

CHAPTER 8

Regional Facility Overview



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8.1 Introduction

Wastewater generated within the conveyance boundaries tributary to Roger Road WRF and Ina Road WRF is collected and treated by the metropolitan facilities (Roger Road WRF, Ina Road WRF and Randolph Park WRF). Non-Metro facilities serve wastewater treatment needs outside the metropolitan service area boundaries. The outside areas are referred to as the Non-Metro regions. The Non-Metro regions are experiencing rapid population expansion. Growth is projected to continue for years, thereby increasing influent flow into PCRWRD's collection/treatment systems. PCRWRD recognizes the value of long-range planning in making timely, cost effective decisions regarding the Non-Metro facilities. Thus, PCRWRD has commissioned this study to identify the optimal strategy for the Non-Metro facilities' treatment of current and projected wastewater flows.

Data presented in this chapter draws upon information provided from PAG and presented in the 2006 Facility Plan. The Facility Plan documents the long-range facility planning process for PCRWRD establishing the capital improvement needs for the next 25 years based on the regulatory, expansion and rehabilitation requirements. Non-Metro facility information for this study is compiled from a series of facilitated workshops consisting of PCRWRD staff, consultants and other stakeholders, as well as several previous planning and engineering efforts performed for, or by the PCRWRD. This chapter describes Non-Metro facilities and proposes their incorporation into Non-Metro schemes, and locations for Non-Metro treatment facilities.

8.2 Non-Metro Facility Evaluation

Pima County's Non-Metro regions include facilities operated by PCRWRD and by others. The facilities addressed in this chapter correspond to the eastern half of Pima County and a small portion of Pinal County. Existing PCRWRD operated facilities include:

- Arivaca Junction Wastewater Reclamation Facility
- Avra Valley Wastewater Reclamation Facility
- Corona de Tucson Wastewater Reclamation Facility
- Pima County Fairgrounds Wastewater Reclamation Facility
- Green Valley Wastewater Reclamation Facility
- Marana Wastewater Reclamation Facility
- Mt. Lemmon Wastewater Reclamation Facility
- Rillito Vista Wastewater Reclamation Facility

Facilities located in the Non-Metro region but not operated by PCRWRD include:

- Arizona Sonora Desert Museum
- Sahuarita

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The proposed or existing non-PCRWRD operated facilities not examined within the ROMP include:

- Adonis
- Ajo Improvement Co.
- Arizona State Prison
- Lukeville
- Milagro Subdivision
- MTC
- Organ Pipe Cactus National Monument
- Saguaro Ranch Guest Ranch
- Sahuarita High School Wetlands
- University of Arizona Science and Technology Park
- US Forest Service – Palisades Ranger Station

Key issues addressed during this evaluation include:

- Examine PCRWRD and non-PCRWRD operated facilities
- Determine current and future facility influent flows
- Determine current and future facility biosolids handling, treatment, and disposal
- Determine current and future facility effluent water reuse
- Determine Non-Metro regions

8.2.1 PCRWRD Operated Facilities

PCRWRD maintains and operates wastewater treatment facilities within the City of Tucson, South Tucson, Oro Valley, Marana, Green Valley, and non-incorporated areas. The following chapters evaluate each PCRWRD operated Non-Metro facility. Each evaluation includes a description of the facility, treatment process, permits, effluent, biosolids, and outlook. The following lists the resources used to complete the evaluation.

- Description – Facility descriptions discuss location, current population served, service area, permitted treatment capacity, and average daily influent flows.
 - Location obtained from the Facility Plan and the 2005 PAG Effluent Generation and Utilization document.
 - Current population served obtained from 2005 PAG Effluent Generation and Utilization document.
 - Service areas are the approximate areas serviced by the current treatment facility and are described by the PAG Section 208 Areawide Water Quality Management Plan. **Figure 8-1** shows eastern Pima County’s wastewater treatment facility service basins and service areas from PCRWRD MapGuide Sewer Maps (December 2006).
 - Permitted treatment capacity values obtained from Arizona Department of Environmental Quality (ADEQ) documents provided by PCRWRD.
 - Average Daily Influent Flow determined by calculating the 2006 average daily flow. It is noted that the Non-Metro wastewater treatment facilities, just as the metropolitan wastewater treatment facilities, experience winter peaks and summer lows.

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- Treatment Process –Processes for each facility compiled from the 2006 Metro Area Facility Plan Update, PAG 208, Pima County Effluent Generation/Utilization Plan, and PCRWRD staff.
- Permits – Reported permits supplied by PCRWRD staff.
- Effluent – Effluent data provided by the Facility Plan, the 2005 PAG Effluent Generation and Utilization Report, and by PCRWRD staff.
- Biosolids – Biosolids data provided by the Facility Plan and PCRWRD staff.
- Outlook – This chapter presents outlooks for the Non-Metro treatment facilities based on current and planned activities. The facility outlooks were developed from data provided by PCRWRD staff, the Facility Plan, Facility Expansion Plans, and, in Avra Valley’s case, the draft Southwest Infrastructure Plan (SWIP).

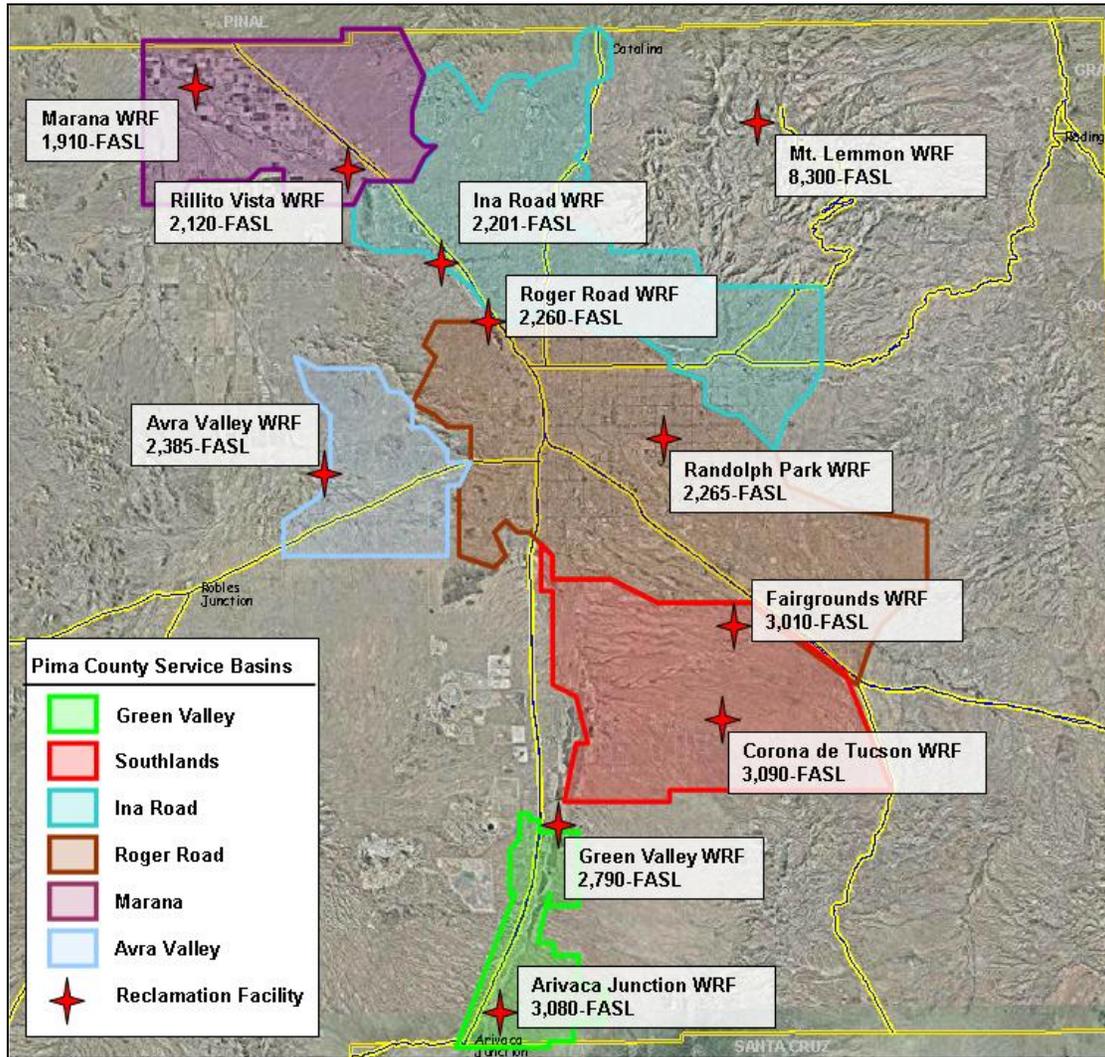


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Figure 8-1

Eastern Pima County Treatment Facility Service Areas (FASL-Feet above Sea Level)



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8.2.1.1 Arivaca Junction Wastewater Reclamation Facility

Arivaca Junction Wastewater Reclamation Facility is located in unincorporated Pima County 3,080 feet above sea level (FASL) on the southern border of Pima County approximately 30 miles south of Tucson just east of Interstate 19. Arivaca Junction WRF's service area consists of 323 lots of approximately 840 people and is entirely residential. The facility has a permitted treatment capacity of 0.1 mgd (maximum daily flow average of 60,000 gallons per day) and treated an average daily influent flow of 0.059 mgd in 2006 (59% capacity).

Process

Arivaca Junction WRF contains a single 3.2-acre, 13-ft deep, unlined aerated facultative stabilization pond (side slope of 3:1) with two surface aspirating aerators/mixers.

Permits

Arivaca Junction WRF currently holds an Aquifer Protection Permit (P-100640) and a Type 2 Reclaimed Water General Permit (R105345) for Class C effluent. The facility's groundwater point of compliance is located approximately 400 feet southeast (down gradient) of the wastewater treatment pond.

