CENTRAL ARIZONA GOVERNMENTS

Section 208

Water Quality Management Plan

June 2015

ACKNOWLEDGEMENTS

High quality water is more than the dream of the conservationists, more than a political slogan; high quality water, in the right quantity at the right place at the right time, is essential to health, recreation, and economic growth. - ***Edmund S. Muskie (US Senator, 1959-80; US Secretary of State, 1980-81)***

ACKNOWLEDGEES

This document would not be possible without the collaborative effort and spirit of approximately 50 stakeholders throughout the Central Arizona Governments Region. This Plan would not have come to life without their initiative and drive. CAG would also like to acknowledge those contributors that were instrumental in the Plan's development, which are as follows:

- **U.S Environmental Protection Agency (EPA)**
- **Arizona Department of Environmental Quality (ADEQ)**
- **CAG Environmental Planning Committee (EPC)**
- **SEAGO Staff**
- **CAG Staff**

DISCLAIMER

CAG has compiled the maps, illustrations and other information in this document as a service to stakeholders. This information was derived from various sources and CAG makes no assurance that they are 100% accurate, current or complete. The maps are for reference and illustrative purposes and may not be suitable for site-specific decision making. Conclusions drawn from such information are the responsibility of the user. CAG disclaims any liability for injury, damage, or loss that might result from the use or errors from misuse of this information. More detailed information and specific locations may be obtained by contacting the Arizona Department of Environmental Quality, CAG, individual municipalities, or other responsible parties.

Table of Contents

EXECUTIVE SUMMARY **ES-1**

CHAPTER 1 – AUTHORITY & PURPOSE **1-1**

1.1 – Authority 1-1

1.2 – Purpose 1-4

1.3 – Watershed Planning 1-5

1.4 – Related Information 1-6

CHAPTER 2 – LOCAL CONDITIONS & WATER BASINS **2-1**

2.1 – The CAG Designated Planning Area 2-1

2.2 – Topography 2-3

2.3 – Climate & Precipitation 2-4

2.4 – Regional Surface Watershed Basins 2-5

2.5 – Groundwater Basins 2-8

2.6 – Soils 2-17

2.7 – Future Considerations 2-25

CHAPTER 3 – WATER QUALITY MANAGEMENT PRACTICES & FACILITIES **3-1**

3.1 – Point-Source Pollution 3-1

3.2 – Non-Point Source Pollution 3-1

3.3 – Regulatory Framework 3-2

3.4 – Permitting 3-5

3.5 – Wastewater Treatment Processes 3-7

3.6 – Operator Training & Certification 3-12

3.7 – Sustainability 3-13

CHAPTER 4 – STRATEGIC PLAN **4-1**

4.1 – Overview 4-1

4.2 – Goals 4-2

Goal 1 4-2

Goal 2 4-3

Goal 3 4-4
Goal 4 4-6
Goal 5 4-7

CHAPTER 5 – PLAN IMPLEMENTATION 5-1
5.1 – Overview 5-1
5.2 – Local Ordinance Development 5-1
5.3 – Wastewater Treatment Options Table 5-3
5.4 – Designated Management Agencies & Wastewater Management Utilities 5-7
5.5 – STEP 1: CAG Pre-Application Meeting 5-9
5.6 – STEP 2: Stakeholder Meeting(s) 5-10
5.7 – STEP 3: Consistency Review Process 5-11
5.8 – STEP 4: Public Hearing Process 5-12
5.9 – STEP 5: CAG Environmental Planning Committee 5-13
5.10 – STEP 6: 208 Plan Amendments 5-14
5.11 – STEP 7: Finalization of a CAG 208 Planning Project or CAG 208 Plan Amendment 5-15
5.12 – CAG Website Information 5-16

APPENDIX A – LEGAL AUTHORITIES A-1
A.1 – Laws Governing Regional Wastewater Planning A-2
A.2 – Laws Governing Wastewater & Agriculture Permits A-2
A.3 – Laws Governing Waste Residuals A-5
A.4 – Laws Governing Location A-6

APPENDIX B – GLOSSARY OF TERMS B-1

APPENDIX C – PROCESS FLOW CHARTS C-1
C1 – CAG 208 Planning Project Proposals C-1
C2 – CAG 208 Plan Amendment Proposals C-2

APPENDIX D – COMPARISON OF 208 PLAN CONDITIONS D-1

APPENDIX E – CAG 208 INVENTORY E-1

List of Tables

TABLE 2.1 – CAG Population Statistics 2-2
TABLE 2.2 – Additional Watershed Information 2-8
TABLE 2.3 – Additional Groundwater Basin Information 2-16
TABLE 5.1 – Wastewater Treatment Options 5-6
TABLE 5.2 – Guidance for Selecting Wastewater Treatment Systems Based on Distance 5-7
TABLE A.1 – Websites for Laws & Regulations A-1

List of Figures

FIGURE 1.1 – Watershed Schematic 1-5
FIGURE 2.1 – Arizona Council of Governments 2-1
FIGURE 2.2 – Arizona's Geologic Physiographic Provinces 2-3
FIGURE 2.3 – Average Annual Precipitation 2-5
FIGURE 2.4 – Surface Watershed Basins 2-6
FIGURE 2.5 – Arizona Groundwater Basins 2-9
FIGURE 2.6 – Arizona AMAs & INAs 2-10
FIGURE 2.7 – Soil Associations Within Gila County 2-20
FIGURE 2.8 – Soil Associations Within Pinal County 2-24
FIGURE 3.1 – ADEQ Monitoring Regions 3-3
FIGURE 3.2 – Typical On-Site Wastewater Treatment System 3-8
FIGURE 3.3 – Typical Surface Aerated Basin 3-9
FIGURE 3.4 – Typical Activated Sludge Treatment Process 3-10
FIGURE 3.5 – Typical Oxidation Ditch Treatment Process 3-10
FIGURE 3.6 – Cross Section of a Trickling Filter 3-11

EXECUTIVE SUMMARY

The Central Arizona Governments (CAG) was appointed as the Designated Planning Agency (DPA) for Gila and Pinal Counties under Section 208 of the Federal Clean Water Act of 1977 by Governor Raul Castro. In 1978 CAG developed its first regional water quality plan, entitled the *CAAG Section 208 Areawide Water Quality Management Plan*. The plan was updated in 1994. The plan establishes strategies and processes to provide regional coordination in developing wastewater treatment facilities and efforts to protect water quality. The CAAG Section 208 Areawide Water Quality Plan is essentially an agreement between CAG, entities operating wastewater utilities within the region, the Arizona Department of Environmental Quality (ADEQ), and the U.S. Environmental Protection Agency (EPA) to implement the strategies and processes to protect water quality. The new plan is referred to as the ***CAG 208 Water Quality Management Plan*** because it fulfills water quality planning requirements established in Section 208 of the Federal Clean Water Act. The purpose of this planning effort is to update the existing CAAG Section 208 Areawide Water Quality Management Plan and to:

- Assure adequate wastewater facilities in the CAG Region;
- Take advantage of economies of scale, treatment efficiencies, new and better treatment technology, and conservation practices where possible;
- Promote recharge and reuse;
- Identify and address water quality and wastewater issues; and
- Improve effectiveness and efficiency of 208 Plan Consistency Reviews.

The original plan, while meeting Local, State, and Federal guidelines, became severely outdated beginning in the 2000s. Higher growth levels that occurred in Pinal County required multiple amendments to the plan. The two counties covered by the CAG Region began to vary in population, which led to changes in planning needs and considerations. The plan that was effective prior to 2000 was no longer a working document. The CAAG Section 208 Areawide Water Quality Management Plan, which was adopted in 1994, was primarily an inventory of then-existing wastewater treatment facilities in the region and the 20-year capacity projections for those facilities. As new facilities were proposed or capacity projections needed modification, a "plan amendment" was required to update the regional plan. The plan amendment process is both time-consuming, costly and of questionable value, especially when it involves a city, town, or sanitary district. Expansion of a public wastewater treatment facility requires multiple public processes including planning and zoning hearings and approval of capital expenditures by the governing body for design and construction. The requirement for a separate 208 amendment often resulted in a large amount of expended effort with little to no public participation, because the project was already well-publicized and approved through other processes. With assistance from ADEQ, CAG was able to revise this document.

The new CAG 208 Water Quality Management Plan (herein referred to as the CAG 208 Plan) is a significant change from the previous plan. The strategy has migrated from a document immersed in regulations and codes to a more streamlined, user friendly document that focuses solely on strategies for future water quality protection and improvement. It incorporates a Strategic Plan of goals with strategies and tactics to achieve those goals. For example, the expansion of an existing treatment facility will not trigger a plan amendment if it is found consistent with the goals and strategies in the CAG 208 Plan. Only those proposed actions that are not found consistent with the Strategic Plan will require a plan amendment as outlined in **Chapter 5, Plan Implementation**.

The planning effort encourages and tries to assure the development and maintenance of sufficient, efficient, cost effective, reliable, and sustainable wastewater treatment reuse systems. The new CAG 208 Plan includes strategies that encourage the use of sustainability and resource conservation practices and address water quality problems from sources other than wastewater treatment and disposal. The CAG 208 Plan also encourages local land use decision makers to consider the goals of the Plan when making planning and zoning decisions that involve development, wastewater management, and stormwater impacts.

CONSISTENCY REVIEWS

Federal and State regulations require that certain proposed actions related to wastewater facilities must be consistent with the CAG 208 Plan. According to State regulations, the following actions can only be approved if ADEQ determines that the proposal is consistent with the CAG 208 Plan:

- Permitting the proposed construction or expansion of a sewage treatment facility with combined flows over of 24,000 gallons per day (gpd) [1] ;
- Discharges to surface waters that require an individual Arizona Pollutant Discharge Elimination System (AZPDES) permit [2]; and
- Provision of a grant or loan through the Water Infrastructure Finance Authority (WIFA) [3]

State regulations do not require a 208 consistency determination for on-site wastewater systems (i.e. septic systems) under 3,000 gpd, on-site systems if combined flows would be under 24,000 gpd, sewer collections systems, subdivisions served by on-site systems, or reclaimed water systems.

Although consistency determinations (i.e., Consistency Reviews) *are not* required by regulation for developments such as subdivisions that rely upon on-site systems, ADEQ 208 staff will work with CAG to complete a preliminary 208 review to determine whether the proposal is consistent with the CAG 208 Plan strategies (i.e. Wastewater Treatment Options Table in **Chapter 5**), if it is within an existing Service or Planning Area, and to coordinate with county and municipal officials in the region.

Similarly, 208 Consistency Review may be necessary when approving small satellite treatment plants, or community systems to assure that strategies in the CAG 208 Plan are implemented such as high priority areas for sewer lines, coordination with Designated Management Agencies, economies of scale, the Wastewater Options Table, etc.

To assist the readers in understanding the acronyms and terminology used in this document, a Glossary of Terms is provided within **Appendix B**.

[1] A.A.C. R18-9-A201(B)(6)(a) & A.A.C. R18-5-303(1)
[2] A.A.C. R18-9-A903(6)
[3] A.A.C. R18-15-202(B)(8)

ISSUES & THE STRATEGIC PLAN

The major water quality and wastewater issues were identified to initiate plan development by CAG's Environmental Planning Committee as a stakeholder group representing the municipalities in the CAG Region and other interested parties. The issues and strategies developed in this plan are summarized below:

ISSUE – 1: Strategies to Assure Adequate Future Wastewater Treatment Facilities

A. Designated Management Agencies and Wastewater Management Utilities:

The Clean Water Act requires that each 208 Plan identify entities that have the legal, institutional, financial, and managerial capabilities to carry out aspects of the 208 Plan. These public entities include Local, Regional, or State agencies and political subdivisions. In the CAG 208 Plan, a wastewater treatment facility operated by a public entity must be able to demonstrate that it has the legal, institutional, financial, and managerial capabilities and resources to construct, operate, and maintain the wastewater facilities it is proposing, or is already operating, and be certified as a Designated Management Agency (DMA).

Non-public entities that are wastewater providers (i.e. a private utility) cannot be approved as a "DMA" because they are not an agency or political subdivision. However, ADEQ will still require the entity to demonstrate that it has the same capabilities to function as a DMA ***within its Certificated Area of Convenience and Necessity as approved by the Arizona Corporation Commission***. If ADEQ finds adequate demonstration, the entity would be approved as a Wastewater Management Utility (WMU) under the CAG 208 Plan.

Approval of some large developments or expansion of some wastewater facilities would be contingent on being certified as a DMA or approved as a WMU. Development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategy 1.1.A**).

B. Expansion Triggers and Capacity Assurance:

The expansion design phase for wastewater facilities will be triggered by the expected flow of wastewater coming into the plant, compared to the facility's design capacity as approved under its Aquifer Protection Permit (see equation below).

Design Phase Trigger Equation

Operational Flow (Entering Facility)	+	Expected New Flows (Planned Sewer Extensions)	+	Capacity Assurance (Promised to Developers)	=	85% of Approved (Design Capacity)

As will be discussed in Chapter 5, new capacity assurance procedures and local ordinances are needed so that a wastewater treatment plant's capacity is not committed indefinitely to proposed developments that will no longer be built. Development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategy 1.1.A**). CAG will work closely with ADEQ to ensure that state rules and policies are also met.

ISSUE – 2: Technologies & Quality Standards – Best Options for Wastewater Treatment

A. Wastewater Treatment Options Table:

The criterion for determining options for a proposed development or replacement wastewater system is established in the **Wastewater Treatment Options Table** in **Chapter 5**. A second "*guidance*" table provides criteria for determining whether a development should connect to a sewer based on the distance from the sewer lines. Both tables will be used for 208 Consistency Reviews. However, additional local ordinances will be needed to implement the criteria in these tables (beyond existing consistency requirements) for wastewater facilities, such as on-site systems, dry sewer collection systems, and connections to sewers when available. Development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategy 1.1.C**).

B. Cost-effectiveness, Economies of Scale, Treatment Efficiencies, and Sustainability and Resource Conservation:

Proposed wastewater treatment facilities should demonstrate the best cost-effective technologies. Facility design should consider sustainability and resource conservation, reuse and recharge, economies of scale, and treatment efficiencies even though these are not required in regulations. For example, in some cases it may be less expensive and more effective in the long-term for the utility to expand an existing wastewater treatment system, rather than create new smaller facilities. Reuse of gray water, effluent, and biosolids should be included in the design, when appropriate. The facility should be designed to have a low impact on the surrounding community and to conserve resources (i.e. low impacts, low energy, and "green" infrastructure). New technologies should be considered, such as the regional reuse of biosolids to create electricity. Effluent of A+ quality standards or better should be considered for reuse for its maximum beneficial use. Development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategy 5.1.B**).

C. High Priority Areas for Sewer Lines and Sensitive Areas:

Some areas are not suitable for on-site wastewater septic systems according to current Aquifer Protection Permit regulations due to high groundwater, floodways, or other concerns. These could be considered "sensitive areas." There may be other areas in the CAG Region where older wastewater systems have begun to fail. Also, some wells in the region are nearing the Aquifer Water Quality Standard for nitrate (10 mg/L), making these areas unsuitable for additional nitrogen loading from septic systems. CAG is working towards developing a GIS database to track these areas in order to encourage development of centralized wastewater treatment facilities rather than the use of conventional on-site septic systems. Where densities are too low to justify centralized treatment, alternative treatment technologies to reduce nitrogen should be considered. Development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategies 1.1.B & 1.1.C**).

ISSUE – 3: Communication & Coordination Strategies

A. The CAG Environmental Planning Committee (EPC):

The EPC is one of CAG's standing committees. The function of the EPC is to provide technical support to the CAG Regional Council on environmental issues. EPC's main functions are to review amendments to the CAG 208 Plan, support the public hearing process portion of 208 Consistency Reviews, and help implement other strategies in the CAG 208 Plan. The EPC also improves coordination and communication within the region, and along with ADEQ, assures that new and replaced wastewater facilities and systems are consistent with the CAG 208 Plan. The EPC is made up of professionals from different facets of environmental planning, including water, wastewater, environmental health, air quality, natural resource conservation, and agriculture. This group of professionals is responsible for providing the groundwork for the Region's overall direction for environmental issues.

B. Stakeholders' Letters of Support or "No Objection":

No language within the previous plan indicates the physical presence of a Letter of Support, or "No Objection". In the past, it has been a common practice to have an agreement among any affected stakeholders of a given amendment, provide a Letter of Support or a "No Objection" before EPC would consider a recommendation for approval by the CAG Regional Council. Previous situations had led the EPC to send back plan amendments due to the fact that affected stakeholders were unable to agree with sections of the plan. This eventually led the EPC to make the decision of having an agreement of understanding among the stakeholders in having a 100 % consensus-based process before a plan would come to the committee for a recommendation. Due to the nature of the possibility of not reaching 100% consensus, an appeals process was discussed within the CAG 208 Plan (**See Chapter 5**).

Also, the definition of a stakeholder has been a point of discussion. The Arizona State Lands Department (ASLD) owns large tracts of land within the CAG Region. It came to the attention to ASLD that some 208 Plan Amendments were being passed through various phases of review and reached the Statewide Water Quality Management Working Group (SWQMWG) for certification without their consent. ASLD had sent out a memo stating that a 208 Plan Amendment applicant is advised to send a letter of request for inclusions that involved state trust lands. ASLD requires at least a 60 day review of the plan before any decision is made by them. Therefore, the question was raised on how ASLD should be viewed within the stakeholder process.

C. Memorandums of Understanding (MOU) and Intergovernmental Agreements (IGA):

Additional MOUs and IGAs may be needed in order to implement the CAG 208 Plan, and minimize potential conflicts as wastewater treatment plants, sewer collection systems, service areas, and planning areas are modified. Although a Letter of Support or "No Objection" will be obtained within the CAG 208 Plan, formal understandings may be needed in order to assure long-term, cost effective wastewater services to an area. For example, if new development is on the fringe of a Municipal Service Area, but adjacent to the service area of a neighboring municipality's treatment facility, an IGA could be developed to have service provided by the neighboring municipality, if in fact it is more cost effective.

D. CAG Website:

In order to help direct the development of wastewater treatment facilities in the region and to facilitate 208 Consistency Reviews, CAG will be posting information to its existing website. This website will incorporate and integrate information from existing facilities and GIS databases developed over time in response to the strategies contained in this Plan. This information will then be available to a broad audience - developers, community members, and other agencies. It is anticipated that this website will initially provide the following information:

- The current version of the CAG 208 Plan;
- The inventory of public and private wastewater treatment facilities (**Appendix E**);
- The Wastewater Treatment Options Table;
- Existing DMA's and WMU's service areas and planning areas;
- Surface waters classified as "impaired" and classified as "Outstanding Arizona Waters";
- Surface waters with established Total Maximum Daily Loads (TMDL);
- Wells sampled for nitrate, highlighting wells near or exceeding 10 mg/L (the Arizona Aquifer Water Quality Standard); and
- Other information that may support Consistency Reviews.

Over time, should funding become available to do so, the website may be expanded to include the following additional information:

- Sensitive areas, where on-site wastewater treatment systems may not be appropriate;
- A record of Consistency Reviews performed, which may include information on the proposal such as location, capacity, change in the service or planning area, treatment and disposal methods, AZPDES discharge location(s), subdivision information, etc.;
- A listing of funding sources for water quality management projects.

The website will eventually replace the facility maps and information presently in **Appendix E**, because this information will eventually become outdated over time. Information on this website will be updated annually based on Consistency Reviews, approved facilities, and other information provided by ADEQ.

ISSUE – 4: Public Support Strategies

A. Improve Educational Opportunities:

Increasing public awareness about water quality issues through outreach and education would encourage citizen involvement. Citizens would become educated about a wide range of water quality issues, including wastewater treatment issues; the harmful effects of improper disposal of chemicals, drugs, grease and other products unsuitable for sewer disposal; the adverse impacts of sediment discharged in stormwater from unpermitted grading and development activities, and the proper care and maintenance of septic systems. Local, State, and Federal agency members can assist with their knowledge and resources. Through these educational endeavors, citizen support needed to create or expand wastewater treatment facilities may be improved. Fostering partnerships with Local, State, and Federal agencies, and academic institutions to develop local outreach and education programs is a recommended strategy under several of the goals in **Chapter 4**.

B. Incentives to Connect to Sewer Collection Lines:

Once sewer collection lines are available to an area, property owners should connect to these centralized collection and treatment systems. Clear incentives and ordinances are recommended to avoid disputes if individuals are expected to discontinue using existing wastewater treatment and pay to connect to centralized sewer (**See Chapter 4, Strategy 1.1.C**). These ordinances and incentives should be established when an area becomes a service area, a planning area, or a "high priority area" for sewer lines.

ISSUE – 5: Impaired Surface Waters and Wells Not Meeting Aquifer Water Quality Standards Strategies

A. Stormwater Best Management Practices:

Stormwater runoff from certain sources often contains many toxic and pathogenic pollutants. Stormwater can also cause extensive damage from flooding to soil erosion. Stormwater management practices would mitigate further pollutant loading to streams, canals, lakes, and rivers. Partnerships and efforts (see discussion above) can help provide landowner education on the subject of stormwater Best Management Practices. Such practices that retain rainwater on the property can reduce stormwater impacts, provide water for landscaping and help recharge the aquifer. Expanding education efforts and the development of model ordinances for consideration by local jurisdictions is recommended as strategies to address this issue (**See Chapter 4, Strategies 2.1.A, 3.3.A, & 3.3.C**).

B. Agricultural Best Management Practices:

Agricultural Best Management Practices for crop production and livestock grazing need to be further encouraged to mitigate pollutant loading to surface water and groundwater. Increased collaboration, education, and development of model ordinances for consideration by local jurisdictions are recommended as strategies to address these issues (**See Chapter 4, Strategy 3.3.B**).

C. Consider Impacts to Impaired Waters:

The review of proposed developments and wastewater facilities will need to consider potential impacts to:

- A surface water assessed as "impaired" or "non-attaining uses";
- Adopted Total Maximum Daily Load (TMDL) allocations to an impaired surface water; and
- Groundwater quality if nearby wells are at or near an Aquifer Water Quality Standard (e.g., nitrates near or above 10 mg/L).

The development of model ordinances for consideration by local jurisdictions is recommended as a strategy to address this issue (**See Chapter 4, Strategy 3.3.A**).

ISSUE – 6: 208 Process Effectiveness Improvement Strategies

A. 208 Review Process:

The 208 review process is being revised in order to avoid past inefficiencies, and to reduce costs. The new CAG 208 Plan is broken down into two types of processes, the CAG 208 Planning Project process or the CAG 208 Plan Amendment process, and will be dependent on the type of proposal being requested. The new processes, including the public hearing component, are described in

Chapter 5. The process efficiency is supported by the development and use of the Wastewater Treatment Options Table, the CAG EPC, the CAG Website, and other strategies in this plan.

B. Quarterly Reporting to ADEQ:
CAG will report quarterly to ADEQ concerning progress on implementing the 208 Plan. The report will include any barriers to accomplishing objectives, recommendations concerning strategy modifications, and highlights of any achievements.

C. Annual Updates:
The CAG Website information will need to be updated annually based on the Consistency Reviews performed and other information that may become available.

D. 208 Plan Revisions Process:
The 208 Plan should be reviewed and revised (if needed) every five years using the process described in **Chapter 5**. Revisions could also be done during interim years, if needed. Revisions would be required for changes in:

- Strategic plan goals, objectives, or strategies (**Chapter 4**);
- The processes described in **Chapter 5** (if significant); and
- The Wastewater Treatment Options Table (**Chapter 5**).

A comparison of the plan amendment conditions under the previous CAAG Section 208 Areawide Water Quality Management Plan of 1994 and the current CAG 208 Plan is represented in **Appendix D**. Although a Consistency Review will still be required for these conditions, the process for such is much less burdensome and costly for the applicant than amending this Plan (**See Chapter 5, and TABLE 5.1**).

PLAN IMPLEMENTATION

The CAG 208 plan will be implemented by instituting the processes, criteria, and tools described in **Chapter 5** of this document. Also where 208 Consistency Reviews are required, the needed processes and criteria are also established in **Chapter 5** of this document.

To adequately implement several strategies of this plan, additional local ordinances are recommended to provide further regulatory authority. Another potential hindrance to "full" plan implementation is a lack of available funding sources. For example, several strategies within this plan involve the development and deployment of GIS data and mapping capabilities. While CAG maintains the ability to develop needed GIS information and mapping services, there are limited resources. Although CAG will pursue funding to implement the strategies in this plan, the availability of such funding is not assured.

CHAPTER 1: AUTHORITY & PURPOSE

1.1 AUTHORITY

There have been numerous water pollution control laws to reduce or eliminate pollution in interstate waters and improve sanitary conditions of groundwater and surface water, starting with the Water Pollution Control Act of 1948. The Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) stipulated broad national objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's waters, and established many of the control programs still in effect today.

The 1972 law, commonly referred to as the Clean Water Act (CWA), provided the legal framework for regulating and minimizing water pollution in the U.S. through the following outcomes:

- Established the basic structure for regulating pollutants discharges into the waters of the United States – the National Pollutant Discharge Elimination System (NPDES) permit program and the Section 404 Dredge and Fill program;
- Gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry;
- Maintained existing requirements to set water quality standards for regulated contaminants in surface waters;
- Made it unlawful for any person to discharge any regulated pollutant from a point source into navigable waters, unless a NPDES permit was obtained under its provisions;
- Funded the construction of sewage treatment plants under the Construction Grants Program; and
- Recognized the need for planning to address the critical problems posed by nonpoint source pollution.

The CWA recognized the advantages of allowing states and tribal Governments to set criteria for water quality appropriate to their location, taking into account local environmental conditions, the effects of geological formations, and prevalent regional industries. The Act also established the mechanism for providing funding and planning to states, regions and municipalities for adequate wastewater infrastructure and for the protection of riparian areas, wetlands, and critical habitat through pollutant discharge permitting.

Amendments to the CWA passed in 1987 placed an increased emphasis on control of nonpoint source pollution and expanded the NPDES permit program to include municipal and industrial storm water discharge. EPA delegated the NPDES program to Arizona in December, 2002. The State program is referred to as the Arizona Pollutant Discharge Elimination System (AZPDES) permit program.

In 1986, Arizona passed the Environmental Quality Act (EQA - HB 2518) which established the Aquifer Protection Permit Program. The program requires permits for the discharge of pollutants to any land or vadose zone when there is a reasonable expectation that the pollutant will reach an aquifer. The APP program also protects all aquifers in the state for drinking water purposes. The program defines specific instances when a permit is required, classes of activities that require a more general permit, and discharges that are exempt from permitting. The EQA manages nonpoint source pollution through implementation of Best Management Practices (BMPs).

Other programs that address water quality in the state include the Safe Drinking Water Act (SDWA), located in Title 18, Chapter 4, of the Arizona Administrative Code and the Water Quality Assurance Revolving Fund. The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. The SDWA establishes standards for allowable levels of contaminants as set by the EPA, and also allows incorporation of state-specific drinking water rules.

The 1986 amendments to the SDWA placed more stringent requirements on drinking water supply systems for treatment, monitoring, and reporting. The 1996 amendments greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. This approach ensures the quality of drinking water by protecting it from source to tap.

The Water Quality Assurance Revolving Fund (WQARF) was created under the EQA in 1986 and authorizes the ADEQ to identify, assess and remediate surface water, groundwater, and soils contaminated with hazardous substances. The fund is dependent upon legislative appropriations, cost recovery from responsible parties, corporate income tax and special fees. The program identifies sites that are most in need of cleanup and adds them to the WQARF Registry. Sites on the Registry receive first consideration for distribution of funds. There are currently 34 sites within the State of Arizona on the WQARF Registry, two within the CAG Region, both residing within Gila County. To see the full list of sites on the WQARF Registry, please refer to http://www.azdeq.gov/environ/waste/sps/index.html.

A detailed explanation of Federal and State laws, regulations, and ordinances governing water quality is contained in **Appendix A.**

The U.S. Environmental Protection Agency (EPA) is the agency of the Federal government empowered with enforcement authority for the CWA. Additional changes and amendments enacted in subsequent years have further defined the scope of the law, including the relationship between the (EPA) and the states. In Arizona, the state agency designated to carry out the requirements of the CWA is the Arizona Department of Environmental Quality (ADEQ). As part of the Regional Water Quality Management Planning Program, ADEQ has the following responsibilities:

- Serving as the state-planning agency for water quality.
- Coordinating with the five Councils of Governments (COGs), and three counties - La Paz, Mohave, and Yuma Counties, that serve as Designated Planning Agencies (DPAs). Their role is to coordinate water quality planning for their member entities or geographic jurisdiction.
- Overseeing coordination of water quality management plan amendments and updates.
- Ensuring that proposed construction of wastewater treatment facilities and water quality protection permits conform to the appropriate regional 208 Plan in accordance with the state's Continuing Planning Process.

In 1976, the Central Arizona Governments (CAG), a non-profit regional Council of Governments (COG), was designated by the Governor as the Designated Planning Agency (DPA) for the two-county region covering Gila and Pinal Counties. As the DPA, CAG acts as a facilitator and coordinator of the planning process which include making recommendations on Consistency Reviews, updating the CAG Plan, and

overseeing amendments, if needed. CAG's Environmental Planning Committee (EPC) will hold the task reviewing the collaborated work done among CAG staff and ADEQ to ensure that a consistent regional approach was implemented. This work includes initial review of development and expansion proposals for wastewater treatment facilities, and to determine when the public 208 Plan Amendment process should be applied to maintain consistency with the overall goals. As mentioned above, ADEQ is the coordinating agency for the DPAs in specific regions of the state, who in turn coordinate planning for their member entities. The responsibilities of the DPAs include the following activities:

- Oversee the implementation of the water quality management plan and coordinate necessary amendments;
- Ensure that proposed construction of wastewater treatment facilities and water quality permits conform to the regional 208 Plan in accordance with the state's Continuing Planning Process;
- Identify existing and proposed wastewater treatment facilities to meet the anticipated municipal and industrial waste treatment needs of an area over a 20-year period;
- Provide general planning guidance for nonpoint source pollution, sludge, storm water and other activities that might impact water quality; and
- Facilitate public participation in the regional planning process.

DPAs also author and update the regional 208 Water Quality Management Plan on an as-needed basis, however, this document for the CAG Region was last revised over twenty years ago (1994). Since that time, the CAG Region has experienced significant population growth and shifting demographics, suburban/exurban sprawl, and a changing regional economic base.

DPAs are also responsible for establishing a regional 208 Review Committee comprised of a representative sample of the COG members' government officials, staff, and private citizens concerned with water quality in the area. This body is tasked with initial review of development and expansion proposals for wastewater treatment facilities, as well as input to revisions of the regional 208 Water Quality Management Plan.

CAG's 208 Review Committee is referred to as the Environmental Planning Committee (EPC). The EPC is part of a more simplified and efficient process of 208 review. Using the guidelines outlined in later chapters, the EPC has the responsibility to review wastewater projects and make a consistency recommendation to ADEQ. In the event it is determined that a proposal triggers the necessity for an amendment to the regional 208 Plan, CAG and the EPC initiate and preside over the public input portion of the amendment process. A complete overview of the amendment process is detailed fully in **Chapter 5** of this document.

