

5.0 Non-Potable Reuse Opportunities

Water Reuse Study

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In investigating potential non-potable reuse opportunities in San Diego, three service areas were identified within the City as viable (**Figure 5-1**). In each service area, the initial focus was on irrigation and industrial customers because those types of customers generally use significant amounts of water. Any additional non-potable opportunities were targeted in the form of other, smaller potential customers located near existing infrastructure, or captured by branching out to areas currently not served by the existing systems. Wetlands creation projects were investigated for the use of recycled water during winter months to simulate storm events in canyon streams. Seasonal storage facilities were considered in each service area and graywater opportunities were reviewed. Also identified were regional opportunities, including the sale of recycled water by the City to neighboring municipalities or water districts.

5.1 Northern Service Area Recycled Water Opportunities

In December 2000, the City prepared the *Updated Water Reclamation Master Plan* (Master Plan). The Master Plan recommended a three-phase extension of the Northern Service Area distribution system. Phase I and Phase II included expansion of the system north on Black Mountain Road and then west into Carmel Valley. Phase III would provide recycled water service to the Rancho Bernardo area. Infrastructure associated with Phases I and II is currently under construction, in design phases, or completed. The City has not authorized funding for the Phase III system, and this phase remains a potential future project for consideration in this report.

In this study, expansion of the existing Northern Service Area recycled water distribution system centered on four conceptual opportunities:

- The first Northern Service Area opportunity considered evaluates the potential for finding new customers with significant irrigation or industrial demands adjacent to or within a quarter-mile of the existing Phase I and Phase II distribution pipelines. These markets were referred to as “infill” customers. Targeted infill customers included commercial and industrial complexes with large landscaped areas, as well as homeowner association common areas, public parks and school yards.
- The second deliberated opportunity was to extend the existing system to the northeast to serve the Rancho Bernardo area (Phase III Expansion) and the golf courses located there.



