Re: Cesspool Replacement Policy

Policy Statement

The current Gila County Wastewater Department policy regarding *waste systems installed prior to 1976* is stated in the Gila County Health Department letter dated 12/9/1996 and partially quoted here:

> "**Any** system that was installed prior to 1976 including but not limited to cesspools, homemade septic tanks, or other sewage disposal hybrid devices would be grandfathered in until these "systems" fail or the residence plumbing is modified."

In support of this policy the following practices were implemented:

Nuisance Complaint Investigation:

- Should failure be discovered through the complaint process, while investigating a possible Environmental Nuisance or during any normal business activity undertaken by Gila County, the failure must be immediately corrected. Possible corrective actions include:
  - Ceasing use of the home or
  - Install an appropriate wastewater treatment system.

  (**Failure** means any structural or hydraulic failure and is evidenced by such things as collapsed lids, deterioration of sidewall structural components, back-up of sewage into the home, groundwater contamination or surfacing of sewage.)

Building Clearance:

- The Wastewater Department will not approve the submittal of building plans for any property served by a cesspool if those plans expand the footprint of buildings or structures on the property or alter the wastewater flow characteristics (bedrooms or plumbing fixtures) of the property.

- In April, 2008 in response to ADEQ's statement that cesspools are not included in the 1.09 General Permit, the clearance practice was modified to state that only Life-Safety remodel projects of homes served by cesspools will be cleared for building plan submittal provided that the cesspool does not meet the definition of failure and the life-safety changes do not expand the home footprint.

Respectfully,

Jake Garrett, P.E.
Wastewater Department Manager

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Stephen A. Owens
Director

April 7, 2008

Jake Garrett, P.E.
Gila County Community Development Division
Wastewater Department Manager
714 S. Beeline Hwy, Ste 200
Payson, AZ 85541

Dear Mr. Garrett:

We have received your letter dated March 18, 2008 regarding cesspools. First, any information provided to you by our Department suggesting that cesspools are to be inspected or transferred under A.A.C. Title 18 is incorrect. Cesspools are not a permitted method of wastewater disposal and are prohibited expressly under R18-9-A309(A)(4) and R18-5-408(D). Accordingly, they are not subject to the notice of transfer requirements of R18-9-A304, the presale inspection rules of R18-9-A316, or the repair provisions of R18-9-A309(A)(9).

In addition to being prohibited under the "General Provisions for On-site Wastewater Treatment Facilities" section of the rule, cesspools do not meet the requirement of the R18-9-B301(I)(1)(b). That provision refers specifically to "[a]n on-site wastewater treatment facility with flows less than 20,000 gallons per day operating before January 1, 2001." The definition of "on-site wastewater treatment facility" is provided in rule (R18-9-101(27));

> "On-site wastewater treatment facility" means a conventional septic tank system or alternative system installed at a site to treat and dispose of wastewater, predominantly of human origin, generated at that site. ...

ADEQ recognizes that a number of residential cesspools remain in operation in Gila County and across the state. However, since their operation is generally prohibited and, as your letter effectively conveys, they unacceptably endanger water quality and the public health and safety, their continued operation should not be encouraged. ADEQ believes that home inspectors and on-site transfer inspections that may occur should encourage potential buyers to require the installation of a permitted facility. Also, we would like to explore with you ways to educate current and potential homeowners of the prohibition against cesspool operation and appropriate methodologies to phase out their use in Gila County.

Please feel free to call me at (602) 771-2306 or David Lelsz at (602) 771-4447.

Sincerely,

Joan Card, Director
Water Quality Division

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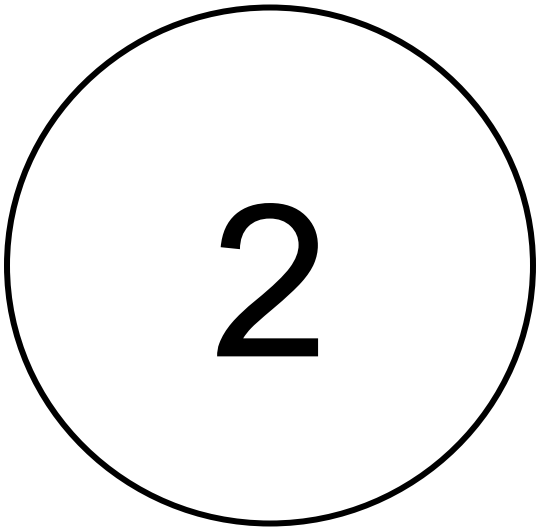
NOTICES OF VIOLATION



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Notive of Violations within TRSD

No.	APN	NOV Sewage	NOV Greywater	Failed Sewage System	Area
1	[redacted]		x	x	Claypool
2	[redacted]		x		Claypool
3	[redacted]		x		Claypool
4	[redacted]		x		Claypool
5	[redacted]		x		Claypool
6	[redacted]		x		Claypool
7	[redacted]	x		x	Claypool
8	[redacted]		x		Claypool
9	[redacted]	x		x	Claypool
10	[redacted]	x		x	Claypool
11	[redacted]	x	x	x	Claypool
12	[redacted]	x		x	Claypool
13	[redacted]	x		x	Claypool
14	[redacted]	x			Claypool
15	[redacted]	x			Claypool
16	[redacted]	x		x	Claypool
17	[redacted]			x	Claypool
18	[redacted]	x			Claypool
19	[redacted]	x			Claypool
20	[redacted]			x	Claypool
21	[redacted]			x	Claypool
22	[redacted]	x			Claypool
23	[redacted]	x		x	Claypool
24	[redacted]	x			Claypool
25	[redacted]	x		x	Claypool
26	[redacted]	x		x	Claypool
27	[redacted]	x		x	Claypool
28	[redacted]	x			Claypool
29	[redacted]	x			Claypool
30	[redacted]			x	Claypool
31	[redacted]		x		Central Heights-Midland City
32	[redacted]			x	Central Heights-Midland City
33	[redacted]			x	Central Heights-Midland City
34	[redacted]			x	Central Heights-Midland City
35	[redacted]			x	Central Heights-Midland City
36	[redacted]		x		Central Heights-Midland City
37	[redacted]			x	Central Heights-Midland City
38	[redacted]			x	Central Heights-Midland City
39	[redacted]			x	Central Heights-Midland City
40	[redacted]	x			Central Heights-Midland City
41	[redacted]		x		
42	[redacted]			x	Central Heights-Midland City
43	[redacted]			x	Central Heights-Midland City
44	[redacted]			x	Central Heights-Midland City
45	[redacted]	x		x	Central Heights-Midland City
46	[redacted]			x	Central Heights-Midland City
47	[redacted]			x	Central Heights-Midland City
48	[redacted]			x	Central Heights-Midland City
49	[redacted]			x	Central Heights-Midland City
50	[redacted]	x		x	Central Heights-Midland City
51	[redacted]			x	Central Heights-Midland City
52	[redacted]			x	Central Heights-Midland City
53	[redacted]	x			Central Heights-Midland City
54	[redacted]	x			Central Heights-Midland City
55	[redacted]	x			Central Heights-Midland City
56	[redacted]			x	Central Heights-Midland City
57	[redacted]			x	Central Heights-Midland City
58	[redacted]	x			Central Heights-Midland City
59	[redacted]			x	
60	[redacted]		x		Central Heights-Midland City
61	[redacted]			x	Central Heights-Midland City
62	[redacted]			x	Central Heights-Midland City
63	[redacted]			x	Central Heights-Midland City
64	[redacted]	x			Central Heights-Midland City
65	[redacted]			x	Central Heights-Midland City
66	[redacted]		x		Central Heights-Midland City
67	[redacted]			x	Central Heights-Midland City
68	[redacted]			x	Central Heights-Midland City
69	[redacted]			x	Little Acres
70	[redacted]			x	Little Acres
71	[redacted]			x	Little Acres
72	[redacted]			x	Little Acres
73	[redacted]			x	Little Acres
74	[redacted]			x	Little Acres
75	[redacted]			x	Central Heights-Midland City

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PACE
Advanced Water Engineering

Appendix D - Gila County Tax Rates & Property Values

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Tax Levies and Tax Rates

Tax Year 2014 (Fiscal Year 2014/2015)

	Tax Authority	Primary - - Secondary	Net Assessed Valuation	Levy Amount	Tax Rate
	STATE OF ARIZONA				
02002	School Equalization	LCV (Primary)	416,099,715	2,117,531	0.5089
	GILA COUNTY				
02000	Gila County General Purpose	LCV (Primary)	416,099,715	17,434,578	4.1900
52000	Gila County	FCV (Secondary)	419,257,531		
	COUNTY-WIDE DISTRICTS				
08150	Gila Community College	LCV (Primary)	416,099,715	3,992,061	0.9594
14900	Gila County Library District	FCV (Secondary)	419,257,531	838,716	0.2000
11900	Fire District Assistance Tax	FCV (Secondary)	419,257,531	419,258	0.1000
	FIRE DISTRICTS				
11202	Tri-City/Central Heights	FCV (Secondary)	18,951,378	393,014	2.0738
11204	East Verde Park	FCV (Secondary)	1,676,962	43,464	2.5918
11205	Pine/Strawberry	FCV (Secondary)	54,580,828	1,773,877	3.2500
11206	Canyon	FCV (Secondary)	7,831,873	254,535	3.2500
11207	Whispering Pines	FCV (Secondary)	8,085,723	250,657	3.1000
11208	Houston Mesa	FCV (Secondary)	3,747,137	121,782	3.2500
11212	Christopher/Kohl	FCV (Secondary)	18,453,117	540,676	2.9300
11213	Tonto Basin	FCV (Secondary)	16,615,131	539,659	3.2480
11214	Gisela	FCV (Secondary)	1,343,916	40,055	2.9805
11215	Round Valley/Oxbow Estates	FCV (Secondary)	4,808,444	112,998	2.3500
11216	Pleasant Valley	FCV (Secondary)	7,163,135	100,076	1.3971
11217	Beaver Valley	FCV (Secondary)	2,856,739	92,844	3.2500
11218	Hellsgate	FCV (Secondary)	21,797,389	708,415	3.2500
	SANITARY DISTRICTS				
21251	Northern Gila County	FCV (Secondary)	156,687,835	940,127	0.6000
21253	Cobre Valley	FCV (Secondary)	-		
21255	Tri-City Regional	FCV (Secondary)	17,150,428	57,711	0.3365
	STREET LIGHTING DISTRICTS				
13252	Pine SLID	FCV (Secondary)	1,290,602	1,966	0.1523
13253	Miami Gardens SLID	FCV (Secondary)	376,054	3,192	0.8487
13254	Apache Hills SLID	FCV (Secondary)	106,161	1,008	0.9491
13255	East Verde Park SLID	FCV (Secondary)	1,676,962	3,646	0.2174
13257	Upper Glendale SLID	FCV (Secondary)	111,249	1,769	1.5899
13258	Claypool Lower Miami SLID	FCV (Secondary)	5,076,669	24,916	0.4908
13259	Central Heights Country Club Midland City SL	FCV (Secondary)	3,800,712	11,243	0.2958
	WATER DISTRICTS				
16010	Canyon County Imp Dist	FCV (Secondary)	1,066,585		
16040	Pine/Strawberry WID	FCV (Secondary)	47,188,650	500,011	1.0596
16060	Strawberry Hollow WWID	FCV (Secondary)	786,107		
16080	Strawberry Hollow DWID	FCV (Secondary)	786,107		
16090	Pine Creek Canyon DWID	FCV (Secondary)	3,204,314	90,000	2.8087
16120	Whispering Pines DWID	FCV (Secondary)	2,741,506	84,249	3.0731
	CITIES AND TOWNS				
04151	City of Globe	LCV (Primary)	37,342,709	492,924	1.3200
54151	City of Globe	FCV (Secondary)	37,803,279		
04152	Town of Hayden	LCV (Primary)	3,434,425	277,498	8.0799
54152	Town of Hayden	FCV (Secondary)	3,433,098		
04153	Town of Miami	LCV (Primary)	3,620,216	170,000	4.6959
54153	Town of Miami	FCV (Secondary)	3,679,704		
04154	Town of Winkelman	LCV (Primary)	734,728	43,300	5.8933
54154	Town of Winkelman	FCV (Secondary)	735,754		
04155	Town of Payson	LCV (Primary)	162,226,267	642,903	0.3963
54155	Town of Payson	FCV (Secondary)	163,633,443	-	0.0000
04156	Town of Star Valley	LCV (Primary)	14,547,713		
54156	Town of Star Valley	FCV (Secondary)	14,786,790		

EXHIBIT A

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Tax Levies and Tax Rates

Tax Year 2015 (Fiscal Year 2015/2016)

