COMMITTEE ACTION SHEET

COUNCIL DOCKET OF _____

☐ Supplemental ☐ Adoption ☐ Consent ☐ Unanimous Consent Rules Committee Consultant Review

R -

O -

Water Reuse Study

☒ Reviewed ☐ Initiated By NR&C On 7/26/06 Item No. 9

RECOMMENDATION TO:

Forward the Water Reuse Study to the full City Council; encourage more outreach by City staff on the issue by holding extensive public meetings and hearings, including evening meetings; and to hold at least one evening Natural Resources and Culture Committee workshop on the item.

VOTED YEA: *Frye, Faulconer, Atkins, Hueso*

VOTED NAY:

NOT PRESENT:

CITY CLERK: Please reference the following reports on the City Council Docket:

REPORT TO THE CITY COUNCIL NO. 06-100

COUNCIL COMMITTEE CONSULTANT ANALYSIS NO.

OTHER:

Jim Barrett's July 21, 2006, memo; Ronald Coss's May 31, 2006, letter; Ronald Coss's October 7, 2005, Scientific Studies and associated resource material on Health Effects related to Water Reuse; Henry Abarbanel's June 27, 2006, letter; Joel Anderson's March 7, 2006, letter; Henry Abarbanel's February 14, 2006, letter; Joel Anderson's March 7, 2006, letter (CONT'D)

COUNCIL COMMITTEE CONSULTANT _____

REPORTS (CONT'D)

Henry Abarbanel's February 14, 2006, letter; Art Madrid's February 9, 2006, letter; Mark Lewis's January 30, 2006, letter; Diane Rose's January 27, 2006, letter; Crystal Crawford's January 24, 2006, letter; Mickey Cafagna's January 17, 2006, letter; Nick Inzunza's January 11, 2006, letter;Tom Smisek's January 9, 2006, letter

City of San Diego
MEMORANDUM

DATE: July 21, 2006

TO: Natural Resources and Culture Committee

FROM: Jim Barrett, Water Department Director

SUBJECT: City of San Diego Recycled Water Master Plan Update 2005

Attached is a copy of the City of San Diego Recycled Water Master Plan Update 2005 (Master Plan Update.) This report is the backup document referenced in the Staff Report and the Water Reuse Study Final Draft Report on the agenda for the NR&C Committee meeting of July 26, 2006.

The Master Plan Update analyzes existing and future recycled water facilities including the location and sizes of water reclamation plants, distribution pipelines, pump stations and reservoirs. The Master Plan Update was prepared to comply with the City's Water Reclamation Ordinance (O-17327), adopted by the City Council in 1989 and incorporated into the Municipal Code (Chapter 66, Article 4, Division 8), which requires the City to have a Recycled Water Master Plan to define, encourage and develop the use of the recycled water within City boundaries. The Master Plan is to be updated every five years with the most recent update in 2000.

At the NR&C Committee, we will propose that the Water Reuse Study Final Draft Report be accepted as the update to the Master Plan.

J. M. Barrett

chr

Attachment

Note: Distribution is limited to Natural Resources and Culture Committee members

THE CITY OF SAN DIEGO

May 31, 2006

James F. DeCarolis, Senior Engineer
MWH Americas, Inc.
Applied Research Department
9444 Farnham Street, Suite 300
San Diego, CA 92123

Dear Mr. DeCarolis:

Subject: Water Reuse Research Studies at the North City Water Reclamation Plant
Draft Statement for Water Quality Data Comparison

The purpose of this letter is to provide a comparison of data obtained from this research study with water quality data from the Colorado River (CR), State Project Water (SPW) and local source water from five of the City's reservoirs which contain a blend of imported water (CR and SPW) and local runoff. Data reflecting the water quality of the CR and SPW was obtained from the Metropolitan Water District of Southern California (MWD). MWH's laboratory and the City of San Diego Water Quality Laboratory (SDWQL) provided data on tertiary water and AWT product water from NCWRP in addition to local lake water quality data. Some of this local lake data was obtained in conjunction with the research study while other data was the product of routine analyses performed by the SDWQL.

In addition, the Southern Nevada Water Authority Research Laboratory analyzed samples from the tertiary water, AWT product water, and two local lakes for 29 commonly found endocrine disrupting compounds (EDCs), pharmaceuticals and personal care products (PPCPs). This data was compiled by Enrique Salvatierra, the Technical Assistant and reviewed by me as Technical Manger.