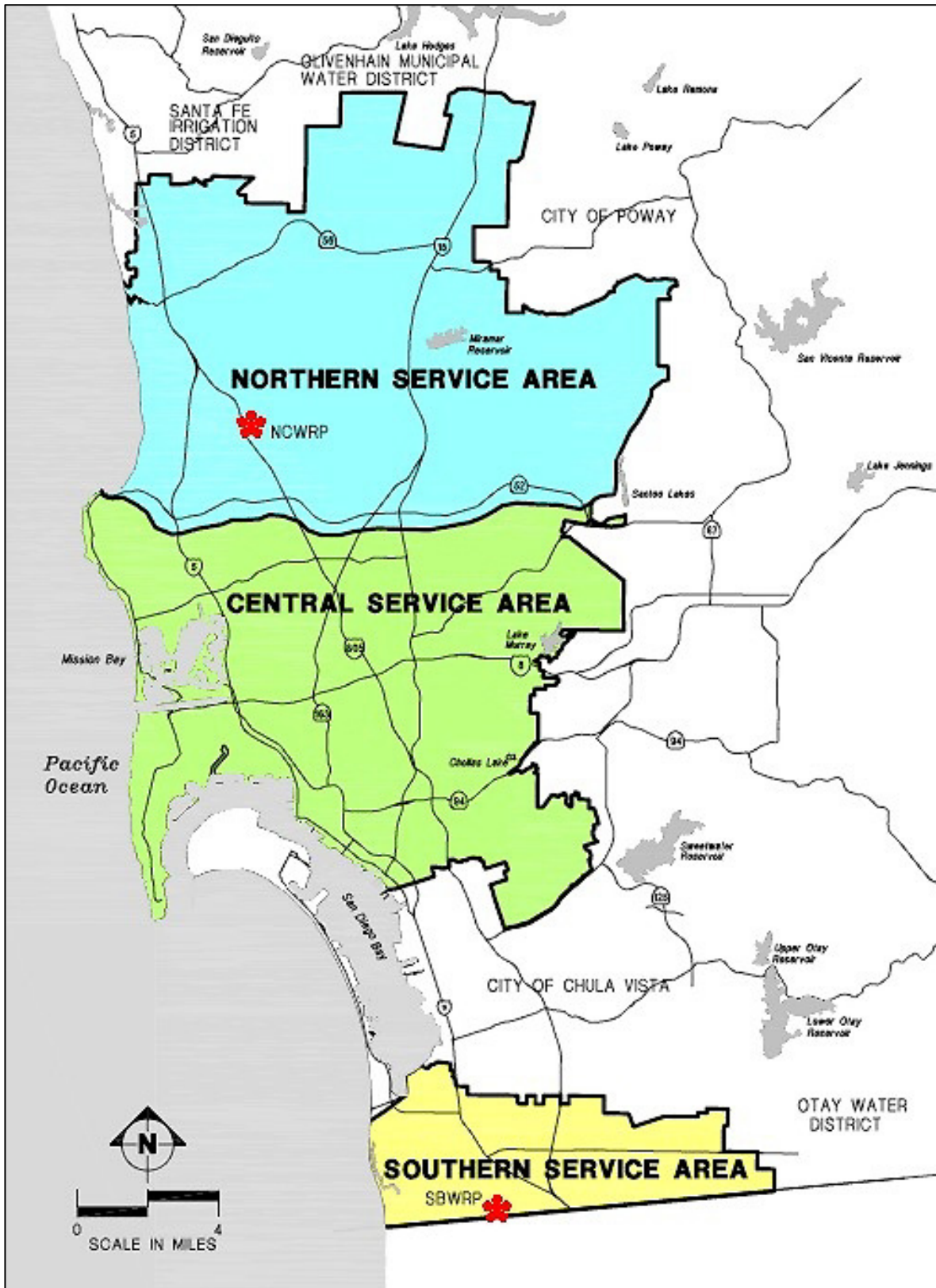


Figure 5-1 – Existing and Proposed Recycled Water Service Areas



- Extending the existing system south to Friars Road to the Central Service Area where it would branch west to Mission Bay Park and south to Balboa Park comprised the third opportunity considered, which would serve additional customers along the way.
- The fourth opportunity was a created wetlands project in Rose Canyon. Through the extension of the existing recycled water system, this opportunity would allow a seasonal discharge of recycled water to Rose Canyon Creek.

These four Northern Service Area non-potable project opportunities are shown in **Figure 5-2**.

Northern Service Area – Infill Customers

When the North City recycled water system was planned, a market assessment evaluated potential recycled water customers based on three key questions:

- Could the customer’s existing water use be met with recycled water?
- How much water do they use regularly?
- What is their proximity to planned infrastructure?

The City worked closely with customers who decided to connect to the recycled water system. The first step was designing the customer’s on-site upgrades so that any retrofitting – disconnecting the potable water system, replacing irrigation heads, posting recycled water signs, etc. – would be executed well. These designs were submitted for regulatory approval. Upon approval, the customer was disconnected from the potable water system, and all upgrades were constructed, connecting the customer to a recycled water system.

Infill is similar to the retrofit process described above that is used to connect customers to the original recycled water system. Infill is particularly applicable to the Northern Service Area, as the City has made strategic infrastructure investments to move transmission facilities to high water demand areas in northern San Diego. Infill could occur by connecting smaller non-potable customers along these pre-existing transmission facility corridors.

Infill Can Meet

2010 Goal

The 2010 beneficial reuse goal of 12 MGD can be met via infill in the northern service area. There are as many as 300 potential customers within a quarter mile of existing pipelines. Infill has less off-site infrastructure requirements, but on-site retrofits must be considered.

The 2010 beneficial reuse goal of 12 MGD from the NCWRP can be met via infill in the Northern Service Area. A new market assessment identified approximately 300 sites within a quarter mile of the existing Phase I and II recycled water pipelines. Not all of the identified sites may be eligible for conversion to recycled water due to site constraints and/or extensive and costly retrofit requirements, though approximately 150 of these sites have an estimated total average water demand, primarily for irrigation, of 3.6 MGD. This amount will close the gap between usage after Phase I and II are completed and the 12 MGD goal. Significant customers include Marine Corps Air Station Miramar, the Qualcomm industrial complex, and the City’s Park and Recreation Department.