	Tax Authority	Primary - - Secondary	Net Assessed Valuation	Levy Amount	Tax Rate
	STATE OF ARIZONA				
02002	School Equalization	LPV (Primary)	482,515,161	2,438,632	0.5054
	GILA COUNTY				
02000	Gila County General Purpose	LPV (Primary)	482,515,161	20,217,385	4.1900
52000	Gila County	LPV (Secondary)	482,515,161		
	COUNTY-WIDE DISTRICTS				
08150	Gila Community College	LPV (Primary)	482,515,161	4,111,994	0.8522
14900	Gila County Library District	LPV (Secondary)	482,515,161	1,170,099	0.2425
11900	Fire District Assistance Tax	LPV (Secondary)	482,515,161	482,515	0.1000
	FIRE DISTRICTS				
11202	Tri-City/Central Heights	LPV (Secondary)	18,125,432	435,010	2.4000
11204	East Verde Park	LPV (Secondary)	1,718,083	50,000	2.9102
11205	Pine/Strawberry	LPV (Secondary)	55,103,294	1,790,857	3.2500
11206	Canyon	LPV (Secondary)	7,757,306	252,112	3.2500
11207	Whispering Pines	LPV (Secondary)	8,576,517	270,160	3.1500
11208	Houston Mesa	LPV (Secondary)	3,664,841	119,107	3.2500
11212	Christopher/Kohl	LPV (Secondary)	18,474,361	557,926	3.0200
11213	Tonto Basin	LPV (Secondary)	16,637,170	540,708	3.2500
11214	Gisela	LPV (Secondary)	1,312,483	40,001	3.0477
11215	Round Valley/Oxbow Estates	LPV (Secondary)	4,860,358	114,218	2.3500
11216	Pleasant Valley	LPV (Secondary)	7,294,626	101,913	1.3971
11217	Beaver Valley	LPV (Secondary)	2,978,699	96,808	3.2500
11218	Hellsgate	LPV (Secondary)	21,552,651	700,461	3.2500
	SANITARY DISTRICTS				
21251	Northern Gila County	LPV (Secondary)	161,038,131	1,410,533	0.8759
21253	Cobre Valley	LPV (Secondary)	4,014,052		
21255	Tri-City Regional	LPV (Secondary)	16,093,359	115,708	0.7190
	STREET LIGHTING DISTRICTS				
13252	Pine SLID	LPV (Secondary)	1,299,441	1,345	0.1035
13253	Miami Gardens SLID	LPV (Secondary)	327,305	2,903	0.8870
13254	Apache Hills SLID	LPV (Secondary)	114,772	5,105	4.4480
13255	East Verde Park SLID	LPV (Secondary)	1,718,083	4,531	0.2637
13257	Upper Glendale SLID	LPV (Secondary)	109,919	1,081	0.9830
13258	Claypool Lower Miami SLID	LPV (Secondary)	3,737,195	19,534	0.5227
13259	Central Heights Country Club Midland City SL	LPV (Secondary)	3,678,786	17,316	0.4707
	WATER DISTRICTS				
16010	Canyon County Imp Dist	LPV (Secondary)	1,078,170		
16040	Pine/Strawberry WID	LPV (Secondary)	47,707,816	500,026	1.0481
16060	Strawberry Hollow WWID	LPV (Secondary)	806,061		
16080	Strawberry Hollow DWID	LPV (Secondary)	806,061		
16090	Pine Creek Canyon DWID	LPV (Secondary)	2,900,205	90,000	3.1032
16120	Whispering Pines DWID	LPV (Secondary)	2,797,980	19,124	0.6835
	CITIES AND TOWNS				
04151	City of Globe	LPV (Primary)	38,638,232	490,010	1.2682
04152	Town of Hayden	LPV (Primary)	3,568,058	203,222	5.6956
04153	Town of Miami	LPV (Primary)	3,692,082	173,375	4.6959
04154	Town of Winkelman	LPV (Primary)	714,338	46,000	6.4395
04155	Town of Payson	LPV (Primary)	167,943,002	651,115	0.3877
04156	Town of Star Valley	LPV (Primary)	14,674,204		

EXHIBIT A

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Tax Levies and Tax Rates

Tax Year 2016 (Fiscal Year 2016/2017)

	Tax Authority	Primary - - Secondary	Net Assessed Valuation	Levy Amount	Tax Rate
	STATE OF ARIZONA				
02002	School Equalization	LPV (Primary)	496,294,071	2,486,433	0.5010
	GILA COUNTY				
02000	Gila County General Purpose	LPV (Primary)	496,294,071	20,794,722	4.1900
52000	Gila County	LPV (Secondary)	496,294,071		
	COUNTY-WIDE DISTRICTS				
08150	Gila Community College	LPV (Primary)	496,294,071	4,335,129	0.8735
14900	Gila County Library District	LPV (Secondary)	496,294,071	1,203,513	0.2425
11900	Fire District Assistance Tax	LPV (Secondary)	496,294,071	496,294	0.1000
	FIRE DISTRICTS				
11202	Tri-City/Central Heights	LPV (Secondary)	23,941,798	646,429	2.7000
11204	East Verde Park	LPV (Secondary)	1,763,729	55,000	3.1184
11205	Pine/Strawberry	LPV (Secondary)	57,005,815	1,852,689	3.2500
11206	Canyon	LPV (Secondary)			
11207	Whispering Pines	LPV (Secondary)	8,738,287	275,256	3.1500
11208	Houston Mesa	LPV (Secondary)	3,863,931	125,578	3.2500
11212	Christopher/Kohl	LPV (Secondary)	18,372,550	554,851	3.0200
11213	Tonto Basin	LPV (Secondary)	16,074,473	522,420	3.2500
11214	Gisela	LPV (Secondary)	1,342,316	40,000	2.9799
11215	Round Valley/Oxbow Estates	LPV (Secondary)	5,065,996	119,051	2.3500
11216	Pleasant Valley	LPV (Secondary)	6,855,896	101,954	1.4871
11217	Beaver Valley	LPV (Secondary)	3,044,447	94,378	3.1000
11218	Hellsgate	LPV (Secondary)	22,223,996	722,280	3.2500
	SANITARY DISTRICTS				
21251	Northern Gila County	LPV (Secondary)	162,722,417	976,335	0.6000
21253	Cobre Valley	LPV (Secondary)			
21255	Tri-City Regional	LPV (Secondary)	18,149,631	115,709	0.6375
	STREET LIGHTING DISTRICTS				
13252	Pine SLID	LPV (Secondary)	1,267,301	2,270	0.1791
13253	Miami Gardens SLID	LPV (Secondary)	302,447	2,903	0.9598
13254	Apache Hills SLID	LPV (Secondary)	115,053	5,105	4.4371
13255	East Verde Park SLID	LPV (Secondary)	1,763,729	4,531	0.2569
13257	Upper Glendale SLID	LPV (Secondary)	87,857	1,081	1.2304
13258	Claypool Lower Miami SLID	LPV (Secondary)	3,663,345	17,317	0.4727
13259	Central Heights Country Club Midland City SLI	LPV (Secondary)	3,298,431	19,533	0.5922
	WATER DISTRICTS				
16010	Canyon County Imp Dist	LPV (Secondary)	1,089,435		
16040	Pine/Strawberry WID	LPV (Secondary)	49,438,627	691,200	1.3981
16060	Strawberry Hollow WWID	LPV (Secondary)	837,061		
16080	Strawberry Hollow DWID	LPV (Secondary)	837,061		
16090	Pine Creek Canyon DWID	LPV (Secondary)	3,009,198	90,000	2.9908
16120	Whispering Pines DWID	LPV (Secondary)	2,911,551	19,129	0.6570
	CITIES AND TOWNS				
04151	City of Globe	LPV (Primary)	38,945,271	508,625	1.3060
04152	Town of Hayden	LPV (Primary)	11,397,912	683,875	6.0000
04153	Town of Miami	LPV (Primary)	3,708,788	174,157	4.6958
04154	Town of Winkelman	LPV (Primary)	962,168	46,000	4.7809
04155	Town of Payson	LPV (Primary)	172,579,944	662,534	0.3839
04156	Town of Star Valley	LPV (Primary)	15,121,918		

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GILA COUNTY, ARIZONA
Net Assessed Valuations
Tax Levies and Tax Rates
Tax Year 2017 (Fiscal Year 2017-18)

	Tax Authority	Primary - Secondary	Net Assessed Valuation	Levy Amount	Tax Rate
	STATE OF ARIZONA				
02002	School Equalization	LPV (Primary)	$ 481,991,319	$ 2,349,708	0.4875
	GILA COUNTY				
02000	Gila County General Purpose	LPV (Primary)	$ 481,991,319	$ 20,195,437	4.1900
52000	Gila County	LPV (Secondary)	$ 481,991,319	$ -	-
	COUNTY-WIDE DISTRICTS				
08150	Gila Community College	LPV (Primary)	$ 481,991,319	$ 4,511,921	0.9361
11900	Fire District Assistance Tax	LPV (Secondary)	$ 481,991,319	$ 481,992	0.1000
14900	Gila County Library District	LPV (Secondary)	$ 481,991,319	$ 1,168,829	0.2425
	FIRE DISTRICTS				
11202	Tri-City/Central Heights	LPV (Secondary)	$ 25,000,992	$ 700,028	2.8000
11204	East Verde Park	LPV (Secondary)	$ 1,847,140	$ 60,000	3.2483
11205	Pine/Strawberry	LPV (Secondary)	$ 59,924,809	$ 2,097,368	3.5000
11207	Whispering Pines	LPV (Secondary)			
11208	Houston Mesa	LPV (Secondary)	$ 4,006,648	$ 130,216	3.2500
11212	Christopher Kohl's	LPV (Secondary)	$ 18,915,075	$ 571,235	3.0200
11213	Tonto Basin	LPV (Secondary)	$ 16,485,044	$ 535,764	3.2500
11214	Gisela Valley	LPV (Secondary)	$ 1,400,775	$ 40,000	2.8556
11215	Round Valley/Oxbow Estates	LPV (Secondary)	$ 5,283,357	$ 124,159	2.3500
11216	Pleasant Valley	LPV (Secondary)	$ 6,809,291	$ 106,320	1.5614
11217	Beaver Valley	LPV (Secondary)			
11218	Hellsgate	LPV (Secondary)	$ 23,248,907	$ 755,589	3.2500
11219	Water Wheel Fire and Medical	LPV (Secondary)	$ 12,186,811	$ 383,885	3.1500
	SANITARY DISTRICTS				
21251	Northern Gila County	LPV (Secondary)	$ 168,850,266	$ 1,013,102	0.6000
21255	Tri-City Regional	LPV (Secondary)	$ 15,071,754	$ 105,918	0.7028
	STREET LIGHTING DISTRICTS				
13252	Pine SLID	LPV (Secondary)	$ 1,302,185	$ 2,270	0.1743
13253	Miami Gardens SLID	LPV (Secondary)	$ 277,851	$ 2,903	1.0448
13254	Apache Hills SLID	LPV (Secondary)	$ 120,305	$ 5,105	4.2434
13255	East Verde Park SLID	LPV (Secondary)	$ 1,847,140	$ 4,531	0.2453
13257	Upper Glendale SLID	LPV (Secondary)	$ 88,557	$ 1,081	1.2207
13258	Claypool Lower Miami SLID	LPV (Secondary)	$ 3,886,289	$ 17,317	0.4456
13259	Central Heights Country Club Midland City SLID	LPV (Secondary)	$ 3,314,818	$ 19,534	0.5893
	WATER DISTRICTS				
16040	Pine Strawberry DWID	LPV (Secondary)	$ 52,042,141	$ 727,601	1.3981
16090	Pine Creek Canyon DWID	LPV (Secondary)	$ 3,156,273	$ 180,000	5.7029
16120	Whispering Pines DWID	LPV (Secondary)	$ 3,025,577	$ 8,575	0.2834
	CITIES AND TOWNS				
04151	City of Globe	LPV (Primary)	$ 39,070,722	$ 513,272	1.3137
04152	Town of Hayden	LPV (Primary)	$ 7,052,170	$ 423,130	6.0000
04153	Town of Miami	LPV (Primary)	$ 4,006,892	$ 175,854	4.3888
04154	Town of Winkelman	LPV (Primary)	$ 674,625	$ 46,280	6.8600
04155	Town of Payson	LPV (Primary)	$ 175,925,301	$ 669,748	0.3807
04156	Town of Star Valley	LPV (Primary)	$ 15,916,284		

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Appendix E - Adjoining Communities Communication

Appendix Intentionally Not Included
See PER Text

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Appendix F - Cost Estimates

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

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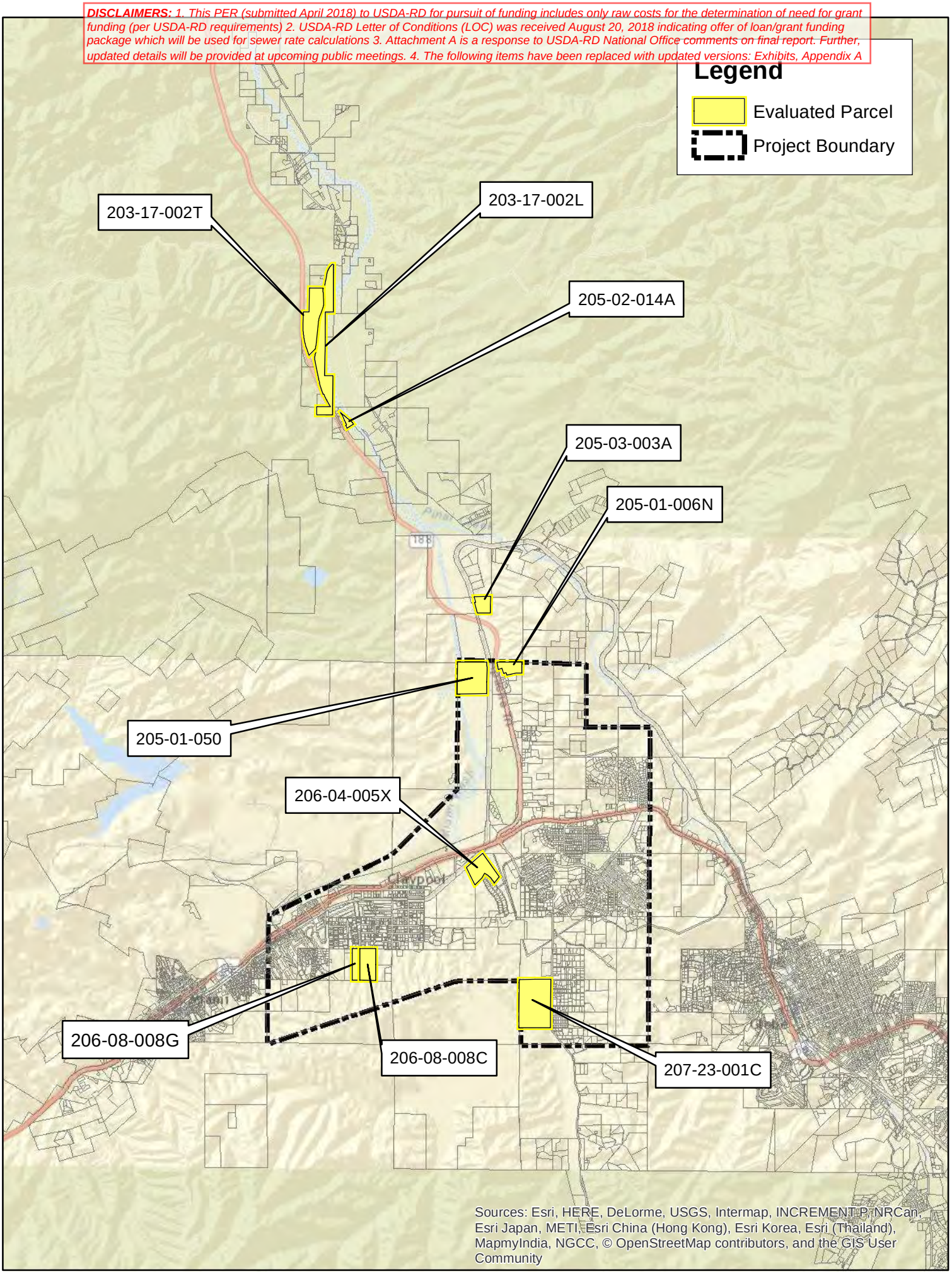
Appendix G - TRSD WRF Site & Process Evaluation