Effluent

Effluent disposal for Arivaca Junction WRF is through percolation, evaporation, and reuse. Percolation is approximately 0.010 mgd while evaporation ranges from 0.007 to 0.014 mgd. The facility is classified for Class C reclaimed water as regulated by a valid Reclaimed Water Permit. A reuse agreement for delivery of the Class C effluent for restricted agriculture use is in place with nearby Reventone Ranch. Prior to effluent delivery to the adjacent ranch, it is disinfected through the addition of sodium hypochlorite. The effluent is not metered and is discharged approximately once every 6 weeks taking approximately 5 days with an average flow of 350 gallons per minute.

Biosolids

The procedure for biosolids is to scrape from one lagoon when necessary and haul to a landfill.

Outlook

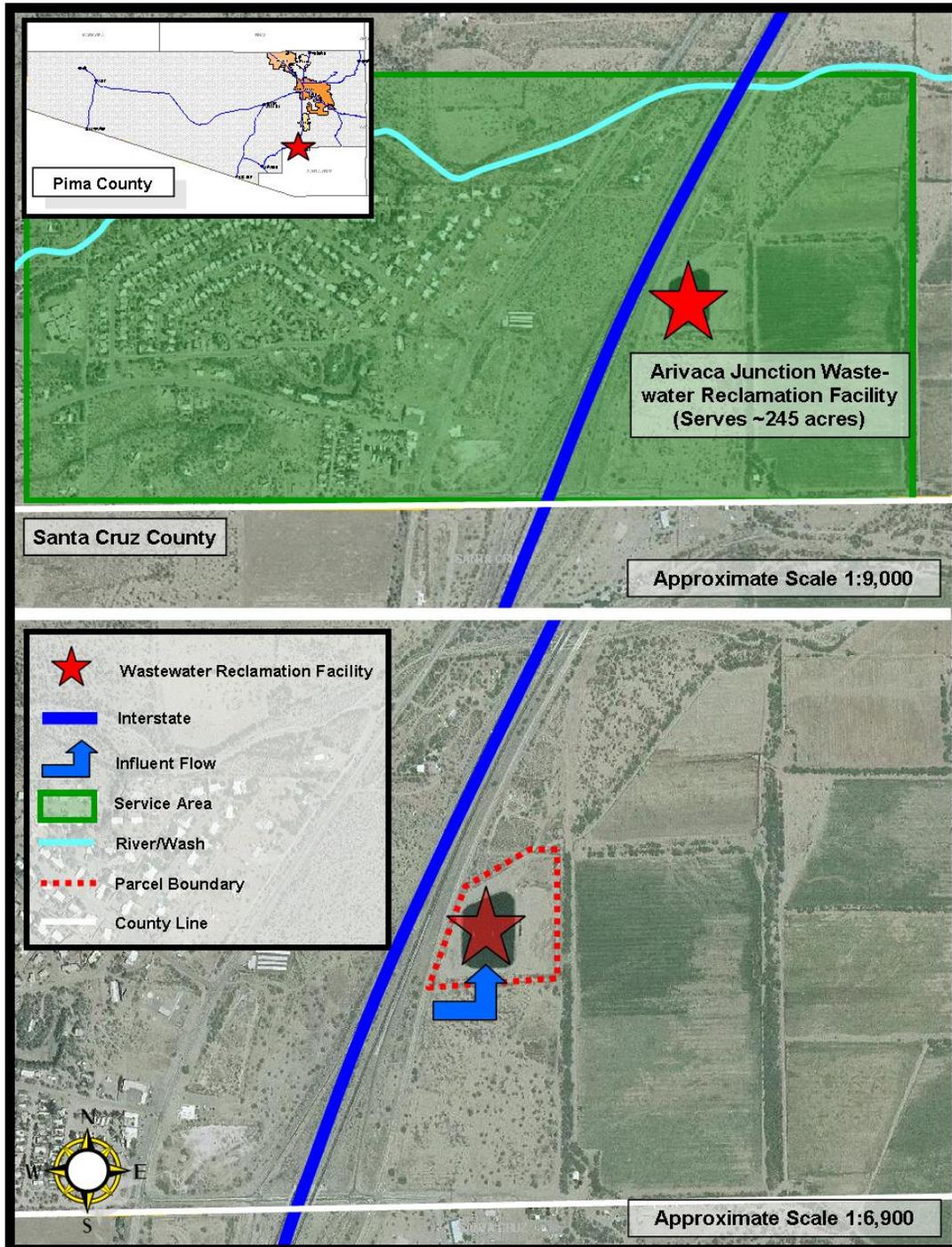
Arivaca Junction WRF expects to close once construction of the gravity sewer line between Arivaca Junction WRF and Green Valley WRF is completed. Wastewater flow from Arivaca Junction WRF will be transported to Green Valley's facility for treatment. Completion of the gravity sewer line is scheduled for 2007/2008.

Aerial photos of Arivaca Junction WRF's sewer basin and plan view are on **Figure 8-2**.

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Figure 8-2
Arivaca Junction Wastewater Reclamation Facility



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8.2.1.2 Avra Valley Wastewater Reclamation Facility

Avra Valley WRF is located in unincorporated Pima County 2,382-FASL in a rapidly growing area about 20 miles southwest of Tucson in southern Avra Valley, north of Hwy 86 (Ajo Way) and east of Three Points. The facility serves about 12,104 people in 2005 and is located on a 138-acre parcel of Pima County owned land. The current service area is roughly four miles to the north, south, west and three miles to the east from the center of the intersection of Hwy 86 (Ajo Way) and San Joaquin Road. The service area is about 70% rural residential and the other 30% is made up of federal and state land, urban residential, industrial, commercial, and multiple use. Avra Valley WRF treated an average daily influent flow of 1.079 mgd in 2006 (49% of the available 2.2 mgd capacity).

Process

Avra Valley WRF's treatment process is a BNROD and consists of a flow equalization basin, an oxidation ditch, two secondary clarifiers, four sludge-drying beds, and four percolation basins. Sewage enters the facility through a lift station where it is discharged to a screening channel. Influent is then equalized in a 0.37 million gallon basin and flows to a 1.33 million gallon oxidation ditch (1.6 mgd permitted treatment capacity as of January 26, 2007. Prior to 2008, an additional 0.6-mgd capacity will be added.). The process is based on extended aeration, nitrification, and de-nitrification within the oxidation ditch by cycling the aeration on and off.

Permits

Avra Valley WRF currently holds an Aquifer Protection Permit (P-100642), Type 2 Reclaimed Water General Permit (R105498) for Class B+ effluent.

Effluent

Effluent is primarily disposed of through percolation, evaporation and plant irrigation reuse, and spraying into the Black Wash only when needed. Future use of the effluent is proposed for a riparian restoration project developed by PCRWRD, Pima County Regional Flood Control District, and other stakeholders.

Biosolids

Waste activated sludge mixed liquors flow into the secondary clarifiers from the oxidation ditches via a distribution box where the sludge settles and further processes produce Class B+ effluent. Sludge from the clarifiers is sent to two gravity thickeners and hauled by tanker truck to the nearest sewer tributary to Roger Road WRF. Four sludge drying beds are available for emergency use.

Outlook

Avra Valley WRF is the only facility located within the County's SWIP report. The Southwest region has been identified as an area of rapid population growth and County planners commissioned the SWIP report to assist in decision-making related to development of the Southwest area's infrastructure (including wastewater infrastructure, transportation, parks and recreation, and flood control). Within the SWIP, the phasing, financial impacts, and funding possibilities are discussed. In regards to the Southwest region's wastewater infrastructure, the SWIP concludes the majority of the wastewater collection and conveyance system has enough capacity for current peak wet weather flow but requires expansion and upgrades to accommodate proposed future flows in the conveyance system.

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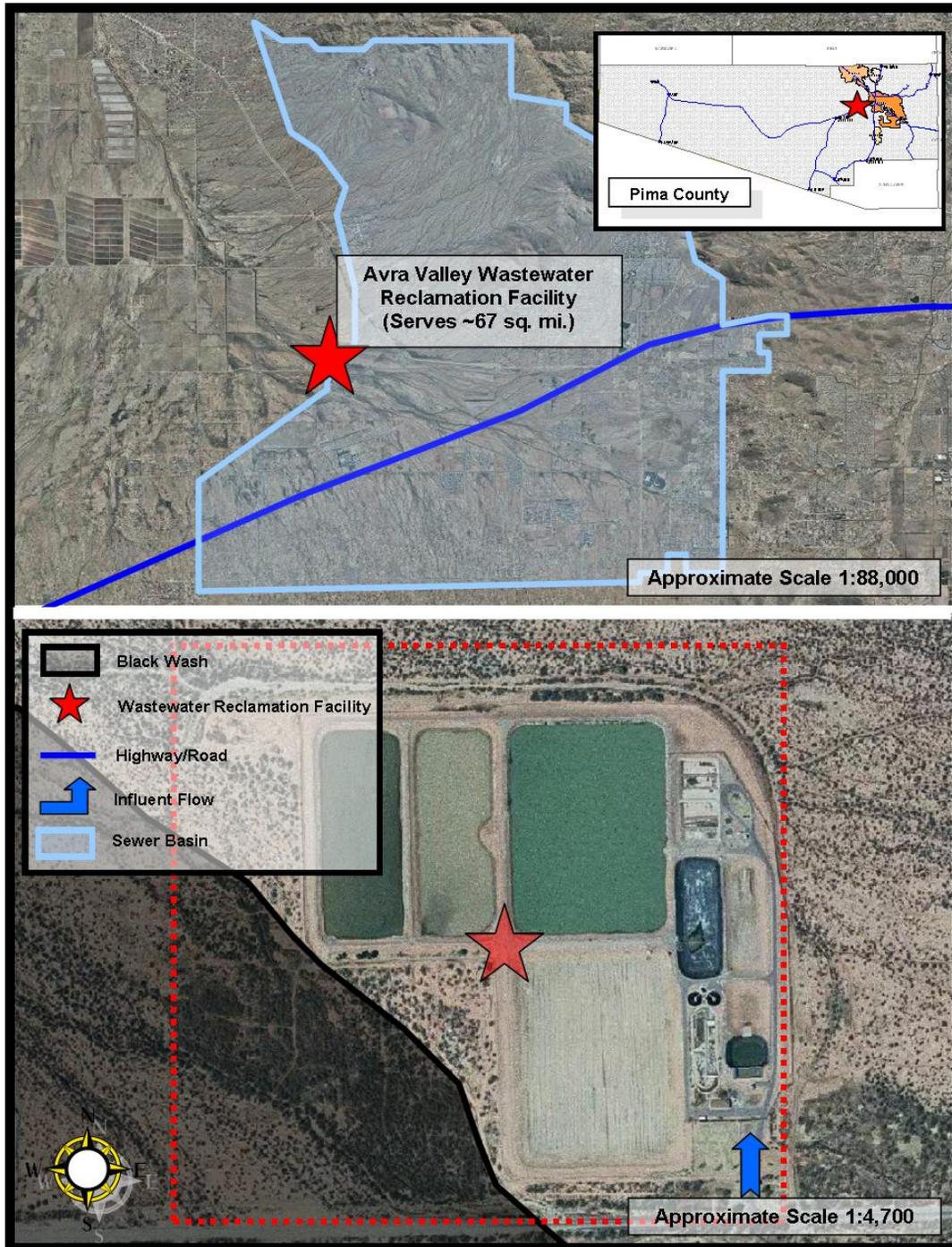
The PCRWRD Avra Valley WRF Expansion Plan recommends two concurrent expansion projects, the first is to increase current 1.6 mgd BNROD capacity to 2.2 mgd through interim improvements and the second is to have a dual oxidation ditches online and permitted to treat 4.0 mgd by 2009. Current design improvements include a new inlet gravity sewer and influent lift station, headworks modifications, two BNRODs, clarifiers, continuous backwashing deep bed filters, ultraviolet disinfection, and sludge holding equipment with an area to provide sludge treatment in the future. A study to determine optimum biosolids processing for both the existing BNROD and new BNROD for the site is currently underway. Avra Valley WRF also plans to treat effluent to Class A+ treatment requirements prior to discharge to percolation basins and/or the Black Wash spray fields.