Designated Management Agencies (DMAs) are entities that have been designated in a regional 208 Water Quality Management Plan to manage sewage treatment facilities and sewage collection systems in their respective service areas. The Clean Water Act requires that each CWA 208 Plan identify entities that have the legal, institutional, financial and managerial capabilities to carry out aspects of the 208 Plan. These public entities include Local, Regional, or State agencies and political subdivisions. A more detailed description of DMAs is provided in **Chapter 5**. An entity seeking DMA approval must demonstrate it has the authority and capability to serve in this capacity. In Arizona, DMAs are predominantly municipalities, but DMAs can also be sanitary sewer districts, wastewater improvement districts, and in one case, a county (Pima). However, A.R.S. §11-264 limit county-owned wastewater treatment facilities to:

> *"Any county with a population between five hundred thousand and one million persons according to the most recent United States decennial census may purchase, construct or operate a sewage system, including the collection, transportation, pumping, treatment and disposal of sewage, and charge fees and levy taxes therefor."*

As of this writing, neither of the two counties in the CAG Region meets the statutory population requirements. However, Pinal County could reach the threshold within the near future. If there is available funding, and should the political will exist to pursue development of county owned and operated WWTPs, the County could do so.

Not all wastewater providers will be municipal or public facilities. The CAG Region, as well as the state of Arizona, has seen a dramatic increase in the last decade of private wastewater entities. Private utilities that serve as domestic wastewater providers are generally regulated by the Arizona Corporation Commission (ACC). These non-public entities that are wastewater providers (e.g. a private utility) cannot be approved as a "DMA" because they are not an agency or political subdivision. However, ADEQ still requires the entity to demonstrate that it has the same legal, institutional, financial and managerial capabilities to function as a DMA within its Certificated Area of Convenience and Necessity as approved by the ACC. If ADEQ finds adequate demonstration, the entity would be approved as a Wastewater Management Utility (WMU) under the CAG 208 Plan.

1.2 PURPOSE

The purpose of the CAG 208 Water Quality Management Plan is to implement Section 208 of the CWA, which requires the development of area wide water quality management plans. The purpose of the water quality management planning process as described in the CWA is to provide:

> *"A consistent national approach for maintaining, improving and protecting water quality while allowing states to implement the most effective individual programs."*

The purpose of the CAG 208 Plan is not to create another administrative obstacle or impose a financial burden on an entity wishing to maintain, improve, or protect water quality. Rather, the CAG 208 Plan should echo the purpose described in the CWA, except on a regional level. Therefore, the purpose of the CAG 208 Plan is:

> *"To provide a consistent regional approach for maintaining, improving and protecting water quality in the CAG Planning Area."*

In the process of rewriting the CAG 208 Plan, stakeholders and the EPC determined that because of the varying characteristics of the region, a "watershed planning" approach could help to ensure consistent water quality management planning for the CAG Region. Watershed planning is described in the following section.

1.3 WATERSHED PLANNING

The Clean Water Act and the Safe Drinking Water Act both champion the concept of "watershed planning," an approach based on hydrological conditions versus political boundaries. The U.S. Environmental Protection Agency (EPA) defines a watershed as such:

> *"A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place."*

The EPA also references the definition of John Wesley Powell, scientist geographer, who defined a watershed as:

> *"…that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."*

FIGURE 1.1
WATERSHED SCHEMATIC

Source: Ottawa Gatineau Watershed Atlas

As illustrated in Figure 1.1 above, watershed water quantity and quality can be impacted by many sources: precipitation, feeder bodies such as lakes and ponds, sub basin inflows, and wastewater treatment discharges from communities and developments. In addition, vegetation, soil conditions and local topography may affect water quality within water sheds by their effect on erosion and runoff to surface waters, and the filtering effects (or lack thereof) of certain soil types, geological formations and subterranean features. The characteristics of the CAG Planning Area will be detailed more fully in **Chapter 2**.

Below ground, numerous basins and aquifers, which are the geologic formations that allow for the storage of groundwater, may be found in a single watershed. These formations provide water to naturally occurring seeps and springs, and are penetrated when man-made wells are drilled to provide groundwater for agricultural, industrial, municipal and residential uses.

While the surface limits of some watercourses (rivers, streams) define political boundaries, (such as the Colorado River creating the western border of Arizona with California), watershed regions below ground are

rarely seen as an actual boundary, even though the activities in one part of the watershed may eventually impact both the quality of surface waters and ground water throughout the watershed. Thus, watershed boundaries rarely have any resonance with geopolitical borders above ground. However, conditions at one portion of a watershed have the potential to negatively or positively impact the watershed as a whole, regardless of whether the entire watershed is under one governmental entity.

Although CAG is only authorized as a DPA for the two-county region of Gila and Pinal, the watersheds within the region transcend local boundaries. The value of this approach is well understood, and necessitates that CAG will work to foster an integrated, cooperative approach to long term watershed planning with its neighbors.

1.4 RELATED INFORMATION

A link to the full text of the Clean Water Act is provided in **Appendix A.**

The previous (1994) version of the CAG 208 Areawide Water Quality Management Plan Updates will be available upon request.

For more information on the role of Arizona's Councils of Governments please refer to:
http://www.azmag.gov/archive/AZ-COGs/index.asp

Drinking Water Quality Rules are available at:
https://www.azdeq.gov/environ/water/dw/rules.html

For additional information on the Arizona Water Quality Assurance Revolving Fund (WQARF) and Superfund sites in the State of Arizona:
http://www.azdeq.gov/environ/waste/sps/index.html

CHAPTER 2: LOCAL CONDITIONS & WATER BASINS

2.1 THE CAG DESIGNATED PLANNING AREA

There are six Councils of Governments (COGs) in the State of Arizona responsible for a range of regional planning efforts. However, there are five COGs and three counties – Mohave, La Paz and Yuma, responsible for water quality management planning.

The CAG Region is comprised of both Gila and Pinal Counties, and is geographically situated in the south central interior region of the State of Arizona and totals 10,169 square miles (**See FIGURE 2.1**). The Region is bordered by Coconino and Navajo Counties to the North, Maricopa and Yavapai Counties to the West, Graham and Navajo Counties to the East, and Pima County to the South.

FIGURE 2.1
ARIZONA COUNCIL OF GOVERNMENTS

The CAG Region includes seventeen incorporated cities and towns. Approximately 28 percent (or 3,000 Square Miles) of all lands within the CAG Region are comprised of the lands of Native American Indian Communities.
The Native American Indian Communities include the Ak-Chin, Gila River, San Carlos, Tonto Apache, Tohono O'odham, and White Mountain Apache Indian Communities. As noted in the "Impacts of Laws and Regulations on the CAG Region", amendments to the Safe Drinking Water Act in 1986 and the Clean Water Act in 1987 established a process through which tribes can be treated as States and manage their own programs under these laws. In addition, while Federal Laws apply to Tribal lands, State laws generally do not. For these reasons, the Indian Communities are not included as part of this plan update. However, Native American Indian Communities within the CAG Region are included in the planning area description and will be encouraged to participate in the CAG Planning Process.

Over the years, the CAG Region has generally been considered "rural." However, in the early 2000s, the CAG Region experienced a phase of growth that took place primarily in Pinal County. **TABLE 2.1** illustrates the growth that occurred between the decennial periods of 2000 and 2010 in terms of total population. The figures represent only those portions that reside within the respective county boundary.

TABLE 2.1 - CAG POPULATION STATISITICS

	Total Population		Absolute Change (2000-2010)	% Change
	2000	2010		
CAG REGION	**231,062**	**429,367**	**198,305**	**85.82%**
GILA COUNTY	**51,335**	**53,597**	**2,262**	**4.41%**
Municipalities	**26,409**	**27,995**	**1,586**	**6.01%**
Globe	7,486	7,532	46	0.61%
Hayden	892	662	-230	-25.78%
Miami	1,936	1,837	-99	-5.11%
Payson	13,620	15,301	1,681	12.34%
Star Valley*	2,036	2,310	274	13.46%
Winkelman	439	353	-86	-19.59%
Indian Communities	**6,430**	**7,086**	**656**	**10.20%**
White Mountain Apache Tribe	**1,514**	**1,678**	**164**	**10.83%**
San Carlos Apache Tribe	**4,784**	**5,288**	**504**	**10.54%**
Tonto Apache Tribe	**132**	**120**	-12	-9.09%
Unincorporated County	**18,496**	**18,516**	**20**	**0.11%**
PINAL COUNTY	**179,727**	**375,770**	**196,043**	**109.08%**
Municipalities	**100,408**	**188,253**	**87,845**	**87.49%**
Apache Junction	31,541	35,546	4,005	12.70%
Casa Grande	25,224	48,571	23,347	92.56%
Coolidge	7,786	11,825	4,039	51.88%
Eloy	10,375	16,631	6,256	60.30%
Florence	17,054	25,536	8,482	49.74%
Kearny	2,249	1,950	-299	-13.29%
Mammoth	1,762	1,426	-336	-19.07%
Marana	0	0	0	0.00%
Maricopa*	1,040	43,482	42,442	4080.96%
Queen Creek	119	449	330	277.31%
Superior	3,254	2,837	-417	-12.81%
Winkelman	4	0	-4	-100.00%
Indian Communities	**10,095**	**10,322**	**227**	**2.25%**
Ak-Chin Indian Community	**742**	**1,001**	**259**	**34.91%**
Gila River Indian Community	**8,558**	**8,718**	**160**	**1.87%**
San Carlos Apache Tribe	**0**	**0**	**0**	**0.00%**
Tohono O'odham Nation	**795**	**603**	**-192**	**-24.15%**
Unincorporated County	**69,224**	**177,195**	**107,971**	**155.97%**

*Represent new places in the 2010 Census that were not designated in the 2000 Census. The 2000 figures for the new places are based on 2000 Census Block geography that are comprised within the respected 2010 Census geography for the given 2010 place.

2.2 TOPOGRAPHY

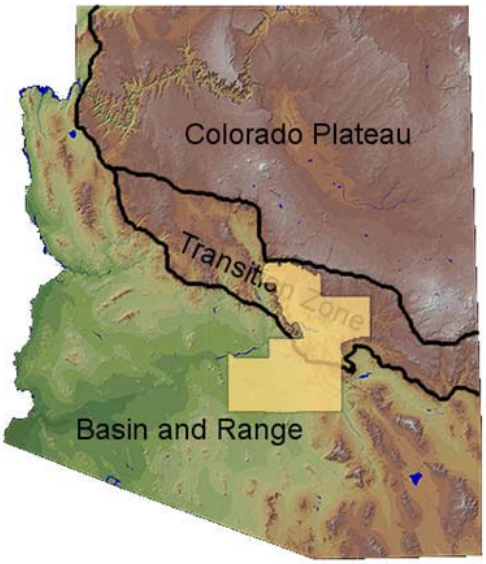


FIGURE 2.2
ARIZONA'S GEOLOGIC PHYSIOGRAPHIC PROVINCES

The physical landscape of the CAG Region is distinctively unique, ranging from the low lying desert terrain of southern Pinal County, to the steep hills and mountains which are characteristic of Northern Gila County. As displayed in **FIGURE 2.2**, the State of Arizona encompasses three geologic physiographic provinces: the Colorado Plateau to the North, and the Basin and Range Province to the South, and the intervening Central Heights (Transition Zone) which runs through the central interior region of the state.

PINAL COUNTY

The topography of Pinal County located in the southern part of the CAG Region ranges from level and gently sloping foothills located on the valley slopes and floodplains, to more distinctively sloped hills and mountains which are located throughout the county. Elevations in Pinal County range from approximately 1,000 feet above mean sea level in the lower lying desert areas, to a high point of approximately 6,158 feet in the mountains located in the far eastern portion of the county, which are adjacent to Graham County. **FIGURE 2.2** displays that the majority of Pinal County is located within the Basin and Range Province and therefore reflects the physiographic features and characteristics which are indicative of that particular zone.

The Basin and Range Province is characterized by extremely dry desert lowlands with annual precipitation ranging from 4 to 12 inches. The Basin and Range Province is comprised of a series of north to northwest trending, fault-block mountain ranges that are flanked by broad gravel fans which slope from the foot of the mountains down into the basins. These regional mountain ranges incorporate a diversity of Proterozoic to Cenozoic rock formations which display very complex structural and metamorphic histories.

As is typical of the Basin and Range Province, the extensive mountain-bounded ranges within the zone are separated by broad alluvial valleys which are comprised of alluvial fill in heterogeneous layers. More specifically, these layers of fill contain unconsolidated deposits responsible for the formation of underground aquifers, which generally contain large quantities of water stored below the surface. Such water serves as an important element to the semi-arid, desert environment of Pinal County.

GILA COUNTY

The topography of Gila County located in the northern part of the CAG Region ranges from moderately to intensely steep hills and mountains, interspersed with gently to strongly sloping valley plains and stream floodplains. Elevations in Gila County ranges from approximately 1,950 feet above mean sea level near the lower lying desert terrain regions located along the Gila River in the southern area of the county, to a height of 7,915 feet at Promontory Butte, located in the extremely mountainous, northern area of the county along the Mogollon Rim. In direct correlation with topographical elevation, Gila County contains heavily forested areas and numerous grassland meadows in the northern highlands, and mountainous desert regions in the southern part of the county that are covered with various desert cacti, flora and fauna.

The southern part of Gila County contains desert terrain, and is located within the Basin and Range Province. However, the majority of Gila County is located within the Central Highlands zone, which is geographically situated in between the Colorado Plateau to the north, and the Basin and Range Province to the south.

The Central Highlands zone is characterized as being a region which is topographically diverse, and features deep canyons, high peaks, and contains a number of interspersed mesas, valleys, and small mountains. Interestingly, because this transition zone contains physiographic aspects which are relevant to both the Colorado Plateau and the Basin and Range Province, it basically conveys little resemblance to either geologic zone. The geological structure of this zone is extremely diversified, and the numerous types of rock formations have exerted a strong influence upon both the landforms located throughout Gila County, and the development of various soil types.

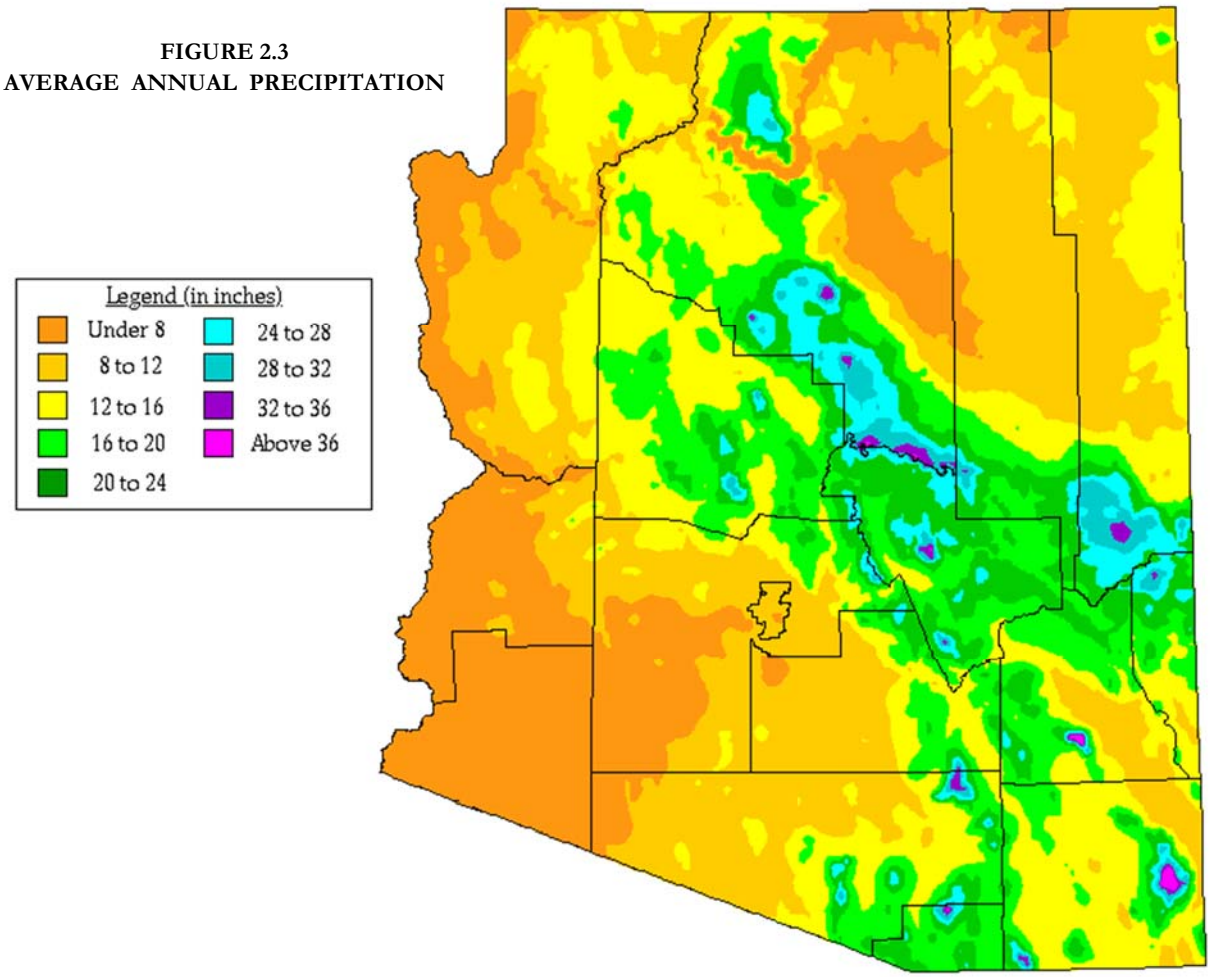
The Central Highlands Province is also commonly known as the surface-water province of Arizona, due to the fact that the Mogollon Rim, which is located on the northern fringe of the CAG Region, stimulates precipitation by forcing prevailing northerly flows of warm, moist air to the higher and much cooler elevations of the region. Because this transitional zone is largely a geologic region of bedrock and steep stream gradients, it tends to lead to surface water runoff in considerable volumes. Over 50% of the State of Arizona's developed surface water originates within the Central Highlands region, which serves as a water source for approximately 60% of the state's population.

2.3 CLIMATE & PRECIPITATION

The climate of the CAG Region is extremely diverse, and contains various climatic zones ranging from the high altitude, coniferous forests of northern Gila County, to the warm and dry Sonoran Desert located in the southern part of Pinal County. The average annual precipitation ranges from approximately 2 to 9.5 inches in the lower desert regions, to a range of approximately 14 to 25 inches in the mountains and areas of higher elevation. The variability in climate results from vast differences in elevation, regional distribution of topographical features, and variations in rainfall. Such variability contributes to the noticeable differences in fauna and flora which are dispersed throughout both Gila and Pinal Counties.

The CAG Region is characterized by two distinctive rainy seasons. The winter rain season generally lasts from December to March, and results from precipitation that originates over the Pacific Ocean and the Gulf of Alaska, and moves eastward across California into Arizona. The winter rain season rainfall usually accounts for the majority of the overall percentage of Pinal and southern Gila County's annual average precipitation. In the northern highlands of the CAG Region, this precipitation generally results in several inches of snowfall. The other rainy season is commonly referred to as the monsoon season, and occurs between the months of July and September. This particular rainfall is the result of relatively moist, warm air from a seasonal Bermuda high pressure system that is geographically situated over the Gulf of Mexico. This established, incoming northwestern air flow from the Gulf of Mexico causes the hot and unstable air located throughout the lower lying desert regions to rise by processes of convection, and typically generates severe thunderstorms and heavy rainfalls within a short duration of time. **FIGURE 2.3** displays the average precipitation throughout the State of Arizona.

FIGURE 2.3
AVERAGE ANNUAL PRECIPITATION



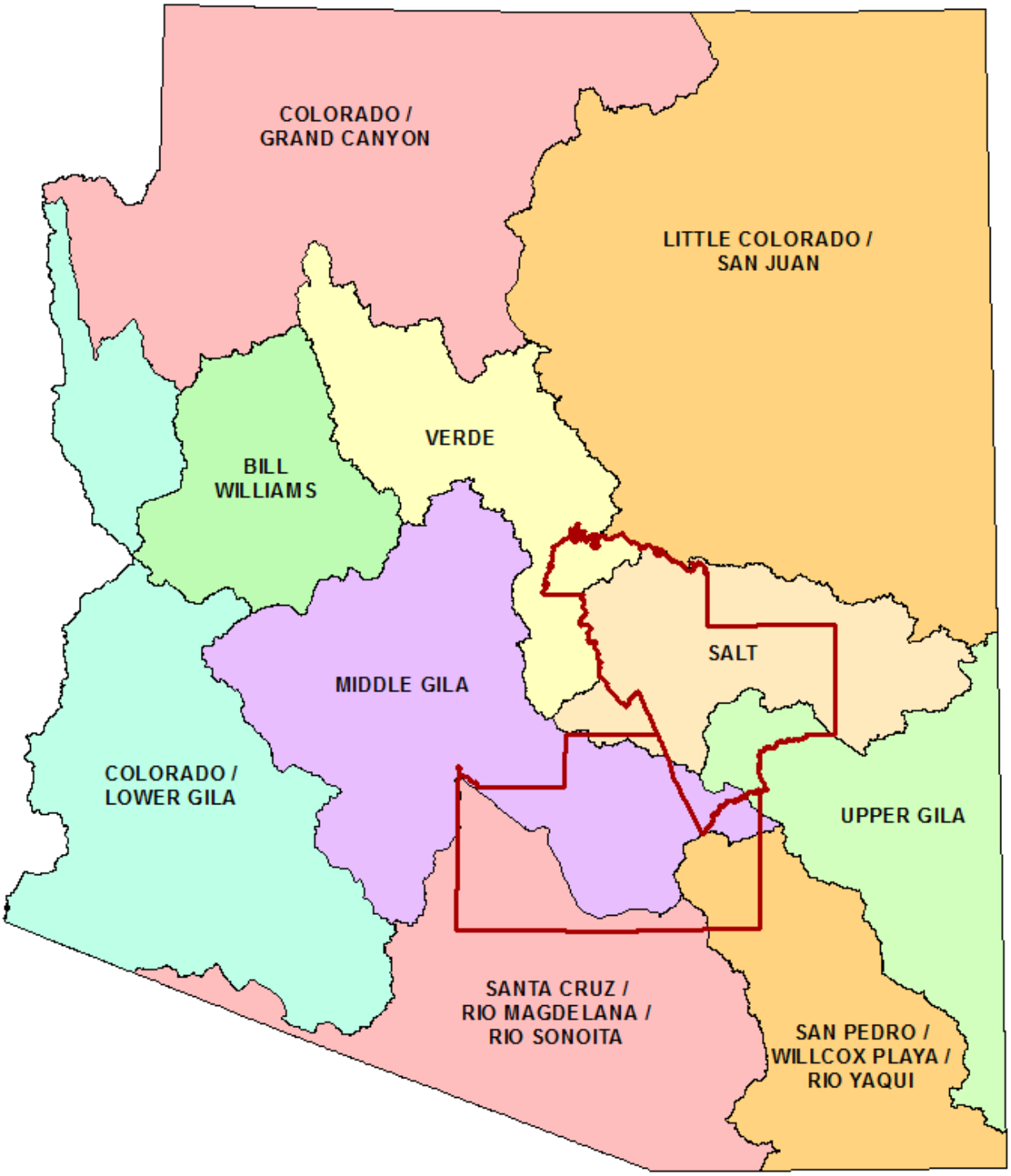
The climate in southern Gila County and Pinal County is characterized by mild winters and extremely warm summers. The climate within northern Gila County is considered to be relatively mild throughout both the summer and winter seasons. Average temperatures range from a January minimum of 23.7 degrees in Payson to a July maximum of 107.0 degrees in Coolidge. Although the CAG Region is topographically and climatically diverse, most of the precipitation within the district occurs during the two rainy seasons of winter and summer, with dryer periods of weather occurring during the spring and fall.

2.4 REGIONAL SURFACE WATERSHED BASINS

Water within the CAG Region is obtained from various sources, including existing groundwater supplies; Colorado River water which is transferred into the region as allotted by the the Central Arizona Project; effluent, and attainable surface water from the region's river basins. Although many segments of the river beds within the various basins are intermittent and only contain water during periods of heavy rains associated with seasonal storm periods, some rivers do in fact maintain yearly flows and provide adequeate water supplies for purposes of diversion.

The CAG Region is comprised of six watershed basins which are illustrated on **FIGURE 2.4**.

FIGURE 2.4
SURFACE WATERSHED BASINS



VERDE RIVER WATERSHED BASIN

The extreme northwestern areas of Gila County are drained by the East Verde River, which in turn flows into the Verde River, and forms a portion of the boundary between Gila and Yavapai Counties. Tonto Creek, which is also linked with numerous tributaries throughout the southern Verde Basin, flows southward from north central areas of Gila County down along the western region of the county until it flows into Theodore Roosevelt Lake.

SALT RIVER WATERSHED BASIN

The Central Highlands province area accounts for approximately 65% of the Salt/Verde Basin flows. The principle runoff producing areas for the Salt River are the White River and Black River, whose headwaters originate on the White Mountain Apache and San Carlos Native American Indian Communities, respectively. The White River drains the north and west sides of the White Mountains, while the Black River drains the east and south sides of the mountains. Their confluence with the Salt River produces 380,000 acre feet of water per year from an area of 1,864 square miles. Along with these two major sources, the Salt River is also sustained by numerous tributaries and flows along a relatively steep gradient in a western direction across the central part of Gila County and merges with Pinal Creek, which in turn flows to Roosevelt Lake. The San Carlos River flows in a southerly direction to the San Carlos Reservoir, and forms the southeastern boundary between Gila and Graham Counties.

UPPER GILA RIVER WATERSHED BASIN

The Upper Gila River Basin, whose headwaters are located near Silver City, New Mexico, enters the region near San Carlos Lake in central eastern Arizona. The Gila River, then flows in a westerly direction past Hayden to Florence, where it enters the Gila River Indian Community. From there it continues northwesterly to metropolitan Phoenix.

MIDDLE GILA RIVER WATERSHED BASIN

The Middle Gila River Basin contains all but the southeastern and southwestern portions of Pinal County. It is separated by the Upper Gila on the east and the Santa Cruz basins on the west. Much of the surface water in the Middle Gila comes from the Upper Gila, down from the mountainous regions of Gila County, where the northerly flow of the Santa Cruz originates from the south.

SAN PEDRO RIVER WATERSHED BASIN

The headwater of the San Pedro River Basin originates in the high mountainous regions of northern Mexico and flows in a northerly, northwesterly direction to its confluence with the Gila River near the Town of Winkelman where it becomes part of the Upper Gila River Basin. This watershed includes not only parts of Mexico, but also, the Mule, Huachuca, Santa Rita, Whetstone, Dragon, Winchester, Santa Catalina, and the Galiuro Mountain ranges, all located in southeastern Arizona.

SANTA CRUZ RIVER WATERSHED BASIN

Like the San Pedro, the Santa Cruz River, which comprises the Santa Cruz River Basin, also has its headwaters in the mountainous regions of northern Mexico. Flowing in a northerly direction through the City of Tucson, the Santa Cruz River enters the south central part of Pinal County and dissipates onto an extremely large floodplain just west of the City of Eloy and the City of Casa Grande. The North Branch of the Santa Cruz flows in a northerly direction to the Gila River Indian Community adjacent to the City of Casa Grande. From there it turns due north to the Ak-Chin Indian Community to join with the Gila River.

For further detailed information regarding the above surface watershed basins, please refer to the document links provided in **TABLE 2.2**.

TABLE 2.2 - ADDITIONAL WATERSHED INFORMATION

SURFACE WATERSHED BASIN	WEBSITE
Verde River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#verde
Salt River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#salt
Upper Gila River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#ugila
Middle Gila River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#midgila
Santa Cruz River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#scruz
San Pedro River	http://nemo.srnr.arizona.edu/nemo/index_old.php?page=characterization#san pedro

2.5 GROUNDWATER BASINS

Ground water is usually considered to be water which is transmitted and stored within the pore space of rocks or unconsolidated material, referred to as an aquifer. An Aquiclude refers to the area which stores water but does not transmit significant amounts. Aquifers can be further classified as confined or unconfined. A confined or artesian aquifer is one which is overlaid by an impermeable or confining layer of material which may place the aquifer under pressure. An unconfined aquifer refers to the typical "water table" condition in which the water has direct vertical contact with the surface through overlying permeable material.

Groundwater is extremely important in Arizona where approximately 60 percent of the total water withdrawal in Arizona is from groundwater resources. In the CAG Region the occurrence and characteristics of the groundwater resources are very diverse.

Aquifer boundaries are identified as the hydrologic basins designated by the Department of Water Resources[1]. Each basin was designated on its physiography, surface drainage patterns, subsurface geology and aquifer characteristics. Similarities of water supply, water use, and other factors relevant to water resource management were used to determine the boundary of the groundwater basins. **FIGURE 2.5** displays the groundwater basins within Arizona and more specifically those within the CAG Region. As a result of the Groundwater Management Act of 1980, four Active Management Areas (AMAs) and three Irrigation Non-Expansion Areas (INAs) were also designated and is displayed in **FIGURE 2.6**.

[1] Department of Environmental Quality, Water Quality Boundaries and Standards, A.A.C. R18-11-501 thru 506.

