

MALCOLM  
PIRNIE

JUNE 2001

Prepared for  
DMB White Tank, LLC

## Application

**Clean Water Act**  
**Plan 208 Amendment**  
for the Town of Buckeye:  
Whitestone Water Reclamation Facility



# WHITESTONE DEVELOPMENT WASTEWATER RECLAMATION FACILITY

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WASTEWATER RECLAMATION FACILITY**

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**ES. EXECUTIVE SUMMARY**

The Maricopa Association of Governments (MAG) is the Designated Planning Agency (DPA) with the authority required by Section 208 (a)(2)(B) of the Clean Water Act (CWA) to implement the area-wide waste treatment management plan for the Maricopa County Planning Area. The Town of Buckeye has requested a CWA Section 208 Amendment to the Regional Water Quality Management Plan to include a wastewater reclamation facility to serve the proposed Whitestone development. The development plan for Whitestone includes a wastewater reclamation facility to serve the proposed development area. The Whitestone development is a proposed 8,800-acre master planned community located in Buckeye, Arizona. The Whitestone Water Reclamation Facility (WRF) is located at the southeast portion of the Whitestone development, north of McDowell Road, west of Tuthill Road, and east of Airport Road. Location maps are included in Appendix A.

DMB White Tank, L.L.C. (DMB), the developer of Whitestone, will be responsible for financing the design and construction of the initial phase WRF, collection system, and discharge pipeline. Citizens Communications Company (Citizens) will own and operate the WRF upon completion of the initial phase construction, and will be responsible for subsequent expansions of the WRF. The WRF is within 3 miles of the City of Goodyear and Maricopa County unincorporated land.

The Whitestone WRF will have an initial rated capacity of 0.45 million gallons per day (mgd), with an ultimate rated capacity of 3.35 mgd. Treated effluent from the Phase I facility will be reused for golf course irrigation. The WRF will treat wastewater generated within the Whitestone development area. The Phase I WRF is anticipated to be operational in April 2003. Subsequent expansions of the WRF will occur as needed to serve the Whitestone development. The Phase I WRF treatment processes will consist of influent pumping, screening, secondary treatment with biological nitrogen removal, chlorination, effluent pumping, and sludge dewatering for landfill disposal.

The CWA Section 208 Checklist on the following pages provides a summary of the amendment application requirements and how and where these issues are addressed in the document.

**CLEAN WATER ACT SECTION 208 CHECKLIST  
WHITESTONE WATER RECLAMATION FACILITY**

Requirement	Summary of How Requirements are Addressed	Page	Section
<b>AUTHORITY</b> The Designated Planning Authority (DPA) with authority to implement the plan for the Town of Buckeye is Maricopa Association of Governments (MAG).			
<b>20-YEAR NEEDS</b>			
<b>Clearly describe the existing wastewater (WWT) facilities:</b>			
<ul style="list-style-type: none"> <li>Describe existing WWT facilities.</li> </ul>	There are no existing WWT facilities.	1	1.1
<ul style="list-style-type: none"> <li>Show WWT certified and service areas for private utilities and sanitary district boundaries, if appropriate.</li> </ul>	The WRF will serve the Whitestone development area. The Whitestone development is located in Buckeye, approximately one-half mile north of Interstate 10, west of Tuthill Road, east of 227 <sup>th</sup> Avenue, and south of Northern Avenue.	2	1.2.1
Clearly describe alternatives and the recommended WWT plan:	A figure showing Citizens' current service area adjacent to the Whitestone development is provided in Appendix A.		
<ul style="list-style-type: none"> <li>Provide POPTAC population estimates (or COG-approved estimates only where POPTAC not available) over 20-year period.</li> </ul>	The population estimates were based on a land-use model. Reference: <i>Master Wastewater Plan Update and Planning Unit Plan for Portions of Planning Units IV and V (Phase I) of Whitestone</i> , Wood/Patel, March 2001.	3	1.2.2
<ul style="list-style-type: none"> <li>Provide wastewater flow estimates over the 20-year planning period.</li> </ul>	Rated flow estimates range from 0.45 mgd at Phase 1 to 3.35 mgd at final build-out in the year 2018.	5	1.2.4
<ul style="list-style-type: none"> <li>Illustrate the WWT planning and service areas.</li> </ul>	The planning and service areas will include the Whitestone development area in Buckeye, Arizona.	1	1.0
<ul style="list-style-type: none"> <li>Describe the type and capacity of the recommended WWT Plant.</li> </ul>	<ul style="list-style-type: none"> <li>Phase I: Screening, secondary treatment with biological nitrogen removal and chlorination will be provided for Phase 1. The initial capacity will be 0.45 mgd.</li> </ul>	4	1.2.4
	<ul style="list-style-type: none"> <li>Ultimate: Screenings, grit removal, secondary treatment with biological nitrogen removal, filtration, coagulation and polymer feed, and ultraviolet disinfection. The ultimate capacity is 3.35 mgd.</li> </ul>		

Requirement	Summary of How Requirements are Addressed	Page	Section
<ul style="list-style-type: none"> <li>Identify water quality problems, consider alternative control measures, and recommend solution for implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Phase I: No water quality problems are anticipated. Effluent quality will meet the Class B+ reclaimed water standards for golf course irrigation and the Aquifer Water Quality Standards.</li> <li>Ultimate: Effluent quality will meet the Class A+ reclaimed water standards for open access irrigation.</li> </ul>	4	1.2.4
<ul style="list-style-type: none"> <li>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?</li> </ul>	<p>Not applicable. There are no private WWT utilities with certificated areas within the proposed regional service area. Citizens has filed for a certificate of convenience and necessity to serve the Whitestone Development.</p>	2	1.2.1
<ul style="list-style-type: none"> <li>Describe method of effluent disposal and reuse sites (if appropriate).</li> </ul>	<p>The effluent will be used to irrigate landscaping at golf courses. The treated effluent will be pumped to the golf course lakes for storage. The golf course irrigation system will feed from the lakes. The ultimate facility's effluent (and, in case a second golf course is not constructed, effluent from the Phase I facility which exceeds reuse demands), will also be used for groundwater recharge. The ultimate facility's effluent will also be used to irrigate open access landscaping, such as in right-of-ways, common areas, and parks.</p>	8	1.2.4.2
<ul style="list-style-type: none"> <li>If Sanitary Districts are within a proposed planning or service area, describe who serves the Sanitary Districts and when.</li> </ul>	<p>There are no Sanitary Districts within the planning or service area.</p>	10	1.2.6
<ul style="list-style-type: none"> <li>Describe ownership of land proposed for plant sites and reuse areas.</li> </ul>	<p>The land used by the plant site is owned by Caterpillar Foundation and is under contract to be purchased by DMB White Tank LLC. The sewage collection system and reclaimed water pipeline will be located on land owned by DMB and Associates. Reuse will occur on land owned by private golf courses.</p>	2	1.2.1
<ul style="list-style-type: none"> <li>Address time frames in the development of the treatment works.</li> </ul>	<p>The plant is designed for an initial flow of 0.45 mgd with an ultimate capacity of 3.35 mgd. Phased expansion sizes are not known, and will be determined based upon expansion within the development. Facility sizing is modular, and accommodates flexibility in phasing.</p>	5	1.2.4
<ul style="list-style-type: none"> <li>Address financial constraints in the development of the treatment works.</li> </ul>	<p>There are no financial constraints in the development of the treatment works.</p>	13	3.2

