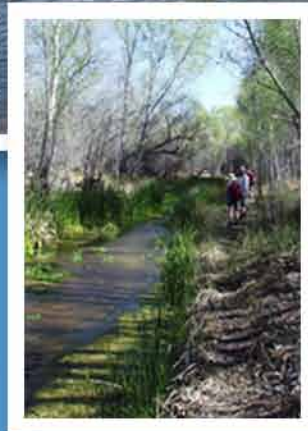
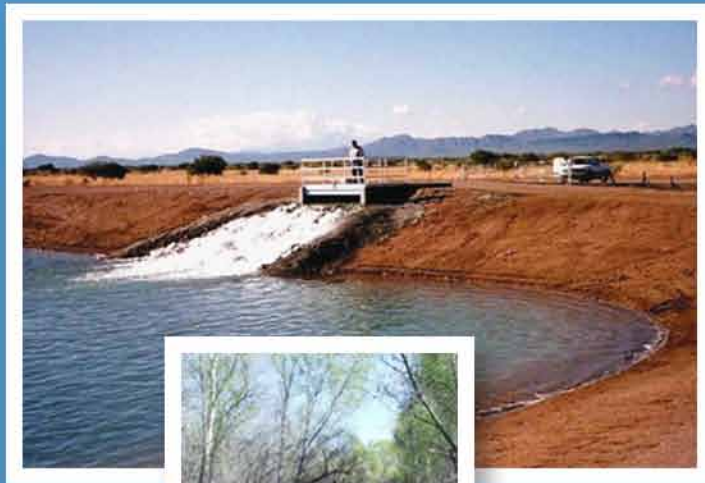


A City of Tucson
and Pima County
Cooperative Project



Water & Wastewater

Infrastructure, Supply & Planning Study



Chapter 4

May 2009

CHAPTER 4: CITY & COUNTY COLLABORATIVE EFFORTS

A. Background

The Scope of Work for the Water Infrastructure, Supply, and Planning Study called for the City of Tucson Water Department (Tucson Water) and Pima County Regional Wastewater Reclamation Department to make progress on four initiatives:

- Tucson Water Department and Pima County Regional Wastewater Reclamation Department staff to improve communication and coordination between the two agencies.
- Cooperatively pursue and develop a joint constructed recharge project for City and County effluent being discharged to the Santa Cruz River;
- Finalize the Conservation Effluent Pool and Intergovernmental Agreement Amendments; and
- Finalize the location of a wastewater reclamation facility in the Southeast Area.

This chapter provides an update on these efforts.

B. Improve Communication and Coordination

Communication and coordination between Tucson Water and Pima County Regional Wastewater Reclamation Department (PCRWRD) staff has improved significantly since the start of this study effort. Staff from both agencies have met at least by-weekly as part of a staff technical advisory team that prepares materials and presentations for the Oversight Committee meetings and provides input to City and County administrations on the overall study. Staff from other City and County departments have also attended these technical advisory team meetings when needed, leading to enhanced communication at a broader staff level. These meetings have also led to increased data sharing and a refinement in the accuracy of each agency's data. Staff from both agencies have been meeting since the beginning of October regarding the development of a joint constructed recharge project along the Santa Cruz River, and the locating of a wastewater reclamation facility in the Southeast area.

An ordinance providing for the directors of both agencies to be non-voting members of each other's advisory committees (Tucson Water's Citizen's Water Advisory Committee and Pima County's Regional Wastewater Reclamation Advisory Committee), was approved by the Board on October 16, 2008 (Ordinance #2008-115) and Mayor and Council on November 25, 2008 (Ordinance #10606). Staff from both agencies also coordinated a joint meeting of these two advisory committees on January 21, 2009.

C. Pursue and Develop a Joint Constructed Recharge Project

The intent of this effort is to accrue additional effluent storage credits through the development of a constructed effluent recharge project. Other goals for the project are to maintain existing riparian vegetation currently dependent on the effluent, and to site a recharge facility such that the effluent remains in the local area. Staff from Tucson Water, PCRWRD, Pima County Regional Flood Control District, and the County Administrator's Office met five times in October, November, and December 2008 in order to move this project forward. The outcomes of these meetings included an inventory of existing managed and constructed effluent recharge projects along the Santa Cruz River, and an inventory of potential effluent recharge projects that have been studied recently or are currently being explored.