FIGURE 2.5
ARIZONA GROUNDWATER BASINS

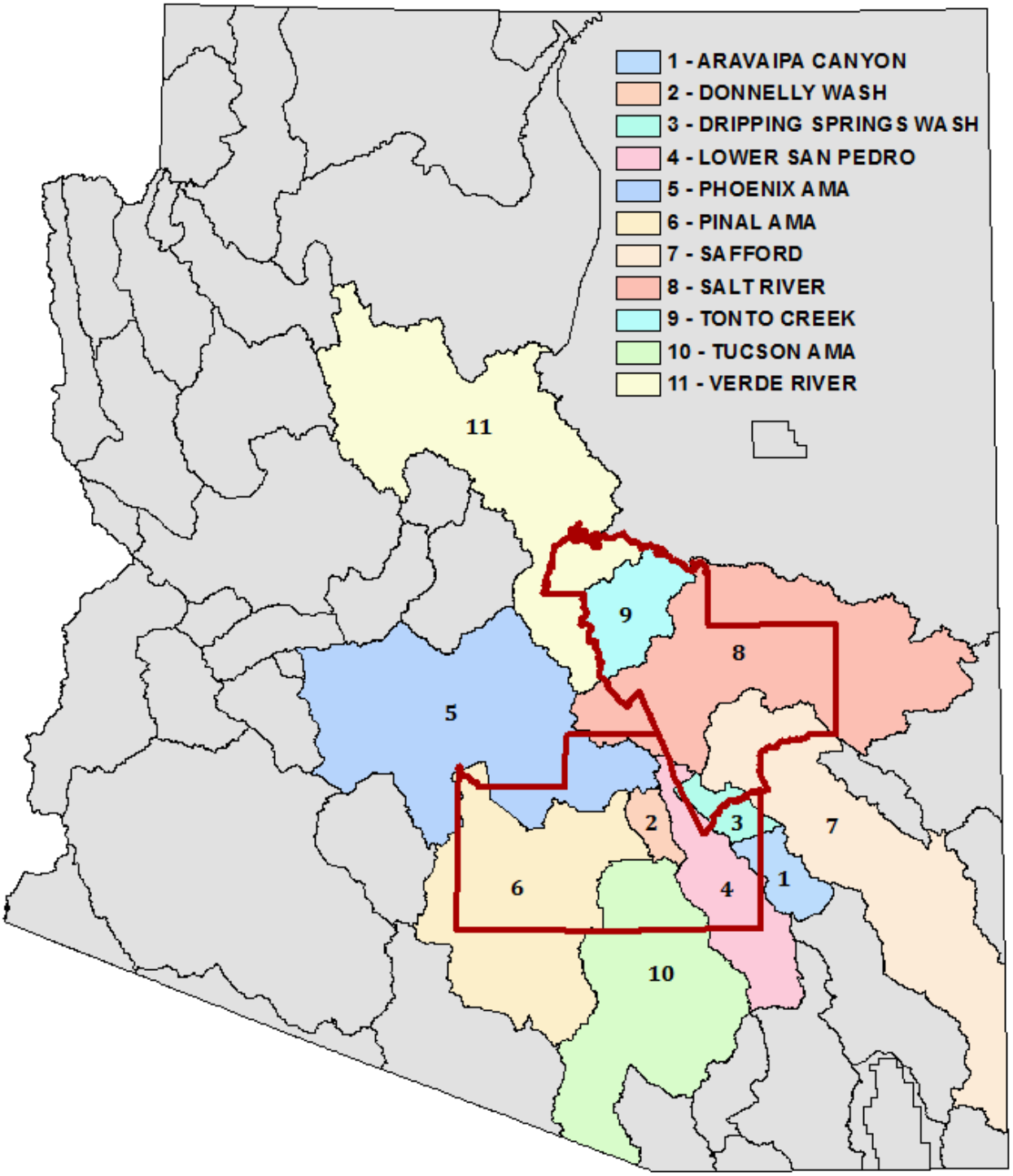
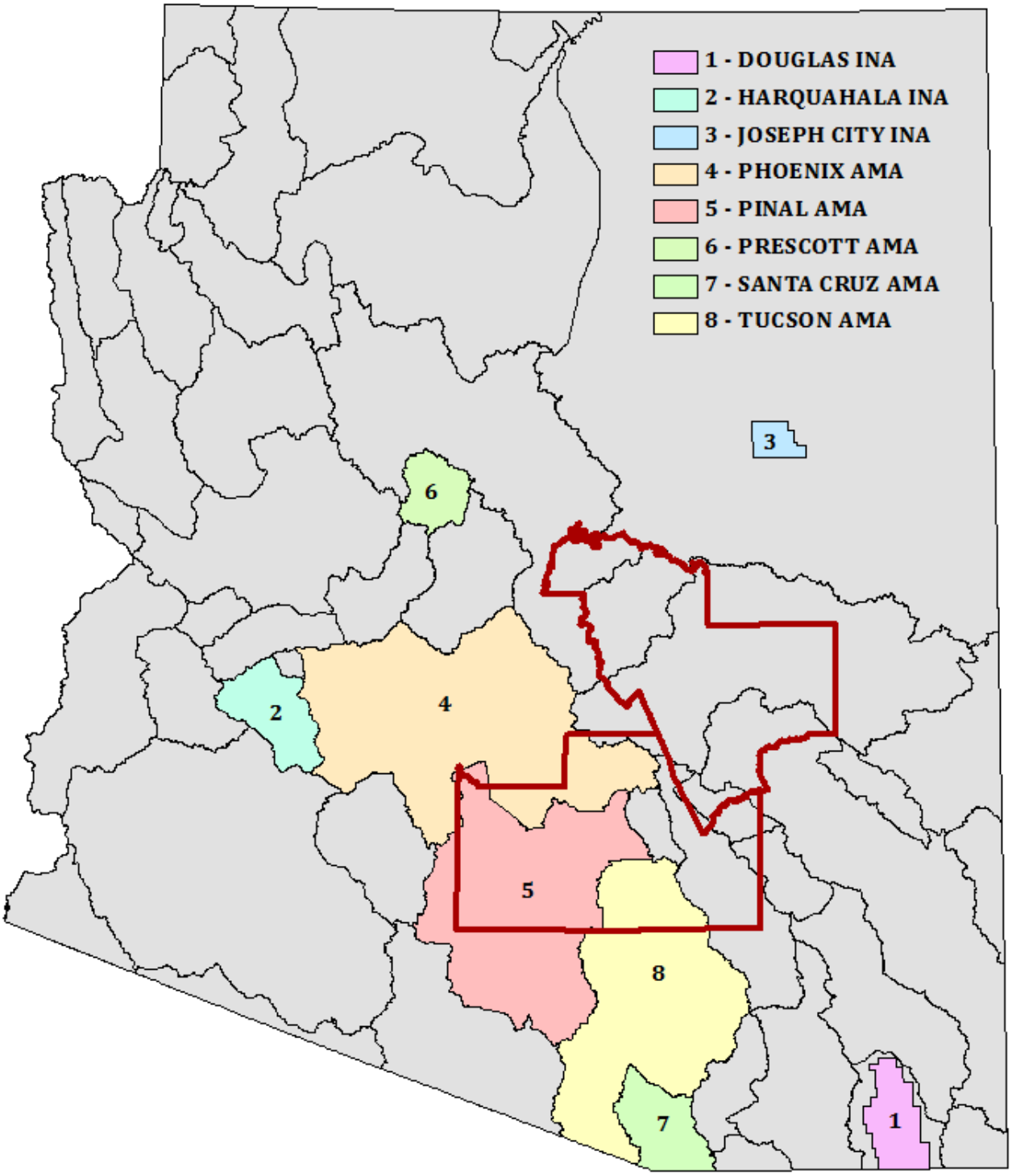


FIGURE 2.6
ARIZONA ACTIVE MANAGEMENT AREAS (AMAs) &
IRRIGATION NON-EXPANSION AREAS (INAs)



The bulk of the State's population and areas of intensive agricultural land uses are concentrated within the AMAs. Most of the other groundwater basins in Arizona are sparsely populated with fewer wells and minimal water quality analyses on which to assess groundwater conditions. Eleven of the 53 basins are connected with or within the CAG Region. Their hydrology is briefly described below, as defined by the Arizona Department of Water Resources.

Phoenix AMA

The primary source of groundwater in the Phoenix AMA is basin-fill sediments. Three distinct water bearing units are identified in most of the sub-basins in the AMA: an upper alluvial unit, a middle fine-grained unit, and a lower conglomerate unit. Although conditions and circumstances vary across the AMA, most groundwater is pumped from the middle unit. Bedrock, consisting of metamorphic and igneous rock, underlies the basin-fill sediments and is not considered an aquifer. Groundwater occurs under generally unconfined conditions throughout most of the AMA. Depth to water ranges vary from just below land surface (bls) to more than 800 feet bls.

There are seven groundwater sub-basins in the Phoenix AMA, which are comprised of the East Salt River Valley, West Salt River Valley, Hassayampa, Rainbow Valley, Fountain Hills, Lake Pleasant, and Carefree sub-basins. Each sub-basin has its own unique hydrogeological characteristics which are described in further detail through the link provided in **TABLE 2.3**.

In several areas, historic flow directions have been altered by well pumping. Prior to extensive pumping, groundwater flowed primarily from the East Salt River Valley to the West Salt River Valley sub-basins along or toward the Salt and Gila Rivers, exiting the AMA near Gillespie Dam. By 1964, a regional groundwater depression had formed in the West Salt River Valley sub-basin east of the White Tank Mountains, redirecting flow in the sub-basin to the depression. By 1983, agricultural pumping had produced localized groundwater depressions throughout the AMA. A groundwater divide now exists in the southwest quarter of Township 1N, Range 4E that severs the hydraulic connections between the East Salt River Valley and West Salt River Valley sub-basins.

Groundwater recharge is from mountain front and stream channel recharge. Groundwater inflow into the AMA occurs as groundwater flows north from the Pinal AMA into the East Salt River Valley, and from the north and east. Groundwater exits the basin at Gillespie Dam where the Gila River exits the AMA. In general, between 1991 to 1992 and 2002 to 2003, water levels rose in the eastern part of the AMA, declined in the central part and were stable, or rose or declined slightly in the western part of the AMA. Well yields throughout the AMA are generally high, with median values of over 1,400 gallons per minute (gpm) reported.

Groundwater quality is generally suitable for most uses, but 68 groundwater contamination sites associated with industrial and other activities have been identified in the AMA. Volatile Organic Compounds are the most common contaminant at these sites. In addition, over 1,500 measurements have been made of parameter concentrations that have equaled or exceeded drinking water standards. Of these, nitrate, fluoride, arsenic, and organics are the most common. All water providers in Arizona that serve more than 25 people or having 15 or more connections are regulated under the Safe Drinking Water Act and treat water supplies to meet drinking water standards.

Pinal AMA

The Pinal AMA consists of five sub-basins with unique groundwater recharge and storage characteristics. These sub-basins include the Maricopa-Stanfield, Eloy, Vekol Valley, Santa Rosa Valley, and Aguirre Valley sub-basins. Sub-basin boundaries follow surface water topographic divides, and in the case of the Eloy and Maricopa-Stanfield sub-basins, a groundwater divide. Groundwater underflow between these two sub-basins is limited. Most groundwater development has occurred within the Maricopa-Stanfield and Eloy sub-basins while relatively little development and hydrologic information is available for the Vekol Valley, Santa Rosa Valley and Aguirre Valley sub-basins, which are primarily tribal lands.

The most productive groundwater-bearing units in the Maricopa-Stanfield and Eloy sub-basins consist of unconsolidated sands, gravels, silts, and clays that were deposited by the ancestral Gila and Santa Cruz rivers. Demand for water by irrigated agriculture has drained much of this upper alluvial unit in both sub-basins and changed the direction of groundwater flow between them.

Natural recharge is primarily from underflow into the basin and from streambed infiltration along the Gila and Santa Cruz rivers, which produce relatively large volumes of runoff from upstream basins outside the AMA following heavy rains. Lesser amounts of natural recharge occur from mountain fronts. The estimated groundwater in storage for the Maricopa-Stanfield, Eloy and Vekol Valley sub-basins is 35.2 million acre-feet (maf) to a depth of 1,000 feet bls. Median well yield in the AMA, reported from 1,582 larger diameter (> 10-in.) wells, is 1,000 gpm. Water levels rose between 1993-1994 and 2003-2004 in many wells, although areas of historic decline are found near Florence, Coolidge, southwest of Picacho and in the vicinity of Casa Grande.

Tucson AMA

The Tucson AMA contains two parallel sub-basins which are the Upper Santa Cruz Valley sub-basin in the east half and the Avra Valley sub-basin in the west half. The sub-basins consist of relatively deep alluvial basins filled with layers of sediments and bordered by mountains. The sediments contain substantial volumes of groundwater, but the composition and productivity of the sediment layers differ between the two.

Groundwater enters the Tucson AMA to the north from the Santa Cruz AMA and bordering mountains and then flows to the north-northwest. Natural recharge also occurs along stream channels (primarily the Santa Cruz River). About 84% of the total net natural recharge in the basin is estimated to occur within the Upper Santa Cruz valley sub-basin. Groundwater storage in the AMA during predevelopment times is estimated to have ranged from 68 maf to 76 maf to a depth of 1,000 feet.

The median well yield reported for 1,063 large diameter (> 10-in.) wells is 520 gpm. Well yields in excess of 1,000 gpm are found in the vicinity of Sahuarita and Green Valley, near Marana and north of Three Points. During the period from 1994-1995 to 2004-2005 water level rises occurred in the northern half of the Avra Valley sub-basin due to agricultural retirement, use of CAP water in lieu of groundwater pumping and groundwater recharge activities. Similar widespread water level rises have not been noted in the Upper Santa Cruz sub-basin with the exception of an area north of Sahuarita where CAP water is being recharge at the Pima Mine Road USF. Elsewhere in the sub-basin, water levels have generally decreased.

Water quality in the Tucson AMA is suitable for most uses, although 26 groundwater contamination sites have been identified. Volatile organic compounds associated with industrial and transportation activities are common at the contamination sites. In addition, elevated concentrations of certain natural constituents,

including arsenic, fluoride and metals have been measured in wells. Elevated nitrate, sulfate and total dissolved solid concentrations have been detected in wells near mining and agricultural operations.

Donnelly Wash

The Donnelly Wash Basin is a relatively small basin with few inhabitants. The principal aquifer is a strip of basin fill that covers about 30 percent of the basin. The rest of the basin is composed of hard-rock that surrounds and underlies the basin fill. A 16-mile reach of the Gila River flows east to west through the basin, which is also drained by Donnelly Wash and Box O Wash located on the south side of the Gila River. In general, groundwater flow follows surface water drainage patterns, flowing toward the Gila River. Aquifer recharge is from the mountain fronts and streambed infiltration. Groundwater is discharged from the alluvium into the Gila River and from domestic and stock wells. Storage estimates for the basin range from 140,000 acre-feet to 2.0 maf. Depth to water in the basin fill varies from about 150 feet in the north, 256 feet in the center, and about 370 feet in the south. Water levels are shallower in wells located in the hard-rock areas. Elevated fluoride concentrations were measured in two springs in the basin. Eleven water samples collected by the Arizona Department of Water Resources (ADWR) in 1996 and 1997 did not find elevated fluoride levels in groundwater in either the alluvium or the hard-rock.

Lower San Pedro

The Lower San Pedro Basin consists of the northwest-trending San Pedro River Valley bordered by mountains ranging in elevation from 6,000 to over 8,000 feet in elevation. There are two sub-basins; the Mammoth Sub-basin and the smaller Camp Grant Wash Sub-basin. The two major water bearing units are stream alluvium and basin fill. Most mining, industrial and domestic/municipal wells are located in the regional basin fill aquifer while most irrigation wells are located in the stream alluvium. The stream alluvium along the San Pedro River and tributaries can be quite permeable with high well yields but this aquifer is often less than 50 feet thick south of Reddington. Groundwater in the alluvium is unconfined. The hydrologic characteristics of the basin fill aquifer vary widely due to the amount of cementation and occurrence of fine-grained layers. Both confined and unconfined conditions exist. Artesian conditions exist from about five miles north to ten miles south of Mammoth in wells drilled deeper than 500 feet.

Groundwater flow direction is from the mountains toward the valley floor and to the north. The estimated groundwater recharge ranges from 24,000 to 29,000 Acre-Feet Annually (AFA) from mountain front recharge, streambed infiltration and underflow from the Aravaipa Canyon and Upper San Pedro basins. Groundwater is discharged by pumpage, evapotranspiration, evaporation from streams, and springs and seeps. The estimated volume of groundwater in storage ranges from 11 maf to more than 27 maf. Water level change data between 1990-91 and 2003-04 for 16 wells shows relatively stable water levels in most wells. Water quality data from selected sites show that fluoride was the parameter that most frequently exceeded drinking water standards, with elevated levels of cadmium found in the vicinity of Hayden and Dudleyville.

Dripping Springs Wash

The Dripping Springs Wash is a mountainous basin containing small sediment-filled valleys with relatively little groundwater in storage. The largest valley is north of the Gila River and drained by Dripping Springs Wash. Water producing units consist of younger alluvium and the Gila Conglomerate, with the younger alluvium along Dripping Springs Wash and its tributaries the major water producer. These deposits are reportedly less than 150 feet thick. Consolidated rocks compose the surrounding mountains and contain minor amounts of groundwater. Groundwater flow is towards the Gila River which bisects the basin. Groundwater recharge has been estimated at 3,000 to 9,000 AFA and groundwater in storage at less than 1maf. Well yields vary widely with a median well yield of about 394 gpm reported. Recent water quality data is lacking.

Salt River

The Salt River Basin is bounded on the west and southwest by the Sierra Ancha and Superstition Mountains, on the south by the Natanes Plateau and on the east by the White Mountains. The Mogollon rim, a 2,000-foot high escarpment, forms a natural groundwater divide along much of the basin's northern boundary. The Salt River Basin contains four sub-basins, which are the Salt River Lakes, Salt River Canyon, Black River, and White River Sub-basins. Principal aquifers differ between the sub-basins, with basin fill and alluvial aquifers found in the western portion of the basin and limestone and volcanic aquifers in the eastern portion.

In the northern part of the basin, groundwater flow in the C-aquifer is from north to south. Groundwater flow has not been characterized in the rest of the basin. Groundwater recharge is estimated at 178,000 AFA. The only estimate of groundwater in storage is 8.7 maf or more to a depth of 1,200 feet bls. Water level change data is available for the Globe-Miami area and near the Community of Young, in the Salt River Lakes and Salt River Canyon sub-basins, respectively. Water levels in these measured wells are relatively shallow, at less than 100 feet bls. Water levels declined in all wells for which changed data was available during the period 1990-1991 and 2003-2004. The median well yield from large (>10-inch diameter) wells is 170 gpm. Most of the water quality measurements in the basin are in the vicinity of Globe-Miami, a copper mining center. The most commonly exceeded drinking water standard was cadmium, although other metals and fluoride concentrations were also elevated in measured wells.

Tonto Creek

In the Tonto Creek Basin groundwater is found in stream alluvium, basin fill sand and gravel, Paleozoic sedimentary rocks and Precambrian igneous, metamorphic and sedimentary rocks. The primary aquifer occurs in basin fill, which underlies a large portion of the basin, from near Rye to the southern basin boundary. The basin fill consists of coarse-grained conglomerate in the lower part of the basin and along the basin margins and locally is overlain by fine-grained mudstone in the center of the basin. The conglomerate may be up to 500 feet thick. Groundwater is also found in the floodplain alluvium, which may be as much as 65 feet thick along Tonto Creek. Along this Creek, the basin fill and alluvial aquifers are recharged primarily by stream infiltration.

A limestone aquifer is utilized along the Mogollon Rim where groundwater movement and well yield are dependent on faults, fractures and solution cavities. Wells in the limestone aquifer generally yield less than 100 gpm. Fractured bedrock also yields small volumes of water to wells east of Payson. These and other sedimentary-rock aquifers are recharged from precipitation on the southern edge of the Colorado Plateau.

Groundwater flow directions are from the Mogollon Rim to the south in the C-aquifer and from north to south along the Rye Creek and Tonto Creek drainages in the alluvial aquifer. Natural recharge for the basin has been estimated at 17,000 to 37,000 AFA. Estimates of groundwater in storage range from 2.0 to 9.4 maf. With one exception, all wells measured in 2003-2004 had a water level below 100 feet. Water levels in wells measured between 1990-1991 and 2003-2004 were either slightly declining or slightly rising. The median well yield reported on registration forms for large (>10-inch diameter) wells was 120 gpm. Since most of the basin is National Forest land, there has been little basin-wide groundwater development and aquifer characteristics are not well defined. Groundwater quality is generally good, although drinking water standards for arsenic, radionuclides, nitrate and organics have been equaled or exceeded in some wells.

Aravaipa Canyon

The sparsely populated Aravaipa Canyon Basin is characterized by a relatively flat northwest-trending valley in the southern half of the basin and an incised valley, Aravaipa Canyon that cuts through the Galiuro Mountains, in the northern half. The principal aquifers are the unconfined stream alluvium, which is the major source of groundwater, and a confined basin fill aquifer. Water level records suggest that the confined aquifer leaks into the unconfined aquifer. The thickness of the younger alluvium decreases to the south. Groundwater flow is similar to the surface water runoff pattern; northwest along the central axis of the valley. Groundwater flows towards the head of Aravaipa Canyon where its flow path is geologically restricted, resulting in the perennial portion of Aravaipa Creek. Groundwater recharge is from infiltrating precipitation and runoff and is estimated to range from 7,000 to 16,700 AFA. Groundwater discharge is to Aravaipa Creek from springs and baseflow, with small discharge to wells. An estimated 5 maf of water in storage is believed to be in the basin. Depth to water within the basin fill varies from 25 feet bls where the younger alluvium is thin to over 500 feet bls in the uplands in the southern part of the basin. Two recent water level measurements in the central valley were 64 and 39 feet bls. Arsenic is the water quality parameter that most frequently exceeds drinking water standards in wells measured in the basin, but groundwater is generally of good chemical quality.

Safford

The Safford Basin is a relatively large, alluvial filled depression bordered by elongated mountain ranges. Basin fill is the major aquifer in all three sub-basins of the Safford Basis, the San Simon Valley, Gila Valley, and San Carlos Valley Sub-Basins.

In the San Simon Valley Sub-basin a clay deposit, known as the Blue Clay unit, separates the upper and lower basin fill aquifers and may be as much as 600 feet thick. Groundwater is found under artesian conditions in the lower aquifer and is generally unconfined in the upper aquifer. Groundwater flow in the sub-basin is toward the north along the San Simon River drainage but also flows toward agricultural pumping centers. The principal aquifer in the Gila Valley Sub-basin, located in the middle part of the Safford Basin, is the upper basin fill, underlain by the Blue Clay unit. Groundwater is also utilized from the lower basin fill, which generally is found under artesian conditions and where well discharges may be quite high. Groundwater flow is from south to north along the Gila River drainage. The main water-bearing unit in the San Carlos Valley Sub-basin, located in the northern part of the Safford Basin, is the upper basin fill, which is found under unconfined conditions. As with the other sub-basins, groundwater in the lower basin fill is generally found under artesian conditions. Groundwater flow in the sub-basin is toward the Gila River drainage.

Groundwater recharge for the entire basin is estimated at 105,000 AFA. Groundwater discharge is due to agricultural and municipal pumping, primarily in the Gila Valley Sub-basin, and to spring discharge. Estimates of groundwater in storage range from more than 27 maf to 69 maf.

Depth to water is relatively shallow in wells measured near the Gila River, while water levels are generally deeper in wells in the San Simon Valley Sub-basin, the southernmost sub-basin. Water levels declined in most wells in the basin that were measured in 1990-1991 and 2003-2004, with the most significant declines south of San Simon where water levels declined more than 30 feet during this time period. Water levels exceed 600 feet bls at two wells along the western boundary of the San Carlos Valley Sub-basin, the northern most sub-basin. In one of these wells, water levels declined over 60 feet between 1990 and 2004. Most of the groundwater development in the Safford Basin is in the Gila Valley Sub-basin and the central sub-basin,

which contain the basin's major population and agricultural centers. The median well yield reported on registration forms for almost 1,500 large (>10-inch) diameter wells was 600 gpm. High yield (>2000 gpm) wells are found along the Gila and San Simon river drainages and in the vicinity of Bowie.

Water quality conditions vary in the basin although fluoride and arsenic concentrations consistently exceed drinking water standards. In the San Simon Valley sub-basin the upper aquifer generally contains elevated total dissolved solids (TDS) and fluoride concentrations. Groundwater in both the upper and lower basin fill of the Gila Valley Sub-basin may also be high in TDS. In the San Carlos Valley sub-basin, elevated levels of TDS have been measured in stream alluvium.

Verde

The Verde River Basin is a relatively large basin that encompasses part of the Coconino Plateau in its northern portion with the Mogollon Rim defining its eastern boundary. It is characterized by steep canyons, rugged mountains and by broad alluvial valleys in the north and west-central portions of the basin. The basin is divided into three sub-basins, which are the Big Chino, Verde Valley, and Verde Canyon sub-basins.

Groundwater recharge estimates for the entire basin range from 107,000 AFA to more than 138,000 AFA. Groundwater in storage is estimated to range from 13 maf to more than 22 maf for the entire basin. Few water level measurements were taken in the basin in both 1990-1991 and 2003-2004 time periods. Well yield varies throughout the basin with the most productive wells located in the Big Chino sub-basin. The median well yield for the entire basin is 260 gpm reported on registration forms for 262 large (> 10 in.) diameter wells.

For detailed information regarding the groundwater basins described in this section, please refer to the Arizona Water Atlas from the Arizona Department of Water Resources (ADWR). Links have been provided in **TABLE 2.3**.

TABLE 2.3 - ADDITIONAL GROUNDWATER BASIN INFORMATION

GROUNDWATER BASIN	WEBSITE
Aravaipa Canyon	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/documents/Volume_3_ARA_final.pdf
Donnelly Wash	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/documents/Volume_3_DON_final.pdf
Dripping Springs Wash	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/documents/Volume_3_DSW_final.pdf
Lower San Pedro	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/documents/Vol_3_LSP_final.pdf
Phoenix AMA	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/ActiveManagementAreas/documents/Volume_8_PHX_final.pdf
Pinal AMA	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/ActiveManagementAreas/documents/Volume_8_PIN_final.pdf
Safford	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/SEArizona/documents/Volume_3_SAF_final.pdf
Salt River	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/CentralHighlands/documents/volume_5_SRB_final.pdf
Tonto Creek	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/CentralHighlands/documents/Volume_5_TON_final.pdf
Tucson AMA	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/ActiveManagementAreas/documents/Volume_8_TUC_final.pdf
Verde River	http://www.azwater.gov/AzDWR/StatewidePlanning/WaterAtlas/CentralHighlands/documents/volume_5_VRB_final.pdf

THREATS TO GROUNDWATER IN THE CAG REGION

Although threats to groundwater are not a major problem throughout the CAG Region, fertilizer and pesticide applications are the two areas most readily identified as having a potential to impact groundwater quality. The other activities/uses which threaten groundwater quality include:

- Septic Systems.
- Confined livestock and poultry operations that create animal wastes that need to be disposed.
- Storage and loading areas of fertilizer and pesticide.
- Application equipment wash areas.
- Run-off from farmyards and septic systems which may slowly seep into groundwater or quickly enter aquifers by draining through poorly constructed wells.
- Chemigation with fertilizers and pesticides which can cause direct contamination if, for example, back-siphon elements of the system are not working properly (Anthonly, et.al.,1992).

Other groundwater problem areas include:

- Leaking Underground Storage Tanks.
- Mining, sand and gravel operations, and construction activities which can contribute to increases in the turbidity/siltation of a water body.
- Land surface subsidence in areas of intensive groundwater development, causing substantial economic consequences.
- Agricultural clearing, pool range land and forestry practices, which have caused vegetation removal resulting in increased turbidity and sedimentation downstream.
- Riparian area vegetation removal to increase runoff for irrigation and domestic uses, and decrease the filtrating (fine sediment and other contaminants), or trapping, capacity of the watershed.
- Land subsidence and the resulting earth fissures can result in considerable damage to sewage systems, well casings, and building foundations.
- Reversal of drainage patterns and removal of land from irrigation may result from erosion along fissures.
- Municipalities within the CAG Region can also contribute to water body pollution through discharges from wastewater treatment plants, urban run-off, natural background levels, and other unknown sources.

To find the most recent official impaired waters list for Arizona, please visit the following website:
http://www.azdeq.gov/environ/water/assessment/

2.6 SOILS

A soil association is basically a group of defined and named soil units occurring together in a characteristic pattern over a specified geographic region. Not only does an association differ in terms of an identified region's temperature and precipitation levels, but each particular soil association also differs in terms of soil depth, texture, acidic levels, permeability, drainage, corrosivity, and overall suitability for development.

The primary types of soils within the CAG Region correlate directly with the physiographic features characteristic of both the Central Highlands and the Basin and Range geologic provinces.

As identified by the U.S. Department of Agriculture, Soil Conservation Service (SCS), **FIGURES 2.7** & **2.8** displays the geographical distribution of the various soil classifications in Gila and Pinal Counties. The SCS study for Gila County placed an emphasis upon the geographical setting of soil associations according to their perspective climatic categorizations; whereas the study for Pinal County placed an emphasis upon soils and their associations within a physiographic environment. Although detailed site investigations are usually required to determine whether or not a particular area is suitable for development, the purpose of these figures is to give a general description of the soil associations and their location within the CAG Region.

When analyzing the content of soils from the perspective of mean annual temperature and precipitation levels, the CAG Region contains five identifiable soil associations extending throughout both Gila and Pinal Counties. The major association of soils can be categorized as follows:

Hyperthermic Arid
Soils with mean annual soil temperatures of more than 72° degrees Fahrenheit, and averaging less than 10 inches of mean annual precipitation.

Thermic Semiarid
Soils with mean annual soil temperatures ranging from 59° to 72° degrees Fahrenheit, and averaging 10 to 16 inches of mean annual precipitation.

Mesic Semiarid
Soils with mean annual soil temperatures ranging from 47° to 59° degrees Fahrenheit, and averaging 10 to 16 inches of mean annual precipitation.

Mesic Subhumid
Soils with mean annual soil temperatures ranging from 47° to 59° degrees Fahrenheit, and averaging more than 16 inches of mean annual precipitation.

Frigid Subhumid
Soils with mean annual soil temperatures of less than 47° degrees Fahrenheit, and more than 16 inches of mean annual precipitation.

As shown in **FIGURE 2.7**, Gila County contains 14 identifiable soil associations which are spatially distributed throughout various elevations in the county. Eight of these are classified as warm semiarid soil associations:

Glendale-Gila-Anthony
Rimrock-Bonita-Graham
Graham-House-Mountain-Rock Outcrop
Mabray-Lithic Torriorthents
Cellar-Lampshire-Rock Outcrop
Retriever-Calciorthids
White House-Caralampi-Hathaway
Continental-Eba-Nickel

In accordance with the climatic and temperature criteria listed above, all eight of these semiarid soil associations are classified as ***Thermic Semiarid***. Elevations of the warm semiarid soil associations located throughout Gila County range from approximately 2,000 to 5,800 feet above mean sea level.