Requirement	Summary of How Requirements are Addressed	Page	Section
<ul style="list-style-type: none"> <li>Describe how discharges will comply with EPA municipal and industrial stormwater discharge regulations (Section 405, CWA)</li> </ul>	<p>There will be no effluent from the plant discharged to surface waters and therefore no individual NPDES permit will be required. The collection system will be designed to prevent stormwater infiltration and the plant will treat wastewater only. The plant site will not receive stormwater runoff from adjacent properties. Stormwater discharges from the plant site will be subject to NPDES stormwater permitting requirements when design flows exceed 1-mgd. The flows will be addressed through implementation of a stormwater pollution prevention plan.</p>	9	1.2.4.3
<ul style="list-style-type: none"> <li>Describe how open areas &amp; recreational opportunities will result from improved water quality and how those will be used.</li> <li>Describe potential use of lands associated with treatment works and increased access to water-based recreation, if applicable.</li> </ul>	<p>The reuse of treated effluent will safely enhance golf course landscaping and lakes while reducing the need for unnecessary use of groundwater/surface water resources.</p> <p>Not applicable.</p>	8	1.2.4.2
<b>REGULATIONS</b>			
<ul style="list-style-type: none"> <li>Describe types of permits needed, including NPDES, APP and reuse.</li> </ul>	<p>The WRF will require an APP, Reuse Permit, and Air Quality Permit.</p>	11	1.4
<ul style="list-style-type: none"> <li>Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal.</li> </ul>	<p>Not applicable, no NPDES permit will be needed.</p>		
<ul style="list-style-type: none"> <li>Provide documentation of communication with ADEQ Permitting Section 30 to 60 days prior to public hearing regarding the need for specific permits.</li> </ul>	<p>DMB is in the process of obtaining necessary permits from ADEQ.</p>		
<ul style="list-style-type: none"> <li>Describe pretreatment requirements and method of adherence to requirements (Section 208 (b)(2)(D), CWA).</li> </ul>	<p>There will be no industrial users contributing to the Whitestone WRF.</p>	11	1.5
<ul style="list-style-type: none"> <li>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).</li> </ul>	<p>Not applicable.</p>		
<ul style="list-style-type: none"> <li>Describe alternatives and recommendations in the disposition of sludge generated (Section 405, CWA and 40 CFR Part 503).</li> </ul>	<p>Sludge will be dewatered via a belt filter press and disposed of at a landfill.</p>	11	1.6
<ul style="list-style-type: none"> <li>Define any non-point issues related to the proposed facility and outline procedures to control them.</li> </ul>	<p>No non-point issues are anticipated. Stormwater flow from the WRF site will be diverted to Tuthill Wash. On-site stormwater retention will be provided to accommodate a 10-year, 24-hour storm.</p>	9	1.2.4.3
<ul style="list-style-type: none"> <li>Describe process to handle all mining runoff, orphan sites and underground pollutants, if applicable.</li> </ul>	<p>Not applicable.</p>		

Requirement	Summary of How Requirements are Addressed	Page	Section
<ul style="list-style-type: none"> <li>If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas.</li> <li>If mining related, define what specialized procedures will be initiated for orphan sites, if applicable.</li> </ul>	Not applicable.		
<b>CONSTRUCTION</b>			
<ul style="list-style-type: none"> <li>Define construction priorities and time schedules for initiation and completion.</li> </ul>	The plant is designed for an initial flow of 0.45 mgd, with a final build-out flow of 3.35 mgd by the year 2018. The initial 0.45-mgd phase of the project is projected to be in operation by April 2003.	12	2.1
<ul style="list-style-type: none"> <li>Identify agencies that will construct, operate, and maintain the facilities and other wise carry out the plan.</li> </ul>	DMB will construct the initial phase of the project. Citizens will operate and maintain the initial phase WRF and will be responsible for expansion of the collection system, discharge line, and WRF beyond the initial phase.	12	2.1
<ul style="list-style-type: none"> <li>Identify construction activity-related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources.</li> </ul>	Pollutants associated with construction activities are expected to be limited to solid waste, inert materials, and residual construction materials such as paint or adhesives. The construction activities will be subject to stormwater permitting and will implement Best Management Practices.	12	2.2
<b>FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN</b>			
<ul style="list-style-type: none"> <li>If plan proposes to take over a certificated private utility, describe how and when financing will be managed.</li> </ul>	Not applicable. The plan does not propose to take over a certificated private utility, but expands Citizens' service area.		
<ul style="list-style-type: none"> <li>Describe any significant measure necessary to carry out the plan (e.g., institutional, financial, economic, etc.)</li> </ul>	Financing will be provided through private funding sources. Financial information for DMB is attached to this report.	13	3.1
<ul style="list-style-type: none"> <li>Describe proposed method(s) of community financing.</li> </ul>	Long-term cost recovery to DMB and Citizens will be provided on a per-connection basis. Connection and operating fees will be regulated by the ACC.	13	3.1
<ul style="list-style-type: none"> <li>Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life.</li> </ul>	The Town of Buckeye is the DMA. The facility is not going to be constructed by Buckeye. It will be constructed by DMB and owned and operated by Citizens.		Appendix D
<ul style="list-style-type: none"> <li>Provide a time line that outlines the period of time necessary for carrying out plan implementation.</li> </ul>	Citizens' Form 10K is provided as evidence of financial capability. The initial phase of this project is planned to be in operation by April 2003. Subsequent expansions to ultimate capacity will be completed as needed, and the facility is projected to be at ultimate capacity by 2018.	14	4.1



Requirement	Summary of How Requirements are Addressed	Page	Section
<ul style="list-style-type: none"> <li>Provide financial information indicating the method and measures necessary to achieve project financing. (Section 201 CWA or Section 604 may apply.)</li> </ul>	<p>Financing will be provided through private funding sources. Financial information for DMB is attached to this report.</p>	13	3.2
<b>IMPLEMENTATION</b>			
<b>Describe impacts and implementation requirements of the Plan:</b>			
<ul style="list-style-type: none"> <li>Describe impacts on existing WWT facilities (e.g. Sanitary district, infrastructure/facilities, and certificated areas).</li> </ul>	There are no impacts on existing WWT facilities.	14	4.2
<ul style="list-style-type: none"> <li>Describe how and when existing package plants will be connected to a regional system.</li> </ul>	Not applicable.		
<ul style="list-style-type: none"> <li>Describe the impact on communities and businesses affected by the plan.</li> </ul>	No impacts on communities and businesses are anticipated.	14	4.2
<ul style="list-style-type: none"> <li>If a municipal 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).</li> </ul>	Not applicable. The WRF will be completed concurrently with the first model homes. No wastewater flow will be generated until the WRF is operational.	14	4.1
<b>PUBLIC PARTICIPATION</b>			
<ul style="list-style-type: none"> <li>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)</li> </ul>	Public participation requirements will be satisfied through MAG.	15	5.0
<ul style="list-style-type: none"> <li>List location where documents are available for review at least 30 days before public hearing.</li> </ul>	Public participation requirements will be satisfied through MAG.	15	5.0
<ul style="list-style-type: none"> <li>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.</li> </ul>	Public participation requirements will be satisfied through MAG.	15	5.0
<ul style="list-style-type: none"> <li>Submit affidavit of publication for official newspaper publication.</li> </ul>	Public participation requirements will be satisfied through MAG.	15	5.0
<ul style="list-style-type: none"> <li>Submit responsiveness summary for public hearing.</li> </ul>	Public participation requirements will be satisfied through MAG.	15	5.0

The Maricopa Association of Governments (MAG) is the Designated Planning Agency (DPA) with the authority required by Section 208(a)(2)(B) of the Clean Water Act (CWA) to prepare the plan for the Maricopa County Planning Area. The Town of Buckeye has requested a CWA Section 208 amendment to the Regional Water Quality Management Plan to include the Whitestone Water Reclamation Facility (WRF), which will treat wastewater generated within the Whitestone development area of Buckeye. Treated effluent from the initial facility will be reused for golf course irrigation. Upon expansion of the WRF beyond the demand of the golf courses, treated effluent will also be used for open access landscape irrigation and groundwater recharge. A location map showing the WRF, and site maps depicting the collection system and treated effluent pipeline alignments are included in Appendix A.

This CWA 208 Amendment application includes required information on the proposed WRF, collection system, and reclaimed water system locations. The WRF will be sized initially to accommodate a rated capacity of 450,000 gallons per day (gpd), with an ultimate capacity of 3.35 million gallons per day (mgd). The collection system will be sized for ultimate capacity. The reclaimed water piping will be sized for the irrigation of four golf courses. This document includes design criteria for the Phase I WRF.

### 1.1 Description of Existing Wastewater Treatment Facilities

This CWA 208 Amendment is for the construction of a new water reclamation facility in the Whitestone development, which is located in Buckeye, Arizona. There are no existing wastewater treatment facilities, sanitary districts or certified service areas within the development boundaries at this time. The WRF is within 3 miles of the City of Goodyear and Maricopa County Unincorporated land.

### 1.2 Description of Recommended WRF Plan

A description of the recommended Whitestone WRF is detailed in the following sections.

## 1.2.1 Site Location and Property Ownership

DMB is currently in the planning stages for the Whitestone development, a proposed 8,800-acre master planned community located near the White Tank Mountains. The majority of the community will be developed as residential areas, golf courses, recreation centers, open space, and commercial areas. Figure 1, included in Appendix A, presents a location map depicting the limits of the development.

The Phase 1 collection system is located north of the WRF, and is routed from Phase 1 development south down Tutthill Road to the plant, as shown in Figure 3, the sewer alignment included in Appendix A.

The Whitestone WRF will be located at the southeast portion of the Whitestone development, north of McDowell Road, and west of Tutthill Road. The location of the WRF is shown on Figure 2, a Site Location Map provided in Appendix A. The WRF will serve the Whitestone development area.

The reclaimed water pipeline alignment runs along Airport Road from the WRF to the Phase 1 golf courses, as shown in Figure 5, the reclaimed water alignment included in Appendix A.