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*



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205-03-005A

Base Metals North America

bhpbilliton
resourcing the future

BHP Copper Inc.
8950 N Oracle Road
Suite 150
Tucson, AZ 85704
Tel 520.531.6924 Fax 520.531.6999
bhpbilliton.com

15 April 2013

Bob Zache, President
Tri-City Regional Sanitary District
PO Box 2198
Claypool, Arizona 85532-2198

Re: Site for wastewater treatment plant

Dear Mr. Zache:

Thank you for clarifying the Tri-City Regional Sanitary District's request. A BHP Billiton team met at the District's request to review and discuss the plans for a District waste water treatment plant (WWTP). A review of both the project engineering studies and the parcel located North of the District was conducted by BHP Billiton Community, Land Management and Engineering. It was determined that this property is not available for donation or sale.

Thank you for considering our water needs; at this time we do not have plans to incorporate effluent into our production process. We appreciate the information you have provided and wish you success with your project and finding a suitable location for the Tri-City Regional Sanitary District's WWTP.

Regards,

Brett McNeil
Head of HSEC
Base Metals North America

CC: Juanita Mucha, Community Superintendent, Base Metals North America

bhpbilliton
resourcing the future

BHP Billiton Limited
2911 N Forest Service Road 287
PO Box 100
Miami AZ 85539 USA

BOB ZACHE, PRESIDENT
TRI-CITY REGIONAL SANITARY DISTRICT
PO BOX 2198
CLAYPOOL, AZ 85532-2198

85532-2198

205803-003A

DISCLAIMERS: 1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A

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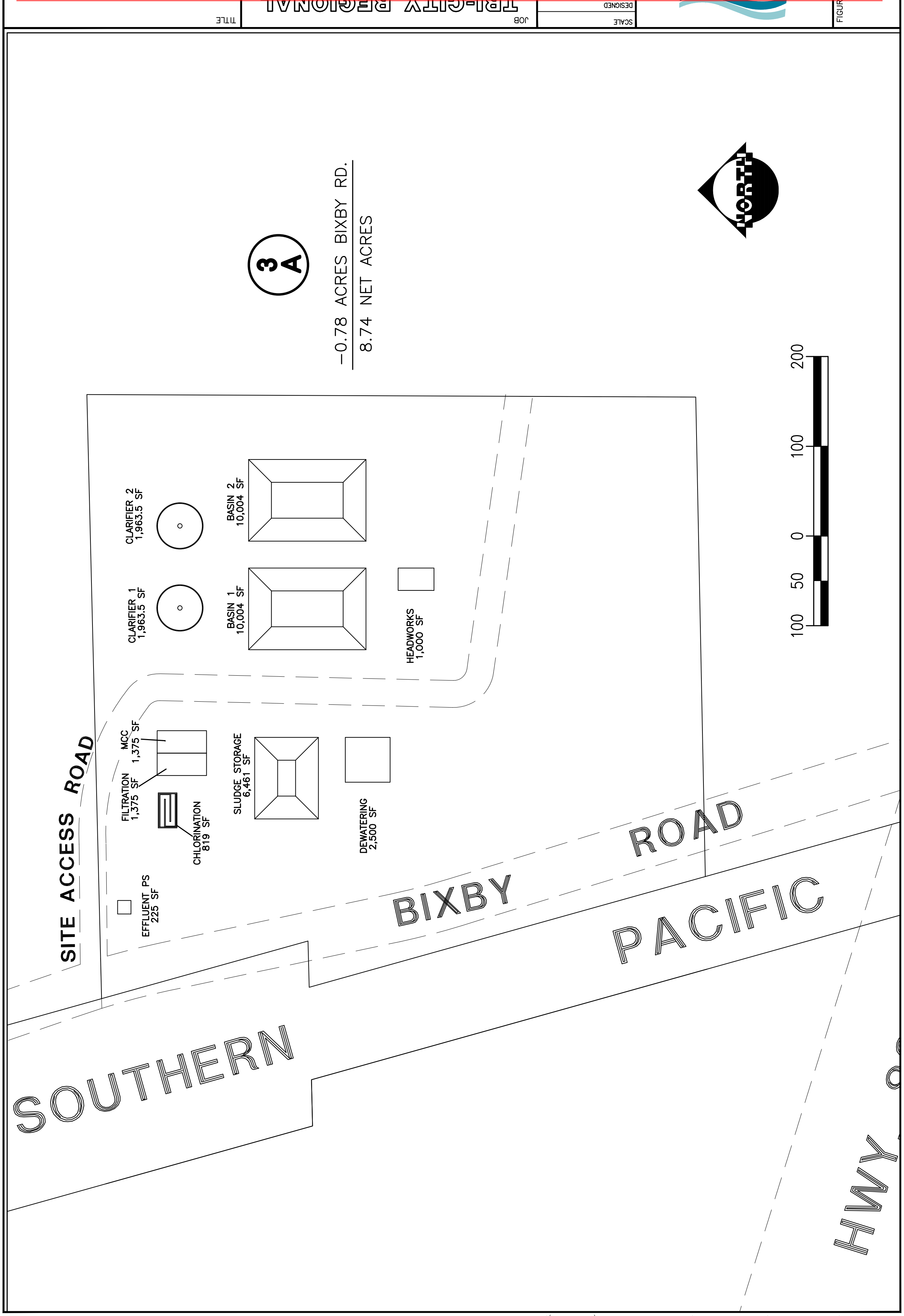

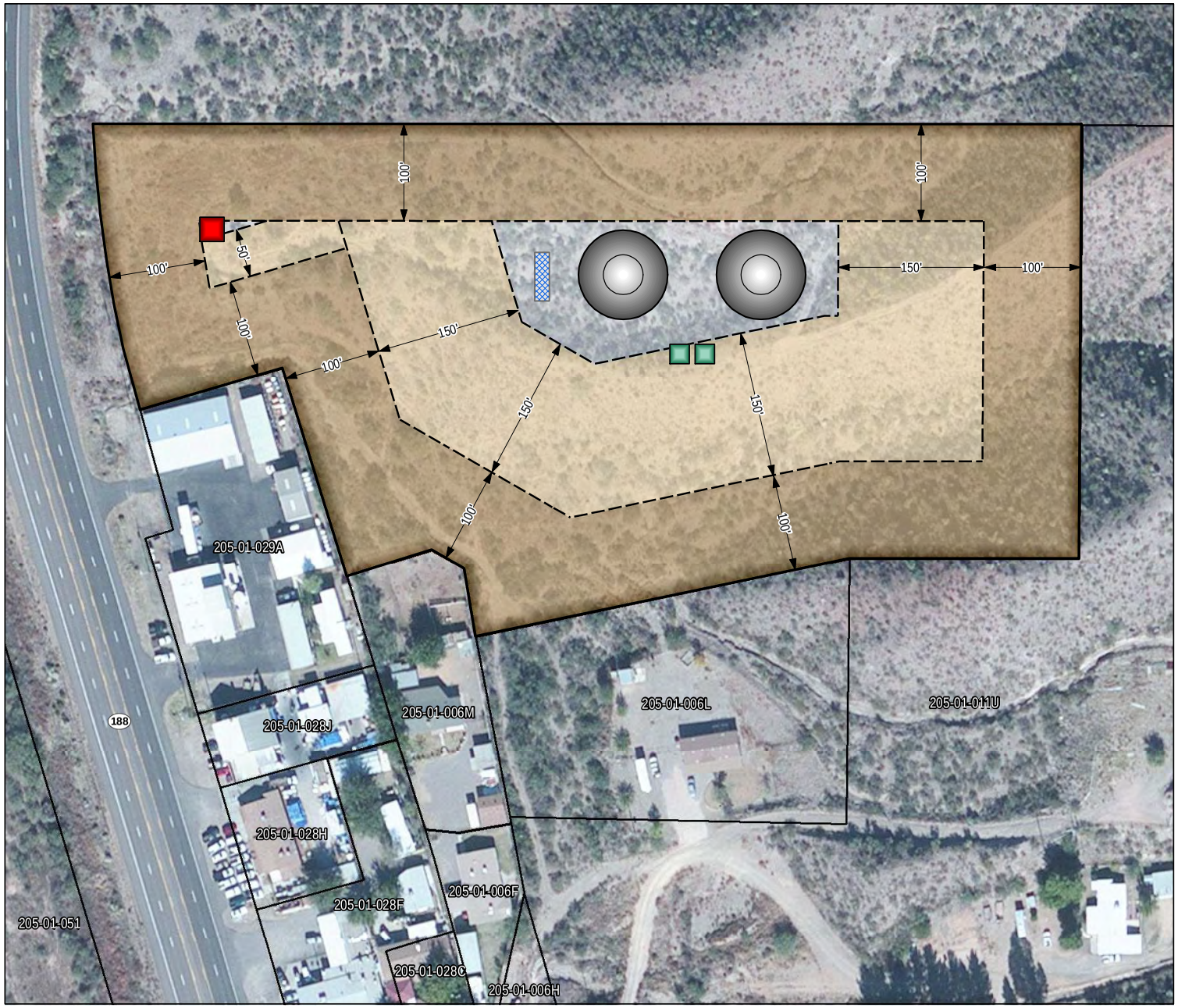

WWTP SITE FACILITIES

- SECONDARY PROCESS TANKS
- FILTERS
- INFLUENT LIFT STATION
- HEADWORKS SCREENS & GRIT

ORDINANCE SETBACK AREAS

- FALL WITHIN THE MINIMUM 100 FT SETBACK
- AVAILABLE FOR FUTURE EXPANSION (ADDITIONAL SETBACK FROM THE MINIMUM)

BOUNDARIES

- PARCEL BOUNDARIES
- PARCEL 205-01-006N (WWTP SITE)

NORTH

100 50 0 100 Feet

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PACE Advanced Water Engineering

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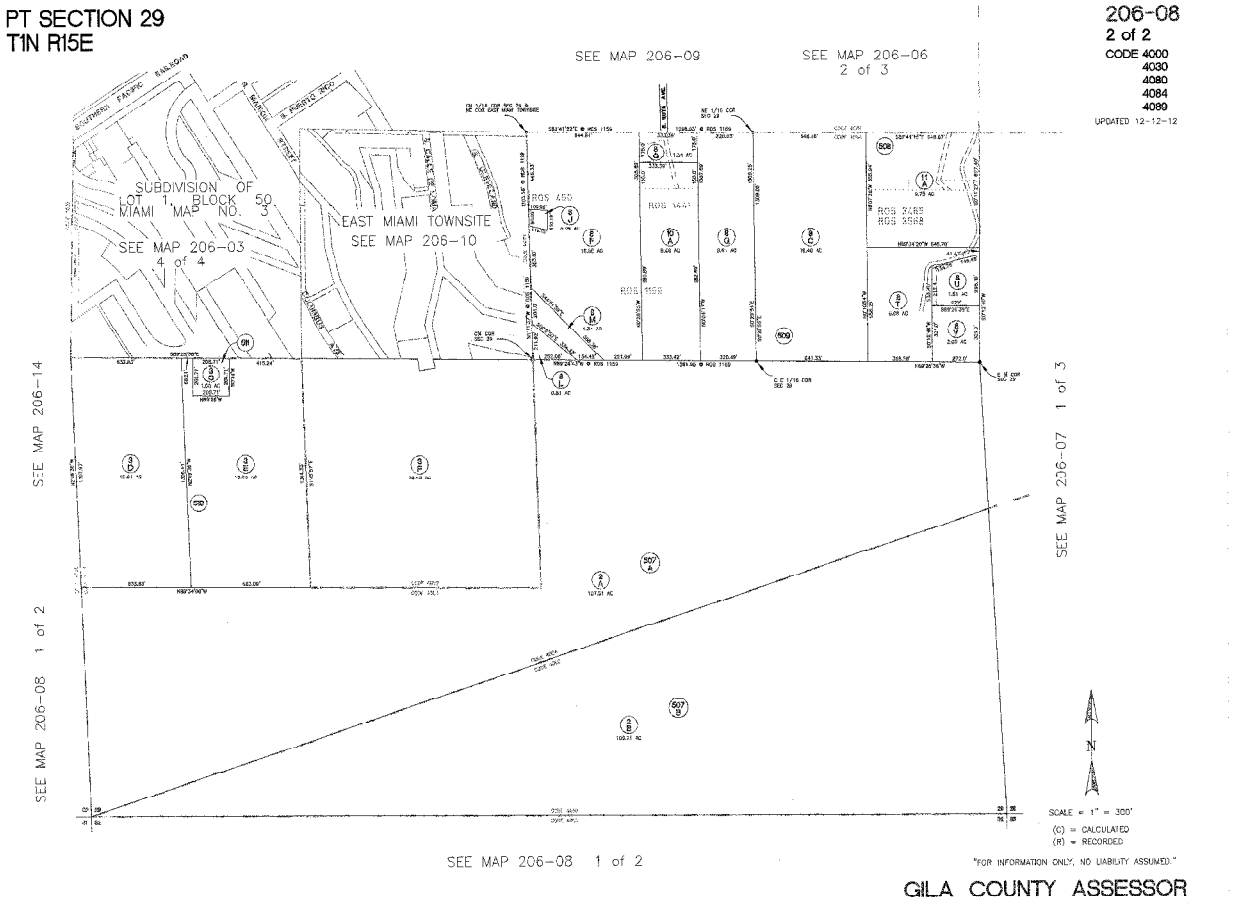
The Real Estate agent is working on trying to get pictures. It's 10 acres south of Grover Canyon in the Claypool/Lower Miami area, Parcel # 206 08 008g, priced at $39,900.
Owner is looking for $5,000 down and is willing to carry the note.

