CHAPTER 10. RECYCLED WATER PLAN

The City currently collects and transports wastewater through two separate systems: the Combined Sewer System (CSS) and the Separated Sewer System (SSS) to deliver the sewage to the Sacramento Regional Wastewater Treatment Plant (SRWWTP) for treatment and disposal. The purpose of this chapter is to briefly describe both systems, including wastewater flow projections for the SRWWTP, and discuss current recycled water use and actions to encourage use of recycled water in the future.

The City's 2000 Urban Water Management Plan did not project the use of recycled water within the City of Sacramento.

DESCRIPTION OF WASTERWATER DISPOSAL AND TREATMENT SYSTEMS

Wastewater within the City is collected and transported through a CSS and an SSS. The CSS was constructed over 100 years ago, while the SSS was constructed in the 1970's. Both systems convey wastewater to the SRWWTP and are discussed in more detail below.

Combined Sewer System (CSS)

The older, central areas of the City are served by a collection system built well over 100 years ago that combines sewage with stormwater into a single network of pipes.[1] The approximate area of the City served by the CSS extends from the Sacramento River on the west, to 65th Street on the east, to the American River to the north, and to Sutterville Road to the south.[2] Figure 10-1 illustrates the approximate area served by the CSS.

CSS Pumping Stations

The CSS conveys sewage via two pump stations: Pump Station 1/1A and Pump Station 2/2A. Pump Station 1/1A consists of two buildings located at the southeast corner of U and Front Streets; the first building was constructed in 1908 and second building was constructed in 1956.[3] The total theoretical capacity of Pump Station 1/1A is 150 mgd (actual capacity is about 130 mgd).[4] Pump Station 1/1A is not normally used during the summer (i.e., during dry weather periods), and is only operated as needed during wet weather or large storm events.[5]

Pump Station 2 was constructed in 1914 at the southeast corner of Riverside Boulevard and 11th Avenue, and went through extensive modifications in 1938, 1977 and 2002 (added pump station 2A).[6] Pump Station 2/2A is the primary pump station for the CSS, operated continuously throughout the year, and has a total capacity of 530 mgd.[7]

Pioneer Reservoir

The Pioneer Reservoir was constructed in 1978 along Front Street, adjacent to the Sacramento River, northwest of the Interstate 5 and 80-freeway interchange to provide 23 million gallons (MG) of temporary storage to reduce overflows to the Sacramento River.[8] The Pioneer

Reservoir is a pile-supported, covered, reinforced-concrete structure that encompasses an area of approximately 3.5 acres.[9] The reservoir has a peak hydraulic capacity of 350 mgd.[10]

Combined Wastewater Treatment Plant (CWTP)

The CWTP, as illustrated on Figure 10-1, was constructed in 1954, east of Interstate 5, near Fruitridge Road.[11] The CWTP provides primary treatment (i.e., a mechanical settling process that removes oil and about 50 percent of the settleable solids) and disinfection; it has a capacity of about 130 mgd.[12] This plant is only operated during very large storm events.

The City's normal operation at this facility is to convey a maximum of 60 mgd to the SRWWTP (see discussion on the SRWWTP in subsequent sections of this chapter).[13] The 60 mgd of treatment capacity at the SRWWTP is sufficient to treat all of the CSS flows during dry weather or low-intensity storms.[14]

All of the flows from the CSS are treated by the SRWWTP; the City only uses the CWTP during large storm events. The City uses the basins at the CWTP to store wastewater until capacity becomes available at the SRWWTP, and then the stored volume is conveyed to the SRWWTP.

CSS Flow Available to Meet Recycled Water Demands

During Fiscal Year 2004/2005, the City's CSS collected and conveyed approximately 28,934 acre-feet of combined wastewater and stormwater runoff. The City stopped expanding the CSS service area in 1946; hence, flows from the CSS are expected to remain constant in the future.

Any CSS effluent treated at the CWTP will not meet the quality standards for recycled water use, as the CWTP only consists of primary treatment. Additionally, the plant operates only very intermittently, as needed, during large storm events and therefore, does not provide a reliable supply to potential recycled water customers.

The City conveys its CSS effluent to the SRWWTP, which provides secondary treatment (e.g., activated sludge) and tertiary treatment. As will be discussed below, the flow from the City's CSS system is combined with flows from other areas in Sacramento County, including the City's SSS. A portion of this regionally-combined flow is already being processed using tertiary treatment and is delivered to meet recycled water demands.

Separated Sewer System (SSS)

In addition to the City's CSS, the City has a SSS that conveys wastewater into major trunk-sewer lines owned and operated by the County Sanitation District 1 (CSD-1), which then conveys the wastewater to the SRWWTP. In general, the City maintains sewer lines within the City limits that are 12-inches in diameter or smaller, while CSD-1 maintains sewer lines that are larger than 12-inches in diameter, and all of the pump stations. Figure 10-1 illustrates the area served by the SSS.