Caterpillar Foundation is currently the owner of the property comprising the Whitestone development, which DMB White Tank LLC is under contract to purchase. The development is located in Buckeye, Arizona. DMB will obtain all required permits on behalf of Citizens for the Phase 1 WRF and treated effluent discharge. DMB will finance the Phase 1 facility design and construction. Citizens will own and operate the WRF upon completion of construction. Citizens will assume responsibility for development of the subsequent phases to ultimately establish the final 3.35-mgd facility. Citizens has submitted an application with the Arizona Corporation Commission for expansion of their certificate of convenience and necessity to include the proposed service area of the plant. Figure 6 depicts the limits of Citizens' current service area adjacent to the proposed development.

The Arizona Administrative Code, Title 18, Chapter 9, Article 2 requires a minimum setback of 350-feet from the nearest adjacent property line for a facility with an ultimate capacity greater than 1 mgd with full noise, odor and aesthetic controls. DMB intends to get setback waivers from Caterpillar Foundation for the property adjacent to the facility on all sides. All property within the 350-foot setback is currently owned by Caterpillar Foundation. Caterpillar

Foundation has agreed to waivers as required. Areas with setback waivers will most likely be used for maintenance facilities and commercial properties.

**1.2.2 Population Estimates**

Population estimates for the Whitestone development were based upon a land-use model. (Master Wastewater Plan Update and Planning Unit Plan for Portions of Planning Units IV and V (Phase I) of Whitestone, Wood/Patel, March 2001). The model assumed 3.5 capita per residential dwelling unit. Table 1 summarizes the proposed overall land use budgets for the project.

**TABLE 1**

PROPOSED OVERALL LAND USE BUDGET	
RESIDENTIAL HOUSING (UNITS)	9,560
COMMERCIAL (ACRES)	235
RESORT (ROOMS)	1,000
SCHOOL (ACRES)	98
COMMUNITY FACILITY (ACRES)	69
PARK (ACRES)	258
ROADWAY LANDSCAPING (ACRES)	214
GOLF (ACRES)	798
<b>Total</b>	

Table 2 summarizes the design criteria for the Phase 1 and ultimate WRF through buildout of the development.

**TABLE 2**

WASTEWATER GENERATION	
Ultimate Number of Residential Housing Units	9,560
Wastewater Flow Generation	100 gal/capita/day
Average Number of People per Residential Unit	3.5
Phase 1 Capacity	0.45 mgd
Ultimate Capacity	3.35 mgd

**1.2.3 Collection System Description**

Based on the natural topography, the majority of property can be served by gravity sewer lines to the WRF. However, four areas on the property cannot flow by gravity due to topographical constraints. These areas are expected to be served by utilizing wastewater lift

stations to pump the wastewater to the proposed gravity sewers. The master wastewater plan, which outlines project phasing, is shown in Figure 4, included in Appendix A. A layout of the Phase 1 collection system is presented by Figure 3 in Appendix A. Wood, Patel and Associates is the design engineer for the collection system.

The sewer was designed to convey the peak hour flow at no more than 75 percent of the calculated pipe capacity, with mean velocities between 2 fps and 10 fps.

Two gravity sewer mains from development north of the WRF will convey wastewater. The gravity sewers will be sized at 15-inch and 24-inch diameter. The sewers will discharge into the influent pump station located within the WRF. The 24-inch diameter sewer will be constructed in Phase 1, while the 15-inch diameter sewer will be provided in a future expansion.

#### 1.2.4 WRF Facility Description

The WRF is categorized as a sequencing batch reactor treatment facility. The treatment processes consist of screening, secondary treatment with biological nitrogen removal, and chlorination. Proper redundancy will be provided at the facility. Figure 7 presents the process flow schematic for the Phase 1 WRF, included in Appendix A. The initial phase facility will meet Class B+ reclaimed water and Aquifer Protection Permit water quality standards. Treated effluent from the initial phase WRF will be pumped to an aquifer recharge facility or the golf course lakes, to be used for golf course irrigation. Upon future expansions of the facility, the treated effluent from the WRF will be also be discharged to alternate end uses. Future alternate end uses include open access landscape irrigation. The ultimate facility will be designed to meet Class A+ reclaimed water quality standards. A process flow schematic for the ultimate facility, and a master site plan of the WRF are included in Appendix A as Figures 8 and 9, respectively. Malcolm Pirnie, Inc is the design engineer for the WRF.

Table 3 presents design flows and process loadings for the initial phase and ultimate capacity of the WRF.

Subsequent expansions of the WRF will be at the discretion of Citizens. The phasing will be dependent upon the increase in population within the Whitestone development, and resultant wastewater flows. Facility sizing is modular, and accommodates flexibility in phasing. The final build-out capacity is planned to be 3.35 mgd by the year 2018.

TABLE 3 WHITESTONE WRF DESIGN FLOWS AND LOADINGS		
Design Criteria	DESIGN FLOWS (mgd):	
	Phase I	Ultimate
Rated Capacity	0.45	3.35
Maximum Day Flow	0.80	5.00
Peak Hourly Flow	1.50	9.65
Minimum Hourly Flow	0.15	1.37
Peak Hourly Flow Peaking Factor = 1.78 (Phase I) Peaking Factor = 1.49 (Subsequent Phases)		
Peak Hourly Flow Peaking Factor = 3.33 (Phase I) Peaking Factor = 2.88 (Subsequent Phases)		
Minimum Hourly Flow Factor = 0.33 (Phase I) Factor = 0.41 (Subsequent Phases)		
INFLUENT WASTEWATER CHARACTERISTICS (mg/L):		
BOD <sub>5</sub>	250	250
TSS	250	250
NH <sub>3</sub> -N	30	30
Total Nitrogen	45	45
MASS LOADINGS (lb/d):		
Rated Capacity	938	6988
BOD <sub>5</sub>	938	6988
TSS	938	6988
NH <sub>3</sub> -N	113	839
Total Nitrogen	169	1258
Sustained Peak		
Peaking Factor = 1.25	1173	8735
BOD <sub>5</sub>	1173	8735
TSS	1173	8735
NH <sub>3</sub> -N	141	1048
Total Nitrogen	212	1572
Minimum Month		
Factor = 0.75	704	5241
BOD <sub>5</sub>	704	5241
TSS	704	5241
NH <sub>3</sub> -N	85	629
Total Nitrogen	127	943
DESIGN TEMPERATURE, °C		
Minimum (Winter)	20	20
Maximum (Summer)	33	33

<b>TABLE 5</b>	
<b>SBR DESIGN CRITERIA</b>	
Number of Treatment Units	2
Basin Sidewater Depth	18 feet
Mixed Liquor Suspended Solids	2,700 mg/L
Solids Retention Time	15 days
Decant Rate	2,400 gpm
Oxygen Requirement for BOD Removal	1.2 lbO <sub>2</sub> /lbr
Oxygen Requirement for TKN Oxidized	4.6 lbO <sub>2</sub> /lbr
Operating Oxygen Concentration	1 mg/L (Peak Hour on Average Day)

The sequencing batch reactor (SBR) facilities consists of batch tanks, aeration blowers, mixing pumps, jet headers and nozzles, effluent decanters, motorized influent valves and air control valves, and waste sludge pumps. Two SBR tanks will be provided in Phase 1. The SBRs are sized to accommodate the peak influent flowrate of 1.5 mgd without resorting to filled-decant. The sizing criteria for the SBRs are presented in Table 5.

**1.2.4.1.2 Sequencing Batch Reactors**

<b>TABLE 4</b>	
<b>SCREENINGS FACILITY DESIGN CRITERIA</b>	
Number of Units	2 (1 duty, 1 standby)
System Capacity (1 in service)	1,700 gpm (2.45 mgd)
Screen Opening	0.10-inch

design criteria is included in Table 4. Preliminary treatment for the initial facility will consist of two screens, a screenings conveyor and compactor. The screenings facility includes two externally-fed wedgewire drum screens with self-cleaning features, and a ram-style dewatering press/conveyor. Dewatered screenings will be disposed of at a landfill. The screens and conveyor/compactor will be fully enclosed and all off-gases will be ducted to the odor control system. The screenings system have been incorporated into the master site plan.

Minimal grit is expected within the collection system initially, therefore grit removal facilities will not be provided in Phase 1, but site considerations for future grit removal

**1.2.4.1.1 Preliminary Treatment**

**1.2.4.1 Unit Processes**

For the initial phase of the WRF, the equalization basin, chlorine contact chamber, and effluent pump station will be within the same structure. Once the filtration facilities are installed, the facility will become the equalization basin and intermediate pump station. The structure will be expanded to accommodate future flows, and the intermediate pump station will pump from the equalization basin to the future rapid mix basins.

The initial phase equalization basin was sized to accommodate one full decant volume from the SBRs. The effluent pump station will fully discharge the decant volume prior to the next decant event.

