# Central Arizona Association of Governments (CAG) 208 Areawide Water Quality Management Plan Town of Miami Defined Designated Management Area Boundary Miami, Arizona CAG 208 ID# 2019-1

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Prepared by CAG, February 2021

## 1.1 INTRODUCTION

### 1.2 Abstract

In accordance with Section 208 of the Clean Water Act (CWA), the Central Arizona Council of Governments (CAG) is designated as the Areawide Water Quality Management Planning Agency for Gila and Pinal Counties. The Town of Miami (Town) is requesting approval of this CAG 208 Water Quality Management Plan Amendment (CAG 208 Plan Amendment) for a clarification of its Designated Management Area (DMA) Boundary in coordination with the Tri- City Regional Sanitary District and the City of Globe. The Tri-City Sanitary District has ceded the area Miami has historically served within the District's boundary for many years to Miami's DMA.

The Town passed a resolution in 1978 to establish its corporate boundary as the Town's Designated Management Agency (DMA) Boundary. This CAG 208 Plan Amendment is to establish the DMA/Service Area boundary as encompassing the corporate Town of Miami and the unincorporated area it serves to the east of town that lies within the Tri-City Sanitary District boundary. The DMA and Service Area have the same boundary and Miami provides no service outside this defined area. See Appendix B figure 3 and Appendix C-1. The Planning Area is also defined as the DMA Boundary

Appendix A provides the 'CAG 208 Plan Amendment Checklist' summary of Plan Amendment application requirements and how they are addressed in this document.

CAG was requested to undertake the update and amending of the Miami 2010 208 Amendment to establish the definition of the Miami DMA Boundary and provide the proper documentation for submittal to the Arizona Department of Environmental Quality (ADEQ) and the Environmental Protection Agency (EPA) for official recognition of their DMA Boundary. This document is an amended version of the 2010 Amendment that was prepared and presented by $EMC^2$. CAG acknowledges their contribution to this document along with other contributors such as Freeport McMoRan Incorporated (FMMI) to make clear this is a composite document utilizing those contributors' previous work for the Town of Miami. The document has maintained the source identities of other contributors on the various charts, maps, and figures included in the document.

### 1.3 History of the Project

The Town's collection and treatment system has historically served a portion of the unincorporated area to the east of town since before 2000 Although the Pinal Sanitary District that held the DMA for the area had existed for some time it was not in a position to offer service to the area. While Miami was able to do so with the contribution of the treatment plant by Freeport McMoRan. Recently the Pinal Sanitary District and the Cobre Valley Sanitary District merged to create the Tri-City Regional Sanitary District (TRSD.) TRSD has received approval for U.S. Department of Agriculture Rural Development (USDA-RD) funding to build a wastewater collection and treatment system to serve the unincorporated area to the east of the Miami service area and west of the Globe service area.

## 2.1 PROJECT DESCRIPTION

### *2.1.1. Facility Ownership*

The proposed DMA boundary will include the entire Town of Miami and include the un-incorporated area to the east they have served since before 2000. A legal description of the DMA area is provided in Appendix C-1. The area is illustrated in Appendix B Figure 3. All the infrastructure serving the defined DMA/Service Area is owned and operated by the Town of Miami. The current collection system has been extensively improved through a USDA-RD funded project that was being completed in 2019 as this Amendment was submitted.

### *2.1.2. Facility Type*

The Wastewater Reclamation Facility (WRF) is an extended aeration (i.e., modified activated sludge process) facility with a design capacity of 640,000 gpd. A conceptual layout of the WRF extended aeration system components is presented in Appendix B - Figure 2. The system components include: headworks, anoxic and aeration chambers, clarifier, sludge holding tank, filtration and disinfection units. The sludge dewatering will be achieved using a skid mounted belt filter press with slurry feed pump, wash water pump, and polymer conditioning system.

### *2.1.3. Build-out Capacity*

The WRF was built in one phase and provides the design/build-out capacity of 640,000 gpd.

### *2.1.4 Service Area Size & DMA area*

The WRF serves areas that were previously being served by the existing wastewater collection and treatment system which includes the Town of Miami's incorporated area and the unincorporated area already being served to the east of the Town but within the boundary of the Tri-City Sanitary District, as shown in Appendix B – Figure 3 and described in the Legal Description in Appendix C-1.

## 2.2 Service Area Description

### *2.2.1 Location*

#### *A. Legal*

A legal description of the WRF site is provided in Appendix C-1.

#### *B. Designated Management Area*

As noted in Section 2.1.4, the DMA includes the Town of Miami's incorporated area and the unincorporated area already being served to the east of the Town that is within the Tri-City Sanitary District boundary, approximately 1.24 square miles total as shown in Appendix B – Figure 3 and described in the Legal Description in Appendix C-1.

### C. Neighboring Communities

The WRF is located in southern Gila County, Arizona. The municipalities and sanitary districts in the vicinity of the WRF are: the Town of Miami, the City of Globe (Globe), an unincorporated portion of Gila County (Claypool) and the Tri-City Regional Sanitary District, as shown on Appendix B - Figures 3 and 5.

### 2.2.2 Area of Service Area

As noted in Section 2.1.4, the service area for the WRF is approximately 1.24 square miles.

## 2.3 Make-up of Service Area

### 2.3.1 Number of Dwelling Units and Consumers Serviced at Build-out

According to the Arizona State Demographer Office at the Arizona Office of Economic Opportunity the 2019 population of the Town of Miami is 1,828 residents and 831 occupied dwelling units within the Town's current service area. Based on these data, the persons per dwelling unit is approximately 2.2. Using the Town's current utility records for residential and commercial services in the unincorporated area there are approximately 628 residential and 95 commercial properties.

Assuming a life expectancy of 30 years for the WRF beginning in 2010, the population projection for year 2040 is 1838. This estimate is based on the Arizona State Demographers' Population Projections. Based on the current 628 residential customers from the town of Miami's utility department there is an estimated 2.9 persons per dwelling. the number of dwelling units for year 2040 is estimated at 628. The Town is projecting 240 future commercial units for year 2040.

### 2.3.2 Land Use – Existing and Projected/Anticipated

### A. Residential, Commercial, etc.

The proposed service area includes approximately 87% residential and 13% commercial land uses based on the current utility records.

### B. Density

As noted in Section 2.1.4, the Town's existing service area includes approximately 1.24 square miles or 794 acres. The Town currently serves 628 dwelling units. The Town's Preliminary Comprehensive Land Use Plan shown in Appendix B – Figure 4 does not provide dwelling unit per acre (density) information for the Town. However, the majority of the Town's service area is single family residential. The density designation identified in the Gila County Comprehensive Plan (December 4, 2003) is used for the classification of the density for the Town. Based on the service area within the Town limit and the current dwelling unit count, the overall density within the Town limit is approximately 1.3. The Town has a small service area where the density is approximately 3.2 (32 homes on a 10-acre mobile home park).

The Gila County Comprehensive Plan identifies residential areas with 1.0-3.5 dwelling units per acre as low-density residential. Based on this classification, the

Town's residential area is mainly low-density residential.

As noted in Section 2.3.2 (A), the Town's service area includes approximately 95% residential and 5% commercial land uses. The commercial land uses include areas like Safeway, Wal-Mart, Miami High School, and Cobre Valley Hospital. A landuse map showing the residential and commercial areas is included in Appendix B – Figure 4.

***C. Ownership of Land***

The WRF service area will include approximately 0.92 square miles of area within the Town limit and approximately 0.32 square miles of existing service areas situated outside the Town limit, as shown in Appendix B - Figure 3.

The site of the WRF including the wastewater delivery system (i.e., forcemain, Pump Station, etc.) is within FMMI's property boundary. FMMI deeded the WRF site and granted necessary easements/rights-of-way to the Town in 2011.

### ***2.3.3 Population Projections***

Per the Arizona State Demographer's Office, the current population of the Town's is approximately 1828. The unincorporated area being served has 38 residential sewer customers calculated at the average household size of 3.0 persons is 114 residents. The combined areas total 1942 persons. According to the Arizona State Demographer's Office 2019-2039 Population Projections, the population for the Town for year 2039 is projected at approximately 1828 and assuming the unincorporated area show the same stability and remains 117 the total persons served will remain at 1945.

## 3.1 DESIGNATED MANAGEMENT AGENCY

## 3.2 Sewer Master Plan

### ***3.2.1 Description of 20-Year Master Plan Goals***

Currently, the Town does not have a formal comprehensive sewer master plan. However, the Town's three goals aligned with master planning objectives: planning for the repair and/or replacement of its existing collection system; closing of the antiquated existing wastewater treatment system; and construction of a new WRF have basically been accomplished.

### ***3.2.2 Collection, Treatment of Wastewater***

The Town has recently completed construction of a complete new collection system under a separate project with a USDA Grant and Loan funding agreement. The wastewater is already being treated using the extended aeration treatment system at the existing WRF brought online in 2011.

This CAG 208 Plan Amendment proposes a DMA boundary/Service Area that will serve those areas presently served by the Town. The existing service areas include the Town limits and a narrow corridor to the east of the Town limits as shown in Appendix B Fig~~ure~~ 3 - Service Area Map. According to Town representatives, there are no septic systems within the Town limits. It is not clear if the Town has legal authority to require septic systems situated outside the Town limits, but within the Town's existing service area, households shall tie into the sewer system. However, the Town has offered septic systems within the Town's service area, but situated outside the Town limits, the opportunity to tie to the Town's new WRF since the completion of its wastewater collection system upgrade project. The collection system upgrade is a recently completed project separate from the DMA/Service Area boundary subject of this CAG 208 Plan Amendment.

### *3.2.3 Plans for Disposal of/Use of Effluent*

The WRF treats the wastewater and generates effluent that meets Class A+ quality standards as outlined in Arizona Administrative Code (AAC) Title 18, Chapter 9 (AAC R18-9). As water conservation and riparian habitat enhancement measures, the effluent may be:

- Option 1: reused for public golf course irrigation; Option
- 2: reused in mining operations;
- Option 3: infiltrated to the alluvial aquifer using an infiltration basin; or
- Option 4: discharged through a permitted discharge point when other options are unavailable.

Options 1, 3 and 4 will reduce the volume of fresh water pumped to the mining operations, and Option 4 will contribute additional surface and subflow water to the alluvial system.

The effluent will is conveyed to the reuse system for golf course irrigation at the Cobre Valley Country Club (located directly across the Miami Wash, a waters of the U.S.), used for mining operations, or conveyed to an infiltration basin to the extent feasible. The reuse of the effluent will be regulated by ADEQ's Reuse Permit. One existing basin, referred to as North #1 Infiltration Basin, is being considered for the effluent infiltration, as shown in Appendix B Figure 1. Effluent is infiltrated to the alluvial aquifer in the North #1 Infiltration Basin with emergency releases from the basin to Miami Wash, a waters of the U.S. The basin is approximately 3.5 acres in size and has a total volume of approximately 8 MG. This volume provides enough capacity for one week of peak flow and a back-to-back 100 year, 24 hour stormflow.

The effluent is also piped to a permitted point of discharge in the Miami Wash, a waters of the U.S. through an Arizona Pollutant Discharge Elimination System (AZPDES) permit. The direct discharge would be required only if reuse and infiltration options are unavailable. Locations of the effluent uses are shown in Appendix B Figures 6 and 7. A flow chart showing effluent use alternatives including volumes is included as Appendix C-7.

### *3.2.4 Pre-treatment Program*

Title 40 of the Code of Federal Regulations (40 CFR) Part 403 requires a Publicly Owned Treatment Work (POTW) with a total design flow greater than 5.0 million gallons per day (MGD) that receive discharges from industrial users to establish a POTW pretreatment program. The WRF treats municipal waste only and does not include flows from any industrial facility. Additionally, the design capacity of the WRF is less than 5.0 MGD; therefore no pretreatment program is required for the WRF and is not subject to AAC R18-9 B204.

## 3.3 Legal Authority to Carry Out DMA

### *3.3.1 Self-Certification letter*

The Town has the authorities required by Section 208(c)(2) of the CWA to implement the plan for the proposed service area. A copy of the self-certification letter presenting this authority is provided in Appendix C-2.

### *3.3.2 Legal Description of DMA Boundary*

A copy of the legal description depicting the Town's revised DMA/Service Area is provided in Appendix C-3 and shown on Appendix B-Figure 3. The original resolution the Town passed using the town's corporate boundary to become a DMA is also included in Appendix C-3.

### *3.3.3 Projected Planning for Funding*

The Town will fund the operating costs for the WRF by a combination of any of the following:

- Current assets and operating budget
- User fees;
- Impact of hookup fees for developers;
- Levy taxes (Town sales and/or property taxes);
- Special assessments;
- Grant and loan packages;
- Grants; and/or
- Private financing

## *3.4 Administrative/Technical Competency to Carry out Plan*

### *3.4.4.1 Personnel Resources*

The Town is the applicant, owner and operator of the WRF. The facility is operated by the Utilities department.

### *3.4.2 Technical Ability*

EUSI as the contracted Operator of Record provides weekly oversight of facility operations and meetings with Town personnel. They provide qualified staff for operator consulting services, staff training for all phases of plant operations and maintenance as well as assisting the Town with ongoing sampling required by current permits. EUSI also assists with reporting to regulatory agencies, permit renewals and is available for emergencies.

## *3.5 Administrative/Technical Competency to Carry out Plan*

### *3.5.1 Personnel Resources*

The Town is the applicant, owner and operator of the existing WRF. FMMI is the community partner that provided technical support to the Town. CAG is the authorized agent, preparing this CAG 208 Plan Amendment.

### *3.5.2 Technical Ability*

During the final stage of construction, the Town was involved with FMMI in the WRF commissioning. Upon the completion of commissioning/construction of the WRF, FMMI transferred ownership and operation of the WRF including necessary easements/rights-of-way to the Town. The Town is the owner and operator of the WRF.

The WRF will be operated under the overall direction of the Town Mayor and the Town Administrator. The day-to-day operation and maintenance of the WRF will be headed by the Public Works Director. Based on the treatment technology and the population to be served (5,000 or fewer), the WRF would be considered a Grade 2 facility as outlined in AAC R18-5. The Town's operation team includes at least a Grade 2- certified operator and will operate and maintain the WRF for the Town.

The Town and CAG have prepared this CAG 208 Plan Amendment.

The technical expertise at FMMI spans a broad range of professions related to the mining and mineral extraction industry. FMMI employs a staff of qualified professionals in various technical groups enabling them to produce high grade copper. The technical groups at FMMI include the following:

- Technical Services; Environmental
- Affairs; Copper Products Division;
- and Copper Production Division.

FMMI professionals that provided technical assistance were educated in the disciplines of environmental management, environmental engineering, land acquisition, permit acquisition, and environmental protection. Mr. Jay Spehar was the Environmental and Land Manager in this group, providing leadership and direction for the project. Mr. Jon Quam, a professional Project Manager from FMMI, provided technical supervision for the engineering design, procurement, management and construction of the WRF to FMMI, the Town and $EMC^2$.

$EMC^2$ is a civil, environmental and construction management firm with over 20 years of extensive experience consulting, managing and coordinating various projects for mining, industrial and public clients. $EMC^2$ has offices in Phoenix, Arizona; Denver, Colorado; and Bozeman, Montana and employed 24 personnel that included the following:

- 9 Professional Engineers (PE) – Civil; and 5
- Engineers-in-Training (EIT) – Civil.

### *3.5.3 Availability of Equipment/Other Pertinent Resources to Implement*

FMMI in coordination with the Town arranged for the construction of the WRF. The Town will utilize existing staff to operate the WRF. The staff is licensed/certified as required for the operation of the WRF.

## 3.6 Political Accountability

### *3.6.1 Brief History*

The Town was incorporated in 1918. The Town began providing sewer services as early as 1920. Since that time, the Town has continued to expand and modernize its sewer system. The Town's existing wastewater treatment system was implemented in 1980 in coordination with Cyprus Miami Mining Corporation, a predecessor of FMMI.

The Town passed a resolution in 1978 to establish the Town's original DMA boundary to include the area within the Town limit. This CAG 208 Plan Amendment is proposing expansion of that boundary to include the unincorporated area east of Miami that they have been serving since before 2000.

### *3.6.2 Administration of DMA*

The Town's DMA will be administered by the Town Council. The Town Council consists of seven elected members of the community. The elections for selecting council members are held every two years.

## 3.7 Political Acceptability

### *3.7.1 Description of Nearby Municipalities and Sewer Service Providers*

The Miami wastewater system abuts the DMA and Service Boundary of the Tri-City Regional Sanitary District and the City of Globe wastewater system and DMA, both to the east and south of the Miami boundary.

#### *3.7.1.1 Municipalities*

The municipalities within a 5-mile radius of the WRF and the Miami DMA and Service Area boundary are: the City of Globe, and an unincorporated portion of Gila County (Claypool) as shown on Appendix B - Figure 5.

#### *3.7.1.2 Sewer Service Providers*

The Town, Tri-City Regional Sanitary District and City of Globe are the only entities that provide sewer services in the vicinity of the WRF. The Town serves no areas outside the Town DMA and Service Area boundary.

### *3.7.2 Provide Documentation that all Nearby Entities/Sewer Operators have Agreed/ Supported DMA Creation/Expansion*

Letters of support from Globe, Gila County and the Tri-City Regional Sanitary District are provided in Appendix C-5.

## 4.1 WASTEWATER CHARACTERIZATION

The wastewater flow collected and treated by the Miami system are primarily residential and commercial. No industrial flows are accepted into the Miami system.

## 4.2 Population

### *4.2.1 POPTAC figures*

According to the Arizona State Demographer's 2019 data reports there are 1,828 residents and using the 2017 US Census household average occupancy of 2.2 approximately 831 occupied dwelling units within the Town's limits. Plus the Miami Gardens and Gordon Street area of 45 Households The current commercial properties count of 211 units was obtained from the Town's Engineering Department.

### *4.2.2 Initial Population Serviced*

The WRF serves the current population of 1,828 residents.

### *4.2.3 Population at Build-Out*

Assuming a life expectancy of 30 years for the WRF, the future population projection for year 2040 is 2,132. This estimate is based on the 2006-2055 Arizona Commerce Gila Sub- County Population Projections. Based on the current persons per dwelling unit estimate of 2.2, the number of dwelling units is projected to be 830 in 2040. The Town is projecting 240 commercial units for year 2040.

### *4.2.4 Population Projections*

See Sections 4.1.1 through 4.1.3.

## 4.3 Wastewater Flows

### *4.3.1 Brief Explanation of Calculations*

EMC$^2$ obtained the Town's existing wastewater system's daily flow records from January 1998 through December 2008 from Town representatives to review capacities and peak flows. EMC$^2$'s detailed analysis of this data to determine the Town's average and peak wastewater flows are presented in Tables 1 and 2. The review of the two highest flow years (i.e. 2005 and 2008) show that the highest wet and dry weather peak flows are 638,110 gpd and 300,330 gpd, respectively. In order to handle these peak flows, the design capacity of the WRF was selected to be 640,000 gpd. That capacity provided approximately 94% more capacity over the Town's permitted capacity of 330,000 gpd at the time. The tables below reflect the towns flows after the construction of the WRF facility and the first few years of the new collection system operation.

| Table 1<br>Wastewater Flow Summary | | | | | |
|---|---|---|---|---|---|
| Year | Total Annual Wastewater Flow (gallons/year) | Average Wastewater Flow (gallons/day) | Peak Wastewater Flow (gallons/day) | Peak Wastewater Flow Date | Wastewater Missing Data Dates (1) |
| 2009 | N/A | N/A | N/A | N/A | None |
| 2010 | N/A | N/A | N/A | N/A | None |
| 2011 | 32,160,200 | 210,197 | 266,540 | 9/6/2011 | Jan-Jul[1] |
| 2012 | 79,045,930 | 215,972 | 349,300 | 9/28/2012 | None |
| 2013 | 85,541,900 | 234,361 | 496,000 | 3/8/2013 | None |
| 2014 | 57,042,552 | 156,281 | 445,690 | 3/27/2014 | None |
| 2015 | 58,898,410 | 161,366 | 412,000 | 2/4/2015 | None |
| 2016 | 54,939,000 | 150,107 | 383,000 | 1/9/2016 | None |
| 2017 | 58,412,900 | 160,035 | 444,000 | 1/24/2017 | None |
| 2018 | 46,868,250 | 128,406 | 371,000 | 1/4/2018 | None |
| 2019 | 49,128,000 | 134,597 | 294,000 | 2/14/2020 | April [2] |
| **2009-2019 Summary** | | **172,369** | **496,000** | **3/8/2013** | - |

**Note:**

1. Plant began operation at current location in August of 2011
2. Data simulated for missing month.

| Table 2<br>Wastewater Flow Summary - Highest Average/Peak Flow Records (1) | | | |
|---|---|---|---|
| Average Flow (gpd) | Continuous Occurrence (days) | Corresponding Dates | Flows (gpd) (2) |
| ***2013*** | | | |
| > 300,000 | 8 | Jan 29 - Feb 5 | ADF = 234,361<br>PDWF = 345,660<br>PWWF = 496000<br>MDWF = 132,100 |
| > 400,000 | 2 | Jan 29 -30 | |
| > 500,000 | 0 | - | |
| > 600,000 | 0 | - | |
| > 700,000 | 0 | - | |
| ***2014*** | | | |
| > 300,000 | 1 | Mar 27 - 28 | ADF = 156,281<br>PDWF = 287,600<br>PWWF = 445,690<br>MDWF = 95,805 |
| > 400,000 | 1 | Mar 27 - 28 | |
| > 500,000 | 0 | - | |
| > 600,000 | 0 | - | |
| > 700,000 | 0 | - | |

gpd = gallons/day; ADF = Average daily flow; PDWF = Peak dry weather flow; PWWF = Peak wet weather flow; MDWF = Minimum dry weather flow.

**Notes:**

1. Information for the two years with the highest average and peak flow based on the past 8 year records (identified in Table 1)

2.PDWF assumed to be May through December. PWWF assumed to be January through April. PDWF and PWWF month breakou ant located at the FMMI mine site.

#### 4.3.2 Flow Capacity at Build-Out

According to the Arizona State Demographer, there are 1,828 residents and 628 occupied dwelling units within the Town's current service area. The WRF was operational in year 2011. Assuming a life expectancy of 30 years for the WRF, the future population projection for year 2040 is 2,132. This estimate is based on the 2006-2055 Arizona Commerce Gila Sub-County Population Projections.

Using the highest annual average daily flow (279,598 gpd) and current population estimate (1,936) for 2008, the 2008 unit flow is 145 gallons per capita per day (gpcd). Using the 2040 projected population of 2,132 and the unit flow of 145 gpcd, the average daily flow at the 2040 population projection is 309,140 gpd. Applying a typically used peaking factor of 2.0, the peak flow in 2040 is projected to be 618,280 gpd. The design capacity (640,000 gpd) for the Town's WRF is significantly higher than this estimate. However, this projected 2040 capacity does not consider greater increase in future flow due to infiltration/inflow from further deterioration of the Town's existing collection system. The Town is currently working towards planning, designing and construction/repair of its existing collection system. With the construction/repair of its collection system, the inflow/infiltration in the collection system is expected to significantly reduce peak flows to average flow conditions at the WRF.

#### 4.3.3 Contingency for Peak Flows

Typically, wastewater treatment plants (WWTPs) are designed to meet the average daily flow. Based on the evaluation of the Town's existing flow records and to provide contingency to the wastewater treatment system, the WRF was designed to handle current peak flows on a continuous basis. Additionally, the design capacity of 640,000 gpd was approximately 94% more capacity over the Town's currently permitted capacity of 330,000 gpd for the existing wastewater treatment system at the time.

AAC R18-9 defines treatment facility design flow as the average daily flow over a calendar year calculated as the sum of all influent flows to the facility. As noted on Table 1, the average wastewater flow for the past 10 years is approximately 258,537 gpd. AAC R18-9 also requires reporting the facility's maximum day flow, defined as the greatest daily total flow that occurs over a 24-hour period within an annual cycle of flow variations. The greatest daily total flow over a 24-hour period on record is 638,110 gpd (2005). The design capacity of 640,000 gpd for the WRF exceeds both these criteria providing sufficient contingency for peak flows.

In addition to the contingency built into the WRF, a lined influent emergency holding pond was built to handle the potential for increased flow resulting from infiltration/inflow from further deterioration of the Town's existing collection system in 2011. The influent emergency holding pond is a temporary facility and will be discontinued from use once the Town construct/repairs its collection system.

The influent emergency holding pond is located south of the WRF site as shown in Appendix B - Figure 1 and is approximately 1 acre in size with an operating capacity of 1 MG.

This capacity provides approximately 1.5 days of peak flow or 4 days of average flow capacity. The wastewater flows from the existing Pump Station will be conveyed to the influent emergency holding pond via a pipe branch off the WRF forcemain. The collected flows will be treated at the WRF. The influent emergency holding pond is designed as a BADCT facility meeting the requirements of AAC R18-9.

#### *4.3.4 Flow Phasing*

As noted in Section 4.1.4, the WRF was built in one phase and provides the design capacity of 640,000 gpd at system start-up.

## 5.1 WASTEWATER RECLAMATION FACILITY

### 5.2 Reclamation Facility Description

#### *5.2.1 Type of Wastewater Reclamation Facility*

The WRF is an extended aeration (i.e., modified activated sludge process) facility with a design capacity of 640,000 gpd. A conceptual layout of this extended aeration system's components planned for the WRF is presented in Appendix B - Figure 2. The components includes: headworks, anoxic and aeration chambers, clarifier, sludge holding tank, filtration and disinfection units. Sludge dewatering is achieved using a skid mounted belt filter press with slurry feed pump, wash water pump, and polymer conditioning system.

#### *5.2.2 Location of WRF – Physical Address and/or Legal Description*

The WRF site is located in Section 16 of Township 1 North, Range 15 East of the Gila and Salt River Meridian, Gila County, Arizona as shown in Appendix B - Figure 1.

A legal description of the site is provided in Appendix C-1.

#### *5.2.3 Flow Rates*

$EMC^2$ obtained the Town's existing wastewater system's daily flow records from January 1998 through December 2008 from Town representatives to review capacities and peak flows. $EMC^2$'s detailed analysis of this data to determine the Town's average and peak wastewater flows are presented in Tables 1 and 2. The review of the two highest flow years (i.e. 2005 and 2008) show that the highest wet and dry weather peak flows are 638,110 gpd and 300,330 gpd, respectively. In order to handle these peak flows, the design capacity of the WRF is selected to be 640,000 gpd. This capacity provides approximately 94% more capacity over the Town's current permitted capacity of 330,000 gpd.

#### *5.2.4 Sewage accepted by WRF*

**A. *Type***

The WRF will treat municipal wastewater consisting of flows mainly from residential and commercial areas.

**B. *Projected Percentage of Amount Per Sewage Type***

The wastewater flow composition of the proposed service area includes approximately 95% residential and 5% commercial.

## 5.3 Sewage Collection System

### *5.3.1 Description of Sewer Works Infrastructure*

#### *A. Sewer Lines Flowing Into Plant*

The Town's wastewater flows are collected and conveyed by a network of sewer lines that ultimately deliver to the Pump Station.

#### *B. Lift Stations*

The existing Pump Station has three pump sets in parallel, with each pump set consisting of two pumps in series. Currently, one, two or all three pump sets are operated to obtain varying flows based on the wastewater flows conveyed to the Pump Station. Based on the review of the existing pump records and calculated flow rates, a maximum flow rate of 691,200 gpd can be obtained using existing pumps. This capacity exceeds the design capacity of the WRF. As a result, the WRF force main and pumping system are sized for the maximum flow rate of 691,200 gpd.

#### *C. Forcemains*

As noted in Section 5.2.1.C, the forcemain for the WRF is designed to deliver a maximum flow rate of 691,200 gpd from the existing Pump Station to the WRF. A 6-inch forcemain will be required to deliver this flow. This sizing was preliminary and was determined using guidelines outlined in AAC R18-9. The forcemain will be connected at the meter box located outside the existing Pump Station, as shown in Appendix B – Figure 6

#### *D. Any Setbacks or Easements that may be Needed to Create Infrastructure*

In accordance with AAC R18-9, the setback requirements for a new treatment facility with a design flow rate of 640,000 gpd is 750 feet assuming no installation of noise, odor and aesthetics controls. Setback distances are measured from the treatment and disposal components within the treatment plant to the nearest property line of an adjacent dwelling, workplace, or private property. The WRF and the surrounding properties are FMMI-owned; thus, no private property acquisition would be required. As shown on Appendix B – Figure 1, the nearest private property is located more than 1,700 feet to the east of the WRF.

#### *E. Other Items Pertinent to Infrastructure Issues*

The Town's current wastewater collection system was installed in the 1920s. In an attempt to repair and/or upgrade the existing antiquated wastewater collection system, the Town initiated mapping of the collection system including: videography of existing sewer mains and manholes; compilation of as-built drawings; and an updated count of sewer connections. The Town previously received a $35,000 Technical Assistance Grant from the Water Infrastructure Financing Authority (WIFA) to videograph the collection system. The Town recently completed videographing approximately 25,000 feet of sewer pipe within the Town's existing service area including under Highway 60. This videography concluded that the Town's collection system is 100 percent inadequate and imminently failing.

The Town's current finances limit their ability to repair/upgrade their deteriorated collection system. Hence, the Town in coordination with the City of Phoenix (City) is aggressively pursuing other options to fund the repair/upgrade of the collection system. These options include grant and loan packages. The Town, through the City, approached various agencies including WIFA and the United States Department of Agriculture for loans and grants to be used for design and construction of the collection system repair/upgrade.

Through the USDA Rural Development program the Town has completed a total rebuild of the sewer collection system to reduce leakage, storm infiltration and improve system collection efficiency including upgrading the lift station facility at Highway 60.

### *5.3.2 Treatment Process*

#### *A. Treatment type*

Three potential technologies were considered for the WRF: extended aeration, sequencing batch reactor, and membrane reactor. In order to evaluate these three technologies, various vendors representing one of these technologies and WWTP operators were contacted to document the real-time performance of these technologies. Criteria researched as part of this communication included the duration for which the technology has been established, operation ease and flexibility, footprint size required, ability to handle wastewater load fluctuations, operator training and qualifications, maintenance requirements, sludge yield and costs. The treatment technology information was taken from vendor brochures and fact sheets published by the United States Environmental Protection Agency (EPA).

Based on this evaluation, extended aeration was selected as the treatment technology. Extended aeration is a modification of the activated sludge process which provides biological treatment for the removal of biodegradable organic wastes under aerobic conditions. Mixing is performed and air is supplied to maintain contact between microbial organisms and dissolved organics and to provide oxygen to sustain the aerobic biological process. In addition, pH is controlled to optimize the biological process and the essential nutrients that must be present to facilitate biological growth and the continuation of biological degradation. Extended aeration systems require seed sludge, usually obtained from other similar wastewater treatment plants, to initiate the microbial treatment process.