All wastewater originating from the City and conveyed through either the SSS or the CSD-1 system, is delivered to the SRWWTP before it is discharged to the Sacramento River. An

estimate of the annual quantity of wastewater generated by the City's SSS service area was not available for this UWMP.

Wastewater generated by the City is combined with wastewater flows from other areas of Sacramento County, and treated at the SRWWTP. Wastewater and recycled water flow projections for the SRWWTP are readily available and are discussed in subsequent sections of this Chapter.

Because the City conveys its wastewater to the SRWWTP, this UWMP focuses on the SRWWTP and recycled water activities associated with the SRCSD. Subsequent sections provide a brief description of the SRWWTP, including its treatment system, followed by a discussion of wastewater flows.

Description of the SRWWTP

The SRCSD owns and operates the SRWWTP, which treats and discharges wastewater generated by the Cities of Sacramento, Citrus Heights, Elk Grove, Rancho Cordova, Folsom, and urbanized areas of the County of Sacramento. The SRWWTP is located in Elk Grove, California, and is currently permitted to discharge an average dry weather flow (ADWF) of 181 mgd, and a daily peak wet weather flow of 392 mgd[15], and discharged an average day annual flow (ADAF) of 158 mgd (based on data obtained for the five year ADAF from 2001 to 2005). Figure 10-1 illustrates the location of the SRWWTP.

The SRWWTP provides secondary treatment consisting of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, secondary clarification, chlorine disinfection, and dechlorination.[16] All treated wastewater is discharged to the Sacramento River. Additionally, treated wastewater must be diverted to existing emergency storage basins when a river-to-effluent dilution ratio of 14:1 cannot be maintained.[17]

The projected ADWF in 2005 from the SRWWTP was estimated to be 174 mgd, which includes all cities conveying wastewater to the SRWWTP.[18] This flow is projected to increase to 218 mgd by the year 2020.[19] The wastewater flow projection was obtained from the SRCSD, and originated from the 2020 SRWWTP Master Plan; flow projections beyond 2020 were not available for this UWMP.

Table 10-1 illustrates the projected wastewater flows for the SRWWTP. The portion of this flow available for recycled water use is discussed in subsequent sections.

Table 10-1. Projected Wastewater Flow from the SRWWTP, mgd[a]

Year	Treatment	2005	2010	2015	2020	2025	2030
Flow Treated to Secondary Levels	Secondary	174[b]	196[b]	210[b]	218[b]	222[c]	224[c]

[a] Quantities presented include wastewater conveyed by the City from its CSS and SSS, and wastewater generated by other cities and urbanized areas within Sacramento County.
[b] SRWWTP 2020 Master Plan EIR
[c] Quantities presented for the year 2025 and 2030 were estimated by the City of Sacramento. The quantities were calculated by fitting a curve to year 2005 to 2020 flows and extrapolating the flow rates to 2025 and 2030.

EXISTING AND PROJECTED RECYCLED WATER USE

The SRCSD, in partnership with the SCWA, has developed a wastewater recycling program; Phase 1 was completed in 2003 and Phase II will be completed sometime between 2008 and 2010.[20] Each phase is discussed in more detail below, followed by a comparison of total wastewater generated to total recycled water delivered.

SRCSD Water Recycling Program – Phase I

Phase I consisted of a 5 mgd Water Reclamation Facility (WRF) designed and constructed by the SRCSD and located at the SRWWTP.[21] In April 2003, the WRF began delivering recycled water to the Laguna West, Lakeside, and Stonelake communities in Elk Grove for landscape irrigation.[22] The recycled water is delivered in partnership with the SCWA. SRCSD provides recycled water and SCWA retails the recycled water to its customers.[23]

As of September 2005, the program has 40 user sites that include parks, schoolyards, commercial landscaping, and roadway medians; additional user sites are planned for connection in 2006.[24] Phase I recycled water usage has reached a peak operation of 3 mgd, average daily water recycling usage in the range of 1 to 1.5 mgd, and an annual quantity in the range of 1,100 to 1,700 acre-feet annually.[25] All operations are conducted in accordance with California Regional Water Quality Control Board (RWQCB) and Department of Health Services (DHS) recycled water standards and SRCSD's Master Reclamation Permit (WDR #97-146).[26]

SRCSD Water Recycling Program – Phase II

Phase II consists of expanding the WRF from 5 mgd to 10 mgd, which is in accordance with SRCSD's Master Reclamation Permit (WDR #'s 97-146).[27] The planned WRF plant expansion from 5 mgd to 10 mgd will serve new areas of the Elk Grove/Laguna Community (East Franklin, and Laguna Ridge developments).[28] Similar to Phase I, SRCSD will provide recycled water and SCWA will retail the recycled water to its customers.[29] As mentioned earlier, Phase II is expected to be completed sometime between 2008 and 2010.