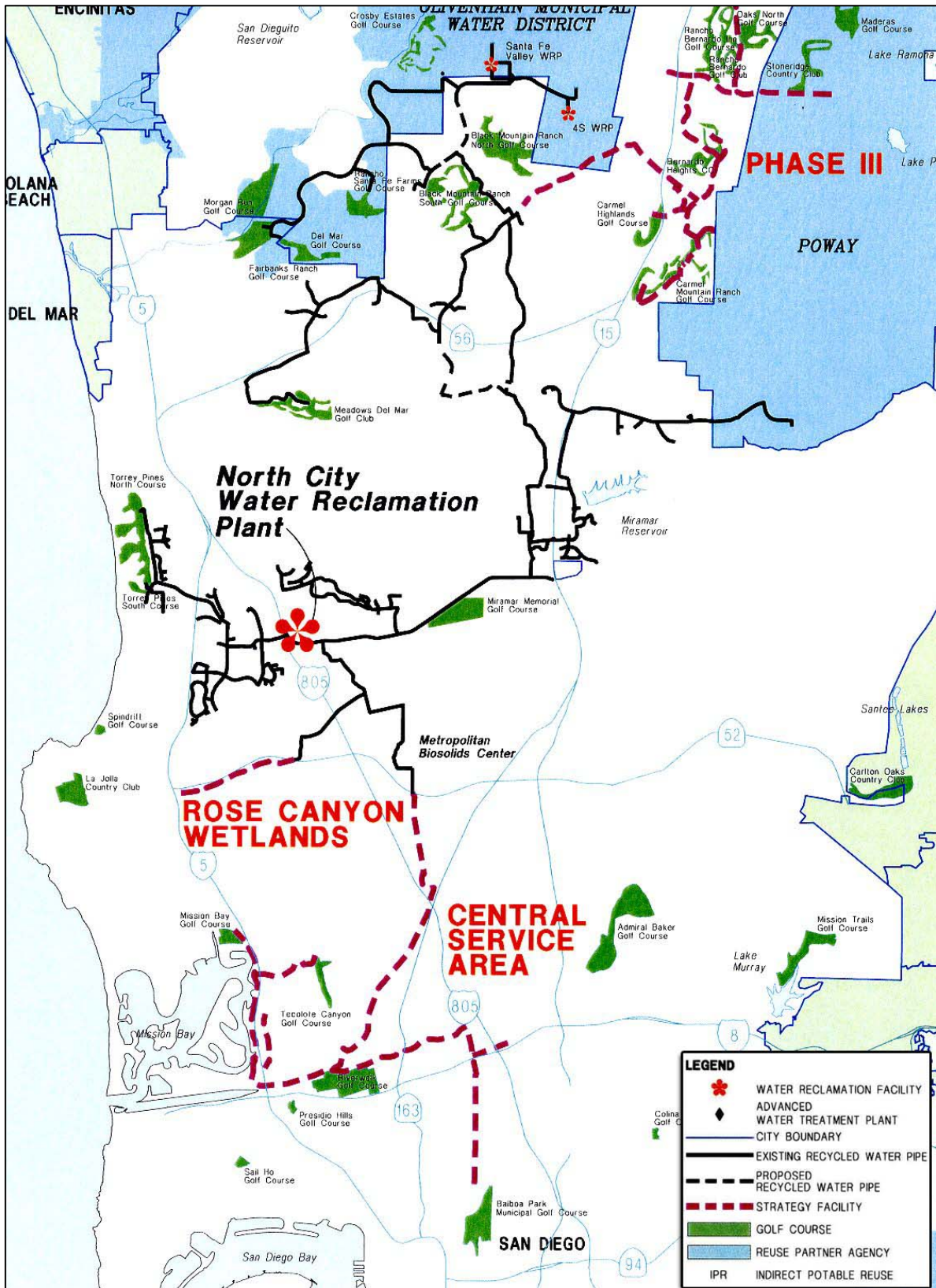


Figure 5-2 – Northern Service Area Non-Potable Reuse Opportunities



Potential customers are located within a quarter-mile to existing and planned pipelines. Although off-site infrastructure requirements are minimal, the customer's on-site retrofit requirements could be extensive depending on the size of the irrigated area.

Northern Service Area – Phase III Expansion

The Phase III expansion was originally proposed in the 2000 Master Plan. This expansion of the system would extend the City's recycled water system into Rancho Bernardo. Originally, the Phase III system started east of Interstate 15 at Sabre Springs, but subsequent technical studies altered the alignment to begin off the Phase II system along Black Mountain Road. The most recently proposed alignment is along the extension of Carmel Valley Road east of Black Mountain. In the Phase III service area, reservoir locations and piping alignments have also been modified from the Master Plan.

The Phase III expansion is aimed at serving six San Diego golf courses, two Poway golf courses, and nearby homeowner associations (HOAs). The expanded system would include approximately 17 miles of pipeline, two separate 2-million gallon reservoirs, and a pump station. In all, 21 customers have been identified, with a total average water demand of 2.5 MGD.

Northern Service Area – Interconnection to Central Service Area

Although the Northern and Central Service Areas are summarized separately in this section, there are opportunities to serve the Central Service Area via the NCWRP. The Central Service Area lies south of the Northern Service Area, bounded by State Route 52 on the north and National City to the south. The largest potential recycled water users in this service area are Balboa and Mission Bay Parks. From a strategic planning approach, within the Central Service Area, these markets would be targeted for conversion to recycled water service first due to the large demands associated with these City-owned parks.

To serve the Central Service Area from the Northern Service Area, a 17-mile, 24-inch diameter pipeline extension is proposed along Convoy Street to Linda Vista Road to Friars Road, west on Friars Road to Mission Bay Park, and east on Friars Road to Qualcomm Way. The pipeline would continue south on Texas, tunneling beneath the San Diego River and Interstate 8, to Balboa Park. Additional potential customers include Riverwalk and Tecolote Golf Courses, the University of San Diego, and Sea World. Their combined estimated average day demand for recycled water would be 2.35 MGD.