Chemical disinfection with sodium hypochlorite as a disinfecting agent will be used for the Phase 1 disinfection facilities. Sodium hypochlorite will be injected via a static mixer into the decant line from the SBRs prior to discharging into the equalization basin. The equalization basin will also serve as a chlorine contact chamber. Sodium hypochlorite will be fed from the chemical bulk storage tanks located within the odor control facilities. The sodium hypochlorite feed pump will be electrically interlocked to start immediately upon initiation of a decant event. The design chlorine residual will be 2 mg/L.

The effluent pump station will be sized to start pumping 20 minutes after each decant event starts. The pump station will pump treated effluent from the WRF to discharge at golf

**1.2.4.1.3 Equalization Basin, Disinfection, & Effluent Pump Station**

<b>TABLE 6</b>	
<b>BIOLOGICAL SLUDGE PRODUCTION</b>	
Net Sludge Yield	0.8 lb TSS/ lb BOD <sub>r</sub>
WAS	750 lb/d

Sludge production data for the Phase 1 SBRs are listed in Table 6.

<b>TABLE 5</b>	
<b>SBR DESIGN CRITERIA</b>	
Alpha/Beta	0.75/0.95
Average Day, Peak Hour AOR/SOR	200 lb/h / 325 lb/h
Clean Water O <sub>2</sub> Transfer Efficiency	20 %



course lakes for golf course irrigation. The treated effluent will be stored at the golf course lakes

until used for irrigation.

#### **1.2.4.1.4 Odor Control**

Odor control facilities will be provided to treat all off-gases from the influent pump station; screenings facility; SBRs; sludge holding tank; and solids handling facility. The odor control system will be a multiple stage chemical wet scrubber, using caustic and sodium hypochlorite to remove the hydrogen sulfide and other odors. A dedicated carbon unit may be provided for the SBRs, since the odors will be primarily biological, and is anticipated to exert a high caustic demand on the wet scrubber.

#### **1.2.4.2 Effluent Disposal and Quality Requirements**

Treated effluent from the initial phase WRF will be recharged and reused as golf course irrigation. The effluent pumps will pump treated effluent to the golf course lakes, where it will be stored. The golf course irrigation system will feed from the golf course lakes. Treated effluent will be recharged during wet weather events, and when the golf courses cannot irrigate. Upon future expansion of the WRF, alternate end uses will also include open access irrigation such as in common areas and parks. There are no anticipated water quality issues for golf course irrigation or groundwater recharge. However, in order to facilitate alternate end uses, the WRF will need to be expanded to include filtration, coagulation and polymer feed, and ultraviolet disinfection facilities. These future process structures have been considered in developing the master site plan of the WRF. A master site plan of the WRF is included in Appendix A as Figure 9.

Water balances showing the anticipated treated effluent supply and golf course irrigation demand for Phase 1 are included in Appendix B. It is anticipated that groundwater recharge will occur during wet weather events, and that some storage will be provided at the golf course lakes. It is recommended that Citizens rely on plant operational experience gained during Phase 1 to verify how the flows are tracking as compared to projected flows, in order to evaluate storage requirements beyond Phase 1.

The reuse of treated effluent for golf course irrigation will reduce the need to use raw surface water or groundwater for irrigation. The Phase 1 effluent will comply with Class B+

reclaimed water quality requirements outlined in the Arizona Administrative Code (A.A.C.) Title 18, Chapter 11, Article 3. The ultimate facility's effluent will comply with Class A+ reclaimed water quality requirements, as required for open access landscape irrigation, such as in right-of-ways, common areas, and parks.

### 1.2.4.3 Discharges

On-site stormwater retention will be provided to accommodate a 10-year 24-hour storm. Stormwater discharge in excess of a 10-year 24-hour storm from within the WRF site will be diverted to Tuthill Wash, a 100-year flood plain located east of the WRF. The plant site will not receive stormwater runoff from adjacent properties. Stormwater discharges from the plant site will be subject to NPDES stormwater permitting requirements when design flows exceed 1-mgd. The flows will be addressed through implementation of a stormwater pollution prevention plan.

### 1.2.5 Reclaimed Water System Description

The reclaimed water infrastructure includes reclaimed water transmission lines, booster pumping stations and storage lakes. Wood, Patel and Associates is the design engineer for the reclaimed water system. The Phase 1 treated effluent will be reused for golf course irrigation. One golf course will be operational and capable of receiving wastewater at the beginning of Phase 1. A second golf course is anticipated to be constructed within a year of operating the WRF. A total of four golf courses are planned for build-out. The treated effluent pump station will be located at the WRF. The reclaimed water transmission lines will follow the major street alignments. The transmission mains are sized to ultimately serve four golf courses. Additional booster pump stations and reclaimed water distribution lines will be installed as needed to provide irrigation for each phase of golf course construction. Ultimately, several recovery wells will be required to meet the peak summer day turf irrigation demand. Figure 5, included in Appendix A, presents the sizing and preliminary locations for the major onsite reclaimed water transmission mains and storage lakes for the golf courses.

Treated effluent will be pumped from the WRF to onsite storage lakes at each golf course. Each storage lake will be sized to regulate the flow of reclaimed water between the time it is delivered and time it is used for irrigation. It is anticipated that the golf course lakes will be

designed to handle Phase I wet weather flows. The surface area of each storage lake will be sized to prevent drawdowns of more than 12 inches for the peak summer day demand.

### **1.2.6 Sanitary Districts, Private Utilities, and WWT Service Areas**

The locations of the Whitestone WRF and the alignment corridors for the proposed collection system and discharge pipeline are shown on Figures 2 and 5, included in Appendix A. There are no existing wastewater treatment facilities, sanitary districts or certified service areas that would be impacted by either the construction of the WRF, collection system, or the discharge line.

### **1.3 Discharge Alternatives**

The Third Management Plan for Phoenix Active Management Area's (AMA) Industrial Conservation Program imposes annual application rates for turf acreage, bodies of water, and low water use landscaping for all turf-related facilities. AMA defines a turf-related facility as any facility, including schools, parks, cemeteries, golf courses, or common areas within a housing subdivision, with ten or more acres of water-intensive landscaped area. In order to encourage the use of treated effluent for irrigation, the Management Plan discounts all direct effluent use by 40 percent, which would provide a higher application rate to facilities using higher percentages of effluent.

Treated effluent from the Phase I WRF will be used for groundwater recharge and golf course irrigation. The demand for irrigation water varies throughout the year, with the summer demand significantly surpassing the winter demand. In the summer months, treated effluent must be supplemented with surface water or groundwater to provide the required irrigation water demand. Upon future expansion of the WRF, alternative means of discharge will be used, such as for irrigation of open access landscaping. It is anticipated that the golf course lakes will be designed to handle Phase I wet weather flows, and groundwater recharge will occur during wet weather events. Upon expansion of the Phase I WRF, additional treatment processes will be provided to enable open access landscape irrigation, such as for right-of-ways, parks, and common areas.

**1.4 Environmental Permitting Requirements**

The Phase 1 WRF and discharge will require the following environmental permits or clearances:

- Aquifer Protection Permit (APP) issued by the Arizona Department of Environmental Quality (ADEQ).
- Type 2 Reclaimed Water General Permit for Direct Reuse of Class B+ Reclaimed Water issued by the ADEQ.
- Air Quality Permit issued by Maricopa County Environmental Services (MCES).
- Hazardous Materials Management Plan (HMMP) issued by Town of Buckeye Fire Department.
- Wastewater Facility Approval to Construct – Approval of Construction issued by MCES.
- Reclaimed Water System Approval to Construct – Approval of Construction issued by MCES.

**1.5 Pretreatment Requirements**

40 CFR Section 403.8 states that any POTW with a total design flow greater than 5 mgd and receiving from industrial users pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to Pretreatment Standards will be required to establish an EPA approved POTW Pretreatment Program. There are no anticipated industrial users connected to the Whitestone WRF, and the ultimate capacity of the facility is less than 5 mgd, therefore no pretreatment will be required.

**1.6 Sludge Management Requirements**

Sludge will be wasted from the sequencing batch reactors to an aerated sludge holding tank. The sludge holding tank is sized to accommodate maximum month loadings, with a solids retention time from 8 to 12 days. Sludge will be pumped from the sludge holding tank to a belt filter press for dewatering. Dewatered sludge from the belt press will be discharged into a 20 cubic yard dumpster. Once a week, sludge will be removed from the dumpster and disposed of at a landfill. Therefore, requirements of 40 CFR Part 503 do not apply.

## 2.1 Construction and Operation Responsibility

The Town of Buckeye will sponsor the Whitestone WRF for purposes of the MAG 208 Plan Amendment.

DMB will carry out the plan for design and construction of the Phase I sewer collection system, WRF, and reclaimed water system. DMB will be solely responsible for funding the Phase I design and construction. Citizens will operate, maintain, and be responsible for expansion of the collection system, discharge line, and WRF beyond the initial phase. Citizens will be solely responsible for funding subsequent expansions.