Aerial photos of Avra Valley WRF's sewer basin and plan view are on **Figure 8-3**.

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Figure 8-3
Avra Valley Wastewater Reclamation Facility



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8.2.1.3 Corona de Tucson Wastewater Reclamation Facility

Corona de Tucson WRF is located in unincorporated Pima County 3,090-FASL and is located approximately 15 miles south of Tucson in an area that is currently rural but facing very rapid population growth. The plant site is northwest of the intersection of Sahuarita Road and Houghton Road. A 2000 census showed a population of 993 for the Traffic Analysis Zones in which the service area is located. Almost half of the service area is residential with the other half consisting of specific plan, multiple use, and commercial areas. The facility has a permitted treatment capacity of 1.3 mgd and average daily influent flows for 2006 were 0.135 mgd (10% capacity).

Process

Sewage enters Corona's WRF through a gravity interceptor, then through a Parshall flume flow-metering chamber. The sewage then flows into a series of "splitter manholes" dividing the flow between the two concrete-lined stabilization ponds of 3.3- and 3.7-acres with an average operating depth of 4-feet. Ponds can be operated in series or parallel. The treated water overflows from the stabilization ponds into the 10.2-acre evaporation pond with a 6.1-acre unlined SAT pond used as a recharge basin.

Permits

The facility has an APP (P100644) for discharge to the SAT basins.

Effluent

Effluent discharges to a plastic lined evaporation pond.

Biosolids

Biosolids removed from the plastic lined evaporation ponds when needed. Dewatering solids to 4% to 6% before transferring to the County conveyance system, Roger Road WRF, Ina Road WRF, Green Valley WRF, or other location should be investigated.

Outlook

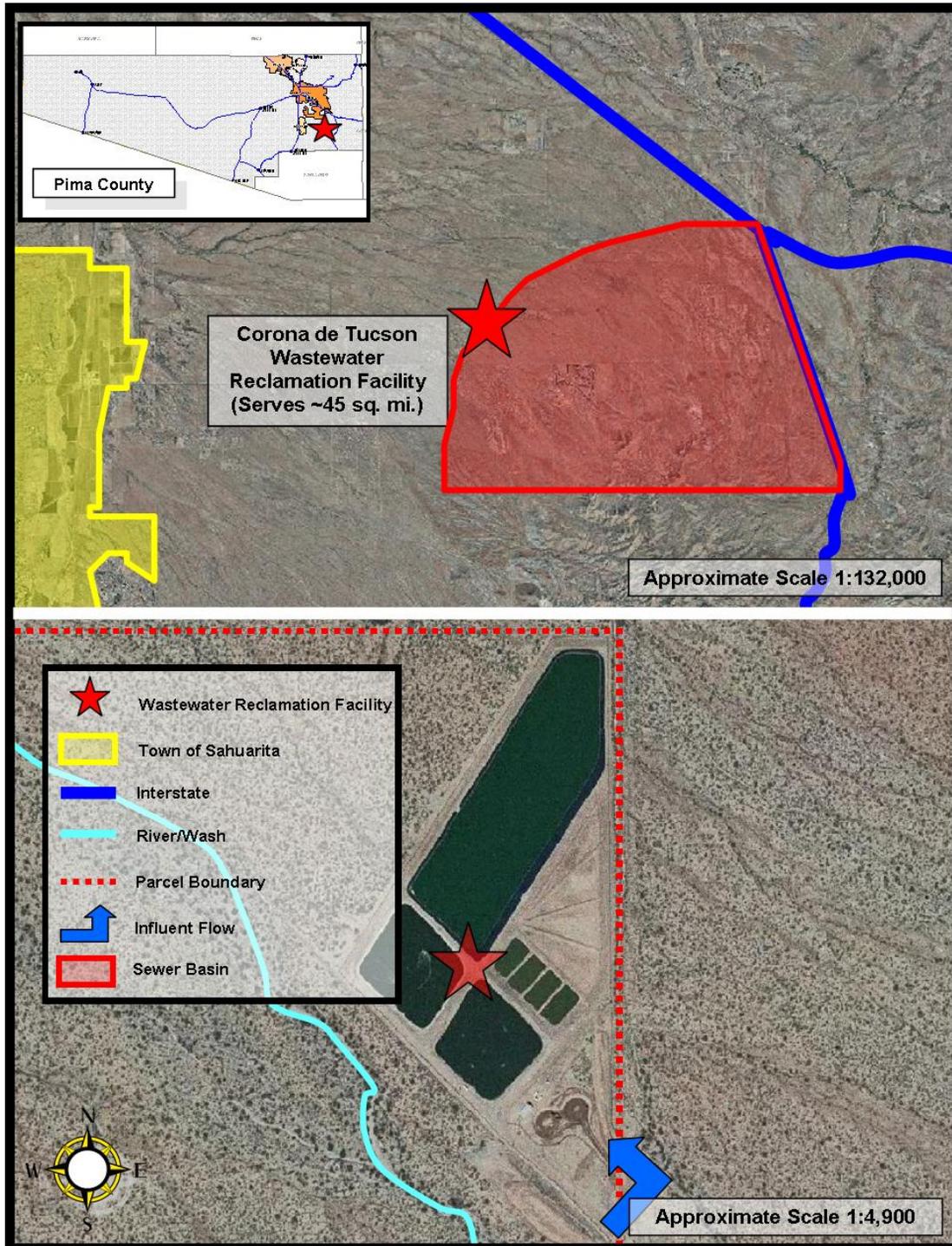
Corona de Tucson WRF is also in an area of rapid population growth and the facility recently placed two new, 0.5 mgd permitted, closed loop reactors to be online in mid 2007. The existing lagoons will remain online as backup capacity. The new WRC will include new headworks, Parshall flume, RAS/WAS station, polymer storage, sludge holding tanks, a sludge pump, and a mechanical/electrical/ administration complex. Effluent will be disposed of via the SAT basins regulated by the facility's APP. Biosolids will be pumped to the facility's sludge holding tanks before being hauled and discharged into the South East Interceptor to Roger Road WRF for final processing and disposal at the Ina Road WRF biosolids processing facility.

Corona de Tucson WRF's service basin and facility are shown on **Figure 8-4**.

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Figure 8-4
Corona de Tucson Wastewater Reclamation Facility



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8.2.1.4 Green Valley Wastewater Reclamation Facility

Green Valley WRF is located in Sahuarita, 790-FASL south of Tucson along the east side of the Santa Cruz River. The facility served about 17,469 people in 2005. The facility was built in 1964, expanded in 1972, 1981, and 2004. The 2004 expansion included the addition of a 2.0 mgd treatment train utilizing BNROD and increased the total capacity to 4.1 mgd ADWF. The 2.0 BNROD process is the primary form of treatment and the facultative pond system is used as a backup. The Green Valley service area covers both the east and west sides of Interstate 19 and serves primarily the community of Green Valley and parts of the Town of Sahuarita. Land use in the service area is primarily residential with some commercial. Most of the property serviced is on the west side of the Santa Cruz River. The service area has an east-west width ranging from one to four miles and covers approximately 9.5 miles north of south, starting just below Twin Buttes Road and extending past Duval Mine road. The facility has a permitted treatment capacity of 4.1 mgd (2.0 mgd BNROD and 2.1 mgd aerated lagoons) and treats an average daily influent flow of 1.764 mgd in 2006 (43% capacity).

Process

Green Valley WRF is split into two processes. The first is a 2.1 mgd Class B effluent producing process. It consists of two trains of primary and secondary aerated lagoons followed by two effluent maturation/settling lagoons and four percolation basins. The second process is a 2.0 mgd BNROD Class A+ effluent producing process. The BNROD process operates on an extended aeration, nitrification, and denitrification process within the oxidation ditch by cycling the aeration on and off. Flows greater than BNROD's capacity are directed to the aerated lagoons and polishing ponds.