The County is currently discharging approximately 62 million gallons per day (MGD) of treated effluent into the Santa Cruz River from the Roger Road and Ina Road wastewater reclamation facilities (WRF). Various entities hold entitlements to this discharged effluent, and they include the Bureau of Reclamation, the City of Tucson, the Metro Water District, Pima County, and the Town of Oro Valley. The Bureau of Reclamation, which has entitlement to the largest volume of effluent annually

discharged to the Santa Cruz River, manages the federal entitlement as a resource to help meet the federal obligations to deliver CAP water to the Tohono O'odham Nation per the Southern Arizona Water Rights Settlement Act (SAWRSA). A portion of the effluent discharged into the Santa Cruz River recharges the aquifer along various stretches of the Santa Cruz River within the Tucson Active Management Area (TAMA), although some effluent flows beyond the TAMA boundary.

Per State law and Arizona Department of Water Resources (ADWR) regulations, entities that store water or effluent underground at "managed" or "constructed" recharge projects within the Tucson AMA are eligible for storage credits that can be recovered at a later date. In order to accrue credits for this effluent recharge and storage, two constructed and two managed recharge projects are being operated pursuant to ADWR permits. The two constructed effluent recharge projects, which receive 100 percent credit for the effluent recharged, include the Sweetwater Recharge Facilities and the Marana High Plains Effluent Recharge Project. The two managed effluent recharge projects, which receive 50 percent credit for the effluent recharged, include the Santa Cruz River Managed Underground Storage Facility and the Lower Santa Cruz River Managed Recharge Project.

The following is a summary of staff's inventory of existing and proposed recharge projects:

EXISTING EFFLUENT RECHARGE PROJECTS

- *Sweetwater Recharge Facilities (USF Permit #71-520083)*

The City of Tucson's Sweetwater Recharge Facilities (SRF) is a constructed recharge project, and it serves an integral part in providing a recycled water supply to Tucson Water's Reclaimed Water System. This project currently consists of a constructed wetland and 28 acres of recharge basins located on both banks of the Santa Cruz River adjacent to the Roger Road WRF. Recharge and recovery operations at the initially-sized facility began in 1989. The annual permitted capacity was recently increased to 13,000 AF in anticipation of facility modifications and a recharge expansion by 2013. The permitted recovery capacity exceeds the annual storage capacity of the facility.

- *Marana High Plains Effluent Recharge Project (USF Permit #71-563876.0005)*

The Marana High Plains Effluent Recharge Project (MHPERP) was developed in 2000 by the Pima County Regional Flood Control District in cooperation with the Bureau of Reclamation, Arizona Water Protection Fund, Cortaro-Marana Irrigation District, Pima County and the Town of Marana. This constructed effluent recharge project is located along the south bank of the Santa Cruz River in Section 33 of Township 11 South, Range 11 East. MHPERP was designed to investigate the feasibility of recharging treated effluent into the local groundwater aquifer, while simultaneously investigating wildlife habitat opportunities associated with recharge facilities. Overall objectives of the project include the recharging up to 600 acre-feet of water per year while determining what infiltration rates can be maintained in basins having side slopes vegetated with emergent plants and riparian trees; revegetating the area outside the recharge basins with plants that will improve wildlife habitat value. Sources of the effluent for MHPERP are discharged from the Roger Road and Ina Road WRF into the Santa Cruz River. The effluent flows about 12 miles before reaching a pre-existing berm constructed of streambed materials that diverts a portion of it into the oxbow channel. The oxbow channel is a former flowing channel of the Santa Cruz River. The diversion sustains the riparian vegetation along the oxbow channel, and pasture irrigation. From the diversion the effluent flows about one mile down the oxbow channel before reaching the facility. A 20-year permit has recently been secured from ADWR that allows for deepening ponds and enhancing recharge to attain the goal of 600 AF/year. Currently, no direct recovery of water stored in this project is planned.

- *Santa Cruz River Managed Underground Storage Facility (USF Permit #71-545943)*

The Santa Cruz River Managed Underground Storage Facility (Phase I: in-channel managed recharge facility) is operated by the City of Tucson to store effluent that is discharged to the Santa Cruz River from the Roger Road WRF and infiltrates through the channel bottom over five miles downstream to Ina Road. The Phase I project began recharging in 1999

and has a maximum permitted capacity of 9,307 AF annually. The City of Tucson and the U.S. Bureau of Reclamation evenly share the effluent storage credits that are annually accrued after a fifty percent cut to the aquifer is taken, given its managed status. As a result, potential credits are limited to 4,653.5 acre-feet per year. The number of credits accrued in any given year is based on annual stream-gauging data which measure infiltration losses in the Santa Cruz River. In addition, adjustments are made to account for evapotranspiration losses. Tucson Water annually recovers all or part of the recharged effluent (storage credits) it accrues along the Phase I channel reach to augment the City's Reclaimed Water System. The U.S. Bureau of Reclamation credits are accruing on a long-term basis.