Extended aeration systems are easy to operate, are a well established technology, and are efficient at handling organic loading and flow fluctuations. They have lower capital cost, are easy to install, are odor free and have lower sludge yields compared to other treatment technologies. However, extended aeration WWTPs have limited flexibility to adapt to changing effluent requirements and have longer aeration periods, which require more energy and longer treatment times compared to other treatment technologies. Since the WRF treats the wastewater to generate only the highest quality (Class A+) effluent, this will not be an issue.

#### *B. Treatment monitoring*

The WRF will meet monitoring requirements approved in the individual APP and AZPDES Permit for the WRF. These requirements are based on AAC R18-9 and AAC R18-11.

### *C. Odor Control*

Please refer to Section 5.2.1 D.

### *D. Stages in Processing*

A conceptual layout of the extended aeration system components planned for the WRF is presented in Appendix B - Figure 7. The components will include: headworks, anoxic and aeration chambers, clarifier, sludge holding tank, filtration and disinfection units.

### *E. Sludges Processing*

The sludge generated from the WRF will be dewatered using a skid mounted belt filter press with slurry feed pump, wash water pump, and polymer conditioning system. The sludge volume after the treatment process and the belt filter press will be approximately 14,342 gpd and 4,240 gpd, respectively.

The dewatered sludge from the belt filter press will meet the paint filter test required for acceptance at a municipal solid waste landfill. The dewatered sludge from the WRF is planned to be conveyed to the Russell Gulch landfill located approximately two miles from the WRF and operated by Gila County. Currently, the operating plan for the Russell Gulch landfill excludes the disposal of sewage sludge. However, Gila County is in the process of reviewing the operating plan to possibly include sewage sludge disposal. In the event the Russell Gulch landfill option is not viable, the sludge from the WRF could be transported and disposed of at the Apache Junction landfill located approximately 50 miles from the WRF. Gila County began accepting dewatered sludge in late 2020 at the Russel Gulch Landfill from the Miami facility for use in a composting process.

In the event the belt filter press is offline for repairs/maintenance, the dewatered sludge may be temporarily stored on onsite drying bed(s). The dried sludge may be used as biosolids for land application for reclamation projects or transported to the Russell Gulch or Apache Junction landfill upon meeting testing requirements as identified in 40 CFR Part 503 and AAC R18-9, Article 10. A flow chart showing sludge use alternatives is included in Appendix C-6.

Onsite drying bed(s) as shown in Appendix B - Figure 2 was preliminarily sized based on the sludge volumes provided by the WRF vendor and the guidelines outlined in ADEQ Engineering Bulletin No. 11.

### *F. Disinfection*

Chlorination will be used for the disinfection of the effluent. In the event the effluent is infiltrated through the permitted infiltration basin or discharged to the Miami Wash, a waters of the U.S., the effluent will be de-chlorinated. The effluent will not be de- chlorinated when it is reused for golf course irrigation or mining operations to maintain the required residual chlorine in the system.

### *G. Any Other Issues in the Treatment Process*

None.

### *5.3.3 Products*

#### *A. Effluent*

The WRF will treat the wastewater to generate effluent that will meet Class A+ quality standards as outlined in AAC R18-9.

#### *B. Sludge*

The dewatered sludge from the WRF is planned to be conveyed to the Russell Gulch landfill located approximately two miles from the WRF and operated by Gila County. Currently, the operating plan for the Russell Gulch landfill excludes the disposal of sewage sludge. However, Gila County is in the process of reviewing the operating plan to possibly include sewage sludge disposal. In the event the Russell Gulch landfill option is not viable, the sludge from the WRF could be transported and disposed of at the Apache Junction landfill located approximately 50 miles from the WRF. Gila County began accepting dewatered sludge in late 2020 at the Russel gulch Landfill from the Miami facility for use in a composting process.

In the event the belt filter press is offline for repairs/maintenance, the dewatered sludge may be temporarily stored on onsite drying bed(s). The dried sludge may be used as biosolids for land application for reclamation projects or transported to the Russell Gulch or Apache Junction landfill upon meeting testing requirements as identified in 40 CFR Part 503. A flow chart showing sludge use alternatives is included in Appendix C-6. Gila County began accepting dewatered sludge in late 2020 at the Russel gulch Landfill from the Miami facility for use in a composting process.

### *5.3.4 Effluent - Collection, Storage and Disposal*

The effluent generation rate from the WRF will be approximately equal to the incoming flow rate. It is not anticipated to store the effluent generated from the WRF onsite. The effluent will be conveyed to the reuse system for golf course irrigation at the Cobre Valley Country Club (located directly across the Miami Wash, a waters of the U.S.), used for mining operations, or infiltrated to North #1 Infiltration Basin to the extent feasible. The North #1 Infiltration Basin includes installation of an engineered hydraulic outlet structure that will be the permitted point of discharge in the Miami Wash, a waters of the United States, under an AZPDES permit. This location is shown in Appendix B - Figures 6 and 8. Effluent at the point exiting the chlorine disinfection unit is the effluent monitoring point for the WRF and is shown on Appendix B - Figure 6. The effluent quality at the effluent monitoring point will meet the Class A+ effluent quality requirements outlined in AAC R18-9. The reuse and infiltration of the effluent will be regulated by ADEQ’s Reuse Permit and APP, respectively, for the WRF.

The direct discharge would be required only if reuse and infiltration options are unavailable. Conceptual locations of the uses are shown in Appendix B - Figure 8. A flow chart showing effluent use alternatives including volumes is included in Appendix C-7.

### *5.3.5 Sludge - Collection, Storage and Disposal*

The dewatered sludge from the WRF is planned to be conveyed to the Russell Gulch landfill located approximately two miles from the WRF and operated by Gila County. Currently, the operating plan for the Russell Gulch landfill excludes the disposal of sewage sludge. However, Gila County is in the process of reviewing the operating plan to possibly include sewage sludge disposal. In the event the Russell Gulch landfill option is not viable, the sludge from the WRF could be transported and disposed of at the Apache Junction landfill located approximately 50 miles from the WRF. Correct notation for the state of the landfill regulations pertaining to the dewatered sludge disposal. Gila County began accepting dewatered sludge in late 2020 at the Russel gulch Landfill from the Miami facility for use in a composting process.

In the event the belt filter press is offline for repairs/maintenance, the dewatered sludge may be temporarily stored on onsite drying bed(s). The dried sludge may be used as biosolids for land application for reclamation projects or transported to the Russell Gulch or Apache Junction landfill upon meeting testing requirements as identified in 40 CFR Part 503. A flow chart showing sludge use alternatives is included in Appendix C-6. Gila County began accepting dewatered sludge in late 2020 at the Russel gulch Landfill from the Miami facility for use in a composting process.

## 5.4 Effluent Management

### *5.4.1 Discharge*

#### *A. Effluent Quality*

The WRF treats the wastewater to generate effluent that will meet Class A+ quality standards as outlined in AAC R18-9.

#### *B. Storage (e.g. Ponds, Vaults, etc.)*

See Section 5.3.4.

#### *C. Discharge Location(s)*

See Section 5.3.4.

#### *D. Discharge Permit Compliance*

See Section 5.3.4.

#### *E. Volume of Discharge*

The amount of effluent generated from the WRF will be approximately equal to the influent flow rate with the peak not exceeding 640,000 gpd.

#### *F. Schedule of Discharge (Constant Discharge vs. Seasonal Discharge)*

To the extent feasible, the effluent will be either reused or infiltrated. Direct discharge to the

Miami Wash, a waters of the U.S. will be used only if reuse and infiltration options are unavailable.

### 5.4.2 Reclamation/Reuse

#### *A. Reusability*

See Section 5.3.4.

#### *B. Reuse Applications (Agriculture, Landscaping, etc.)*

See Section 5.3.4.

#### *C. Water Reuse Permit Compliance*

See Section 5.3.4.

#### *D. Projected Reuse Flows*

The WRF effluent will first be utilized in reuse to augment or replace irrigation for the Cobre Valley Golf Course and to augment or replace the water supply for FMMI mining operations.

The Cobre Valley Golf Course is currently supplied fresh water from a ground source. Reuse of effluent will be used to augment or replace the irrigation requirements. The irrigation requirements vary throughout the year based on the season, ranging from approximately 30 gpm in the winter months to 210 gpm during peak summer months. Irrigation can accommodate the average WRF flow during summer months, and may be increased if the facility overseeds with year-round irrigation. As with reuse in mining activities, reuse for irrigation will allow for less pumping from natural systems.

FMMI requires water supplies to support various mining activities. For example, the smelter requires between 670 and 1,200 gallons per minute (gpm), averaging approximately 1,000 gpm (2008 data). The smelter alone can assume the full 445 gpm (640,000 gpd) complement of WRF effluent, which will allow for less stress on existing water supply wells that currently provide this water.

#### *E. Contingency for Surplus Effluent, Lack of Effluent for Viable Reuse*

The WRF effluent that is not reused as described in Section 5.3.4 will be infiltrated to the alluvial aquifer in the tributary drainages to Miami Wash, a waters of the U.S. Infiltration will be in an infiltration basin located in the tributaries north of the WRF site.

Direct discharge to Miami Wash, a waters of the U.S. will be used only if infiltration and reuse options are unavailable.

## 6.1 CONSTRUCTION

### 6.2 Construction Summary

As noted, FMMI in coordination with the Town constructed the WRF. The contractor responsible for construction activities was selected through a bid process upon the completion of the design for the WRF. It is anticipated that the construction was completed in the first quarter of 2010. The WRF was built in one phase and provides a capacity of 640,000 gpd. The Town operates and maintains the WRF and is responsible for permit compliance.
The Town of Miami has completed a total reconstruction of the sewer collection system and upgrades of other components of the system including the Highway 60 lift station using USDA Rural Development funding to resolve significant leakage, infiltration and other performance issues.

## 6.3 Phasing

### *6.3.1 Time Frame for Construction*

The WRF was built in one phase and the construction was completed in the first quarter of 2010.

### *6.3.2 Phasing Benchmarks*

See Section 6.2.1.

### *6.3.3 Phase Time Table*

See Section 6.2.1.

## 7.1 IMPACT

## 7.2 Environmental Impact

### *7.2.1 Known Water Quality Issues*

Pinal Creek Group (PCG), a consortium of mining companies, including FMMI, operates alluvial groundwater remediation facilities that are situated at various locations along Pinal Creek and its tributaries. PCG's facilities are designed to dewater the alluvial aquifer system for the purpose of capturing and treating the water for historic contaminants, including certain metals and acidity.

PCG's remediation facilities include two remedial well fields, an impermeable underground barrier wall and a water treatment plant as shown in a flow chart included in Appendix C-8. These facilities are situated both up and downstream from the WRF site and are operated under the oversight of ADEQ. The existence of PCG's remedial facilities made any policy preferences for recharge over discharge in the Pinal Creek drainage technically unsuitable. The entire alluvial system is dewatered downstream from the WRF. After treatment of contaminants, the water is then discharged, pursuant to the terms and conditions of an AZPDES permit, into Pinal Creek.

PCG operates the Kiser Basin well field at Miami Wash, a waters of the U.S. about 2,500 feet upstream from the WRF site. The purpose of the Kiser Basin well field is to create a hydrologic barrier by dewatering the alluvial aquifer of contaminated groundwater from Bloody Tanks Wash inflows, while allowing the relatively smaller and cleaner inflows from Russell Gulch to flank the hydrologic barrier on its easterly side, where it then becomes groundwater in the down gradient alluvial system. The Kiser

Basin well field produces from 15 capture wells yielding approximately between 500 gallons per minute (gpm) and 4,200 gpm, with 2,250 gpm being the average yield. Yields are dependent on precipitation cycles. The well field is designed to dewater the alluvial aquifer at saturated conditions. Remedial water pumped from the Kiser Basin well field is neutralized and utilized or managed in mining district operations.

About eight miles downstream from the WRF site, PCG has constructed an underground barrier wall across the Pinal Valley that is situated perpendicular to the Pinal Creek drainage. This underground barrier wall is essentially an impermeable underground dam that stops alluvial groundwater from entering the flow system of Lower Pinal Creek. The alluvial aquifer is dewatered by PCG's Lower Pinal Creek Well Field, which is situated immediately up gradient of the underground barrier wall. Sixteen capture wells yield approximately between 2,000 gpm and 6,500 gpm, with 4,100 gpm being the average yield. Yields are dependent on precipitation cycles. The well field is designed to dewater the alluvial aquifer at saturated conditions. The dewatered groundwater is then pumped to the Lower Pinal Creek Water Treatment Plant for treatment of various metals and acidity.

At the Lower Pinal Creek Water Treatment Plant, the contaminated water is subjected to a two- stage lime treatment process that results in the water meeting water quality discharge standards. After completing the treatment process, the water is piped to a location immediately down gradient of the underground barrier wall and is released to Pinal Creek at Outfall 001 in compliance with an AZPDES permit.

Because the aquifer into which the WRF would be discharged or infiltrated is truncated and subject to complete dewatering and discharge at a down gradient location, no preference should be made for infiltration over discharge. Such a preference would be technically unsuitable because of the location and functionality of the groundwater remediation system facilities in place, and such a preference would produce virtually no cost benefit. Moreover, federal regulations provide for permitted discharges and discharge is a permissible activity in the State of Arizona.

As part of the APP application for the WRF, a white paper outlining the regional geology and hydrogeology in the vicinity of the WRF was developed by Golder Associates, Inc. This document is provided as Appendix C-9. No water quality problems are anticipated for the WRF. Effluent generated by the WRF will produce Class A+ effluent meeting the requirements outlined in AAC R18-9.

#### *7.2.2 Point Source Pollution*

The products (i.e., effluent and sludge) generated from the WRF will not result in point source pollution as the effluent and sludge management outlined for the WRF will meet the requirements set forth by the regulating authorities like ADEQ.

#### *7.2.3 Non-Point Source Pollution*

There are no non-point issues related to the WRF. The WRF site will be protected from stormwater runoff with proper site grading. Stormwater originating onsite will be routed to stormwater impoundments located south of the WRF.

#### *7.2.4 Soil Erosion*

The construction and implementation of the WRF will not increase soil erosion. Sediment erosion control methods were implemented during the construction of the WRF. These methods are part of the Stormwater Pollution Prevention Plan (SWPPP) developed for the WRF.

#### *7.2.5 Air Quality*

Construction of the WRF and effluent forcemain will not be a pollution intensive activity. Anticipated pollutants may include dust from construction activities, construction related solid waste, and disposal of inert materials. Mitigation measures will include erosion control structures and construction site monitoring for dust control. New construction will be conducted under the AZPDES Permit issued by ADEQ.

### 7.3 Community Impacts

#### *7.3.1 Service/Infrastructure*

The WRF will service the areas that are currently served by the existing wastewater treatment system. The prior existing wastewater treatment system was decommissioned in accordance with AAC R18-9.

No modification to the existing collection system was made for the implementation of the WRF. In order to deliver the design flow from the existing Pump House to the WRF, a 6-inch forcemain will be required. The sizing was determined using guidelines outlined in AAC R18-9. The forcemain will be connected at the meter box located outside the existing Pump Station as shown in Appendix B - Figure 6.

#### *7.3.2 Residential/Commercial*

The implementation of the WRF was not anticipated to have any impact on adjacent residential or commercial areas. The effluent reuse, infiltration or discharge is not anticipated to increase odor or vector concerns. Setback requirements set forth by ADEQ for these uses from the nearest private property are maintained for the WRF. The construction of the WRF has received strong community support as demonstrated by support letters from neighboring communities/organizations in Appendix C-5.

#### *7.3.3 Economic*

Since the WRF will be provides approximately 94% more capacity than the Town's currently permitted capacity for the existing wastewater treatment system, the implementation of the WRF allowed the Town to handle excess flow that may occur due to the inflow/infiltration into the existing collection system and possible growth of the service area upon repairing the current collection system.

The generation of Class A+ effluent from the WRF provides an opportunity to use the effluent for beneficial uses likes reuse and infiltration.

### 7.4 Water-Based Recreation

#### *7.4.1 Recreational Uses*

The products of the WRF were not anticipated to create any new water-based recreational uses.

However, the reuse of the effluent for the irrigation of the Cobre Valley Golf Course provides recreational use for the community, replaces the dependency on the current groundwater source for irrigation and may support expansion of the golf course. Additionally, riparian habitat for wildlife may be created/supported if effluent discharges are adequate.

### *7.4.2 Access or Improvement to Water-Based Recreation*

The Cobre Valley Golf Course and Country Club are accessible to the public. As noted in Section 7.3.1, the WRF did not anticipate creation of any new water-based recreational uses hence access or improvement to water-based recreation is not applicable for the WRF.

### *7.4.3 Change in Land Use Due to Water-Based Recreation*

In the event of the expansion of the Cobre Valley Golf Course, the existing pasture/grazing area in the vicinity of the golf course will be converted to a recreation area. Since the implementation of the WRF did not anticipate creation of any new water-based recreation, a change in the land use due to water-based recreation is not anticipated with implementation of the WRF.

## 8.1 PERMITS

In addition to this CAG 208 Plan Amendment, the permits summarized below were obtained by $EMC^2$ on behalf of the Town and FMMI for the design, construction, and operation of the WRF.

## 8.2 Air Quality Permit

The diesel driven back-up generator to be installed at the WRF site required an Air Quality permit from ADEQ. The permit is governed by AAC R18-2, Article 3. On behalf of the Town, FMMI submitted the Air Quality Control General Permit for the stand-by generator for this WRF to ADEQ for review and approval on September 2, 2009.

## 8.3 Aquifer Protection Permit

Permitting required for the construction of a WRF includes an individual APP. The requirements of the individual APP are outlined in AAC R18-9. The goals of the APP are to demonstrate that the WRF is designed, constructed and operated to achieve the greatest degree of discharge pollutant reduction; and to prevent violations of Aquifer Water Quality Standards and Reuse Permit standards. On behalf of the Town, FMMI submitted the individual APP for the WRF to ADEQ, that No. is P-106156

## 8.4 AZPDES Discharge Permit

An AZPDES Permit was obtained from ADEQ for potential discharges of treated effluent to adjacent surface waters when the reuse and infiltration options are unavailable. The AZPDES Permit is No. AZ0025909

## 8.5 AZPDES Stormwater Pollution Prevention Plan

FMMI submitted the Notice of Intent for the AZPDES Construction General Permit (CGP) to ADEQ on August 6, 2009 for the WRF construction activities. The contractor for the facilities will be responsible to abide by the CGP and applicable SWPPP to manage the discharge of pollutants in stormwater runoff from construction activities. The contractor for the facilities will be responsible to abide by the AZPDES Permit regulations relevant to construction sites to prevent the contamination of surface water and groundwater. All hazardous materials and potential pollutants will be stored onsite in appropriate storage areas constructed to contain any spills or runoff of hazardous materials. Onsite retention basins, silt traps and other sediment barriers are to be provided at the site as needed to filter sediment from stormwater runoff.

### 8.6 Local Floodplain and Drainage Regulations

The WRF is located outside of the flood hazard boundary and thus a Floodplain Permit will not be required for the WRF.

### 8.7 Reuse Permit

The WRF will treat the wastewater to generate effluent that will meet Class A+ quality standards as outlined in AAC R18-11. This effluent is to be reused for mining operations, golf course irrigation and/or infiltrated. The Reuse Permit issued by ADEQ will allow the reuse of the Class A+ quality effluent.

## 9.0 FINANCE INFORMATION

The closure and post-closure of the prior existing wastewater treatment system and the design and construction of the WRF were performed by FMMI. Upon construction completion, the Town will own and operate the WRF.

The Town's detailed budget for existing sewer operations, including forecast/projection of future operations and a letter signed by the chief financial officer of the Town, included in Appendix C- 4 provides documentation of the Town's financial capability to operate and maintain the WRF.

## 10.1 REFERENCES

Arizona Administrative Code. September 2005. Title 18, Chapters 8 through 14.

Arizona Department of Commerce. 2006-2055 Gila Sub-County Projections.

Arizona Department of Environmental Quality. July 2001. Town of Miami Wastewater Treatment Plant Aquifer Protection Permit, Permit No. P-100814.

Arizona Department of Environmental Quality. 1978. Minimum Requirement for Design, Submission of Plans and Specifications of Sewage Works, Engineering Bulletin No.11.

Arizona Department of Water Resources. Underground Storage Facility Permit. Central

Arizona Association of Governments Residential Reports. July 2008. Code of Federal

Regulations. July 2003. Title 40, Parts 503 and 430.8.

Golder Associates, Inc. May 2009. Geology and Hydrogeology of the Site for Wastewater Reclamation Facility.

United States Census 2000.

United States Environmental Protection Agency. September 2000. Wastewater Technology Fact Sheet Package Plants.

United States Environmental Protection Agency. September 1999. Wastewater Technology Fact Sheet Sequencing Batch Reactor.

# APPENDIX A

# 208 CHECKLIST

## CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN
## MIAMI WASTEWATER RECLAMATION FACILITY – TOWN OF MIAMI, ARIZONA

## CAG 208 PLAN AMENDMENT CHECKLIST

The Central Arizona Association of Governments (CAG) 208 Plan Amendment checklist (Section 208 of the Clean Water Act (40 CFR Part 130.6)) on the following pages provides a summary of the amendment application requirement and how those issues are addressed within this document.

| ITEM | REQUIREMENT | PROVIDE BRIEF SUMMARY OF HOW REQUIREMENTS ARE ADDRESSED | ADDRESSED ON PAGE: |
|---|---|---|---|
| 1 | **AUTHORITY**<br>Proposed Designated Management Agency (DMA) shall self certify that it has authorities required by Section 208(c) (2) of the Clean Water Act (CWA) to implement the plan for its proposed planning and service areas. Self-certification shall be in the form of a legal opinion by the DMA or entity attorney. | Town of Miami (Town) self-certifies that it has the authorities required by Section 208(c)(2) of the CWA to implement the plan for the proposed planning and services area. | Page 6<br>(Section 2.3.1. and Appendix C-2 ) |
| 2 | **20-YEAR NEEDS**<br>*{Clearly describe the existing wastewater treatment (WWT) facilities}* | Currently, the Town does not have a formal comprehensive sewer master plan. However, the Town is working towards three goals aligned with master planning objectives: planning for the repair and/or replacement of its existing collection system; closing of the antiquated existing wastewater treatment system; and construction of a new wastewater reclamation facility (WRF). The Town is currently obtaining grants to map the existing collection system and will ultimately develop a master plan that will identify the Town's master plan goals in detail.<br>The Town will continue to use the existing network of gravity sewers to collect wastewater and ultimately discharge it to the existing Pump Station shown in Appendix B - Figure 1. The existing wastewater treatment system is also shown in this figure. | Page 5<br>(Sections 3.1.1 and 3.1.2)<br>(Appendix B - Figure 1) |
| 3 | Show WWT certified and services areas for private utilities and sanitary district boundaries if appropriate. | Refer to Appendix B - Figure 3 for the service area map of the Town and adjacent municipality and sanitary districts in the vicinity of the WRF. | Page 3<br>(Section 2.2.1.D) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

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| **4** | *{Clearly describe alternatives and the recommended WWT plan:}*<br><br>Provide POPTAC population estimates (or CAG-approved estimates only where POPTAC not available) over 20-year period. | According to the Arizona State Demographer's Office data, there are 1,828 residents and 1032 occupied dwelling units within the Town's current service area. Based on 2017 Census estimates, the persons per dwelling unit is approximately 2.2. The current commercial properties count of 211 units was obtained from the Town's Engineering Department.<br><br>Assuming a life expectancy of 30 years for the WRF, the Arizona State Demographer's population projection for year 2039 is 1,828. | Page 3<br><br>(Section 2.3.1) |
| **5** | Provide wastewater flow estimates over the 20-year planning period. 2020-2039 | The WRF was designed based on the review of the Town's existing wastewater flow records from January 1998 through December 2008. The review of the two highest flow years (i.e. 2005 and 2008) show that the highest wet and dry weather peak flows is 638,110 gallons per day (gpd) and 300,330 gpd, respectively. In order to handle these peak flows, the design capacity of the WRF is selected to be 640,000 gpd. This capacity provides approximately 94% more capacity over the Town's current permitted capacity of 330,000 gpd.<br><br>Using the highest annual average daily flow (279,598 gpd) and population (1,936) for 2008, the unit flow is 145 gallons per capita per day (gpcd). Using the 2040 build-out projected population of 2,132 and the unit flow of 145 gpcd, the average daily flow at build-out is 309,140 gpd. Applying a typically used peaking factor of 2.0, the peak flow at build-out is 618,280 gpd. The design capacity (640,000 gpd) for the Town's WRF is significantly higher than this estimate. However, this projected build-out | Pages 10 and 12<br><br>(Sections 4.2.1 and 4.2.2) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

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| | | capacity does not consider for greater increase in flow due to infiltration/inflow from deterioration of the Town's existing collection system. | |
| **6** | Illustrate the WWT planning and service areas. | The WRF serves areas that have historically been served by the Miami wastewater treatment system. The 1.24 square mile service area includes approximately 0.92 square miles of area within the Town limit and approximately 0.32 square miles of areas outside the Town limit, as shown in Appendix B - Figure 3. | Appendix B – Figure 3<br>Page 3<br>(Section 2.2) |
| **7** | Describe the type and capacity of the recommended WWT Plant. | The WRF is an extended aeration (i.e., modified activated sludge process) facility with a design capacity of 640,000 gpd. | Page 2<br>(Section 2.1.2) |
| **8** | If applicable, identify any known water quality problems and explain how the plan addresses them, consider alternative control measures, and recommend solution for implementation. | No water quality problems were anticipated for the WRF. Effluent generated by the WRF will produce Class A+ quality meeting the requirements outlined in the Arizona Administrative Code Title 18, Chapter 9 (AAC R18-9). | Page 21<br>(Section 7.1.1) |
| **9** | If private WWT utilities with certificated areas are within the proposed regional service area, define who (municipal or private utility) serves what area and when. Identify whose sewer lines can be approved in what areas and when? | There are no private wastewater facilities within the Town's proposed DMA/Service Area boundary.<br>The Town, Tri-City Regional Sanitiary District and the City of Globe (Globe) are the only entities that provide sewer services in the vicinity of the WRF. The Town serves areas outside the Town limit that are within the Designated Management Area (DMA) boundary. | Page 9<br>(Section 3.6.1.2) |
| **10** | Describe method of effluent disposal and reuse sites (if appropriate). | The effluent is conveyed to the reuse system for golf course irrigation at the Cobre Valley Country Club (located directly across the Miami Wash, a waters of the U.S.) or mining operations, or infiltrated to the alluvial aquifer using an infiltration basin to the extent feasible. The reuse and infiltration of the effluent is regulated by the Arizona Department of Environ- | Page 18<br>(Section 5.2.4, Appendix B - Figure 8 and Appendix C-7) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