The property dimensions are 320 by 1300. Even though it is 10 acres it is not wide enough to meet ADEQ setback requirements of 350 ft.

I wonder of one of the adjacent properties is available.



Just got a call from the R.E. individual who had the 10 acre parcel. She has another one in that same area, 19+acres - taxes haven't been paid and owner is out of town. She has a # for him but hasn't heard back. The parcel number is 206-08-008C. Owner's name is Oropeza.

Mary Anne has found a couple of parcels that are next to each other that Mike feels if we could get them both, it would be large enough for the plant and required setbacks. Can you pull the area on the parcel maps that we put together and outline the parcels to get an idea of where this is and perhaps what elevation? The 2 parcels are on this survey record from Gila Count, but it is hard to tell where it sits.

Parcels: 206-08-008C & 206-08-008G

Here's some info on those parcels. It is up the hill behind the Claypool area and will have to pump 100% of the flow.

Total area of 29 acres
Average Elevation of 3626'
Lowest point around 3500'
Highest point around 3700'
Approx. 185' height above the corner of the Walmart parking lot (3315' relative low spot for project) to lowest point on these parcels.

Duong says we could still make it work in a 20year LCC but it will weaken that option significantly. Before we were pumping flow at relatively low pressure of 15' of head and now it'll be high pressure at 200' of head. That'll make quite a difference.

Going off the google earth elevations the Miami WWTP is at 3355 ft.

I checked with the realtor Monday and she said people don't seem to be anxious to list properties. Didn't have anything other than the pieces we looked at up Grover Canyon.

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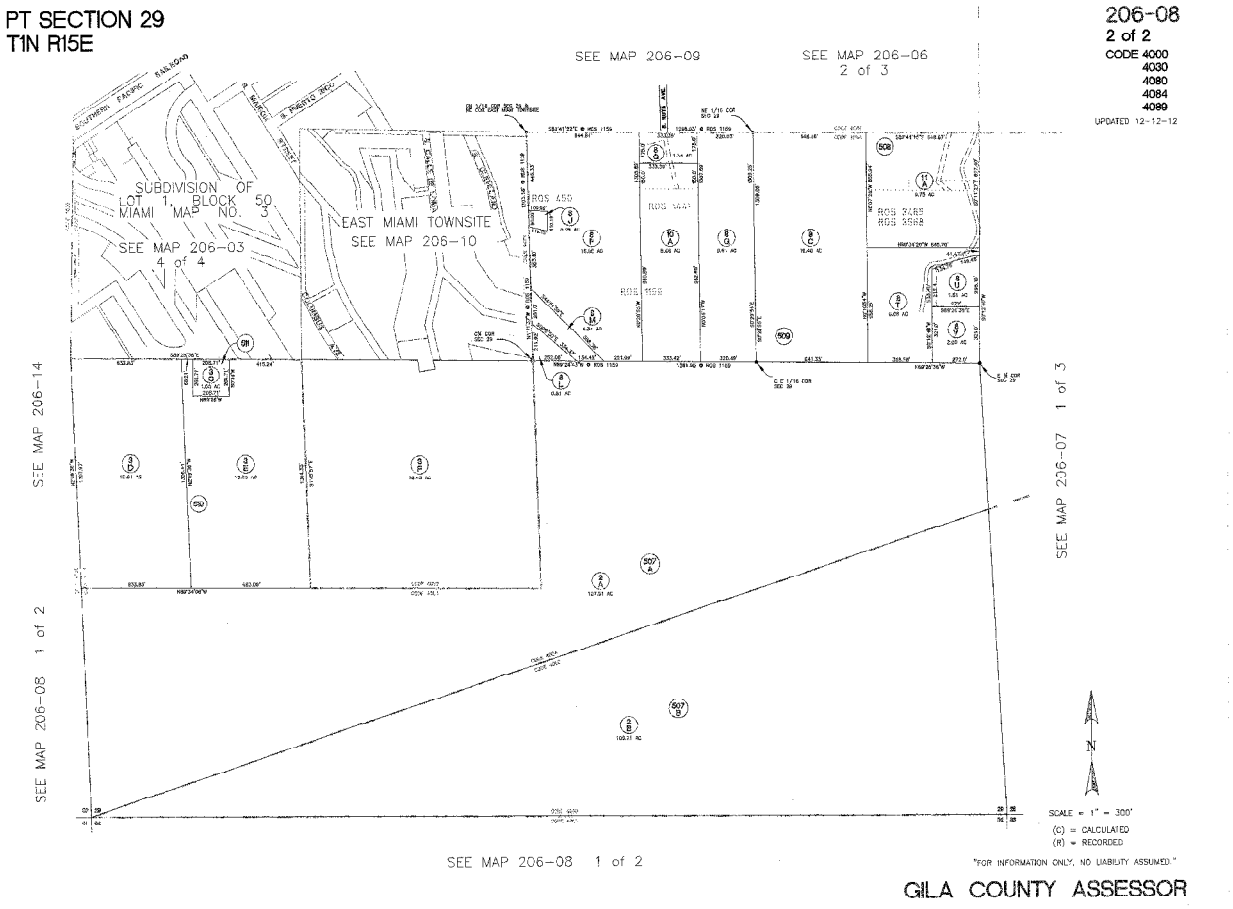

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TRSD WRF - TOTAL ESTIMATED PROJECT COST (0.25 MGD) - SBR

Construction Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Site Improvements					
1	Main Tank Excavation	13,500	CY	$ 5	$ 67,500
2	Subgrade prep	1	LS	$ 15,000	$ 15,000
3	Main tank Backfill	10,000	CY	$ 7	$ 70,000
4	Site Grading	1	LS	$ 50,000	$ 50,000
5	Utilities Water, Communication & Power to the site	1	LS	$ 75,000	$ 75,000
6	Access Rd & Site Lighting	1	LS	$ 35,000	$ 35,000
Process Improvements					
	Headworks Screening				
7	Combo Fine Screen / Grit Removal	1	EA	$ 200,000	$ 200,000
8	Piping	1	LS	$ 10,000	$ 10,000
9	Mechanical Installation	1	LS	$ 20,000	$ 20,000
10	Instrumentation	1	LS	$ -	$ -
11	Electrical	1	LS	$ -	$ -
	Sequencial Batch Reactor				
12	Misc Metals	1	LS	$ 17,500	$ 17,500
13	SBR/digester Concrete & Reinforcing Bottom slab	330	CY	$ 700	$ 231,000
14	SBR/digester Concrete Reinforcing Walls	300	CY	$ 1,000	$ 300,000
15	SBR Misc Concrete	1	LS	$ 15,000	$ 15,000
16	Concrete Walls	300	CY	$ 1,000	$ 300,000
17	Misc	1	LS	$ 25,000	$ 25,000
SBR Concrete					
	SBR Mechanical Equipment				
18	SBR Blowers	2	LS	$ 40,000	$ 80,000
19	SBR Fine Bubble Aeration	1	LS	$ 55,000	$ 55,000
20	SBR Decantors	2	LS	$ 55,000	$ 110,000
21	Anoxic Mixers	1	LS	$ 75,000	$ 75,000
22	RAS/WAS Pumps	1	LS	$ 75,000	$ 75,000
23	Blower Enclosure/ Bay	1	LS	$ 30,000	$ 30,000
24	Mechanical	1	LS	$ 60,000	$ 60,000
	Filtration				
25	Tertiary Filtration Equipment	1	LS	$ 152,600	$ 152,600
26	Concrete slab	1	LS	$ 25,000	$ 25,000
27	Valving Piping & By Pass	1	LS	$ 50,000	$ 50,000
28	Mechanical Set Filters	1	LS	$ 15,000	$ 15,000
	Disinfection				
29	Chlorine/ De-Chlor Disinfection	1	LS	$ 40,000	$ 40,000
30	Mechanical & Structural	1	LS	$ 60,000	$ 60,000
	Solids				
31	Decantor for Digester	1	LS	$ 30,000	$ 30,000
32	Sludge Aeration Blowers	2	EA	$ 20,000	$ 40,000
33	Sludge Diffusers	2	LS	$ 15,000	$ 30,000
34	Piping	1	LF	$ 25,000	$ 25,000
35	Dewatering Equipment with Sludge Pumps and polymer uni	1	LS	$ 200,000	$ 200,000
36	Dewatering Cake Conveyor	1	LS	$ 30,000	$ 30,000
37	Mechanical	1	LS	$ 50,000	$ 50,000
				Process Improvements Subtotal	**$ 2,351,100**
	Electrical				
38	Electical Underground	1	LS	$ 80,000	$ 80,000
39	Grounding	1	LS	$ 15,000	$ 15,000
39	Rough Electrical	1	LS	$ 50,000	$ 50,000
40	Feeder	1	LS	$ 40,000	$ 40,000
40	Lighting	1	LS	$ 12,000	$ 12,000
41	Electrical and Gear	1	LS	$ 80,000	$ 80,000
42	Generator/Transfer Swith	1	EA	$ 100,000	$ 100,000
43	Controls and Instrumentation and SCADA	1	LS	$ 200,000	$ 200,000
				Electrical Improvements Subtotal	**$ 577,000**
Contractor GC/OVHD/Profit/Contingency					
44	Bonds & Insurance @ 2%	2%	%		$ 97,218
45	General Conditions @ 10%	12%	%		$ 388,872
46	Fee	10%	%		$ 324,060
				Contractor GC/OVHD/Profit/Contingency Subtotal	**$ 810,150**
				Total Construction	**$ 4,050,750**
Engineering Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Engineering					
47	Performance Specifications	1	LS	$ 65,000	$ 65,000
48	Design	1	LS	$ 350,000	$ 350,000
				Engineering Subtotal	**$ 415,000**
				Total Engineering	**$ 415,000**
				TOTAL ESTIMATED PROJECT COST	**$ 4,465,750**

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TRSD WRF - TOTAL ESTIMATED PROJECT COST (0.25 MGD) Biolac

Construction Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Site Improvements					
1	Main Tank Excavation	6,200	CY	$ 5	$ 31,000
2	Subgrade prep	1	LS	$ 15,000	$ 15,000
3	Liner for basin HDPE	9,000	SF	$ 1	$ 9,900
4	Site Grading	1	LS	$ 50,000	$ 50,000
5	Utilities Water, Communication & Power to the site	1	LS	$ 75,000	$ 75,000
6	Access Rd & Site Lighting	1	LS	$ 35,000	$ 35,000
Process Improvements					
	Headworks Screening				
7	Combo Fine Screen / Grit Removal	1	EA	$ 200,000	$ 200,000
8	Piping	1	LS	$ 10,000	$ 10,000
9	Mechanical Installation	1	LS	$ 20,000	$ 20,000
10	Instrumentation	1	LS	$ 5,500	$ 5,500
	Bio Lac System				
11	Bio Lac	1	LS	$ 310,000	$ 310,000
12	Concrete Slab on bottom for aerators	119	CY	$ 700	$ 82,000
13	Air Piping	1	LS	$ 50,000	$ 50,000
14	Undergrounf Piping	1	LS	$ 50,000	$ 50,000
15	Fencing/Post cable for system	1	LS	$ 25,000	$ 25,000
16	Splitter Box	1	LS	$ 15,000	$ 15,000
	Clarifiers				
17	30 ft Clarifiers	2	LS	$ 40,000	$ 80,000
18	Concrete slab	40	CY	$ 1,000	$ 40,000
19	Wall Slabs	70	CY	$ 1,000	$ 70,000
20	Clarifier piping	1	LS	$ 35,000	$ 35,000
21	RAS/WAS Pumps	1	LS	$ 35,000	$ 35,000
22	RAS/WAS Pump Station	1	LS	$ 30,000	$ 30,000
23	RAS/WAS Piping	1	LS	$ 30,000	$ 30,000
24	Mechanical	1	LS	$ 45,000	$ 45,000
	Filtration				
25	Tertiary Filtration Equipment	1	LS	$ 152,600	$ 152,600
26	Concrete slab	1	LS	$ 25,000	$ 25,000
27	Valving Piping & By Pass	1	LS	$ 50,000	$ 50,000
28	Mechanical Set Filters	1	LS	$ 15,000	$ 15,000
	Disinfection				
29	Chlorine/ De-Chlor Disinfection	1	LS	$ 40,000	$ 40,000
30	Mechanical & Structural	1	LS	$ 60,000	$ 60,000
31	Misc	1	LS	$ 7,500	$ 7,500
	Solids				
32	Sludge Aeration Blowers	2	EA	$ 20,000	$ 40,000
33	Sludge Diffusers	2	LS	$ 15,000	$ 30,000
34	Piping	1	LF	$ 25,000	$ 25,000
35	Dewatering Equipment with Sludge Pumps and polymer unit	1	LS	$ 200,000	$ 200,000
36	Dewatering Cake Conveyor	1	LS	$ 30,000	$ 30,000
37	Mechanical	1	LS	$ 50,000	$ 50,000
				Process Improvements Subtotal	**$ 1,857,600**
	Electrical				
38	Electical Underground	1	LS	$ 80,000	$ 80,000
39	Grounding	1	LS	$ 15,000	$ 15,000
39	Rough Electrical	1	LS	$ 50,000	$ 50,000
40	Feeder	1	LS	$ 40,000	$ 40,000
40	Lighting	1	LS	$ 12,000	$ 12,000
41	Electrical and Gear	1	LS	$ 80,000	$ 80,000
42	Generator/Transfer Swith	1	EA	$ 100,000	$ 100,000
43	Controls and Instrumentation and SCADA	1	LS	$ 200,000	$ 200,000
				Electrical Improvements Subtotal	**$ 577,000**
				Direct Construction Cost Total	**$ 2,650,500**
Contractor GC/OVHD/Profit/Contingency					
44	Bonds & Insurance @ 2%	2%	%		$ 79,515
45	General Conditions @ 10%	12%	%		$ 318,060
46	Fee	10%	%		$ 265,050
				Contractor GC/OVHD/Profit/Contingency Subtotal	**$ 662,625**
				Total Construction	**$ 3,313,125**
Engineering Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Engineering					
47	Performance Specifications	1	LS	$ 65,000	$ 65,000
48	Design	1	LS	$ 350,000	$ 350,000
				Engineering Subtotal	**$ 415,000**
				Total Engineering	**$ 415,000**
				TOTAL ESTIMATED PROJECT COST	**$ 3,728,125**