Permits

Green Valley (GV) WRF's APP (P100629), issued on July 1, 2003, require discharge monitoring to be performed at the point of discharge to the percolation beds and the Santa Cruz River as well as reuse and recharge areas. Groundwater monitoring is required at the point of compliance wells GV-01 and GV-02. Type 3 Reclaimed Water General Permit (R105574) allows direct reuse of Class B+ (Lagoons) and Class A+ (BNROD with filtration) effluent. AZPDES (AZ0024937) allows discharge into the Santa Cruz River.

Effluent

Effluent is disposed of through percolation, reuse, and delivery. PCRWRD has a contract to deliver up to 1 mgd of Class A+ and B effluent to Robson/Quail Creek Inc.

Biosolids

Green Valley WRF is the only Non-Metro facility with biosolids treatment and disposal capacity. The sludge is thickened, digested, and dried (Class A biosolids) before being utilized as a mine tailing reclamation product at the ASARCO Mines.

Outlook

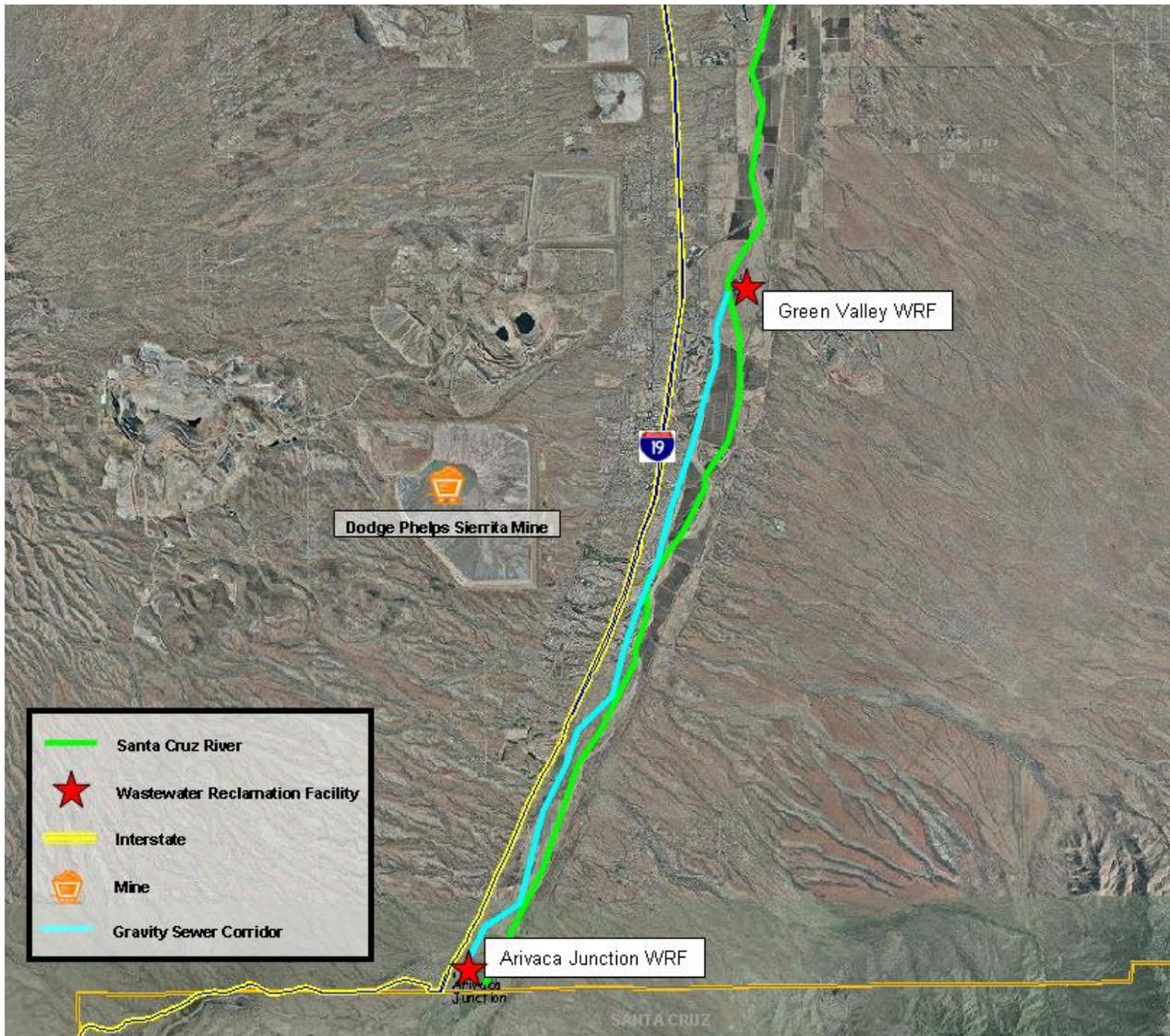
Green Valley WRF will be treating flow from the Arivaca Junction WRF's treatment area once the gravity sewer main is completed (completion is developer driven and is not expected before 2009/2010). The gravity sewer corridor transferring flow from Arivaca Junction WRF to the Green Valley WRF is shown on **Figure 8-5**.

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Green Valley WRF's service area and facility are also shown on **Figure 8-6**

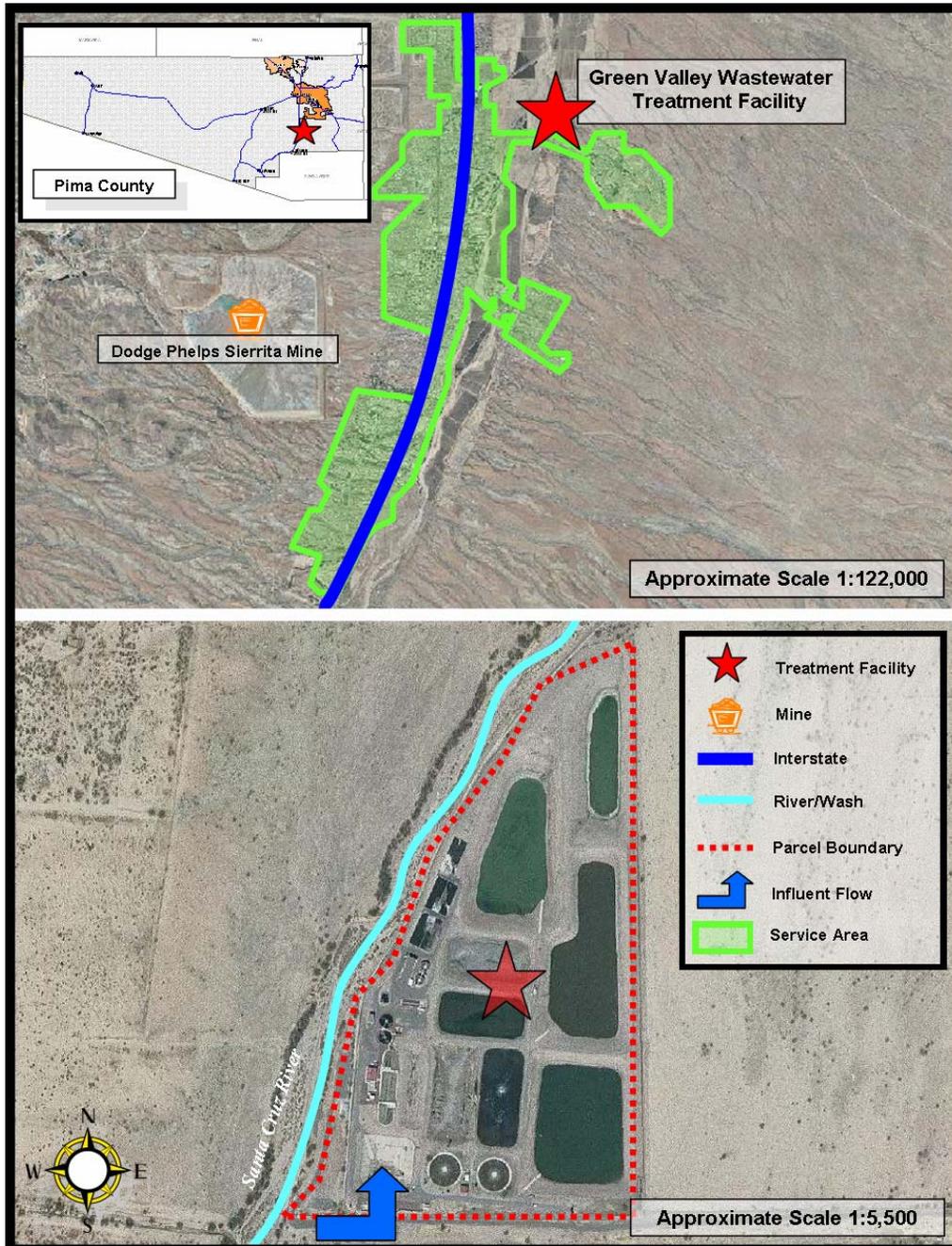
Figure 8-5
Gravity Sewer Corridor from Arivaca Junction WRF to the Green Valley WRF



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Figure 8-6
Green Valley Wastewater Reclamation Facility



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8.2.1.5 Marana Wastewater Reclamation Facility

Marana Wastewater Reclamation Facility (WRF) is located in unincorporated Pima County 1,910-FASL one-half mile north of Marana Road, one mile west of Luckett Road, and one-half mile east of the Santa Cruz River. The facility served about 2,616 people in 2005. Marana WRF is located in an agricultural area owned by Pima County since 1980. The facility currently serves a relatively small area in Marana. Marana WRF is under expansion to serve the rapidly growing northwest area with 66% residential small and medium lots, 12% of the service area corresponds to a specific plan, and only 0.4% is zoned commercial. Marana WRF serves areas north and south of Grier Road and developments south of Moore Road and east of Sanders Road. The facility has a permitted treatment capacity of 0.7 mgd and treats an average daily influent flow of 0.19 mgd in 2007 (27% capacity).