- ***Lower Santa Cruz River Managed Recharge Project (USF Permit #71-591928.0000)***

The Lower Santa Cruz River Managed Recharge Project (Phase II: in-channel managed recharge facility) is operated by the Cortaro-Marana Irrigation District. The Phase II facility stores effluent that is discharged from the Roger Road WRF and flows beyond Ina Road and the Ina Road WRF. From these two County treatment facilities, the discharged effluent infiltrates through the channel bottom between Ina Road and Trico Road.

The project began accruing credits in 2003 and has a maximum permit capacity of 43,000 AF annually. The City of Tucson, Pima County, Bureau of Reclamation, the Metropolitan Domestic Water Improvement District, and the Town of Oro Valley are effluent entitlement holders who have accrued credits at the Phase II facility. Potential credits are limited to 21,500 AF annually after the 50 percent cut to the aquifer. The number of credits accrued in any given year is based on annual stream-gauging data, which measures infiltration losses; in addition, adjustments are made to account for evapotranspiration losses. A wet-water recovery plan has yet to be agreed upon by the participating entities.

POTENTIAL EFFLUENT RECHARGE PROJECTS TO DATE

- ***Tres Rios del Norte***

Tres Rios del Norte (TRDN) is an ecosystem restoration study being cooperatively prepared by the U.S. Army Corps of Engineers, Pima County Regional Flood Control District, the City of Tucson, and the Town of Marana. The purpose of this study is to: (1) identify and define the extent of ecosystem degradation, potential impacts due to flood events, and other damages related to land and water resources; (2) evaluate problems and identify opportunities and constraints; (3) develop a comprehensive set of viable alternatives consisting of ecosystem restoration, flood damage reduction, water supply, and recreation; (4) evaluate the alternatives based on costs and benefits; and (5) recommend the preferred alternative for implementation. Currently the 90 percent Draft Feasibility Report for TRDN is in progress and final results are expected soon.

The TRDN study area is divided into three reaches. Reach 1 runs from Prince Road to Ina Road. Reach 2 runs from Ina to Avra Valley Road. Reach 3 runs from Avra Valley Road to Sanders Road. For water supply/recharge, six alternatives have been developed and analyzed, including a "no action" plan, as well as alternatives that combined both managed and constructed recharge options.

Within Reach 1 approximately 42 acres of in-channel and off-channel constructed recharge is under consideration, which may replenish 8,000 AF/yr of effluent. Reach 2 is estimated to have about 100 acres potentially available for constructed recharge using a combination of multiple channels; T-basins, and gravel pits. Reach 3 contains approximately 73 acres of in-channel T-berms and an existing gravel pit for constructed recharge of effluent.

Preliminary results of the preferred ecosystem restoration/water supply alternatives include approximately 50 acres of t-berms, 30 acres of multiple channels with grade control outlets, and 10 acres of overbank spreading basins. The estimated amount of effluent that may be recharged is not presently known

- ***Lower Santa Cruz Replenishment Project Effluent Diversion Feasibility Assessment***

The Central Arizona Water Conservation District (CAWCD), the entity that operates the Central Arizona Project (CAP) and Pima County Regional Flood Control District jointly developed the Lower Santa Cruz Replenishment Project (LSCR). The LSCR is a constructed underground storage facility permitted by the Arizona Department of Water Resources to recharge 50,000 AF annually of CAP water. The LSCR is located in the Town of Marana, approximately 1,000 feet south of the Santa Cruz River channel in the Northeast Quarter of Section 3, Township 12 South, and Range 11

East. The recharge site is located in the 100-year floodplain of the Santa Cruz River and consists of three 11-acre surface infiltration basins excavated approximately 20 feet below original land surface. The LSCRCP has been in operation since June 2000 and stores approximately 40,000 acre-feet of water diverted from the CAP aqueduct each year.

A feasibility study funded by the Central Arizona Groundwater Replenishment District (CAGRD) is currently considering potential methods of constructing the infrastructure necessary to divert effluent from the Santa Cruz River for recharge in the LSCRCP facility. The study is evaluating the feasibility of design alternatives for a 10,000 to 20,000 AF per year diversion from the Santa Cruz River channel and conveyance system. Criteria being considered include: feasibility of gravity flow and/or pumped lift diversion and conveyance; hydraulic conductivity of stream channel sediments to estimate potential yield of an infiltration gallery; daily and seasonal effluent flow variability as it relates to system storage for flow equalization; potential vulnerability of infrastructure to flood flow damage; turbidity of effluent; land requirements for diversion and conveyance routing and regulatory permitting requirements. CAGRD is also considering potential credit-sharing arrangements for the 10,000 to 20,000 AF of effluent annually with the owners.