From a regional perspective, the majority of lands within these soil associations are primarily utilized for rangeland and recreational activities. With the exception of the White House-Caralampi-Hathaway and

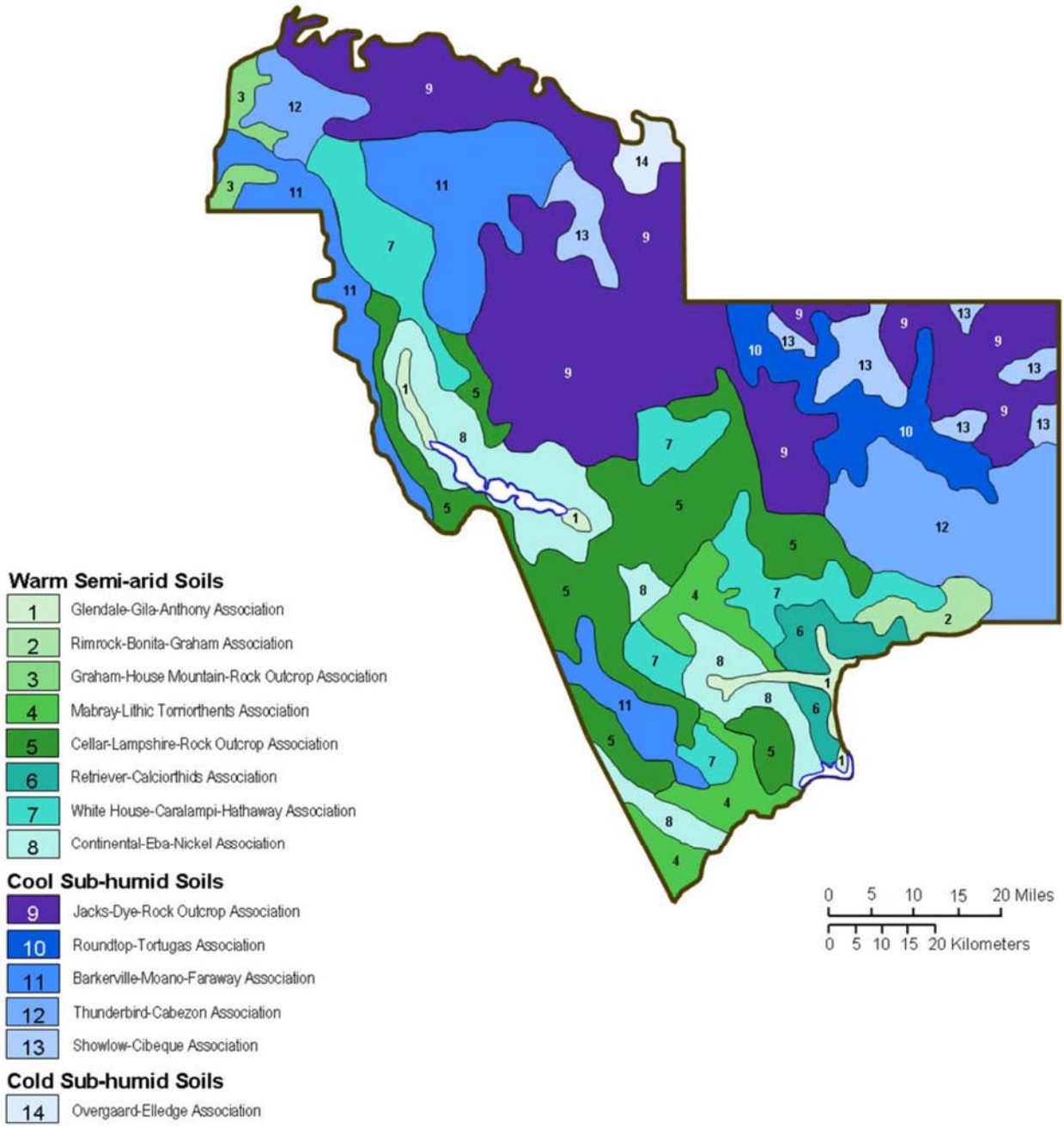
Continental-Eba-Nickel associations, most of the soils within these areas generally contain moderate to severe limitations for purposes of construction and extensive community development.

A moderate soil limitation basically implies that the soils within these associations contain properties that are moderately, or somewhat reasonably favorable for construction or community development purposes, and that most limitations due to inadequate soil features can be overcome by special planning that focuses upon methods of how to alleviate problematic areas. However, a severe soil limitation implies that the soil has many properties that are considered unfavorable for community development, such as steep slopes, potential flooding hazards, bedrock near the surface, seasonal high water tables, or high levels of susceptibility to volume and moisture changes.

The cool subhumid soils within Gila County range in elevation from 4,000 to 7,850 feet above mean sea level, and are comprised of the Jacks-Dye-Rock Outcrop; Roundtop-Tortugas; Barkerville-Moano-Faraway; Thunderbird-Cabezon; and Showlow-Cibeque soil associations. Soils within the Jacks-Dye-Rock Outcrop Association are classified as ***Thermic Semiarid***; whereas the other soils listed above are considered ***Mesic Subhumid***, due to their cooler mean annual soil temperatures. These soil associations are located upon slopes which generally range anywhere from 5° to 65° degrees, and are therefore considered unsuitable for any form of extensive, physical community development activities. The lands within these associations are primarily utilized for rangeland, timber production, and contain various recreational activities. However, within the Thunderbird-Cabezon association, which is geographically situated within the northwest region of Gila County, significant residential and industrial development has occurred upon several isolated site locations which contain favorable soil conditions.

The cold sub-humid Overgaard-Elledge soil association, located in far north central Gila County, is the only **Frigid Sub-humid** classification within the region. Elevations within this soil association range from approximately 6,500 to 7,500 feet above mean sea level. Like many other soil associations located throughout Gila County, this smaller region also possesses severe restrictions concerning activities related to construction and community development, due to its mountainous features and steep slope gradients. The lands within this particular association are utilized for rangeland, timber production, and also contain various recreational activities.

FIGURE 2.7
SOIL ASSOCIATIONS WITHIN GILA COUNTY



As shown in **FIGURE 2.8**, the Soil Conservation Service study prepared for Pinal County identified the spatial distribution of soil associations in accordance with their physiographic setting within the county. Descriptions of the soil associations are categorized as follows:

- **Soils of the Floodplains**
- **Soils of the Valley Slopes**
- **Shallow Soils over Bedrock**
- **Limy Soils on Valley Slopes & High Fans**
- **Rock Land**
- **Rough Broken Lands** - (areas of rock which are extremely difficult to adequately delineate for visual display)

Soils of the Floodplains

Two soil associations comprise the soils of the Floodplains:

- Gilman-Anthro-Pimer
- Torrifluvents Association

Soils of the Floodplains account for a large percentage of land area within Pinal County, and are classified as ***Hyperthermic Arid***, due to the area's higher mean annual soil temperatures and limited annual precipitation levels. The lands within these associations are primarily utilized for irrigated crops and pasturelands for the production of cotton, desert rangeland, and various recreational activities. Although the prime rangeland within these areas is considered to be somewhat poor as a habitat for wildlife, the soils within these associations provide a favorable base for the erection of commercial, industrial, and residential structures, along with other various community development projects.

Soils of the Valley Slopes

Seven soil associations comprise the soils of the Valley Slopes:

- Mohall-Casa Grande Association
- Mohall-Pinamt Association
- Casa Grande-La Palma Association
- Mohall-Vecont Association
- White House-Caralampi Association
- Caralampi-White House Association
- Caralampi Association

Of the seven associations, the Mohall-Casa Grande, Mohall-Pinamt, Casa Grande-La Palma, and Mohall-Vecont have been classified as ***Hyperthermic Humid***. As in the case of the Gilman-Anthro-Pimer and Torrifluvents floodplain soil associations mentioned above, these particular soils contain minimal slopes and are also utilized for irrigated crops and pastureland. The soils of the Valley Slopes are also considered exceptionally favorable for activities such as the production of cotton, desert rangeland, various recreational activities, and construction.

The White House-Caralampi, Caralampi-White House, and Caralampi soil associations are primarily situated within the eastern regions of Pinal County along moderately sloped alluvial fans. These particular soil associations are classified as ***Thermic Semiarid***. Unlike the soil associations located in the lower-level elevations of the county, these particular associations are comprised of reddish gravel-like material, and are considered rather limited in terms of agricultural productivity. The principal sources of land utilization within these associations include rangeland and recreational activities, along with limited construction and community development.

Shallow Soils Over Bedrock

One soil association comprises the Shallow Soils Over Bedrock:

- Chiricahua Association

The Chiricahua Association can be classified as ***Thermic Semiarid***, and is located upon low to moderately sloped granitic foothills in the central and southeastern parts of Pinal County. The slope gradients which range from 5 to 25 percent and the gravel-like texture of the soil compositions within the soil association generally prohibit any viable form of farming, or extensive crop cultivation. The main uses of the soil association are predominately comprised of rangeland activities and limited forms of construction.

Limy Soils on Valley Slopes & High Fans

Two soil associations comprise the Limy Soils on Valley Slopes & High Fans:

- Gunsight-Cavelt-Rillito Association
- Laveen-Rillito Association

The Limy Soils on Valley Slopes & High Fans are classified as ***Hyperthermic Arid***, and are located upon the lower elevations of central and western Pinal County. These associations are located in areas which contain relatively level slope gradients. The lands within these associations are primarily utilized for irrigated crop and pastureland, the production of cotton, and various community site developments.

Rock Land

Four soil associations comprise the Rock Lands:

- Granite & Schist Rock Land – (*Arid & Semiarid*)
- Andesite & Basalt Rock Land – (*Arid & Semiarid*)
- Andesite & Basalt Rock Land – (*Subhumid*)
- Granite & Schist Rock Land – (*Subhumid*)

The arid and semiarid classifications of these particular associations basically indicate that they are ***Hyperthermic Arid***, whereas the subhumid classifications are ***Mesic Subhumid***.

The Granite & Schist Rock Land (arid & semiarid) association consists of the mountains and buttes of granite and schist which are located throughout the southeastern, central, and western areas of Pinal County. Approximately 60 to 75 percent of this association is comprised of rock outcrop, which contains slopes ranging from 15 to 75 percent, and elevations ranging from 1,200 to 4,000 feet above mean sea level.

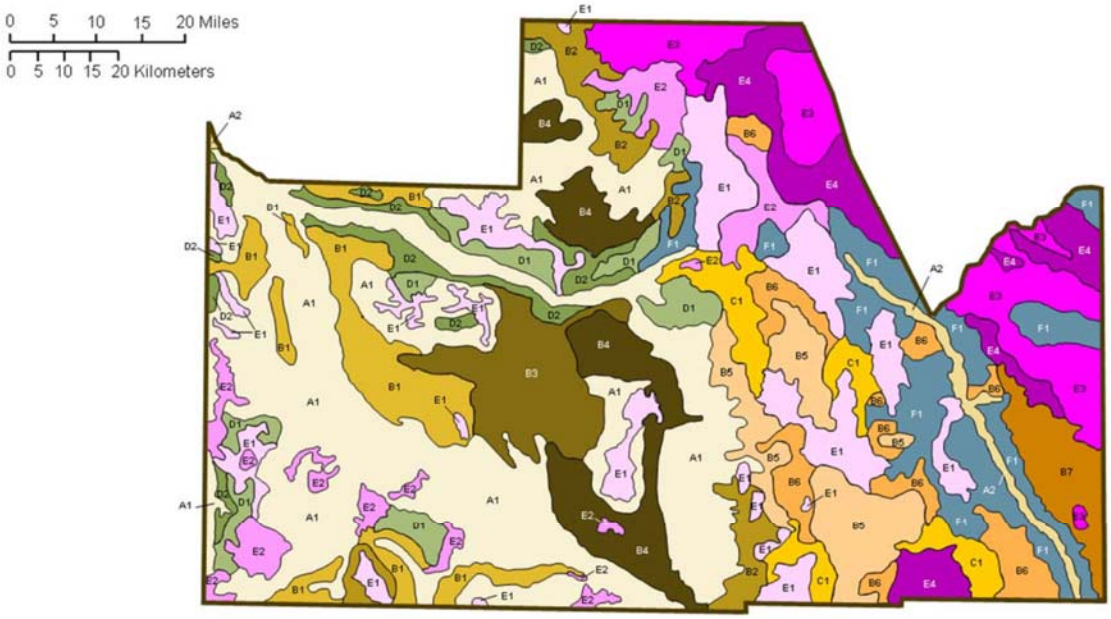
The Andesite & Basalt Rock Land (arid & semiarid) association consists of the arid and semiarid mountains and buttes which are primarily located throughout the central and western areas of Pinal County as well. This association is comprised of andesite and basalt, and contains slopes ranging from 5 to 60 percent, and elevations ranging from 1,200 to 4,000 feet above mean sea level. Approximately 50 to 75 percent of the Andesite & Basalt Rock Land (arid & semiarid) association consists of rock outcrop.

The Andesite & Basalt Rock Land (subhumid) association consists of the rough and mountainous areas of andesite, basalt, and tough agglomerate formations which are located in the northeastern and eastern areas of Pinal County. This association contains slopes ranging from 15 to 75 percent or more, and elevations ranging from approximately 3,000 to 5,500 feet above mean sea level. Approximately 40 to 50 percent of this association consists of rock outcrop in the form of ledges, pinnacles, and talus slopes.

The Granite & Schist Rock Land (subhumid) association consists of rough mountainous areas of granite and schist which are also located in the northeastern and eastern areas of Pinal County. This association contains slopes ranging from 15 to 75 percent, and has elevations which also range from approximately 3,000 to 5,500 feet above mean sea level. Although these associations are categorized from a climatical perspective as being subhumid in nature, this particular classification would only be applicable to the mountainous uplands that are generally above 5,000 feet in elevation. The majority of lands within these soil associations which are below 5,000 feet in elevation are classified as ***Thermic Semiarid***. The lands within both of these associations are primarily utilized for desert rangeland and various recreational activities. Due to the steep slopes, and the shallow rock and gravel-like textures of the soils which are characteristic of this region, severe limitations exist for crop cultivation and community development activities.

The area identified in **FIGURE 2.8** as Miscellaneous, or the areas containing rough broken land, are rather mountainous areas that are predominately located in the eastern region of the country, and consist of soils which are undevelopable.

FIGURE 2.8
SOIL ASSOCIATIONS WITHIN PINAL COUNTY



Soils of the Flood Plains
- A1 Gilman-Antho-Pimer Association
- A2 Torrifluvents Association

Soils of the Valley Slopes
- B1 Mohall-Casa Grande Association
- B2 Mohall-Pinami Association
- B3 Casa Grande-La Palma Association
- B4 Mohall-Vecont Association
- B5 White House-Caralampi Association
- B6 Caralampi-White House Association
- B7 Caralampi Association

Shallow Soils Over Bedrock
- C1 Chiricahua Association

Limy Soils on Valley Slopes and High Fans
- D1 Gunsight-Cavelt-Rillito Association
- D2 Laveen-Rillito Association

Rock Land
- E1 Granite and Schist Rock Land (Arid & Semi-arid)
- E2 Andesite and Basalt Rock Land (Arid & Semi-arid)
- E3 Andesite and Basalt Rock Land (Sub-humid)
- E4 Granite and Schist Rock Land (Sub-humid)

Miscellaneous
- F1 Rough Broken Land

2.7 FUTURE CONSIDERATIONS

Twenty-year regional wastewater treatment planning must consider emerging contaminants in water and new technologies that can improve wastewater treatment efficiency and also reduce energy use. Although newer technologies to save energy and water resources have higher upfront costs, cost recovery can be rapid, and in the long-run can be a benefit to the local economy. As wastewater treatment plants expand and new facilities are developed, new green technologies and better treatment technologies need to be incorporated where practical.

REUSE OF BIOSOLIDS

Biosolids created at wastewater treatment plants and concentrated animal feeding operations in the region have potential economic value as either soil enhancement/fertilizer or as a source of energy. Currently much of the biosolid wastes from wastewater treatment plants are disposed of in landfills which is a cost to the public. The reuse of biosolids can return natural resources back to the environment. Biosolids are rich in nutrients and trace minerals needed to grow crops, and because the nutrients are in an organic form, biosolids are slowly released. Biosolids can also improve the soil condition, thereby reducing soil erosion from wind and runoff.

However, the use of biosolids also has the potential to create environmental problems such as odor and pollutant contamination of soil and water if not properly managed. Therefore, the reuse of biosolids is regulated by ADEQ.

Further information concerning the use and management of biosolids in Arizona can be obtained at ADEQ's website: www.azdeq.gov/environ/water/permits/download/bioprog.pdf.

BIOSOLID USE AS ALTERNATIVE ENERGY SOURCE

New technologies are being developed to use biosolids as an alternative energy source. Anaerobic "microbial fuel cell" technology can be used to simultaneously treat organic wastewater and generate electricity. The EPA indicates that wastewater treatment processes consume an estimated two percent (2%) of energy nationwide (*Final Report: Electricity Generation from Anaerobic Wastewater in Microbial Fuel Cells, EPA's National Center for Environmental Research, 2009*). These microbial fuel cells harvest the chemical energy stored in contaminants and convert it to electricity using the bacteria commonly found in biological wastewater treatment processes used by larger treatment plants.

Two methods are currently being investigated to convert biosolids into energy sources: Biological and Thermo-chemical. Biological conversion involves using algae or bacteria to break down the biosolids. For example, under anaerobic conditions some bacteria can convert the biosolids into hydrogen gas and carbon dioxide gas which can then be converted into methane, a natural gas that can power heaters and stoves. Thermo-chemical conversion uses high temperatures to break down the elements in biosolids into gas or hydrocarbon fuels. In London, biosolids create more than 11 megawatts of electricity a year.

Further information can be obtained at:
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8957/report/F.

REUSE OF EFFLUENT

Regional wastewater plans also must consider potential reuse of effluent (reclaimed or "recycled" water). Effluent is a valuable resource in an area that receives less than six (6) inches of rain a year. It has become increasingly important due to growing populations and ongoing drought. Many facilities in the CAG Region, of particular in the central and western parts of Pinal County, and the Payson area, have designed facilities to maximize the reclamation and reuse of treated water.

A reclaimed water permit is required for a facility that generates or uses treated effluent or gray water. All wastewater treatment facilities providing reclaimed water for reuse must have an individual APP certification for a particular "class" of reclaimed water (A+, A, B+, B, C), and monitoring to ensure that effluent limitations for reclaimed water quality classes are met.

Reuse and recharge efforts and plans for the future must be tempered by residual contaminants found in treated effluent (see emerging contaminants discussion below). Nutrient accumulation in surface waters receiving reclaimed water may also become a problem. Lakes that receive effluent may develop significant issues with excess weeds and algae that can lead to fish kills and other negative impacts on the designated uses of lakes.

EMERGING CONTAMINANTS

An emerging concern in environmental contaminants is the introduction of pharmaceuticals and personal care products into the environment. These pollutants enter surface water and groundwater in many ways, but primarily through effluent from municipal wastewater treatment plants. Although found in trace amounts (parts per billion or parts per trillion) these compounds can have adverse effects on aquatic life due to their continual introduction to the environment. The risk to humans is largely unknown. Removal efficiencies vary by treatment and the chemical properties of the pollutant. Both treated effluent and biosolid applications to soils may contribute these pollutants to surface or groundwater. In biosolids, research indicates that these contaminants can persist for hundreds of days, but their persistence will depend on soil temperature, oxygen content, and moisture.

Further information can be obtained at:
http://water.epa.gov/scitech/swguidance/ppcp/basic.cfm.

CHAPTER 3: WATER QUALITY MANAGEMENT PRACTICES & FACILITIES

This section identifies types of wastewater, commonly utilized technologies and guidelines for wastewater management.

3.1 POINT-SOURCE POLLUTION

Point-source pollution can be traced back to a single origin or source such as a sewage treatment plant discharge. Point source pollution is often loosely defined as "any source that comes out of a pipe." Both A.R.S. 49-201(28) and Section 502(14) of the Clean Water Act define point source pollution as:

> *"any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture."*

Point source pollution is often more easily monitored and assessed, as it generally emanates from a monitored source "point" that has measureable discharges and regular monitoring as a condition of operation. For the purpose of this plan, "point source" will be defined as *those activities for which some type of permit or authorization is issued prior to discharge.*

A major point source in the CAG Region are wastewater treatment plants (WWTPs), both municipal and privately owned. Other point sources include industrial sites that often include tailings ponds or wastewater treatment facilities to address pollutants that arise from mining extraction and processing activities. For a list and map of permitted WWTPs in the planning region by county, see **Appendix E**.

3.2 NON-POINT SOURCE POLLUTION

Non-point source pollution includes all pollutants carried from diffuse sources into surface and ground waters via rainfall, runoff, irrigation, snow melt, and ground infiltration.

The U.S. EPA has compiled the following list of common non-point source pollutants:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Salt from irrigation practices and acid drainage from abandoned mines;
- Bacteria and nutrients from livestock, pet wastes and faulty septic systems; and
- Atmospheric deposition and hydromodification.

Sources of non-point source pollution may become so numerous that they constitute a measureable quantity of pollution with effects similar to that of a point source. One example is that of a densely developed residential subdivision that utilizes individual septic systems for wastewater treatment. If enough housing units are constructed in one location, the combined discharges may enter a groundwater aquifer or surface waters in concentrations or quantities to cause concern. The exact number of systems it might take to cause environmental degradation is dependent on several factors such as soil type, slope, usage of individual systems, and proximity of the aquifer or surface waters; however, as rural areas without centralized wastewater treatment systems develop, it is important to consider at what point the density of an individual system triggers the need for centralized wastewater treatment. A discussion of how to strategically plan for triggers to address this issue follows in **Chapter 4**.

Non-point source pollution is difficult to assess due to the non-specific release points, movement of runoff, remoteness of sources (or releases), and erratic timing of events and circumstances that convey contaminants (i.e. major storms or movement of livestock). However, non-point source pollutants have been repeatedly shown to have harmful effects on drinking water supplies, recreation, fisheries, and wildlife.

Non-point source pollutants represent some of the most recalcitrant and easily obscured sources of water pollution, especially for rural regions without storm water conveyance infrastructure. Much of the CAG Region lacks storm water conveyance systems, and adequate drainage structures along roadways. There is also no central repository of data on non-point sources for the region, making tracking extremely difficult. Coordinated programs for CAG members documenting best practices regarding storm water management and GIS tracking of non-point pollution locations would greatly enhance water quality management and planning throughout the region.

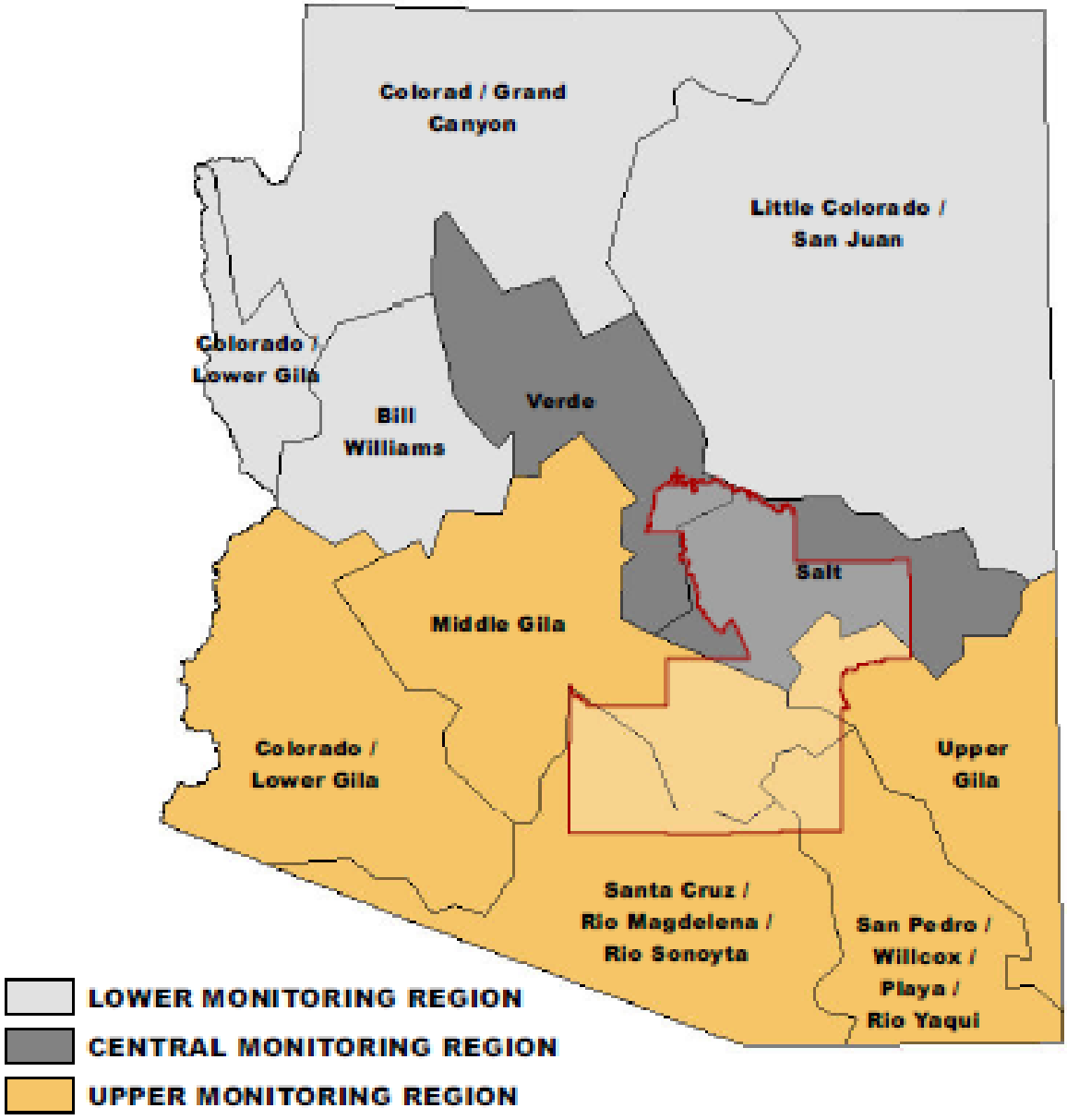
3.3 REGULATORY FRAMEWORK

Monitoring of Surface Water Quality

The Arizona Department of Environmental Quality (ADEQ) is tasked with monitoring surface and groundwater quality on non-tribal lands throughout Arizona and reporting this data as required by the Clean Water Act. Arizona's Integrated 305(b) Assessment and 303(d) Listing Report describes the status of surface water in Arizona in relation to state water quality standards. The report also contains a list of Arizona's impaired surface waters, including a list of surface waters requiring the development of a Total Maximum Daily Load (the 303(d) List). The report fulfills requirements of the Federal Clean Water Act sections 305(b) (assessments), 303(d) (impaired water identification), and 314 (status of lake water quality). Waters that have an exceedance of one or more pollutants or parameters of concern are placed on the "impaired waters list." Waters where analytical results meet all surface water quality standards for the water body's designated uses are labeled "Attaining All Uses." Still other waters may be labeled "Inconclusive" based on insufficient sampling or mixed testing results precluding a full assessment of its designated uses. The Arizona's Integrated 305(b) Assessment and 303(d) Listing Report can be found at the following link: http://www.azdeq.gov/environ/water/assessment/

In 2007, ADEQ divided the state into three "Monitoring Regions," which include the Upper, Central, and Lower Regions, and scheduled comprehensive monitoring on a three year cycle – one region each year. Most of the CAG Region falls within the Upper Monitoring Region, with a portion of the CAG Region crossing into the Central Monitor Region within Gila County (See **FIGURE 3.1**). In a monitoring year, sampling locations are selected based on several criteria, including targeted sites to fill data gaps for assessment purposes; long-term sites for trend analysis, and probabilistic sites to determine water quality conditions for similar type locations and conditions. Within a monitoring year, each site is generally visited quarterly for sampling.

FIGURE 3.1
ADEQ MONITORING REGIONS



Assessment includes the following ADEQ field measurements:

- pH
- Total Dissolved Solids
- Dissolved Oxygen Concentration
- Dissolved Oxygen Percent Saturation
- Air and Water Temperature
- Specific Conductivity
- Turbidity
- Discharge or flow
- Bacteria Concentrations

Water Samples are analyzed by state-licensed environmental laboratories for:

- General Chemistry
- Major Cations and Anions
- Nutrient Concentrations
- Total Metal Concentrations
- Dissolved Metal Concentrations

When a surface water body is found to be impaired, a Total Maximum Daily Load (TMDL) study is developed to determine the maximum amount (concentration) of a chemical, element, or nutrient that can be carried by a surface water body, on a daily basis, without causing an exceedance of surface water quality standards. TMDLs are developed by the ADEQ and must be approved by the EPA. Each TMDL is developed specific to the location, basin geology, surrounding uses and environmental factors, such as critical habitats. The allowable "load" has two parts: wasteload allocation (WLA) which is apportioned among the point source discharges in the watershed and load allocation (LA), which accounts for all the non-point pollution sources in the watershed. The TMDL list can be found at the following link: http://www.azdeq.gov/environ/water/assessment/

Monitoring of Groundwater Quality

The ADEQ also conducts a groundwater monitoring program for the 51 groundwater basins found throughout the state. Studies are done on a basin-by-basin approach. In a selected basin, samples are collected from a variety of wells (e.g., private, irrigation, production) and analyzed for various pollutants, including Safe Drinking Water Act (SDWA) inorganic analyses and oxygen and hydrogen. Samples for radiochemistry and radon analysis are also frequently collected while Volatile Organic Compounds (VOCs), currently-registered pesticides, banned pesticides, perchlorate, and other types of samples are collected in areas where these pollutants are likely to be encountered. The groundwater sampling program provides general basin-side information about water quality to residents using private wells that do not have the benefit of the regular sampling required at public water supplies.

3.4 PERMITTING

Discharges to groundwater and surface water require permits issued by the ADEQ. Discharges below ground are regulated with Aquifer Protection Permits (APPs), while surface water discharges require an Arizona Pollutant Discharge Elimination System (AZPDES) permit. Responsibilities of the applicant range from simple notification to a full engineering review, depending on the type of required permit. Permit types range from individual site-specific permits to general permits that may cover a geographic region or area. General permits are typically issued to a category of discharges, or for operations that have similar types of discharges and pose little environmental risk. Individual permits are issued for operations that pose significant environmental risk, or when an operation currently under a general permit expands or exceeds the pre-set limits for that type of general permit.

Surface Water

In December 2001, Arizona was authorized by the EPA to operate the National Pollutant Discharge Elimination System Permit Program (NPDES) (section 402 of the Clean Water Act) at the state level. All facilities that discharge pollutants from a point source into waters of the United States are required to obtain or seek coverage under an AZPDES permit. The original delegation included individual permits, general permits, Federal facilities, and pretreatment. In March 2004, EPA also delegated the biosolids program to ADEQ. Most areas of the CAG Region fall under State jurisdiction, however, the EPA continues to regulate and permit discharges on all Native American lands that will continue to be subject to EPA oversight.

AZPDES permits are also issued as either general permits or individual permits. Individual permits are facility or activity specific and contain effluent limits and conditions based on surface water quality standards and effluent limitations to ensure that discharges meet standards of the receiving water. AZPDES permits are issued to municipalities, industrial facilities and other entities and regulate the volume of discharge and pollutant concentrations so as to protect water quality in the receiving water.

A general permit may be issued to cover a discharge over a common geographic area if the facilities involved:

- Are the same or substantially similar types of operations;
- Discharge the same types of wastes;
- Require the same effluent limitations or operating conditions; and/or
- Require the same or similar monitoring requirement.

ADEQ has issued several general AZPDES permits including: the Construction Stormwater General Permit; Multi-sector General Permit for Stormwater Discharges from Industrial Facilities, and the DeMinimis Discharges General Permit. See A.R.S. § 49-255 thru § 49-255.03 and A.A.C. R18-9-A901 thru 1015, and for statutes and rules related to the AZPDES program.

Groundwater

The ADEQ requires an Aquifer Protection Permit (APP) under the following circumstances:

> *"If you own or operate a facility that discharges a pollutant either directly to an aquifer or to the land surface or the vadose zone (the area between an aquifer and the land surface) in such a manner that there is a reasonable probability that the pollutant will reach an aquifer."*

APPs are issued as either individual or general permits. The following facilities are considered to be "discharging" and require permits, unless exempted or ADEQ determines that there will be no migration of pollutants directly to the aquifer or to the vadose zone.