Process

Marana WRF started treatment via two facultative/evaporation ponds (FEPs) in 1986. Accelerated development of the Marana area began in 2000 and continues. Additional treatment capacity was provided. The western FEP was closed and the eastern FEP has been converted into an emergency influent storage basin and is lined with soil cement.

The current wastewater treatment system includes a headworks and a 3-inch Parshall flume with a maximum capacity of 1.1 mgd. To provide wastewater treatment for the accelerated development, three 0.05 mgd biological nutrient removal package plants began operation at the end of 2001 and a fourth was added in 2005 providing a treatment capacity of 0.2 mgd. The four package plants will be supplemented with a 0.5 mgd “Biolac” activated sludge treatment system, as an interim treatment process. The Biolac will be used as a supplemental treatment capacity until the new 1.5 mgd facility is constructed. The four package plants have been taken off line and will be eventually moved elsewhere in the system.

Effluent discharges into a high-density polyethylene (HDPE) lined effluent storage pond and disinfected with chlorine. Odorous air from the treatment of process is collected and treated in an in-ground biofilter located onsite.

Permits

Marana WRF operates according to APP (P100631) issued on November 22, 2006, AZPDES (AZ0024520), and a Type 2 Class B+ Reclaimed Water General permit (R100631). The APP and AZPDES apply to the point downstream of effluent chlorination and upstream of the point of discharge to the Santa Cruz River and the reuse area. The Reclaimed Water permit applies to irrigation of the Marana Riparian Habitat Restoration site and for irrigation on facility vegetation.

Effluent

Effluent is reused onsite through landscape irrigation or for a riparian habitat restoration project or discharged to the Santa Cruz River. Class B+ effluent is produced through a Biological Nutrient Removal process and a chlorination and de-chlorination disinfection process.

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Biosolids

Marana WRF collects sludge in sludge storage tanks before transporting it to Ina Road WRF for processing. Dewatering solids 4% to 6% before transfer to the County conveyance system, Ina Road WRF, or other location should be investigated.

Outlook

The Traffic Analysis Zone data used to project population has indicated that the Marana WRF area population would increase rapidly; however the actual population growth in the area has lagged significantly behind the TAZ data projections. The service area is expanding to match the area's growth and eventually the facility will require expansion to provide capacity beyond the currently planned 1.5 MGD expansion. Possible flows for inclusion to Marana WRF's future capacity are the Rillito Vista WRF and the Continental Ranch Wastewater Pumping Station. An evaluation of the economic feasibility of expanding Marana WRF to include Rillito Vista WRF and the Continental Ranch Wastewater Pumping Station's wastewater. Design of a new 1.5 mgd BNROD facility is being completed, but future construction is not currently scheduled. Once BNROD construction is complete, the existing package plants should be evaluated to determine their remaining life and application for future projects. Plans to relocate two of the existing package plants to a proposed restoration project, the Canoa Ranch Water Reclamation Facility, south of Green Valley WRF have been proposed.

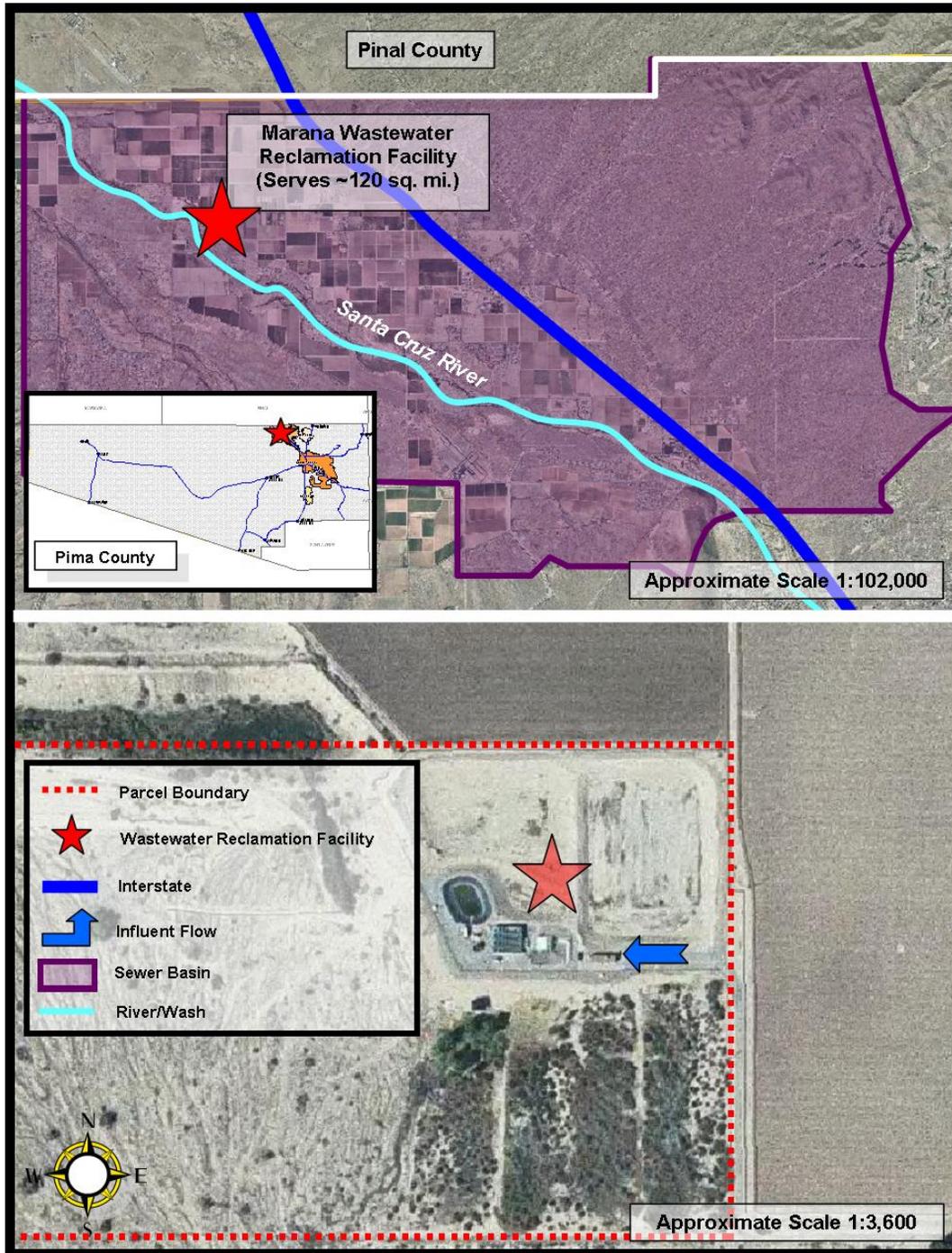
Marana WRF's service area and facility are shown on **Figure 8-7**.



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Figure 8-7
Marana Wastewater Reclamation Facility



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8.2.1.6 Mount Lemmon Wastewater Reclamation Facility

Mt. Lemmon WRF is located in unincorporated Pima County 8,310-FASL in the small community of Summerhaven on Mount Lemmon, north of Tucson. The facility was constructed in 1982 to end wastewater discharges into the Sabina Creek Watershed. The service area is primarily residential. The area was severely impacted by the 2003 Aspen fire destroying most of the buildings in Summerhaven. Mt. Lemmon WRF's service area is limited by Pima County's agreement with the USFS restricting the number of lots and the discharge limit to the spray field. The facility serves 47 lots as of 2005 and will acquire 30 more sewer front accessible properties. The facility treats an average of 12,500 gpd which is approximately 15% of design capacity.

Process

The Mt. Lemmon WRF consists of a closed loop reactor followed by chlorination-dechlorination units. The facility is the only treatment plant in Pima County experiencing freezing temperatures and is entirely enclosed.

Permits

Mt. Lemmon WRF also has an APP (#P100345), and a Special Use Permit (SAN0139) issued by the United States Forest Service. The APP regulates General Type 4 discharges to the local aquifer via sprayfield irrigation of vegetation on US Forest Service land.

Mt. Lemmon WRF received an AZPDES permit (AZ0022250) enabling backup discharge to three outfalls into receiving waters of unnamed washes all tributary to the San Pedro River and San Pedro/Wilcox Playa River Basin on February 10, 2006. The AZPDES permit and authorization to discharge expires on December 31, 2010. The receiving waters (unnamed washes) have the following designated uses.

- Aquatic and Wildlife ephemeral (A&We)
- Partial Body Contact (PBC)

The AZPDES permit is issued for a period of five years.

Effluent

Treated effluent from the Mt. Lemmon WRF is disposed of via sprayfield irrigation onto forest vegetation, or is disposed of using underground pipelines leading to three combined outfalls; both are regulated by the facility's AZPDES permit. The AZPDES permit states only treated effluent will be discharged to the unnamed wash if freezing or inoperable conditions of the sprayfield exist.

Biosolids

Sludge is deposited into the County conveyance system (manhole 8716-03) for transport and treatment at the Ina Road WRF and further processing at the Regional Biosolids Facility. Dewatering solids 4% to 6% before transfer to the County conveyance system or other location should be investigated.

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Outlook

PCRWRD, the County Department of Environmental Quality and the United States Forest Service (USFS) are working together on the Mt. Lemmon Service Area Watershed and Wastewater Management Plan, and the study is currently underway. This plan hopes to identify the conditions and circumstances existing in and around the Mt. Lemmon community, and the significant issues and challenges involved in planning wastewater systems. The study is anticipated to be completed in 2008. Due to its location and limited service, Mt. Lemmon WRF will most likely continue to be a stand alone facility in the future.

Mt. Lemmon WRF's current service area and facility are shown on **Figure 8-8**.