- ***El Rio Medio***

El Rio Medio (ERM) is an ecosystem restoration study being cooperatively prepared by the U.S. Army Corps of Engineers, the Pima County Regional Flood Control District, and the City of Tucson. The study area is along the historic floodplain of the Santa Cruz River and Silvercrock Wash, from Congress Street to Prince Road in central Tucson. The purpose of this study is similar to the TRDN study purpose discussed above. Currently the 75 percent Draft Feasibility Report for ERM is underway and preliminary results are not yet available.

In addition to ecosystem restoration alternatives, five effluent water supply alternatives were developed. Alternatives include both in-channel and off-channel constructed recharge using multiple channels, t-basins, and/or spreading basins on 7 to 22 acres. Preliminary estimates of potential annual recharge included 1330 to 5840 AF/year, with up to 100 percent recharge credit.

In April 2008, the City of Tucson requested that the water-supply-recharge component be removed from the ERM study because of:

- Anticipated changes associated with the PCRWRD Regional Optimization Master Plan (ROMP) which will result in less effluent produced by the County near Roger Road resulting in higher capital cost for infrastructure expansions and higher annual energy costs if the effluent was to be pumped uphill from the Ina Road WRF,
- Incidental vegetation management and liability issues for maintaining appropriate flood conveyance in the channel.

NEXT STEPS

City and County staff are currently developing a list of site selection criteria; this effort may include coordination with the Bureau of Reclamation, which is also seeking a suitable site for a constructed effluent recharge facility along the Santa Cruz River. The goal is to complete an internal assessment of sites, identify project partners, and determine permitting processes by early 2009, and hire a consultant by mid 2009 to fulfill the Scope of Work to include conducting a feasibility study, cost benefit analysis, risk assessment and an assessment of the permit acquisition process. Participation in this project by the Bureau of Reclamation would also require the completion of an Environmental Impact Statement (EIS) under the National Environmental Protection Act (NEPA).

D. Finalize the Conservation Effluent Pool and IGA Amendments

Largely due to the development of the Sonoran Desert Conservation Plan, a portion of the 2000 Supplemental Intergovernmental Agreement between the City and County was developed whereby the parties jointly agreed to set aside up to 10,000 AF per year of effluent (the Conservation Effluent Pool effluent or CEP effluent) for use as part of a Habitat Conservation Plan (HCP) or on riparian projects. The CEP effluent is to be taken on a priority basis from the effluent produced by the County-operated metropolitan WRF. Only effluent supplied to the Bureau of Reclamation under the Southern Arizona Water Rights Settlement Act has a higher priority.

The City and County are currently negotiating an intergovernmental agreement that will define how the CEP effluent will be managed and allocated to riparian projects. The City and County have the decision-making authority on use of the CEP effluent, and there is a provision in the agreement whereby the Board and Mayor and Council could increase the CEP effluent beyond the allotted 10,000 acre-feet. Tucson Water and Pima County have agreed upon acceptable language for the CEP agreement.

E. Finalize Location of Wastewater Reclamation Facility in Southeast Area

In November 2008, Westcor, the development company involved in planning much of the vacant Arizona State Trust Land in the Houghton Master Plan area (HAMP) southeast of Tucson, suspended planning activities due to the current economic downturn. However, most real estate and planning experts seem to agree that what we are currently experiencing is a temporary reduction in development and population growth that will return to historic patterns in the long term. The City's Houghton Area Master Plan for the area southeast of Tucson was based on long-term growth, with buildout not expected for 30 to 40 years.

The City and County have long recognized the need for the development of a new WRF to serve this general area. Under a 1983 Intergovernmental Agreement (IGA) between the City and County, a parcel of City-owned land at Harrison and Irvington was designated for a future County WRF for this area. The City has historically leased this parcel to the Davis-Monthan Air Force Base (DMAFB) for use as part of the Poorman Gunnery Range. Plans for this facility have never been implemented and the parcel ownership has never been transferred to the County. At this point in time, the Air Force has informed County Management that they consider this parcel to be unsafe for public use due to its proximity to the operations of the Poorman Gunnery Range.

A key benefit to locating a WRF in the southeast area would be the local production and possible underground storage of effluent for future reclaimed water supply, as opposed to the current practice of pumping reclaimed water up gradient and several miles from the City's existing reclaimed water facilities. In addition, a WRF in this area may provide opportunities to reduce the conveyance expansions needed for new wastewater flows through the Pantano and Southeast Interceptors to the Roger and Ina Road facilities.