Northern Service Area – Seasonal Storage

To maximize the use of recycled water from the NCWRP with a non-potable use strategy, seasonal storage would be needed to provide a means of storing recycled water in the winter for use during summer months. The Study team considered several Northern Service Area seasonal storage opportunities, including groundwater storage and recovery in the San Dieguito Groundwater Basin, and several potential sites for the construction of an excavated earthen basin. Due to the difficulties associated with permitting non-potable recycled water storage in groundwater basins as described in Section 4, the San Dieguito Basin was too costly to merit further consideration. However, several potential earthen basin sites were identified in the Black Mountain area, adjacent to Phase I facilities. Since the Black Mountain area is currently undergoing development, and City-owned properties in the area may not be suitable for an earthen basin site, it is anticipated that construction would be difficult and most likely expensive.



The cost-effectiveness of seasonal storage must be weighed against the cost of supplementing the peak recycled water demands with potable water. The specific volumes of water needed for storage differs for each alternative reuse implementation strategy and are described in Section 7.

Northern Service Area – Wetlands

Wetlands serve as habitat for diverse and endangered species, provide areas for migratory waterfowl along the Pacific Flyway, improve water quality by filtering pollutants, and help reduce flooding. Recycled water has been used successfully in California to create wetlands.

In San Diego, natural wetlands are usually inundated by water for only a few months per year. Almost all natural freshwater wetlands in San Diego have been built over and are not considered recoverable at this point.



Wetlands serve a number of valuable roles in the California environment. Recycled water has been used to create wetlands, however several issues must be considered.

Created wetlands would produce the loss of native upland habitat, resulting in negative environmental impacts. Salt water marshes and their sensitive ecosystems would also be negatively impacted by increased seasonal or year-round upstream flows of freshwater. Environmental groups in San Diego have not generally supported created wetlands or year-round fresh water inputs to an urban or natural ecosystem.

Since wetlands do not usually represent a financial benefit to water agencies, the long-term cost and the negative environmental impacts are likely to outweigh the environmental and aesthetic gains of created wetlands or live stream discharge projects.

The least problematic of the potential sites for a created wetlands project that could be served by the NCWRP were Rose Canyon, Los Penasquitos, San Dieguito River, and De Anza Point (Mission Bay). These sites were investigated closely and it was determined that the sites themselves, much less their receiving waters, could be negatively impacted by freshwater flows.

Rose Canyon was the most attractive opportunity to study further, based on its few environmental constraints associated with freshwater flows and its proximity to existing recycled water facilities. A Rose Canyon recycled water wetland project had also been studied previously. (City of San Diego, 2001)

Rose Canyon is an “L” shaped canyon located in the City. The canyon originates at Marine Corps Air Station Miramar and eventually drains to Mission Bay. The focus of this discussion is on a 1.5-mile stretch of the canyon within the Rose Canyon Open Space Park, running east to west between Genesee Avenue and Interstate 5. This section of the canyon is narrow and relatively undeveloped. Rose Creek meanders through the bottom of this portion of the canyon, which contains many natural upland and wetland habitats and is rich in cultural history. Recycled water would enter the canyon from the base of Erlanger Street, off of Governor Drive, east of Genesee Avenue, where an 8-inch existing recycled water pipeline from the NCWRP ends.



Two potential concepts for environmental reuse projects at Rose Canyon were identified based on a review of available photos, maps, and data. One concept would consist of developing year-round wetlands along the bottom of the canyon. This development would impact existing wetland and upland habitat that would make the project difficult to permit and approve. The project would also need to overcome other environmental concerns associated with the alteration of any seasonal drainage to year-round flow, loss of some unique and sensitive wetland and upland habitats, disturbance to cultural resources, and conflicts with recreational and educational opportunities.

The second concept would comprise of seasonal and/or periodic discharges to Rose Creek. Under this concept, recycled water would be discharged during storms and the wet season in quantities that would not adversely impact habitats or channel integrity. These wet season flows would avoid potential impacts associated with year-round flows and may also provide some benefits to the stream ecology. The concept project would use up to 800 AFY of recycled water during the wet-weather months (approximately 1.5 MGD from November to April), when recycled water supplies are generally available.

An additional factor to consider in evaluating wetlands, in either a year-round or seasonal form, would be the likelihood that once a wetlands project was established, the City would be required by permitting agencies to maintain the flow of water to that project in perpetuity.

Northern Service Area – Groundwater

All of San Diego's groundwater basins are designated for municipal and industrial use. Under this designation, only water treated to an extremely high level can be placed into the basins. The San Diego Basin Plan would also require amending prior to regulatory approval of any possible non-potable groundwater recharge project.