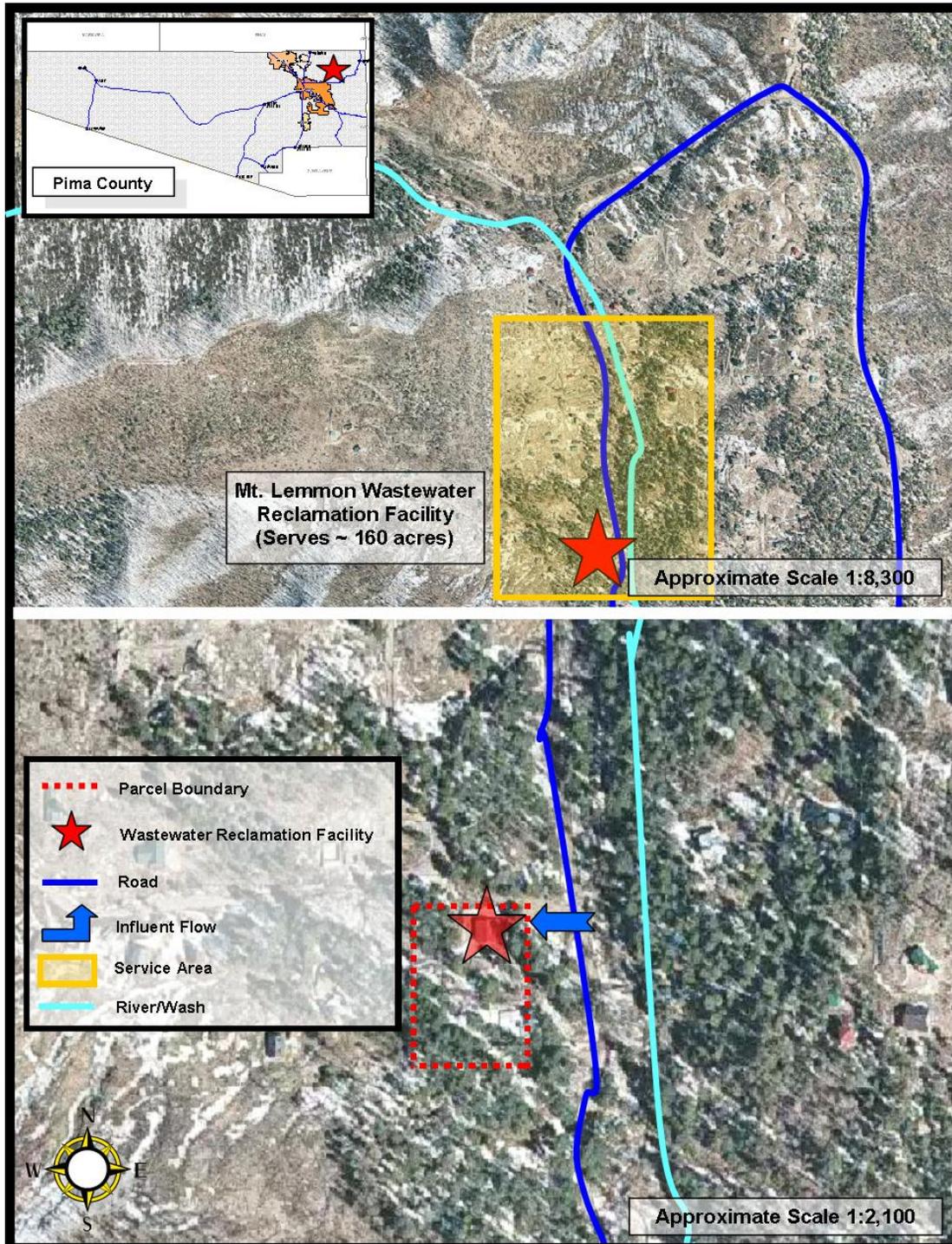


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Figure 8-8

Mt. Lemmon Wastewater Reclamation Facility



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8.2.1.7 Pima County Fairgrounds Wastewater Reclamation Facility

The Fairgrounds WRF is located 3,010-FASL approximately 18 miles southeast of Tucson at the county fairgrounds south of Interstate 10 and west of Houghton Road. Pima County Fairgrounds WRF serves only the fairgrounds for the Pima County Fair and for various events throughout the year. The Fairgrounds has measurable flow in the month of April when the Pima County Fair is held. The facility has a permitted treatment capacity of 0.035 mgd.

Process

The Fairgrounds WRF consists of two primary stabilization ponds and an overflow pond. Flow is split or directed into a stabilization pond via a manual splitter device.

Permits

The facility has an APP for the three facultative ponds.

Effluent

The Fairgrounds WRF does not discharge effluent.

Biosolids

Biosolids are dried, scraped, and hauled to a landfill when necessary.

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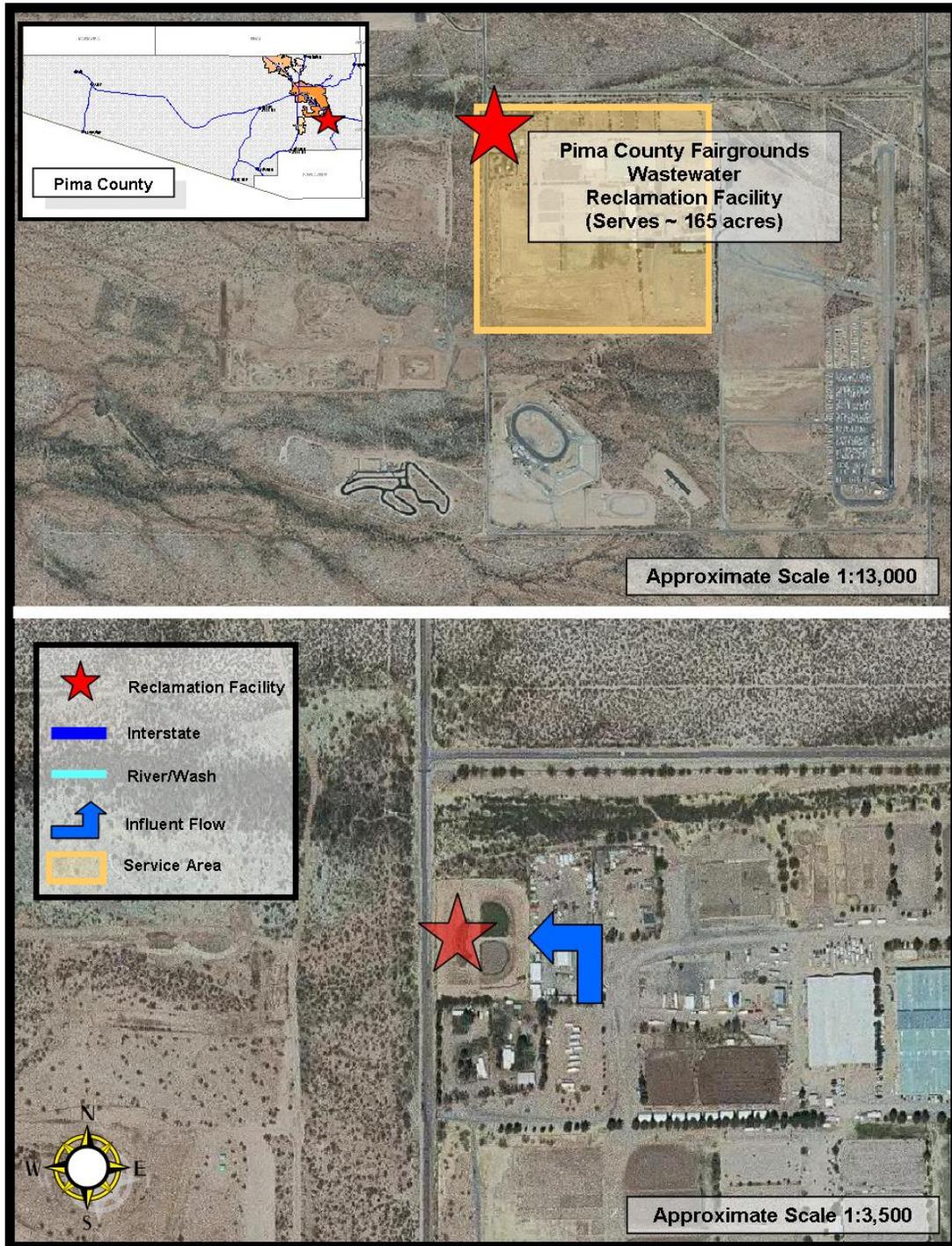
Flow originating from the Pima County Fairgrounds can be transferred once a conveyance structure connecting the Fairgrounds to the South East Interceptor, or other location is completed. Such a conveyance structure has not been included in any Capital Improvement Plan budget to date but is under long term consideration. Currently, a basin study is underway to assess the Southlands sewer basin, which includes the Fairgrounds WRF. Possible alternatives to be considered include a conveyance structure connecting the Fairgrounds to the South East Interceptor or connection to another future facility that would support the entire Southlands basin.

PC Fairground's service area and facility are shown on **Figure 8-9**.

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Figure 8-9
Pima County Fairground Wastewater Reclamation Facility



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8.2.1.8 Rillito Vista Wastewater Reclamation Facility

Pima County's Rillito Vista WRF is located in unincorporated Pima County 2,130-FASL on land owned by Arizona Portland Cement, northwest of Tucson, between Avra Valley Road and Tangerine Road, and between Interstate 10 and the Santa Cruz River. The facility serves 156 people based on the average owner-occupied rate published in the Pima County Sonoran Desert Conservation Plan (SDCP) Housing Report. Rillito Vista WRF's service area boundary corresponds to the Rillito Vista subdivision northwest of Tucson. The area is entirely rural and serves 60 lots. The facility has a permitted treatment capacity of 0.02 mgd and treats an average daily influent flow of 0.012 mgd in 2006 (60% capacity).

Process

The treatment method for this area consists of two stabilization/evaporation/percolation ponds. One pond is in use while the adjacent pond is dried and scraped before returning to service.

Permits

The facility has a general APP (P100636).

Effluent

The facility does not discharge effluent.

Biosolids

Biosolids are dried, scraped, and hauled for disposal via landfill.