- Surface impoundments, pits, ponds, and lagoons
- Solid waste disposal facilities (generally regulated by the solid waste management section, except for mining overburden and wall rock that has not been subject to mine leaching operations).
- Injection wells
- Land treatment facilities
- Facilities adding pollutants to a salt dome, salt beds, or salt formations, drywells, underground caves, or mines.
- Mine tailings piles and ponds
- Mine leaching operations
- Septic tank systems
- Underground water storage facilities (if wastewater - effluent is used)
- Sewage or wastewater treatment facilities

Some types of facilities or activities are exempt from the APP process. For a complete list of exemptions, see http://www.azdeq.gov/environ/water/permits/app.html#exempt

More detailed information on the permitting process and all types of ADEQ permit types is available online at: http://www.azdeq.gov/function/permits/index.html

See A.R.S. § 49-241 thru § 49-252 and A.A.C. R18-9-101 thru 404 for statutes and rules related to APPs. Rules for the reclaimed water program are found in A.A.C. R18-9-601 thru 720.

3.5 WASTEWATER TREATMENT PROCESSES

Wastewater treatment processes are designed to address: 1) the type and quantity of influent; and 2) the amount of treatment required to produce effluent of a quality required by the necessary permits for the planned disposal.

There are four levels of wastewater treatment:

1. Primary
2. Secondary
3. Tertiary
4. Advanced Treatment

Below is a brief discussion of each and technologies commonly used in each category. All new and expanding wastewater treatment facilities must treat wastewater to the secondary level at a minimum, prior to discharge. Raw sewage is separated into sludge and liquid (treated effluent) via the treatment process. The ADEQ defines sewage sludge as:

a. Solid, semi-solid, or liquid residue that is generated during the treatment of domestic sewage in a treatment works, and;

b. Includes domestic septage, scum, or solids that are removed in primary, secondary, or advanced wastewater treatment processes, and any material derived from sewage sludge, but

c. Does not include ash that is generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings that are generated during preliminary treatment of domestic sewage in a treatment works.

Under AZPDES, the biosolids program deals with wastewater treatment plants that treat domestic sewage. The biosolids regulations are in A.A.C. R18-9-1001 thru 1015 and contain requirements for the treatment, transportation, land application, and management of biosolids.

It is illegal to incinerate biosolids in Arizona, and application, composting, and other activities using biosolids may require a permit. For more information, please see:
http://www.azdeq.gov/environ/water/permits/bio.html

Wastewater treatment technologies can be extremely involved and a complete discussion is beyond the scope of this document; however, the following sections provide a brief overview of the stages of wastewater treatment and of some of the technologies currently being utilized in the CAG Region.

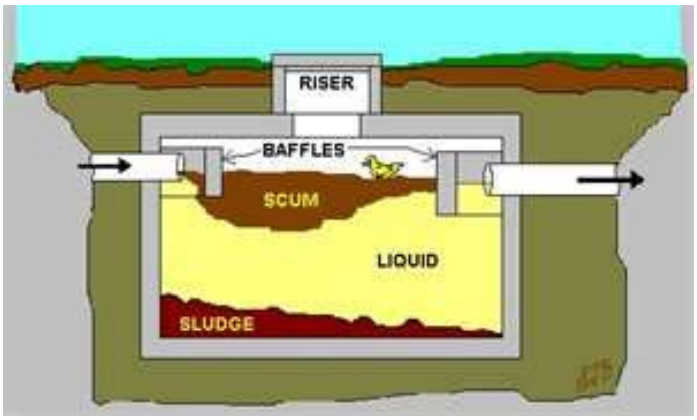
Onsite Wastewater Treatment Systems

In 2001 and 2005, Arizona adopted extensive regulations regarding onsite disposal systems.[1] A.A.C. R18-9-A316 requires inspection of systems within six months of the transfer of ownership (the sale or exchange of the property). Also, A.A.C. R18-9-A309(A)(4) prohibits the use of cesspools for the disposal of sewage. These regulations provide for specific design guidelines and setbacks for onsite systems, which should result

[1] A.A.C. R18-9-A301-317

in fewer failures in the future. These regulations may also provide opportunities for regional tracking and identification of areas of failing systems or cesspools. Model ordinances could be developed, which if adopted by local jurisdictions, could require repair or replacement of substandard or failing systems. **FIGURE 3.2** shows a typical onsite wastewater treatment system.

FIGURE 3.2
TYPICAL ONSITE WASTEWATER TREATMENT SYSTEM



Primary Wastewater Treatment

Primary treatment involves sedimentation, or the settling of solids, as well as removing suspended grit and solids through screening or coarse filtering. The filtering/screening process typically removes 30 to 50 percent of the suspended solid materials in raw wastewater. Most primary treatment is done by screening large suspended solids first, then detaining the raw sewage for a period of time sufficient to allow settling to separate the heavier suspended materials. This process is usually followed by a secondary treatment.

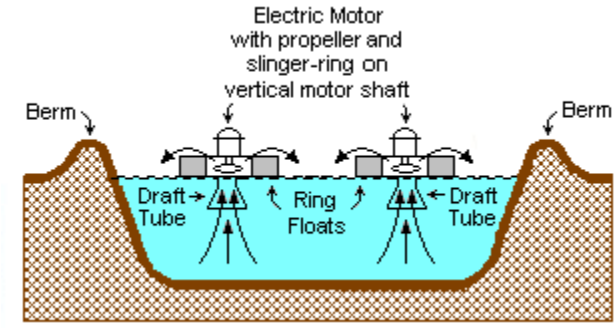
Secondary Wastewater Treatment

Secondary treatment typically involves biological processes that follow the primary sediment removal (e.g. sedimentation) treatment of raw wastewater. Sedimentation must precede all biological filtration (secondary treatment) operations in order for the secondary treatments to be effective. Often, additional screening and filtering occurs during the secondary treatment phase if needed.

Aerated Basins and Lagoons

There are two types of aerated basins or lagoons: suspended mixed and facultative lagoons. As implied by the name, aeration is the introduction of air into effluent through surface or underwater diffusers. The introduction of oxygen into the sludge promotes breakdown by enhancing the actions of the aerobic bacteria present in the influent. **FIGURE 3.3** shows a typical aerated basin.

FIGURE 3.3
TYPICAL SURFACE – AERATED BASIN



NOTE: The ring floats are tethered to posts on the berms.

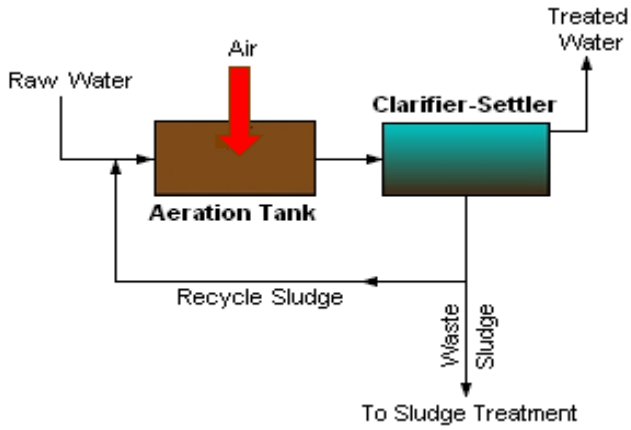
Suspension mixed lagoons - where there is sufficient energy provided by the aeration equipment to keep the sludge in suspension. The advantage of suspension systems is their ability to efficiently convert soluble biodegradable organics in the influent which tend to stay in suspension to a biomass, which is able to settle as sludge. This process typically takes one to five days.

Facultative lagoons - where there is insufficient energy provided by the aeration equipment to keep the sludge in suspension and solids settle to the lagoon floor. The biodegradable solids in the settled sludge then degrade anaerobically. Some suspended organic particles may stay in suspension for extended periods of time, thus, facultative lagoons may have longer residence times, and some particulates may not settle completely.

Activated Sludge

In activated-sludge processes aeration is combined with the introduction of a biological floc consisting of bacteria and organisms that assist in the breakdown of sludge and the removal of nitrates and entrained gases such as ammonia, carbon dioxides, and nitrogen. The resultant solids settle more easily and generate a liquid component (referred to as "liquor") that has few suspended particulates. One variant on this process is the sequencing batch reactor, which aerates and separates sludge one batch at a time, versus some activated sludge systems that continually process waste. A common activated sludge technology is the sequencing batch reactor (SBR) which combines secondary treatment and settlement. Typically, activated sludge is mixed with raw incoming sewage, and then mixed and aerated. The settled sludge is run off and re-aerated before a proportion is returned to the system to be added to the next incoming raw sewage batch. **FIGURE 3.4** illustrates the typical activated sludge treatment process.

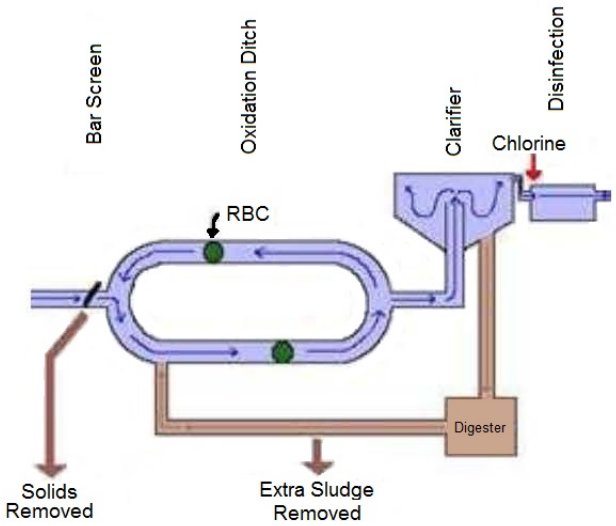
FIGURE 3.4
TYPICAL ACTIVATED SLUDGE TREATMENT PROCESS



Oxidation ditches

An oxidation ditch is an extended aeration activated sludge process. A large oval-shaped shallow ditch, lined with an impervious material (e.g. concrete), is used to detain the wastewater. This allows prolonged (>24 hours) exposure to the open air and diffusion of oxygen into the influent. This process maintains conditions that allow aerobic bacteria to further breakdown components of the wastewater over an extended time period. As with standard activated sludge, the resultant solids settle more easily and the liquid effluent contains few particulates. **FIGURE 3.5** shows the oxidation ditch treatment process.

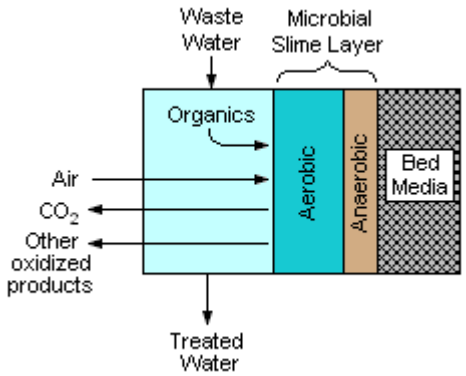
FIGURE 3.5
TYPICAL OXIDATION DITCH TREATMENT PROCESS



Trickling Filters

Trickling filters are one of the oldest and most widely used wastewater treatment processes, and can be adapted to a wide range of facility sizes. A trickling filter consists of a fixed bed of gravel or other suitable media over which wastewater flows and causes a layer of microbial slime (biofilm) to grow, eventually covering the media, and developing an aerobic outer layer and an anaerobic inner slime layer. Pollutants are removed by the biofilm layer through absorption and adsorption processes. Several communities in the CAG Region use trickling filters. **FIGURE 3.6** shows a cross section of a trickling filter.

FIGURE 3.6
CROSS SECTION OF A TRICKLING FILTER



Tertiary Wastewater Treatment

Tertiary wastewater treatment processes provide a final treatment stage to raise the effluent quality before it is discharged to the receiving surface or groundwater. Tertiary treatments may be used in combination to provide specific desired results and high quality effluent. Sand filtration, carbon filtration, and nutrient removal and disinfection are examples of tertiary processes. Nutrient removal and disinfection are commonly utilized in the CAG Region by facilities seeking to use reclaimed water for approved end uses.

Nutrient Removal

Wastewater contains sufficiently high levels of phosphorus and nitrogen, that when released to receiving waters, may cause eutrophication. *Eutrophication* is a biological condition that results from an excess growth of aquatic weeds and algae (an algal "bloom") that feed on these nutrients. The overpopulation of algae and plants eventually results in their mass die off, and aerobic bacteria begin consuming the decaying algal remains. The bacteria in turn consume large quantities of oxygen formerly available to native plants, fish, and other organisms that perish as a result of the depleted levels of oxygen.

Nitrogen removal involves the biological oxidation of nitrogen from ammonia to form nitrates ("nitrification"), followed by denitrification, which reduces nitrate to nitrogen gas. Nitrogen gas is then released harmlessly to the atmosphere.

Phosphorous is removed through the use of specific bacteria, called polyphosphate accumulating organisms (PAOs). PAOs selectively accumulate large quantities of phosphorus internally, and are then separated from the wastewater. The bacterial by-product of the separation procedure is highly valued as a fertilizer.

Stormwater and agricultural runoff also may contain elevated levels of phosphorus and nitrogen, making nutrient pollution both a point and non-point source concern.

Disinfection

Disinfection kills many of the microorganisms in the influent, some of which pose public health threats and environmental damage. The dosage of chemicals, length of time of contact, and pollutants present in the wastewater to be treated all effect treatment methods. Chlorination is the most widely used method of disinfection in the United States; however, because residual chlorine is toxic to aquatic species, and organic compounds left by chlorination, known as total trihalomethanes, may be carcinogenic to humans, the treated effluent must also be chemically dechlorinated, adding to the complexity and cost of treatment.

Package Plants and Batch Reactors

Package plants are often used by municipalities as satellite plants in outlying areas where densities are high enough to preclude use of on-site systems or as an initial phase of a larger, planned system. These systems often combine at least two stages of the three main treatment stages into one combined stage. In the U.S., package plants are typically used in rural residential areas, RV parks, and remote subdivisions. A common package plant system that combines secondary treatment and settlement is the sequencing batch reactor (SBR). See discussion under secondary treatment earlier in this section.

A major advantage of the package plant system is the ability to treat raw sewage to a much higher effluent quality than an individual onsite septic system, and the ability to centralize wastewater treatment for small commercial or residential developments without access to municipal treatment services. A disadvantage of package plants is their sensitivity to variations in batch composition. Because they operate with a small batch size compared to large wastewater treatment plants, reaction times, chemical inputs, and aeration must be monitored to determine that the effluent is properly processed.

Where package plants are used, there needs to be a capable management entity (e.g., WMU) to carry out necessary maintenance to assure such plants are operating as designed. In rural areas, it may be necessary to form a legal entity with the authority to charge users a fee for the ongoing maintenance and operation of the plant.

3.6 OPERATOR TRAINING & CERTIFICATION

The requirements for certification of Arizona's Operator Certification Program can be found in A.A.C R-18-5-101 thru 116. The program is administered by the ADEQ, and establishes guidelines to ensure that only certified operators make decisions about process control or system integrity with the potential to affect public health. The program establishes minimum standards for certification and recertification of the operators of both treatment and distribution systems for community and non-transient non-community public water

systems, and collection and treatment of wastewater. Operator certifications are classified into one of four grades by facility type, size, complexity, and population served. The grade corresponds with the level of system complexity, with Grade 1 being the most simple and Grade 4 being the most complex. Operators are required to maintain their certification through participation in continuing professional education workshops and must be re-certified every three years.[2]

3.7 SUSTAINABILITY

New wastewater systems are encouraged to incorporate sustainability in the system design whenever economically practicable. Features such as high efficiency rotating equipment, oxygen sensors, and solar panels can significantly reduce the operating costs of wastewater treatment plants. Existing systems can often benefit from these features where retrofitting is possible. Biosolids generated through the treatment process can be converted to soil amendment and fertilizer. Where sufficient quantities exist, biosolids can also be used for energy production.

[2] ADEQ, 2011

CHAPTER 4: STRATEGIC PLAN

4.1 OVERVIEW

As discussed in **Chapter 1**, CAG is the Designated Planning Agency (DPA) for the CWA 208 Water Quality Management planning process for Pinal and Gila Counties. Among other responsibilities, as the DPA, CAG acts as a facilitator and coordinator of the planning process. This includes making recommendations on consistency reviews, updating the CAG 208 Plan and overseeing amendments, if needed. To assist in implementing the CAG 208 Plan and to ensure a consistent regional approach, CAG's Environmental Planning Committee (EPC) will review the collaborated work done among CAG staff and ADEQ. The work includes initial review of development and expansion proposals for wastewater treatment facilities and to determine when the public 208 Plan amendment process should be applied to maintain consistency with the overall goals outlined in this chapter.

As also discussed in **Chapter 1**, the CAG 208 Plan's purpose, or mission statement, reflects the authorizing CWA mission, which is as follows:

> "*To provide a consistent regional approach for maintaining, improving and protecting water quality in the CAG Planning Area.*"

A "**consistent regional approach**" requires:

1) **An Accepted Framework** for decision-making and action. The CAG 208 Plan and the goals, objectives, strategies, and tactics contained herein are intended to provide such a framework.

2) **Regional Communication**. As both the Council of Governments and the DPA, CAG's role is to coordinate water quality management planning activities within its geographic jurisdiction and to convene stakeholder public meetings to review development proposals for Plan conformance. In this manner, as well as through the use of various media, CAG will provide the required regional communication.

3) **Common Values** with regard to protecting water quality. Because it is comprised of a representative sample of the CAG member entities, government officials, staff, and private citizens concerned with water quality in the area, the EPC is a highly diverse group of individuals. The EPC's high level of diversity helps to ensure that the goals, objectives, strategies, and tactics of the CAG 208 Plan are designed to maintain, improve and protect the region's water quality, and also ensure that they are attainable and do not over-reach the authority provided by the CWA.

4) **Willingness to Participate and Cooperate** in regional strategies for handling issues regarding water quality. Due to the desert environment of our region, the availability of clean water is a matter paramount to the quality of life that most citizens cherish. While water quality management goals, objectives, strategies, and tactics must be carefully balanced with economic and property interests, the overarching issue of preserving and protecting the quality of this precious resource helps ensure willing participation and cooperation.

4.2 GOALS

All of the above mentioned elements underscore the importance of the collaborative roles of the ADEQ, CAG, and the EPC. With a focus on these items, the following goals, objectives, strategies, and tactics for the program were established.

GOAL 1 PROVIDE REGION-WIDE WASTEWATER TREATMENT THAT MEETS ALL REGULATORY REQUIREMENTS, IS ECONOMICALLY SUSTAINABLE, AND UTILIZES RECOGNIZED BEST MANAGEMENT PRACTICES.

OBJECTIVE 1.1

Plan for wastewater treatment facilities and use/development of on-site wastewater treatment systems with a 20-year horizon.

STRATEGY 1.1.A

Identify wastewater management entities that have the legal, institutional, financial, and managerial capabilities, and the resources to implement the CAG 208 Plan.

Tactic: *Develop model ordinances to encourage public wastewater entities (e.g. Municipality, Sanitary District, Wastewater Improvement District) to become Designated Management Agencies. An entity seeking DMA approval must demonstrate it has the authority and capability to serve in this capacity.*

Tactic: *Develop model ordinances to formalize private wastewater providers as Wastewater Management Utilities (WMUs). Private wastewater providers must demonstrate the authority, the capabilities and the resources to implement the CAG 208 Plan within their proposed delineated service area (e.g., Certificated Area of Convenience and Necessity). Those entities with the necessary authorities, capabilities, and resources will be designated as Wastewater Management Utilities (WMUs).*

Tactic: *Develop model ordinances and processes for a municipality to rescind capacity assurance once given to a developer, or to establish a phased approach to providing capacity assurance.*

STRATEGY 1.1.B

Identify environmentally sensitive areas undesirable for development or placement of conventional onsite wastewater treatment (septic) systems.

Tactic: *Formulate criteria for "sensitive areas." Examples include:*

- *Areas with shallow groundwater (e.g., < 10 feet seasonally)*
- *Impaired surface waters*
- *Wells with high nitrate concentrations (> 10mg/l)*
- *Areas of known groundwater contamination*
- *Areas within a regulatory floodway* [1]

[1] A.R.S § 48-3601(8) defines "Floodway" as the area of a river or other watercourse and the adjacent land areas necessary in order to discharge the one hundred-year flood without cumulatively increasing the water surface elevation more than one foot. A.R.S. § 48-3609(C) dictates that waste disposal systems shall not be installed wholly or partially in a regulatory floodway.

Tactic: *Create a regional GIS database to map areas that meet the sensitive areas criteria for use by regional planners and permitting entities.*

STRATEGY 1.1.C

Provide centralized wastewater treatment guidelines for new development.

Tactic: *Develop model ordinances with density triggers for the development of new centralized wastewater treatment facilities in remote areas or areas that are not served by existing facilities (high priority areas).*

Tactic: *Create regional GIS database to map high priority areas for centralized wastewater treatment facilities.*

Tactic: *For individual on-site wastewater systems installed under the Wastewater Treatment Options Table presented in Chapter 5 of this Plan, and which are within a service area, planning area, or high priority area for sewer lines, develop model ordinances to require that property owners connect to sewer lines when they become available.*

GOAL 2 ENCOURAGE PRACTICES THAT SUPPORT WATER SUSTAINABILITY, WASTE REDUCTION, AND ENERGY PRODUCTION *(E.G. EFFLUENT REUSE, RECHARGE BASINS, GRAYWATER USE, RAINWATER HARVESTING, CONSERVATION MEASURES & BIOMASS ENERGY PRODUCTION)*

OBJECTIVE 2.1

Support county and local ordinances regarding water sustainability.

STRATEGY 2.1.A

Maximize efficient water use through 100 percent reuse and recharge of treated effluent to avoid future nuisance impacts.

Tactic: *Develop model ordinances that incentivize low water use fixtures and metered water service connections in future developments through the use of credits.*

Tactic: *Develop model ordinances that incentivize the use of effluent and/or storm water discharges, and rainwater harvesting in future developments through the use of credits.*

Tactic: *Increase community workshops and educational efforts through partnerships with Local, State, Federal agencies, academic institutions, and watershed groups to develop local outreach and education programs.*

STRATEGY 2.1.B

Investigate the potential and logistical development of regional facilities for the long-term use of residual waste, agricultural waste, and biosolids for composting or alternative energy production.

Tactic: *Gather current biosolids and waste management production and future needs data.*

Tactic: *Create regional GIS database to map biosolids production/disposal, solid waste disposal, agricultural, and composting facilities of significance.*

Tactic: *Identify communities/utilities that could collaborate on regional or sub-regional facilities.*

Tactic: *Survey local electric utilities and seek public-private partnerships to fund the development of facilities and infrastructure for alternative energy production.*

GOAL 3 AVOID AND/OR PREVENT POLLUTION DISCHARGES TO SURFACE AND GROUND WATERS.

OBJECTIVE 3.1

Maximize, to the fullest extent possible, the flexibility of effluent reuse through the use of A+ reclaimed quality effluent and minimize the need for discharging.

STRATEGY 3.1.A

Design and permit non-discharging wastewater facilities that allow discharges for emergency purposes only.

Tactic: *Identify uses that could benefit from reclaimed water rather than using ground water supplies to the maximum extent possible.*

Tactic: *Develop model ordinances that incentivize the use of effluent in future developments through the use of credits to the maximum extent possible.*

OBJECTIVE 3.2

Ensure that discharges from on-site wastewater treatment (septic) systems do not cause or contribute to an exceedance of a surface or aquifer water quality standard.

STRATEGY 3.2.A

Identify substandard or failing septic systems in the CAG Region and find acceptable alternative solutions.

Tactic: *Create a regional database to map areas with substandard or failing septic systems in the CAG Region. Database and mapping can aid in developing high priority areas for sewering and treatment.*

Tactic: *Create model ordinances requiring submittal of the on-site system inspection report required by A.A.C. R18-9-A316 to the local permitting authority and repair of deficiencies or replacement of the failing on-site system within one year of the date of the inspection report.*

STRATEGY 3.2.B

Improve education and outreach pertaining to septic system management.

Tactic: *Provide outreach and educational opportunities and materials – revise if necessary, or create new material. Partners include: UA Cooperative Extension, Rural Water Association, Watershed Groups, and local realtors.*

OBJECTIVE 3.3

Promote programs to reduce pollutant loadings to surface waters.

STRATEGY 3.3.A

Encourage review of developments for consideration of potential stormwater impacts to surface waters, especially those that are impaired, have a TMDL allocation or are within a Nitrogen Management Area.

Tactic: *Develop model ordinances that encourage low impact development and protection of water resources.*

Tactic: *Develop model ordinances to encourage stormwater management to retain/recharge to the maximum extent practicable.*

STRATEGY 3.3.B

Encourage use of agricultural best management practices to reduce pollutant loadings.

Tactic: *Collaborate with watershed groups for issue focus.*

Tactic: *Educate farmers and ranchers in implementation of agricultural and livestock grazing BMPs to reduce targeted pollutant discharges to surface waters and groundwater.*

Tactic: *Identify grant funds, loans, or other incentives for implementing BMPs**;** collaborate with watershed groups on grant proposals.*

STRATEGY 3.3.C

Educate the public about water pollution and ways to reduce pollutants.

Tactic: *Identify needs and gaps in existing programs (e.g. lack of public knowledge about the harmful effects of improper disposal of chemicals, drugs, grease and other products unsuitable for sewer disposal, the adverse impacts of sediment discharged in stormwater from unpermitted grading and development activities, or the proper care and maintenance of septic systems).*

Tactic: *Research funding sources for regional water quality educational activities.*

Tactic: *Partner with Local, State, Federal agencies, academic institutions and Watershed groups to develop local outreach and education programs.*

GOAL 4 FOSTER REGIONAL COORDINATION AND PUBLIC INVOLVEMENT, AND PROVIDE A CONTINUING PLANNING PROCESS TO SUPPORT PLAN IMPLEMENTATION.

OBJECTIVE 4.1

Encourage coordination and cooperation among programs, agencies, and other partners.

STRATEGY 4.1.A

Re-engage and maintain involvement of the EPC.

Tactic: *Hold EPC meetings at a minimum of a bi-monthly basis, or as needed, with subsequent reports presented to the CAG Management Committee and Regional Council when appropriate.*

STRATEGY 4.1.B

Use Consistency Review Process to provide a more efficient and consistent regional approach to evaluating proposals. This should minimize the need for amendments to the CAG 208 Plan.

Tactic: *Facilitate CAG consistency review of applications in conjunction with ADEQ to provide comments to EPC for recommendation of approval.*

Tactic: *Ensure that consistency reviews are coordinated with affected parties and key stakeholders so that the review is thorough and timely.*

STRATEGY 4.1.C

Encourage cooperation in regional planning through Memorandums of Understanding (MOUs) and Intergovernmental Agreements (IGAs) among CAG member entities.

Tactic: *Facilitate discussions between adjacent communities that may benefit from joint planning of facilities or cross-boundary service agreements.*

STRATEGY 4.1.D

Encourage cooperation in regional planning through Letters of Support or No Objection from identified affected stakeholders.

Tactic: *Facilitate discussions among affected stakeholders to obtain a "Letter of Support" or "No Objection" for a more efficient process.*

GOAL 5 SEEK TO MAKE ALL WATER QUALITY PROJECTS IN THE CAG REGION COST EFFECTIVE.

OBJECTIVE 5.1

Reduce the costs of developing, operating, and maintaining water quality projects and systems.

STRATEGY 5.1.A

Increase the amount of funding made available to CAG members for water quality improvement projects.

Tactic: *Create, update, and make available listing of potential funding sources.*

Tactic: *Use the Environmental Planning Committee (EPC) as a conduit to facilitate and coordinate information about funding opportunities.*

Tactic: *Identify opportunities to coordinate water quality projects with other planning projects in the region (i.e., community development, housing, transportation, and economic development).*

Tactic: *Identify grants, loans, or other sources of funds to replace substandard or failing septic systems.*

STRATEGY 5.1.B

Expand development proposal submission requirements.

Tactic: *Develop model ordinances to require wastewater treatment proposals to include information on treatment efficiencies, cost effectiveness, economies of scale, and resource conservation strategies.*

CHAPTER 5: PLAN IMPLEMENTATION

5.1 OVERVIEW

Implementing the CAG 208 Plan will require cooperation and collaboration to accomplish the goals of the CAG 208 Plan. The collaboration will include many different parties working together to utilize the strategies set within this Plan. The implementation of the CAG 208 Plan will also require a variety of tools that were previously unavailable, which include the development of model local ordinances, the use of a Wastewater Treatment Options Table to guide appropriate actions, creation of various GIS databases for tracking facilities and development, expanded partnerships, and most importantly, funding mechanisms. This chapter describes many of these new tools and the processes. Flow diagrams illustrating the overview of the CAG 208 Plan processes are provided in **Appendix C**.

Previous processes have been revised to provide a more streamlined and coordinated approach to implementation of this Plan. Improved regional communication and distinct roles and responsibilities are required so that processes can occur in a timely manner and be seamlessly integrated with the permit approval process.

The permit review process requires that a proposal must first be reviewed to ensure that it is consistent with the goals and strategies in the CAG 208 Plan. The Wastewater Treatment Options Table that appears later in this chapter is a tool to assist both ADEQ and CAG in evaluating development proposals to bring forth to the EPC for approval. As explained later in this chapter, during this 'Consistency Review' process, the goals and strategies in the strategic plan will be considered.

The Consistency Review process will be much faster if the proposal is consistent with the CAG 208 Plan. Although the CAG 208 Plan's strategies, tables, and processes can be revised, such revisions will cause considerable delays in obtaining a permit. Therefore, it will be easier, faster, and less costly to revise the proposal so that it is consistent with the CAG 208 Plan.

If the applicant must be approved as a Designated Management Agency (DMA) or a Waste Management Utility (WMU), the process will be necessarily extended. However, only wastewater treatment facilities with defined service areas and planning areas would be required to put forth this level of effort. Owners or operators of on-site systems will not be required to become DMAs or WMUs.

5.2 LOCAL ORDINANCE DEVELOPMENT

Because existing federal and state regulations are inadequate to implement some aspects of this plan, additional local regulations should be considered. Development of model ordinances to provide such authority was included as a tactic in several of the strategies in **Chapter 4** and is discussed below. Development of local policies and procedures to implement the ordinances may also be needed. Development of model local ordinances should be carefully and thoughtfully coordinated with ADEQ and other State and Federal regulatory agencies as necessary to ensure consistency with state and Federal regulations. Examples of the model ordinances identified in **Chapter 4** include:

Designated Management Agencies or Wastewater Management Utilities - (STRATEGY 1.1.A)
Ordinances to require a municipality to be approved as a DMA or a privately-owned wastewater utility as a WMU, and require that they take on the responsibilities of a DMA or WMU will be required for full Plan implementation. Such ordinances should indicate that these requirements must be met before approval of new or expansion of existing wastewater facilities. Additional policies and procedures may be necessary for coordinating approval of a Wastewater Management Utility. (See further discussion of DMAs and WMUs later in this chapter.)