Due to the limited size of the available basins and generally poor quality of San Diego's native groundwater, any blending of highly treated water would result in the need for advanced treatment, such as RO, before it could be added back to the reclaimed water system. In order to meet the State of California's groundwater requirements and the additional treatment to meet water quality requirements, no non-potable groundwater storage projects could be identified that were economically feasible at this time.

5.2 Southern Service Area Recycled Water Opportunities

Upon DHS approval, the SBWRP will provide recycled water for its own on-site uses and for those of the neighboring International Boundary and Water Commission (IBWC) Wastewater Treatment Plant. In 2003, OWD entered into a 20-year agreement with the City to purchase up to 6 MGD of recycled water from the SBWRP by 2007. This recycled water will be used to supplement OWD's existing recycled water supply to serve demands within the Eastern Chula Vista area. OWD is constructing a 30-inch pipeline connection to the City's Southern Service Area distribution system at Dairy Mart Road, shown as an existing pipeline in **Figure 5-3**.

Southern Service Area – Sweetwater Expansion

Expansion of the City's recycled water distribution system in the South Bay area to serve customers in the Sweetwater Authority (a neighboring water district) is also being considered



(Figure 5-3). Sweetwater Authority provides water service to National City and the western portions of Chula Vista, and recently completed a recycled water master plan. Potential customers in this area include a proposed power plant, parks, and a redevelopment project along the Chula Vista waterfront. Sweetwater Authority’s average annual demand is estimated to be 5.25 MGD.