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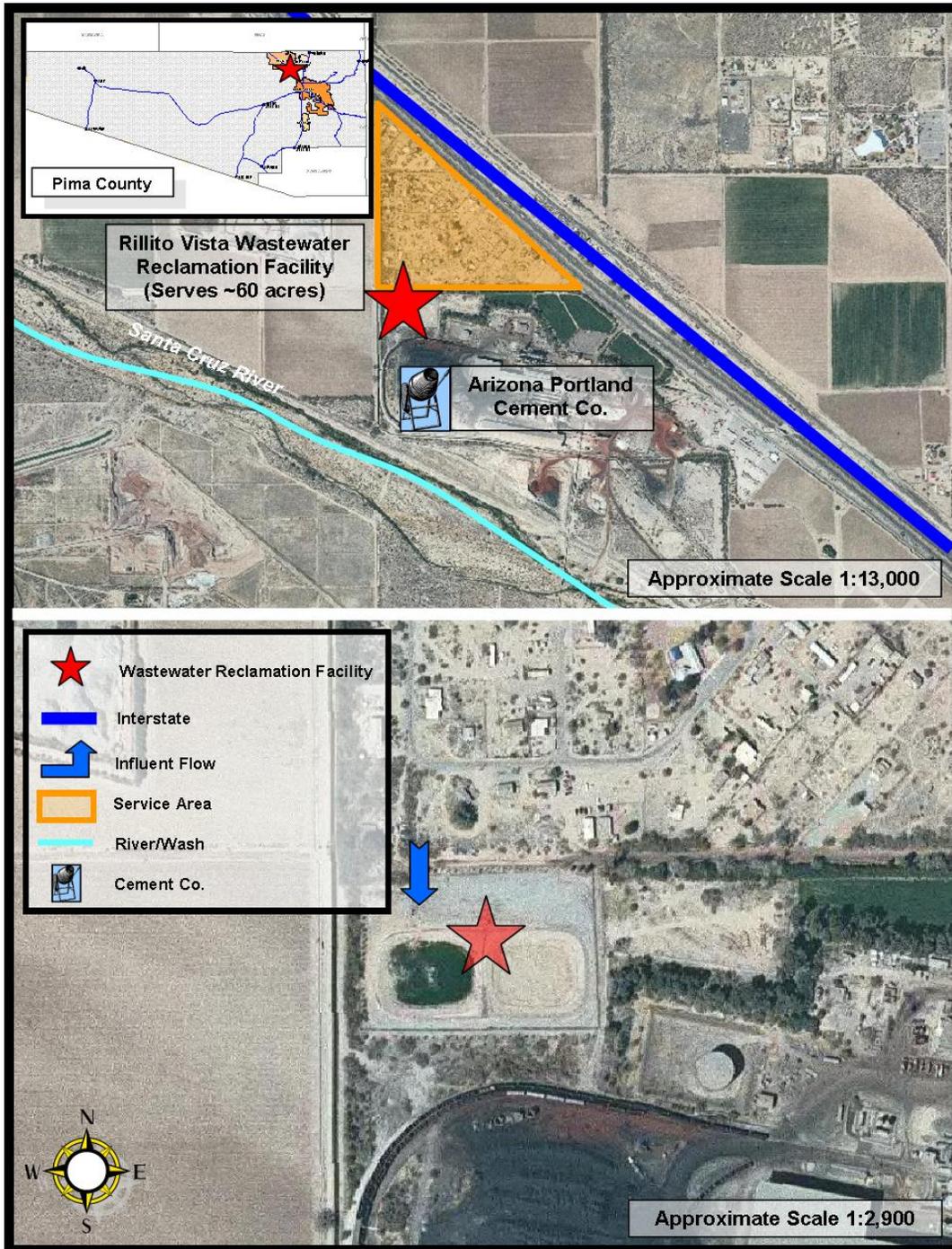
Rillito Vista WRF is operated by PCRWRD on land leased from the Arizona Portland Cement Company and treatment should be transferred to a treatment location on County owned property as soon as a conveyance structure connecting the service area to a facility for treatment is completed (Marana WRF or Ina Road WRF). Continued operation on leased land reduces the County's control in providing reliable treatment for its customers.

Rillito Vista WRF's service area and facility are shown on **Figure 8-10**.

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Figure 8-10
Rillito Vista Wastewater Reclamation Facility



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8.2.2 Non-PCRWRD Operated Facilities

The two non-PCRWRD operated facilities discussed in this chapter include the Arizona Sonora Desert Museum and Sahuarita, however many smaller ones exist. Should any of these non-PCRWRD-operated entities relinquish their wastewater treatment responsibility, PCRWRD may become responsible for providing treatment to meet current and future governmental regulations. PCRWRD is aware of other developer built and operated non-PCRWRD facilities. These are usually in the form of small package plants. This report recognizes the existence of small developer facilities, but they are not individually identified. The western Pima County communities including Ajo, Why, and Lukeville treat wastewater via their own systems and their operations are not expected to change by a significant amount within the next 25 years. Therefore, the western Pima County communities, and small developer built and operated facilities are not included in the Non-Metro scheme.

8.2.2.1 Arizona Sonora Desert Museum Wastewater Treatment Facility

The Arizona Sonora Desert Museum (ASDM) wastewater facilities have been turned over by Pima County to Westland Resources Inc. for operation. The service area consists of the facilities belonging to the ASDM only. ASDM facilities operate according to the Aquifer Protection Permit (P100628) with a maximum monthly average domestic wastewater flow of 0.015 mgd and consists of settling tanks, a flow equalization basin, subsurface leach beds, recirculating sand filter and disposal trenches with sludge hauled to the Butterfield Landfill for disposal.

8.2.2.2 Sahuarita Wastewater Treatment DMA

The Town of Sahuarita became a Management Agency responsible for treatment of the incorporated area in 1999. Its service area is west of Santa Cruz River and south of Pima Mine Road and serves the residential areas of the Rancho Resort and Rancho Sahuarita development. Sahuarita is permitted for a capacity of 0.25 mgd with a current flow of 0.2 mgd. Treatment of Sahuarita wastewater is performed via a biode-nitrification process using oxidation ditches. Effluent is discharged to on-site rapid infiltration basins. Solids are digested and placed on sludge drying beds for dewatering prior to transport to the Tangerine Landfill.

8.2.3 Non-Metro Regions

Current facility influent flows are increasing primarily for Marana WRF, Avra Valley WRF, and Corona de Tucson WRF. Projected flow increases at these facilities range from 250 to nearly 3,000 percent. Many of the Non-Metro facilities will be treating over 1.0 mgd by 2010 with all facilities treating more than 1.0 mgd by 2020. 2030 flow projections for these Non-Metro facilities range from 2.1 to 10.5 mgd.

Consolidating treatment into Non-Metro facilities offers advantages over treating wastewater at many satellite facilities. These advantages include:

- Reduced capital investment due to economies of scale: Consolidation reduces the average cost/gallon of wastewater treated when expanding an existing facility or constructing a new one.

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- Increased operations and maintenance efficiency: Consolidation reduces the amount of time a “roaming” operations crew spends traveling between satellite facilities. Chemicals may be purchased in bulk, delivered to one location, and stored at one location for use.
- Increased treatment reliability: Larger flows experienced at a consolidated facility buffers treatment disruption due to flow and loading fluctuations more effectively than at a smaller facility.

A Non-Metro treatment facility must be located in an area where the consolidation effort provides benefit over the continued operation at many satellite facilities. This chapter evaluates the Non-Metro areas for possible Non-Metro treatment facility locations.

Five sewer basins make up the Non-Metro area regions: Northwest, Southwest, South, Southeast, and Mountain. The following describe the objectives for determining each region’s boundaries.

- Separate topographically confined areas – Some Non-Metro facilities serve populations in topographically separated areas. Conveying wastewater to or from these locations would require a significant investment in time, energy, and money far greater than expanding or upgrading the current facilities to meet future regulations, flow and loading needs of the area served.
- Convey wastewater via gravity – Many of the configuration alternatives are eliminated by considering flow conveyance by gravity only. Conveying flows up gradient requires additional investment in pump and lift stations, energy to run these systems, and operations and maintenance for these systems. A pipeline of sufficient slope to achieve a minimum scour velocity of 2.5 feet per second is required. This report examined conveying flows to locations where a minimum slope of ten (10) feet per mile was possible. Note, however, eliminating pump and lift station construction for an entire Non-Metro region is unlikely. In some instances, guiding flow to treatment locations to meet minimum travel velocities and overcome topographical boundaries may require the construction of pump and/or lift stations.
- Limit conveyance line distances – PCRWRD is committed to eliminating problem odors emanating from the conveyance system in an effort to improve quality of life within the community. These odor problems are exacerbated in a number of ways due to long conveyance structures. Long conveyance structures lead to long residence times increasing the chance for the wastewater to become septic. The region’s warm climate leads to increased chemical and biochemical activity and reactions releasing malodorous compounds. The longer wastewater travels before reaching a wastewater treatment facility the greater the chance for these odors to be released into the air and an odor issue to arise. Thus, to mitigate future odor problems, conveyance line distance should be minimized.
- Avoid conveyance line construction in areas of sparse population – Construction of conveyance structures in locations of projected populations allows the County to offset capital costs by collecting connection fees from developers. Connection fees may be used as a credit against the cost of development, or collected as payment to defer capital construction costs. This constraint requires locating the conveyance structure in an area of actual development. An accurate prediction for the location of future development is critical and trusted population