The type of analyses, when samples were analyzed and the location they were taken is detailed in the accompanying spreadsheet. While maximum contaminant levels (MCL), notification levels and reporting levels are set by state and federal authorities, laboratories vary in method detection levels of analyses and the units used to report data (parts per million versus parts per billion, for example). For this reason, comparison of data to established MCLs, if any, were made. It must be noted that some data in this report from CR, SPW and local sources may be based on quarterly or monthly sampling schedules while others are only required to be reported once per year or longer basis, such as radiological analyses, which are only required to be performed four consecutive quarters every four years. Since radiation is usually only associated with groundwater and San Diego's water originates from surface sources, radiation only need to be analyzed on a minimal basis.

Water Reuse Study • Water Department
600 B Street, Suite 700, MS 907 • San Diego, CA 92101-4515
Tel (619) 533-4747 Fax (619) 533-5775
www.sandiego.gov/water/waterreusestudy

A total of two hundred thirty-two (232) of the listed contaminants/constituents were analyzed in both the AWT product water and the local raw water supply. AWT product water contaminant/constituent concentrations were lower than or equivalent to that in the local raw water supply for two hundred twenty-six (226) of the parameters. Six (6) parameters were found to be higher in AWT product water than the raw water supply (boron, free carbon dioxide, nitrogen, nitrate, chloroform and total trihalomethanes).

Boron was found in slightly higher concentrations in AWT water, but well below its notification level, which is a non-regulatory standard below which no suspected health effects are probable. Boron is a naturally-occurring element and is non-toxic in most of its forms. It's been estimated that most people consume between 10 to 25 milligrams every day from the food they eat, or the equivalent of 36 to 90 times the amount found in one liter of AWT water.

The level of free carbon dioxide in AWT water was about 1/3 higher than in San Diego source water. There is no standard for free carbon dioxide in drinking water and the most common concern is that acid produced by excess carbon dioxide combining with water to corrode metal pipes. Both beer and sodas are "super-saturated" with free carbon dioxide, which forms bubbles when pressure is released and it comes out of solution after the can or bottle is opened.

Nitrogen and nitrate as nitrogen were found in greater abundance in AWT water than raw water in concentrations at about one-tenth the MCL for drinking water. Nitrate is formed when nitrogen combines with oxygen and is usually only considered a problem when it promotes excess plant growth, such as aquatic algae blooms. Nitrate in concentrations greater than 10 milligrams per liter can lead to blue baby syndrome in babies younger than six months of age. Nitrate is commonly used as a preservative in dried meats, such as salami.

AWT water contained slightly higher amounts of chloroform and total trihalomethanes (THMs). Chloroform is a one component of the group of chemicals known as total trihalomethanes (TTHMs). These "disinfection byproducts" (DBPs) are formed when chlorine, the most commonly used disinfectant in the drinking water industry, is added to water containing carbon compounds. In addition to killing any bacteria in the water, chlorine binds to compounds containing carbon to form chloroform and other THMs. Chloroform, first used as an anesthetic in the mid-1800s, has been shown to cause miscarriages or birth defects when inhaled at concentrations greater than 30 parts per million. There is no individual drinking water standard for chloroform itself, but the drinking water standard for total THMs is 80 parts per billion. Both chloroform and TTHMs were found in significantly lower amounts than are commonly found in drinking water.

This data indicates that AWT water is superior to San Diego's current raw water supply. Of the six (6) constituents found in the AWT at higher levels than San Diego's current raw water, all were well below any known level of human health concern. The human health risk from consuming AWT water directly is negligible, especially when compared to current drinking water standards and with other water supplies available to San Diego.

Augmenting San Diego's raw water supply with AWT water would result in an improvement to water quality over its current water supplies.

Sincerely,

Ronald Coss
Technical Manger
Water Reuse Study

RJC/BP

Enclosure: Water Quality Comparison Spreadsheet

Scientific Studies and associated resource material on Health Effects related to Water Reuse

Cooper, R., Olivieri, A., Eisenberg, D, Soller, J., and Hall. T. (1996) City of San Diego Water Repurification Project Public Health Assessment. Western Consortium for Public Health.