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TRSD WRF - TOTAL ESTIMATED PROJECT COST (0.25 MGD) Schreiber

Construction Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Site Improvements					
1	Effluent Piping Drop & Site Work	1	LS	$ 30,000	$ 30,000
2	Subgrade prep	1	LS	$ 15,000	$ 15,000
3	Utilities Water, Communication & Power to the site	1	LS	$ 50,000	$ 50,000
4	Access Rd & Site Lighting	1	LS	$ 25,000	$ 25,000
Process Improvements					
	Headworks Screening				
5	Combo Fine Screen / Grit Removal	1	EA	$ 200,000	$ 200,000
6	Piping	1	LS	$ 10,000	$ 10,000
7	Mechanical Installation	1	LS	$ 20,000	$ 20,000
8	Instrumentation	1	LS	$ 5,500	$ 5,500
	Bio Lac System				
9	Schreiber Tank	1	LS	$ 249,500	$ 249,500
10	Shipping to Jobsite	1	LS	$ 24,700	$ 24,700
11	Concrete Slab for tank	100	CY	$ 750	$ 75,000
12	Site Piping & Set Tank	1	LS	$ 50,000	$ 50,000
13	Undergrounf Piping	1	LS	$ 50,000	$ 50,000
14	Splitter Box	1	LS	$ 15,000	$ 15,000
	Clarifiers				
15	RAS/WAS Pumps	1	LS	$ 35,000	$ 35,000
16	RAS/WAS Pump Station	1	LS	$ 30,000	$ 30,000
17	RAS/WAS Piping	1	LS	$ 30,000	$ 30,000
18	Mechanical	1	LS	$ 45,000	$ 45,000
	Filtration				
19	Tertiary Filtration Equipment	1	LS	$ 152,600	$ 152,600
20	Concrete slab	1	LS	$ 25,000	$ 25,000
21	Valving Piping & By Pass	1	LS	$ 50,000	$ 50,000
22	Mechanical Set Filters	1	LS	$ 15,000	$ 15,000
23	Misc	1	LS	$ 10,000	$ 10,000
	Disinfection				
24	Chlorine/ De-Chlor Disinfection	1	LS	$ 40,000	$ 40,000
25	Mechanical & Structural	1	LS	$ 60,000	$ 60,000
26	Misc	1	LS	$ 7,500	$ 7,500
	Solids				
27	Tank & Decantor for Digester	1	LS	$ 30,000	$ 30,000
28	Sludge Aeration Blowers	2	EA	$ 20,000	$ 40,000
29	Sludge Diffusers	2	LS	$ 15,000	$ 30,000
30	Piping	1	LF	$ 25,000	$ 25,000
31	Dewatering Equipment with Sludge Pumps and polymer unit	1	LS	$ 200,000	$ 200,000
32	Dewatering Cake Conveyor	1	LS	$ 30,000	$ 30,000
33	Mechanical	1	LS	$ 50,000	$ 50,000
				Process Improvements Subtotal	**$ 2,653,200**
	Electrical				
34	Electical Underground	1	LS	$ 40,000	$ 40,000
35	Grounding	1	LS	$ 7,500	$ 7,500
35	Rough Electrical	1	LS	$ 25,000	$ 25,000
36	Feeder	1	LS	$ 20,000	$ 20,000
36	Lighting	1	LS	$ 12,000	$ 12,000
37	Electrical and Gear	1	LS	$ 40,000	$ 40,000
38	Generator/Transfer Swith	1	EA	$ 50,000	$ 50,000
39	Controls and Instrumentation and SCADA	1	LS	$ 75,000	$ 75,000
				Electrical Improvements Subtotal	**$ 269,500**
				Direct Construction Cost Total	**$ 3,042,700**
Contractor GC/OVHD/Profit/Contingency					
40	Bonds & Insurance @ 2%	2%	%		$ 91,281
41	General Conditions @ 10%	12%	%		$ 365,124
42	Fee	10%	%		$ 304,270
				Contractor GC/OVHD/Profit/Contingency Subtotal	**$ 760,675**
				Total Construction	**$ 3,803,375**
Engineering Cost Estimate					
Item	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Cost**
Engineering					
43	Performance Specifications	1	LS	$ 55,000	$ 55,000
44	Design	1	LS	$ 300,000	$ 300,000
				Engineering Subtotal	**$ 355,000**
				Total Engineering	**$ 355,000**
				TOTAL ESTIMATED PROJECT COST	**$ 4,158,375**

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TRSD WRF - TOTAL ESTIMATED PROJECT COST (0.25 MGD) - MBR

Construction Cost Estimate				
Description	**Quantity**	**UOM**	**Unit Price**	**Total Cost**
FM & Construction of TRSD WRF				
200,000 GPD TRSD WRF	1	LS	$ 1,293,627	$ 1,293,627
Additional Screening	1	LS	$ 120,000	$ 120,000
Solids Dewatering Train	1	LS	$ 300,000	$ 300,000
Shipping to Site	3	LS	$ 8,000	$ 24,000
Effluent Piping Drop & Site Work	1	LS	$ 25,000	$ 25,000
Concrete Slab	100	Cyds	$ 650	$ 65,000
Site Piping & Set Train	1	LS	$ 120,000	$ 120,000
Underslab Utilities (wet/dry)	1	LS	$ 20,000	$ 20,000
Water, Communication & Power to Site	1	LS	$ 55,000	$ 55,000
Access Road to Site & Site Lighting	1	LS	$ 12,000	$ 12,000
Electrical	1	LS	$ 25,000	$ 25,000
Generator	1	LS	$ 50,000	$ 50,000
Misc	1	LS	$ 10,000	$ 10,000
Demo Existing Septage system	1	LS	$ 7,500	$ 7,500
Subtotal Construction Cost				**$ 2,127,127**
Bonds & Insurance @ 2%	0.020	LS	$ 42,543	$ 42,543
Taxes @ 5.3%	0.053	LS	$ 112,738	$ 112,738
General Conditions @ 10%	0.100	LS	$ 212,713	$ 212,713
Fee	0.100	LS	$ 212,713	$ 212,713
Total Construction Cost				**$ 2,495,120**

Engineering Cost Estimate				
Item	**Quantity**	**UOM**	**Unit Price**	**Total Cost**
Engineering				
Performance Specifications	1	LS	$ 30,000	$ 30,000
Design	1	LS	$ 220,000	$ 220,000
			Total Design Cost	**$ 250,000**
			Total Project Cost	**$ 2,745,120**

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Appendix H - OMB Circular A-94

APPENDIX C
(Revised November 2016)

DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE, AND RELATED ANALYSES

Effective Dates. This appendix is updated annually. This version of the appendix is valid for calendar year 2017. A copy of the updated appendix can be obtained in electronic form through the OMB home page at http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c/. The text of the Circular is found at http://www.whitehouse.gov/omb/circulars_a094/, and a table of past years' rates is located at http://www.whitehouse.gov/sites/default/files/omb/assets/a94/dischist.pdf. Updates of the appendix are also available upon request from OMB's Office of Economic Policy (202-395-3316).

Nominal Discount Rates. A forecast of nominal or market interest rates for calendar year 2017 based on the economic assumptions for the 2018 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
1.4	1.7	1.9	2.1	2.5	2.8

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2018 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
-0.5	-0.3	0.0	0.1	0.5	0.7

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate.

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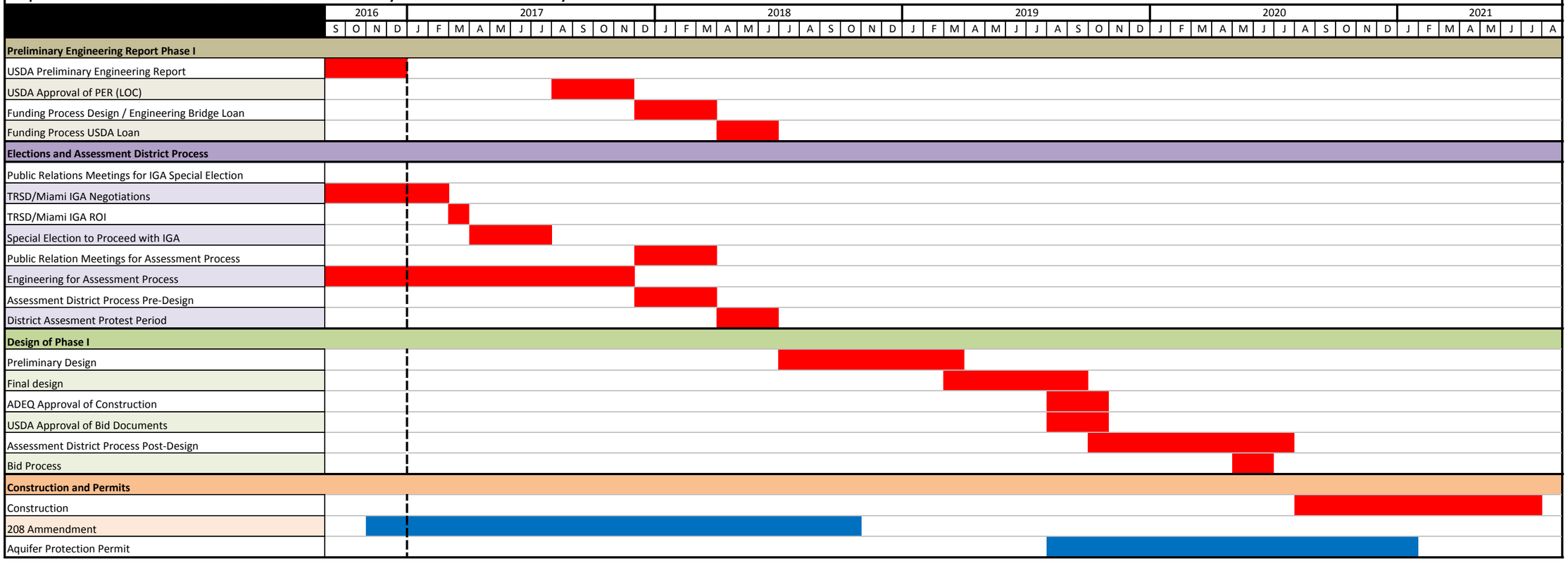
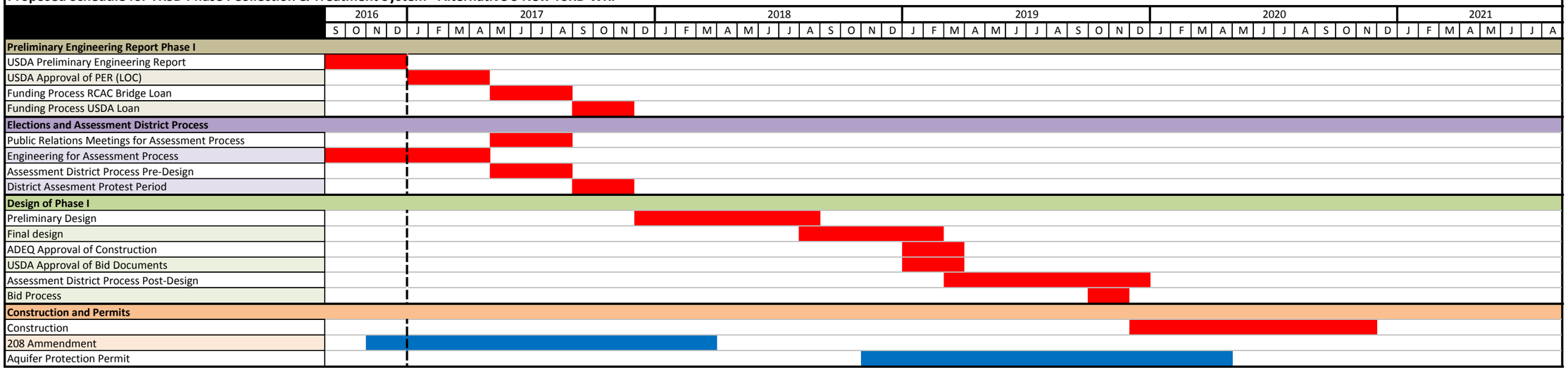
Appendix I - Project Schedule

DISCLAIMERS: *1. This PER (submitted April 2018) to USDA-RD for pursuit of funding includes only raw costs for the determination of need for grant funding (per USDA-RD requirements) 2. USDA-RD Letter of Conditions (LOC) was received August 20, 2018 indicating offer of loan/grant funding package which will be used for sewer rate calculations 3. Attachment A is a response to USDA-RD National Office comments on final report. Further, updated details will be provided at upcoming public meetings. 4. The following items have been replaced with updated versions: Exhibits, Appendix A*

Tri-City Regional Sanitary District
Proposed Schedule for TRSD Phase I Collection & Treatment System - Alternative 2 Convey to Miami WRF



Tri-City Regional Sanitary District
Proposed Schedule for TRSD Phase I Collection & Treatment System - Alternative 3 New TSRD WRF



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PACE
Advanced Water Engineering
7434 E. MCDONALD DRIVE
SCOTTSDALE, AZ 85250
480.991.3595 | WWW.PACEWATER.COM

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Attachment A

May 4, 2018

Mr. Mike Luecker
USDA-RD
230 N. 1st Ave, Suite 206
Phoenix, AZ 85003
Phone (602) 280-8762

Re: Tri-City Regional Sanitary District (TRSD) Wastewater Collection & Treatment System Phase I of III #A128 Response to National Office (NO) Preliminary Engineering Report (PER) Phase I of III Comments

Mr. Luecker,

Tri-City Regional Sanitary District (TRSD) has worked hard in the recent years to develop the Wastewater Collection & Treatment System Phase I of III Preliminary Engineering Report (PER) by way of exploring any and all options for the objective to provide a wastewater collection and treatment system to its residents to address the public health issues associated with current wastewater treatment methods. Over the years, information has been gathered and considered to make a well-informed decision on the most cost effective, responsible action. PACE, on behalf of TRSD, is providing the following information to help answer USDA-RD National Office questions regarding the PER.