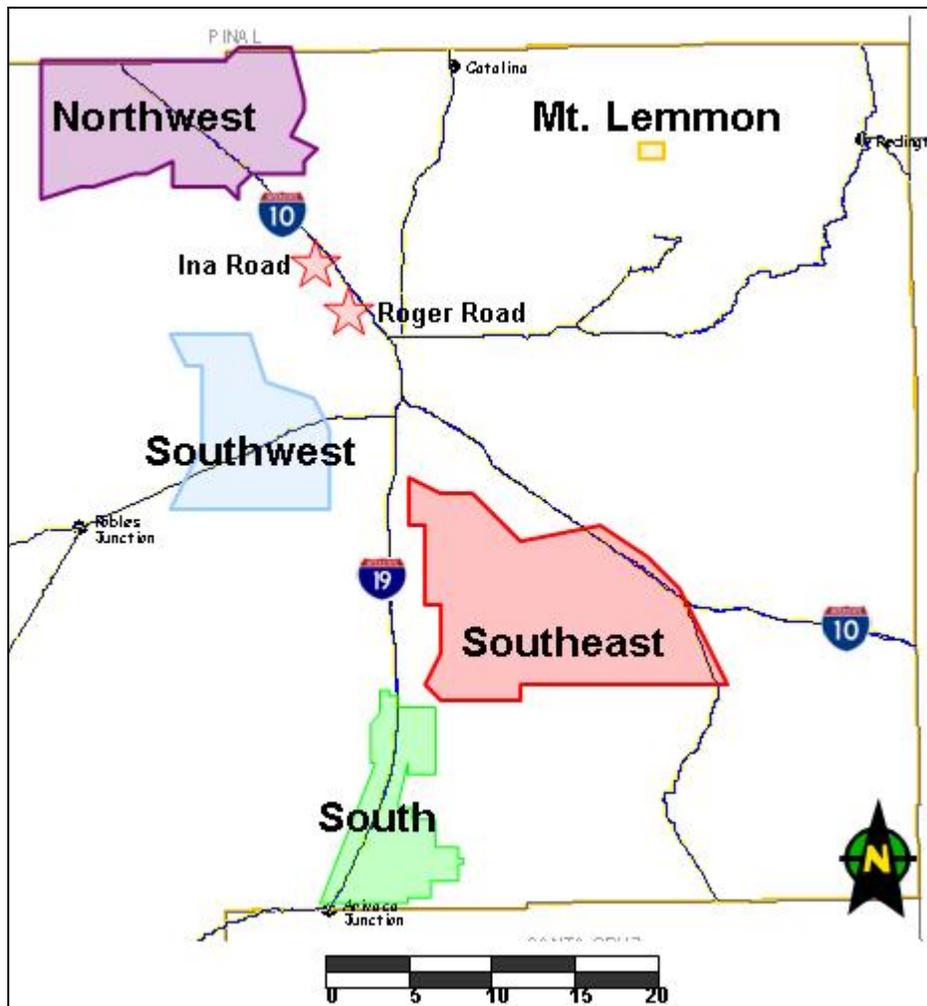
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projection/distribution data must be utilized. Construction of conveyance systems in densely populated areas can result in a substantial increase in construction costs. Other disadvantages to constructing conveyance lines through the metropolitan area include economic disruptions for businesses and travel disruptions for commuters. Thus, the option of routing flow from remote areas through the densely populated metropolitan area to the regional treatment facilities is eliminated.

Figure 8-11 shows the five conceptual Non-Metro regions.

Figure 8-11
Non-Metro Regions



It should be noted that the boundaries of these conceptual regions may exclude locations of future tributary flow that could be conveyed to a Non-Metro treatment facility. It is important to remember these boundaries are simply conceptual and have been formed by including existing sewage systems,

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areas of proposed rapid population expansion, and excluding national parks, protected areas, Non-Pima County designated management areas, adjacent counties, and areas of where providing sewerage service would currently be considered economically infeasible.

8.2.3.1 Northwest Region

The Northwest region currently includes the Marana and Rillito Vista facilities and could include Continental Ranch Wastewater Pumping Station (CRWWPS) flow via gravity; however, no conveyance structure connecting the two has been designed or constructed. Marana's existing facility location is down-gradient of much of the projected service area population, whereas Rillito Vista WRF is bounded by privately owned property and resides on land leased by the Arizona Portland Cement Company up-gradient of much of the proposed population. CRWWPS is situated within the town of Marana (12 miles, point to point, from Marana) down-gradient of Ina Road and up-gradient of Rillito Vista and Marana. Due to location, land availability, effluent reuse possibilities, and PCRWRD's invested time and capital, Marana's facility will become the Northwest Region's Non-Metro treatment facility and expand to meet treatment demands.

8.2.4 Southwest Region

The Southwest region's projected development poses an interesting opportunity for Pima County. Avra Valley WRF is the only facility serving this region, and is currently undergoing significant upgrades to address capacity needs. Because of these upgrades and coupled with the fact that the Avra Valley facility is located down-gradient from much of its projected service area, the Avra Valley facility will serve as the Southwest Non-Metro facility. This creates an opportunity for Pima County to proactively implement its goals for thoughtful growth and development in this area of the County. Fundamentally, this Southwest region could become the model for Pima County for managing "smart" growth policies, which bring long-term quality of life benefits to the citizens of the area.

8.2.5 South Region

Completion of the gravity sewer line in 2007/2008 will mark the end for the aerated lagoons of Arivaca Junction WRF and the beginning of the transfer of flow to the Green Valley WRF, the South Region's Non-Metro facility. Class C effluent delivery to Reventone Ranch will cease and partial reuse of Arivaca Junction WRF's wastewater may occur pending acceptance of a proposition to construct a water reclamation facility in the Canoa Ranch vicinity to 'scalp and treat' flow providing highly treated effluent for the habitat in the area. PCRWRD has already invested in a 2.0-mgd BNROD facility and plans on providing additional treatment via an additional 2.0-mgd BNROD process by 2010 (providing a total treatment capacity of 4.0 mgd). Green Valley WRF's current activities have positioned the facility to become the South Non-Metro wastewater reclamation facility.

8.2.6 Southeast Region

The Southeast region consists of two Non-Metro facilities, a future facility and the Corona de Tucson WRF. Due to the recent investment in the Corona de Tucson WRF, the facility will expand to provide service for its area until construction of the future facility and individual conveyance lines connecting Corona de Tucson WRF to the future facility is complete. The conveyance line capacity from Corona de

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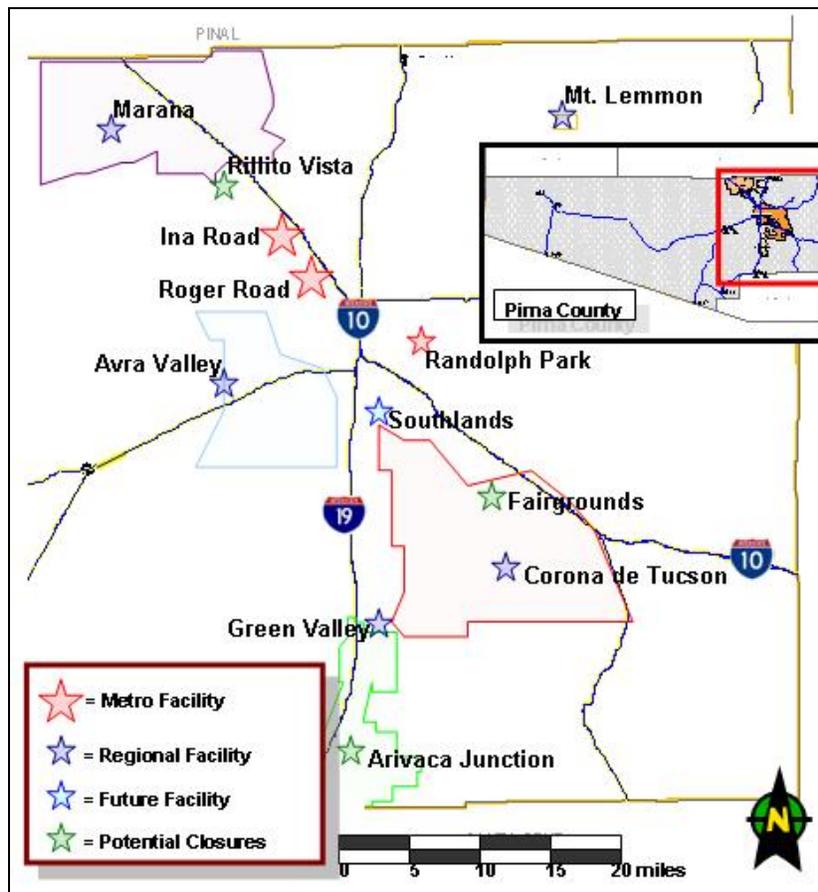
Tucson WRF to Southlands WRF will be designed to include upstream 2030 projected flows and be located in areas of projected development to allow funding to be defrayed from connection fees. A future study must be conducted to determine whether the Corona de Tucson WRF should be phased out or converted to a water reclamation facility providing treated effluent to local customers.

8.2.7 Mount Lemmon Region

Mt. Lemmon WRF will continue operation as a stand-alone facility and flows will not be incorporated into a regional facility due to its remote location.

Figure 8-12 shows PCRWRD's current and future Non-Metro treatment facilities.

Figure 8-12
Current and Future Non-Metro Reclamation Facilities



8.3 Summary

The Non-Metro facilities were constructed to meet wastewater treatment demands for smaller Non-Metro developments. The treatment technologies are varied and require various levels of maintenance and

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repair. As developments were constructed, the Non-Metro facilities offered centralized treatment for the areas generating wastewater, supporting the County's growth and development. When the Non-Metro facilities were initially constructed, wastewater treatment consolidation to the regional facilities (Roger Road WRF and Ina Road WRF) from these areas was not an optimal solution because it would have required long stretches of conveyance structures transporting relatively low flows from areas of little population. Initial treatment processes at the Non-Metro facilities consisted of relatively simply operated and maintained aerated lagoons. As populations increased, PCRWRD sought to improve nutrient removal providing the environment with higher quality of effluent. Thus, a shift towards oxidation ditches, closed loop reactors, and package plants occurred. The wastewater treatment level, and operations and maintenance of these activated sludge systems have since proved to be beneficial and a significant amount of time and capital has been invested in the activated sludge systems.

This chapter summarizes the current and planned activities for each of PCRWRD's operated Non-Metro facilities and identified five Non-Metro regions for probable Non-Metro facility locations: Northwest, Southwest, South, Southeast, and Mountain. The next chapter discusses the recommended flow management for the Non-Metro facilities for the 25-year planning period, building upon what PCRWRD has already prepared and constructed.