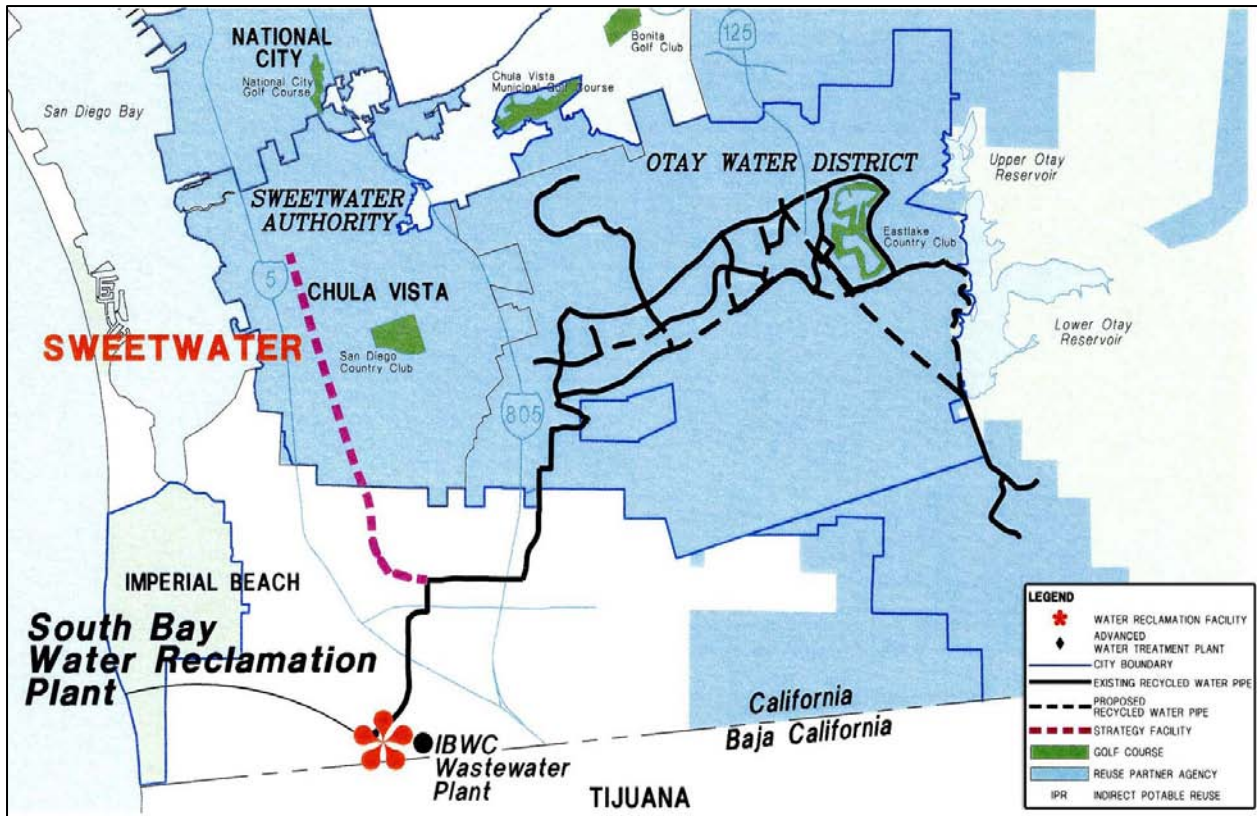


Figure 5-3 – Southern Service Area Non-Potable Opportunities

Southern Service Area – Wetlands

In San Diego, natural wetlands are usually inundated by water for only a few months per year. Almost all of San Diego’s natural freshwater wetlands, have been built over and are unrecoverable at this point. The constructed wetlands would produce some loss of native upland habitat, resulting in negative environmental impacts. Salt water marshes and their sensitive ecosystems would also be negatively impacted by increased or year-round upstream flows of freshwater. Environmental groups in San Diego have not generally supported created wetlands or artificial fresh water inputs to an urban or natural ecosystem.

Since wetlands do not usually represent a financial benefit to water agencies, the financial cost and the negative environmental impacts do not generally outweigh the environmental and aesthetic gains of created wetlands.

Potential sites for a created wetlands project in the Southern Service Area included Dairy Mart Road Pond Enhancement, Tijuana River Valley locations, and the South Bay Salt Flats. The Salt Flats were eliminated from consideration due to their distance from the SBWRP and because the



property is privately held. It was determined that the Dairy Mart Road site has been studied by San Diego County and enhancement is not considered necessary or desirable there. Tijuana River Valley sites would likely require the conversion of agricultural lands. Freshwater flows from a wetlands project there may negatively impact the Tijuana Estuary. Based on this survey, no potential sites were identified as likely locations for a wetlands project in the Southern Service Area.

Southern Service Area – Seasonal Storage

To maximize the use of recycled water from the SBWRP, seasonal storage would provide a means of storing recycled water in the winter for use during peak summer months. Southern Service Area seasonal storage opportunities evaluated include the pre-established Tijuana Groundwater Basin and other potential sites for the construction of an earthen basin. Because of the difficulties associated with permitting non-potable recycled water storage in groundwater basins, as described in Section 4, the Tijuana Basin was eliminated from consideration.

Adjacent to OWD's distribution facilities, numerous potential sites were identified in the Otay Mesa area. Since these areas are currently undergoing development, and the identified properties are not City-owned, it is anticipated that obtaining the rights to these sites would be difficult and possibly expensive. The cost effectiveness of seasonal storage must be weighed against the cost of supplementing the peak summer water demands with potable water instead of recycled water. The specific volume of water needed for storage is different for each alternative implementation strategy, described in Section 7, and the cost effectiveness of seasonal storage was evaluated as part of the overall strategy proposed.

Southern Service Area – Groundwater

As previously stated, all of San Diego's groundwater basins are designated for municipal and industrial use. Under this designation, only water treated to a high level can be placed into them. The San Diego Basin Plan would also require amending prior to regulatory approval of any possible non-potable groundwater recharge project.

Due to the limited size of the available basins and general poor quality of San Diego's native groundwater, any blending of highly-treated water would result in the need for advanced treatment such as RO before it could be added back to the reclaimed water system. Because a project like this would need to meet the State of California's groundwater requirements and provide the additional treatment to meet general water quality requirements, no non-potable groundwater storage projects could be identified that were economically feasible at this time.

5.3 Central Service Area Recycled Water Opportunities

In the 1990's, the Central Service Area was envisioned to receive recycled water service from a new water reclamation plant in Mission Valley. This proposed conventional recycled water treatment plant and related distribution system was never built. Since then, renewed interest in having a Central Service Area system has emerged due to a number of reasons, including:

- Large, high profile customers such as Balboa Park, Mission Bay Park, and the Riverwalk Golf Course and,



- Treatment technology advances, which have reduced the size and costs of treatment components.

Locating a new recycled water treatment facility in the vicinity of potential Central Service Area customers was evaluated in this study. The City’s Metropolitan Wastewater Department (MWWDD) provided their projects and future plans, which conceptualized a 15 MGD wastewater plant located in Mission Valley by 2030. This plant could be constructed in conjunction with a reclamation facility to provide recycled water. The recycled water treatment system could take advantage of technological advances in treatment processes and utilize MBRs, as described in Section 3.

A new treatment plant could be sited on a City-owned parcel in Mission Valley on Camino del Rio North. This site is close to a large volume of wastewater via the North Mission Valley Trunk Sewer, and also appears to allow phased construction of the plant, saving initial costs. To serve the Central Service Area markets, a Mission Valley reclamation facility, if constructed, would have a capacity of 5 MGD to serve identified irrigation customers in the Central Service Area. Excess recycled water in winter months could be returned to the North Mission Valley Trunk Sewer or to the adjacent San Diego River as part of a live stream discharge/wetlands creation project, although the latter is discouraged.