"Based on the research conducted on the Aqua II facility, the overall conclusion reached by the Health Advisory Committee was that:

The Health risk associated with the use of the Aqua II AWT (Advanced Water Treatment) water as a raw water supply is less than or equal to that of the existing City raw water as represented by the water entering the Miramar water treatment plant.

Preliminary results of the Aqua III HES (Health Effects Study) confirm the observations of the Aqua II HES. In addition, the risk assessment conducted in this report supports these conclusions."

Cooper, R., Olivieri, A., Eisenberg, D, Soller, J., Pettegrew, L. and Danielson, R. (1997) Total Resource Recovery Project Aqua III San Pasqual Health Effects Study Final Summary Report. Western Consortium for Public Health.

"Based on the final Aqua II HES (Health Effects Study), the overall conclusion reached by the Health Advisory Committee was that:

The Health risk associated with the use of the AWT (Advanced Water Treatment) water as a raw water supply is less than or equal to that of the existing City raw water as represented by the water entering the Miramar water treatment plant.

Results of the Aqua III HES at San Pasqual confirm the observations of the Aqua II HES."

Cooper, R., Crawford-Brown, D. Nellor, M, Tchobanoglous, G., and Wei, E. (2000) Groundwater Replenishment System Water Quality Evaluation, Task 7: Conduct Risk Assessment Final Report, Independent Advisory Committee Findings. EOA, Inc.

"It is concluded that the health risk associated with the quality of recharge water expected under the "Proposed Action" Alternative will be less than or equal to that associated with the "No Action" Alternative based on GWRS [GroundWater Replenishment System] water."

Molgaard, C., Golbeck, A. and Elder, J. (1990) Final Report: The Epidemiology Component of the San Diego Total Resource Recovery Program. Division of Epidemiology and Biostatistics, Graduate School of Public Health, San Diego State University.

"No statistically significant evidence of a difference in the rates was found between the two geographical areas studied."

Sloss, E., Geschwind, S., McCaffrey, D., and Ritz, B. (1996) Groundwater Recharge with Reclaimed Water: An Epidemiological Assessment in Los Angeles County, 1987 – 1991. Rand.

"This report assesses the rates of selected health outcomes in a population receiving some reclaimed water in its water supply. The groundwater basin in the Montebello Forebay area of Los Angeles County has been replenished with some reclaimed water since 1962. Rand's epidemiologic assessment of the process of groundwater recharge with reclaimed water is part of an ongoing effort to monitor the health of those consuming reclaimed water in Southern California. The results in this report compare cancer incidence, mortality, and the occurrence of selected infectious diseases between 1987 – 1991 in an area receiving some reclaimed water and a matched control area not receiving reclaimed water in Los Angeles County."

"This epidemiologic study concludes that almost 30 years after groundwater recharge with some reclaimed water began, the rates of cancer, mortality, and infectious disease are similar in both the area of Los Angeles County receiving some reclaimed water and a control area not receiving reclaimed water. Rates of these health outcomes are also similar in areas receiving higher and lower percentages of reclaimed water. The analysis included routinely collected data on cancer incidence (all cancers and cancer of the bladder, colon, esophagus, kidney, liver, pancreas, rectum, and stomach), mortality (deaths due to all causes, hearth disease, stroke, all cancer and the either specific cancer sites), and infectious diseases (giardia, hepatitis A, sammonella, shigella, and several less common diseases)."

"The limitations of epidemiologic methods make drawing definitive conclusions about the effect of reclaimed water on health difficult. Despite its limitations, the results of this epidemiologic study do not provide evidence that reclaimed water has an adverse effect on health."

Sloss, E., McCaffrey, D., Fricker, R., Geschwind, S., and Ritz, B. (1999) Groundwater Recharge with Reclaimed Water: Birth Outcomes in Los Angeles County, 1982-1993. Rand.