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| | | mental Quality's (ADEQ) Reuse Permit and the Aquifer Protection Permit (APP) respectively.<br><br>The effluent will also be piped for discharge to a permitted point of discharge in the Miami Wash, a waters of the United States, through an Arizona Pollutant Discharge Elimination System (AZPDES) permit. (Permit #?) The direct discharge to Miami Wash, a waters of the U.S., would be required only if reuse and infiltration options are unavailable. | |
| **11** | If Sanitary Districts are within a proposed planning or service area, describe who serves the Sanitary Districts and when. | There are no Sanitary Districts within the Town DMA/Service Area boundary. As shown in Appendix B - Figure 3, service areas for Tri-City Regional Sanitary District<br><br>and the City of Globe are adjacent to Miami's DMA/Service Area boundary and they do not provide sewer service within the Miami DMA/Service Area boundary | Page 9<br><br>(Section 3.6.1.2) |
| **12** | Describe ownership of land proposed for plant sites and reuse areas. | The site for the WRF including the wastewater delivery system (i.e., forcemain, Pump Station, etc.) was within Freeport-McMoRan Miami Inc.'s (FMMI) property boundary. FMMI deeded the WRF site and granted necessary easements/ rights-of-way to the Town. | Page 4<br><br>(Section 2.3.2.C) |
| **13** | Address time frames in the development of the treatment works. | The WRF will be built in one phase and the construction is anticipated to be completed in the first quarter of 2010. | Page 21<br><br>(Section 6.2) |
| **14** | Address financial constraints in the development of the treatment works. | FMMI provided financing for construction of the WRF. No other financial constraints were involved in the development of the WRF. | Pages 7 and 25<br><br>(Sections 3.3.1 and 3.3.2 and 9.0) |
| **15** | Describe how discharges will comply with Environmental Protection Agency (EPA) municipal and industrial stormwater discharge regulations (Section 405, CWA). | All stormwater will be diverted away from the WRF. Stormwater originating onsite will be routed to stormwater impoundments located south of the WRF. The new construction was conducted under the AZPDES Permit issued by ADEQ. | Pages 22 and 23<br><br>(Section 7.1.3 and 7.1.5) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

| | | | |
|---|---|---|---|
| **16** | Describe how open areas & recreational opportunities will result from improved water quality and how those will be used. | The effluent is conveyed to the reuse system for golf course irrigation at the Cobre Valley Country Club or mining operations, or infiltrated to an infiltration basin to the extent feasible. The reuse of the effluent for golf course irrigation and mining operations will replace the dependency on irrigation water from groundwater wells. | Pages 18<br>(Sections 5.2.4) |
| **17** | Describe potential use of lands associated with treatment works and increased access to water-based recreation, if applicable. | The land associated with the WRF is dedicated specifically to the WRF. The products of the WRF are not anticipated to create any new water-based recreational uses. | Pages 24<br>(Sections 7.3.1) |
| **18** | **<u>REGULATIONS</u>**<br>Describe types of permits needed, including National Pollutant Discharge Elimination System (NPDES), Aquifer Protection Permit (APP) and reuse. | The construction and implementation of the WRF required CAG 208 Plan Amendment (#2010-1, Approved Feb. 2010), Individual APP, Reuse, AZPDES Discharge and Air Quality permits. An AZPDES Construction General Permit will be applied for construction purposes. | Page 24<br>(Section 8.0)<br>Permit #s? |
| **19** | Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal. | The direct discharge will be required only if reuse and infiltration options are unavailable. The effluent will be piped for discharge to a permitted point of discharge in the Miami Wash, a waters of the U.S., through an AZPDES permit. (Permit #) | Page 18<br>(Section 5.2.4) |
| **20** | Provide documentation of communication with ADEQ Permitting Section 30 to 60 days prior to public hearing regarding the need for specific permits. | In the event the ADEQ Permitting Section requests permits additional to the ones listed in Section 8.0, documentation requiring these permits will be provided 30 to 60 days prior to a public hearing. | Page 24<br>(Section 8.0) |
| **21** | Describe pretreatment requirements and method of adherence to requirements (Section 208 (b)(2)(D), CWA). | Title 40 of the Code of Federal Regulations (CFR) Part 403.8 requires a Publicly Owned Treatment Work (POTW) with a total design flow greater than 5.0 million gallons per day (MGD) and that receive discharge from industrial users to establish a POTW pretreatment program. The WRF will treat municipal waste and will not include flows from any industrial facility. Additionally, the design capacity of the | Page 6<br>(Section 3.1.4) |

| | | | |
|---|---|---|---|
| | | WRF is less than 5.0 MGD, therefore no pre-treatment program is required for the WRF. | |
| **22** | Identify, if appropriate, specific pollutants that will be produced from excavations and procedures that will protect ground and surface water quality (Section 208(b)(2)(K) and Section 304, CWA). | Sediment erosion control methods were implemented during the construction of the WRF. These methods are part of the SWPPP developed for the WRF. | Page 23<br>(Section 7.1.4) |
| **23** | Describe alternatives and recommendation in the disposition of sludge generated. (Section 405 CWA). | The dewatered sludge from the belt filter press meets the paint filter test required for acceptance at a municipal solid waste landfill. The dewatered sludge from the WRF is conveyed to the Russell Gulch landfill located approximately two miles from the WRF and operated by Gila County. Currently, the operating plan for the Russell Gulch landfill excludes the disposal of sewage sludge. However, Gila County is in the process of reviewing the operating plan to possibly include sewage sludge disposal. In the event the Russell Gulch landfill option is not viable, the sludge from the WRF could be transported and disposed of at the Apache Junction landfill located approximately 50 miles from the WRF.<br>In the event the belt filter press is offline for repairs/maintenance, the dewatered sludge may be temporarily stored on onsite drying bed(s). The dried sludge may be used as biosolids for land application for reclamation projects or transported to the Russell Gulch or Apache Junction landfill upon meeting testing requirements as identified in 40 CFR Part 503. | Page 16<br>(Section 5.2.2.E) |
| **24** | Define any non-point issues related to the proposed facility and outline procedures to control them. | There are no non-point issues related to the WRF. The WRF site is protected from stormwater runoff with proper site grading. | Page 22<br>(Section 7.1.3) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

| | | | |
|---|---|---|---|
| **25** | Describe process to handle all mining runoff, orphan sites and underground pollutants, if applicable. | Runoff from the adjacent FMMI property will be controlled and not affect the operation of the WRF. | Not applicable |
| **26** | If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas. | The W R F project, while initiated in part by FMMI, is not mining industry related, rather provides domestic sewer service for the Town. The facility is not affected by nearby mining operations. | Not applicable |
| **27** | If mining related, define what specialized procedures will be initiated for orphan sites, if applicable. | The WRF project, while initiated in part by FMMI, is not mining industry related, rather provides domestic sewer service for the Town. The facility is not affected by nearby mining operations. | Not applicable |
| **28** | **CONSTRUCTI ON**<br>Define construction priorities and time schedules for initiation and completion. | The construction of the WRF was completed in the first quarter of 2010. The WRF was built in one phase and provides a capacity of 640,000 gpd. | Page 20<br>(Section 6.1) |
| **29** | Identify agencies that will construct, operate and maintain the facilities and otherwise carry out the plan. | The Town is a DMA and is responsible for the operation and maintenance of the WRF. | Page 20<br>(Section 6.1) |
| **30** | Identify construction activity-related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources. | Construction of the WRF and effluent forcemain was not a pollution intensive activity. Anticipated pollutants may include dust from construction activities, construction related solid waste, and disposal of inert materials. New construction was conducted under an AZPDES Permit issued by ADEQ. Mitigation measures included erosion control structures and construction site monitoring for dust control. Any wastes produced during construction will be properly managed and disposed of at an appropriate facility. | Page 23<br>(Sections 7.1.4 and 7.1.5) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

| | | | |
|---|---|---|---|
| 31 | **FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN**<br>If the plan proposes to take over certificated private utility, describe how, when and financing will be managed. | The Town will not take over any certificated private utilities.<br>The Town's DMA/Service Area boundary includes areas outside the Town limit. The Tri-City Regional Sanitary District and the City of Globe have service areas adjacent to Miami's DMA/Service Area boundary but neither provide sewer service within the Miami Service Area. | Page 9<br>(Section 3.6.1.2) |
| 32 | Describe any significant measures necessary to carry out the plan, e.g., institutional, financial, economic, etc. | There are no significant measures necessary to carry out the plan. There are no financial or economic limitations.<br>Construction was financed by FMMI, with maintenance and operation financed by the Town. | Page 7<br>(Section 3.3) |
| 33 | Describe proposed method(s) of community financing. | The methods of financing include a combination of user fees, levy taxes (i.e., city sales, property taxes etc.) and grants and loan package. | Page 7<br>(Section 3.3) |
| 34 | Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life. | A letter signed by the chief financial officer of the Town stating the Town's financial capability is included in Appendix C-4.<br>Additionally, the Town's detailed budget for existing sewer operations and a forecast/ projection of future operations including the Town's Capital Improvement Plan is included in Appendix C-4. | Pages 7 and 25<br>(Sections 3.3 and 9.0 and Appendix C-4) |
| 35 | Provide a time line outlining period necessary for carrying out plan implementation. | The WRF was operational in the first quarter of 2010 and serves areas currently served by the existing wastewater treatment system. | Page 20<br>(Section 6.1) |
| 36 | Provide financial information indicating the method and measures necessary to achieve project financing (Section 201 CWA or Section 604 may apply). | The Town owns and operates the WRF. A letter signed by the chief financial officer of the Town stating the Town's financial capability is included in Appendix C-4.<br>Additionally, the Town's detailed budget for existing sewer operations and a forecast/ | Page 7 and 25 (Sections 3.3 and 9.0 & Appendix C-4) |

## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

| | | | |
|---|---|---|---|
| | | projection of future operations including the Town's Capital Improvement Plan is included in Appendix C-4. | |
| **37** | **IMPLEMENTABILITY**<br>*Describe impacts and implementability of Plan:*<br>Describe impacts on existing wastewater (WW) facilities, e.g., Sanitary district, infra-structure/facilities and certifi-cated areas. | The Town owns and operates the WRF.<br>The WRF serves the areas that are currently served by the existing wastewater treatment system. No modifications to the existing collection system was made for the implementation of the WRF.<br>Service areas of the TRSD are adjacent to the WRF. However, the Sanitary District currently does not provide wastewater services in these service areas. Hence, the construction of the WRF will not impact any existing wastewater facilities. | Pages 9 and 23<br>(Section 3.6.1.2 and 7.2.1) |
| **38** | Describe how and when existing package plants will be connected to a regional system. | The WRF serves the areas that are currently served by the existing wastewater treatment system. Upon the construction of the WRF, the prior existing wastewater treatment system was decommissioned in accordance with AAC R18-9.<br>No modification to the existing collection system was made for the implementation of the WRF.<br>According to Town representatives, there are no septic systems within the Town limits. Whether the Town has legal authority to require septic systems situated outside the Town limits, but within the Town's existing service area, to tie into the sewer system is questionable. However, the Town may offer those septic systems within the Town's service area but situated outside the Town limits the opportunity to tie to the Town's WRF after the Town completes its wastewater collection system upgrade project, which is a future (and currently unfunded) project separate from and not covered by this CAG 208 Plan Amendment | Pages 5 and 23<br>(Sections 3.1.2 and 7.2.1) |

## CAG 208 PLAN AMENDMENT CHECKLIST – CONTINUED

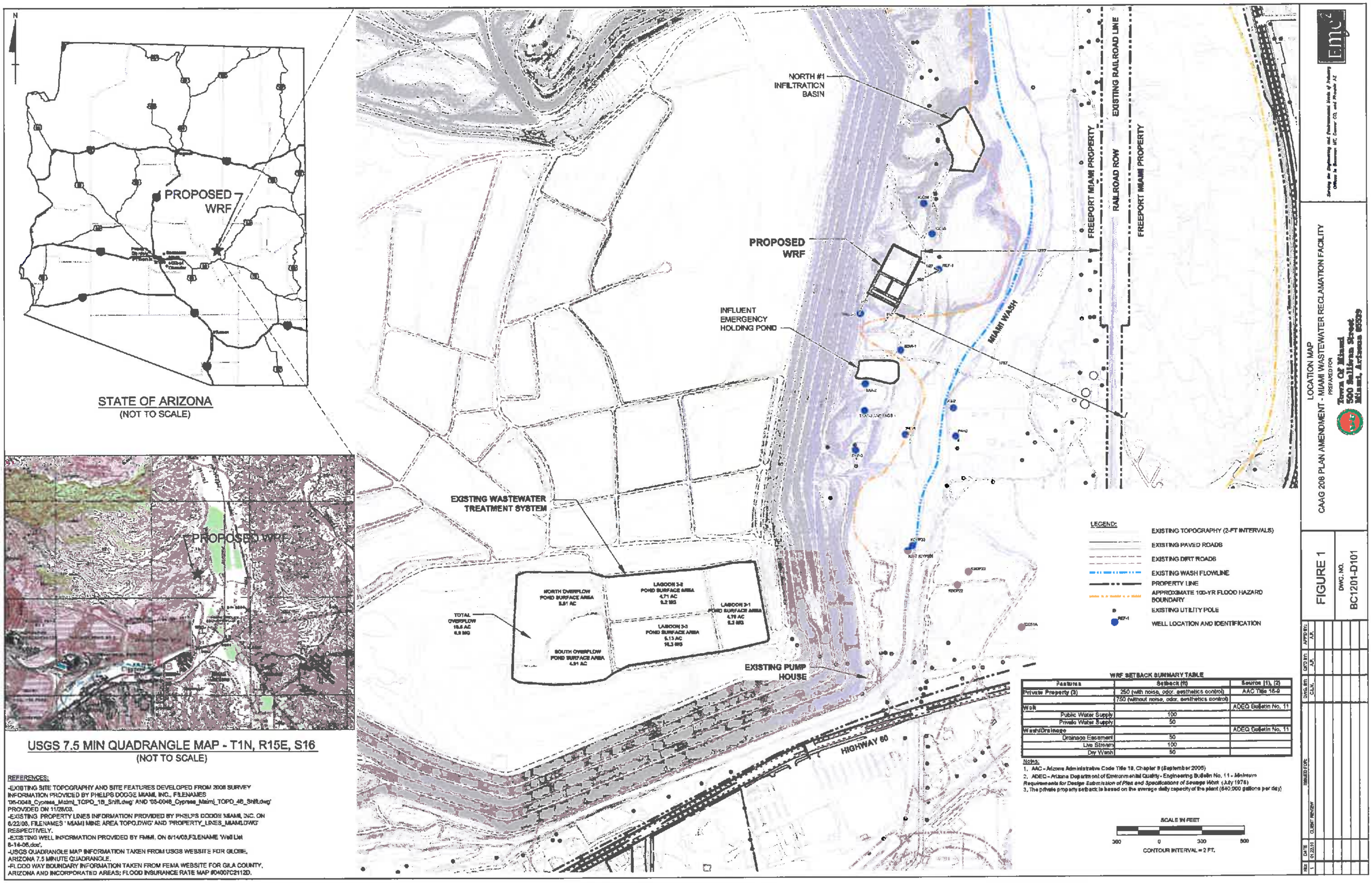
| | | | |
|---|---|---|---|
| **39** | Describe the impact on communities and businesses affected by the plan. | There are no anticipated impacts on communities and businesses as a result of this CAG 208 Plan Amendment. This Amendment only serves to clarify and document the boundary of the area already receiving services from the Miami Wastewater Utility. The WRF replaced the existing aging wastewater treatment system with a prescriptive best available demonstrated control technology facility. This facility will provide additional treatment capacity to the Town. Additionally, the WRF generates Class A+ quality effluent that will be reclaimed and put to beneficial uses. The effluent reuse, infiltration or discharge is not anticipated to increase odor or vector concern as the setback requirements set forth by ADEQ for these uses from private property are maintained for the WRF.<br><br>The construction of the WRF received strong community support as demonstrated by the support letters from neighboring communities/organizations. | Page 23<br>(Section 7.2.2 and Appendix C-5) |
| **40** | If a municipal wastewater (WWT) system is proposed, describe how WWT service will be provided until the municipal system is completed; i.e., will package plants and septic systems be allowed and under what circumstances. (Interim services). | The Town used the existing wastewater treatment system until the start- up of the new WRF.<br><br>According to Town representatives, there are no septic systems within the Town limits. Whether the Town has legal authority to require septic systems situated outside the Town limits, but within the Town's existing service area, to tie into the sewer system is questionable. However, the Town may offer those septic systems within the Town's service area, but situated outside the Town limits. the opportunity to tie to the Town's new WRF after the Town completes its wastewater collection system upgrade project, which is a future (and currently unfunded) project separate from and not covered by this CAG 208 Plan Amendment. | Pages 5 and 23<br><br>(Sections 3.1.2 and 7.2.1) |

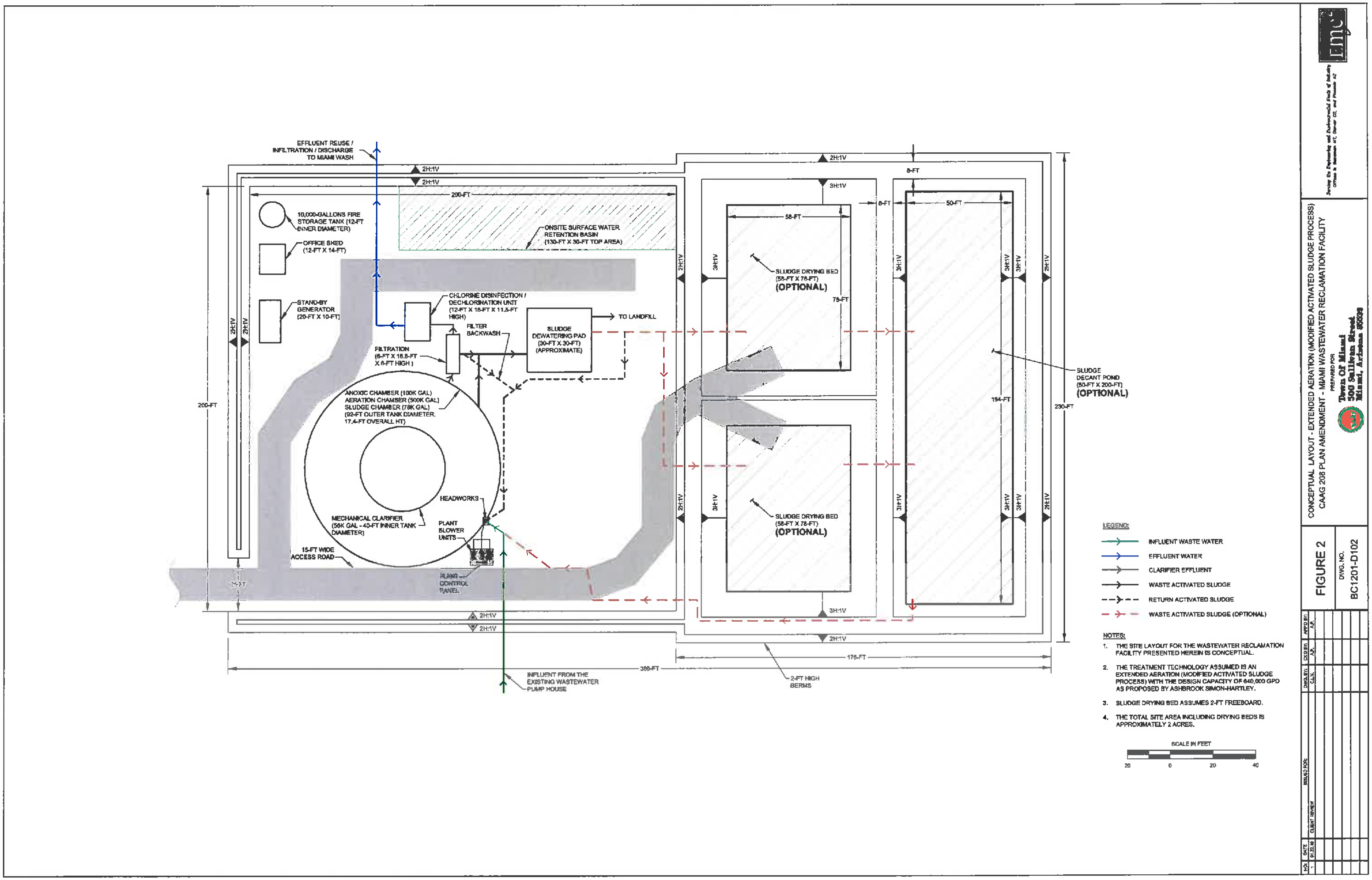
## CAG 208 PLAN AMENDMENT CHECKLIST - CONTINUED

| | | | |
|---|---|---|---|
| **41** | **<u>PUBLIC PARTICIPATION</u>**<br>Submit copy of mailing list used to notify the public of the public hearing on the 208 Amendment. (40 CFR, Chapter 1, Part 25.5). | | |
| **42** | List location where documents are available for review at least 30 days before public hearing. | | |
| **43** | Submit copy of the public notice of the public hearing as well as an official affidavit of publication from the area newspaper. Clearly show the announcement appeared in the newspaper at least 45 days before the hearing. | | |
| **44** | Submit affidavit of publication for official newspaper publication. | | |
| **45** | Submit responsiveness summary for public hearing. | | |

# APPENDIX B

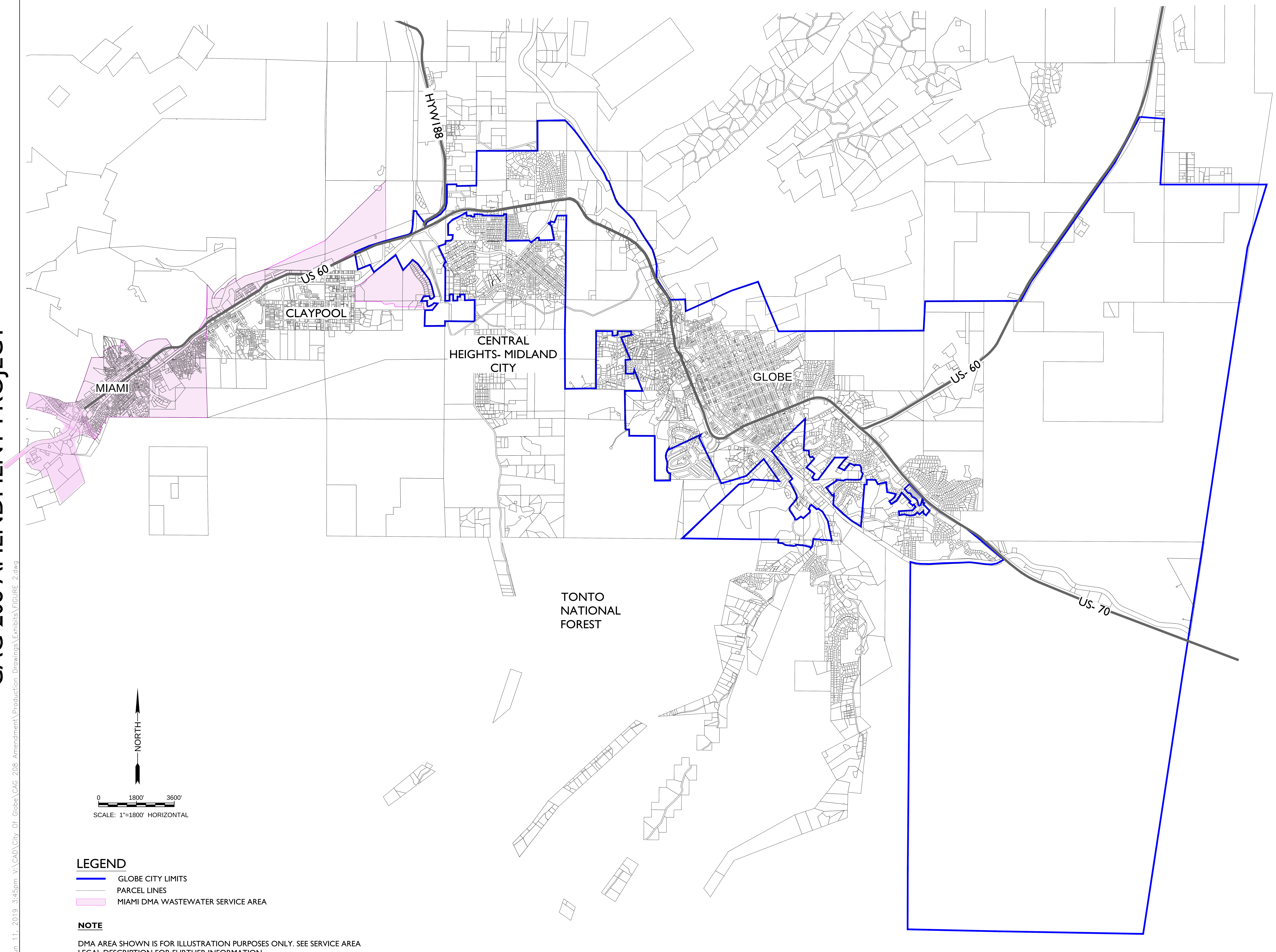
# FIGURES


N
PROPOSED WRF
STATE OF ARIZONA
(NOT TO SCALE)
PROPOSED WRF
USGS 7.5 MIN QUADRANGLE MAP - T1N, R15E, S16
(NOT TO SCALE)
REFERENCES:
-EXISTING SITE TOPOGRAPHY AND SITE FEATURES DEVELOPED FROM 2006 SURVEY INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC., FILENAMES '06-0048_Cypress_Maimi_TOPO_1B_Shift.dwg' AND '06-0048_Cypress_Maimi_TOPO_4B_Shift.dwg' PROVIDED ON 11/28/03.
-EXISTING PROPERTY LINES INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC. ON 6/22/06, FILENAMES ' MIAMI MINE AREA TOPO.DWG' AND 'PROPERTY_LINES_MIAMI.DWG' RESPECTIVELY.
-EXISTING WELL INFORMATION PROVIDED BY FMMI, ON 8/14/06,FILENAME 'Well List 8-14-06.doc'.
-USGS QUADRANGLE MAP INFORMATION TAKEN FROM USGS WEBSITE FOR GLOBE, ARIZONA 7.5 MINUTE QUADRANGLE.
-FLOOD WAY BOUNDARY INFORMATION TAKEN FROM FEMA WEBSITE FOR GILA COUNTY, ARIZONA AND INCORPORATED AREAS; FLOOD INSURANCE RATE MAP #04007C2112D.
NORTH #1 INFILTRATION BASIN
PROPOSED WRF
INFLUENT EMERGENCY HOLDING POND
MIAMI WASH
FREEPORT MIAMI PROPERTY
RAILROAD ROW
EXISTING RAILROAD LINE
FREEPORT MIAMI PROPERTY
EXISTING WASTEWATER TREATMENT SYSTEM
NORTH OVERFLOW POND SURFACE AREA 5.81 AC
LAGOON 3-2 POND SURFACE AREA 4.71 AC 8.2 MG
LAGOON 3-1 POND SURFACE AREA 4.70 AC 8.2 MG
LAGOON 3-3 POND SURFACE AREA 5.13 AC 10.3 MG
TOTAL OVERFLOW 10.6 AC 4.9 MG
SOUTH OVERFLOW POND SURFACE AREA 4.81 AC
EXISTING PUMP HOUSE
HIGHWAY 60
LEGEND:
EXISTING TOPOGRAPHY (2-FT INTERVALS)
EXISTING PAVED ROADS
EXISTING DIRT ROADS
EXISTING WASH FLOWLINE
PROPERTY LINE
APPROXIMATE 100-YR FLOOD HAZARD BOUNDARY
EXISTING UTILITY POLE
WELL LOCATION AND IDENTIFICATION
WRF SETBACK SUMMARY TABLE
Features | Setback (ft) | Source (1), (2)
Private Property (3) | 250 (with noise, odor, aesthetics control) | AAC Title 18-9
750 (without noise, odor, aesthetics control)
Well | | ADEQ Bulletin No. 11
Public Water Supply | 100
Private Water Supply | 50
Wash/Drainage | | ADEQ Bulletin No. 11
Drainage Easement | 50
Live Stream | 100
Dry Wash | 50
Notes:
1. AAC - Arizona Administrative Code Title 18, Chapter 9 (September 2006)
2. ADEQ - Arizona Department of Environmental Quality - Engineering Bulletin No. 11 - Minimum Requirements for Design Submission of Plan and Specifications of Sewage Work (July 1978)
3. The private property setback is based on the average daily capacity of the plant (840,000 gallons per day)
SCALE IN FEET
300 0 300 600
CONTOUR INTERVAL = 2 FT.
LOCATION MAP
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
FIGURE 1
DWG. NO.
BC1201-D101



EFFLUENT REUSE / INFILTRATION / DISCHARGE TO MIAMI WASH
2H:1V
200-FT
10,000-GALLONS FIRE STORAGE TANK (12-FT INNER DIAMETER)
OFFICE SHED (12-FT X 14-FT)
ONSITE SURFACE WATER RETENTION BASIN (130-FT X 30-FT TOP AREA)
STAND-BY GENERATOR (20-FT X 10-FT)
CHLORINE DISINFECTION / DECHLORINATION UNIT (12-FT X 18-FT X 11.5-FT HIGH)
FILTER BACKWASH
SLUDGE DEWATERING PAD (30-FT X 30-FT) (APPROXIMATE)
TO LANDFILL
FILTRATION (6-FT X 18.5-FT X 6-FT HIGH)
ANOXIC CHAMBER (100K GAL) AERATION CHAMBER (500K GAL) SLUDGE CHAMBER (78K GAL) (92-FT OUTER TANK DIAMETER, 17.4-FT OVERALL HT)
HEADWORKS
MECHANICAL CLARIFIER (56K GAL - 40-FT INNER TANK DIAMETER)
PLANT BLOWER UNITS
15-FT WIDE ACCESS ROAD
PUMP CONTROL PANEL
INFLUENT FROM THE EXISTING WASTEWATER PUMP HOUSE
380-FT
3H:1V
8-FT
58-FT
50-FT
SLUDGE DRYING BED (58-FT X 78-FT) (OPTIONAL)
78-FT
194-FT
230-FT
SLUDGE DECANT POND (50-FT X 200-FT) (OPTIONAL)
176-FT
2-FT HIGH BERMS
LEGEND:
INFLUENT WASTE WATER
EFFLUENT WATER
CLARIFIER EFFLUENT
WASTE ACTIVATED SLUDGE
RETURN ACTIVATED SLUDGE
WASTE ACTIVATED SLUDGE (OPTIONAL)
NOTES:
1. THE SITE LAYOUT FOR THE WASTEWATER RECLAMATION FACILITY PRESENTED HEREIN IS CONCEPTUAL.
2. THE TREATMENT TECHNOLOGY ASSUMED IS AN EXTENDED AERATION (MODIFIED ACTIVATED SLUDGE PROCESS) WITH THE DESIGN CAPACITY OF 640,000 GPD AS PROPOSED BY ASHBROOK SIMON-HARTLEY.
3. SLUDGE DRYING BED ASSUMES 2-FT FREEBOARD.
4. THE TOTAL SITE AREA INCLUDING DRYING BEDS IS APPROXIMATELY 2 ACRES.
SCALE IN FEET
20 0 20 40
CONCEPTUAL LAYOUT - EXTENDED AERATION (MODIFIED ACTIVATED SLUDGE PROCESS)
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
PREPARED FOR
Town Of Miami
500 Sullivan Street
Miami, Arizona 85539
FIGURE 2
DWG. NO.
BC1201-D102

# CAG 208 AMENDMENT PROJECT






EPS GROUP
125 S. Avondale Blvd., Suite 115
Avondale, AZ 85323
T:623.547.4461 | F:623.547.4662
www.epsgroupinc.com

Project: CAG 208 AMENDMENT PROJECT
City Of Globe, Arizona

TOWN OF MIAMI DMA WASTEWATER SERVICE AREA

Revisions:

Designer: B.L.S.
Drawn by: S.C.D.