Rescinding Capacity Assurance - (STRATEGY 1.1.A)
Legal authority and processes do not currently exist for a municipality to rescind capacity assurance once given to a developer, or to establish a phased approach to providing capacity assurance. State APP regulations require capacity assurance to be given, but absent clear, local regulations, the assurance is assumed by ADEQ to be an everlasting contract with the developer.

Wastewater Treatment Options Table - (STRATEGY 1.1.C)
While proposed wastewater treatment facilities are required to be consistent with the Plan, local ordinances will be necessary to require that property owners connect to sewer lines when they come available when individual on-site wastewater systems have been installed within a service area, planning area, or high priority area for sewer lines under the Wastewater Treatment Options Table presented in this chapter.

Support Water sustainability (STRATEGY 2.1.A)
Model ordinances will be necessary to maximize efficient water use and recharge through incentives for developers to use high efficiency water fixtures and metered water connections, and encourage the use of effluent, stormwater discharges, and rainwater harvesting.

Reducing Impact from Failing On-Site Systems - (STRATEGY 3.2.A)
While septic tank inspections are required by Arizona law whenever a property changes ownership, there is nothing in the regulations that requires the new property owner to correct the deficiencies identified in the inspection report or to replace a failing system. As a result, many cesspools or failing on-site systems continue to contribute to the degradation of surface and ground waters. Creation of model ordinances requiring submittal of the on-site system inspection report required by A.A.C. R19-9-A316 to the local permitting authority and repair of deficiencies or replacement of the failing on-site system within one year of the date of the inspection report would eliminate failing systems over time, thus reducing the impact on surface and ground waters.

Impacts to Impaired Waters - (STRATEGY 3.3.A)
During the permit review process, in order for jurisdictions to consider potential pollutant contributions to surface waters (i.e. streams with TMDLs or assessed by ADEQ as "impaired" or "not attaining" standards), and contributions to an aquifer with wells that exceed an Aquifer Water Quality Standards, local ordinances will be necessary.

Proposal Submission Requirements - (STRATEGY 5.1.B)
In order to fully implement this Plan, local ordinances, policies, and procedures will be necessary to require wastewater treatment facility proposals to include additional information such as cost-effectiveness, resource conservation strategies, treatment efficiencies, or economies of scale.

5.3 WASTEWATER TREATMENT OPTIONS TABLE

The Wastewater Treatment Options Table, **TABLE 5.1**, will be used during Plan Consistency Reviews of new or expanding wastewater treatment facilities and should also be applied during review of new or replacement on-site wastewater systems. In order for a proposed wastewater treatment facility to be consistent with the CAG 208 Plan, it must be consistent with the Wastewater Treatment Options Table. If inconsistent with this table, either the proposal or the table must be revised. Revision of the table would require going through a CAG 208 Plan Amendment process described in **STEP 6: 208 PLAN AMENDMENTS** in section **5.10**.

Although the table addresses on-site systems, current State and Federal regulations do not require consistency reviews for many of these systems. Local ordinances will be necessary to require that property owners connect to sewer lines when they come available when individual on-site wastewater systems have been installed within a service area, planning area, or high priority area for sewer lines under the Wastewater Treatment Options Table presented in this chapter.

In selecting the right option, engineering considerations and physical site characteristics must be considered. Also, selected options must meet all current Aquifer Protection Permit (APP) and Arizona Pollutant Discharge Elimination System Permit (AZPDES Permit) rule requirements. A detailed description of each option is presented below, followed by the Wastewater Treatment Options Table.

Option 1 – Connect to an Existing Wastewater Treatment Plant (WWTP) with Adequate Capacity

If economically feasible, and an existing WWTP has adequate capacity, connecting to a sewer line is usually the best choice within a service area, a planning area, or a high priority area for sewer lines. Depending on the proximity and characteristics of a proposed development, connecting to existing wastewater facilities frequently provides economies of scale, treatment efficiencies, resource conservation, and is more cost-effective than other alternatives. Even outside of a service or planning area it may be more cost-effective and resource efficient to connect to an existing wastewater plant than constructing new facilities or systems. These opportunities should be evaluated before constructing new wastewater treatment plants or using on-site wastewater treatment (septic systems).

Connection to an existing sewer line may require a change in a service area. This change would require going through the Consistency Review Process. This type of change may also require an Intergovernmental Agreement (IGA) or Memorandum of Understanding (MOU) to institutionalize long-term service agreements. Once approved, the changes would be documented and **Appendix E** of the CAG 208 Plan would be modified.

Other options may be more cost-efficient when a sewer line is not yet available or a WWTP does not have sufficient capacity. In these cases, new developments should be designed so that connections to sewer lines can easily be accommodated when sewer lines become available.

Option 2 – Modify Existing Wastewater Treatment Plant or Collection System

Expanding or modifying existing wastewater facilities to take on a new development may also improve treatment efficiency, energy efficiency, resource conservation, or offer economies of scale. As developments are proposed, DMAs and WMUs should look for opportunities to merge WWTPs, expand treatment plants, or create collection systems to take advantage of economies of scale. This is more consistent with the CAG 208 Plan than developing new, smaller treatment plants that are less efficient at removing pollutants.

When inside a service area or high priority area for sewer lines, proposed development should be delayed until adequate capacity is available at the wastewater treatment plant and the sewer lines are available to the property. However, if development cannot be delayed, the "phased approach" in Option 4 and 5 could be considered.

Option 3 – Build New Wastewater Treatment Facilities

Construction of a new wastewater treatment facility is sometimes the best alternative due to physical site conditions and engineering considerations in a given development scenario and/or capacity limitations at existing facilities. New construction also can be the best alternative when the facility is designed to use more effective technologies than existing facilities. In addition, new facilities can be designed and constructed to accommodate future expansion if further growth is anticipated.

New centralized wastewater treatment facilities and collection systems should be designed to take advantage of new technologies and potential economies of scale whenever practicable. For example, new facilities and collections systems can be designed to accept wastewater from older and less efficient facilities or systems located inside or adjacent to an existing or proposed service area.

Similar to Option 2, when inside a service area or high priority area for sewer lines, proposed development should be delayed until adequate capacity is available at the wastewater treatment plant and the sewer lines are available at the property. If development cannot be delayed, the "phased approach" in Option 4 and 5 may be considered.

Option 4 – Build On-Site Wastewater Systems (up to 24,000 gpd)

Although a treatment facility is highly encouraged, an on-site wastewater system (septic system) may be the best option in low density developments (2 acres or larger) with no site limiting conditions. These larger systems may also provide for a common collection system that can be hooked up to a centralized sewer when available. This option does not offer the economies of scale, treatment efficiencies, or resource conservation potential of Options 1, 2, or 3. However, on larger properties with good site conditions, on-site systems can be a low-cost and effective alternative. An individual on-site system is an option if all of the following conditions exist:

- Appropriate site conditions (APP Rules, A.A.C. R18-9-A310).
- Not located in a 100-year floodway (Floodplain Use Statutes, A.R.S. § 48-3609 (C)).
- For lots with both an on-site well and wastewater system, the minimum lot size is 1 acre (Arizona Subdivision Rules, A.A.C. R18-5-404).
- The property is not located within an area identified for connection to a sewage collection system by a Certified Area-Wide Water Quality Management Plan or wastewater master plan adopted by the county, municipality, or sanitary district (APP Rules, A.A.C. R18-9-A309(A)(5)(a)(iii)).

A conventional on-site septic system is an option if all of the following conditions exist:

- Not in a Nitrogen Management Area (APP Rules, A.A.C. R18-9-A317(D))
- Nitrate concentration in groundwater less than 10 mg/L (Aquifer Protection Standard) within ½ mile of the development (requires local ordinance)

If either or both conditions above exist, alternative on-site wastewater systems (APP Rules, A.C.C. R18-9-E303 through E322) are an option if:

- Landowner can demonstrate adequate maintenance will be performed (requires local ordinance).

Phased approach

In service areas or high priority areas for sewer lines, where development or replacement of existing on-site systems cannot be delayed until sewer lines are available (Options 1, 2, and 3), individual septic systems could be allowed using a phased approach if:

- APP rule requirements are met.
- A dry sewer line collection system is provided to the properties.

- The residents are required to connect to the sewer lines and properly abandon their septic system when the sewer line from the WWTP is extended to their area.

The phased approach will require local ordinances and procedures for notification of new owners when the property changes ownership.

Option 5 – Build a Satellite Plant or Communal Facility

If the other options are not feasible, one of the following small centralized wastewater treatment facilities must be considered:

- A "satellite plant" is a small privately-owned wastewater treatment facility that services one property, such as a recreational vehicle or mobile/manufactured home park. The facility is larger or uses technologies beyond those of a typical septic system and smaller than most municipal wastewater treatment facilities.

- A communal facility serves multiple properties but may be using rather simple technologies, such as an expanded septic tank and leaching system.

Once again, these small treatment plants and collection systems do not provide the economies of scale and treatment efficiencies provided by larger plants. However, they are a necessary option in areas where larger centralized facilities are not available and individual on-site systems are not appropriate due to lot size or other limiting site conditions. These systems can be more expensive and more complicated to operate than conventional on-site systems, and therefore, may need to be maintained by a certified operator.

Phased approach

In service areas where development cannot be delayed until sewer lines are available, satellite plants or communal systems could be used during the initial development phase until sewer lines become available. However, local ordinances or written agreements between the owners of the wastewater facility and the wastewater treatment plant will need to be established so that these facilities would become collector systems for the WWTP when the sewer lines become available.

Commercial and Industrial Wastewater

Domestic sewage discharges from commercial properties would require Consistency Review and would follow the Wastewater Options Table. However, discharges from non-municipal or industrial processes (i.e., industrial process wastewater) are not covered under the 208 Process or covered by the CAG 208 Plan.

Options Considering Distance to Sewer Lines

Determining which wastewater treatment option is preferable can often be determined by considering the distance to existing sewer lines or the wastewater treatment plant. Such *guidance* is provided in **TABLE 5.2**, in which the five options outlined in **TABLE 5.1** are combined into just three options: Septic – An on-site wastewater treatment system, including an alternative on-site system; Tie in – Connect to a wastewater treatment plant, and Satellite Plant – constructing a small treatment plant. ***TABLE 5.2*** *should be considered guidance.*

TABLE 5.1 – WASTEWATER TREATMENT OPTIONS

NOTE: Selected option must meet all ***current*** Aquifer Protection Permit (APP), Arizona Pollutant discharge Eliminations System Permit (AZPDES), and adopted local ordinance requirements. Options should also consider how to incorporate technologies for reuse of effluent and biosolids, including the use of biosolids for alternative energy, and other strategies outlined in **Chapter 5** of the CAG 208 Plan.

	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5
	Existing WWTP with Adequate Capacity	**Expand WWTP or Collection System**	**New Centralized WWTP and Collection System**	**Individual On-site Wastewater Treatment Systems** (up to 24,000 gpd)	**Satellite Plants or Communal Facilities**
In a Service Area, Planning Area, or High Priority Area for Sewer Lines	Connecting to an existing WWTP is generally the best option if feasible. If sewer lines are not yet available or WWTP capacity insufficient, see Options #2 and #3.	Expanding a WWTP is generally preferable to building new facilities. It is usually more cost effective to delay proposed development until expansion has been completed. However, if unwilling to delay development, an initial phase can be developed (see options #4 and #5.)	Construction of new public service facilities may be the best option, for example if the size of the plant cannot be expanded. New facilities must be provided by the entity assigned the Service Area (or developed under a contract with that entity). If in a High Priority Area, but outside of a Service Area or Planning Area, development of a sanitary district, wastewater improvement district or private utility should be *encouraged*. It is usually more cost-effective in the long- term to delay proposed development until new facilities are complete. However, if unwilling to delay development, an initial phase can be developed under Options #4 and #5.	This option includes septic systems and alternative on-site systems. Both new or replacement individual on-site wastewater systems should be restricted by local ordinance to: • Lots larger than 1 acre with adequate site conditions for the individual on-site wastewater system and a replacement system • Situations where sewer lines are not available If unwilling to delay development until sewer lines are available, individual on-site systems could be used in a "first phase" of development if: • Dry sewer lines are constructed to facilitate connection to a future sewer line; and • A local ordinance requires property owners to connect to sewers when they become available, and a mechanism is in place to notify future property owners of this requirement.	These privately owned facilities may be an option only when sewer lines are not yet available. In a Service Area, this is another alternative to delay development until sewer lines are available under a "first phase" of development if: • There is a written agreement with the WWTP to connect to the collection system when sewer lines become available and properly decommission the treatment system. (This may also require local ordinances.)
All Other Areas	If feasible, modify the Service Area and connect to the sewer lines. This would require Public Hearing, Consistency Review and possibly revision of the utility's operations plan. (Not a likely option)	If feasible, modify the Service Area and connect to the sewer lines. This would require Public Hearing, Consistency Review and possibly revision of the utility's operations plan.	If feasible, establish a Service Area and initiate development of a **new WWTP and collection system.** Establishment of a Service Area may require certification as a DMA or WMU.	A good option on lots larger than 1 acre with no limiting site conditions for conventional systems.	Centralized on-site wastewater treatment facilities include "package plants" and communal septic systems which may be a good option where sewer lines are not available and limiting site conditions restrict use of conventional septic systems. Establishment of a Service Area may require certification as a DMA or WMU.

TABLE 5.2
GUIDANCE FOR SELECTING WASTEWATER TREATMENT SYSTEMS BASED ON DISTANCE

Type of Development	Distance from Existing Sewer Line or WWTP			
	< 300 feet	301 feet – 1 mile	1 mile – 2 miles	> 2 miles
New Single Lot	Tie in	Septic	Septic	Septic
Failed On-site System (Septic System)	Tie in	Replace Septic	Replace Septic	Replace Septic
New Development with Lots > or = 1 acre	Tie in	Septic Tie in if > 50 lots	Septic Tie in if > 100 lots	Septic
New Development with Lots < 1 acre	Tie in	Tie in	Tie in	Satellite Plant

5.4 DESIGNATED MANAGEMENT AGENCIES & WASTEWATER MANAGEMENT UTILTIES

Designated Management Agencies (DMAs)
According to the Clean Water Act (Section 208(c)(l)), a DMA is an existing or newly-created local, regional, or state agency or political subdivision that has water quality issues, as a result of urban-industrial concentrations or other factors. An incorporated municipality, sanitary district, or wastewater improvement district that will be a public wastewater utility needs to be certified as a DMA. ADEQ and EPA must certify that a proposed DMA has the authority and capacity to carry out the functions of the DMA.

Before a new wastewater treatment facility is established and people become dependent on the public wastewater utility, the proposed utility needs to be able to demonstrate that it has the long-term capability to provide adequate services into perpetuity. In doing so the proposed utility is committed to implementing the CAG 208 Plan (**Strategy 1.1.A.**). Service extending beyond a DMA boundary does not establish any DMA or planning authority.

Wastewater Management Utilities (WMUs)
Many privately owned utilities operate and function similar to a DMA, but because a private utility is not a local, regional or state agency or a political subdivision, a privately owned utility cannot be certified as a DMA. However there is still the need for privately owned utilities to demonstrate the capacity, resources, and commitment to the CAG 208 Plan in order to carry out their functions as if they were a DMA. For example, a privately owned utility normally serves multiple landowners and may need to expand facilities or collection systems in order to provide the service to all properties in its designated service area. Hence, the WMU needs to take on many functions of a DMA and therefore will need to demonstrate legal, financial, and managerial capabilities before the establishment or expansion of facilities can be approved. WMUs must also provide a 20-year future growth plan and coordinate with neighboring DMAs and other WMUs that will implement other strategies in the CAG 208 Plan in high priority areas. By becoming a WMU, privately owned utilities assure the treatment of wastewater for the long-term and help support regional planning efforts (**Strategy 1.1.A.**).

A WMU however does not have the same territorial advantages as a DMA. A WMU through the CAG 208 Plan, may only hold exclusive rights within their service area that is identified within their Certificate of Convenience of Necessity (CC&N) that is approved by the Arizona Corporation Commission (ACC). The CAG 208 Plan will recognize, upon approval, a WMU's Planning Area beyond what their CC&N has granted them for regional coordination efforts. However the CAG 208 Plan will not grant exclusive rights to Planning Areas beyond a WMU's CC&N as the WMU legally has no authority to claim such rights. Current privately owned utilities that operate wastewater treatment facilities approved under previous CAG 208 Plan amendments prior to the adoption of this CAG 208 plan, will be considered as WMUs from this point forward and therefore will assume the same guiding principles outlined in this section. Should a WMU's CC&N expand its Service Area, the annual CAG survey of existing facilities, to be updated within **Appendix E**, will capture the changes.

Not all privately owned public wastewater treatment facilities need to be approved as a WMU. A facility serving one owner such as a recreational vehicle park, mobile/manufactured home park, motel, hotel, or shopping center might not be functioning as a WMU and likely would not be able to fulfill the requirements of a WMU. A wastewater facility serving all lots within a small subdivision would also not be functioning as a WMU. However, before this private facility can expand its service or collections systems beyond its defined neighborhood, it needs to be approved as a WMU.

***Functions of a DMA* – Pursuant to the CWA, Section 208(c)(2), a DMA must be able to:**

- Carry out appropriate portions of a regional 208 Plan.
- Manage effectively waste treatment facilities and related facilities in conformance with the 208 Plan (see note below about related facilities).
- Design, construct, operate, and maintain new and existing wastewater treatment facilities, directly or by contract, as required by any plan established to fulfill Section 208 planning requirements (see note below about any plan).
- Accept and utilize grants or other funds from any source for waste treatment management purposes.
- Raise revenues, including assessment of waste treatment changes.
- Incur short-term and long-term indebtedness.
- Assure in the implementation of the regional 208 Plan that each participating community pays its proportionate share of treatment costs.
- Refuse to receive any wastes from any municipality or subdivision which does not comply with any provisions of an approved plan established to fulfill Section 208 planning requirements (see note below about an approved plan).
- Accept industrial wastes for treatment.

To clarify this list:

"***Related facilities***" would include collection systems and effluent/biosolid disposal methods.
"***An approved plan***" or "***any plan***" established to fulfill Section 208 planning requirements would include both the CAG 208 Plan and any adopted wastewater plans of a DMA or WMU submitted in response to the CAG 208 Plan's requirements.
"***Accept industrial wastes for treatment***" also indicates that the entity needs the ability to require pre-treatment of wastewater entering the collection system.

The Code of Federal Regulations further requires that DMAs must be able to demonstrate the legal, financial, and managerial capabilities to implement both this Plan and any plans the DMA submits in response to the CAG 208 Plan.

Responsibilities of a DMA or WMU

Becoming a DMA or WMU requires making a commitment to implement the strategies in the CAG 208 Plan. Strategies in a 208 Plan must also address nonpoint source issues and controls and help implement load reductions established in a TMDL. Therefore, becoming a DMA or WMU requires making a commitment to help manage and control a nonpoint source pollution, which includes pollutants carried by stormwater and pollutants associated with activities such as agriculture, construction, urban development, roads, mining, recreation, and septic systems. The DMA or WMU is also making a commitment to participate in the development and implementation of a TMDL Implementation Plan (TIP) or other watershed improvement plan.

Establishment of a DMA or WMU

The process for certification of a DMA or establishing a WMU requires the applicant to file a CAG 208 Plan Amendment and not a CAG 208 Planning Project. The request would either be from one of the defined agencies mentioned earlier in this section that needs to be certified as a DMA, or a privately owned utility looking to construct a new wastewater treatment facility that will need to be established as a WMU. Certification for an agency seeking DMA status is necessary to demonstrate that it has the long-term capability in providing adequate services in perpetuity. As defined earlier in this section, a privately owned utility company cannot obtain a DMA status and therefore establishes themselves as a WMU. Section **5.10**, **STEP 6: 208 PLAN AMENDMENTS**, provides a summarization of the CAG 208 Plan Amendment process. A flow chart in **Appendix C2** for CAG 208 Plan Amendments also illustrates this process.

Approval of a new DMA or WMU would be considered an automatic update of the Plan, and website information and databases will need to be updated.

De-designation of a DMA or WMU

ADEQ can withdraw or modify the designations if:

- The DMA/WMU requests such cancellation in writing.
- The DMA/WMU fails to meet its management or planning requirements as specified in grant agreements, contracts, or memorandums of understanding (MOUs).
- The DMA/WMU no longer has the resources or commitment to continue water quality management or planning activities within its designated boundaries.

When the DMA or WMU is de-designated, ADEQ assumes the roles and responsibilities for that area. However, de-designation of a DMA or WMU is not that easy. The two counties in the CAG Region do not have the authority and resources to manage a wastewater treatment facility. A.R.S. § 11-264 states only counties with a population between one million and two million persons may purchase, construct or operate a sewage system. The purpose of establishing a DMA or WMU before construction or expansion of a facility is to assure that it has the resources and capability to provide these services and to fulfill planning responsibilities into perpetuity.

5.5 STEP 1: CAG PRE-APPLICATION MEETING

The CAG Pre-Application Meeting is the first step for an applicant to present the base information of their proposal with CAG staff. This step allows the applicant and CAG staff to review the broad scope of the proposal. The meeting will help determine if their proposal will be a CAG 208 Planning Project to be evaluated to be listed in **Appendix E** or a CAG 208 Plan Amendment. However, this determination might not be present until **STEP 3: CONSISTENCY REVIEW PROCESS** in section **5.7**. Prior to initiating a Pre-Application meeting, the applicant may choose to view CAG's website to view or request service or planning area maps to strengthen any given proposal.

Discussions within a Pre-Application Meeting will consist of but not limited to the following:

- Applicant / Utility Company Contact Information
- Consultant information
- Type of 208 Planning Project or Amendment being proposed
    - New Treatment Works
    - Expansion / Change in Service Area
    - Increase in Existing Facility Capacity
    - Addition / Change in discharge location(s)
    - New Designated Management Agency
    - DMA Boundary Modification
    - Request for New AZPDES Permit
    - Change in Ambient Water Quality / TMDL
- Facility Type
- Treatment Method
- Capacity
- Effluent Classification
- Current & Anticipated Flow Compositions
- Effluent Disposal Methods & Treatment Methods
- Geography / Political Boundaries
- Current & Projected Land Uses
- Current & Projected Population
- Fee Structure of Type of Submittal
    - CAG 208 Planning Project
    - CAG 208 Plan Amendment
- Identify the List of Stakeholders in Affected Area
    - *If there is state trust land within the project proposal, the Arizona State Lands Department (ASLD) effectively becomes a stakeholder and requires a 60 day review period of the CAG 208 Planning Project or Plan Amendment proposal internally. The ASLD is an Ex Officio, as an advisory member for CAG's Environmental Planning Committee.*

After reviewing the base information the applicant can then officially submit a CAG 208 Planning Project or Plan Amendment.

5.6 STEP 2: STAKEHOLDER MEETING(S)

Stakeholders will have been identified within the Pre-Application phase at this point if not sooner. CAG will convene all of the identified affected stakeholders to discuss the first draft plan proposal from within the 208 Planning Project or Plan Amendment. No less than two (2) weeks prior to the meeting, each stakeholder will receive a copy of the plan to review. The purpose of the stakeholders meeting would be to provide input focused on the technical aspects and completeness of the first draft proposal before moving forward in the CAG 208 process. The goal is to obtain 100 percent agreement of the stakeholders by a "Letter of Support or No Objection" received by CAG within 30 days (60 days for ASLD) from the meeting date in order to identify and resolve any issues prior to taking the proposal for a public hearing.

In the event that a 100 percent agreement is not reached, any affected stakeholders that are in objection and will not provide a "Letter of Support or No Objection" received by CAG within the 30 days (60 days for ASLD) from the stakeholders meeting, the objector(s) will need to issue a "Letter of Objection" sent to CAG stating the nature of the objection. The applicant can then decide to move forward through an "Appeals Process" only if the objector, or objectors comprise a minority representation of the overall stakeholders.

If a stakeholder does not provide a "Letter of Support or No Objection" or a "Letter of Objection" received by CAG within 30 days (60 days for ASLD) from the initial stakeholders meeting, they forfeit their opportunity to object as a stakeholder and allow the applicant to move forward in the process. Once all required letters are received, the applicant can move forward to the next step of the CAG 208 Process, **STEP 3: CONSISTENCY REVIEW PROCESS** in section **5.7**.

In the event an "**Appeals Process**" is initiated by the applicant, the following steps will be taken:

1. *The applicant and those objecting will work for no more than 90 days to resolve outstanding issues. All stakeholders will meet a minimum of once per 30 days until the issue is resolved. CAG will function as the facilitator in these discussions.*

2. *If the parties can resolve outstanding issues, a "Letter of Support or No Objection" will be issued by the stakeholder(s) and received by CAG by the end of the 90 day period.*

3. *In the event a resolution is not reached, the stakeholder(s) objecting will issue an updated "Letter of Objection," sent to CAG, noting their specific objections to the proposal.*

4. *If the stakeholder(s) will not provide a "Letter of Support or No Objection" or an updated "Letter of Objection" and is not received by CAG within the 90 day period, the initial objection will be nullified.*

5. *After all letters have been obtained, "Letter of Support or No Objection" or "Objection," the applicant can proceed through the CAG 208 process to* ***STEP 3: CONSISTENCY REVIEW PROCESS*** *in section* ***5.5****.*

IDENTIFYING STAKEHOLDERS

Stakeholders are identified as anyone who is potentially affected by the CAG 208 Planning Project or CAG 208 Plan Amendment proposal within the CAG Region.

Stakeholders are identified as, **but not limited to** the following:

- Neighboring Municipalities / DMAs
- Neighboring Sanitary Districts
- Neighboring Native American Communities
- Neighboring Private Facilities
- Arizona State Lands Department (if applicable)

As mentioned in Section **5.5** of this chapter, if state trust land is involved or potentially affected, then the Arizona State Lands Department (ASLD) requires a 60 day review period of the CAG 208 Planning Project or CAG 208 Plan Amendment proposal internally.

5.7 STEP 3: CONSISTENCY REVIEW PROCESS

The Consistency Review Process is designed to facilitate regional wastewater coordination by:

- Encouraging communication among government agencies during the application review process;
- Consideration of broader, potential area-wide impacts, other than the permit review process;
- Encouraging the development of infrastructure that achieves desired economies, conservation of resources, cross-jurisdictional cooperation; and
- Providing earlier opportunities for public involvement in the decision process other than the permit review process.

In the past, Consistency Reviews frequently resulted in Plan Amendments and extensive public review, a process that would generally cost the developer or municipality a great deal of money and time by taking up to a year or more to complete. This Plan introduces a new process that would cut the costs and time needed, where the strategic plan and a Wastewater Treatment Options Table provide clear criteria for acceptable wastewater infrastructure development. Some proposals may still need a CAG 208 Plan Amendment, but they would be rare.

Instead of using the Plan Amendment Process to keep an accurate inventory of wastewater facilities, the inventory will be updated annually based on Consistency Reviews and facility surveys performed throughout the year. A database of existing wastewater treatment facilities is included in this CAG 208 Plan, and a similar database of those applicants seeking Consistency Review will be developed and made available to all interested parties on the CAG website. The applicants seeking Consistency Review to obtain permit approval for a new facility will be added to the wastewater facilities database. Those applicants seeking increased treatment capacity or similar changes will have their information updated in the wastewater facilities database. Thus, the inventory will become a tool, not the outcome of planning.

ADEQ, in conjunction with CAG, will continue to make the official Consistency Review determination when a review is required. CAG 208 Planning Project and Plan Amendment proposals that require Consistency Reviews will be measured against the Wastewater Treatment Options Table (**TABLE 5.1**) and other strategies in the CAG 208 Plan.

When proposed CAG 208 Planning Projects are consistent with the CAG 208 Plan, revisions to the CAG 208 Plan are not needed and the process is quickly completed. If CAG 208 Planning Project proposals are inconsistent with the CAG 208 Plan, they can be revised and resubmitted. This would put the technical review process on hold until revisions are complete and are viewed as consistent to the CAG 208 Plan. Once the CAG 208 Planning Project proposal is consistent with the CAG 208 Plan, the applicant can then proceed to **STEP 4: PUBLIC HEARING PROCESS** in section **5.8**.

The other option is to propose a CAG 208 Plan Amendment describing why the proposal should be approved despite being inconsistent with the current CAG 208 Plan. The EPC would then review the basis for amending the CAG 208 Plan before moving forward with the plan. If this option is accepted by the EPC, the applicant will follow the process for a Plan Amendment to the CAG 208 Plan described in **STEP 6: 208 PLAN AMENDMENT** in section **5.10**.

Not all wastewater permit applications will require Consistency Review. During the early administrative review phase of the permitting process, ADEQ will determine whether a formal Consistency Review is required. Review is dependent on whether combined design flows to a wastewater treatment facility will be above or below 24,000 gallons per day (gpd). In determining the wastewater flows, all wastewater flows on the subject property are considered. **Appendix D** represents when a Consistency Review will need to be performed and submitted to ADEQ with the appropriate application form unless specifically exempted. All CAG 208 Planning Projects and CAG 208 Plan Amendments will require a Consistency Review. When a consistency review is not required, ADEQ would be in contact with CAG staff and make that determination.

5.8 STEP 4: PUBLIC HEARING PROCESS

The public hearing process gives the public an opportunity to learn about potential wastewater development and express their concerns during the application review process. Public comments are used to inform the EPC of issues during the Consistency Review in order for the committee to have a more informed decision. This public hearing process fulfills federal requirements for public participation established in 40 CFR § 25. If ADEQ, in conjunction with CAG, determines that a proposal is inconsistent with the CAG 208 Plan

during the Consistency Review process, the public hearing process will be delayed until the proposal is consistent with the CAG 208 Plan or have approval from the EPC to amend the CAG 208 Plan (See **STEP 6: 208 PLAN AMENDMENTS** in section **5.10**).

The Public Hearing Process is outlined below:

1. *A Public Hearing Notice will be issued in a local newspaper, informing the public on any given CAG 208 Planning Project and/or CAG 208 Plan Amendment proposals at least 45 days in advance. The notice will also be on CAG's website at least 30 days prior to the Public Hearing and will include:*
    - *A brief description of the proposal*
    - *Copy of the Public Hearing Notice*
    - *Copy of the Public Hearing Notice Affidavit*
    - *Current Draft of the proposal to download*
    - *Instructions on how to submit comments*

2. *Written notice to identified stakeholders, CAG EPC members, CAG Management Committee, CAG Regional Council, and any other interested parties.*

3. *At least 30 days will be given for comments from the public leading up to the day of the Public Hearing. Comments can be in writing, email, or by phone to CAG staff.*

4. *Upon the expiration date of the Public Hearing, CAG will collect and note all comments that were submitted into documentation for the EPC to review.*

At the end of the Public Comment Process, CAG will provide a summary of comments to each remaining review body based on the type of proposal, until a final submittal is given to ADEQ.

5.9 STEP 5: CAG ENVIRONMENTAL PLANNING COMMITTEE

CAG's Environmental Planning Committee (EPC) is one of CAG's standing committees. The function of the EPC is to provide technical support to the CAG Regional Council on environmental issues in general. However the EPC's main function is to review the Consistency Review reports and comments from the comment period, provided by CAG staff, to ensure that a CAG 208 Planning Project or CAG 208 Plan Amendment proposal is consistent with the CAG 208 Plan.