*Central Service Area
A 5 MGD reclamation
plant could be located in
Mission Valley to supply
customers such as
Balboa Park, Mission
Bay Park, and the
Riverwalk Golf Course.*

Since the need for a new wastewater treatment facility in this Central Service Area is not imminent, and the City is concentrating on how to maximize the recycled water it currently produces, this opportunity was not considered viable at this time.

5.4 Regional Opportunities

For recycled water customers beyond the City limits, the City works closely with the Water Authority and local water purveyors to provide service. The City supports the Water Authority’s efforts to investigate countywide recycled water systems and the City has also investigated regional opportunities with individual water purveyors. To date, the City has secured agreements with Poway, the Olivenhain Municipal Water District, and OWD for the sale of recycled water.

Countywide Opportunity – San Diego County Water Authority

In March 2002, the Water Authority published the *Regional Recycled Water System Study* that identified recycled water system strategies which would potentially utilize Water Authority and/or local agency facilities. The concepts would provide a balance between recycled water demand and supply in San Diego County. As a result of this analysis, nine project strategies were developed. Two of the proposed strategies involved the City.

The Escondido/Padre Dam/Helix/San Diego/Sweetwater Strategy included the utilization of the Water Authority First Aqueduct to send recycled water flows south from Escondido’s Hale Avenue Resource Recovery Facility to Helix Water District, serving Padre Dam and the City demands by converting the East Mission Gorge Interceptor to recycled water use. Service to the Tijuana Valley/Mexico area with 2.32 MGD of recycled water from either Padre Dam or Escondido was also considered. (It was assumed that OWD would be using all of the available



supply from the SBWRP, thus none would be available to Tijuana Valley or Mexico.) Neither of these strategies has been or is expected to be pursued by the Water Authority.

On a related note, the Water Authority completed a feasibility study in November 2005, the *Regional Membrane Bioreactor System Study*, that evaluated locations throughout San Diego County to potentially site satellite MBR plants for recycled water production and distribution.

Northern Service Area Regional Opportunity – City of Poway

Since 1998, the City has had an agreement with Poway to provide recycled water via a connection at Scripps Poway Parkway. Based on that agreement, the City would initially provide up to 0.67 MGD (750 AFY) of recycled water to Poway. Upon Poway's request, the City would be obligated to expand its pumping capacity to provide an additional 0.40 MGD (450 AFY), for a total of 1.07 MGD (1,200 AFY). To date, Poway has not requested additional supply. Poway typically purchases approximately 0.45 MGD (500 AFY) of recycled water from the City to provide irrigation within the South Poway Business Park. To increase the supply to high use customers, such as the Stone Ridge and Maderas Golf Courses in northern Poway, would require construction of the City's Phase III recycled water system expansion into Rancho Bernardo.

Northern Service Area Regional Opportunity – Olivenhain Municipal Water District and Santa Fe Irrigation District

In December 2004, the City approved an agreement with the Olivenhain Municipal Water District to provide recycled water via a metered connection at San Dieguito Road. This connection was part of the City's Phase I recycled water system expansion to the Black Mountain Ranch development. The agreement allows Olivenhain Municipal Water District to reserve 0.36 MGD (400 AFY) of capacity in the City's Northern Service Area distribution system for a period of 20 years. Future expansion of Olivenhain's recycled water system or a new service to Santa Fe Irrigation District could increase the demand for recycled water.

Southern Service Area Regional Opportunity – Otay Water District

OWD provides water and wastewater service in south San Diego, including the eastern part of the City of Chula Vista, portions of the City, and unincorporated areas within San Diego County. OWD operates its own water reclamation treatment plant, the 1.3 MGD Ralph W. Chapman Water Recycling Facility. This facility cannot meet all the demands in the OWD recycled water system. Therefore, in 2003, OWD signed an agreement with the City to purchase up to 6 MGD of recycled water from the City's SBWRP by 2007 (also described in section 5.2). To serve demands within their service area, the City's recycled water will supplement OWD's existing recycled water supply. OWD will construct portions of their master plan's recycled water system as new subdivision projects are developed, as well as a pipeline connection to the City's southern service area distribution system at Dairy Mart Road. Future expansion in the OWD system may increase the need for City supply beyond the current 6 MGD commitment.

*Otay Water District
Otay Water District has
agreed to purchase
6 MGD of recycled
water from the City. This
needs to occur prior to
considering additional
regional expansion in
their service area.*

Southern Service Area Regional Opportunity – Sweetwater Authority

As discussed in the Southern Service Area System expansion section (5.2), the Sweetwater Authority provides water service to National City and the western portions of Chula Vista.