NOT FOR CONSTRUCTION

Job No. 16-242

06-04-2019

Sheet No. 1 of 1

FIGURE 3

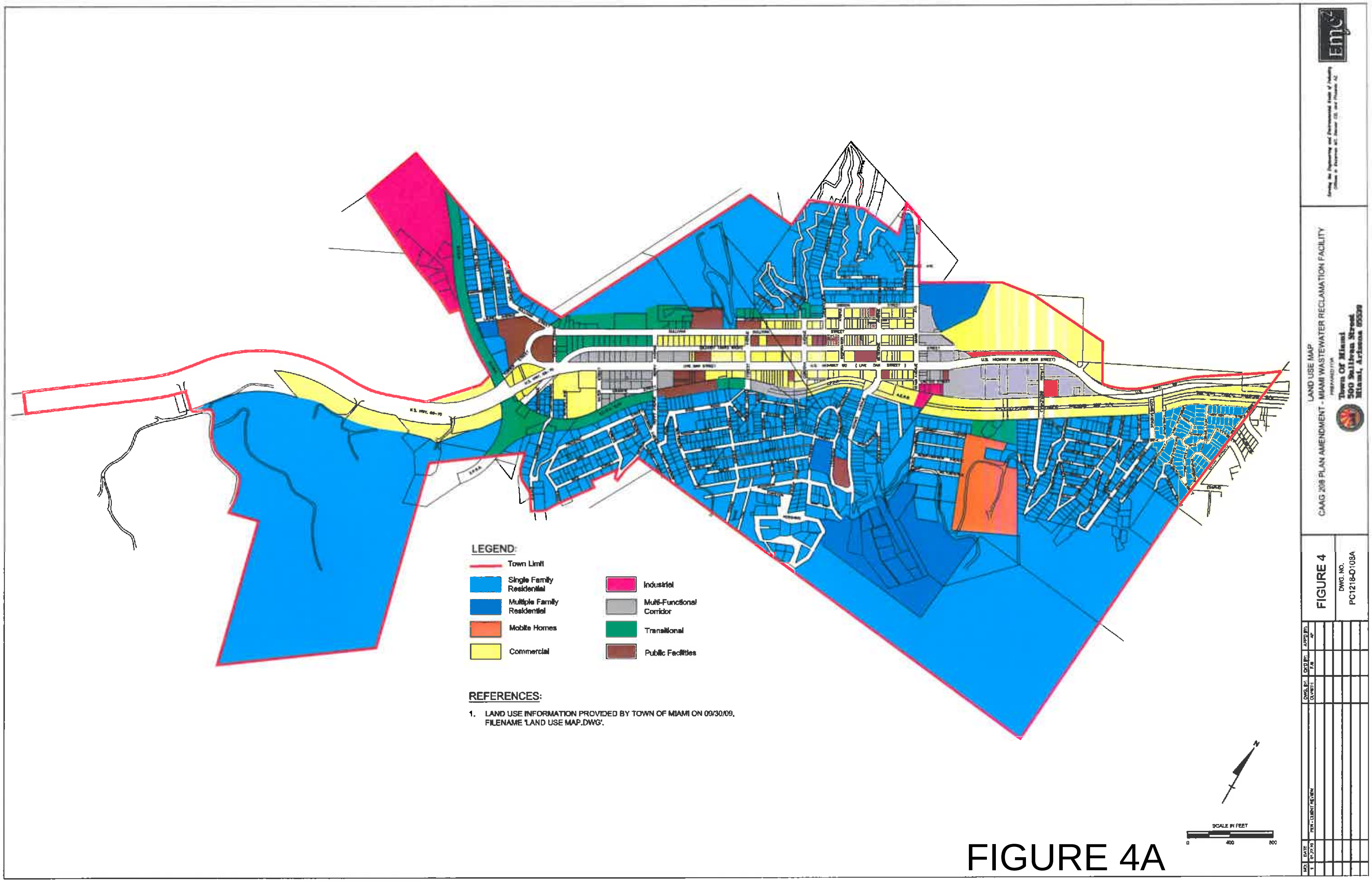
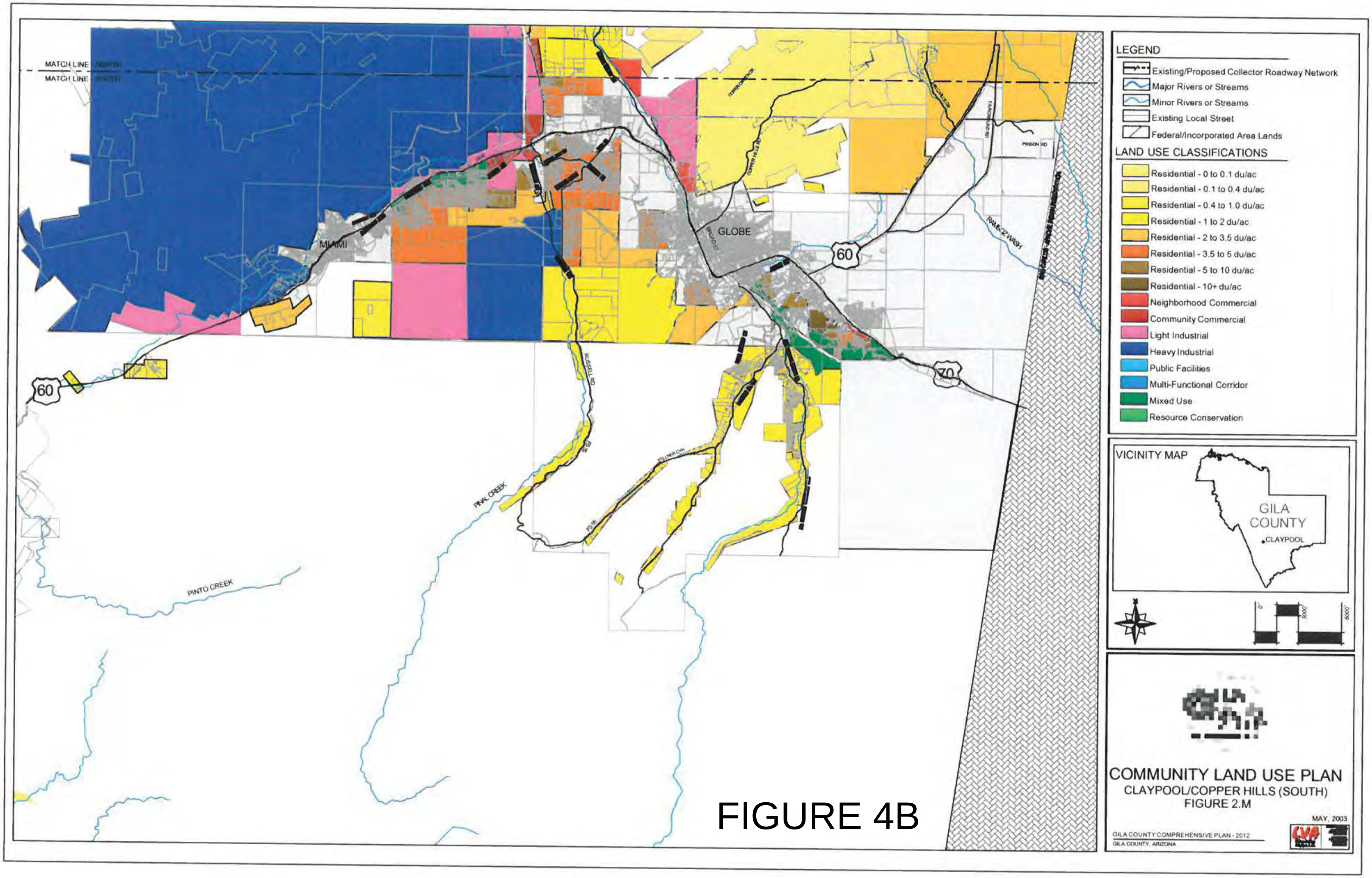
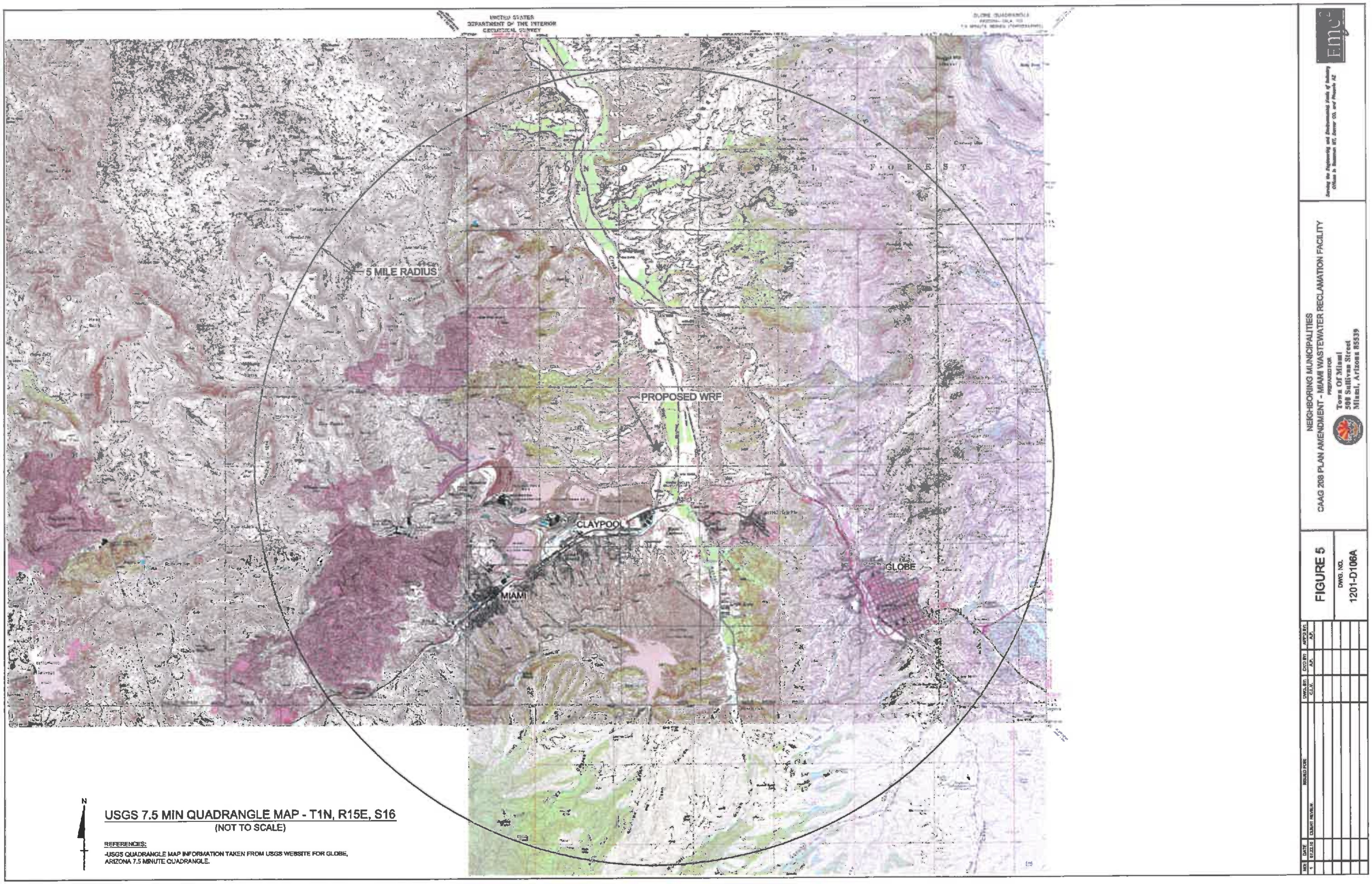

LEGEND:
Town Limit
Single Family Residential
Multiple Family Residential
Mobile Homes
Commercial
Industrial
Multi-Functional Corridor
Transitional
Public Facilities
REFERENCES:
1. LAND USE INFORMATION PROVIDED BY TOWN OF MIAMI ON 09/30/09, FILENAME 'LAND USE MAP.DWG'.
LAND USE MAP
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
FIGURE 4
DWG. NO.
PC1218-D103A
SCALE IN FEET

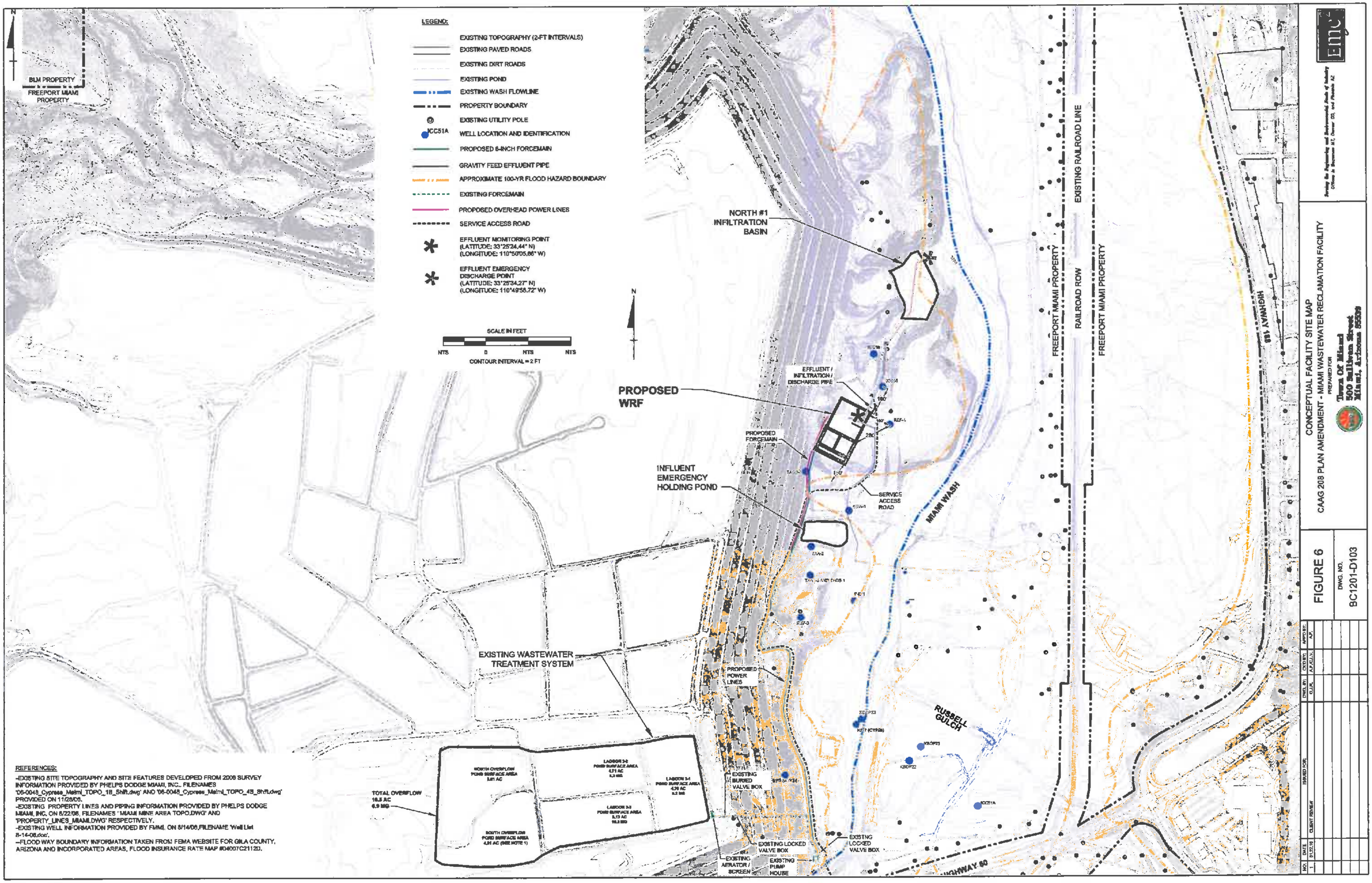
FIGURE 4A



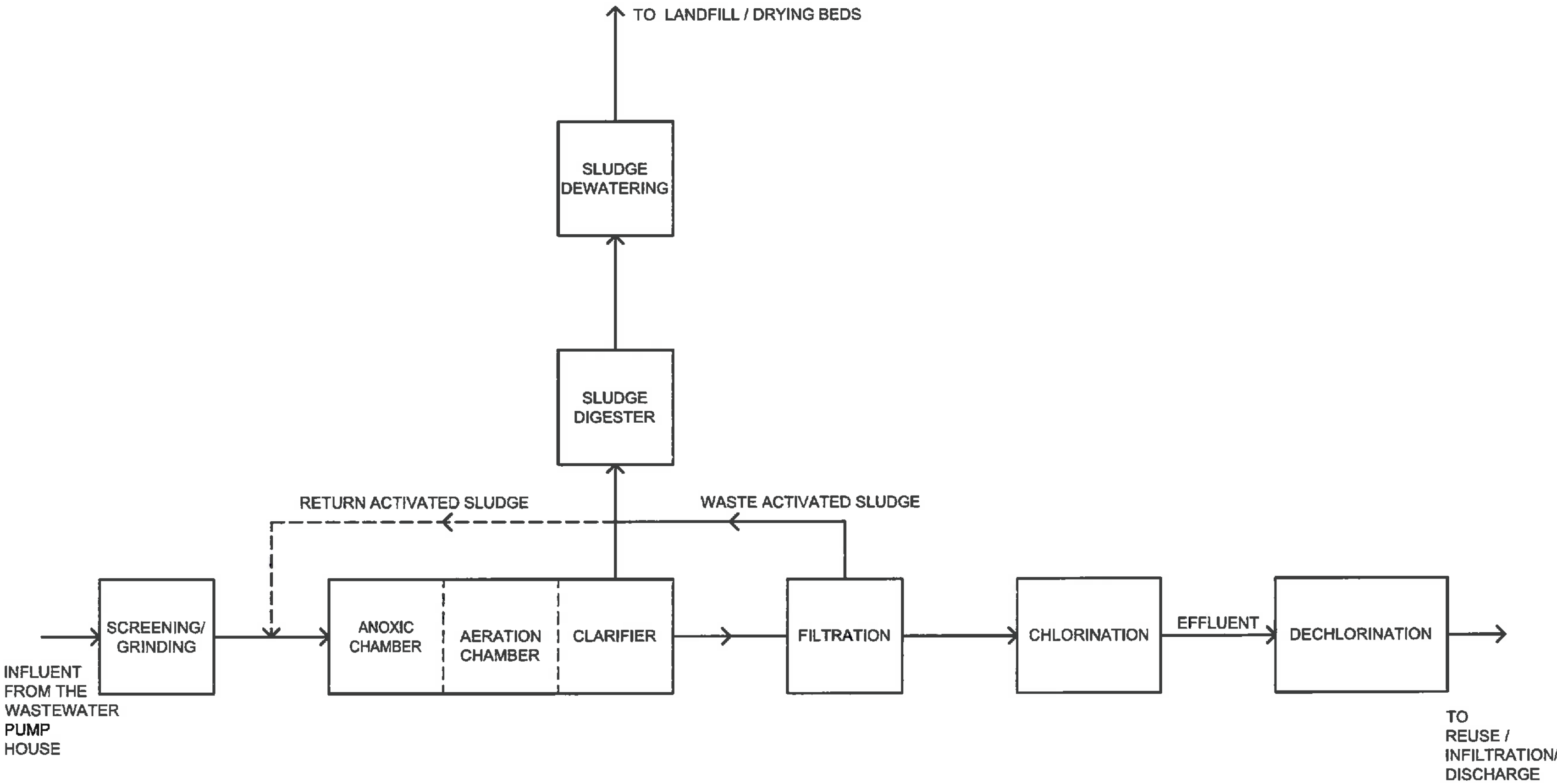
LEGEND
Existing/Proposed Collector Roadway Network
Major Rivers or Streams
Minor Rivers or Streams
Existing Local Street
Federal/Incorporated Area Lands
LAND USE CLASSIFICATIONS
Residential - 0 to 0.1 du/ac
Residential - 0.1 to 0.4 du/ac
Residential - 0.4 to 1.0 du/ac
Residential - 1 to 2 du/ac
Residential - 2 to 3.5 du/ac
Residential - 3.5 to 5 du/ac
Residential - 5 to 10 du/ac
Residential - 10+ du/ac
Neighborhood Commercial
Community Commercial
Light Industrial
Heavy Industrial
Public Facilities
Multi-Functional Corridor
Mixed Use
Resource Conservation
VICINITY MAP
GILA COUNTY
CLAYPOOL
COMMUNITY LAND USE PLAN
CLAYPOOL/COPPER HILLS (SOUTH)
FIGURE 2.M
MAY, 2003
GILA COUNTY COMPREHENSIVE PLAN - 2012
GILA COUNTY, ARIZONA
MIAMI
GLOBE
60
70
PINTO CREEK
PINAL CREEK


FIGURE 4B


5 MILE RADIUS
PROPOSED WRF
CLAYPOOL
MIAMI
GLOBE
USGS 7.5 MIN QUADRANGLE MAP - T1N, R15E, S16
(NOT TO SCALE)
REFERENCES:
-USGS QUADRANGLE MAP INFORMATION TAKEN FROM USGS WEBSITE FOR GLOBE, ARIZONA 7.5 MINUTE QUADRANGLE.
NEIGHBORING MUNICIPALITIES
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
Town Of Miami
500 Sullivan Street
Miami, Arizona 85539
FIGURE 5
DWG. NO.
1201-D106A



LEGEND:
EXISTING TOPOGRAPHY (2-FT INTERVALS)
EXISTING PAVED ROADS
EXISTING DIRT ROADS
EXISTING POND
EXISTING WASH FLOWLINE
PROPERTY BOUNDARY
EXISTING UTILITY POLE
ICC51A
WELL LOCATION AND IDENTIFICATION
PROPOSED 6-INCH FORCEMAIN
GRAVITY FEED EFFLUENT PIPE
APPROXIMATE 100-YR FLOOD HAZARD BOUNDARY
EXISTING FORCEMAIN
PROPOSED OVERHEAD POWER LINES
SERVICE ACCESS ROAD
EFFLUENT MONITORING POINT (LATITUDE: 33°25'24.44" N) (LONGITUDE: 110°50'05.66" W)
EFFLUENT EMERGENCY DISCHARGE POINT (LATITUDE: 33°25'34.27" N) (LONGITUDE: 110°49'58.72" W)
SCALE IN FEET
NTS 0 NTS NTS
CONTOUR INTERVAL = 2 FT
N
BLM PROPERTY
FREEPORT MIAMI PROPERTY
NORTH #1 INFILTRATION BASIN
PROPOSED WRF
EFFLUENT / INFILTRATION / DISCHARGE PIPE
PROPOSED FORCEMAIN
INFLUENT EMERGENCY HOLDING POND
SERVICE ACCESS ROAD
MIAMI WASH
EXISTING WASTEWATER TREATMENT SYSTEM
PROPOSED POWER LINES
RUSSELL GULCH
EXISTING BURIED VALVE BOX
EXISTING LOCKED VALVE BOX
EXISTING LOCKED VALVE BOX
EXISTING AERATOR / SCREEN
EXISTING PUMP HOUSE
TOTAL OVERFLOW 16.5 AC 6.9 MG
HIGHWAY 60
HIGHWAY 188
FREEPORT MIAMI PROPERTY
RAILROAD ROW
EXISTING RAILROAD LINE
FREEPORT MIAMI PROPERTY
REFERENCES:
-EXISTING SITE TOPOGRAPHY AND SITE FEATURES DEVELOPED FROM 2006 SURVEY INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC., FILENAMES '06-0048_Cypress_Miami_TOPO_1B_Shift.dwg' AND '06-0048_Cypress_Miami_TOPO_4B_Shift.dwg' PROVIDED ON 11/28/06.
-EXISTING PROPERTY LINES AND PIPING INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC. ON 8/22/06, FILENAMES 'MIAMI MINE AREA TOPO.DWG' AND 'PROPERTY_LINES_MIAMI.DWG' RESPECTIVELY.
-EXISTING WELL INFORMATION PROVIDED BY FMMI, ON 8/14/06, FILENAME 'Well List 8-14-06.doc'.
-FLOOD WAY BOUNDARY INFORMATION TAKEN FROM FEMA WEBSITE FOR GILA COUNTY, ARIZONA AND INCORPORATED AREAS, FLOOD INSURANCE RATE MAP #04007C2112D.
CONCEPTUAL FACILITY SITE MAP
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
PREPARED FOR
Town Of Miami
500 Sullivan Street
Miami, Arizona 85539
FIGURE 6
DWG. NO.
BC1201-D103




NOTES:

1. THE PROCESS FLOW DIAGRAM PRESENTED HEREIN IS CONCEPTUAL.
2. THE TREATMENT TECHNOLOGY ASSUMED IS AN EXTENDED AERATION SYSTEM (MODIFIED ACTIVATED SLUDGE PROCESS).

NOT TO SCALE

CONCEPTUAL PROCESS FLOW DIAGRAM

CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY

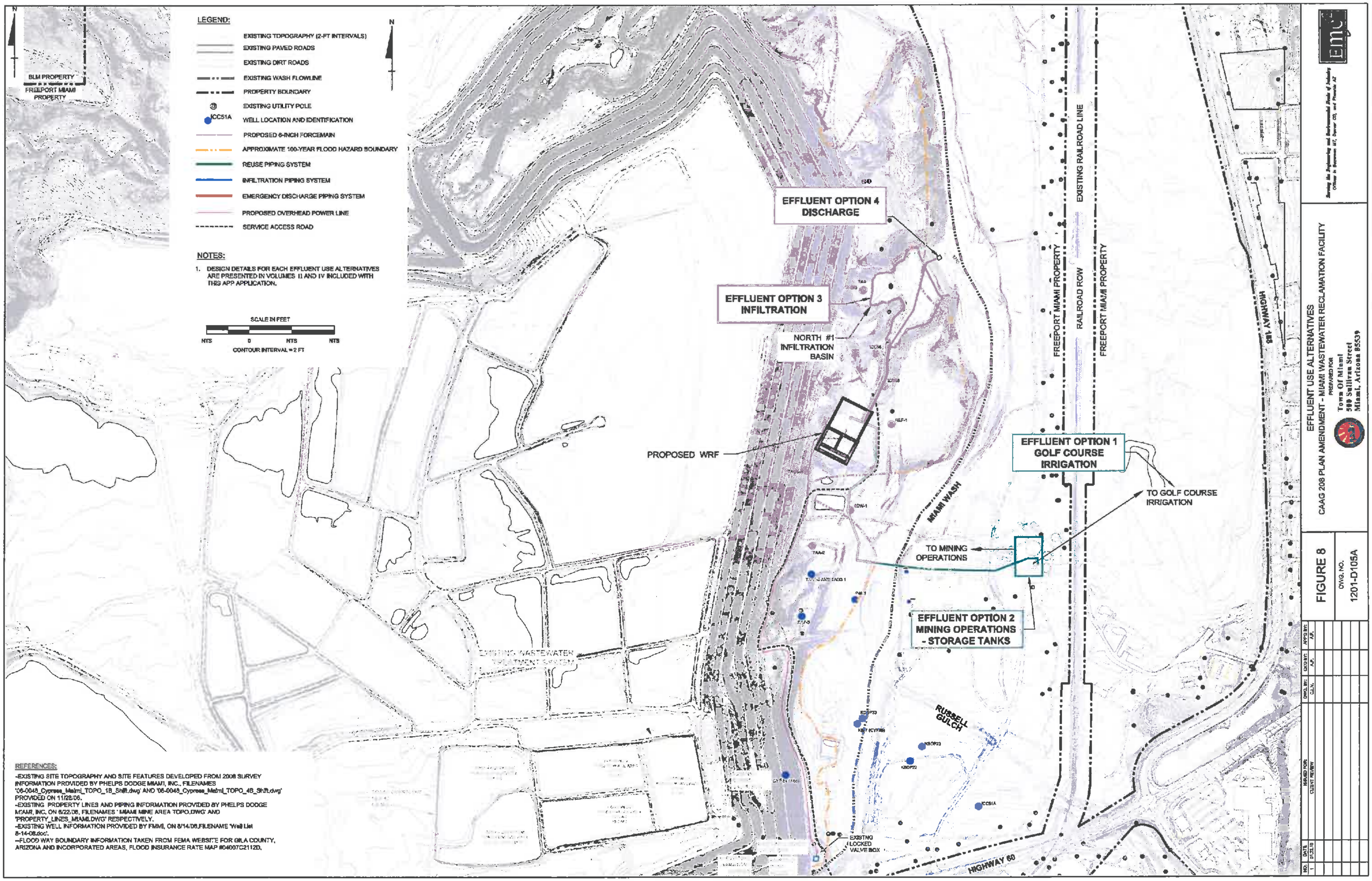
PREPARED FOR

Town Of Miami
500 Sullivan Street
Miami, Arizona 85539

FIGURE 7

DWG. NO. BC1201-D104

U:\1201\Permitting\CAAG\CADD\BC1201-D104.dwg, FIGURE 7, 1/22/2010 4:32:56 PM, Curt


LEGEND:
EXISTING TOPOGRAPHY (2-FT INTERVALS)
EXISTING PAVED ROADS
EXISTING DIRT ROADS
EXISTING WASH FLOWLINE
PROPERTY BOUNDARY
EXISTING UTILITY POLE
WELL LOCATION AND IDENTIFICATION
PROPOSED 6-INCH FORCEMAIN
APPROXIMATE 100-YEAR FLOOD HAZARD BOUNDARY
REUSE PIPING SYSTEM
INFILTRATION PIPING SYSTEM
EMERGENCY DISCHARGE PIPING SYSTEM
PROPOSED OVERHEAD POWER LINE
SERVICE ACCESS ROAD
NOTES:
1. DESIGN DETAILS FOR EACH EFFLUENT USE ALTERNATIVES ARE PRESENTED IN VOLUMES III AND IV INCLUDED WITH THIS APP APPLICATION.
SCALE IN FEET
CONTOUR INTERVAL = 2 FT
BLM PROPERTY
FREEPORT MIAMI PROPERTY
EFFLUENT OPTION 4 DISCHARGE
EFFLUENT OPTION 3 INFILTRATION
NORTH #1 INFILTRATION BASIN
PROPOSED WRF
EFFLUENT OPTION 1 GOLF COURSE IRRIGATION
TO GOLF COURSE IRRIGATION
TO MINING OPERATIONS
EFFLUENT OPTION 2 MINING OPERATIONS - STORAGE TANKS
MIAMI WASH
RUSSELL GULCH
EXISTING LOCKED VALVE BOX
HIGHWAY 60
HIGHWAY 188
FREEPORT MIAMI PROPERTY
RAILROAD ROW
EXISTING RAILROAD LINE
REFERENCES:
-EXISTING SITE TOPOGRAPHY AND SITE FEATURES DEVELOPED FROM 2006 SURVEY INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC., FILENAMES '06-0048_Cypress_Miami_TOPO_1B_Shift.dwg' AND '06-0048_Cypress_Miami_TOPO_4B_Shift.dwg' PROVIDED ON 11/28/06.
-EXISTING PROPERTY LINES AND PIPING INFORMATION PROVIDED BY PHELPS DODGE MIAMI, INC. ON 6/22/06, FILENAMES 'MIAMI MINE AREA TOPO.DWG' AND 'PROPERTY_LINES_MIAMI.DWG' RESPECTIVELY.
-EXISTING WELL INFORMATION PROVIDED BY FMMI, ON 8/14/06,FILENAME 'Well List 8-14-06.doc'.
--FLOOD WAY BOUNDARY INFORMATION TAKEN FROM FEMA WEBSITE FOR GILA COUNTY, ARIZONA AND INCORPORATED AREAS, FLOOD INSURANCE RATE MAP #04007C2112D.
EFFLUENT USE ALTERNATIVES
CAAG 208 PLAN AMENDMENT - MIAMI WASTEWATER RECLAMATION FACILITY
PREPARED FOR
Town Of Miami
500 Sullivan Street
Miami, Arizona 85539
FIGURE 8
DWG. NO.
1201-D105A

# APPENDIX C

## COMMUNICATION/DOCUMENTATION

**CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN**
**MIAMI WASTEWATER RECLAMATION FACILITY – DESIGNATED MANAGEMENT AREA**
TOWN OF MIAMI, ARIZONA

# APPENDIX C-1

## LEGAL DESCRIPTION

DESIGNATED MANAGEMENT AREA

## Legal Description
## Miami Designated Management Agency
## Wastewater Service Area

Job No. 18-508 June 3, 2019

That part of the west half of Section 21, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying north of the south right-of-way line of US60, except that portion falling within Gila County Assessor Parcel Number 206-04-001D; and

That part of Section 21, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, falling outside the jurisdictional limits of the City of Globe and lying south of the north line of the Arizona Eastern Railway Company right-of-way and east of the west right-of-way line of South Maple Leaf Street; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Warranty Deed recorded as document Number 2007-011282, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Deed of Trust recorded as document Number 2017-006027, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Deed of Trust recorded as document Number 2011-007609, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Warranty Deed recorded as document Number 1996-006134, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Deed of Trust recorded as document Number 2005-004147, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the property described in Deed of Trust recorded as document Number 2007-011282, Official Records of Gila County; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within Gila County Assesssor Parcel Number 206-07-007N; and

That part of Section 28, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within Gila County Assesssor Parcel Number 206-07-004G; and

That part of Section 29, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying north of the south right-of-way line of US60; and

That part of Section 20, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying north of the south right-of-way line of US60, except that portion lying within Gila County Assessor Parcel Numbers 206-01-001A, 206-01-003, 206-01-013, 206-01-004, and 206-01-014; and

That part of Section 30, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the jurisdictional limits of the City of Miami; and

That part of Section 31, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying within the jurisdictional limits of the City of Miami; and

That portion of Sections 36 and 25, Township 1 North, Range 14 East, Gila and Salt River Meridian, Gila County, Arizona, lying northeast of the following described line:

Beginning at the southeast corner of Lot 9, Amended Map of Westward Addition to the Original Townsite of Miami, Map Number 165, Official Records of Gila County;

Thence along the west line of Lots 9, 8, 7, 6, 5, 4, 3, 2, and 1 of said Westward Addition;

Thence along the south and west lines of that property described in Quitclaim Deed recorded as Document Number 2010-003925, Official Records of Gila County;

Thence along the southwest line of that property described in Special Warranty Deed recorded as Document Number 2018-005860, Official Records of Gila County;

Thence along the southwest line of Gila County Assessor Parcel Number 204-16-021;

Thence along the southwest line of Gila County Assessor Parcel Number 204-16-022;

Thence along the southwest line of that property described in Quit Claim Deed recorded as Document Number 2008-006375, Official Records of Gila County;

Thence along the west line of that property described in Quit Claim Deed recorded as Document Number 1998-000143, Official Records of Gila County;

Thence along the west and northwest lines of that property described in Quit Claim Deed recorded as Document Number 2000-014352, Official Records of Gila County;

Thence to the intersection of the north right-of-way line of Live Oak Street with the west right-of-way line of Plaza Avenue, said point being the southeast corner of Gila County Assessor Parcel Number 204-15-075;

Thence along said west right-of-way line of Plaza Avenue to the intersection of said west right-of-way line of Plaza Avenue with the south line of West Sullivan Street, said point being the northeast corner of Gila County Assessor Parcel Number 204-15-075;

Thence to the southwest corner of that property described in Warranty Deed recorded as Document Number 2003-002307, Official Records of Gila County;

Thence along the west and north lines of said property described in Warranty Deed recorded as Document Number 2003-002307, Official Records of Gila County to the southwest corner of that property described in Special Warranty Deed recorded as Document Number 2013-004243;

Thence along the west line of said property described in Special Warranty Deed recorded as Document Number 2013-004243;

Thence along the west line of that property described in Warranty Deed recorded as Document Number 2008-010320 to a point on the east line of said Section 25, said point being the point of termination of said described line.