The Committee can consist of the following representatives, but is not limited to the following representations:

- Public Officials representing the CAG member entities
- Other Public Officials or Representatives that may be affected by Regional Water Quality Standards
- Federal, State, or Local Agencies that deal with Water Quality Issues
- Private Citizens

The EPC would be the body within the CAG 208 process to approve any CAG 208 Planning Projects that are viewed as consistent with the CAG 208 Plan. The rationale for the EPC to become the deciding body for approval on CAG 208 Planning Project proposals is that it was deemed unnecessary for the Regional Council to review proposals that meet the goals and strategies that they had approved when approving the CAG 208 Plan. Once the EPC approves a CAG 208 Planning Project proposal, the proposal would then move straight to the State Water Quality Management Working Group (See **STEP 7: STATE WATER QUALITY MANAGEMENT WORKING GROUP** in section **5.11**).

The EPC would be a recommending body within the CAG 208 process for a CAG 208 Plan Amendment proposal as the final decision will be made at the Regional Council. Since the CAG 208 Plan was approved by the Regional Council, a CAG 208 Plan Amendment would need to be reviewed and approved by the Regional Council before forwarding the proposal to the State Water Quality Management Working Group, as changes were made to the original approved document. (See **STEP 6: 208 PLAN AMENDMENTS** in section **5.10**).

5.10 STEP 6: 208 PLAN AMENDMENTS

The approval of a CAG 208 Plan Amendment requires a much lengthier process than a CAG 208 Planning Project proposal. CAG 208 Plan Amendments follow the same steps outlined in this chapter with the exception that the EPC would not have the final decision before it reaches the State Water Quality Management Working Group. The EPC would exercise their duty to provide technical support to the CAG Regional Council in reviewing the Consistency Review reports and comments from the comment period to ensure proposals are consistent with the CAG 208 Plan. The EPC only makes a recommendation for approval to the CAG Management Committee, who then decides to recommend for approval to Regional Council for a final approval. It is then taken to the State Water Quality Management Working Group. Conditions requiring CAG 208 Plan Amendments are represented in **Appendix D**.

This process replaces the CAG 208 Plan Amendment process used in the past. Unlike the 1994 CAG 208 Plan Amendment Process, this CAG 208 Plan will not need to be revised to approve a new wastewater treatment plant or simple changes to an existing facility as they would fall under the process of a CAG 208 Planning Project (exception is the establishment of a WMU). These proposals would go through the Consistency Review Process and Public Hearing Process as described in the previous sections of this Chapter, to assure conformity with the Plan and to allow affected parties to voice their concerns.

Amendment Process

The CAG 208 Plan amendment process is described below:

1. The applicant presents to CAG (the DPA) and ADEQ the base information of their proposal at a **CAG PRE-APPLICATION MEETING** for determination and eligibility to be recognized as a DMA or WMU and to begin identifying affected stakeholders.
2. The applicant submits a 1st draft of the proposal to CAG and ADEQ (via CAG) in preparation for the stakeholder meeting.
3. With CAG facilitation, the applicant will present the proposal to the identified stakeholders at a **STAKEHOLDER MEETING** to seek "Letters of Support" or "No Objection" in order to resolve any potential issues prior to CAG and ADEQ reviewing the document for consistency determination with the overall CAG 208 Plan. If any "Objections" from the stakeholder meeting(s) are filed according to the process of this CAG 208 Plan, an appeals process will begin if the applicant's desire is to continue with the proposal.
4. If the majority of the stakeholders are in support or not in objection to the applicant's proposal through the process established within this CAG208 Plan, CAG and ADEQ will review the proposal in its entirety through the **CONSISTENCY REVIEW PROCESS**. If the majority of the stakeholders are in objection to the applicant's proposal, the Amendment is dead.
5. Once the proposal has been determined to be "consistent" with the CAG 208 Plan, the proposal will be brought before the CAG EPC to decide if the CAG 208 Plan Amendment is necessary. If determined to be necessary and agrees with the consistency review findings, the CAG EPC will provide a "Letter of Support". If EPC does not support the proposal the amendment dies.
6. Following the issuance of the CAG EPC "Letter of Support", the **PUBLIC HEARING PROCESS** will then begin, hosting at least one public hearing in the county (or counties) within the

general area of the proposal. A 45-day publication of the notice and a 30-day comment period leading up to the hearing is required.

7. CAG would submit the Public Hearing meeting minutes and all public comments back to the **CAG EPC**, along with the proposal, to be viewed for recommendation for approval by Regional Council (*Additional opportunity for public comments*).
8. Pending CAG EPC approval recommendation, CAG forwards all pertinent information regarding the applicant's proposal to the **CAG MANAGEMENT COMMITTEE** for review for recommendation for approval by Regional Council (*Additional opportunity for public comments*).
9. Pending CAG Management Committee approval recommendation, CAG forwards all pertinent information regarding the applicant's proposal to the **CAG REGIONAL COUNCIL** for review for approval (*Additional opportunity for public comments*).
10. Pending CAG Regional Council approval, CAG forwards all pertinent information regarding the applicant's proposal to the **STATEWIDE WATER QUALITY MANAGEMENT WORKING GROUP (SWQMWG)** for review for recommendation of approval to **ADEQ** (*Additional opportunity for public comments*).
11. Pending SWQMWG approval recommendation, CAG forwards all pertinent information regarding the applicant's proposal to **ADEQ** for approval. ADEQ, as the Governor's designee for the 208 Program, then engages a final review of the proposal and pertinent information collected through the process and approves the CAG 208 Plan Amendment for submittal to the EPA.
12. Pending ADEQ approval, ADEQ submits all pertinent information to **EPA** for approval. According to Section 208(c)(1), EPA then has 120 days to accept the proposed CAG 208 Plan Amendment. Upon EPA's approval of the amendment, the CAG 208 Plan is automatically revised to reflect the changes.

A flow chart illustrating an overview of the CAG 208 Plan Amendment process is shown in **Appendix C2**.

5.11 STEP 7: FINALIZATION OF A CAG 208 PLANNING PROJECT OR CAG 208 PLAN AMENDMENT.

State Water Quality Management Working Group (SWQMWG)

The Statewide Water Quality Management Working Group is an advisory committee to the Arizona Department of Environmental Quality's Surface Water Permits Unit. The Working Group includes Section 208 Designated Planning Agencies (DPA), as well as several other state agencies.

Each of the DPAs has developed a Water Quality Management Plan (208 Plan) for their region. A key responsibility of the Working Group is to make recommendations to ADEQ on 208 plan amendments and to assist with consistency reviews to ensure that new or changed facilities are consistent with 208 plans. Once a CAG 208 Planning Project or CAG 208 Plan Amendment proposal has completed the seven steps outlined in the previous sections, the proposal would go to the SWQMWG to recommend approval to ADEQ.

Arizona Department of Environmental Quality (ADEQ)

The Arizona Department of Environmental Quality's mission within their Water Quality Division is to protect and enhance public health and the environment by ensuring safe drinking water and reducing the impact of pollutants that are discharged to surface and groundwater. After the SWQMWG recommends approval for a CAG 208 Planning Project or CAG 208 Plan Amendment proposal, ADEQ, the Governor's designee for the 208 Program, will request the following information from CAG:

- Copy of the Proposal
- Summary of the Public Hearing Comments and Recommendations

- Meeting Agendas & Minutes from the EPC, Management Committee, and Regional Council
- Copy of the Signed Resolution from CAG's Regional Council for approval
- CD of GIS Maps (*if applicable*)

After receiving the requested documentation, ADEQ internally would seek the needed departmental signatures to either approve the CAG 208 Planning Project proposal or receive authorization to send a CAG 208 Plan Amendment proposal to the Environmental Planning Agency for finalization.

Environmental Protection Agency (EPA)
A CAG 208 Plan Amendment to the CAG 208 Plan would require the EPA's approval before it could become official. According to Section 208(c)(1), EPA would have 120 days to accept the proposed plan amendment. CAG then would implement and incorporate the changes of the proposed CAG 208 Plan Amendment and make it available on the CAG website.

5.12 CAG WEBSITE INFORMATION

The CAG website will incorporate and integrate information from individual wastewater facilities so that information is readily accessible to developers, planners and other interested parties. It will provide an inventory of wastewater systems in the region and a record of Consistency Reviews performed. At a minimum, the website will provide the following information:

- The current version of the CAG 208 Plan;
- The inventory of public and private wastewater treatment facilities (**Appendix E**);
- The Wastewater Treatment Options Table;
- Existing DMA's and WMU's service areas and planning areas;
- Surface waters classified as "impaired" and classified as "outstanding Arizona waters";
- Surface waters with established Total Maximum Daily Loads;
- Wells sampled for nitrate, highlighting wells near or exceeding 10 mg/L (the Arizona Aquifer Water Quality Standards; and
- Other information that may support Consistency Reviews.

Over time, should funding become available to do so, the website may be expanded to include the following additional information:

- Sensitive areas, where on-site wastewater treatment systems may not be appropriate;
- A record of Consistency Reviews performed, which may include information on the proposal such as location, capacity, change in service or planning area, treatment and disposal methods, AZPDES discharge location(s), subdivision information, etc.; and
- A listing of funding sources for water quality management projects.

APPENDIX A: LEGAL AUTHORITIES

Regional water quality management planning and wastewater treatment and disposal practices must conform to established water quality rules and laws. **Appendix A** describes the State and Federal regulations affecting water quality management as of the publishing of this document. Copies of the regulations discussed in this section can be downloaded from the internet at the sites shown in the table below.

TABLE A.1 - WEBSITES FOR LAWS & REGULATIONS

Program	Regulation	Website
Animal Feeding Operations	A.A.C. R18-9-D901 thru D905	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
Arizona Aquifer Protection Permit Program (APP)	A.A.C. R18-9-A201 thru E323	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
	A.R.S. § 49-241 thru § 49-252	http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49
AZPDES Permits	A.A.C. R18-9-A901 thru A909	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
	A.R.S. § 49-255 thru § 49-255.03	http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49
Biosolids and Sludge	A.A.C. R18-9-1001 thru 1015	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
County Planning & Zoning	A.R.S. § 11-801 thru § 11-877	http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=11
General Water Quality	Federal Clean Water Act	http://www2.epa.gov/laws-regulations/summary-clean-water-act
Gray Water	A.A.C. R18-9-719	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
NPDES Permits	Federal Clean Water Act § 402	http://www.epa.gov/owow/wetlands/laws/section402.html
Municipal Separate Stormwater Systems (MS4)	40 CFR § 122.26 - (LG & MD)	http://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol22/pdf/CFR-2011-title40-vol22-sec122-26.pdf
	40 CFR § 122.32 - (SM)	http://www.gpo.gov/fdsys/granule/CFR-2012-title40-vol23/CFR-2012-title40-vol23-sec122-32
	A.A.C. R18-9-A902 A.A.C. R18-9-A909 A.A.C. R18-9-B901 A.A.C. R18-9-B904 A.A.C. R18-9-C901	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
Reclaimed Water – Conveyances	A.A.C. R18-9-601 thru 603	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
Reclaimed Water – reuse	A.A.C. R18-9-701 thru 720	http://apps.azsos.gov/public_services/Title_18/18-09.pdf
	A.R.S. § 49-201 A.R.S. § 49-203 A.R.S. § 49-204 A.R.S. § 49-221 A.R.S. § 49-250	http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49
Regional Water Quality Planning	Federal Clean Water Act § 208	http://epw.senate.gov/water.pdf
	40 CFR § 130	http://www.gpo.gov/fdsys/granule/CFR-2013-title40-vol23/CFR-2013-title40-vol23-part130
	A.A.C. R18-5-301 thru 303	http://apps.azsos.gov/public_services/Title_18/18-05.pdf
Sanitary Districts & Domestic Wastewater Improvement Districts	A.R.S. § 48-1011 thru 1020 A.R.S. § 48-2001 thru 2085	http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=48
Subdivision Certification	A.A.C. R18-5-401 thru 411	http://apps.azsos.gov/public_services/Title_18/18-05.pdf
	A.R.S. § 49-104(B)(11)	http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49
Water Quality Standards, 1. Surface Water 2. Reclaimed Water 3. Aquifers 4. Groundwater 4. Impaired Water ID	1. A.A.C R18-11-101 thru 123 2. A.A.C. R18-11-301 thru 309 3. A.A.C. R18-11-401 thru 408 3. A.A.C. R18-11-501 thru 506 4. A.A.C. R18-11-601 thru 606	http://apps.azsos.gov/public_services/Title_18/18-11.pdf

A.A.C. = Arizona Administrative Code
A.R.S. = Arizona Revised Statues
CFR = Code of Federal Regulations

A.1 LAWS GOVERNING REGIONAL WASTEWATER PLANNING

Clean Water Act and Federal Regulations

Regional water quality management planning is required under Section 208 of the federal Clean Water Act. ADEQ's 208 Program facilitates the review of infrastructure projects to assure they are consistent with the certified regional water quality management plan. The processes developed to implement Section 208 encourage the identification of water quality problems and implementation of strategies to address these problems. Public participation and collaboration among public and private sectors is promoted during all stages of plan development and implementation.

Specific regulations in the Code of Federal Regulations (40 CFR § 130) establish how regional water quality management planning will be conducted.

State Water Quality Management Planning Rules

How regional water quality management will be conducted in Arizona is established in a set of brief rules (A.A.C. R18-5-301 thru 303) and the Continuing Planning Process adopted by ADEQ in 1993. The Continuing Planning Process establishes how state water quality programs will be coordinated and water quality goals will be achieved. ADEQ plans to revise portions of the Continuing Planning Process to adjust to the new model 208 planning process developed for the CAG 208 Plan.

A.2 LAWS GOVERNING WASTEWATER & AGRICULTURE PERMITS

The Federal Clean Water Act strives to restore and maintain the chemical, physical, and biological integrity of the nation's waters by controlling discharges of pollutants. The basic means to achieve the goals of the Clean Water Act is through a system of water quality standards, permits and discharge limitations. Two primary laws, the federal Clean Water Act and the Arizona Aquifer Protection Program, impact sewage treatment facilities through required permits.

Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program

The National Pollutant Discharge Elimination System (NDPES) Program requires permits for activities that discharge pollutants to waters of the United States. This program is established under Section 402 of the Clean Water Act. EPA has delegated authority to ADEQ to operate the NPDES program, which in Arizona is referred to as the Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program. All facilities that discharge pollutants from any point source into a surface water are required to obtain coverage under an AZPDES permit. The program includes individual permits, and general permits for construction, deminimus discharges, and municipal (MS4) and industrial storm water (Multi-Sector General Permit) discharges.

Individual Permits

A wastewater treatment plant that discharges to a surface water requires an individual permit, which lasts no more than five years. The permit addresses effluent limitations, monitoring requirements, reporting requirements, and other special conditions such as best management practices. Applications for new discharges must be made no later than 180 days before the discharge begins. Applications for permit renewals (for existing dischargers) must be made at least 180 days before the existing permit expires. Facilities must be consistent with the appropriate 208 Plan in order to receive a permit.

Multi-Sector General Permit

Industrial sites that discharge stormwater associated with industrial activity are required to have a Multi-Sector General Permit. A Stormwater Pollution Prevention Plan (SWPPP) must be developed for the industrial activities identified in the Multi-Sector General Permit. The SWPPP includes best management

practices that would be implemented to reduce soil erosion, and contain or minimize the pollutants that might be released to surface waters.

The industry also must implement the appropriate sector-specific requirements for wastewater treatment works (a Sector T industry) which are (one of the following):

- *Treatment works treating domestic sewage, or any other sewage sludge or wastewater treatment device or system used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge.*
- *Located within the confines of a facility with a design flow of 1.0 million gallons per day (MGD) or more. Required to have an approved pretreatment program under 40 CFR § 403.*

Construction General Permit

Storm water discharges associated with construction activities (clearing, grading, or excavating) which disturb one acre or more must obtain an AZPDES Construction General Permit. Permit coverage also is required for construction activities that will disturb less than one acre of land if the project is part of a larger common plan of development or sale and the entire project will ultimately disturb one or more acres.

If new clearing, grading, or excavating activities will occur, then a Stormwater Pollution Prevention Plan must be prepared and implemented during the course of construction. The SWPPP must identify such elements as the project scope, anticipated acreage of land disturbance, and the best management practices that would be implemented to reduce soil erosion, and contain or minimize the pollutants that might be released to surface waters.

Pretreatment

As part of an AZPDES Permit, publicly-owned treatment works (POTWs) that discharge five million gallons per day or greater, must provide a pretreatment program to control pollutants discharged to its sewer system from identified Significant Industrial Users. Significant Industrial Users are those businesses that have discharges that significantly impact the sanitary sewage conveyance system or treatment facilities, either because of the discharge amount or certain pollutants in the discharge. Usually the Pretreatment Plan involves permitting the industrial users, discharge limits for certain pollutants, required monitoring and reporting from the industrial user, and enforcement authority for violations. ADEQ must approve the pretreatment plan or its amendments.

Municipal Separate Storm Sewer Systems (MS4s)

State and federal regulations require some municipalities to obtain a permit for their municipal stormwater discharges. These regulations stemmed from national studies, and local findings within Arizona, that showed runoff from urban areas greatly impairs stream ecology and the health of aquatic life. While many of the water courses in Arizona are ephemeral or intermittent, these national regulations still apply.

ADEQ has authority to determine that a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, and storm drains) constitutes an MS4, even if not owned or operated by a municipality.

Aquifer Protection Program

In Arizona, the Aquifer Protection Permit Program (APP) is the major regulatory program aimed at protecting groundwater quality from the disposal of pollutants on land or in subsurface excavations. An APP is needed for any facility that discharges a pollutant to an aquifer, or to the land surface or vadose zone in

such a way that the pollutant might reach the aquifer (A.R.S. § 49-241(A)). Arizona law also establishes a list of facilities considered to be discharging and therefore require an APP (A.R.S. § 49-241(B)):

- *Surface impoundments, pits, ponds, and lagoons;*
- *Solid waste disposal facilities, except for mining overburden and wall rock that has not been subject to mine leaching operations;*
- *Injection wells;*
- *Land treatment facilities;*
- *Septic tank systems;*
- *Point source discharges to navigable waters;*
- *Sewage or wastewater treatment facilities.*
- *Wetlands designed and constructed to treat municipal and domestic wastewater for underground storage.*

The APP program issues both individual and general permits. On-site wastewater (septic) treatment systems are covered by general permits. Larger on-site wastewater systems, from 3,000 to less than 24,000 gallons per day, also usually obtain a general permit. Permitting for most on-site wastewater treatment general permits is delegated to the counties.

Proposed wastewater treatment plants must be consistent with the appropriate 208 Plan in order to receive an individual permit (A.A.C. R18-9-A201(B)(6)). A person constructing a new on-site wastewater septic system must connect to a sewage collection system if the on-site wastewater treatment facility is located within an area identified for connection to a sewage collection system in a 208 Plan (A.A.C. R18-9-A309(A)(5)).

Nitrogen Management Area

An area designated by ADEQ where prescribed measures to control nitrogen will be enforced because cumulative discharges of nitrogen threaten to cause or have caused an exceedance of the Aquifer Water Quality Standard for nitrate (10 mg/L).

Within a Nitrogen Management Area:

- *An on-site wastewater treatment facility (including septic systems) must employ one or more alternative technologies allowed under APP rules that achieve a discharge level containing not more than 15 mg/L of total nitrogen.*
- *Delegated authority for wastewater permits to the county may be rescinded.*
- *Agricultural operation must use the best control measure necessary to reduce nitrogen discharge.*
- *ADEQ may require the owner or operator of an impoundment liner to reassess its performance.*
- *Entities must comply with any special provisions established to reduce nitrogen loading to groundwater.*

Nitrogen Management General Permits

The application of nitrogen fertilizer and operation of a concentrated animal feeding operation also regulated under a general APP Permit (A.A.C. R18-9-401 thru 404). These rules indicate best management practices applicable to controlling nitrogen impacts to ground water.

Grazing General Permit

An entity that engages in livestock grazing and applies any voluntary best management practices to maintain soil cover and prevent accelerated erosion, nitrogen discharges, and bacterial impacts to surface water is issued a Surface Water Quality General Grazing Permit (A.A.C. R18-9-501).

A.3 LAWS GOVERNING WASTE RESIDUALS

Reuse of effluent

Arizona has regulations that apply to the facility generating wastewater that will be reused and to the site where the reclaimed water is used or applied. Reclaimed water is water that has been treated or processed by a wastewater treatment plant or an on-site wastewater treatment facility. The facility providing the reclaimed water must have an individual APP indicating the class of reclaimed water it generates (A.A.C. R18-9-703(A)). The APP requires the facility to monitor the effluent quality to ensure that the effluent limitations for the particular reclaimed water class are met.

Reclaimed Water Quality Standards (A.A.C. R18-11-301 thru 309) establishes five classes of reclaimed water expressed as a combination of minimum treatment requirements and a limited set of numeric reclaimed water quality criteria.

- Class A reclaimed water is required for reuse applications where there is a relatively high risk of human exposure to potential pathogens in the reclaimed water.
- Class B or C reclaimed water is acceptable for uses where the potential for human exposure is lower.
- Class A+ and Class B+ reclaimed water have received treatment to produce water with a total nitrogen concentration of less than 10 mg/l. These categories of reclaimed water will minimize concerns over nitrate contamination of groundwater beneath sites where reclaimed water is applied. As a result, the general permits for the direct reuse of Class A+ and Class B+ reclaimed water do not include nitrogen management as a condition of the reuse.

Reusing reclaimed water is governed by various general permits (A.A.C. R18-9-708).

Ground Water Recharge

Injecting treated effluent into the vadose zone or aquifer would require an APP General Permit. The type of permit would depend on the method of recharge and the available uses of the recharged water (A.R.S. § 49-245.02). APP rules also establish the requirements for recharge/disposal through wetlands.

Gray Water

"Gray water" means wastewater collected separately from a sewage flow that originates from a clothes washer, bathtub, shower, and sink, but does not include wastewater from a kitchen sink, dishwasher or toilet. Use of gray water and harvesting rainwater for watering landscape, instead of using potable water, is encouraged as a way to conserve limited water resources in an arid climate. The use of gray water is regulated under an APP general permit (A.A.C. R18-9-719).

Biosolids and Sewage Sludge

Sewage sludge is the solid, semisolid or liquid residue that is generated during the treatment of domestic sewage in a wastewater treatment plant. Biosolids is that part of sewage sludge that is placed on, or applied to the land to use the beneficial properties of the material as a soil amendment, conditioner, or fertilizer. Use and disposal of sewage sludge and biosolids is regulated under AZPDES Permit requirements. Treated biosolids produced by a facility can be applied to agricultural fields, mining reclamation, or landscaping provided that all applicable regulations are followed.

In Arizona, sewage sludge that is not applied as biosolids must be disposed of through a surface disposal site (e.g., landfill) that complies with 40 CFR § 503(C), and obtains an APP. Grit and other materials generated during preliminary treatment are considered solid waste and must be disposed of accordingly.

Biosolids processing facilities are also subject to rules governing hazardous waste (Resource Conservation and Recovery Act (RCRA)). In Arizona, RCRA is implemented by ADEQ's Waste Programs Division,

which is responsible for permitting facilities that treat, store or dispose of hazardous waste and for approving solid waste facility plans.

A.4 LAWS GOVERNING LOCATION

Subdivision Approval

Prior to sale or lease of subdivided lands, the Arizona Department of Real Estate requires ADEQ to issue a Certificate of Approval for Subdivisions (A.R.S. §49-104(B)(11)). To issue this certification, ADEQ must determine that the subdivision will have adequate drinking water, wastewater disposal, and refuse disposal as established in A.A.C. R18-5-401 thru 411.

If the proposed subdivisions will use on-site wastewater treatment systems, the applicant must demonstrate through geology, soils, and design reports that all lots have acceptable site conditions and adequate lot sizes. The County Health Department must also provide a statement of agreement to the use of individual on-site systems. Where the on-site wastewater system is to be installed on each lot is the lot owner's responsibility when they build the system.

If the subdivision is to connect to a wastewater treatment plant, a Treatment Plant Capacity Assurance statement must be provided by the treatment plant. This statement must affirm that service to the subdivision will not cause the design flow of the facility to be exceeded nor any permit limits for the facility to be exceeded. If the subdivision's sewage collection system will not discharge directly to a wastewater treatment facility, Capacity Assurance for Sewage Collection System must be provided by the operator of the collection system(s).

Clean Water Act Section 404 Permits and 401 Certification

Section 404 of the Clean Water Act identifies conditions for when a permit is required for placing fill or dredged material into waters of the United States. The U.S. Army Corp of Engineers is responsible for administering the 404 permit program. If a federal permit is required for a project, a state-issued Clean Water Act section 401 certification of the permit will be required. The U.S. Army Corps of Engineers includes the conditions of the Clean Water Act 401 certification as requirements of its Section 404 permit to ensure that the permitted activities do not result in a violation of the State's surface water quality standards.

Particular Surface Waters

Listing as an impaired water or as an Outstanding Arizona Water, or having a Total Maximum Daily Load established by ADEQ may impact permits by limiting the amount of certain pollutants that can be discharged to the surface water.

Impaired Waters

Under Section 303 of the Clean Water Act, states are required to adopt surface water quality standards that preserve and protect the quality of navigable waters. Section 303(d) of the Clean Water Act requires that the Department identify and list waters that do not meet one or more of the surface water quality standards. Waters that do not meet an applicable water quality standard are impaired (A.R.S. § 49-232). No further degradation of water quality is permitted in impaired surface water (A.A.C. R18-11-107). This must be considered for AZPDES permitted discharges to the surface water and APP permitted discharges to the ground that might impact surface water quality.

Total Maximum Daily Load (TMDL)

Based on the 303(d) impaired waters list, the Clean Water Act requires that a Total Maximum Daily Load (TMDL) analysis be conducted. A TMDL is the maximum daily amount of the pollutant loads from natural sources, non-point sources and point-source discharges of the pollutant that can be carried by a surface water without causing an exceedance of a water quality standard (A.R.S. § 49-234). TMDLs are one of the required elements that must be included in 208 Plans or referenced as part of the Plans.

Outstanding Arizona Water (OAW)

ADEQ can classify a surface water as an OAW because of its unique attributes, such as the geology, flora and fauna, water quality, aesthetic value, or the wilderness characteristic of the surface water, or an endangered or threatened species is associated with the surface water and the existing water quality is essential to the species.

Floodplains

Under A.R.S. § 48-3609(C), and the Arizona Department of Water Resources interpretation, waste disposal systems must not be installed in a regulatory floodway, which ADWR defines as the area officially declared a floodway by a county flood control district or incorporated community.

APPENDIX B: GLOSSARY OF TERMS

TERM	DEFINITION
208 Plan	A regional water quality management plan developed in accordance with Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) – AKA the "Clean Water Act".
A.A.C.	Arizona Administrative Code (State Rules).
ADEQ	Arizona Department of Environmental Quality.
Adequate Capacity	The daily flow not to exceed 100% of the APP Permit design flow for a WWTP.
Anion	Any negatively charged atom or group of atoms.
APP	Aquifer Protection Permit. A state permit required to discharge a pollutant to an aquifer or to the land surface if reasonable probability that the pollutant will reach an aquifer.
Aquiclude	Any geological formation that absorbs and holds water but does not transmit it at a sufficient rate to supply springs, wells, etc.
A.R.S.	Arizona Revised Statutes (State Laws).
AZPDES	Arizona Pollutant Discharge Elimination System. A state permit required to discharge pollutants to a surface water. ADEQ was delegated the federal NPDES permitting program in December 2002.
bls	Below land surface
BMP	Best Management Practices.
Budgeted Capacity	The aggregate wastewater flows expected to be produced by the sum of all the homes, subdivisions and other developments with whom the facility has contracted to provide wastewater treatment services.
CAG	Central Arizona Governments
Capacity	See constructed capacity, design capacity, APP approved capacity, and capacity assurance.
Capacity Assurance	Assurance given in writing to a developer that a wastewater treatment plant has sufficient permitted capacity to accept wastewater from a proposed development. • Capacity assurance cannot exceed 100% of the capacity approved in the APP; • Capacity assurance is required for subdivisions and other APP 4.01 General Permits if estimated combined design flow is more than 3,000 gpd.
Cations	Any positively charged atom or group of atoms.
CFR	Code of Federal Regulations.
Chemigation	The injection of any chemical such as nitrogen, phosphorus or pesticide into irrigation water and applied to the land using the irrigation system.
Communal Facility	A wastewater treatment system used by multiple property owners but is not operated by either a municipal or private utility or considered to be a public utility.

APPENDIX B: GLOSSARY OF TERMS (Continued)

TERM	DEFINITION
CWA	Clean Water Act (Federal Water Pollution Control Act Amendments of 1972 [P.L. 92-500]).
Design Capacity	The engineered design flow capacity of a facility of a facility in an approved 208 Plan.
Design Flow	Daily flow rate a facility is designed to accommodate on a sustained basis while satisfying all APP discharge limitations, treatment, and operational requirements. It incorporates peaking and safety factors to ensure sustained and reliable operation. • Operationally, it is the estimated daily flow from discharges to the plant, based on number and types of connections.
DMA	Designated Management Agency. A local government subdivision that is certified by the ADEQ as having adequate resources and capabilities to design, operate, and maintain wastewater facilities and the desire to implement portions of the CAG 208 Plan. (See also Wastewater Management Utility)
DPA	Designated Planning Agency. The regional or state agency responsible for overseeing 208 planning. Central Arizona Governments (CAG) is the DPA for Pinal and Gila Counties.
EPA	U.S. Environmental Protection Agency.
EPC	Environmental Planning Committee.
EQA	Environmental Quality Act.
Feasible	Relating to **Table 5.1 Wastewater Treatment Options**, economical, physical, and technological constraints established in APP and AZPDES Rules are considered.
Flow	See operational flow, design flow, and AZPDES discharge limit.
gpd	Gallons per day.
gpm	Gallons per minute.
Goal	Within a strategic plan, a goal is the desired outcome in broad and inclusive terms.
Grey Water	Wastewater collected from clothes washer, bathtub, shower, and sink (excluding kitchen sink, and excludes sewage flow from other sources).
Higher Density Area	Areas where the average lot size is less than one acre.
High Priority Area	An area where providing centralized wastewater treatment is a high priority (see Strategy 1.1.B and 1.1.C).
Hydromodification	The alteration of the natural flow of water through a landscape
IGA	Intergovernmental Agreement; A formal agreement between two or more government agencies.
Impaired Water	A surface water that is listed by ADEQ or EPA as not meeting water quality standards or its designated uses.