The Phase I WRF is designed for an initial flow of 0.45 mgd, with a final build-out flow of 3.35 mgd required by the year 2018. The initial 0.45 mgd phase of the project is projected to be in operation by April 2003.

The timing of subsequent WRF expansions will depend upon the increase in population and resultant wastewater flows. Phasing of future expansions will be determined by Citizens at a later date.

## 2.2 Sources of Pollution

Construction of the WRF and discharge line will not be a pollution-intensive activity. Anticipated pollutants include fugitive dust from the construction activities, construction-related solid waste, inert materials, and residual construction materials such as paint and adhesives. Any waste generated during construction will be properly managed and disposed of in an appropriately permitted facility. The construction activities will be subject to stormwater permitting and will implement Best Management Practices.

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### 3.0 FINANCING AND OTHER ACTIONS TO IMPLEMENT PLAN

#### 3.1 Financing Plan

DMB is the master developer of the project. The residential and commercial developers will enter into agreements with Citizens for wastewater treatment and distribution services throughout the Whitestone development. Citizens is the wastewater treatment and distribution service provider for the Whitestone development.

Per an infrastructure agreement between DMB and Citizens, DMB will construct the Phase I collection system, wastewater treatment facilities, and effluent pipeline. A copy of the agreement's signature page is included in Appendix A. Upon completion of construction, Citizens will own and operate these facilities. Subsequent phases will be constructed by Citizens. Citizens will receive its financing from internally generated funds. DMB will receive financing through private sources. DMB's financial information is included in Appendix D. DMB will provide the financial support to construct the reuse site.

Long term cost recovery to DMB and Citizens will be provided on a per-connection basis. Connection and operating fees will be regulated by the ACC.

#### 3.2 Financing Capacity

DMB has the financial capacity to construct the Phase I WRF, collection system, discharge pipeline, and reuse site. Financing will be provided through private funding. Citizens Communications Company has the financial capacity to operate and maintain the WRF over its useful life. Citizens is a diversified utility company. Citizens had revenues of \$1.8 billion in its fiscal calendar year 2000, and has assets of over \$6.9 billion. Citizens intends to finance its investment in utilities facilities at the Whitestone development through cash flow, public debt offerings, and other sources. A copy of the most recent financial statements for Citizens is attached as Appendix D.

**4.1 Implementation Plan**

The initial phase of the Whitestone WRF will have a rated capacity of 0.45 mgd, and is anticipated to be operational in April 2003. A detailed start-up plan will be developed for the facility during the design phase.

Subsequent expansions of the WRF will be dependent upon the increase in population within the Whitestone development, and resultant wastewater flows. The final build-out capacity is planned to be a flow of 3.35 mgd by the year 2018.

**4.2 Impacts of Proposed WWT Plan**

The effect of implementing the Phase I WRF is not expected to impact the operation of any adjacent municipality, not any existing sanitary district or certificated area, nor any communities or businesses. The treated effluent will be used primarily for golf course irrigation, thereby reducing the amount of groundwater or surface water used. The high quality effluent will have very little organic content and therefore will be very unlikely to produce odors.

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## 5.0 PUBLIC PARTICIPATION

MAG is responsible, with cooperation from the Town of Buckeye, for ensuring that the following actions are taken as this CWA 208 Amendment process proceeds:

- Submittal of a mailing list that will be used to notify the public of the hearing on this 208 Amendment.
- 30-day notification to the public of the location where documentation pertaining to this 208 Amendment is available for review.
- Publication of a public notice with information on the date, time, subject, and location of the public hearing on this 208 Amendment at least 45 days prior to the hearing.
- Submittal of an affidavit of publication of the public notice.
- Submittal of a responsiveness summary for the public hearing.





**Location and Site Maps**

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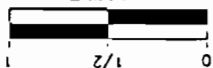
**APPENDIX A**