# APPENDIX C-2

# SELF-CERTIFICATION LETTER

## CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN
## TOWN OF MIAMI, ARIZONA

GUST ROSENFELD
ATTORNEYS SINCE 1921 P.L.C.

ONE E. WASHINGTON, SUITE 1600 ■ PHOENIX, ARIZONA 85004-2553 ■ TELEPHONE 602-257-7422 ■ FACSIMILE 602-254-4878

Susan D. Goodwin
602.257.7671
sgoodwin@gustlaw.com

October 11, 2019

Mr. Joseph Heatherly
Town Manager
Town of Miami
500 Sullivan Street
Miami, Arizona 85539

Re: Town of Miami 208 Plan – Self Certification
Our File No. 027646-00026

Dear Joe:

As legal counsel for the Town of Miami, Arizona, I hereby certify, in connection with wastewater collection and treatment facilities that serve homes, businesses, industries and other users within the jurisdictional limits of the Town of Miami (which wastewater facilities are referred to in this letter as the "Subject Facilities") and pursuant to Clean Water Act Section 208(c)(2) [33 U.S.C. § 1288(c)(2)], that the Town of Miami is authorized by law:

A. to carry out appropriate portions of Central Arizona Association of Governments' Areawide Water Quality Management Plan (the "208 Plan") developed under Clean Water Act Section 208, subsection (b);

B. to manage effectively the Subject Facilities and any other waste treatment works and related facilities servicing such area in conformance with the 208 Plan;

C. directly or by contract, to design and construct the Subject Facilities and any other new works, and to operate and maintain new and existing works as required by the 208 Plan;

D. to accept and utilize grants, or other funds from any source, for waste treatment management purposes;

E. to raise revenues, including the assessment of waste treatment charges;

F. to incur short- and long-term indebtedness;

3644866.1

G. to assure in implementation of the 208 Plan that each participating community pays its proportionate share of treatment costs;

H. to refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of the 208 Plan applicable to such area; and

I. to accept for treatment industrial wastes.

Please let me know if you need any additional information with this self-certification.

Very truly yours,

Susan D. Goodwin
For the Firm

SDG/cal

# APPENDIX C-3

# DMA
# DOCUMENTATION

## CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN
## TOWN OF MIAMI, ARIZONA

**RESOLUTION NO. 537**

**A RESOLUTION OF THE MAYOR AND COUNCIL OF THE TOWN OF MIAMI ACCEPTING A 201 GRANT FOR DEVELOPMENT OF A PUBLICLY OWNED WASTE TREATMENT FACILITY UNDER SECTION 201 OF PUBLIC LAW 92-500 (FEDERAL WATER POLLUTION CONTROL ACT).**

WHEREAS, the Town of Miami has accepted a 201 grant for development of a publicly owned waste treatment facility under Section 201 of Public Law 92-500 (Federal Water Pollution Control Act) and;

WHEREAS, the Governor of Arizona is required under Section 208 of P.L. 92-500 to designate a management agency for each puclicly owned waste treatment facility, and;

WHEREAS, the Central Arizona Association of Governments has been designated by the Governor under Section 208 of P.L. 92-500 as the 208 Areawide Water Quality Management Planning Agency for Pinal and Gila Counties; which is required by the Act to recommend management agencies to the Governor for designation, and;

WHEREAS, there are certain legal, financial, and technical criteria which a management agency must fulfill, and;

WHEREAS, the Town of Miami wishes to be designated as the management agency for the Town's Publicly Owned Waste Treatment Facility;

NOW, THEREFORE, BE IT RESOLVED that the Town of Miami does hereby request the Central Arizona Association of Governments to recommend to the Governor of Arizona that the Town of Miami be preliminarily designated as a management agency for its Publicly Owned Waste Treatment Works and further, that the Central Arizona Association of Governments assist in assuring all criteria are met for final designation.

PASSED AND ADOPTED by the Mayor and Common Council of the Town of Miami, Arizona, on 19 day of June, 1978

MAYOR

ATTEST:

ACTING TOWN CO-ORDINATOR

APPROVED AS TO FORM:

TOWN ATTORNEY

Legal Description
Miami Designated Management Agency
Wastewater Service Area

Job No. 18-508 June 3, 2019

That part of the west half of Section 21, Township 1 North, Range 15 East, Gila and Salt River Meridian, Gila County, Arizona, lying north of the south right-of-way line of US60, except that portion falling within Gila County Assessor Parcel Number 206-04-001D; and

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Thence along the southwest line of Gila County Assessor Parcel Number 204-16-022;

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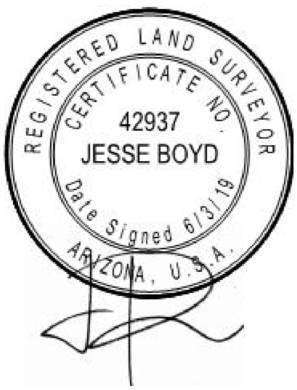
Thence along the west line of that property described in Warranty Deed recorded as Document Number 2008-010320 to a point on the east line of said Section 25, said point being the point of termination of said described line.



# APPENDIX C-4

# TOWN OF MIAMI FINANCIAL DOCUMENTATION

## CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN
## TOWN OF MIAMI, ARIZONA

## CITY/TOWN OF Miami Tentative Budget
## Summary Schedule of Estimated Revenues and Expenditures/Expenses
## Fiscal Year 2020

| Fiscal Year | | Sch | | FUNDS: General Fund | Special Revenue Fund | Debt Service Fund | Capital Projects Fund | Permanent Fund | Enterprise Funds Available | Internal Service Funds | Total All Funds |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | Adopted/Adjusted Budgeted Expenditures/Expenses* | E | 1 | 1,595,033 | 1,192,215 | 264,000 | 13,066,000 | 0 | 911,137 | 0 | 17,028,385 |
| 2019 | Actual Expenditures/Expenses** | E | 2 | 1,597,434 | 1,205,665 | 279,000 | 9,954,539 | 0 | 592,214 | 0 | 13,628,852 |
| 2020 | Fund Balance/Net Position at July 1*** | | 3 | 205,188 | | | | | | | 205,188 |
| 2020 | Primary Property Tax Levy | B | 4 | 176,000 | | | | | | | 176,000 |
| 2020 | Secondary Property Tax Levy | B | 5 | | | | | | | | 0 |
| 2020 | Estimated Revenues Other than Property Taxes | C | 6 | 1,563,743 | 2,048,433 | 0 | 4,035,000 | 0 | 1,248,000 | 0 | 8,895,176 |
| 2020 | Other Financing Sources | D | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2020 | Other Financing (Uses) | D | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2020 | Interfund Transfers In | D | 9 | 117,821 | 0 | 309,000 | 0 | 0 | 0 | 0 | 426,821 |
| 2020 | Interfund Transfers (Out) | D | 10 | 0 | 0 | 0 | 0 | 0 | 426,821 | 0 | 426,821 |
| 2020 | Reduction for Amounts Not Available: | | 11 | | | | | | | | |
| LESS: | Amounts for Future Debt Retirement: | | | | | | | | | | 0 |
| | Future Capital Projects | | | | | | | | | | 0 |
| | Maintained Fund Balance for Financial Stability | | | | | | | | | | 0 |
| | | | | | | | | | | | 0 |
| | | | | | | | | | | | 0 |
| 2020 | Total Financial Resources Available | | 12 | 2,062,752 | 2,048,433 | 309,000 | 4,035,000 | 0 | 821,179 | 0 | 9,276,364 |
| 2020 | Budgeted Expenditures/Expenses | E | 13 | 2,062,752 | 2,048,433 | 309,000 | 4,035,000 | 0 | 821,179 | 0 | 9,276,364 |

| | EXPENDITURE LIMITATION COMPARISON | 2019 | 2020 |
|---|---|---|---|
| 1 | Budgeted expenditures/expenses | $ 17,028,385 | $ 9,276,364 |
| 2 | Add/subtract: estimated net reconciling items | | |
| 3 | Budgeted expenditures/expenses adjusted for reconciling items | 17,028,385 | 9,276,364 |
| 4 | Less: estimated exclusions | | |
| 5 | Amount subject to the expenditure limitation | $ 17,028,385 | $ 9,276,364 |
| 6 | EEC expenditure limitation | $ | $ |

☐ The city/town does not levy property taxes and does not have special assessment districts for which property taxes are levied. Therefore, Schedule B has been omitted.

* Includes Expenditure/Expense Adjustments Approved in the current year from Schedule E.

** Includes actual amounts as of the date the proposed budget was prepared, adjusted for estimated activity for the remainder of the fiscal year.

*** Amounts on this line represent Fund Balance/Net Position amounts except for amounts not in spendable form (e.g., prepaids and inventories) or legally or contractually required to be maintained intact (e.g., principal of a permanent fund).

## CITY/TOWN OF Miami Tentative Budget
## Tax Levy and Tax Rate Information
## Fiscal Year 2020

| | 2019 | 2020 |
|---|---|---|
| 1. Maximum allowable primary property tax levy. A.R.S. §42-17051(A) | $ 175,854 | $ 176,000 |
| 2. Amount received from primary property taxation in the **current year** in excess of the sum of that year's maximum allowable primary property tax levy. A.R.S. §42-17102(A)(18) | $ | |
| 3. Property tax levy amounts | | |
| A. Primary property taxes | $ 175,854 | $ 176,000 |
| B. Secondary property taxes | | |
| C. Total property tax levy amounts | $ 175,854 | $ 176,000 |
| 4. Property taxes collected* | | |
| A. Primary property taxes | | |
| (1) **Current** year's levy | $ 175,854 | |
| (2) Prior years' levies | 1,251 | |
| (3) Total primary property taxes | $ 177,105 | |
| B. Secondary property taxes | | |
| (1) **Current** year's levy | $ | |
| (2) Prior years' levies | | |
| (3) Total secondary property taxes | $ | |
| C. Total property taxes collected | $ 177,105 | |
| 5. Property tax rates | | |
| A. City/Town tax rate | | |
| (1) Primary property tax rate | 4.7596 | 4.4929 |
| (2) Secondary property tax rate | | |
| (3) Total city/town tax rate | 4.7596 | 4.4929 |

B. Special assessment district tax rates

Secondary property tax rates - As of the date the proposed budget was prepared, the city/town was operating ______ special assessment districts for which secondary property taxes are levied. For information pertaining to these special assessment districts and their tax rates, please contact the city/town.

* Includes actual property taxes collected as of the date the proposed budget was prepared, plus estimated property tax collections for the remainder of the fiscal year.

## CITY/TOWN OF Miami Tentative Budget
## Revenues Other Than Property Taxes
## Fiscal Year 2020

| SOURCE OF REVENUES | ESTIMATED REVENUES 2019 | ACTUAL REVENUES* 2019 | ESTIMATED REVENUES 2020 |
|---|---|---|---|
| **GENERAL FUND** | | | |
| **Local taxes** | | | |
| Municipal Sales Tax | $ 400,000 | $ 327,638 | $ 400,000 |
| Past Due Property Tax | 175,854 | 177,105 | 176,000 |
| **Licenses and permits** | | | |
| Business | 4,000 | 5,350 | 4,000 |
| Building | 3,000 | 6,171 | 33,000 |
| Franchise Fee | 95,000 | 106,173 | 110,000 |
| Code Enforcement | 700 | | 2,000 |
| **Intergovernmental** | | | |
| **Charges for services** | | | |
| Rental | 12,500 | 12,045 | 14,000 |
| Courier | 65,000 | 57,188 | 75,000 |
| Transit | 17,000 | 14,232 | 17,000 |
| Senior Center | 11,000 | 8,296 | 10,000 |
| **Fines and forfeits** | | | |
| Magistrate | 50,000 | 28,820 | 40,000 |
| PD | 5,000 | 2,552 | |
| Code Enforcement | | | |
| **Interest on investments** | | | |
| **In-lieu property taxes** | | | |
| Urban Revenue Sharing | 218,637 | 214,467 | 215,000 |
| AZ Sate Sales Tax | 176,763 | 161,455 | 177,000 |
| VLT | 126,411 | 112,949 | 130,000 |
| **Contributions** | | | |
| Voluntary contributions | | | |
| Police Department | | | 75,000 |
| Senior Center | | | 10,000 |
| Bio Waste | | | 57,543 |
| **Miscellaneous** | | | |
| Surplus Equipment | | | |
| Swimming Pool | 7,000 | 8,592 | 9,000 |
| Library | 1,000 | 1,319 | 1,200 |
| Misc | 5,000 | 8,436 | 8,000 |
| **Total General Fund** | $ 1,373,865 | $ 1,252,788 | $ 1,563,743 |

* Includes actual revenues recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated revenues for the remainder of the fiscal year.

# CITY/TOWN OF Miami Tentative Budget
## Revenues Other Than Property Taxes
## Fiscal Year 2020

| SOURCE OF REVENUES | ESTIMATED REVENUES 2019 | ACTUAL REVENUES* 2019 | ESTIMATED REVENUES 2020 |
|---|---|---|---|
| **SPECIAL REVENUE FUNDS** | | | |
| Police Communication | $ | $ | $ |
| donation | | | |
| 12-D | | | 187,000 |
| GOHS | 25,000 | | 11,989 |
| | $ 25,000 | $ | $ 198,989 |
| Pinal/Gila Senior Center | $ 78,000 | $ 79,433 | $ 76,968 |
| Gila County Contribution Transit | 73,000 | 73,000 | 73,000 |
| Globe Contribution Transit | 73,000 | 73,000 | 73,000 |
| Gila County Senior Center | 21,296 | 14,500 | 14,500 |
| | $ 245,296 | $ 239,933 | $ 237,468 |
| HURF | $ 186,210 | $ 187,372 | $ 186,210 |
| Gila Count 1/2 Cent Excise Tax | 115,000 | 119,389 | 115,000 |
| USDA-Street Flood Control | | | 500,000 |
| CDBG | 300,000 | 339,000 | 273,000 |
| | $ 601,210 | $ 645,761 | $ 1,074,210 |
| Gila County Library District | $ 54,400 | $ 54,400 | $ 54,400 |
| | $ 54,400 | $ 54,400 | $ 54,400 |
| ADOT Contribution Transit | $ 353,000 | $ 272,345 | $ 441,727 |
| | $ 353,000 | $ 272,345 | $ 441,727 |
| Bio Waste | $ 50,000 | $ | $ |
| | $ 50,000 | $ | $ |
| Library | $ | $ | $ 14,000 |
| | $ | $ | $ 14,000 |
| Police Department- 100 Club | $ | $ | $ 7,639 |
| - Communications | | | 20,000 |
| | $ | $ | $ 27,639 |
| **Total Special Revenue Funds** | $ 1,328,906 | $ 1,212,439 | $ 2,048,433 |

* Includes actual revenues recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated revenues for the remainder of the fiscal year.

## CITY/TOWN OF Miami Tentative Budget
## Revenues Other Than Property Taxes
## Fiscal Year 2020

| SOURCE OF REVENUES | | ESTIMATED REVENUES 2019 | | ACTUAL REVENUES* 2019 | | ESTIMATED REVENUES 2020 |
|---|---|---|---|---|---|---|
| **DEBT SERVICE FUNDS** | | | | | | |
| | $ | | $ | | $ | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | $ | | $ | | $ | |
| | $ | | $ | | $ | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | $ | | $ | | $ | |
| | $ | | $ | | $ | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | $ | | $ | | $ | |
| | $ | | $ | | $ | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | $ | | $ | | $ | |
| **Total Debt Service Funds** | $ | | $ | | $ | |
| **CAPITAL PROJECTS FUNDS** | | | | | | |
| Sewer Replacment -USDA | $ | 12,000,000 | $ | 9,954,539 | $ | 3,500,000 |
| Administration Sewer | | 15,000 | | | | |
| | | | | | | |
| | | | | | | |
| | $ | 12,015,000 | $ | 9,954,539 | $ | 3,500,000 |
| GOHS Safety Grant | $ | | $ | | $ | |
| Homeland Security | | 210,000 | | | | |
| 12-D | | 200,000 | | | | |
| | | | | | | |
| | $ | 410,000 | $ | | $ | |
| Genessis | $ | | $ | | $ | |
| Public Works Barn | | 50,000 | | | | |
| Public Works Equipment Replacement | | 91,000 | | | | |
| | | | | | | |
| | $ | 141,000 | $ | | $ | |
| Bio Waste | $ | 200,000 | $ | | $ | 530,000 |
| | | | | | | |
| Senior Center Porch | | | | | | 5,000 |
| | | | | | | |
| | $ | 200,000 | $ | | $ | 535,000 |
| **Total Capital Projects Funds** | $ | 12,766,000 | $ | 9,954,539 | $ | 4,035,000 |

* Includes actual revenues recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated revenues for the remainder of the fiscal year.

## CITY/TOWN OF Miami Tentative Budget
## Revenues Other Than Property Taxes
## Fiscal Year 2020

| SOURCE OF REVENUES | ESTIMATED REVENUES 2019 | ACTUAL REVENUES* 2019 | ESTIMATED REVENUES 2020 |
|---|---|---|---|
| **PERMANENT FUNDS** | | | |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| **Total Permanent Funds** | $ | $ | $ |
| **ENTERPRISE FUNDS** | | | |
| WWT User Fees | $ 780,000 | $ 635,893 | $ 718,000 |
| Septic Receiving | 218,184 | 217,820 | 200,000 |
| Sanistion Fees | 187,152 | 188,313 | 190,000 |
| | $ 1,185,336 | $ 1,042,026 | $ 1,108,000 |
| Collection of Receivables | $ | $ | $ 140,000 |
| Deposits | | | |
| | $ | $ | $ 140,000 |
| WWT Rehab Cleaner Thickner | $ 70,000 | $ | $ |
| | $ 70,000 | $ | $ |
| | $ | $ | $ |
| | $ | $ | $ |
| **Total Enterprise Funds** | $ 1,255,336 | $ 1,042,026 | $ 1,248,000 |

* Includes actual revenues recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated revenues for the remainder of the fiscal year.

## CITY/TOWN OF Miami Tentative Budget
## Revenues Other Than Property Taxes
## Fiscal Year 2020

| SOURCE OF REVENUES | ESTIMATED REVENUES 2019 | ACTUAL REVENUES* 2019 | ESTIMATED REVENUES 2020 |
|---|---|---|---|
| **INTERNAL SERVICE FUNDS** | | | |
| | $ | $ | $ |
| | | | |
| | | | |
| | | | |
| | $ | $ | $ |
| | $ | $ | $ |
| | | | |
| | | | |
| | | | |
| | $ | $ | $ |
| | $ | $ | $ |
| | | | |
| | | | |
| | | | |
| | $ | $ | $ |
| | $ | $ | $ |
| | | | |
| | | | |
| | | | |
| | $ | $ | $ |
| **Total Internal Service Funds** | $ | $ | $ |
| **TOTAL ALL FUNDS** | $ 16,724,107 | $ 13,461,792 | $ 8,895,176 |

* Includes actual revenues recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated revenues for the remainder of the fiscal year.

# CITY/TOWN OF Miami Tentative Budget
## Other Financing Sources/(Uses) and Interfund Transfers
## Fiscal Year 2020

| FUND | OTHER FINANCING 2020 SOURCES | OTHER FINANCING 2020 (USES) | INTERFUND TRANSFERS 2020 IN | INTERFUND TRANSFERS 2020 (OUT) |
|---|---|---|---|---|
| **GENERAL FUND** | | | | |
| Administration | $ | $ | $ 117,821 | $ |
| HURF | | | | |
| **Total General Fund** | $ | $ | $ 117,821 | $ |
| **SPECIAL REVENUE FUNDS** | | | | |
| HURF | $ | $ | $ | $ |
| **Total Special Revenue Funds** | $ | $ | $ | $ |
| **DEBT SERVICE FUNDS** | | | | |
| USDA | $ | $ | $ 192,000 | $ |
| City of Globe | | | 96,000 | |
| County Magistrate | | | 21,000 | |
| **Total Debt Service Funds** | $ | $ | $ 309,000 | $ |
| **CAPITAL PROJECTS FUNDS** | | | | |
| | $ | $ | $ | $ |
| **Total Capital Projects Funds** | $ | $ | $ | $ |
| **PERMANENT FUNDS** | | | | |
| | $ | $ | $ | $ |
| **Total Permanent Funds** | $ | $ | $ | $ |
| **ENTERPRISE FUNDS** | | | | |
| Sanitation | $ | $ | $ | $ |
| Wastewater-Debt Service | | | | 309,000 |
| -Administration | | | | 117,821 |
| **Total Enterprise Funds** | $ | $ | $ | $ 426,821 |
| **INTERNAL SERVICE FUNDS** | | | | |
| | $ | $ | $ | $ |
| **Total Internal Service Funds** | $ | $ | $ | $ |
| **TOTAL ALL FUNDS** | $ | $ | $ 426,821 | $ 426,821 |

# CITY/TOWN OF Miami Tentative Budget
## Expenditures/Expenses by Fund
## Fiscal Year 2020

| FUND/DEPARTMENT | ADOPTED BUDGETED EXPENDITURES/ EXPENSES 2019 | EXPENDITURE/ EXPENSE ADJUSTMENTS APPROVED 2019 | ACTUAL EXPENDITURES/ EXPENSES* 2019 | BUDGETED EXPENDITURES/ EXPENSES 2020 |
|---|---|---|---|---|
| **GENERAL FUND** | | | | |
| Allowance for Admin Allocation | $ (629,719) | $ | $ (571,696) | $ (668,339) |
| Police | 799,131 | | 603,695 | 913,711 |
| Magistrate | 32,755 | | 25,561 | 34,533 |
| Administration | 671,553 | | 660,532 | 780,636 |
| Public Works | 231,483 | | 241,313 | 317,994 |
| Executive | 16,612 | | 14,199 | 14,912 |
| Transit | 90,000 | | 141,083 | 86,000 |
| Parks & Recreation | 133,187 | | 156,923 | 134,113 |
| Library | 53,493 | | 55,043 | 43,796 |
| Senior Center | 143,163 | | 223,295 | 182,498 |
| Develop/Eng/Code Enforacment | 53,375 | | 47,486 | 100,611 |
| Others | | | | 122,287 |
| **Total General Fund** | $ 1,595,033 | $ | $ 1,597,434 | $ 2,062,752 |
| **SPECIAL REVENUE FUNDS** | | | | |
| Transit | $ 499,000 | $ | $ 411,615 | $ 587,727 |
| Library | 54,400 | | 54,400 | 68,400 |
| Senior Center | 99,296 | | 81,750 | 91,468 |
| Police | 25,000 | | | 226,628 |
| BioWaste | 50,000 | | | |
| Streets -HURF | 464,519 | | 657,900 | 1,074,210 |
| **Total Special Revenue Funds** | $ 1,192,215 | $ | $ 1,205,665 | $ 2,048,433 |
| **DEBT SERVICE FUNDS** | | | | |
| USDA | $ 180,000 | $ | $ 195,000 | $ 192,000 |
| City of Globe | 84,000 | | 84,000 | 96,000 |
| Gila County | | | | 21,000 |
| **Total Debt Service Funds** | $ 264,000 | $ | $ 279,000 | $ 309,000 |
| **CAPITAL PROJECTS FUNDS** | | | | |
| Sewer Project | $ 12,000,000 | $ | $ 9,954,539 | $ 3,500,000 |
| Public Works | 141,000 | | | |
| Others | 925,000 | | | 535,000 |
| **Total Capital Projects Funds** | $ 13,066,000 | $ | $ 9,954,539 | $ 4,035,000 |
| **PERMANENT FUNDS** | | | | |
| Contingency | $ | $ | $ | $ |
| **Total Permanent Funds** | $ | $ | $ | $ |
| **ENTERPRISE FUNDS** | | | | |
| Sanitation | $ 131,924 | $ | $ 160,181 | $ 190,000 |
| Wastewater | 779,213 | | 432,033 | 631,179 |
| **Total Enterprise Funds** | $ 911,137 | $ | $ 592,214 | $ 821,179 |
| **INTERNAL SERVICE FUNDS** | | | | |
| Contingency | $ | $ | $ | $ |
| **Total Internal Service Funds** | $ | $ | $ | $ |
| **TOTAL ALL FUNDS** | $ 17,028,385 | $ | $ 13,628,852 | $ 9,276,364 |

* Includes actual expenditures/expenses recognized on the modified accrual or accrual basis as of the date the proposed budget was prepared, plus estimated expenditures/expenses for the remainder of the fiscal year.

# APPENDIX C-5

# LETTERS OF SUPPORT

**CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN**
**DESIGNATED MANAGEMENT AREA, TOWN OF MIAMI, ARIZONA**

**TOWN OF MIAMI**
*"Copper Center of the World"*

500 W. Sullivan St.
Miami, AZ 85539
928-473-4403
www.miamiaz.gov



October 19, 2019

Central Arizona Governments
Attention: Alan Urban
2540 W Apache Trail #108
Apache Junction, AZ 85120

Re: Letter of Support for proposed Central Arizona Governments (CAG) 208 Water Quality Management Plan Amendment by the City of Globe and Tri City Regional Sanitary District

Mr. Urban:

The Town of Miami supports the proposed CAG 208 Plan Amendment for both the City of Globe and the Tri City Regional Sanitary District which modifies each of their Designated Management Agency (DMA) boundary in Gila County. This is being done in junction with the proposed modified DMA boundary for the Town of Miami.

The proposed changes to each of the three DMA's are a positive move for the Southern Gila County region and will benefit the entire regional community.

If there are any further questions or you require additional information of this matter please contact me at your convenience.

Sincerely,

Joseph Heatherly
Town Manager
Town of Miami

# TRI-CITY REGIONAL SANITARY DISTRICT

Malissa Buzan President
5515 S. Apache Ave STE 200
Globe, AZ 85501-4430
www.TRSD.org

PO Box 2198
Claypool AZ 85532-2198
www.TRSDwastewater.org

Mary Anne Moreno, Secretary
John Chism
Stephen Palmer
Bill Tower

October 31, 2019

Central Arizona Association of Governments

Attn: Alan Urban, Community Development Manager

RE: Proposed 208 Amendment

Representatives from The TRSD Regional Sanitary District attended the Stakeholders Meeting on September 18th, 2019 along with Representatives from Globe and Miami.

TRSD agrees with the Proposed changes to the Designation Management Agency (DMA) area plan and is in full support of Globe's and Miami's changes to the current plan.

Please feel free to contact me via email or by phone if you have any questions regarding this matter.