APPENDIX B: GLOSSARY OF TERMS (Continued)

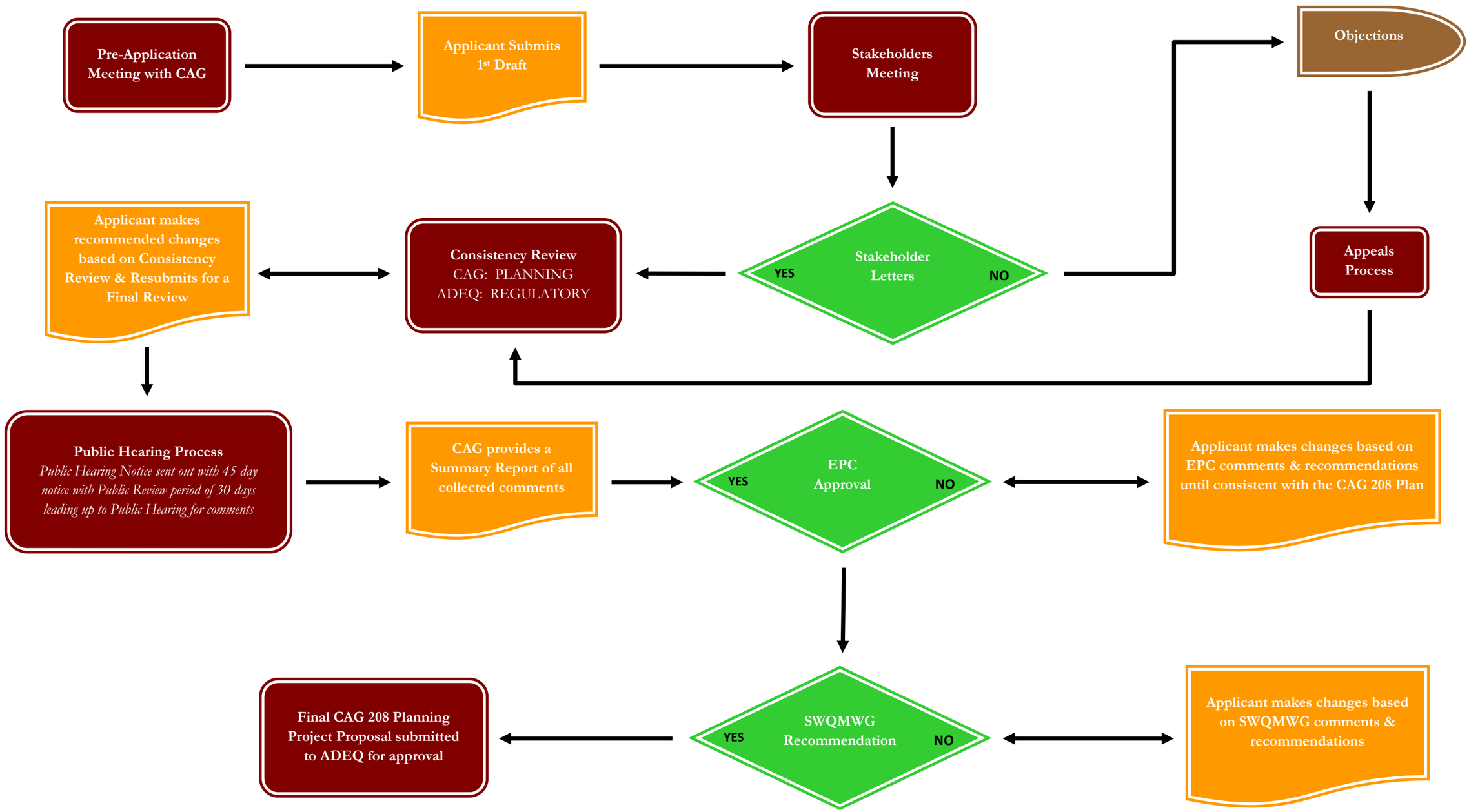
TERM	DEFINITION
maf	Million Acre-Feet
MGD	Million gallons per day.
MOU	Memorandum of Understanding; A formal agreement between two or more governmental or non-governmental entities.
Nitrogen Management	An area designated by ADEQ with specific prescribed measures to control nitrogen sources that threaten to cause or have caused an exceedance of the Aquifer Water Quality Standard for nitrate (10mg/L).
Objective	In a strategic plan, the broad changes needed to achieve a goal.
On-Site Wastewater Treatment System	A conventional septic tank system or alternative system installed to treat and dispose of wastewater predominantly of human origin, generated at the site.
Operational Flow	The maximum monthly average measured flow into a wastewater treatment plant, based on the last 12 months of flow.
Planning Area	For a WMU, the PLANNING AREA is anything beyond their Certificate of Convenience and Necessity (CC&N) used for planning coordination efforts with no exclusive rights granted. For a DMA, the PLANNING AREA is the DMA boundary.
Reclaimed Water	Sewage that has been treated by wastewater treatment plant or on-site wastewater treatment facility.
Satellite Plant	The construction of a small wastewater treatment facility for new development greater than two (2) miles away from an existing regional wastewater treatment facility and is considered to be unreasonable to connect or tie into for the purposes of wastewater collection and processing.
SCS	Soil Conservation Service (through the U.S. Department of Agriculture).
Septic System	A type of on-site wastewater treatment system usually composed of a septic tank and a leaching system. Also referred to as a conventional system.
Service Area	For a WMU, the SERVICE AREA is their Certificate of Convenience and Necessity (CC&N). For a DMA, the SERVICE AREA is the boundary of the existing collection system.
Sewage	Untreated wastes from toilets, baths, sinks, lavatories, laundries, and other plumbing fixtures, and waste pumped from septic tanks (See also GREY WATER).
Sewage Collection System	A system of pipelines, pumping stations, and other structures and devices to collect and convey sewage to the sewage treatment facility or an on-site wastewater treatment facility serving more than a single family dwelling.
Sewage Treatment Facility	A wastewater treatment plant or system and its disposal works. This facility definition excludes an on-site wastewater treatment facility, a sewage collection system, or reclaimed water distribution system. (See also TREATMENT WORKS).

APPENDIX B: GLOSSARY OF TERMS (Continued)

TERM	DEFINITION
Strategy	In a strategic plan, the specific actions needed to accomplish an objective or goal.
SWQMWG	State Water Quality Management Working Group.
TMDL	Total Maximum Daily Load. The calculated maximum load of a water quality parameter which can be carried by a surface water on a daily basis without causing an exceedance of a surface water quality standard. Require if surface water is listed as "impaired."
Treatment Works	A plant, device, unit process, or other works used for treating, stabilizing, or holding municipal or domestic sewage in a sewage treatment facility or on-site wastewater treatment facility (Broad and inclusive term used for wastewater treatment facilities).
Vadose Zone	The part of Earth between the land surface and the top of the position at which the groundwater (the water in the soil's pores) is at atmospheric pressure.
Wastewater Management Utility	A privately-owned centralized wastewater treatment facility and a collection system that provides services to multiple properties and may expand these services or facilities in the future. To be a WMU, ADEQ must certify that the entity has the resources, capability, and desire to function as a DMA.
WIFA	Arizona's Water Infrastructure Finance Authority, a state program for grants and loans for construction of wastewater and drinking water facilities.
WWTP	Wastewater treatment plant.

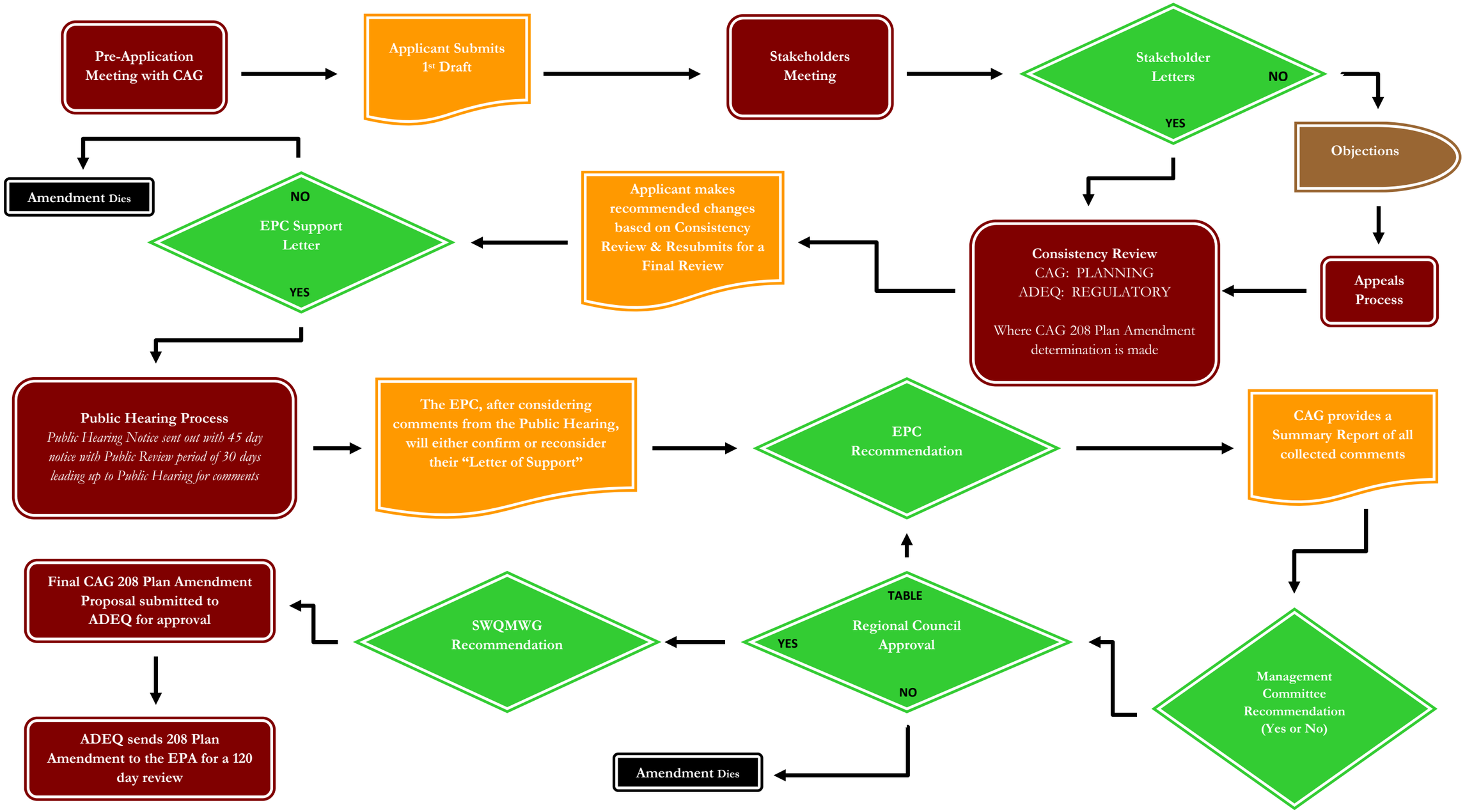
APPENDIX C1: PROCESS FLOW CHARTS

CAG 208 PLANNING PROJECT PROPOSALS



APPENDIX C2: PROCESS FLOW CHARTS (Continued)

CAG 208 PLAN AMENDMENT PROPOSALS



APPENDIX D: COMPARISON OF 208 PLAN CONDITIONS

CONDITION	1994 CAG 208 PLAN	THIS CAG 208 PLAN	
	CAG 208 Plan Amendment	CAG 208 Planning Project	CAG 208 Plan Amendment
Changes in goals, objectives, strategies or tactics.	Yes	No	Yes
Changes in processes established under this CAG 208 Plan.	Yes	No	Yes
Administrative Plan Changes not affecting the goals, objectives, strategies, Wastewater Treatment Options Table, or processes established in this CAG 208 Plan (grammatical errors or textual changes for clarity).	Yes	No	No
New Designated Management Area (DMA) or Wastewater Management Utility (WMU) approval.	Yes	No	Yes
Changes in DMA Planning Area.	Yes	No	Yes
Changes in DMA Service Area outside the DMA Planning Area.	Yes	No	Yes
Changes in DMA Service Area inside the DMA Planning Area.	Yes	No	No
New Wastewater Treatment Facility (WWTF) proposal/construction by a DMA not within an approved CAG 208 Plan Amendment.	Yes	Yes	No
WWTF proposal by a DMA through an approved CAG 208 Plan Amendment under 20 years old without changes.	Yes	No	No
Changes to a WWTF proposal by a DMA through an approved CAG 208 Plan Amendment under 20 years old.	Yes	Yes	No
WWTF proposal by a DMA through an approved CAG 208 Plan Amendment over 20 years old.	Yes	Yes	No
Changes in WMU Planning Area or Service Area.	Yes	No	No
New WMU WWTF proposal/construction (Where a WMU has already been established).	Yes	Yes	No
WWTF proposal by a WMU through an approved CAG 208 Plan Amendment under 20 years old without changes.	Yes	No	No
Changes to a WWTF proposal by a WMU through an approved CAG 208 Plan Amendment under 20 years old.	Yes	Yes	No
WWTF proposal by a WMU through an approved CAG 208 Plan Amendment over 20 years old.	Yes	Yes	No
Expansion of an existing WWTF without a Consistency Review performed through a CAG 208 Plan Amendment within the last 20 years.	Yes	Yes	No

NOTE: The above list represents typical 208 planning situations but does not include all possible situations. Other 208 planning situations not listed may apply and will be individually reviewed for determination.

APPENDIX D: COMPARISON OF 208 PLAN CONDITIONS - (continued)

CONDITION	1994 CAG 208 PLAN	THIS CAG 208 PLAN	
	CAG 208 Plan Amendment	CAG 208 Planning Project	CAG 208 Plan Amendment
Expansion of an existing WWTF with design flows increasing of 10% or more beyond original approved capacity.	Yes	Yes	No
Expansion of an existing WWTF with design flows increasing less than 10% beyond original approved capacity.	Yes	No	No
Expansion of an existing WWTF onto new additional property not identified through an approved CAG 208 Plan Amendment.	Yes	No	Yes
Replacement plant of an existing WWTF that has no prior Consistency Review performed.	Yes	Yes	No
New treatment or disposal methods for an existing or proposed WWTF.	Yes	Yes	No
Changes in effluent quality.	Yes	Yes	No
Changes in effluent discharge location points.	Yes	Yes	No
New or renewed Arizona Pollutant Discharge Elimination Systems (AZPDEZ), Aquifer Protection Permits (APP), or any other type of water quality permits inconsistent with the CAG 208 Plan.	Yes	Yes	No
Proposed new components to a sewage collection system only.	No	No	No
Minor technical corrections to a permit, such as a change of ownership when a DMA or a WMU is not involved.	Yes	No	No
Minor technical corrections to a permit, such as a change of ownership when a DMA or WMU is involved.	Yes	Yes	No
Changes in the Wastewater Treatment Options Table.	-	No	Yes
Individual on-site systems with combined design flow of 24,000 gallons per day (gpd) or more.	Yes	Yes	No
Individual on-site systems with combined design flow less than 24,000 gpd.	No	No	No
Non-domestic sewage treatment facilities (e.g., industrial process wastewater).	No	No	No
Any projects that CAG or ADEQ deems to be environmentally sensitive or potentially controversial.	Yes	Yes	No

NOTE: The above list represents typical 208 planning situations but does not include all possible situations. Other 208 planning situations not listed may apply and will be individually reviewed for determination.

APPENDIX E: CAG 208 INVENTORY

(Last Updated - June 30, 2015)

The **CAG 208 Inventory** should be understood as a living breathing document for its contents are expected to be updated on an annual cycle through the CAG annual survey to ensure accurate information and through potential proposals that are approved. All information has been compiled and derived from various sources and every effort is being made to provide up to date information. CAG makes no assurance that they are 100% accurate, current or complete in its entirety. Information within this appendix should be used strictly for guidance and understanding only. Conclusions drawn from such information are the responsibility of the user. CAG disclaims any liability for injury, damage, or loss that might result from the use or errors from misuse of this information. More detailed information may be obtained by contacting the Arizona Department of Environmental Quality, CAG, individual municipalities, or other responsible parties upon availability. Locational information may represent general location of facility and "(N/A)" represent information "Not Available" (or not available at the time of compilation).

GILA COUNTY FACILITIES

Facility	Facility Location	APP Permit #	AZPDES Permit #	Average Daily Capacity (MGD)	Current Design Capacity (MGD)	Approval Capacity	Effluent Quality	Last Updated CAG 208 Document Year
City of Globe (Pinal Creek) – Wastewater Treatment Plant	150 N Pine St, Globe, AZ 85501	P100692	AZ0020249	(N/A)	1.200	(N/A)	(N/A)	(N/A)
Freeport-McMoran (Lower Pinal Creek) – Wastewater Treatment Plant	LAT: 33d, 31', 1.2579" N / LNG: 110d, 52', .8024" W	103997	AZ0024350	(N/A)	9.360	(N/A)	(N/A)	(N/A)
Hayden – Wastewater Treatment Plant	LAT: 33d, 0', 17.39" N / LNG: 110d, 46', 58.22" W	106225	-	(N/A)	0.080	0.080	(N/A)	2010
Houston Creek Landing – Wastewater Treatment Plant	390 S Granite Ridge Rd, Star Valley, AZ 85541	103676	AZ0025305	(N/A)	0.037	(N/A)	(N/A)	(N/A)
Lake Roosevelt – Water/Wastewater Treatment Plant	LAT: 33d, 40', 1.2214" N / LNG: 111d, 7', 30.6145" W	100819	-	(N/A)	0.045	(N/A)	(N/A)	(N/A)
Miami Wastewater Reclamation Facility	US Highway 60 & SR 188, Miami, AZ 85539	106156	AZ0025909	(N/A)	0.640	0.640	A+	2009
N. Gila County Sanitary District (American Gulch) – Wastewater Treatment Plant	2200 W Doll Baby Rd, Payson, AZ 85541	101541	AZ0020117	(N/A)	2.200	(N/A)	(N/A)	(N/A)
Pine Meadows Utilities, LLC (Pine Meadows) – Wastewater Treatment Plant	LAT: 34d, 17', 33.996" N / LNG: 111d, 6', 6.6935" W	21397	AZ0024783	(N/A)	0.050	(N/A)	(N/A)	(N/A)
Town of Winkelman – Wastewater Treatment Plant	425 W Quarelli St, Winkelman, AZ 85192	101902	AZ0020176	(N/A)	0.120	(N/A)	(N/A)	(N/A)

PINAL COUNTY FACILITIES

Facility	Facility Location	APP Permit #	AZPDES Permit #	Average Daily Capacity (MGD)	Current Design Capacity (MGD)	Approval Capacity	Effluent Quality	Last Updated CAG 208 Document Year
Arizona City Sanitary District – Wastewater Treatment Plant	12922 S Kashmir Rd, Arizona City, AZ 85123	101688	AZ0024244	(N/A)	1.500	(N/A)	(N/A)	(N/A)
Biosphere 2 (Student Village) – Wastewater Treatment Plant	32540 S Biosphere Rd, Oracle, AZ 85739	102464	-	(N/A)	0.025	(N/A)	(N/A)	(N/A)
CCA – Eloy Detention Center – Wastewater Treatment Facility	1705 E Hanna Rd, Eloy, AZ 85131	102749	-	(N/A)	0.613	0.900	A+	2008
CCA – Red Rock Correctional Center – Wastewater Treatment Facility	1750 E Arica Rd, Eloy, AZ 85131	105663	-	(N/A)	0.545	0.545	B+	2006
City of Casa Grande – Wastewater Reclamation Plant	1194 W Kortsen Rd, Casa Grande, AZ 85122	100419	AZ0025178	(N/A)	6.000	14.00	A+	2009
City of Coolidge – Wastewater Treatment Plant	1595 W Coolidge Way, Coolidge, AZ 85128	105911	-	(N/A)	2.000	2.000	(N/A)	2005
City of Eloy – Wastewater Treatment Plant	1750 N Eleven Mile Corner Rd, Eloy, AZ 85131	-	-	(N/A)	2.000	14.000	B+	2007
EJR Ranch – Wastewater Treatment Facility	LAT: 32d, 52', 28.1973" N / LNG: 111d, 37', 33.529" W	105678	-	(N/A)	1.800	(N/A)	(N/A)	(N/A)
Entrada Del Oro – Wastewater Treatment Plant	LAT: 33d, 18', 46.9263" N / LNG: 111d, 22', 5.5566" W	105488	AZ0024899	(N/A)	0.300	0.450	A+	2006
Global Water – Palo Verde (Campus 1) – Wastewater Reclamation Facility	41265 W Hiller Rd, Maricopa, AZ 85138	105228	AZ0025071	(N/A)	9.000	15.000	A+	2003
Global Water – Palo Verde (Campus 2) – Wastewater Reclamation Facility	LAT: 32d, 59', 56.0847" N / LNG: 112d, 4', 0.8028" W	105668	-	(N/A)	13.00	13.00	A+	2005

PINAL COUNTY FACILITIES – (Continued)

Facility	Facility Location	APP Permit #	AZPDES Permit #	Average Daily Capacity (MGD)	Current Design Capacity (MGD)	Approval Capacity	Effluent Quality	Last Updated CAG 208 Document Year
Gold Canyon Sewer Company – Wastewater Treatment Plant	6520 E US Highway 60, Gold Canyon, AZ 85118	100217	-	(N/A)	1.900	1.900	(N/A)	(N/A)
Johnson Utilities – Anthem @ Merrill Ranch – Wastewater Reclamation Plant	LAT: 33d, 3', 4.3259" N / LNG: 111d, 29', 20.6953" W	105646	-	(N/A)	3.000	8.10	A+	2004
Johnson Utilities – Pecan Wastewater Reclamation Plant	38539 N Gantzel Rd, San Tan Valley, AZ 85140	105324	-	(N/A)	4.000	4.000	A+	2006
Johnson Utilities – San Tan Wastewater Reclamation Plant	200 E Hunt Hwy, San Tan Valley, AZ 85143	105325	-	(N/A)	2.000	(N/A)	(N/A)	(N/A)
Johnson Utilities – Section 11 Wastewater Reclamation Plant	LAT: 33d, 6', 3.87" N / LNG: 111d, 30', 15.32" W	103081	-	(N/A)	1.600	(N/A)	(N/A)	(N/A)
Picacho Wastewater Reclamation Plant	6197 W Cornman Rd, Casa Grande, AZ 85194	103890	-	(N/A)	0.250	9.000	A+	2005
Oracle Sanitary District – Wastewater Treatment Plant	3295 W State Highway 77, Oracle, AZ 85623	-	AZ0020681	(N/A)	0.071	(N/A)	(N/A)	(N/A)
Red Rock Water Reclamation Facility	LAT: 32d, 34', 20.9" N / LNG: 111d, 20', 38.96" W	105621	AZ0025143	(N/A)	1.100	3.000	A+	2009
Saddlebrooke Ranch Water Reclamation Plant	LAT: 32d, 35', 56.2482" N / LNG: 110d, 54', 53.9027" W	105334	AZ0024775	(N/A)	0.249	(N/A)	(N/A)	(N/A)
Saddlebrooke Utility Company – Wastewater Treatment Plant	40000 S Ridgeview Blvd, Saddlebrooke, AZ 85739	100356	AZ0022853	(N/A)	0.990	(N/A)	(N/A)	(N/A)
San Manuel – Wastewater Treatment Plant	LAT: 32d, 37', 11.0261" N / LNG: 110d, 37', 4.1365" W	105607	-	(N/A)	0.300	(N/A)	(N/A)	(N/A)
Sandia Water Reclamation Plant	LAT: 32d, 59', 41.0927" N / LNG: 111d, 36', 7.7071" W	105597	-	(N/A)	3.000	3.000	A+	2004
Santa Rosa Water Reclamation Plant	LAT: 32d, 57', 46" N / LNG: 112d, 1', 47" W	105297	-	(N/A)	1.400	4.310	A+	2002
Sunscape Estates – Wastewater Treatment Plant	1083 E Sunscape Way, Casa Grande, AZ 85194	100077	-	(N/A)	0.080	(N/A)	(N/A)	(N/A)
Superior Sanitary District – Wastewater Treatment Plant	101 Airport Rd, Superior, AZ 85173	P100687	AZ0021199	(N/A)	0.750	(N/A)	(N/A)	(N/A)
Superstition Mtns. Comm. Facilities District No 1 – Wastewater Treatment Plant	5661 S Ironwood Dr, Apache Junction, AZ 85120	P102873	AZ0023931	(N/A)	2.140	16.000	B+	2010
Tierra Grande Utility Company	LAT: 32d, 51', 45.439" N / LNG: 111d, 35', .6579" W	P105233	-	(N/A)	0.060	(N/A)	(N/A)	(N/A)
Town of Florence (North Florence) – Wastewater Treatment Plant	100 S Plant Rd, Florence, AZ 85132	100392	AZ0025194	(N/A)	0.428	0.428	(N/A)	(N/A)
Town of Florence – Wastewater Reclamation Facility	100 S Plant Rd, Florence, AZ 85132	100370	AZ0025208	(N/A)	2.500	15.000	A+	2005
Town of Kearny – Wastewater Treatment Plant	501 Veterans Ave, Kearny, AZ 85137	103709	AZ0024449	(N/A)	0.250	(N/A)	B+	(N/A)
Town of Mammoth (Cielo) – Wastewater Treatment Plant	LAT: 32d, 44', 27.84" N / LNG: 110d, 38', 53.78" W	105647	AZ0025470	(N/A)	0.650	(N/A)	(N/A)	(N/A)
Willow Springs – Wastewater Reclamation Facility	LAT: 32d, 43', 43.3037" N / LNG: 111d, 59', 46.2201" W	105855	AZ0025852	(N/A)	0.500	1.500	A+	2005

DESIGNATED MANAGEMENT AGENCIES – (DMAs)

UTILITY COMPANY	CONTACT	ADDRESS	CITY	STATE	ZIP	PHONE
Arizona City Sanitary District	Susan Versluis	P.O. Box 2377	Arizona City	AZ	85123	(520) 466-5203
City of Apache Junction	Bryant Powell	300 E. Superstition Blvd.	Apache Junction	AZ	85119	
City of Casa Grande	Kevin Louis	3181 N. Lear Ave.	Casa Grande	AZ	85122	(520) 421-8625
City of Coolidge	Susanna Struble	355 S. 1st Street	Coolidge	AZ	85128	(520) 723-4882
City of Eloy		1137 W. Houser Rd.	Eloy	AZ	85131	(520) 466-3082
City of Globe	Leon Cons	150 N. Pine St.	Globe	AZ	85501	(928) 425-4959
Cobre Valley Sanitary District	Mary Ann Moreno	P.O. Box 489	Claypool	AZ	85532	(928) 425-7242
Northern Gila County Sanitary District		P.O. Box 591	Payson	AZ	85541	(928) 474-5257
Oracle Sanitary District	John Soule	P.O. Box 215	Oracle	AZ	85623	(520) 896-9091
Pinal Sanitary District	Bob Zacke	5737 S. Miami Gardens Dr.	Miami	AZ	85539	(928) 425-7121
Queen Valley Sanitary District	Jason Scott	281 W. Monte Vista Dr.	Queen Valley	AZ	85118	
Superstition Mountain Community Facilities District	Ed Grabek	879 N. Plaza Dr., Ste. C-101	Apache Junction	AZ	85120	(480) 983-2212
Town of Florence	Wayne Costa	P.O. Box 2670	Florence	AZ	85132	(520) 868-7620
Town of Hayden	Bob Lorona	P.O. Box B	Hayden	AZ	85135	(520) 356-7801
Town of Kearny		P.O. Box 639	Kearny	AZ	85137	(520) 363-5547
Town of Mammoth	Wendy Gort	P.O. Box 130	Mammoth	AZ	85618	(520) 487-2331
Town of Marana	John Kmiec	5100 W Ina Road	Marana	AZ	85743	(520) 382-2500
Town of Miami		500 Sullivan St.	Miami	AZ	85539	(928) 473-4403
Town of Payson	LaRon Garrett	303 N. Beeline Highway	Payson	AZ	85541	(928) 474-5242
Town of Queen Creek	Paul Gardner	22350 S. Ellsworth Rd.	Queen Creek	AZ	85142	(480) 358-3451
Town of Superior	Becky Brothers	734 Main St.	Superior	AZ	85173	(520) 689-5752
Town of Winkelman	Arthur Monterde	P.O. Box 386	Winkelman	AZ	85192	(520) 356-7212

WASTEWATER MANAGEMENT UTILITIES – (WMUs)

UTILITY COMPANY	CONTACT	ADDRESS	CITY	STATE	ZIP	PHONE
Arizona Training Center Children's Colony	Bob Penman	P.O. Box 1467	Coolidge	AZ	85128	(520) 723-4151
CCA – Eloy Detention Center	Paul Vonderharr	10 Burton Hills Blvd.	Nashville	TN	37215	(615) 263-3000
CCA – Red Rock Correction Center	Paul Vonderharr	10 Burton Hills Blvd.	Nashville	TN	37215	(615) 263-3000
Cielo	David Williamson	6420 E Tanque Verde Rd., Ste. 150	Tucson	AZ	85718	(520) 622-8771
Coronado Utilities	Jason Williamson	6825 E. Tennessee Ave., Ste. 401	Denver	CO	80224	(303) 333-1250
Desert Springs Utilities Company	Clark Reddin	P. O. Box 689	Oracle	AZ	85623	(520) 838-6199
Entrada Del Oro Sewer Company	Chuck Kennedy	11811 N. Tatum Blvd., Ste. 1060	Phoenix	AZ	85028	(602) 867-6501
Gold Canyon Sewer Company	Charlie Hernandez	5301 S. Superstition Mountain Dr., Ste. 104A PMB 422	Gold Canyon	AZ	85118	(480) 983-5020
Johnson Utilities Company, LLC	Grant Hinderer	5310 E. Shea Blvd	Scottsdale	AZ	85254	(480) 998-3300
Mountain Pass Utility Company	Steven Soriano	9532 E. Riggs Rd.	Sun Lakes	AZ	85248	(480) 895-4251
Palo Verde Utilities Company	Graham Symmonds	21410 N. 19th Ave., Ste. 201	Phoenix	AZ	85027	(623) 580-9600
Picacho Cover Utilities Company	Graham Symmonds	21410 N. 19th Ave., Ste. 201	Phoenix	AZ	85027	(623) 580-9600
Picacho Sewer Company	Steven Soriano	9532 E. Riggs Rd.	Sun Lakes	AZ	85248	(480) 895-4251
Pine Meadows Utilities	Jason Williamson	6825 E. Tennessee Ave., Ste. 401	Denver	CO	80224	(303)333-1250
Red Rock Utilities Company	Mark Weinberg	2200 E. River Rd., Ste. 115	Tucson	AZ	85718	
Saddlebrook Utility Company	Steven Soriano	9532 E. Riggs Rd.	Sun Lakes	AZ	85248	(480) 895-4251
Santa Rosa Utility Company	Steven Soriano	9532 E. Riggs Rd.	Sun Lakes	AZ	85248	(480) 895-4251
Willow Springs Utilities	Jamie Argueta	1600 E. Hanley Blvd., Ste. 128	Oro Valley	AZ	85737	(520) 219-1315
Woodruff Utility Company – Sandia	Brian Hall	2555 E. Camelback Rd., Ste. 700	Phoenix	AZ	85016	(602) 956-7200