1. The sanitary district includes two schools and a hospital. What are they using for sanitary sewage treatment? Will they connect to the system?

   Response: The two schools and the hospital are currently within the boundaries of TRSD and are not a part of Phase I. In addition, they are currently being served by the Town of Miami.

2. Elaborate on the reasons why connecting to Globe's treatment facility was not evaluated further. The PER provides minimal discussion on why not evaluated further.

   Response: Connecting to Globe's treatment facility was considered early in the evaluations, but for the reasons listed below it was also ruled out as a viable alternative prior to more in-depth alternative options.
   - *Higher capital costs compared to the Miami option*
     - *Distance to connect to the Globe facility is further than the distance to the Miami WRF that would increase infrastructure needed to connect.*
     - *There is a ridge between the TRSD Phase I project and the Globe facility that would require multiple lift stations.*
   - *Higher operational costs compared to the Miami option*
     - *The increased distance to connect to the Globe facility and the additional lift stations required to accommodate the ridge would increase power and maintenance costs.*
     - *The Globe facility is in need of major repairs and Globe set expectations that TRSD would be depended on in paying for a share of those repairs; the actual costs are unknown and not provided.*
     - *The capacity fee to Globe was higher than that of the Miami option at $9.32/gallon versus $5.11/gallon.*

3. Only gravity sewers were considered for collection. Why not grinder pumps or a septic tank effluent pump system? These alternatives were not discussed. Present worth analysis should be used to select the collection system from all feasible alternatives.

   Response: Initially low pressure sewer systems were considered for the project due to the

Attachment A

varying terrain, but it was ultimately determined that gravity would be the simplest and most cost effective approach for this project. The concern with the smaller pump systems was the upfront cost of the pumps and then the cost of ongoing maintenance for the pumps. Both appeared to be higher than the proposed gravity collection system. Because of the housing density in the TRSD area, the step type systems are less cost effective.

A present value comparison of a Step system vs Gravity Sewer system was recently completed. The breakdowns and calculations are included with this response as Attachment #1. Please note the following assumptions:

- *Both of the collection system types would be collected and drained to the main lift station and then conveyed via the force main to the TRSD WRF. Therefore since this portion of the systems will be identical, the costs for this is not included in the Attachment #1 analysis.*
- *The Step system Capital costs include an assumption regarding the need to upgrade electrical service at most of the homes to accommodate the power required to run these individual systems. We assumed that 617 of the 823 (or 75%) new services connections will require an upgrade to the meter and meter base and the estimated cost is approximately $2,500/home.*
- *The Step system O&M cost for the Electrical at $22,056 was calculated as follows:*
  - *The pump will be 1 horsepower and would run about 1 hour/day, equating to 0.735 kW/day,*
  - *Estimated average cost of $0.10/kWh,*
  - *So, 0.735 kW/day x 365 days x $0.10/kWh = $26.80/year/home,*
  - *So, $26.80 x 823 new connections = $22,056*

The comparison indicates that both the construction and non-construction costs of the Step system was greater than the Gravity system by almost $4.0 million. Additionally, the O&M cost of the Step system would be greater than the proposed Gravity system for a number of reasons. Including the following:

- *Short-Lived Asset Reserve (SLAR) would need to include the a 5 to 10 year replacement of the step pumps*
- *The tanks would require the removal of the solids every 5 to 10 years*
- *Higher power costs to operate the numerous pumps*

The present value analysis shows that the Present Worth Cost for Gravity system alternative is a about $5.2 million less expensive than the Step system indicating that the gravity system is the more cost effective approach. The simplicity of the gravity system over the long haul is what is best for TRSD and its customers.

4. Population has declined over the last 20 years for the area, yet the reasonable growth estimates are 25 percent?

Response: As described in Section 1.3 Population Trends, the population decrease in these TRSD communities can be attributed to the diminishing conditions, amount of abandoned properties, and/or properties that have had water supply disconnected due to violations of onsite wastewater management. Therefore, when estimating growth, only the existing vacant properties were considered because with immediate access to a collection system, these properties are more likely to be inhabited and/or re-inhabited. Section 3.3.6 TRSD Phase I Reasonable Growth Estimates can be further clarified:

340 EDUs of the 1,374 Total Phase I EDUs are vacant properties.

210 EDUs of the total 1,374 (15%) are vacant properties that have frontage to the new proposed collection system. Again, with immediate access to a collection system, these properties are more likely to be inhabited and/or re-inhabited. Even though they are vacant at this time, they have frontage and the state laws regarding sanitary districts allows for TRSD to assess these properties 100% of the debt service fees and up to 50% of the O&M fees per EDU. Therefore, these are not necessarily considered "true growth", but more of a "soft growth". These vacant properties are scattered among the other proposed connected properties within the TRSD service area, so the inclusion of them in the EDU count does not increase the length of proposed sewer lines. However, they are important to the overall success of the project. Since these properties have frontage and are able to be assessed, then it is necessary to have sufficient treatment capacity available should they be inhabited and/or re-inhabited and require service. Revisiting Table 33 of the PER below, these 210 properties are included within the Debt Service EDU count of 1,244 and are included at 50% in the O&M Payment EDU count of 1,139 EDUs and

Attachment A

not considered true growth. Should these properties be inhabited and/re-inhabited, the flows would increase accordingly and the property would then be assessed the full 100% of the O&M Payment.

PER Table 1 – TRSD Phase I EDUs for O&M Payments

Land Use Type	Total New Connections	Total Phase I EDUs	Debt Repayment EDUs	Allowed User Fee %	O&M Payment EDUs
Residential	806	806	806	100%	806
Commercial	19	174	174	100%	174
Industrial	7	30	30	100%	30
Vacant	0	340	210	50%	105
Other	24	24	24	100%	24
Totals	**856**	**1,374**	**1,244**		**1,139**

The remaining 130 vacant EDUs (representing 22,750 GPD or 10% of the growth flows) do not have frontage on the proposed sewer lines and are not able to be assessed at this time. Additional sewer lines would need to be constructed to include these properties. Therefore these represent the amount of potential capacity growth. They are not included with in any EDU count at this time except the overall total potential count of EDUs within Phase I (1,374).

The reasonable growth of 10% for this project includes the 130 vacant EDUs that are within TRSD, that do not have frontage, and cannot be assessed the debt service or O&M cost at this time.

5. The main lift station will be located in the 100-year floodplain, how will it be protected? Could it be moved out of the floodplain?

Response: The new proposed TRSD Lift Station location on the shallow (less than a foot) south edge of the 100 year floodplain. It is important to note that the floodplain extends north and encompasses a number of nearby large buildings within the floodplain. It is estimated that the impact of the lift station to the floodplain will be minimal as the estimated footprint of the lift station will only be approximately 20 ft x 20 ft and only about 1 ft will actually be in the floodplain. Additionally, to accomplish flood protection for this critical facility, the design criteria shall require the top of the lift station to sit a minimum of 2 feet above the 500-year floodplain and then requiring the electrical panel to be installed on post sitting above the top of the lift station.

As discussed within the PER, the entire district was analyzed and the natural flows were evaluated to determine the optimal location for the lift station location. The goal of locating the lift station was to be able to place it in an area that was most cost effective and efficient, not only the Phase I but the futures phases as well since eventually all three phases will be collected at this main lift station to then be conveyed to the TRSD WRF. Within this optimal location, all available parcels are located within the floodplain.

6. The treatment alternative (treatment technology) was not selected based on present worth analysis. The present worth analysis evaluated Alternative 2 connection to the Miami facility (not completely feasible) versus a [TRSD] treatment facility. Why do present worth analysis on an alternative that isn't feasible?

Response: The treatment technology selection was based on a present worth analysis. A review of Table 20 from the PER, shown on the following page, provides the construction capital cost of the different treatment technologies evaluated. Since the size of the facilities were relatively small, it was assumed that both the non-construction and O&M cost for each type of treatment technology would be very similar.

Attachment A

PER Table 2 - Treatment Process Cost Estimate Comparison

Capital Cost	SBR	EAAS	CSR	MBR
Construction Costs	$ 4,050,750	$ 3,313,125	$ 3,803,375	$2,495,120
Non-Construction Costs	$ 415,000	$ 415,000	$ 355,000	$ 250,000
Total Cost	**$ 4,465,750**	**$ 3,728,125**	**$ 4,158,375**	**$2,745,120**

To take a more in-depth evaluation, we have provided a Present Value Analysis. The table below summarizes the updated comparison. As shown, the MBR treatment process is still the most cost effective. Detailed breakdown and calculations are included with this response as Attachment #2. After this present worth analysis, the selection of the MBR can still be considered the most appropriate treatment process for this TRSD project.

Updated Treatment Process Present Worth Comparison

Capital Cost	SBR	EAAS	CSR	MBR
Capital Cost	$5,189,406	$4,430,519	$4,917,294	$3,478,213
Annual O&M	$6,705,000	$6,800,000	$6,655,000	$7,030,000
Annual SLA	$450,000	$450,000	$450,000	$636,000
Salvage Value	$733,000	$600,000	$688,000	$452,000
Total Present Worth Cost	**$11,611,406**	**$11,080,519**	**$11,334,294**	**$10,692,213**

As a result, with each alternative technology having the same (or nearly the same) non-construction and O&M cost, the construction capital provides for an adequate present worth calculation to analyze and make a determination of the appropriate treatment process selection. Thus the selection of the MBR as the most appropriate treatment process for this project was based on a present worth analysis.

It was determined that it was necessary to know that the Miami alternative was technically feasible prior to TRSD expending major efforts in negotiations with the Town of Miami for the possibility of the Town treating TRSD flows. As shown in the PER, it was determined to be technically viable, however during the negotiation period it became clear that there were a number of variables that render this alternative not viable. The major ones are the following:

- *Unsuccessful negotiations an Intergovernmental Agreement (IGA) with the Town of Miami after tremendous TRSD efforts expended to come to an agreement*
- *Lack of audited financial statements from the Town of Miami to accurately estimate the costs to convey the TRSD wastewater flows to the Miami WRF for treatment*

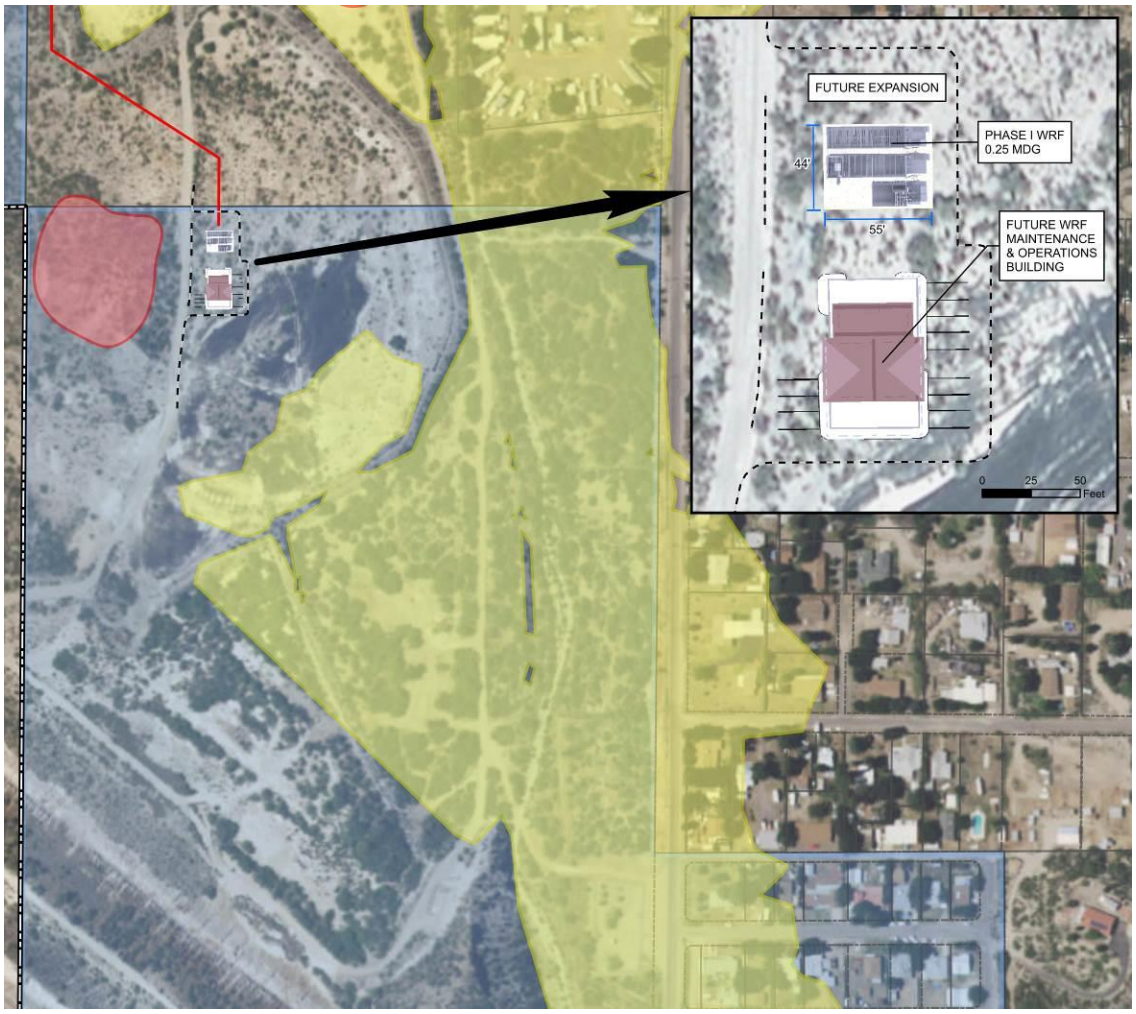
7. It appears the treatment technology was really selected based on what would fit on the available site. How big is it? How do we know the SBR or CSR won't fit? The selection of WWTF treatment technology should be based on present worth analysis.