Malissa Buzan, Tri-City Regional Sanitary District Board President

Phone: 928-961-6439

Email: maliss39@hotmail.com

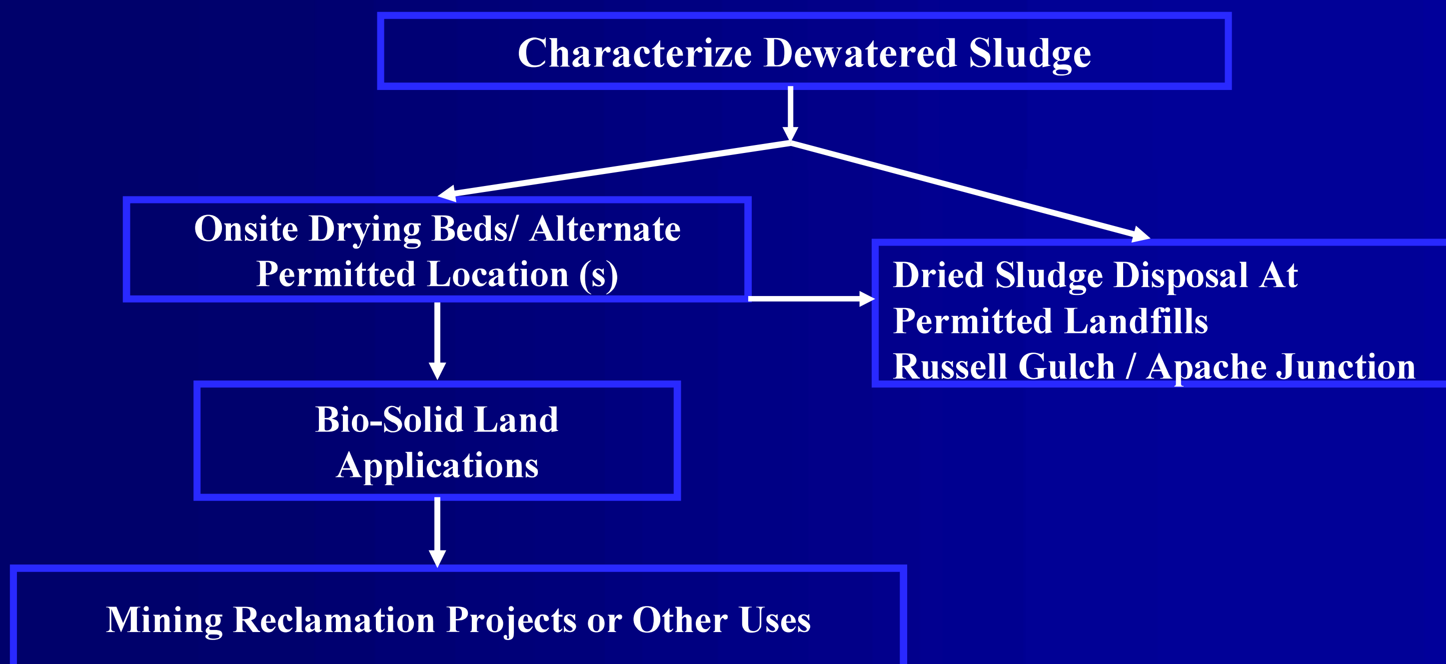
# APPENDIX C-6

## SLUDGE USE ALTERNATIVES FLOW CHART

**CAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN**
**MIAMI WASTEWATER RECLAMATION FACILITY – TOWN OF MIAMI, ARIZONA**

# Town of Miami WRF

## Sludge Management Evaluation

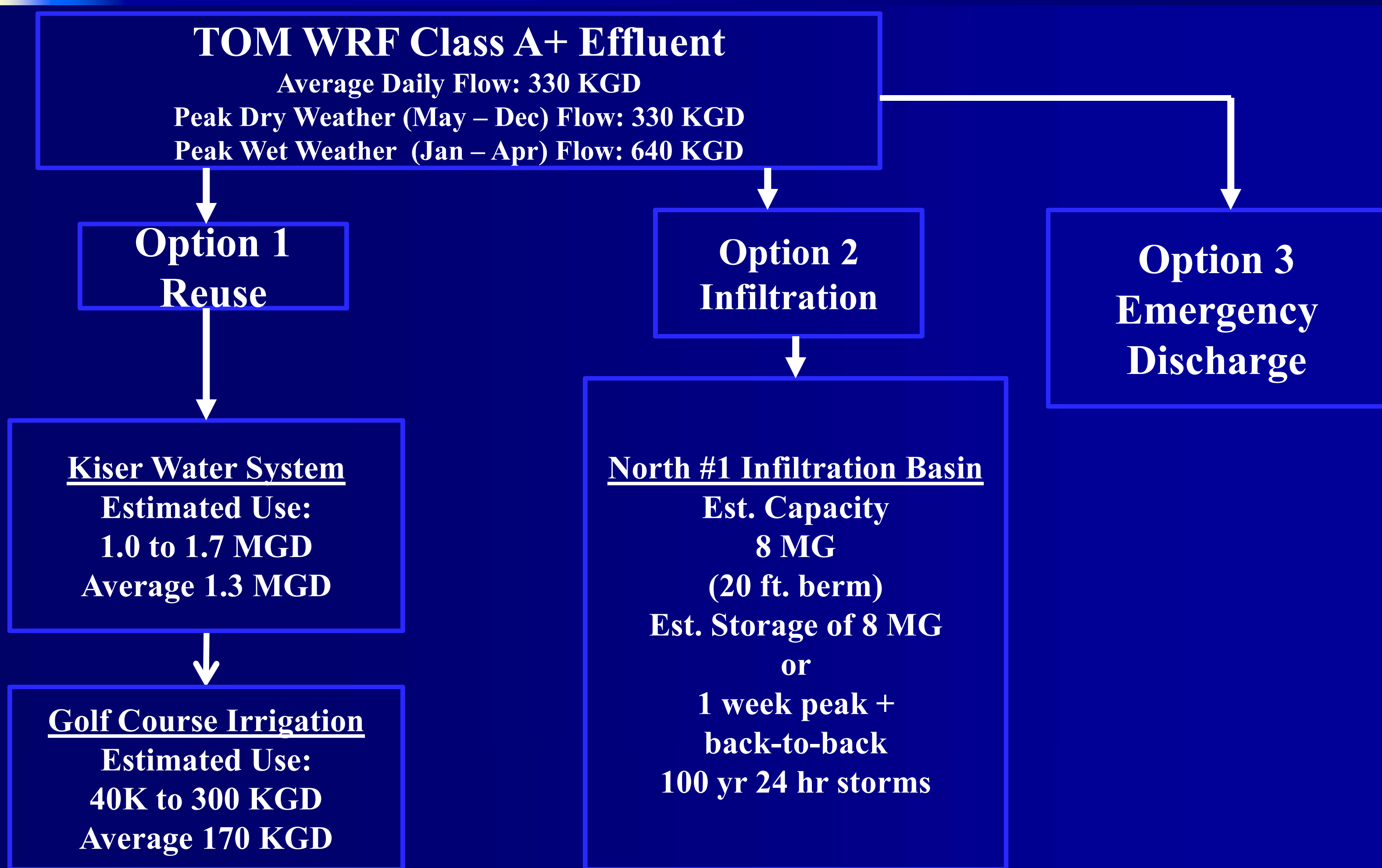


# APPENDIX C-7

# EFFLUENT USE ALTERNATIVES FLOW CHART

**CAAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN**
**MIAMI WASTEWATER RECLAMATION FACILITY – TOWN OF MIAMI, ARIZONA**

# Town of Miami WRF
## Effluent Use Alternatives



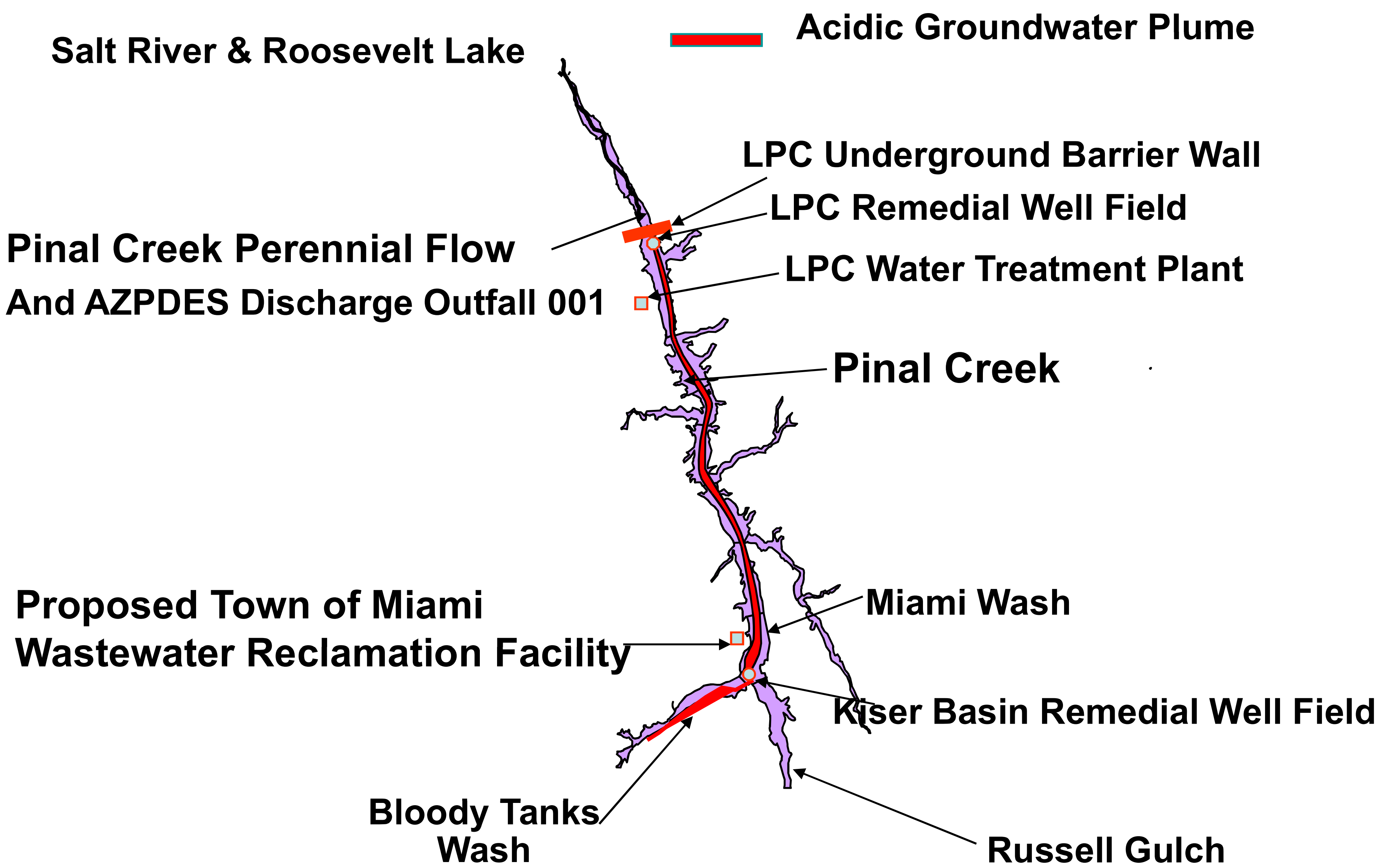

Note: Numbering indicates prioritization for sequencing options

# APPENDIX C-8

# PROPOSED WRF AND PINAL CREEK GROUP FACILITIES

## CAAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN

# *Proposed WRF & Pinal Creek Group Facilities*



# APPENDIX C-9

# GEOLOGY AND HYDROGEOLOGY OF THE PROPOSED SITE FOR WASTEWATER RECLAMATION FACILITY (GOLDER ASSOCIATES, INC.)

## CAAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN
## MIAMI WASTEWATER RECLAMATION FACILITY – TOWN OF MIAMI, ARIZONA

# GEOLOGY AND HYDROGEOLOGY OF THE PROPOSED SITE FOR A WASTEWATER RECLAMATION FACILITY
## MIAMI, ARIZONA

Prepared for

Freeport McMoRan Miami Inc.
P.O. Box 4444
Claypool, Arizona 85532

September 10, 2009

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## LIST OF FIGURES

# 1.0 INTRODUCTION

Freeport McMoRan Miami Inc. (FMMI) is preparing engineering plans to build a municipal wastewater reclamation facility (WRF) for the town of Miami, Arizona. The proposed WRF will be used to treat municipal wastewater generated by the Town of Miami that is currently being delivered to engineered storage impoundments constructed and operated on the mine tailings impoundments. Once constructed, the proposed WRF will produce Class A+ effluent, which will be utilized for beneficial use. Beneficial uses will include reuse through irrigation at the nearby Cobre Valley Country Club golf course and reuse by FMMI mining operation. As necessary, effluent will be infiltrated to the alluvium using an infiltration basin with discharge by emergency releases to Miami Wash. This document has been prepared to support permitting by summarizing the geology and hydrogeology in the vicinity of the proposed WRF and describing probable hydrologic consequences of effluent use.

The site lies within an area that has been extensively characterized during 100+ years of exploration and mine development, from studies conducted by the U.S. Geologic Survey through their Toxics Substances Hydrology Program, through environmental investigations and restoration activities conducted under the Pinal Creek State of Arizona Water Quality Assurance Revolving Fund (WQARF) program, and by routine environmental monitoring by the mining companies in the district. As a result, the amount and types of information available for the site are voluminous. For example, the FMMI environmental database alone contains over 700,000 water quality analyses and groundwater level measurements with more than 70,000 samples from approximately 1,250 sites throughout the district. Numerical modeling studies have been completed for the main alluvial aquifer (Hydro Geo Chem Inc. 1989, 1997, 1998), which provide detailed estimates of groundwater flow rates and velocities and contaminant transport behavior. The descriptions and data presented here rely largely on information available in the public domain from key documents including documents authored by the U.S. Geological Survey (Ransome, 1903; Peterson, 1962); reports by Hydro Geo Chem Inc., (Hydro Geo Chem Inc., 1989, 1993, 1997, 1998, 1999a, 1999b); and on data available from the FMMI environmental database. The reader is referred to these sources if more information is desired.

# 2.0 GEOLOGIC SETTING

## 2.1 General Site Description

The proposed WRF for the Town of Miami is located in the Globe-Miami mining district, which is within the Pinal Creek watershed. The Pinal Creek watershed is a north-northwest trending drainage basin. It is bounded by the Pinal Mountains to the south, the Salt River Mountains, Webster Mountain and Jewel Hill to the west, and the Apache Peaks, Squaw Peak and foothills of Globe Hills to the east. As is characteristic of the region, these mountains trend northwestward with the highest elevations of 7,850 feet above mean sea level (ft-amsl) in the Pinal Mountains south of Miami. Elevations then decrease north towards the Salt River. The Globe Hills and western foothills of the Apache Peaks reach elevations up to 6,940 ft-amsl.

Within the Pinal Creek watershed, the major stream drainages are ephemeral and include Bloody Tanks Wash, Miami Wash, Russell Gulch, Upper Pinal Creek, and lower Pinal Creek (Figure 1). Starting in the Pinal Mountains, Bloody Tanks Wash runs northeast for about 6.5 miles to its confluence with Russell Gulch. This general area is known as Kiser Basin. Most of the length of Bloody Tanks Wash is bordered on the north by open pit copper mines, production facilities, and tailings impoundments. Miami Wash drains northward from Kiser Basin for 2.5 miles until it joins

Upper Pinal Creek. Lower Pinal Creek begins at the confluence of Upper Pinal Creek and Miami Wash. The entire length of the west bank of Miami Wash is bordered by tailings impoundments. Below Miami Wash, lower Pinal Creek drains to the north-northwest for 13 miles where it discharges into the Salt River. The Salt River then flows westerly for about 4 miles before feeding into Theodore Roosevelt Lake.

Most of Pinal Creek and all of its tributaries within the study area are ephemeral streams. The National Weather Service precipitation gauge in the town of Miami provides a record of rainfall since 1913. Average precipitation for the area is 19 inches per year (Hydro Geo Chem Inc., 1989). Precipitation occurs in two distinct periods; summer rainfall with short but intense storms typically occurring from July to September and winter storms that can last several days from December to March. Snowfall melts quickly except for accumulations at the higher elevations of the Pinal Mountains. Most recharge to the aquifers occurs along stream channels during the winter and spring.

In its southern and central sections, the Pinal Creek drainage basin is bordered by steep bedrock hills on the west and a broad, gently sloping alluvial pediment to the east. The basin narrows to the north-northwest and a steep, narrow canyon is cut into the bedrock from Inspiration Dam to the Salt River. Streambed elevations range from 4200 to 3310 ft-amsl along Bloody Tanks Wash and from 3310 ft-amsl in Kiser Basin to 2725 ft-amsl at Inspiration Dam. The average stream grade over the 12 miles from Kiser Basin to Inspiration Dam is 0.009 (Hydro Geo Chem Inc., 1989).

The mining district is generally located in the central section of the Pinal Creek watershed. The district has had an almost continuous record of metals production since 1878. Two types of deposits have been mined within the district: large disseminated copper deposits north of the town of Miami and small polymetallic vein deposits in the Globe Hills. Underground copper mining began near the town of Globe in 1882 and ended in 1931. Copper has been mined primarily in open pits near Miami since 1903. The ore minerals in this area are disseminated in granite porphyry. The mining operations have significantly altered the physiography and surface water hydrology in portions of the watershed. Mining, source control activities, and groundwater remediation have also altered the groundwater flow system and groundwater quality in the district. The effects relevant to the proposed WRF are described in more detail later in this document.

## 2.2 Regional Geology and Stratigraphy

Ransome (1903) and Peterson (1962) provide detailed studies of the regional geology and stratigraphy of the Pinal Creek watershed. The watershed is located within an area of highly deformed and faulted blocks of upper Precambrian and Paleozoic sedimentary formations resting on lower Precambrian schists and granites. The three major structural blocks in the region are, from east to west, the Globe Hills block, the Globe Valley block and the Inspiration block:

- The Globe Hills block is bounded on the west by the Pinal Creek fault system and extends northwestward through a point likely near the confluence of Pinal Creek and Miami Wash. The Pinal Creek fault system forms a zone of extensive north-trending faults which separates a group of Precambrian to Tertiary rocks on the west from younger sedimentary formations on the east. Outcrops of diabase predominate within the Globe Hills block.

- The Globe Valley block is a graben that lies between the Globe Hills block on the east and the Inspiration block on the west. Likewise, it is bounded on the west by the Miami fault and on the east by the Pinal Creek fault zone. The Miami fault acts as the major structural feature in the region. The eastern side of the Miami fault is downthrown about 1,500 feet and is characterized by unconsolidated to semi-consolidated alluvial deposits overlying or in fault contact with older, indurated sedimentary, igneous, and metamorphic bedrock of Precambrian to Tertiary age. Bedrock includes dacite, diorite, and schist. Gila Conglomerate is the only unit cropping out from the Globe Valley block.

- The Inspiration block includes the remaining area of the Globe-Miami mining district west of the Miami fault. This block is economically significant since it contains the Miami and Inspiration copper-ore bodies. Bedrock ranges from Precambrian Pinal Schist to Recent alluvium. Outcropping units include every formation within the local stratigraphic column (schists, granites, etc.) and all intrusive and volcanic rocks known in this district.

### 2.3 Site Geology and Stratigraphy

The proposed WRF lies within the Globe Valley structural block and is located west of Miami Wash, adjacent to Tailings Impoundment #4. The site is located on a Gila Conglomerate ridge between two east-facing alluvial drainages (Figure 2). The site is bordered to the east by the alluvium of Miami Wash.

Near the proposed WRF, only the Gila Conglomerate is exposed at the surface while alluvium fills in the local erosional channels of Miami Wash and its tributaries. The Gila Conglomerate is bounded on the east by a mineralized complex and on the north by welded tuff and granite. With displacements of about 1,500 feet, the Miami fault acts as the major structural boundary of the Gila Conglomerate to the west. The Miami fault downdrops the conglomerate against the Pinal Schist and other bedrock lithologies west of Miami Wash.

The Gila Conglomerate is composed of Tertiary to Quaternary age basin-fill deposits which formed from broad alluvial fans coming from the Pinal Mountains, Globe Hills, and Apache Peaks. The conglomerate overlies Tertiary age sedimentary and volcanic rocks and underlies alluvium. The Gila Conglomerate has been incised by Bloody Tanks Wash, Webster Gulch, Russell Gulch, Miami Wash, and Pinal Creek.

The Gila Conglomerate is typically a poorly-sorted mix of angular rubble, well-rounded pebbles and cobbles, and firmly cemented sand and silt. It is calcium carbonate (calcite) cemented and moderately indurated but friable. In general, strata are lensoidal or laterally gradational over distances of several hundreds of feet. Bedding is subhorizontal in most exposures. Steeply dipping beds of the Gila Conglomerate have been observed in faulted areas along the west flank of Pinal Creek, north of Wheatfields (Hydro Geo Chem Inc., 1989). Overall, the Gila Conglomerate ranges in thickness from up to 4,000 feet thick about 1 mile south of Bloody Tanks Wash to at least 500 feet thick in the Wheatfields area (Hydro Geo Chem Inc., 1997). The Gila Conglomerate generally is cemented by calcite with a calcite content of approximately 3% by weight.

Unconsolidated alluvium, consisting of reworked Gila Conglomerate detritus and material eroded from older rocks, overlies or is adjacent to the Gila Conglomerate near the proposed WRF site. The alluvium is a poorly-sorted mix of materials with a wide range of particle size from clay to boulders. It is predominantly composed of fine sand to coarse gravel but finer and coarser materials are also present, generally in localized lenses and stringers. Recent, unconsolidated deposits of alluvium cover hillsides and fill the erosional channel of Pinal Creek and its tributaries including Bloody Tanks Wash, Russell Gulch and Miami Wash. Older deposits of alluvium of up to tens of feet thick form a pediment covering the Gila Conglomerate along the east flank of lower Pinal Creek. Overall, the alluvium ranges in width from 985 to 2,600 feet and is up to 165 feet thick along Miami Wash and lower Pinal Creek (Eychaner and Stollenwerk, 1985).

In the vicinity of the proposed WRF site, the Gila Conglomerate has been incised by easterly and north-easterly ancestral drainages to Miami Wash. The tributaries mostly underlie the tailings impoundments (Figure 2). The extent of the alluvium under the tailings impoundments was estimated based on original topography and historic aerial photographs (Hydro Geo Chem Inc. 1999a).

Knowledge of the thickness of alluvium and depth to the base of the Gila Conglomerate in the vicinity of the proposed WRF site and proposed infiltration basin is available from drill logs for wells located in tributary drainages and the adjacent Miami Wash. The locations of wells referenced in this document are shown on Figure 2. At monitor well 6DW-1, the thickness of alluvium is 31 feet. The alluvium is 42.5 feet thick at monitor well TAA-4 located north of the proposed WRF site, and 50 feet at monitor well TAA-3 located south of the site. The alluvium is 82 feet thick at monitor well TAA-10. In Miami Wash, the alluvium thickness is 115 feet at wells KBM-3, KB-10, and KB-11. The Gila Conglomerate underlies the alluvium throughout the study area. The base of the Gila Conglomerate in the vicinity of the proposed WRF site is reported to be at a depth of approximately 1,060 feet at well REF-1.

## 3.0 HYDROGEOLOGIC SETTING

### 3.1 Regional Hydrogeology

#### 3.1.1 Regime

The regional and local hydrogeology of the Pinal Creek watershed has been described in numerous reports by Hydro Geo Chem Inc., (Hydro Geo Chem Inc., 1989, 1993, 1997, 1998, 1999a, 1999b) and the U.S. Geological Survey (Eychaner and Stollenwerk, 1985; Eychaner, 1988, 1991). Within the area of the Pinal Creek watershed, groundwater is produced from two major sources: alluvium and the Gila Conglomerate (Hydro Geo Chem Inc., 1997). These two aquifers have historically produced water for domestic use, industrial supply, and other uses. Crystalline bedrock generally does not yield significant flow in the region and is not considered to be an important aquifer in the study area (Hydro Geo Chem Inc., 1997, 1999a).

The Gila Conglomerate aquifer is widespread in the watershed, forming laterally extensive basin-fill deposits hundreds of feet deep. It is exposed throughout the area and is bounded by the Miami fault on the west and incised by Pinal Creek and its tributaries. The conglomerate is the primary source of fresh water in the area and is capable of supporting wells with several hundred gallons-per-minute production. However, previous reports have noted the heterogeneous nature of the Gila Conglomerate and the irregular distribution of water producing zones (Hazen and Turner, 1945; Peterson, 1962).

The Gila Conglomerate aquifer is recharged by stormwater infiltration into conglomerate outcrops and from groundwater flow from the upgradient bedrock. In areas where the Gila is buried by tailings, recharge occurs by pore water drainage from tailings impoundments and groundwater flow from the upgradient bedrock. The Gila Conglomerate typically has an unsaturated zone (Hydro Geo Chem Inc., 1999a). The thickness of this unsaturated zone depends on the topography since the groundwater elevation slopes either more or less than the pre-existing topography from the Miami fault in the west to Miami Wash in the east. Although the Gila Conglomerate appears to act as an unconfined aquifer at shallow depths, its heterogeneous nature can also cause confined to semi-confined conditions at depth.

Since the alluvium is composed of poorly-sorted, unconsolidated sediments, it forms a highly permeable water table aquifer. The alluvial deposits fill the erosional channels cut into the Gila Conglomerate by Pinal Creek and its tributaries. Alluvium generally coarsens with depth and coarse, highly permeable gravel and boulder zones have been identified at the base of the alluvium. The alluvial aquifer is narrow (less than 1,000 feet wide) and shallow (less than 100 feet deep) within the watershed. The alluvium between the Pinal Crossing and Nugget Wash confluence is constricted by outcrops of the Gila Conglomerate. This results in a hydrogeologic "bottleneck" in the alluvium in lower Pinal Creek (Figure 1), which divides the watershed into upper and lower basins.

The alluvial aquifer is recharged by intermittent surface water flows, storm events, and upward flow from the Gila Conglomerate to the alluvium. Most recharge to the alluvial aquifer occurs along stream channels during the winter and spring runoff events. This aquifer responds rapidly to storm events. Data collected from wells in the alluvium have shown that groundwater elevations are highly dynamic, varying in response to major single runoff events as well as seasonal fluctuations. At times, the alluvial groundwater level has risen to land surface along the stream channel. Due to its dynamic nature, the alluvial aquifer is considered to be unconfined, though localized variability due to discontinuous clay strata may cause semi-confined behavior.

### 3.1.2 Aquifer Properties

Based on pump tests of wells screened in the Gila Conglomerate, Envirologic Systems, Inc. (1983) estimates transmissivity for that unit in the range 2.8 to 31.7 feet squared per day ($ft^2$/day). Estimates of hydraulic conductivity range between 0.1 to 0.2 feet per day (ft/day) (Hydro Geo Chem Inc., 1997) and average 0.58 ft/day along Webster Gulch beneath the tailings impoundments (Hydro Geo Chem Inc., 1999a).

Significant information exists on the hydraulic properties of the alluvial aquifer. The hydraulic properties have been estimated from the results of aquifer tests in Kiser Basin, Miami Wash, and along lower Pinal Creek; from calibrated groundwater flow modeling; and from tracer studies. Estimates of transmissivity for the alluvial aquifer range from 4,500 to 59,765 $ft^2$/day (Hydro Geo Chem Inc., 1989). The hydraulic conductivity ranges from approximately 300 to as much as 1,200 ft/day (Hydro Geo Chem Inc., 1997). The average hydraulic gradient in the alluvium is 0.02 ft/ft (Hydro Geo Chem Inc., 1999a). Extensive numerical groundwater flow and transport modeling (Hydro Geo Chem Inc., 1989, 1997, 1998) has included calibration of hydraulic properties consistent with these reported ranges.

Since the hydraulic conductivity of the alluvium is two orders of magnitude higher than the Gila Conglomerate, groundwater flows more easily in the alluvium and does not migrate significantly into the Gila Conglomerate unless a downward vertical hydraulic gradient exists across the contact. Historically, most measurements of hydraulic head in the Gila Conglomerate are higher than hydraulic head of the overlying alluvium. For instance, water levels in Webster Gulch, Kiser Basin, and Pinal Creek indicate that groundwater flows upward and laterally from the Gila Conglomerate to the alluvial aquifer. Alternatively, the Gila Conglomerate may behave locally as a semi-confined aquifer.

### 3.1.3 Groundwater Levels and Flow

Hydro Geo Chem Inc., (1999a) provides a list of groundwater elevations for monitoring wells screened within the Gila Conglomerate aquifer in the general area of Bloody Tanks Wash, Webster Gulch and Miami Wash. Groundwater elevations ranged from approximately 3,192 to 3,294 ft-amsl in Miami Wash. Elevations in Webster Gulch and Bloody Tanks Wash ranged from approximately 3,304 to 3,458 ft-amsl. North of Webster Gulch, groundwater flow direction in the Gila Conglomerate aquifer is generally from the west to the east-northeast. South of Webster Gulch, groundwater flow diverges to the nearby alluvial channels of Webster Gulch, south to Bloody Tanks Wash, and east to Miami Wash. Groundwater velocities in the Gila Conglomerate range from 0.01 to 0.12 ft/day (Hydro Geo Chem Inc., 1999a).

As previously noted, groundwater elevations in the alluvial aquifer are highly dynamic, responding rapidly to storm events and seasonal fluctuations. This is shown on figures 3 and 4 for selected representative groundwater wells completed in the alluvium of Miami Wash. Figure 3 shows levels for wells located in the southern portion of the study area. Figure 4 shows levels for wells completed in the northern study area. Historical water level measurements in the Kiser Basin have varied by as much as 60 feet over the period of record and have risen over 20 feet in less than 30 days in response to major storm events (Hydro Geo Chem Inc., 1998). In the alluvial aquifer, groundwater flow generally follows the topography of the bottom of the alluvial channel. Groundwater parallels the stream channels and flows north-northwestward from Miami Wash to lower Pinal Creek and further downstream to the Salt River. Calculated average groundwater velocities range from approximately 15 to 30 ft/day (Hydro Geo Chem Inc., 1997).

### 3.1.4 Groundwater Quality

Groundwater quality along Bloody Tanks Wash, Miami Wash, and lower Pinal Creek has been impacted by mining operations. The earliest evidence of poor-quality groundwater in the watershed dates from the mid-1930s, when water supply wells in Miami Wash were retired due to acidic conditions indicating that in order to migrate to Miami Wash, releases of poor quality water occurred prior to that time (Hydro Geo Chem Inc., 1997). Impacted water is characterized by low pH, acidity, elevated metals concentrations, and elevated sulfate concentrations. Impacts are primarily limited to the shallow alluvial aquifer below mine discharge areas, but some localized impacts to the Gila Conglomerate aquifer have occurred. Groundwater impacts have occurred from the upper reaches of Bloody Tanks Wash to lower Pinal Creek, a distance of about 10 miles.

Metals that are present in groundwater at concentrations that exceed drinking water standards or are elevated above background levels include iron, manganese, copper, cobalt, nickel, zinc, cadmium, beryllium, aluminum, and chromium. Elevated concentrations of sulfate, total dissolved solids, fluoride, lithium, strontium, hardness, and sodium are also present. The values of pH may be as low as 2.0, but typically range from 3.0 to 6.5 in acidic water. Other inorganic contaminants can also be present.

Hydro Geo Chem Inc. identified four water types at the site (1989):

**Table 1. Water Analyses Typical of Acid, Transition, Neutralized, and Unimpacted Waters**

| Constituent\Water Type | Acid | Transition | Neutralized | Unimpacted |
|---|---|---|---|---|
| pH | 3.66 | 4.39 | 5.57 | 7.51 |
| Electrical Conductance (mS/cm) | 9.53 | 4.38 | 3.95 | 0.67 |
| Alkalinity (mg/l as $CaCO_3$) | <1 | <1 | 39 | No Data |
| $SO_4$ (mg/l) | 8,700 | 2,800 | 2,400 | 158 |
| Al (mg/l) | 326 | 16 | 2 | <0.01 |
| Cu (mg/l) | 116 | 25 | 0.9 | <0.05 |
| Fe (mg/l) | 2,555 | 375 | <0.05 | 0.09 |
| Mn (mg/l) | 51 | 91 | 115 | 0.75 |
| Zn (mg/l) | 16 | 6 | 3 | <0.01 |
| Cl (mg/l) | 289 | 124 | 113 | 20 |

Unimpacted represents background groundwater conditions. Neutralized represents water with a component of acidic mine releases that has been neutralized by natural buffering capacity of the aquifer materials and alkalinity in native groundwater and recharge. Transition represents water deteriorating in quality from neutralized to acid conditions, and acid water represents groundwater fully impacted by mine releases, in which the acidity of the releases has consumed the natural buffering capacity. Acid conditions prevail today along the Miami Wash alluvial aquifer, although concentrations have been declining since implementing remedial actions in upgradient areas.