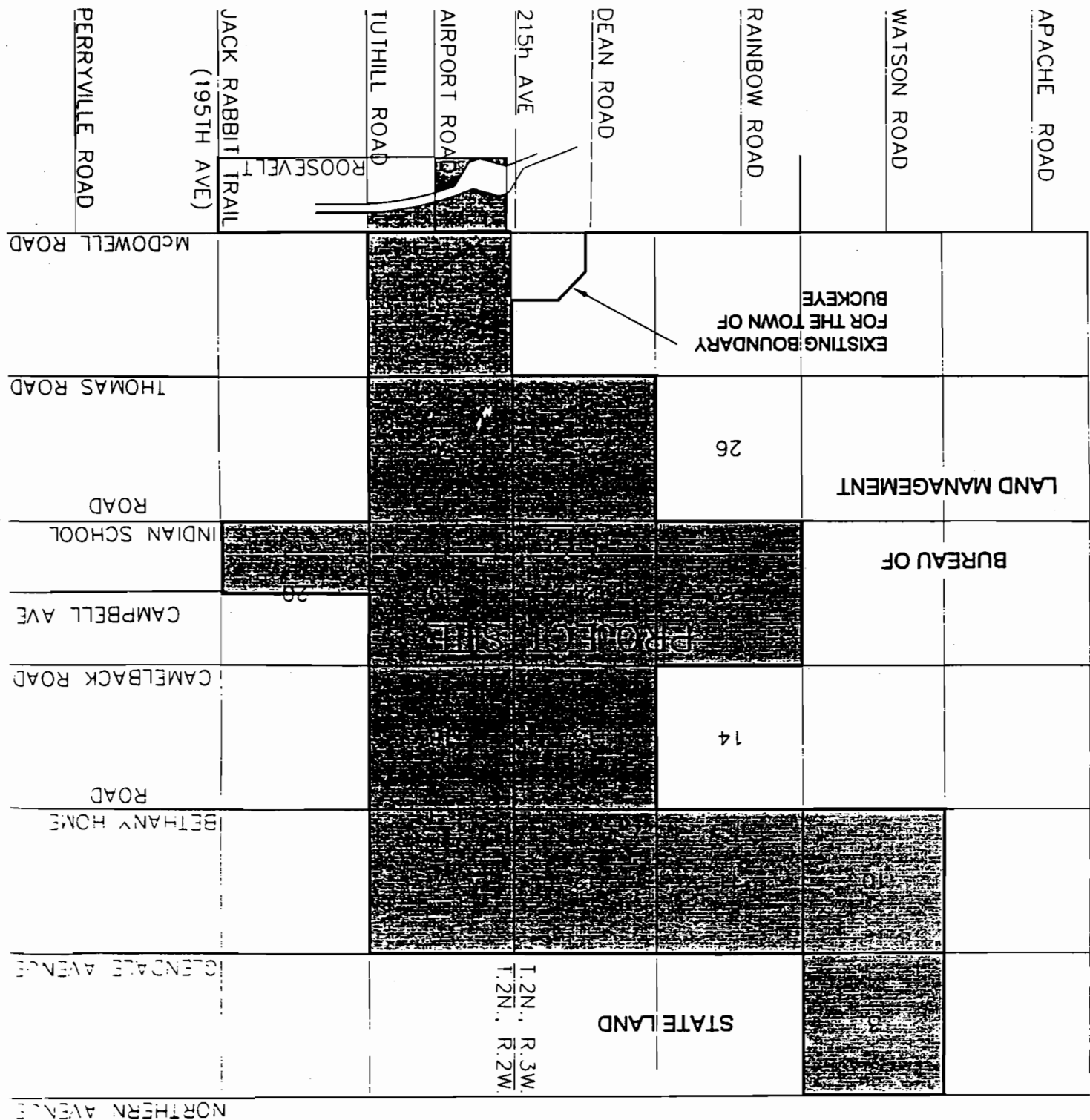
# LOCATION MAP FIGURE # 1

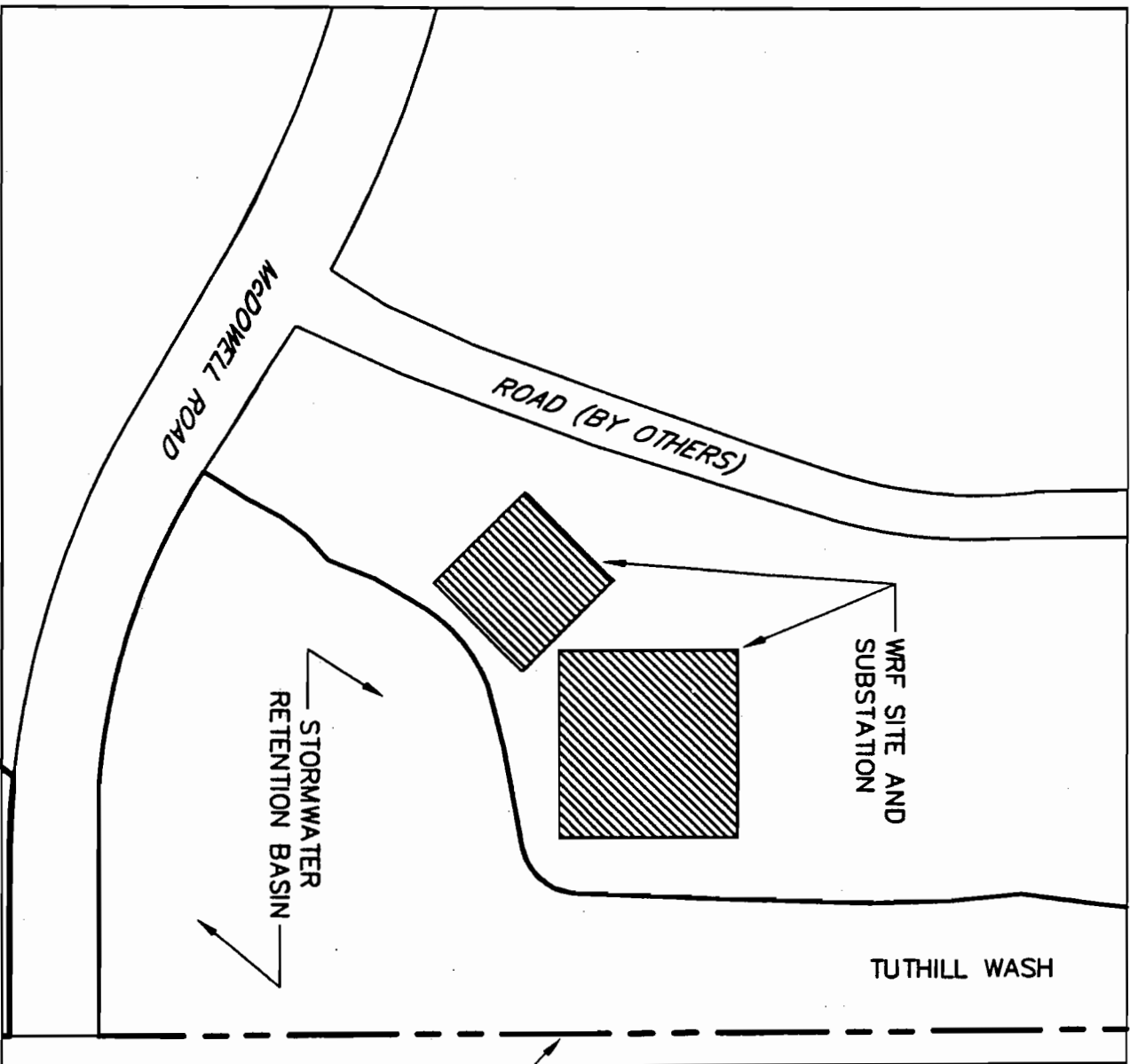
WHITESTONE  
BUCKEYE, ARIZONA

1 MILE



WOOD, PATRICK & ASSOCIATES INC.  
Civil Engineers, Surveyors and  
Land Surveyors  
(928) 526-0500





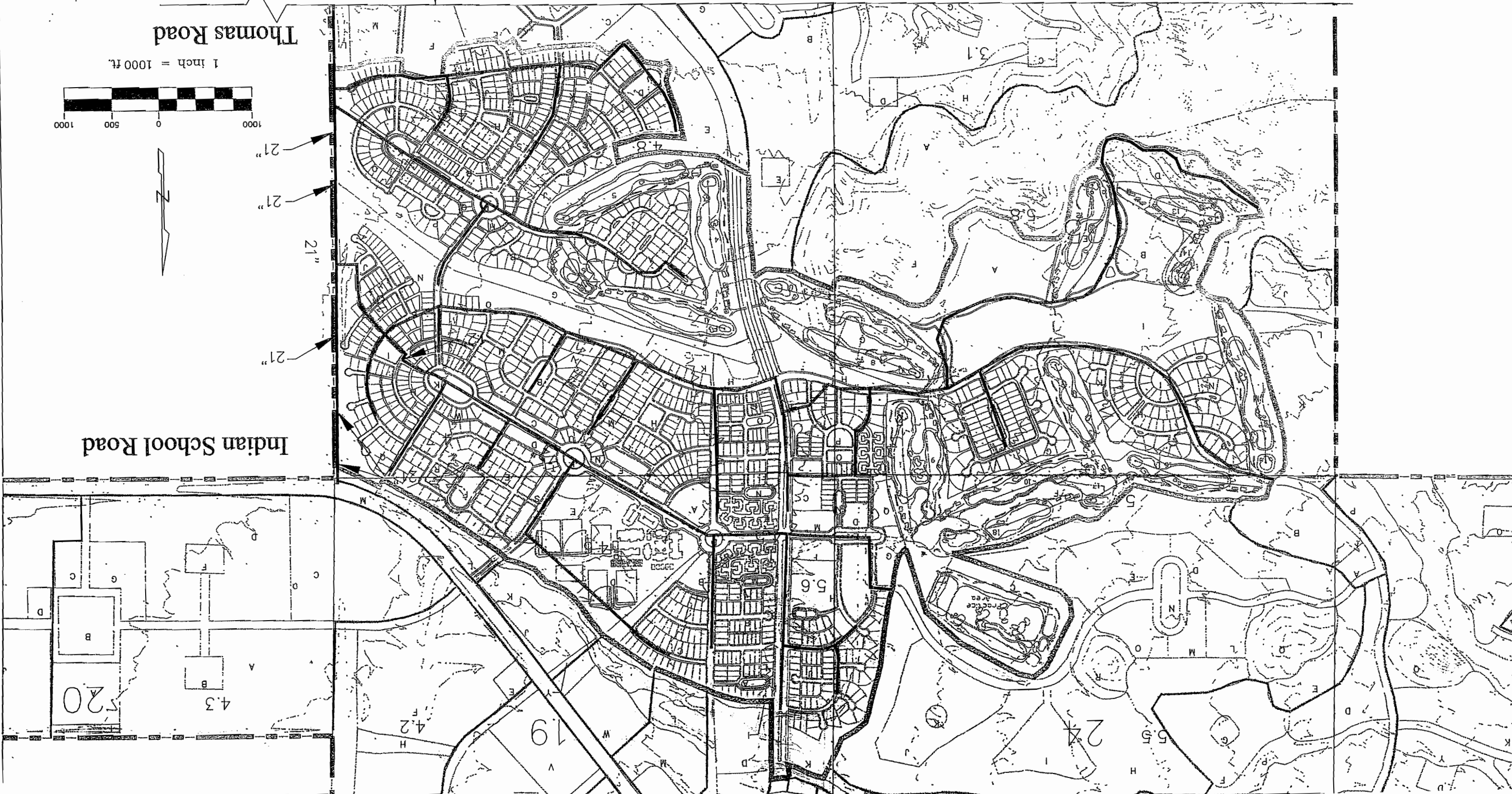


NOTE:  
 ALL SEWER LINES ARE PROPOSED 8" DIAMETER  
 UNLESS OTHERWISE NOTED.  
 THE BACKBONE INFRASTRUCTURE LOCATIONS ARE  
 PRELIMINARY AND SUBJECT TO CHANGE WITH  
 PREPARATION OF THE CONSTRUCTION DOCUMENTS.

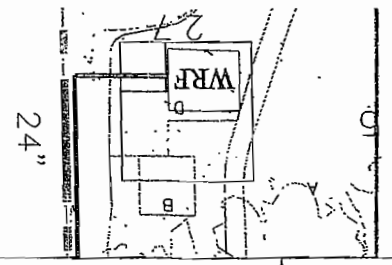
**WHITESTONE**  
 BUCKEYE, ARIZONA  
**PHASE 1 ON-SITE BACKBONE INFRASTRUCTURE**  
**MASTER WASTEWATER PLAN**  
**CITIZENS WATER RESOURCES**  
**FIGURE # 3**

25' CONTOUR LINES  
 SERVICE AREA  
 PHASE BOUNDARY

**LEGEND**



1 inch = 1000 ft.

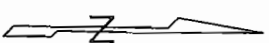


24"

3000'

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 Civil Engineers, Hydrologists and  
 Land Surveyors  
 (602) 335-8500  
 03/21/01

Northern Avenue



1 inch = 3000 ft.

Glendale Avenue

Bethany Home Road

Camelback Road

Indian School Road

Thomas Road

Jackrabbit Trail

McDowell Road

PROPOSED  
WASTEWATER  
TREATMENT/WATER  
RECLAMATION  
FACILITY

Airport Road  
Tuthill Road

- LEGEND**
- FM FORCEMAIN
  - LIFT STATION
  - SERVICE AREA
  - - - PROJECT BOUNDARY
  - IV 25' CONTOUR LINES
  - PLANNING UNIT
  - PHASE 1 —
  - PHASE 2 —
  - PHASE 3 —
  - PHASE 4 —
  - PHASE 5 —
  - PHASE 6 —
  - PHASE 7 —

NOTE: ALL SEWER LINES ARE PROPOSED 8 INCH DIAMETER UNLESS OTHERWISE NOTED.