Response: As stated in our response #6 above, the treatment technology selection was based on a present worth analysis. As described within the PER, we evaluated a number of potential treatment sites and each site had its own challenges due to varying sizes, property location / shape, floodplain issues, adjacent properties, etc. Each were evaluated openly with different technologies in an attempt to not be limited to a specific technology, but to ensure the best fit for the property while achieving TRSD objectives.

In reference to the proposed site, the property owner has requested that the footprint of the WRF be reasonably limited to allow for the system to be expanded but to not consume an enormous amount of the property. The negotiations for this site are ongoing, but the site layout as proposed within the PER (shown on the following page) are acceptable to the existing property owner.

Attachment A

Figure 1 – New TRSD WRF



If you have any further questions regarding the response enclosed, please feel free to contact me at (602) 741-2115 or mikekrebs@pacewater.com.

Sincerely,

Mike G. Krebs, MBA, PE
Vice President – Environmental Water Division

Enclosures: *Attachment #1 TRSD Step vs Gravity Present Value Analysis*
Attachment #2 TRSD WRF Process Present Value Analysis

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TRSD Gravity vs Step Alternative PV Comparison

			Alt 1 -Gravity Sewer	Alt 2 - Step Sewer
Life Cycle Period	20 Years			
OMB A-94 Real Interest Rate	0.50% Escalation Rate	0.00%	Note: Highlighted Cells - Fill in Values	
http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c				
A. Initial Cost (Capital Cost)				
1. Construction			$14,525,946	$17,327,923
2. Non-Construction w/Contingincies			$5,624,286	$6,769,089
		Total Initial Capital Costs	**$20,150,232**	**$24,097,012**
B. Operations and Maintenance (O&M)				
O&M (does not include debt or replacements-SLA)			$200,429	$231,285
		Total Annual Costs	$200,429	$231,285
		Present Worth Factor	18.9874	18.9874
		Present Worth of RECURRENT COSTS	**$3,806,000**	**$4,392,000**
C. Replacement Reserve - Short Lived Assets (SLA)				
		Years	20	20
Short Lived Assets (SLA)		Total Cost for Replacements/Repair	$120,000	$2,469,000
(use avg yearly SLA calculation w/o escalation)		Yearly Cost	$6,000	$123,450
		Present Worth Factor	18.9874	18.9874
		Present Worth of REPLACEMENTS	**$114,000**	**$2,344,000**
D. Salvage Value				
		Useful Life (years)	50	50
		Construction Cost - Collection System	$14,525,946	$17,327,923
		Salvage Value (assume straight-line of construction cost)	$8,715,568	$10,396,754
		TOTAL CONSTRUCTION COST	$14,525,946	$17,327,923
		TOTAL SALVAGE VALUE	$8,715,568	$10,396,754
		Present Worth Factor	0.9051	0.9051
		Present Worth of SALVAGE VALUE	**$7,888,000**	**$9,410,000**
LIFE CYCLE - PRESENT WORTH SUMMARY				
A. Capital Cost			$20,150,232	$24,097,012
B. Annual O&M (PRESENT WORTH)			$3,806,000	$4,392,000
C. Annual SLA (PRESENT WORTH)			$114,000	$2,344,000
D. Salvage Value (PRESENT WORTH)			$7,888,000	$9,410,000
G. TOTAL PRESENT WORTH COST (A+B+C-F)			**$16,182,232**	**$21,423,012**

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TRSD PHASE I - STEP CAPITAL COST ESTIMATES

DESCRIPTION	QTY	UOM	UNIT PRICE	EXTENDED COST
Construction Cost				
Underground Piping for the Collection System				
2" PVC FM Sewer Pipe	23500	LF	$ 30	$ 705,000
3" PVC FM Sewer Pipe	14300	LF	$ 35	$ 500,500
4" PVC FM Sewer Pipe	12779	LF	$ 40	$ 511,160
10" PVC (SDR-35) Gravity Sewer Pipe	4076	LF	$ 60	$ 244,565
48" Manhole - 8" to 12" Gravity Pipe @ every 400'	18	EA	$ 5,200	$ 93,600
Force Main Valve Chamber - FM 4" and up @ every 500'	20	EA	$ 3,000	$ 60,000
Sewage Air/Vac Valve and Vault	20	EA	$ 3,300	$ 66,000
Traffic Control	1	LS	$ 305,298	$ 183,179
Lift Station for Collection System				
Individual Step Systems Stations	823	EA	$ 5,000	$ 4,115,000
Electrical upgrade for Individual Step Systems on 75% of the homes	617	EA	$ 2,500	$ 1,543,125
Excavation and Pavement Restoration				
Jack & Bore w/ 20" Casing @ 100' / Jack & Bore	785	LF	$ 550	$ 431,750
Jack and Bore RR permit	4	LS	$ 1,100	$ 4,400
Asphalt R & R - 6' Wide Trench Patch (4"/8")	23142	SY	$ 53	$ 1,226,535
Dewatering	0	LS	$ 25,000	$ -
Utility Relocations	1	LS	$ 50,000	$ 50,000
Hard Dig Contingency @ 1.5% of all buried pipe	868	LF	$ 200	$ 173,566
Services Connections (Included in Connection Costs Breakdown)				
Connect Services (New lateral to building)	823	EA	$ 2,000	$ 1,646,000
Backwater Valves	-	EA	$ 250	$ -
Abandon Existing Cesspool/Septic Tank	823	EA	$ 2,000	$ 1,646,000
Yard Restoration	823	EA	$ 500	$ 411,500
			Subtotals	**$ 13,611,880**
Bonds & Insurance @ 2%	2%	LS	$ 272,238	$ 272,238
Taxes @ 5.3%	5%	LS	$ 721,430	$ 721,430
General Conditions @ 10%	10%	LS	$ 1,361,188	$ 1,361,188
Fee	10%	LS	$ 1,361,188	$ 1,361,188
STEP TOTAL CONSTRUCTION COST				**$ 17,327,923**
Non-Construction Costs				
Land Acquisition, ROW, Easements				
Collection System Land and ROW Acquisition	1	LS	$ 250,000	$ 250,000
Non-Frontage Easement Survey	42	EA	$ 1,500	$ 63,000
Obtain Non-Frontage ROW (title, escrow, appraisal, acquisition)	42	EA	$ 1,200	$ 50,400
Railroad Easement Coordination	4	EA	$ 10,000	$ 40,000
Railroad Easement Documentation	4	EA	$ 10,000	$ 40,000
Engineering - Permit Applications				
208 Amendment Application Process	1	LS	$ 40,000	$ 40,000
4.01 General Permit Application Process	1	LS	$ 45,000	$ 45,000
Permit Application Expenses	1	LS	$ 7,500	$ 7,500
ADEQ & County Permit Fees				
208 Amendment Application Fee	1	LS	$ 10,000	$ 10,000
4.01 General Permit Application Fee	1	LS	$ 25,000	$ 25,000
ADEQ Review Fees	1	LS	$ 15,000	$ 15,000
Engineering - Design Information Gathering				
Aerial Survey	1	LS	$ 25,500	$ 25,500
Design Survey Cost	1	LS	$ 212,500	$ 212,500
Underground Utilities Investigation	1	LS	$ 170,000	$ 170,000
Geotechnical Cost	1	LS	$ 127,500	$ 127,500
Engineering - Design Collection/LS & WRF				
Collection Design	331	SH	$ 3,500	$ 1,158,500
Lift Stations Design	1	LS	$ 85,000	$ 85,000
USDA 500 yr Storm Analysis	1	LS	$ 12,500	$ 12,500
Service Connection Easement and Design	823	EA	$ 200	$ 164,600
Construction Bid Services	1	LS	$ 50,000	$ 50,000
Design Services Expenses	1	LS	$ 75,000	$ 75,000
District Policies and Procedures Standards	1	LS	$ 75,000	$ 75,000
Design Management, Scheduling, and Progress & Board Meetings	1	LS	$ 200,000	$ 200,000
Engineering - Construction Administration				
Materials & Testing	1	LS	$ 45,000	$ 45,000
Startup Commissioning	1	LS	$ 50,000	$ 50,000
RPR Construction Engineer	14	MO	$ 27,810	$ 389,333
Construction Inspector	14	MO	$ 20,857	$ 292,000
Project PM / EOR Monthly Meetings	16	EA	$ 3,000	$ 48,000
Special Inspection	1	LS	$ 25,000	$ 25,000
Services During Construction Expenses	1	LS	$ 100,000	$ 100,000
Post Construction Services	1	LS	$ 45,000	$ 45,000
O&M Manuals Collection	1	LS	$ 35,000	$ 35,000
STEP NON-CONSTRUCTION SUBTOTALS				**$ 3,971,333**
				$ 2,797,755
Construction Contingency	15%	LS		$ 2,599,189
Non-Construction Contingency	5%	LS		$ 198,567
STEP TOTAL CONSTRUCTION & NON-CONSTRUCTION COST				**$ 24,097,012**

TRSD PHASE I - GRAVITY CAPITAL COST ESTIMATES				
DESCRIPTION	**QTY**	**UOM**	**UNIT PRICE**	**EXTENDED COST**
Construction Cost				
Underground Piping for the Collection System				
6" PVC (SDR-35) Gravity Sewer Pipe	1102	LF	$ 45	$ 49,596
8" PVC (SDR-35) Gravity Sewer Pipe	52677	LF	$ 55	$ 2,897,248
10" PVC (SDR-35) Gravity Sewer Pipe	4076	LF	$ 60	$ 244,565
Force Main from Main LS to Miami WWTP	4850	LF	$ 60	$ 291,000
48" Manhole - 8" to 12" Gravity Pipe @ every 400'	145	EA	$ 5,200	$ 754,000
Force Main Valve Chamber - FM 4" and up @ every 500'	7	EA	$ 3,000	$ 21,000
Sewage Air/Vac Valve and Vault	3	EA	$ 3,300	$ 9,900
Traffic Control	1	LS	$ 305,298	$ 305,298
Lift Station for Collection System				
Smaller Lift Station	3	EA	$ 50,000	$ 150,000
Excavation and Pavement Restoration				
Jack & Bore w/ 20" Casing @ 100' / Jack & Bore	785	LF	$ 550	$ 431,750
Jack and Bore RR permit	4	LS	$ 1,100	$ 4,400
Asphalt R & R - 6' Wide Trench Patch (4"/8")	38570	SY	$ 53	$ 2,044,225
Dewatering	1	LS	$ 25,000	$ 25,000
Utility Relocations	1	LS	$ 100,000	$ 100,000
Hard Dig Contingency @ 1.5% of all buried pipe	868	LF	$ 200	$ 173,566
Services Connections (Included in Connection Costs Breakdown)				
Connect Services (New lateral to building)	823	EA	$ 2,000	$ 1,646,000
Backwater Valves	823	EA	$ 250	$ 205,750
Abandon Existing Cesspool/Septic Tank	823	EA	$ 2,000	$ 1,646,000
Yard Restoration	823	EA	$ 500	$ 411,500
ALTERNATIVE 2 CONSTRUCTION SUBTOTALS				**$ 11,410,798**
General Conditions, Bonding, Taxes				
Bonds & Insurance @ 2%	2%	LS	$ 228,216	$ 228,216
Taxes @ 5.3%	5%	LS	$ 604,772	$ 604,772
General Conditions @ 10%	10%	LS	$ 1,141,080	$ 1,141,080
Fee	10%	LS	$ 1,141,080	$ 1,141,080
GRAVITY TOTAL CONSTRUCTION COST				**$ 14,525,946**
Non-Construction Costs				
Land Acquisition, ROW, Easements				
Non-Frontage Easement Survey	42	EA	$ 1,500	$ 63,000
LS & Other Land & Acquisition ROW	1	LS	$ 250,000	$ 250,000
Obtain Non-Frontage ROW (title, escrow, appraisal, acquisition)	42	EA	$ 1,200	$ 50,400
Railroad Easement Coordination	4	EA	$ 10,000	$ 40,000
Railroad Easement Documentation	4	EA	$ 10,000	$ 40,000
Engineering - Permit Applications				
208 Amendment Application Process	1	LS	$ 40,000	$ 40,000
4.01 General Permit Application Process	1	LS	$ 45,000	$ 45,000
Permit Application Expenses	1	LS	$ 10,000	$ 10,000
ADEQ & County Permit Fees				
208 Amendment Application Fee	1	LS	$ 10,000	$ 10,000
4.01 General Permit Application Fee	1	LS	$ 25,000	$ 25,000
ADEQ Review Fees	1	LS	$ 25,000	$ 25,000
Engineering - Design Information Gathering				
Aerial Survey	1	LS	$ 27,000	$ 27,000
Design Survey Cost	1	LS	$ 152,500	$ 152,500
Underground Utilities Investigation	1	LS	$ 180,000	$ 180,000
Geotechnical Cost	1	LS	$ 135,000	$ 135,000
Engineering - Design Collection/LS & WRF				
Collection Design	331	SH	$ 3,500	$ 1,158,500
Service Connection Easement and Design	823	EA	$ 150	$ 123,450
Construction Bid Services	1	LS	$ 44,790	$ 44,790
Design Services Expenses	1	LS	$ 56,250	$ 56,250
Design Management, Scheduling, and Progress & Board Meetings	1	LS	$ 168,658	$ 168,658
Engineering - Construction Administration				
Materials & Testing	1	LS	$ 27,450	$ 27,450
Startup Commissioning	1	LS	$ 9,150	$ 9,150
RPR Construction Engineer	9	MO	$ 27,810	$ 237,493
Construction Inspector	9	MO	$ 20,857	$ 178,120
Project PM / EOR Monthly Meetings	10	EA	$ 3,000	$ 29,280
Special Inspection	1	LS	$ 15,250	$ 15,250
Services During Construction Expenses	1	LS	$ 61,000	$ 61,000
Post Construction Services	1	LS	$ 27,450	$ 27,450
Work at WRF As-Builts	1	LS	$ 5,795	$ 5,795
District GIS Mapping	1	LS	$ 24,400	$ 24,400
O&M Manuals Collection & Treatment	1	LS	$ 21,350	$ 21,350
ALTERNATIVE 1 NON-CONSTRUCTION SUBTOTALS				**$ 3,281,286**
Contingencies				**$ 2,343,000**
Construction Contingency	15%	LS	-	$ 2,178,892
Non-Construction Contingency	5%	LS	-	$ 164,064
GRAVITY TOTAL CONSTRUCTION & NON-CONSTRUCTION COST				**$ 20,150,188**