Total Existing and Projected Recycled Water Use

As discussed previously, the SRCSD, in partnership with the SCWA, has developed a water recycling program that currently provides up to 5 mgd of recycled water and will provide a total of 10 mgd of recycled water by 2010. Table 10-2 presents the projected wastewater flow generated at the SRWWTP and the delivery capacity for recycled water use. As will be discussed in subsequent sections, the SRCSD is working on a plan to increase recycled water use beyond 2010; however, the actual quantities to be used are still under review.

Table 10-2. Quantity of Wastewater Planned for Recycled Water Programs[a], mgd (DWR Table 14,33,36)

Year	Treatment	2005	2010	2015	2020	2025	2030
Flow Treated to Secondary Levels[b]	Secondary	174	196	210	218	222[c]	224[c]
Quantity Available for Recycled Water	Tertiary	5	10 [a]	10 [a]	10 [a]	10 [a]	10 [a]
% of Total Used for Recycled Water		2.9%	5.1%	4.8%	4.6%	4.5%	4.5%

[a] SRCSD is currently evaluating the expansion of recycled water production. Quantity of planned recycled water production may increase after completion of the studies.

[b] Quantities presented include wastewater conveyed by the City from its CSS and SSS, and wastewater generated by other areas of Sacramento County.

[c] Quantities presented for the year 2025 and 2030 were estimated by the City of Sacramento. The quantities were calculated by fitting a curve to year 2005 to 2020 flows and extrapolating the flow rates to 2025 and 2030.

ACTIONS TO ENCOURAGE USE OF RECYCLED WATER

The SRCSD is currently planning for recycled water projects beyond 2010, through the development of a Water Recycling Master Plan (WRMP) that uses a planning horizon of 2030.[30] The overall objective of the WRMP, which is expected to be completed by the end of 2006, is to increase the use of recycled water in the Sacramento Region to 30 or 40 mgd during peak irrigation months.[31] Water recycling on the scale of 30 to 40 mgd will allow the SRCSD to better manage its effluent discharged to the Sacramento River and will help Sacramento area water purveyors improve their water supply quantity and reliability in terms of irrigation and industrial water supply.[32]

The SRCSD, as part of the WRMP effort, is planning significant outreach to stakeholders that could be associated with SRCSD's future water recycling plans.[33] Stakeholders to be contacted during the WRMP are expected to include, among others: Sacramento area water purveyors and users; land use planning authorities; land development leaders; and environmental interests.[34]

The WRMP will culminate in the development of a SRCSD Water Recycling Master Plan document that is expected to contain numerous water recycling project alternatives that have been evaluated for future SRCSD implementation.[35]

The City is participating in an advisory committee developed by the SRCSD as part of the WRMP effort, which had its first meeting on December 15, 2005. Participation in the committee provides the City the opportunity to consider the feasibility of a future partnership. Recycled water, if utilized within the City, would likely be used for irrigation purposes only.