Currently, the Sweetwater Authority does not have reclamation facilities, but has expressed interest in purchasing recycled water from the City. The Sweetwater Authority has recently completed a recycled water master plan. Recycled water could be used as a source of process and cooling water at a proposed local power plant facility. In addition, the Sweetwater Authority is investigating the use of recycled water for irrigation and industrial uses. As the Sweetwater Authority recycled water system master plan progresses, further opportunities for increasing regional usage may emerge.

5.5 Graywater Opportunities

Graywater use is a form of water recycling. It does have distinct differences from the other recycled water opportunities described throughout this study. Usually, graywater systems serve one individual site or home, contrasting municipal recycled water systems that serve communities, businesses, and industry. Graywater is generally domestic wash water, typically from sinks, showers, and clothes-washing machines located in the home or building. Water from toilets, kitchen sinks with garbage disposals, and other sources containing high concentrations of organic waste is termed “blackwater” and is diverted to the sewerage system.

In California, graywater may be used for irrigation on a wide range of sites, ranging from single-family to industrial. Typically, graywater systems require a separate plumbing system, surge tank, transfer pump, and subsurface irrigation system. Graywater is subject to little or no treatment, though there are commercially available systems that include sand filters and settling tanks. The California Graywater Standards were originally developed and adopted in response to Assembly Bill 3518, the Graywater Systems for Single Family Residences Act of 1992. These standards have since been incorporated into the California Plumbing Code (California Code of Regulations, Title 24, Part 5, Appendix G: Graywater Systems). The standards apply to the construction, installation, alteration, and repair of graywater systems for subsurface landscape irrigation. Within city limits, permits are required from both the City and the DHS to construct and operate a graywater system.

Graywater Components

The local permitting authority makes the final determination of what is required for a graywater system. The common components of a system are:

- a separate plumbing system to bring the graywater out of the house,
- a surge tank to temporarily hold large flows from washing machines or bathtubs,
- a pump to transfer the water from the tank to the irrigation system, and
- a subsurface irrigation system to distribute the water to the landscaped area.

In 1995, the California Department of Water Resources developed a Graywater Guide for using graywater in home subsurface landscape irrigation. The guide provides prospective users of a graywater system with guidance on design, installation, and maintenance. The guide also provides education on permits, health safety, and some benefits of graywater use. California graywater regulations estimate the potential exists to capture 40 gallons of graywater per person per day from a local single-family residence for irrigation use. For a family of four, this would amount to 58,400 gallons per year or 78 hundred cubic feet (HCF). The present day cost of water per HCF in San Diego is approximately \$2, so use of graywater could amount to a yearly savings of approximately \$156 to a family’s water bill.



For residents and business owners, whether or not a graywater system will be advantageous depends on site-specific conditions. Typically, it is easier to install graywater systems in new structures as the necessary additional piping would be incorporated into the design from the start. Retrofitting existing structures typically increases installation costs. Clay soil conditions often require homeowners to replace or amend their soil prior to using graywater. These constraints limit the impact graywater use can have on decreasing potable water use for landscape irrigation purposes in San Diego. However, graywater use will be examined periodically to identify any technical or economic changes that increase its viability in San Diego.

5.6 Summary of Non-potable Opportunities that are Brought Forward for Evaluation

All of the non-potable reuse opportunities, types of customers served, quantity of recycled water used, and the facilities required to bring recycled water to the customer in each of the three service areas have been described in previous sections. Although many opportunities were investigated, not all were brought forward for evaluation as components of larger implementation strategies.

A summary by service area of the viable opportunities and the facilities required to deliver the recycled water for non-potable uses is presented in **Table 5-1**.

Table 5-1
Summary of Non-potable Reuse Opportunities

Service Area	Opportunity	Estimated Average Day Demand (MGD)	Estimated Annual Use (AFY)	Customers Served	Facilities Required
Northern	Infill	3.6	3,820	Approx. 150 low demand irrigation and industrial customers adjacent to existing recycled water pipelines	Customers install on-site retrofits
Northern	Rancho Bernardo - Phase III; Seasonal Storage	2.5	2,980	21 irrigation and industrial customers including 8 golf courses	2 2-MG reservoirs pump station 17 miles pipeline
Northern	Interconnection to Central Service Area; Seasonal Storage	2.35	2,640	10 irrigation and industrial customers including Balboa Park and Mission Bay Park	1 MG reservoir 2 MG reservoir 17 miles pipeline
Northern	Rose Canyon Wetlands	1.5 (November to April only)	800	None	480 acres of created wetlands and conveyance pipeline
Southern	Expansion to neighboring water districts	6 5.25	5,760* 5,880	Otay Water District Sweetwater Authority	Pipelines constructed by other agencies

* San Diego-Otay Recycled Water Sales Agreement allows maximum of 6 MGD but limits ultimate annual use to 5,760 AFY.



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