### 3.1.5 Influence of Remedial Actions

Historical groundwater contamination resulting from mining operations is being managed by various remedial activities within the study area. Most relevant to the proposed WRF site are the active remedial pumping wells at Kiser Basin. The Pinal Creek Group, a consortium of mining companies in the district, operates a series of shallow groundwater extraction wells designed and operated to intercept poor quality groundwater from source areas along Bloody Tanks Wash and Webster Gulch. Some groundwater from Russell Gulch is not captured by the Kiser basin pumping system, but this groundwater is not impacted to the same degree as groundwater from other source areas.

The Kiser Basin pumping system removes annually 39 to 72 million gallons, approximately 1.5 to 2.8 million pounds of aluminum, iron, copper, manganese, and zinc, and approximately 6.5 to 14.5 million pounds of sulfate (data from 2000 to 2004). The hydraulic effect of this remedial action is to remove groundwater that would otherwise report to Miami Wash. As a result, the groundwater elevations in the Miami Wash alluvial aquifer are lowered.

The lower Pinal Creek wellfield, cutoff wall, and water treatment plant are located below the study area (Figure 1). At this location, all shallow alluvial groundwater is captured by a remedial wellfield aided by the barrier wall across the alluvium. The extracted groundwater is treated by a nearby water treatment plant. The treated water is discharged to the lower Pinal Creek stream channel below the cutoff wall. While this is an important element of the site-wide remediation network, it does not have any hydrogeologic effect on the conditions at the proposed WRF site.

### 3.2 Site Hydrogeology

#### 3.2.1 Regime

Groundwater conditions along Miami Wash have been thoroughly characterized and are well documented. Numerous groundwater monitoring wells, piezometers, and remedial extraction wells exist (Figure 2). These wells are periodically monitored along the reach proximal to the proposed WRF site. Quantitative studies have been made of the groundwater flow rates and chemistry using numerical models. Groundwater conditions in the alluvial tributary drainages and the underlying Gila Conglomerate have been characterized by Golder Associates Inc. (1997) and Hydro Geo Chem Inc., (1999a). Nested groundwater monitor wells were installed in the mid-1990s in each of the major tributary drainages near the confluence with Miami Wash. The TAA-series wells were completed in the tributary alluvium; the TAGS-series wells were completed in the underlying Gila Conglomerate. The wells are monitored routinely for water levels and chemistry.

Groundwater in the vicinity of the proposed WRF is present in (1) unconfined to locally semi-confined conditions in the alluvial deposits of Miami Wash and tributaries and (2) confined to semi-confined conditions in the underlying Gila Conglomerate. The areal extents of exposed alluvium and Gila Conglomerate are shown on Figure 2. The site hydrogeologic regime is dominated by the Miami Wash alluvial aquifer and its associated alluvial tributary drainages.

Groundwater in the alluvial aquifer along Miami Wash flows to the north, except where it is affected by remedial pumping in Kiser Basin to the south. The direction of flow at the site mimics the stream channel grade. The aquifer receives recharge from:

1. infiltrating stormflows from Russell Gulch, Bloody Tanks Wash, and tributary drainages;

2. groundwater flow from Russell Gulch, and to a lesser degree Bloody Tanks Wash[1], that bypasses the Kiser Basin wellfield;

3. lateral groundwater inflows from tributary drainages;

4. upward discharge from the Gila Conglomerate aquifer; and

5. direct precipitation to exposed alluvium.

Groundwater in the alluvial tributary drainages, where present, is controlled by the surface of the incised Gila Conglomerate and generally flows along the alignment of the ancestral and present day channel. Near the confluence with Miami Wash, the alluvium in the tributary drainages is in direct hydraulic communication with the alluvial aquifer along Miami Wash. As such, the direction of groundwater flow in the alluvium of the tributary drainages can be reversed if groundwater levels in Miami Wash are elevated relative to groundwater levels in the drainages.

Recharge to the tributary drainages is significantly restricted by the overlying low-permeability tailings impoundments, but recharge can occur from (1) upward discharge from the underlying Gila Conglomerate and (2) infiltrating stormflows where the alluvium in the drainages is exposed along Miami Wash. Recharge occurs in stormwater retention basins constructed along some of the major

[1] Although the Kiser Basin wellfield was designed to provide hydraulic containment of impacted water originating along Bloody Tanks Wash, bypass occurs during prolonged low flow periods (e.g. drought conditions) when groundwater levels are depressed and hydraulic containment is less efficient.

tributaries (Figure 2) and by infiltration along the tributary stream channels. Recharge can also occur from the alluvial aquifer in Miami Wash during periods of high groundwater levels.

### 3.2.2 Aquifer Properties

Although no site-specific hydraulic testing has been conducted near the proposed WRF, local aquifer properties are expected to be similar to those found regionally.

### 3.2.3 Groundwater Levels and Flow

Groundwater elevations and depth to groundwater are shown on Figures 3 and 4 for selected wells in the area of the proposed WRF, the proposed infiltration basin, and adjacent areas along Miami Wash. Depths to groundwater are shallow, ranging from 6 to 100 feet. In the drainage immediately north of the proposed WRF site, depth to groundwater in the alluvium ranges from 17.6 feet to 27.2 feet (TAA-4). In the southern tributary drainage (well TAA-3), depth to groundwater in the alluvium is 46.4 to 55.5 feet. Water levels for both wells have been declining over the period of record beginning in 1995. Further north in monitor well TAA-10, depth to groundwater in the alluvium ranges from 34.5 to 70.0 feet. Groundwater levels in the tributaries are generally higher than those in the Miami Wash alluvium (figure 3 and 4), indicating a predominant direction of flow to the east into the Miami Wash alluvial aquifer.

Groundwater levels in monitor well 6DW-1 are typically 7.9 to 15.3 feet below the alluvium/Gila Conglomerate contact. At this location, the alluvium is unsaturated.

Most nested wells show an upward gradient from the Gila Conglomerate to the alluvium. Calculated vertical gradients for TAA-04 and TAGS-4 range from 0.043 to 0.11 ft/ft upward. Calculated vertical gradients for TAA-03 and TAGS-3 range from 0.12 ft/ft downward to 0.69 ft/ft upward, averaging 0.34 ft/ft upward. This general upward direction of flow from the Gila Conglomerate into the alluvial aquifer is consistent with regional observations in the district. A downward vertical gradient is measured between TAA-10 and TAGS-10.

Flows along Miami Wash near the site have been quantified by others, most notably Hydro Geo Chem Inc., who developed calibrated numerical groundwater flow models for the alluvial aquifer (Hydro Geo Chem Inc., 1989, 1997, 1998). The models were developed to support the initial remedial investigation, support the alternatives analysis for the feasibility study, and design and evaluate remedial actions, including the wellfield at Kiser Basin. The hydraulic properties of the aquifer were developed based on site-specific hydraulic testing, and adjusted during model calibration. Using these calibrated properties, flows were estimated for a high flow period following a large storm event in 1993 (Figures 3 and 4) and for more recent "average" conditions using water levels for calendar year 2006. For 1993, the flow rate for Miami Wash alluvial aquifer using a hydraulic gradient of 0.004 ft/ft and a hydraulic conductivity of 1,050 ft/day (Hydro Geo Chem Inc., 1997, Appendix F) is approximately 2,700 gallons per minute (gpm). For 2006, the calculated flow rate is approximately 780 gpm using a computed gradient of 0.0036 ft/ft. These estimated flow rates are consistent with the flow rates calculated by the numerical flow models.

The difference in estimated flow rates between these two periods is due to the significantly lower water levels in Miami Wash alluvium (Figure 3) and the attendant reduced cross sectional area of groundwater flow. The reduced water level is due to climatic factors, but also to the remedial pumping in Kiser Basin, which has operated on average at rates of 1,452 gpm for 2005, 778 gpm for 2006, and 366 gpm for 2007. The reported pumping capacity for the Kiser Basin wellfield is approximately 4,000 gpm. For comparison, the LPC wellfield (Figure 1) has operated at average rates of 2,629 gpm for 2005, 2,415 gpm for 2006, and 1,759 gpm for 2007. The LPC wellfield removes all alluvial groundwater flow at the cutoff wall.

Groundwater flows from the tributaries are not available, but are expected to be significantly less than the flow along Miami Wash under average conditions.

### 3.2.4 Groundwater Quality

Groundwater chemistry at the proposed WRF site is variable, depending on the aquifer and location relative to mine releases. Table 2 (located at the end of this document) provides summary statistics for site groundwater water chemistry for selected wells. Provided are minimum, maximum, and average concentrations for major and minor constituents including heavy metals. Chemistry for selected wells is described below:

- Monitor wells KB-9, KB-10, KB-11 and KBM-3 – Chemistry data are available for some of these wells since 1989. All of these wells are completed in the alluvium of Miami Wash near the proposed site. The periods of record of chemistry data for these wells reflects the recent history of groundwater contamination along Miami Wash. The water type for these wells is acid (Table 1), with pH as low as 2.9 (averaging from 3.6 and 3.9), elevated TDS and sulfate, and elevated heavy metals concentrations. For example, the record shows iron concentrations as high as 1,462 milligrams per liter (mg/L) and copper as high as 226 mg/L.

- Monitor wells TAA-3 and TAGS-3 – Chemistry for these monitor wells reflects shallow groundwater chemistry for the alluvium and Gila Conglomerate, respectively, in a tributary to Miami Wash. Chemistry is similar in each suggesting good hydraulic communication between the two formations, although concentrations are slightly higher in the Gila Conglomerate. Both waters are generally neutral, but exhibit elevated concentrations of TDS and sulfate. Heavy metals are below detection or present only at trace or low concentrations. The chemistry at these wells is likely affected by tailings seepage.

- Monitor wells TAA-4 and TAGS-4 – Chemistry for monitor well TAA-4 reflects shallow groundwater chemistry for the alluvium in this minor tributary to Miami Wash. The groundwater is neutral, but exhibits slightly elevated concentrations of TDS and sulfate. Heavy metals are below detection or present only at trace or low concentrations. The chemistry at this well is comparable to that of TAA-3 and is also likely affected by tailings seepage. Chemistry for the adjacent monitor well TAGS-4 reflects shallow groundwater chemistry for the Gila Conglomerate. The groundwater is neutral, and does not exhibit elevated concentrations of TDS or sulfate. Heavy metals are below detection or present only at trace concentrations. The chemistry at this well likely represents unimpacted background groundwater in the Gila Conglomerate.

- Monitor wells TAA-10 and TAGS-10 – Chemistry for monitor well TAA-10 reflects shallow groundwater chemistry for the alluvium in this minor tributary to Miami Wash. The groundwater is neutral, but exhibits slightly elevated and variable concentrations of TDS and sulfate. Heavy metals are below detection or present only at trace or low concentrations. The chemistry at this well is comparable to that of TAA-3 and TAA-4 and is also likely affected by tailings seepage. Chemistry for adjacent monitor well TAGS-10 reflects shallow groundwater chemistry for the Gila Conglomerate. The chemistry is similar to the alluvium suggesting good hydraulic communication consistent with the measured downgradient vertical gradient at this location.

- Monitor well 6DW-1 – This monitor well is completed in the Gila Conglomerate adjacent to the FMMI industrial water circuit pond 6 Decant (Figure 2). Measured water levels are in the Gila Conglomerate. Chemistry for this well is not impacted by acidic mine discharges, but does reflect impacts from the 6 Decant Pond. Concentrations of total dissolved solids (TDS), chloride and sulfate are elevated relative to unimpacted water type (Table 1) and the other local wells completed in the Gila Conglomerate (TAGS-3 and TAGS-4). The water exhibits a circumneutral pH with measureable alkalinity (130 to 143 mg/L as $CaCO_3$). Heavy metals are below detection or present only at trace concentrations.

## 4.0 PROPOSED ACTION

The proposed WRF will receive and process municipal wastewater from the current Town of Miami's sewer system. Monthly measured municipal influent flows provided by the Town of Miami are as follows:

**Table 3. Influent Wastewater Flows - From January to December 2008**

| Month | Total Flow (gal) | Average Daily Flow (gpd) | Peak Daily Flow (gpd) |
|---|---|---|---|
| January-08 | 11,143,160 | 359,456 | 607,520 |
| February-08 | 14,631,410 | 504,531 | 593,210 |
| March-08 | 13,260,800 | 427,767 | 566,030 |
| April-08 | 7,816,320 | 260,544 | 336,290 |
| May-08 | 7,836,940 | 252,804 | 349,580 |
| June-08 | 7,373,500 | 245,783 | 278,770 |
| July-08 | 7,440,970 | 240,031 | 327,020 |
| August-08 | 5,536,270 | 178,589 | 249,470 |
| September-08 | 6,327,970 | 210,932 | 271,650 |
| October-08 | 6,919,270 | 223,202 | 284,890 |
| November-08 | 6,738,830 | 224,627 | 270,960 |
| December-08 | 7,307,560 | 235,727 | 295,750 |

gal = gallons; gpd = gallons per day

The average daily flow based on these records is 194 gpm with a peak of 422 gpm.

Municipal influent wastewater is currently placed on an FMMI tailings impoundment for evaporation (Figure 2). The proposed WRF will reclaim all the wastewater flows producing a Class A+ effluent that can be put to beneficial use. The beneficial uses include reuse by Cobre Valley Country Club golf course for irrigation and FMMI mining operations. When necessary, water will be conveyed to an infiltration basin located near the WRF with emergency direct discharge to Miami Wash.

It is likely that some combination of reuse at the mine and golf course with infiltration will be used to handle the proposed WRF discharge to accommodate seasonal variability in flows, seasonal demand, and storage and infiltration limitations using a basin. Direct discharge to Miami Wash for infiltration along the channel would occur, if ever, only under emergency conditions resulting from disruption of reuse systems and following full use of the infiltration basin option.

The reuse concepts and probable hydrologic consequences of each are described in the following sections.

### 4.1 Reuse

The proposed WRF effluent will first be used to augment or replace irrigation for the Cobre Valley Golf Course located directly across Miami Wash from the proposed WRF site (Figure 2) and to augment or replace the water supply for FMMI mining operations.

The Cobre Valley Golf Course is currently supplied fresh water from a groundwater source. Reuse of effluent will be used to augment or replace the irrigation requirements. The irrigation requirements vary throughout the year based on the season, ranging from approximately 30 gpm in the winter months to 210 gpm during peak summer months. Irrigation can accommodate the average WRF flow during summer months, and may be increased if the facility overseeds with year-round irrigation. As with reuse in mining activities, reuse for irrigation will allow for less stress on existing water supply wells that currently provide this water. The irrigation water will meet irrigation standards and is of significantly better quality than groundwater in the alluvial aquifer underlying the golf course.

Most golf course irrigation is and will likely continue to be consumptively lost by evapotranspiration. What infiltration does occur has no detrimental effects to the hydrogeologic flow system along Miami Wash. The depth to groundwater along Miami Wash is as much as 100 feet (Figure 3), which provides a significant vadose zone to accept recharge. The alluvial flow system has the hydraulic capacity to accept additional recharge from golf course irrigation beyond that already occurring. As described earlier, the estimated groundwater flow along Miami Wash near the proposed WRF was approximately 780 gpm in 2006, whereas the maximum calculated flow is approximately 2,700 gpm following a major storm event in 1993. For normal conditions, therefore, Miami Wash can accommodate an additional 2,000 gpm in recharge, far in excess of the average and peak WRF discharge rates. Any significant increases in water levels will be moderated by pumping at the Kiser Basin wellfield.

Probable hydrologic consequences include minor increases in the groundwater levels in the alluvial aquifer along Miami Wash. Any increase in groundwater levels along Miami Wash resulting from additional recharge will help to improve the efficiency of hydraulic containment by the Kiser Basin wellfield. In addition, a modest improvement to groundwater quality in the vicinity and downgradient of the golf course can be expected as clean recharge water mixes with contaminated groundwater in the alluvial aquifer. Routine groundwater monitoring being conducted by FMMI will provide information to detect and measure any changes in groundwater levels and quality.

FMMI requires water supplies to support various mining activities. For example, the smelter requires on average between 670 and 1,200 gpm, averaging approximately 1,000 gpm (2008 data). The smelter alone can assume the full 194 gpm complement of WRF effluent, which will allow for less stress on existing water supply wells that currently provide this water. Any water that is reused by FMMI mining activities is consumptive and has no effect on the hydrologic or hydrogeologic system other than to reduce demand on existing groundwater supplies.

### 4.2 Infiltration Basin

WRF effluent that is not reused as described above will be conveyed to an infiltration basin located in a tributary drainage to Miami Wash. Several potential infiltration basins have been identified north of the proposed site and include existing non-discharging, bermed stormwater impoundments used to contain and infiltrate storm runoff from the small, truncated tributary catchments. The basin being considered for the WRF is shown on Figure 2. High infiltration rates are possible through the alluvium, although infiltration may be limited by groundwater mounding within the drainages during operation. Monitoring of groundwater levels along Miami Wash will be conducted during infiltration to ensure excessive groundwater mounding does not occur.

Probable hydrologic consequences include raising of the groundwater levels in the alluvial aquifer in tributary drainages and along Miami Wash. As described earlier, the Miami Wash alluvium has significant capacity to receive additional inflows and surfacing of groundwater along Miami Wash is considered unlikely. Groundwater levels have only risen to near land surface once in nearly 30 years of monitoring, resulting from a large runoff event during the winter of 1992/1993. Regardless, routine and site-specific monitoring of groundwater levels near the basin and along Miami Wash will be used to guide basin use to avoid any excessive groundwater mounding.

As with current conditions in the tributaries, infiltration to the Miami Wash alluvium will rinse impacted sediments with clean water and accelerate the cleanup of the aquifer. Further, any increase in groundwater levels along Miami Wash resulting from infiltration will help to improve the efficiency of hydraulic containment by the Kiser Basin wellfield.

### 4.3 Emergency Discharge to Miami Wash

Direct discharge to Miami Wash will be used for emergency purposes only. Based on the capacity for reuse and infiltration in a basin, this option is unlikely to be used and is presented only for contingency. This option is least desirable due to poor control following discharge and the more onerous regulatory monitoring and reporting requirements. As currently envisioned, direct discharge would be required only if other measures cannot be used to adequately handle effluent flows.

Probable hydrologic consequences include raising of the groundwater levels in the alluvial aquifer along some length of Miami Wash and lower Pinal Creek. The volume of release is expected to be small following abstractions for reuse and basin infiltration.

Any infiltration of clean water to the Miami Wash alluvium will rinse impacted sediments with clean water and accelerate the cleanup of the aquifer. This may be focused to the sediments along the current thalweg of the drainage.

## 5.0 SUMMARY

FMMI is planning to design and construct a municipal WRF for the Town of Miami. The WRF will accept and reclaim municipal wastewater at an average rate of approximately 300,000 gpd. The treated effluent will meet Class A+ standards, and the effluent will be utilized for beneficial use. Beneficial uses will include irrigation at the nearby Cobre Valley Country Club golf course and reuse by FMMI mining operations. An infiltration basin is also planned to help utilize the effluent followed by emergency releases to Miami Wash.

Abundant data exist regarding the geology, hydrology, and groundwater quality for the proposed WRF site from previous studies. Groundwater exists in the shallow alluvium deposits along Miami Wash and tributaries and deeper in the underlying Gila Conglomerate. Along Miami Wash, groundwater has been impacted by historical mining practices. These impacts include acidic conditions characterized by low pH, elevated sulfate and TDS, and elevated heavy metals concentrations. Groundwater chemistry in the vicinity of the proposed WRF is variable depending on the aquifer and proximity to upgradient sources. Groundwater quality in these areas is of significantly better quality than the Miami Wash alluvial aquifer and in some areas is unimpacted by mining activities.

With the exception of reuse by mining activities, beneficial uses will recharge the shallow alluvial aquifer in the local tributaries near the proposed WRF site and in the nearby Miami Wash alluvial aquifer. The infiltration rates are small relative to the total hydraulic capacity of the alluvial aquifer along Miami Wash. The probable hydrologic consequences of increased infiltration include raising of the groundwater levels in the alluvial aquifer along Miami Wash and tributary drainages if used for infiltration basin. Routine groundwater monitoring at infiltration basin and along Miami Wash will be used to monitor the effect of infiltration on groundwater levels and chemistry. As with current conditions, infiltration to the Miami Wash alluvium will rinse impacted sediments with clean water and accelerate the cleanup of the aquifer. Further, any increase in groundwater levels along Miami Wash resulting from infiltration will help to improve the efficiency of hydraulic containment by the Kiser Basin wellfield.

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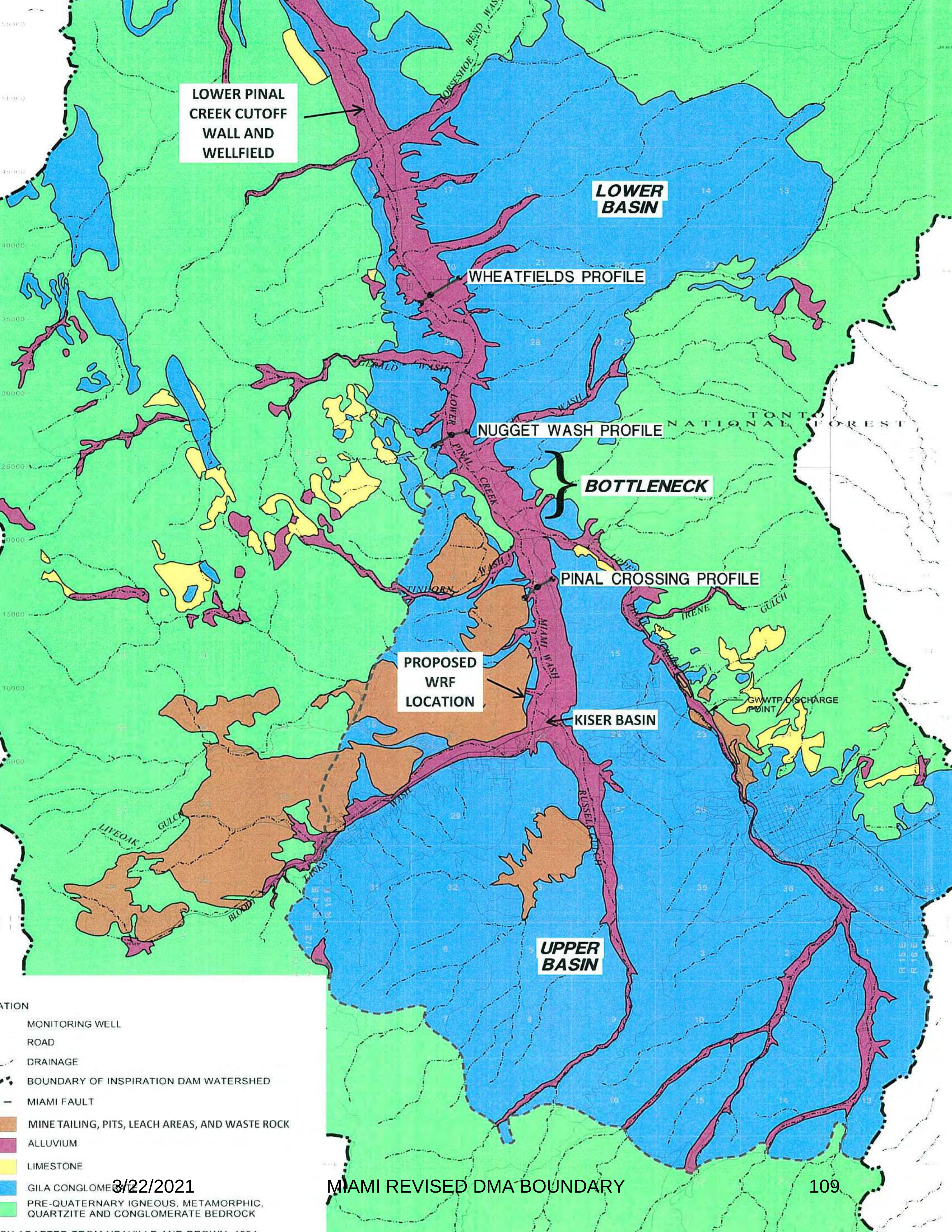
TABLES