With the task of finalizing a location for a future wastewater reclamation facility to serve the southeast area, staff from Tucson Water and Pima County Regional Wastewater Reclamation Department met three times in October and November 2008. Two of these meetings also included staff from Pima County Development Services Department and a representative from Westcor. Existing infrastructure serving portions of the southeast area was reviewed, as well as previous studies and planning efforts for this area. Proposed siting objectives and criteria were developed and reviewed. Hydraulic flow modeling for all of Roger Road's flows at regional buildout was completed in December 2008, which will enable staff to identify the various sewer basins that can flow into any given site and the amount of sewage to be generated in those areas. Staff is also attempting to obtain the planning data compiled by Westcor for the State Land Department's planning effort, which would greatly assist in this effort.

Existing Wastewater Infrastructure Service in the Southeast Area

Two major sewer interceptor lines, the Pantano and the Southeast Interceptors, serve the far southeast side of the metropolitan area and convey wastewater from this area west and north across the community to the Roger Road and Ina Road Wastewater Reclamation Facilities (WRF) adjacent to the Santa Cruz River.

Sites Identified From Previous Studies and Planning Efforts

In 2006, both agencies began a coordinated evaluation of the future water, reclaimed water and wastewater needs of the HAMP area, in conjunction the City of Tucson's Urban Planning and Design Department and the master planning initiative by the State Land Department for the 12,000 acres they hold in the HAMP and its tributary area. Both agencies consulted with Malcolm Pirnie to produce two parallel and complementary reports – one on water/reclaimed water and one on wastewater. It is important to note that these reports were developed using the same population projections and flow/demand assumptions, the same infrastructure condition and capacity assessments, the same land use assumptions, and the same approach for developing cost opinions. The wastewater evaluation portion of the report was completed in February 2008. The water and reclaimed water portion of the report was released at the end of March 2008.

Malcolm Pirnie Inc. identified several potential reclamation facility sites in their February 2008 wastewater report:

- Davis-Monthan Air Force Base's (DMAFB) Poorman Gunnery Range at the southwest corner of Harrison and Irvington as discussed above.
- Pima County Regional Flood Control District (PCRFCDD) land along the Pantano Wash south of East Camino del Desierto, east of South Perlita Road, west of Old Spanish Trail, and north of East Saguaro Crest Place.

- Sonoran Environmental LLC land along the Pantano Wash, east of Harrison and south of Escalante (north of the DMAFB site), along with a parcel of State land immediately to the west of this site (to meet setback requirements).
- City of Tucson land south of Valencia Road and east of Old Vail Road at the northwest corner of the approximate intersection of Pantano Road and the Southern Pacific railroad.

The first three sites were identified to support the planning scenarios with a reclamation facility sited closer to the Pantano Interceptor (and existing Tucson Water reclaimed facilities), while the fourth site is the only scenario with a reclamation facility located near the Southeast Interceptor.

Other Locations Identified by Staff

At the initial October 7, 2008 meeting with representatives from both agencies, Pima County Development Services, and Westcor, staff reviewed the project history, discussed the wastewater and reclaimed water issues in the area and began to develop expanded criteria and objectives for a WRF in the Southeast/HAMP area. Following the meeting, internal work sessions identified some additional potential facility sites along the Houghton Road and Interstate 10 corridors. The following additional locations were identified:

- City-owned property at the northwest corner of Houghton Road and Irvington Road as described in the 1983 IGA as an alternate to the Poorman Gunnery Range site.
- State-owned land at the intersection of Houghton and Valencia.
- State-owned land in the Houghton Road and I-10 vicinity.
- Land adjacent to the University of Arizona Science and Tech Park, including the IBM Wastewater Treatment Facility (site is currently owned and operated by University of Arizona).
- Wilmot Road and I-10, vicinity tributary to the state and federal prison sites.
- Land currently occupied by PCRWRD's Rancho del Lago Pump Station.

Combined with the sites identified in the Malcolm Pirnie Inc. report, a total of 10 sites have been identified, which will undergo additional evaluation.

NEXT STEPS

Staff are now working to complete planning-level evaluation of projected flows and reclaimed water needs and will refine acquisition issues related to specific sites. The evaluation will apply expanded criteria and objectives for the WRF to the 10 potential locations. Staff will continue to work with the Arizona State Land Department and any future State Land Department planning permittees, to integrate their new planning concepts and assumptions into the overall wastewater conceptual plan for the HAMP tributary area. The deliverable of this continuing review will be a refined list of recommended WRF sites, which would be agreed to by both agencies.