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Project Expenses - Base O&M Phase I 0.20 MGD TRSD Collection	Gravity Sewer	Step Sewer System
Description	**Totals**	**Totals**
ADMINISTRATION		
Salaries - Manager/Supervisor, Field Tech., Clerical*	$ 105,248	$ 105,248
Payroll Taxes Use 40% of Wages*	$ 18,061	$ 18,061
Medical/Dental/Disability/Life Insurance*	$ 1,670	$ 1,670
Workers Comp	$ 2,800	$ 2,800
Contract Services	16,000	$ 16,000
Property, Casualty, Liability	$ 2,800	$ 2,800
District Vehicles & Trucks Reserve	$ 3,000	$ 3,000
Truck Maintenance & Repairs	$ 3,000	$ 3,000
Accounting Services Billing Collection & Payroll	$ 7,000	$ 7,000
Audit Services	$ 4,000	$ 4,000
Legal Fees	$ 4,250	$ 4,250
Postage	$ 100	$ 100
Office Supplies	$ 150	$ 150
Bank Charges	$ 500	$ 500
Dues & Subscriptions	$ 225	$ 225
Custodial Supplies	$ 300	$ 300
Office equipment	$ 500	$ 500
Community - Public Relations	$ 350	$ 350
Travel	$ 700	$ 700
Conferences	$ 500	$ 500
Uniforms	$ 400	$ 400
Education/Training	$ 200	$ 200
Telephone and Fax	$ 425	$ 425
Cell Phones	$ 500	$ 500
Consultants and Professional Fees	$ 10,000	$ 10,000
COLLECTION		
Safety Equipment	$ 1,000	$ 1,000
Equipment Rental	$ 300	$ 300
Small Tools and Equipment	$ 750	$ 750
Special Supplies	$ 500	$ 500
PS Electrical	$ 1,200	$ 22,056
Fuel	$ 2,500	$ 2,500
Line Equip Main & Repair Parts	$ 3,000	$ 3,000
LS Equip Main & Repair Parts	$ 3,000	$ 3,000
Additional Contract Services for Step System	$ -	$ 10,000
Equipment Rentals	$ 1,000	$ 1,000
Annual line Camera & Flushing 20%	$ 4,500	$ 4,500
Total TRSD Annual Expenses	**$ 200,429**	**$ 231,285**

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SLAR Sewer System Evaluation	Anticipated Lifespan of short-lived asset (years)	Estimated Repair, Rehab, Replacement Expense in Today's $	Annual Reserve for Gravity Sewer System	Annual Reserve for Step Sewer System
Collection System and Lift Stations				
Step Systems Pumps (823)	10	$ 1,234,500	$ -	$ 123,450
Collection LS Pumps	15	$ 35,000	$ 2,333	$ -
Collection LS Motors	10	$ 10,000	$ 1,000	$ -
Pump Controls & Security	10	$ 10,000	$ 1,000	$ -
Valves	15	$ 10,000	$ 667	$ -
Emergency Generator	15	$ 15,000	$ 1,000	$ -
Collection System Annual SLA Reserve Required			$ 6,000	$ 123,450
Collection System Total SLA			**$ 120,000**	**$ 2,469,000**

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TRSD WRF Process PV Comparison

			SBR	EAAS	CSR	MBR
Life Cycle Period	20 Years					
OMB A-94 Real Interest Rate	0.50% Escalation Rate	0.00%	Note: Highlighted Cells - Fill in Values			
http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c						
A. Initial Cost (Capital Cost)						
1. Construction			$4,050,750	$3,313,125	$3,803,375	$2,495,120
2. Non-Construction w/Contingincies			$1,138,656	$1,117,394	$1,113,919	$983,093
		Total Initial Capital Costs	**$5,189,406**	**$4,430,519**	**$4,917,294**	**$3,478,213**
B. Operations and Maintenance (O&M)						
O&M (does not include debt or replacements-SLA)			$353,132	$358,116	$350,505	$370,224
		Total Annual Costs	$353,132	$358,116	$350,505	$370,224
		Present Worth Factor	18.9874	18.9874	18.9874	18.9874
		Present Worth of RECURRENT COSTS	**$6,705,000**	**$6,800,000**	**$6,655,000**	**$7,030,000**
C. Replacement Reserve - Short Lived Assets (SLA)						
		Years	20	20	20	20
Short Lived Assets (SLA)		Total Cost for Replacements/Repair	$473,667	$473,667	$473,667	$669,667
(use avg yearly SLA calculation w/o escalation)		Yearly Cost	$23,683	$23,683	$23,683	$33,483
		Present Worth Factor	18.9874	18.9874	18.9874	18.9874
		Present Worth of REPLACEMENTS	**$450,000**	**$450,000**	**$450,000**	**$636,000**
D. Salvage Value						
		Useful Life (years)	25	25	25	25
		Construction Cost - WWTF	$4,050,750	$3,313,125	$3,803,375	$2,495,120
		Salvage Value (assume straight-line of construction cost)	$810,150	$662,625	$760,675	$499,024
		TOTAL CONSTRUCTION COST	$4,050,750	$3,313,125	$3,803,375	$2,495,120
		TOTAL SALVAGE VALUE	$810,150	$662,625	$760,675	$499,024
		Present Worth Factor	0.9051	0.9051	0.9051	0.9051
		Present Worth of SALVAGE VALUE	**$733,000**	**$600,000**	**$688,000**	**$452,000**

LIFE CYCLE - PRESENT WORTH SUMMARY	SBR	EAAS	CSR	MBR
A. Capital Cost	$5,189,406	$4,430,519	$4,917,294	$3,478,213
B. Annual O&M (PRESENT WORTH)	$6,705,000	$6,800,000	$6,655,000	$7,030,000
C. Annual SLA (PRESENT WORTH)	$450,000	$450,000	$450,000	$636,000
D. Salvage Value (PRESENT WORTH)	$733,000	$600,000	$688,000	$452,000
G. TOTAL PRESENT WORTH COST (A+B+C-F)	**$11,611,406**	**$11,080,519**	**$11,334,294**	**$10,692,213**

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Wastewater Treatment SLAR	Anticipated Lifespan of short-lived asset (years)	Estimated Repair, Rehab, Replacement Expense in Today's $	Annual Reserve	Annual Reserve	Annual Reserve	Annual Reserve
Water Reclamation System			**SBR**	**EAAS**	**CRS**	**MBR**
Valves	15	$ 6,000	$ 400	$ 400	$ 400	$ 400
WRF Pumps	15	$ 60,000	$ 4,000	$ 4,000	$ 4,000	$ 4,000
WRF Motors,	10	$ 25,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Flow Meters	15	$ 6,000	$ 400	$ 400	$ 400	$ 400
Field & Process Inst Equip & Alarms	15	$ 12,000	$ 800	$ 800	$ 800	$ 800
Disk Filters	5	$ 10,000	$ 2,000	$ 2,000	$ 2,000	$ -
Membranes	10	$ 118,000	$ -	$ -	$ -	$ 11,800
Actuators	10	$ 7,500	$ 750	$ 750	$ 750	$ 750
Headworks Screening & Grit	5	$ 3,000	$ 600	$ 600	$ 600	$ 600
Emergency Generator	15	$ 65,000	$ 4,333	$ 4,333	$ 4,333	$ 4,333
Blowers	15	$ 75,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Aeration System	10	$ 25,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Chlorine Dosing System	15	$ 3,000	$ 200	$ 200	$ 200	$ 200
Dechlorination System	15	$ 3,000	$ 200	$ 200	$ 200	$ 200
Annual SLA Reserve Required			**$ 23,683**	**$ 23,683**	**$ 23,683**	**$ 33,483**
Total SLA			**$ 473,667**	**$ 473,667**	**$ 473,667**	**$ 669,667**

Attachment A

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O&M Estimate	SBR	EAAS	CRS	MBR
Admin/Office	$ 13,825	$ 13,825	$ 13,825	$ 13,825
Contract Services - Waste Treatment	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Engineering	$ 24,000	$ 24,000	$ 24,000	$ 24,000
Insurance	$ 3,500	$ 3,500	$ 3,500	$ 3,500
Legal	$ 4,250	$ 4,250	$ 4,250	$ 4,250
Other	$ 19,250	$ 19,250	$ 19,250	$ 19,250
Repairs/Maint	$ 47,971	$ 52,955	$ 46,725	$ 62,300
Salaries/Benefits	$ 159,724	$ 159,724	$ 159,724	$ 159,724
Supplies	$ 15,750	$ 15,750	$ 15,750	$ 15,750
Utilities	$ 24,863	$ 24,863	$ 23,481	$ 27,625
TOTAL	**$ 353,132**	**$ 358,116**	**$ 350,505**	**$ 370,224**

Attachment A

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Non-Construction Cost	SBR	EAAS	CSR	MBR
Non Construction Cost for WRF				
WRF Land and ROW Coordination (title, escrow, appraisal)	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Aquifer Protection Permit (APP) Application Process	$ 32,000	$ 32,000	$ 32,000	$ 32,000
Biosolids Management Plan Application Process	$ 22,500	$ 22,500	$ 22,500	$ 22,500
AZPDES Permit Application Process	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Permit Application Expenses	$ 7,500	$ 7,500	$ 7,500	$ 7,500
Aquifer Protection Permit (APP) Application Fee	$ 7,500	$ 7,500	$ 7,500	$ 7,500
Biosolids Management Plan Application Fee	$ 1,250	$ 1,250	$ 1,250	$ 1,250
AZPDES Permit Application Fee	$ 6,350	$ 6,350	$ 6,350	$ 6,350
ADEQ Review Fees	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Engineering - Design Information Gathering				
Aerial Survey	$ 4,500	$ 4,500	$ 4,500	$ 4,500
Design Survey Cost	$ 37,500	$ 37,500	$ 37,500	$ 37,500
Geotechnical Cost	$ 22,500	$ 22,500	$ 22,500	$ 22,500
Engineering - Design WRF				
USDA 500 yr Storm Analysis	$ 12,500	$ 12,500	$ 12,500	$ 12,500
TRSD WRF Design	$ 220,000	$ 270,000	$ 220,000	$ 220,000
Site Piping & Set Train	$ 8,305	$ 8,305	$ 8,305	$ 8,305
Design Services Expenses	$ 12,455	$ 12,455	$ 12,455	$ 12,455
Design Management, Scheduling, and Progress & Board Meetings	$ 33,212	$ 33,212	$ 33,212	$ 33,212
Engineering - Construction Administration				
Materials & Testing	$ 7,473	$ 7,473	$ 7,473	$ 7,473
Startup Commissioning	$ 8,305	$ 8,305	$ 8,305	$ 8,305
RPR Construction Engineer	$ 64,653	$ 64,653	$ 64,653	$ 64,653
Construction Inspector	$ 48,490	$ 48,490	$ 48,490	$ 48,490
Project PM / EOR Monthly Meetings	$ 7,971	$ 7,971	$ 7,971	$ 7,971
Special Inspection	$ 4,152	$ 4,152	$ 4,152	$ 4,152
Services During Construction Expenses	$ 16,606	$ 16,606	$ 16,606	$ 16,606
Post Construction Services	$ 7,473	$ 7,473	$ 7,473	$ 7,473
WRF As-Builts	$ 18,000	$ 18,000	$ 18,000	$ 18,000
District GIS Mapping	$ 6,642	$ 6,642	$ 6,642	$ 6,642
O&M Manuals Treatment	$ 5,812	$ 5,812	$ 5,812	$ 5,812
Subtotals Non-Construction	$ 698,649	$ 748,649	$ 698,649	$ 698,649
Construction Contingency @ 10%	$ 405,075	$ 331,313	$ 380,338	$ 249,512
Non Construction Contingency @5%	$ 34,932	$ 37,432	$ 34,932	$ 34,932
Grand Totals	**$ 1,138,656**	**$ 1,117,394**	**$ 1,113,919**	**$ 983,093**