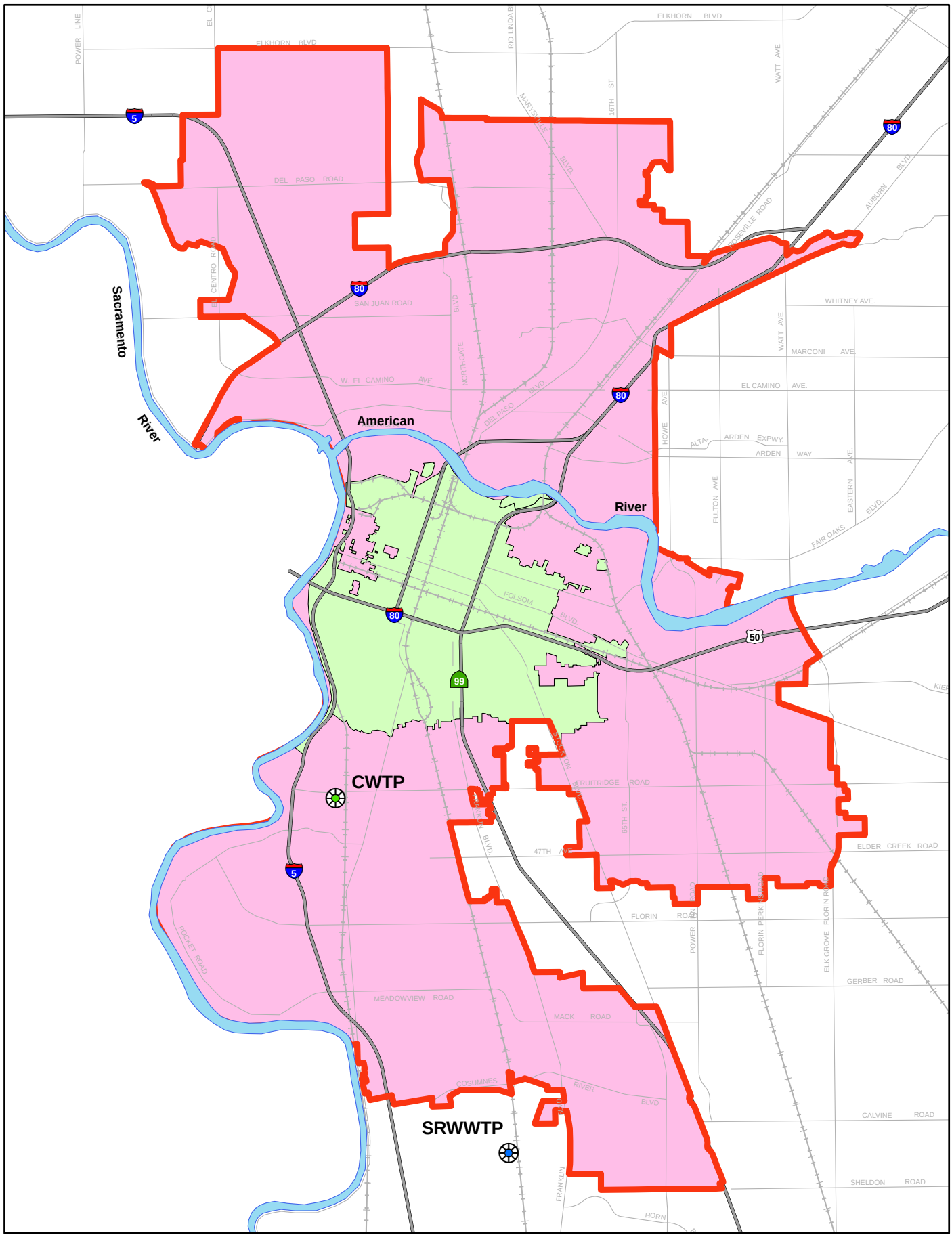
Financial incentives, such as subsidized water pricing may encourage recycled water use within the City. Target areas for subsidized recycled water may include the Bartley Cavanaugh Golf Course, and public green spaces near the Regional Wastewater Treatment Plant, or other scalping plants/recycled water facilities in the future. More study needs to be conducted to determine the feasibility of utilizing recycled water. At this time the City has not made any commitment to utilize recycled water, but is working with the Sacramento Regional County Sanitation District to explore potential future usage.

For the purposes of this Urban Water Management Plan, no recycled water is projected to be used in the City. This may change in the future as studies progress and projects develop. Table 10-3 presents the current projections of recycled water that may be used in the City.

Table 10-3. Methods to Encourage Recycled Water Use (DWR Table 36)

	2010	2015	2020	2025	2030
Recycled Water Delivered Using Financial Incentives (Subsidized Pricing) in Acre-Feet	0[(a)]	0[(a)]	0[(a)]	0[(a)]	0[(a)]

[(a)] The SRCSD is currently evaluating the expansion of its recycled water production, which includes the potential to provide recycled water for the City of Sacramento. After the feasibility study for the water recycling project is completed, the SRCSD and the City of Sacramento may decide whether or not it would be feasible to provide recycled water for the City of Sacramento.



LEGEND:

- Combined Wastewater Treatment Plant (CWTP)
- Sacramento Regional Wastewater Treatment Plant (SRWWTP)
- Area Served by the Combined Sewer System (CSS)
- Area Served by the Separated Sewer System (SSS)
- River
- City Limits
- Freeway
- Railroad
- Streets

N

0 0.45 0.9 1.8

Scale in Miles

FIGURE 10-1

City of Sacramento

COMBINED AND SEPARATED SEWER SYSTEMS

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REFERENCES

[1] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[2] City of Sacramento, *General Plan Technical Background Report*. June 2005.

[3] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[4] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[5] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[6] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[7] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[8] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[9] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[10] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[11] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[12] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[13] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[14] EIP, City of Sacramento Combined Sewer System Rehabilitation and Improvement Plan Final Environmental Impact Report, February 1997.

[15] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[16] Maddaus Water Management, *Urban Water Management Plan 2000*. December 2001.

[17] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[18] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[19] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[20] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[21] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[22] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[23] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[24] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[25] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[26] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[27] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[28] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[29] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[30] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[31] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[32] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[33] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[34] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.

[35] Craney, K., *SRCSD Water Recycling Urban Water Management Plan Language*. September 2005.