NOTE: THE BACKBONE INFRASTRUCTURE LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE WITH PREPARATION OF THE CONSTRUCTION DOCUMENTS.

FIGURE # 4

ON-SITE BACKBONE INFRASTRUCTURE PHASING  
 MASTER WASTEWATER PLAN  
 CITIZENS WATER RESOURCES

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BUCKEYE, ARIZONA

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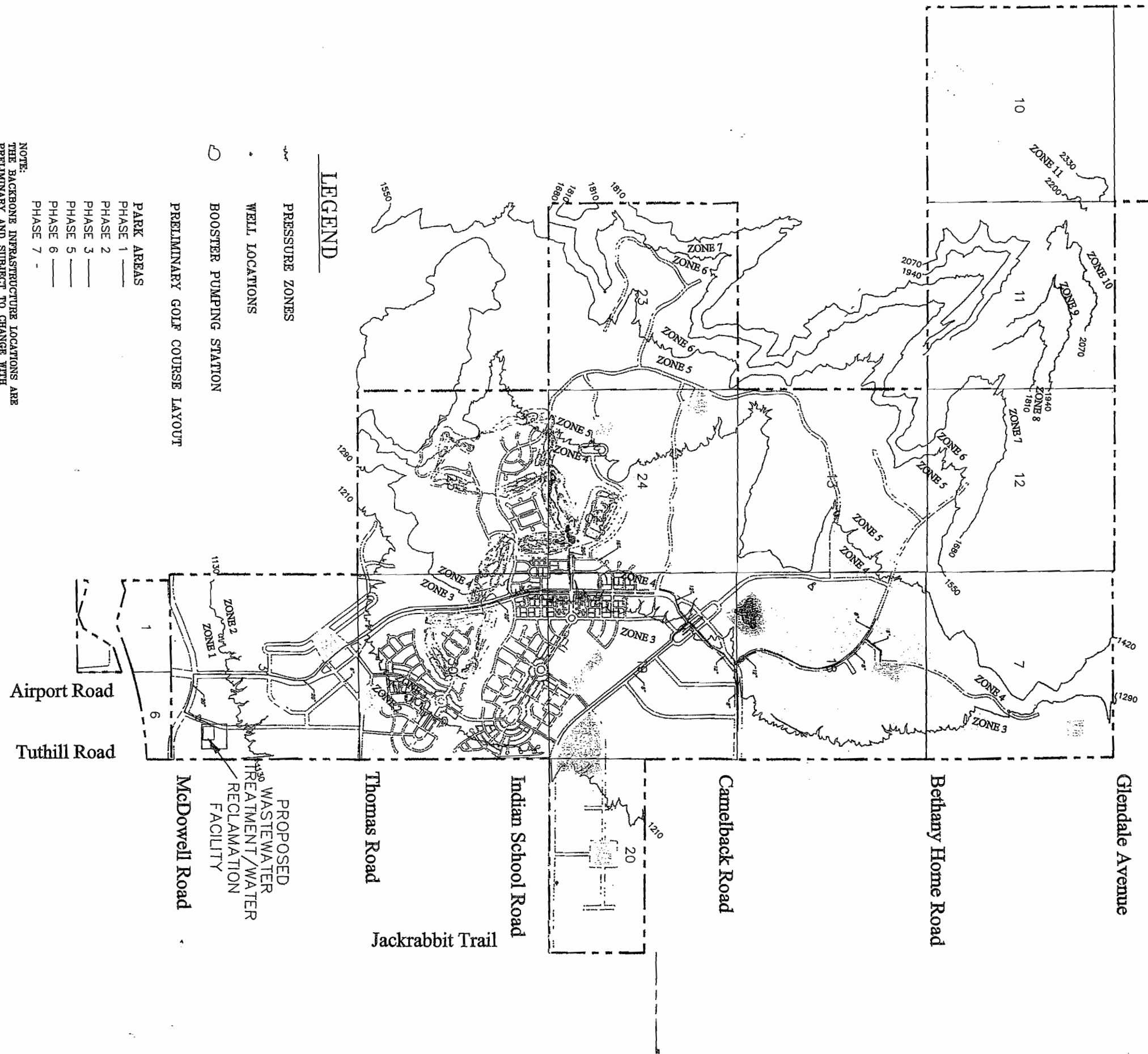
03/21/09







1 inch = 3000ft.



### LEGEND

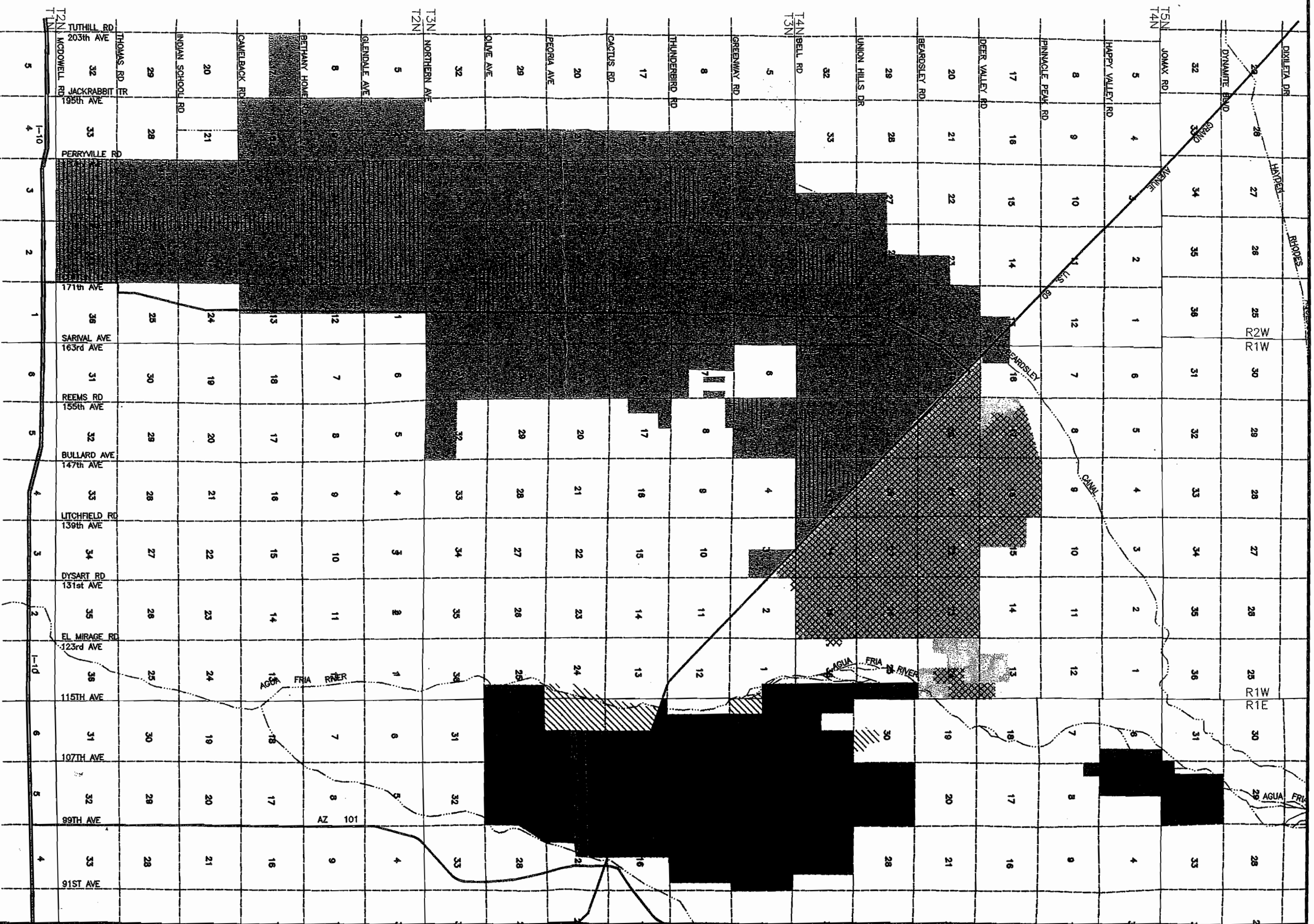
- PRESSURE ZONES
- WELL LOCATIONS
- BOOSTER PUMPING STATION
- - - - - PRELIMINARY GOLF COURSE LAYOUT
- PARK AREAS
- PHASE 1 ———
- PHASE 2 ———
- PHASE 3 ———
- PHASE 5 ———
- PHASE 6 ———
- PHASE 7 - - -

NOTE:  
THE BACKBONE INFRASTRUCTURE LOCATIONS ARE  
PRELIMINARY AND SUBJECT TO CHANGE WITH  
PREPARATION OF THE CONSTRUCTION DOCUMENTS.