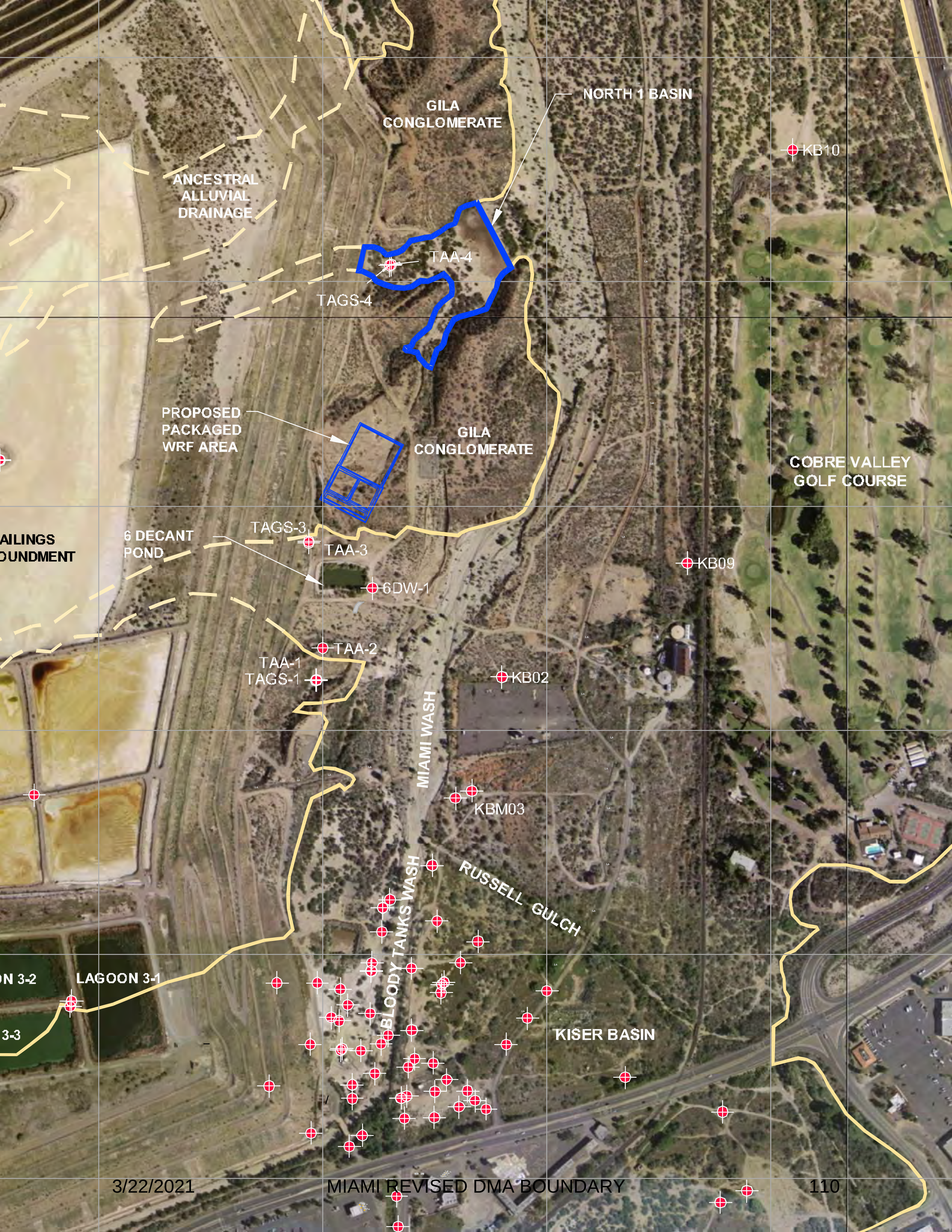
| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/18/1996 | 7810 | 7200 | 4420 | 7.2 | 6.4 | NA | 1130 | 793 | 147 | 146 | 82 | 439 | 6.0 | 13 | 130 | 1480 | 1590 | 1217 | 1490 |
| 5/20/2008 | 8910 | 8280 | 8850 | 7.5 | 7.6 | NA | 1520 | 1120 | 240 | 260 | 624 | 1400 | 9.0 | 23 | 143 | 2500 | 2970 | 1550 | 2340 |
| | 8288 | 7740 | 6525 | 7.3 | 6.8 | NA | 1318 | 998 | 187 | 219 | 267 | 816 | 7.5 | 18 | 137 | 1935 | 2073 | 1385 | 1748 |
| | 5 | 2 | 8 | 3 | 6 | NA | 5 | 3 | 5 | 3 | 3 | 3 | 2 | 3 | 2 | 4 | 4 | 4 | 4 |
| 8/18/1995 | NA | NA | 2400 | 6.5 | NA | NA | NA | 434 | NA | 92 | NA | 85 | NA | 4.8 | NA | NA | -1.0 | NA | 1460 |
| 4/23/1999 | NA | NA | 2410 | 6.6 | NA | NA | NA | 446 | NA | 98 | NA | 93 | NA | 5.5 | NA | NA | 81 | NA | 1530 |
| | NA | NA | 2405 | 6.6 | NA | NA | NA | 440 | NA | 95 | NA | 89 | NA | 5.2 | NA | NA | 41 | NA | 1495 |
| | NA | NA | 2 | 2 | NA | NA | NA | 2 | NA | 2 | NA | 2 | NA | 2 | NA | NA | 2 | NA | 2 |
| 8/18/1995 | NA | NA | 1080 | 7.1 | NA | NA | NA | 246 | NA | 31 | NA | 25 | NA | 4.8 | NA | NA | 102 | NA | 541 |
| 4/23/1999 | NA | NA | 2590 | 7.3 | NA | NA | NA | 584 | NA | 61 | NA | 56 | NA | 5.9 | NA | NA | 106 | NA | 1500 |
| | NA | NA | 1850 | 7.2 | NA | NA | NA | 407 | NA | 45 | NA | 39 | NA | 5.3 | NA | NA | 103 | NA | 988 |
| | NA | NA | 4 | 4 | NA | NA | NA | 4 | NA | 4 | NA | 4 | NA | 4 | NA | NA | 4 | NA | 4 |
| 8/18/1995 | NA | NA | 1050 | 6.9 | NA | NA | NA | 221 | NA | 37 | NA | 38 | NA | 4.0 | NA | NA | 91 | NA | 484 |
| 4/23/1999 | NA | NA | 1060 | 7.0 | NA | NA | NA | 236 | NA | 40 | NA | 39 | NA | 4.0 | NA | NA | 97 | NA | 500 |
| | NA | NA | 1055 | 7.0 | NA | NA | NA | 229 | NA | 39 | NA | 39 | NA | 4.0 | NA | NA | 94 | NA | 492 |
| | NA | NA | 2 | 2 | NA | NA | NA | 2 | NA | 2 | NA | 2 | NA | 2 | NA | NA | 2 | NA | 2 |
| 8/18/1995 | 746 | 1700 | 1630 | 6.7 | 6.7 | -2.0 | 381 | 327 | 56 | 22 | 24 | 21 | 2.5 | 2.4 | 107 | 60 | 1.0 | 950 | 970 |
| 9/17/2008 | 2320 | 2140 | 3330 | 7.8 | 8.0 | -2.0 | 475 | 490 | 70 | 75 | 27 | 30 | 3.0 | 9.2 | 128 | 60 | 331 | 950 | 1530 |
| | 2006 | 1936 | 1958 | 7.2 | 7.1 | 1.0 | 415 | 436 | 61 | 62 | 25 | 26 | 2.7 | 4.1 | 117 | 60 | 67 | 950 | 1125 |
| | 22 | 8 | 26 | 18 | 27 | 11 | 6 | 25 | 6 | 25 | 7 | 25 | 7 | 24 | 12 | 1 | 26 | 1 | 26 |
| 8/18/1995 | 1602 | 1890 | 1740 | 6.5 | 6.7 | -2.0 | 324 | 340 | 41 | 44 | 28 | 24 | 3.5 | 2.6 | 77 | 54 | 40 | 1050 | 1060 |
| 3/18/2009 | 2800 | 2390 | 2468 | 7.9 | 8.0 | -2.0 | 539 | 544 | 72 | 74 | 34 | 42 | 4.7 | 6.1 | 119 | 82 | 81 | 1260 | 1790 |
| | 2342 | 2096 | 2110 | 7.4 | 7.2 | 1.0 | 446 | 491 | 58 | 64 | 30 | 30 | 4.2 | 4.5 | 109 | 65 | 56 | 1130 | 1293 |
| | 30 | 14 | 41 | 27 | 40 | 18 | 14 | 34 | 14 | 34 | 15 | 34 | 15 | 33 | 19 | 3 | 40 | 3 | 40 |
| 8/18/1995 | NA | NA | 1650 | 7.1 | NA | NA | NA | 290 | NA | 54 | NA | 66 | NA | 5.2 | NA | NA | 53 | NA | 938 |
| 10/1/1997 | NA | NA | 1730 | 7.2 | NA | NA | NA | 330 | NA | 60 | NA | 71 | NA | 5.6 | NA | NA | 55 | NA | 1000 |
| | NA | NA | 1690 | 7.2 | NA | NA | NA | 310 | NA | 57 | NA | 68 | NA | 5.4 | NA | NA | 54 | NA | 969 |
| | NA | NA | 2 | 2 | NA | NA | NA | 2 | NA | 2 | NA | 2 | NA | 2 | NA | NA | 2 | NA | 2 |
| 8/18/1995 | NA | NA | 430 | 7.3 | NA | NA | NA | 78 | NA | 15 | NA | 40 | NA | 4.7 | NA | NA | 24 | NA | 130 |
| 4/23/1999 | NA | NA | 460 | 7.3 | NA | NA | NA | 79 | NA | 15 | NA | 41 | NA | 4.7 | NA | NA | 25 | NA | 143 |
| | NA | NA | 445 | 7.3 | NA | NA | NA | 78 | NA | 15 | NA | 40 | NA | 4.7 | NA | NA | 25 | NA | 137 |
| | NA | NA | 2 | 2 | NA | NA | NA | 2 | NA | 2 | NA | 2 | NA | 2 | NA | NA | 2 | NA | 2 |
| 8/25/1995 | 1.6 | 1320 | 900 | 6.8 | 6.2 | -2.0 | 275 | 64 | 34 | 9.1 | 43 | 29 | 3.7 | -0.30 | 130 | 42 | 29 | 780 | 385 |
| 3/18/2009 | 1870 | 1710 | 4950 | 7.8 | 7.8 | -2.0 | 331 | 358 | 41 | 37 | 58 | 57 | 4.5 | 5.0 | 152 | 45 | 232 | 780 | 3310 |
| | 1468 | 1560 | 1376 | 7.2 | 7.0 | 1.0 | 302 | 270 | 37 | 31 | 51 | 43 | 4.1 | 3.7 | 143 | 44 | 50 | 780 | 797 |
| | 38 | 13 | 45 | 25 | 48 | 16 | 12 | 38 | 12 | 38 | 13 | 38 | 13 | 37 | 18 | 2 | 44 | 1 | 45 |
| 8/25/1995 | 985 | 1470 | 866 | 6.9 | 6.5 | -2.0 | 297 | 30 | 34 | 5.4 | 29 | 26 | 4.0 | -0.30 | 137 | 32 | 27 | 760 | 425 |
| 3/18/2009 | 1900 | 1740 | 1980 | 7.9 | 7.9 | -2.0 | 349 | 366 | 42 | 70 | 56 | 56 | 5.0 | 39 | 151 | 45 | 62 | 784 | 900 |
| | 1531 | 1611 | 1351 | 7.3 | 7.1 | 1.0 | 319 | 291 | 38 | 36 | 49 | 43 | 4.6 | 7.2 | 145 | 40 | 43 | 772 | 713 |
| | 39 | 13 | 47 | 25 | 51 | 16 | 13 | 40 | 13 | 40 | 14 | 40 | 14 | 39 | 18 | 3 | 46 | 2 | 47 |
| 7/27/1989 | 283 | NA | 200 | 3.2 | 3.1 | -2.0 | 241 | 5.5 | 34 | 5.3 | 32 | 16 | 3.3 | 1.4 | 0.0 | 143 | 7.0 | 1753 | 120 |
| 3/12/2009 | 9900 | NA | 7552 | 6.6 | 7.3 | -2.0 | 498 | 696 | 110 | 256 | 115 | 137 | 6.1 | 12 | 61 | 150 | 388 | 1772 | 4506 |
| | 2967 | NA | 3013 | 3.9 | 4.3 | 1.0 | 390 | 429 | 87 | 97 | 95 | 87 | 5.3 | 5.1 | 36 | 147 | 105 | 1763 | 1793 |
| | 228 | NA | 245 | 89 | 234 | 5 | 3 | 145 | 4 | 144 | 6 | 99 | 6 | 98 | 6 | 2 | 248 | 2 | 245 |
| 8/25/1989 | 1000 | NA | 984 | 3.0 | 3.7 | NA | NA | 281 | NA | 254 | NA | 102 | NA | 12 | 0.0 | NA | 47 | NA | 512 |
| 3/7/1997 | 7000 | NA | 5750 | 4.1 | 5.1 | NA | NA | 281 | NA | 254 | NA | 102 | NA | 12 | 0.0 | NA | 167 | NA | 5100 |
| | 3188 | NA | 3252 | 3.6 | 3.9 | NA | NA | 281 | NA | 254 | NA | 102 | NA | 12 | 0.0 | NA | 107 | NA | 2487 |
| | 8 | NA | 10 | 9 | 10 | NA | NA | 1 | NA | 1 | NA | 1 | NA | 1 | 1 | NA | 10 | NA | 10 |
| 8/10/1991 | 968 | NA | 800 | 3.0 | 3.1 | 194 | 125 | 110 | 48 | 48 | 69 | 70 | 5.3 | 6.5 | -2.0 | NA | 15 | NA | 105 |
| 3/18/2009 | 4160 | NA | 5288 | 4.1 | 4.5 | 433 | 302 | 649 | 113 | 324 | 111 | 126 | 11 | 13 | -2.0 | NA | 169 | NA | 3411 |
| | 2431 | NA | 2561 | 3.6 | 3.7 | 286 | 242 | 332 | 91 | 125 | 95 | 97 | 9.3 | 9.7 | 1.0 | NA | 74 | NA | 1488 |
| | 135 | NA | 142 | 51 | 146 | 4 | 6 | 84 | 6 | 84 | 5 | 42 | 6 | 42 | 6 | NA | 144 | NA | 144 |
| 8/10/1991 | 23 | NA | 656 | 2.9 | 3.0 | 138 | 164 | 78 | 55 | 28 | 68 | 63 | 7.8 | 7.7 | -2.0 | NA | 14 | NA | 265 |
| 3/18/2009 | 4970 | NA | 6496 | 4.5 | 6.7 | 431 | 222 | 646 | 102 | 236 | 89 | 114 | 11 | 14 | -2.0 | NA | 202 | NA | 3622 |
| | 2164 | NA | 2359 | 3.7 | 3.9 | 235 | 202 | 288 | 86 | 115 | 82 | 81 | 9.4 | 9.8 | 1.0 | NA | 59 | NA | 1375 |
| | 155 | NA | 157 | 59 | 160 | 8 | 5 | 88 | 5 | 88 | 4 | 45 | 5 | 45 | 8 | NA | 158 | NA | 158 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| n | 4/18/1996 | -0.020 | -0.030 | NA | -0.050 | 0.020 | 0.031 | 0.17 | 0.20 | NA | -0.030 | 0.070 | NA | 0.30 | 0.060 | -0.050 | -0.20 | -0.20 |
| x | 5/20/2008 | -0.020 | -0.0050 | NA | -0.010 | 0.21 | 0.56 | 2.1 | 1.5 | NA | 0.060 | 0.070 | NA | 0.41 | 0.13 | 0.092 | -0.20 | 0.84 |
| e | | 0.010 | 0.0067 | NA | 0.012 | 0.11 | 0.21 | 0.87 | 0.86 | NA | 0.028 | 0.070 | NA | 0.34 | 0.095 | 0.041 | 0.10 | 0.33 |
| t | | 1 | 3 | NA | 3 | 3 | 3 | 3 | 2 | NA | 3 | 1 | NA | 3 | 2 | 3 | 1 | 3 |
| n | 8/18/1995 | NA | -0.00050 | NA | NA | NA | 0.045 | 0.10 | NA | 0.10 | 0.0090 | NA | NA | -0.010 | NA | NA | NA | -0.030 |
| x | 4/23/1999 | NA | 0.0012 | NA | NA | NA | 0.047 | 0.20 | NA | 0.20 | 0.0090 | NA | NA | -0.010 | NA | NA | NA | 0.060 |
| e | | NA | 0.00073 | NA | NA | NA | 0.046 | 0.15 | NA | 0.15 | 0.0090 | NA | NA | 0.0050 | NA | NA | NA | 0.038 |
| t | | NA | 2 | NA | NA | NA | 2 | 2 | NA | 2 | 2 | NA | NA | 2 | NA | NA | NA | 2 |
| n | 8/18/1995 | NA | -0.00050 | NA | NA | NA | -0.0010 | -0.010 | NA | -0.010 | -0.0050 | NA | NA | -0.010 | NA | NA | NA | -0.030 |
| x | 4/23/1999 | NA | -0.00050 | NA | NA | NA | 0.0050 | 0.020 | NA | 0.020 | -0.0050 | NA | NA | -0.010 | NA | NA | NA | 0.030 |
| e | | NA | 0.00025 | NA | NA | NA | 0.0020 | 0.013 | NA | 0.013 | 0.0025 | NA | NA | 0.0050 | NA | NA | NA | 0.019 |
| t | | NA | 4 | NA | NA | NA | 4 | 4 | NA | 4 | 4 | NA | NA | 4 | NA | NA | NA | 4 |
| n | 8/18/1995 | NA | -0.00050 | NA | NA | NA | 0.0030 | 0.080 | NA | 0.080 | 0.20 | NA | NA | -0.010 | NA | NA | NA | 0.070 |
| x | 4/23/1999 | NA | 0.0030 | NA | NA | NA | 0.0090 | 0.18 | NA | 0.18 | 0.30 | NA | NA | -0.010 | NA | NA | NA | 0.23 |
| e | | NA | 0.0016 | NA | NA | NA | 0.0060 | 0.13 | NA | 0.13 | 0.25 | NA | NA | 0.0050 | NA | NA | NA | 0.15 |
| t | | NA | 2 | NA | NA | NA | 2 | 2 | NA | 2 | 2 | NA | NA | 2 | NA | NA | NA | 2 |
| n | 8/18/1995 | -0.030 | -0.030 | -0.050 | -0.10 | -0.050 | -0.050 | -0.020 | -0.050 | -0.020 | -0.010 | -0.030 | -0.050 | -0.050 | -0.050 | -0.050 | -0.20 | -0.060 |
| x | 9/17/2008 | 0.0040 | 0.0020 | -0.010 | 0.012 | 0.12 | 3.4 | 32 | 1.2 | 15 | 2.3 | 0.13 | -0.010 | 0.30 | 0.070 | 0.14 | 1.1 | 37 |
| e | | 0.0052 | 0.0028 | 0.013 | 0.011 | 0.028 | 0.30 | 6.1 | 0.16 | 2.9 | 0.19 | 0.025 | 0.013 | 0.023 | 0.026 | 0.044 | 0.20 | 6.7 |
| t | | 7 | 25 | 6 | 22 | 8 | 25 | 25 | 8 | 8 | 25 | 7 | 6 | 24 | 7 | 23 | 7 | 25 |
| n | 8/18/1995 | -0.020 | -0.030 | -0.050 | -0.10 | -0.050 | -0.10 | -0.050 | -0.050 | -0.050 | -0.050 | -0.030 | -0.050 | -0.050 | -0.050 | -0.10 | -0.20 | -0.20 |
| x | 3/18/2009 | -0.00050 | -0.00050 | -0.010 | -0.010 | 0.020 | 0.070 | 6.4 | 0.19 | 0.10 | 0.15 | 0.015 | -0.010 | 0.050 | 0.19 | 0.11 | 0.11 | 8.5 |
| e | | 0.0032 | 0.0044 | 0.010 | 0.012 | 0.011 | 0.020 | 0.75 | 0.037 | 0.023 | 0.020 | 0.0078 | 0.0092 | 0.012 | 0.027 | 0.029 | 0.057 | 1.00 |
| t | | 14 | 34 | 12 | 31 | 14 | 33 | 34 | 14 | 10 | 34 | 15 | 13 | 33 | 13 | 32 | 14 | 34 |
| n | 8/18/1995 | NA | -0.00050 | NA | NA | NA | 0.0020 | 0.51 | NA | 0.51 | 0.015 | NA | NA | -0.010 | NA | NA | NA | 0.70 |
| x | 10/1/1997 | NA | -0.00050 | NA | NA | NA | 0.0040 | 0.70 | NA | 0.70 | 0.030 | NA | NA | -0.010 | NA | NA | NA | 0.86 |
| e | | NA | 0.00025 | NA | NA | NA | 0.0030 | 0.61 | NA | 0.61 | 0.023 | NA | NA | 0.0050 | NA | NA | NA | 0.78 |
| t | | NA | 2 | NA | NA | NA | 2 | 2 | NA | 2 | 2 | NA | NA | 2 | NA | NA | NA | 2 |
| n | 8/18/1995 | NA | -0.00050 | NA | NA | NA | -0.0010 | 0.040 | NA | 0.040 | 0.0070 | NA | NA | -0.010 | NA | NA | NA | -0.030 |
| x | 4/23/1999 | NA | -0.00050 | NA | NA | NA | 0.0010 | 0.050 | NA | 0.050 | 0.010 | NA | NA | -0.010 | NA | NA | NA | 0.060 |
| e | | NA | 0.00025 | NA | NA | NA | 0.00075 | 0.045 | NA | 0.045 | 0.0085 | NA | NA | 0.0050 | NA | NA | NA | 0.038 |
| t | | NA | 2 | NA | NA | NA | 2 | 2 | NA | 2 | 2 | NA | NA | 2 | NA | NA | NA | 2 |
| n | 8/21/1995 | -0.020 | -0.020 | -0.050 | -0.050 | -0.20 | -0.050 | -0.10 | -0.050 | -0.010 | -0.020 | -0.030 | -0.050 | -0.050 | -0.050 | -0.050 | -0.20 | -0.10 |
| x | 3/18/2009 | -0.0010 | 0.0030 | 0.010 | -0.010 | 0.070 | 0.42 | 2.3 | 0.040 | 0.040 | 0.085 | 0.13 | -0.010 | 0.030 | 0.040 | 0.19 | 0.31 | 2.6 |
| e | | 0.0032 | 0.0023 | 0.0082 | 0.0067 | 0.024 | 0.044 | 0.18 | 0.018 | 0.0094 | 0.010 | 0.018 | 0.0091 | 0.0074 | 0.013 | 0.024 | 0.064 | 0.29 |
| t | | 12 | 38 | 11 | 35 | 12 | 37 | 38 | 12 | 9 | 38 | 12 | 11 | 37 | 12 | 36 | 12 | 38 |
| n | 8/25/1995 | -0.020 | -0.020 | -0.050 | -0.050 | -0.20 | -0.050 | -0.010 | -0.050 | -0.010 | -0.030 | -0.030 | -0.050 | -0.050 | -0.050 | -0.050 | -0.20 | -0.060 |
| x | 3/18/2009 | 0.0010 | 0.0020 | -0.010 | 0.050 | 0.17 | 0.61 | 85 | 0.40 | 0.070 | 2.9 | 0.10 | 0.010 | 0.15 | 0.030 | 0.34 | 0.48 | 85 |
| e | | 0.0034 | 0.0023 | 0.011 | 0.0096 | 0.028 | 0.087 | 7.2 | 0.056 | 0.017 | 0.25 | 0.018 | 0.0088 | 0.019 | 0.015 | 0.048 | 0.070 | 7.5 |
| t | | 13 | 40 | 11 | 37 | 13 | 39 | 40 | 13 | 9 | 40 | 14 | 12 | 39 | 12 | 38 | 13 | 40 |
| n | 7/27/1989 | -0.0010 | -0.020 | -0.010 | -0.050 | 0.024 | -0.010 | -0.10 | -0.050 | -0.010 | 0.040 | 0.24 | -0.010 | -0.050 | -0.010 | -0.020 | -0.030 | 0.12 |
| x | 3/12/2009 | 0.0020 | 0.19 | 0.010 | 0.97 | 1.5 | 225 | 921 | -0.020 | 921 | 272 | 2.6 | 0.070 | 1.4 | 0.070 | 14 | 10 | 186 |
| e | | 0.00083 | 0.024 | 0.0056 | 0.15 | 0.95 | 23 | 135 | 0.021 | 268 | 11 | 1.7 | 0.049 | 0.21 | 0.046 | 1.6 | 6.5 | 19 |
| t | | 6 | 245 | 8 | 180 | 7 | 246 | 217 | 7 | 119 | 248 | 7 | 7 | 180 | 7 | 247 | 8 | 183 |
| n | 8/25/1989 | NA | 0.016 | NA | 1.1 | NA | 4.8 | NA | NA | 113 | 3.2 | NA | NA | 1.7 | NA | 0.92 | NA | 153 |
| x | 3/7/1997 | NA | 0.20 | NA | 1.1 | NA | 91 | NA | NA | 1462 | 40 | NA | NA | 1.7 | NA | 14 | NA | 153 |
| e | | NA | 0.090 | NA | 1.1 | NA | 40 | NA | NA | 671 | 17 | NA | NA | 1.7 | NA | 5.9 | NA | 153 |
| t | | NA | 10 | NA | 1 | NA | 10 | NA | NA | 10 | 10 | NA | NA | 1 | NA | 10 | NA | 1 |
| n | 8/10/1991 | 0.021 | -0.0050 | 0.15 | 0.080 | 28 | 7.3 | 3.3 | 5.2 | 27 | 2.3 | 6.9 | 0.23 | 0.14 | 0.91 | 0.43 | 21 | 7.5 |
| x | 3/18/2009 | 0.043 | 0.21 | 0.39 | 1.1 | 73 | 226 | 120 | 38 | 602 | 47 | 14 | 0.53 | 1.4 | 2.2 | 6.9 | 40 | 125 |
| e | | 0.036 | 0.039 | 0.28 | 0.33 | 56 | 50 | 34 | 27 | 156 | 14 | 10 | 0.41 | 0.46 | 1.6 | 2.5 | 33 | 40 |
| t | | 5 | 144 | 5 | 108 | 5 | 144 | 61 | 5 | 83 | 143 | 6 | 5 | 108 | 5 | 144 | 5 | 108 |
| n | 8/10/1991 | 0.015 | 0.0020 | 0.15 | 0.040 | 27 | 4.2 | 6.5 | 7.3 | 47 | 2.6 | 6.0 | 0.22 | 0.070 | 0.78 | 0.58 | 13 | 4.4 |
| x | 3/18/2009 | 0.044 | 0.22 | 0.40 | 0.77 | 74 | 172 | 143 | 39 | 870 | 38 | 13 | 0.49 | 1.0 | 2.0 | 7.2 | 31 | 100 |
| e | | 0.033 | 0.037 | 0.30 | 0.31 | 54 | 45 | 49 | 24 | 212 | 13 | 10 | 0.40 | 0.44 | 1.6 | 2.4 | 25 | 33 |
| t | | 5 | 158 | 5 | 115 | 5 | 158 | 65 | 5 | 93 | 158 | 5 | 5 | 115 | 5 | 158 | 5 | 115 |

Notes:
Negative values indicate not detec
limit
Tot. - total analysis
Diss. - dissolved analysis
Lab - laboratory
su - standard units for pH
TDS - total dissolved solids
umhos/cm - microsmhos per centi
NA - not analyzed or anayses not
Alk - Alkalinity
Alkalinity and acidity are as CaCO
Older Total Iron data reported as I

**FIGURES**


LOWER PINAL CREEK CUTOFF WALL AND WELLFIELD
LOWER BASIN
WHEATFIELDS PROFILE
NUGGET WASH PROFILE
TONTO NATIONAL FOREST
BOTTLENECK
PINAL CROSSING PROFILE
PROPOSED WRF LOCATION
KISER BASIN
GWWTP DISCHARGE POINT
UPPER BASIN
HORSESHOE BEND WASH
GERALD WASH
LOWER PINAL CREEK
TINHORN WASH
MIAMI WASH
RUSSELL GULCH
IRENE GULCH
LIVEOAK GULCH
BLOODY TANKS WASH
R 14 E R 15 E
R 15 E R 16 E
ATION
MONITORING WELL
ROAD
DRAINAGE
BOUNDARY OF INSPIRATION DAM WATERSHED
MIAMI FAULT
MINE TAILING, PITS, LEACH AREAS, AND WASTE ROCK
ALLUVIUM
LIMESTONE
GILA CONGLOMERATE
PRE-QUATERNARY IGNEOUS, METAMORPHIC, QUARTZITE AND CONGLOMERATE BEDROCK


NORTH 1 BASIN
GILA
CONGLOMERATE
KB10
ANCESTRAL
ALLUVIAL
DRAINAGE
TAA-4
TAGS-4
PROPOSED
PACKAGED
WRF AREA
GILA
CONGLOMERATE
COBRE VALLEY
GOLF COURSE
AILINGS
OUNDMENT
6 DECANT
POND
TAGS-3
TAA-3
6DW-1
KB09
TAA-2
TAA-1
TAGS-1
KB02
MIAMI WASH
KBM03
RUSSELL GULCH
BLOODY TANKS WASH
ON 3-2
LAGOON 3-1
3-3
KISER BASIN

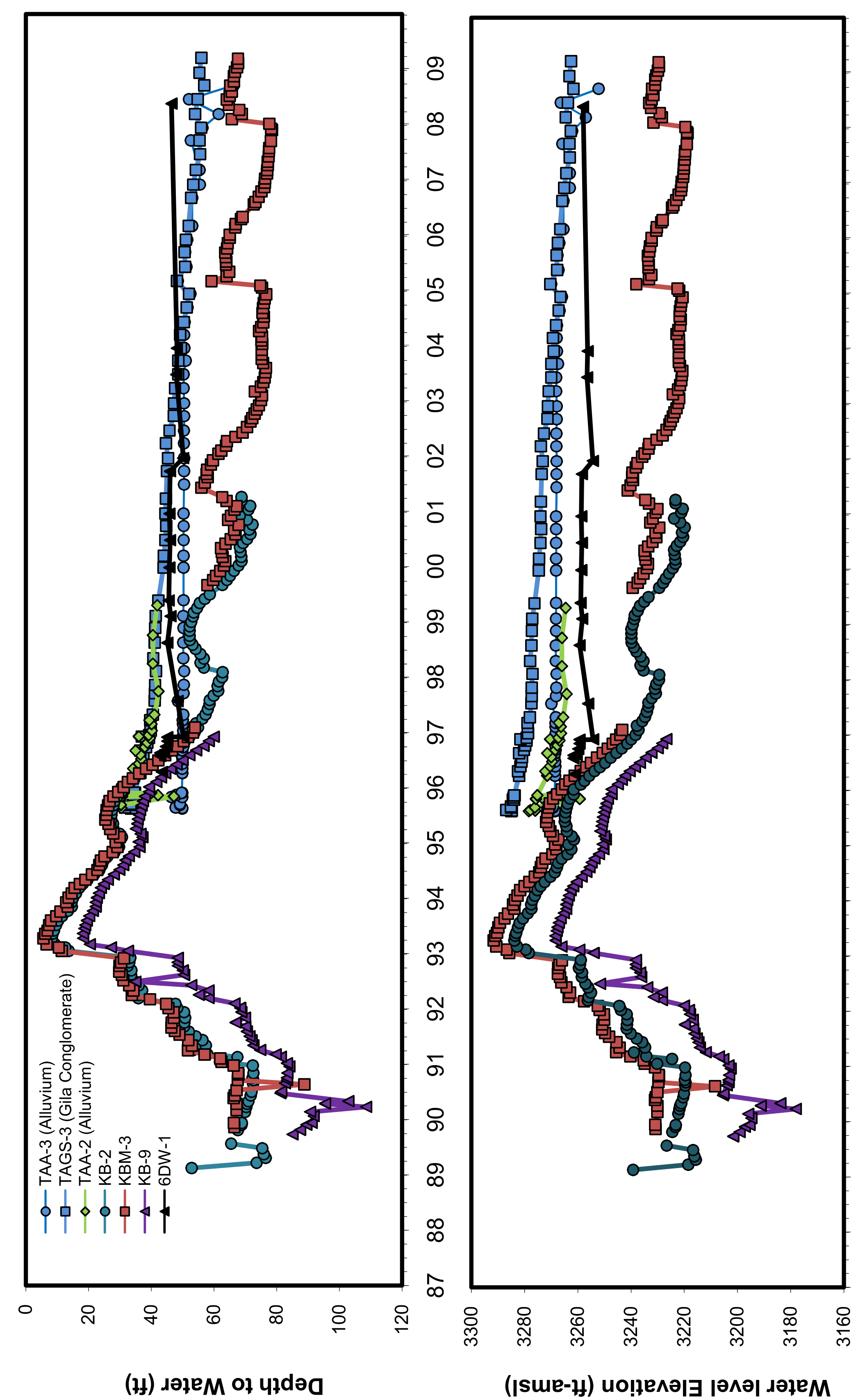



**Figure 3**
**GROUNDWATER LEVELS FOR SELECTED WELLS, SOUTHERN STUDY AREA**
**Golder Associates**

Denver, Colorado, USA
093-2205

5/15/2009

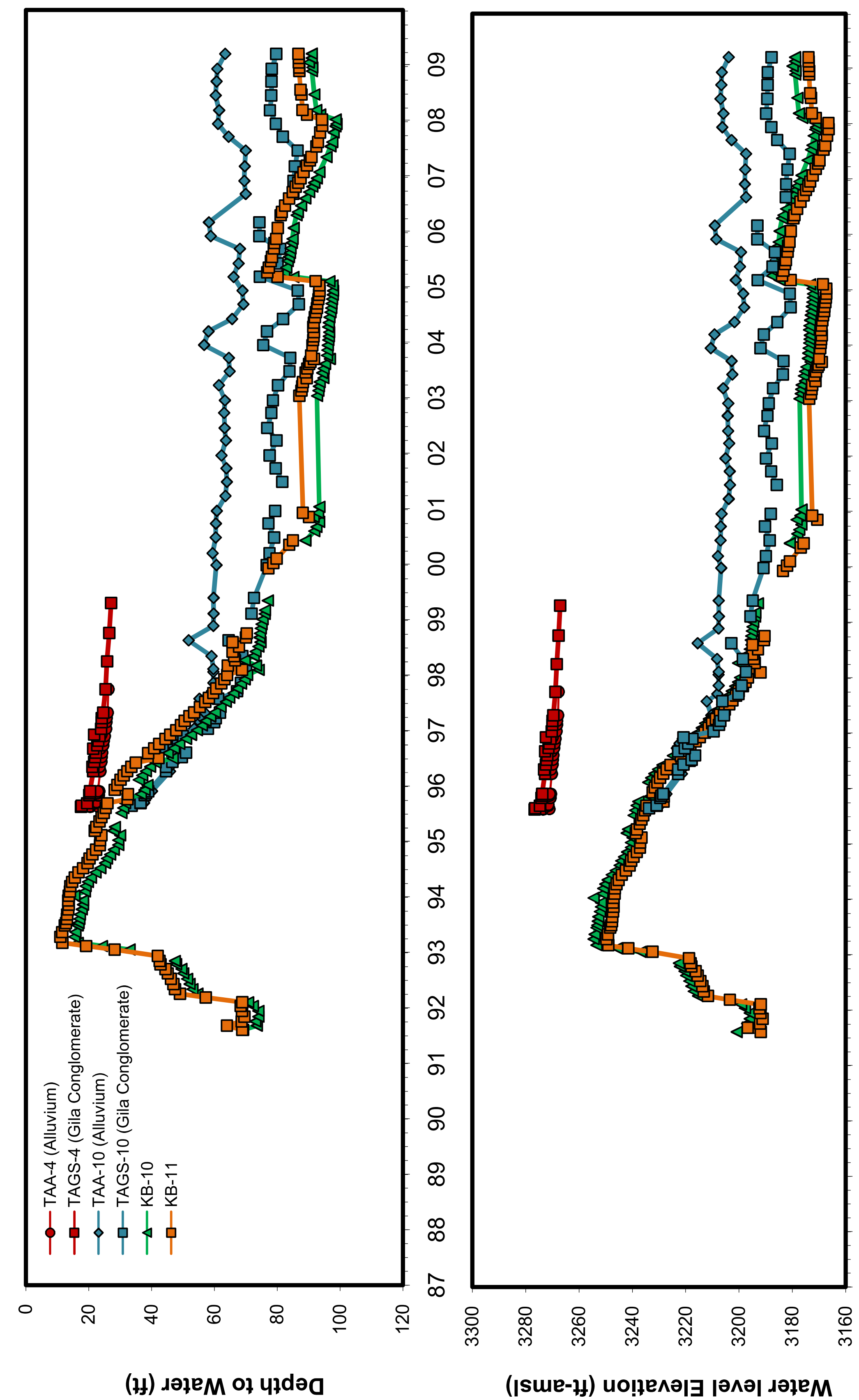



**Figure 4**
**GROUNDWATER LEVELS FOR SELECTED WELLS, NORTHERN STUDY AREA**
**Golder Associates**

Denver, Colorado, USA
093-2205
5/15/2009

**APPENDIX C-10**

**ADDENDUM**
**CAAG 208 AREAWIDE WATER QUALITY MANAGEMENT PLAN**
**FOR TOWN OF MIAMI WASTEWATER RECLAMATION FACILITY**

AND DESIGNATED MANAGEMENT AREA
PUBLIC PROCESS
PREPARED BY CAG: DATE____________