**FIGURE # 5**  
**MASTER NON POTABLE WATER PLAN**  
**ONSITE BACKBONE INFRASTRUCTURE PHASING**  
**CITIZENS WATER RESOURCES**  
**WHITESTONE**  
 BUCKEYE, ARIZONA



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 Land Surveyors  
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CITIZENS UTILITIES COMPANY  
ARIZONA WATER/WASTEWATER  
WATER



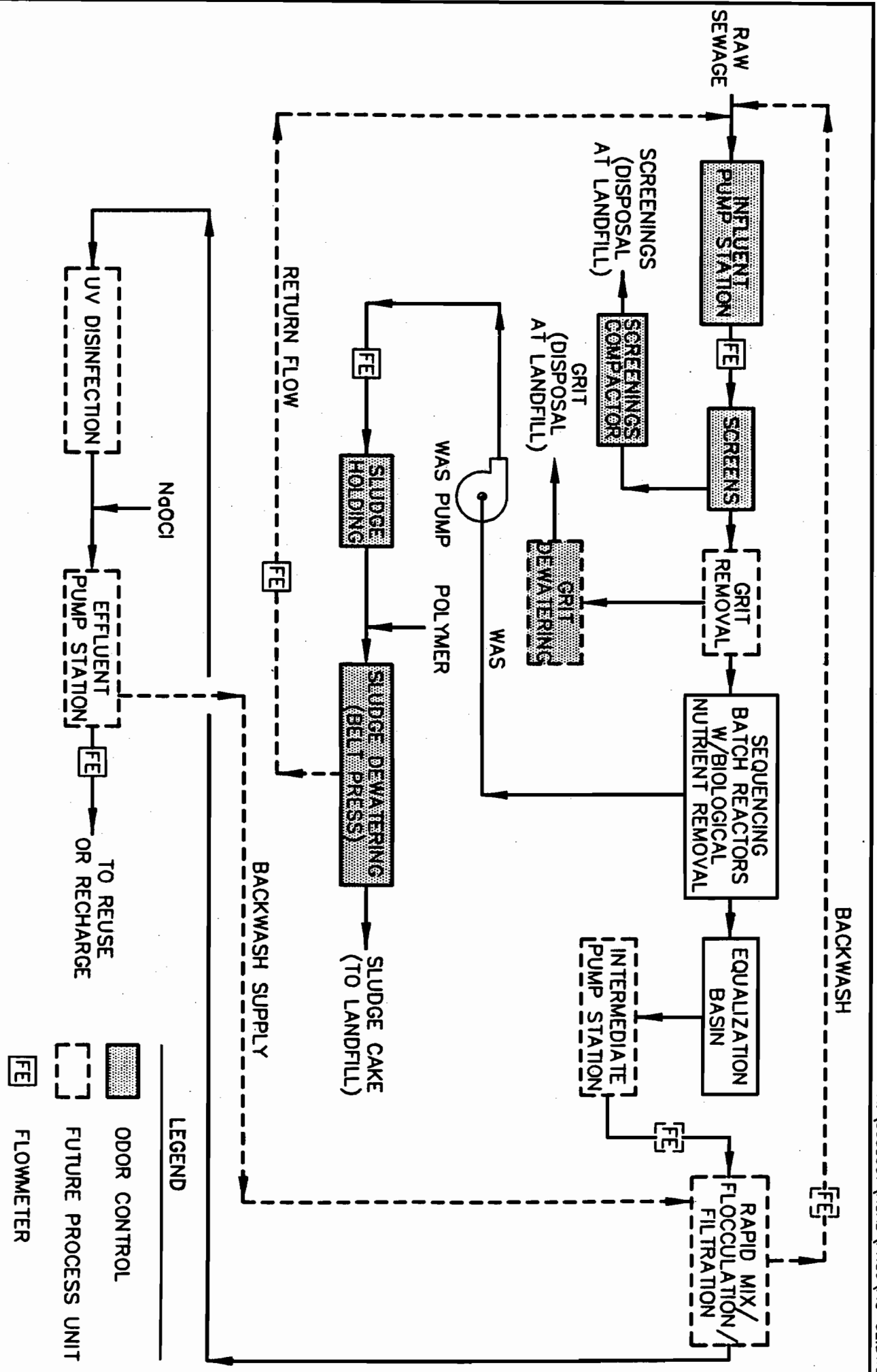
FIGURE # 6

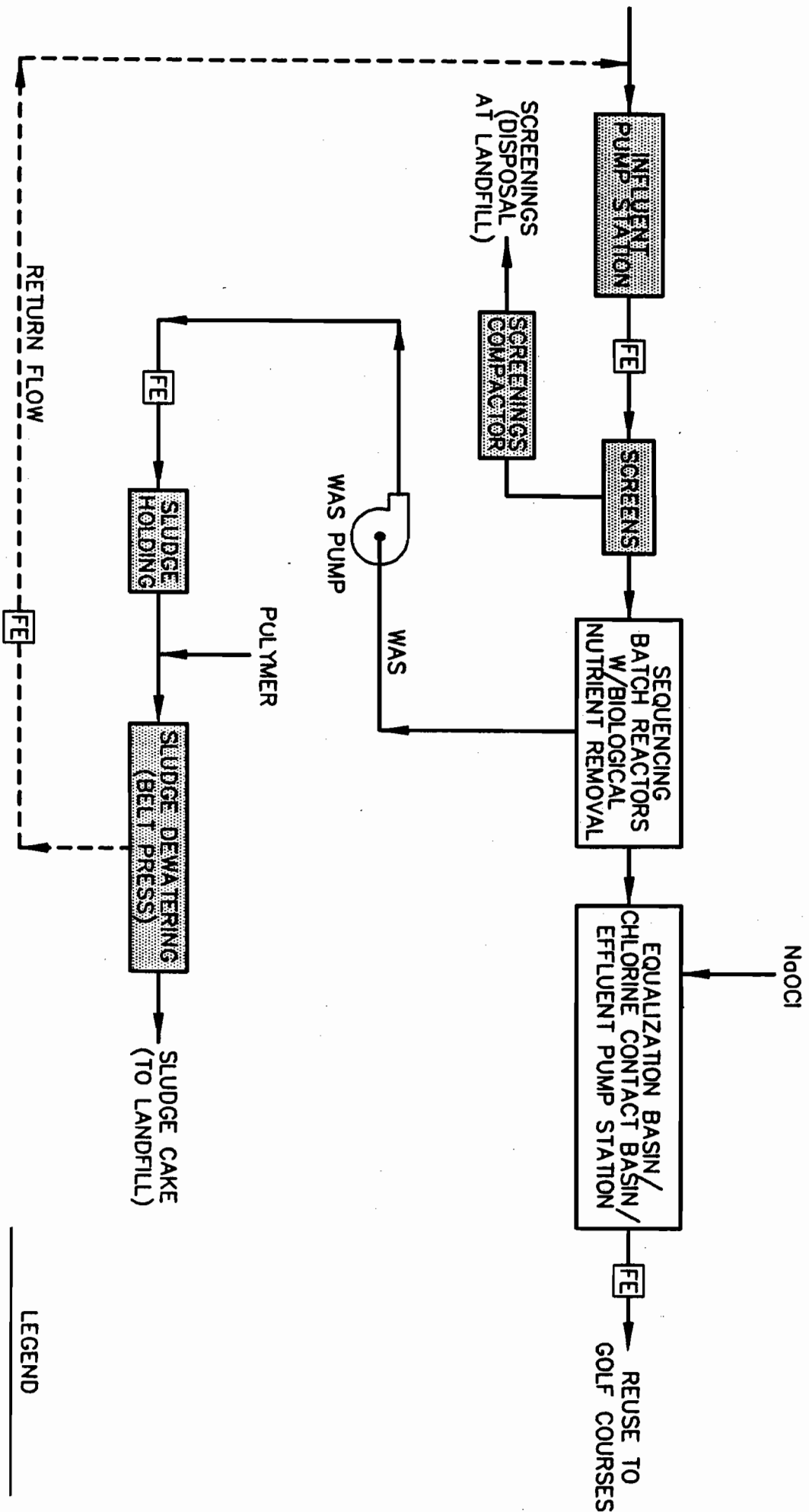
SERVICE CERTIFICATED AREA	
	SUN CITY WATER COMPANY
	SUN CITY WEST WATER COMPANY
	CITIZENS UTILITIES AGUA FRIA DIVISION



0 8500  
SCALE: 1"=8500'







LEGEND

 ODOR CONTROL

 FLOWMETER