"This report describes an epidemiologic study designed to measure the association between adverse birth outcomes and residence in an area with some reclaimed water in the drinking water supply. This study focuses on a population living in the Montebello Forebay region of eastern Los Angeles County, California. In this area, reclaimed water has been used in conjunction with other water sources to recharge the groundwater basin since 1962. We analyzed data on adverse birth outcomes among infants born between 1982 and 1993 to women living in this area, a period from 20 to 30 years after groundwater recharge with reclaimed water was initiated in the Montebello Forebay. This report updates the results of earlier studies of birth outcomes occurring in the Montebello Forebay population between 1969 and 1980 (Frerichs et al., 1981, 1982b, 1983). These studies found no association between reclaimed water and higher rates of low birth

weight, infant mortality, and congenital malformations recorded at the time of birth. The results in this report also complement a recent epidemiologic study (Sloss et al., 1996) that investigated patterns of cancer incidence, mortality, and infectious diseases from 1987 to 1991 in the Montebello Forebay region of Los Angeles County."

"The pattern of results indicates that rates of the prenatal development outcomes and infant mortality between 1982 and 1993, and rates of all types of birth defects between 1990 and 1993 were similar in the reclaimed water and control groups."

"The limitations of epidemiologic methods make drawing conclusions about the effects of reclaimed water on adverse birth outcomes difficult. Despite their limitations, the patterns of results in this report provide little evidence of an association between reclaimed water and adverse birth outcomes. The results of this or any other epidemiologic study cannot certify that reclaimed water has no effect on human health. We can conclude, however, that if reclaimed water is causing higher rates of any of these adverse birth outcomes, the increased risk is likely to be small."

Snyder, S., Pleus, R., Snyder, E., Hemming, J., and Bruce G. (2005) Toxicological Significance of Trace Endocrine Disruptors and Pharmaceuticals in Water. Water Reuse and Desalination Conference, Denver, CO.

"While reports have demonstrated that environmentally relevant levels of potent estrogens do induce biomarker changes in aquatic organisms, implications to human health from water contamination are essentially non-existent. Human exposure to trace endocrine disruptors and pharmaceuticals via water is quite different from that of fish and other aquatic wildlife. Humans are generally considered to ingest 2 liters/day of drinking water and are exposed through bathing and other activities. However, fish and other aquatic organisms are potentially exposed continuously through out a lifetime. This is just one of many reasons that extrapolation from aquatic effects to potential human health consequences is inappropriate."

Stenstrom, M., and Berk, R. (2002) Southern California Environmental Report Card: Water Reclamation. UCLA Institute for the Environment.

"More advanced reclamation techniques produce higher quality water and in some cases these waters are potable. Figure 2 shows technologies called "indirect potable" reclamation. Treated wastewaters are further purified by advanced treatment and are discharged to a reservoir (top) or aquifer (bottom). The reclaimed water has a residence time of one or more years. During this time any remaining bacteria or viruses decay. Indirect potable reclamation has been practiced in California for almost 40 years. Epidemiological studies have found no evidence of any harmful effects."

Stenstrom, M. (2005) Southern California Environmental Report Card: Water Quality. UCLA Institute for the Environment.

"Another positive development is the experience we have gained with failed projects. The failure of the East Valley Water Reclamation Project has taught us we need to better inform the public and politicians about the safety, risks and benefits of water reclamation. The plan died when it became a political football with candidates for City offices wooing voters with statements like "toilet to tap" (see RC 2002 to learn why water reclamation is not toilet to tap). Voters and candidates need to understand that our water supplies already contain reclaimed wastewater, that we need to reclaim more in the future, and that it's low risk."

Collins, H., Bull, R., Cantor, K., Christman, R., Cooper, R., Cotruvo, J., Crook, J., Daniel, R., Okun, D., Rose, J., Skinner, J., Tchobanoglous, G., and Todd, D. (2004), Report of the Scientific Advisory Panel: Orange County Water District's Santa Ana River Water Quality and Health Study National Water Research Institute.

Conclusions

1. Based on the results of the SARWQH Study, the recharge of SAR water to the groundwater basin does not currently threaten water quality or public health.
2. Water quality in the SAR will continue to change, and these changes may influence OCWD recharge operations.
3. Emerging chemical and microbiological constituents of concern (non-regulated and previously unidentified) will require continued surveillance.
4. OCWD should continue to monitor the quality of SAR water and groundwater for chemical and biological constituents of public health concern.
5. Groundwater in the SARWQH Study area is vulnerable to microbial contamination, as indicated by the occasional presence of phage in some water samples.
6. Utilities using recharged groundwater supplies from vulnerable sources must do more than rely on drinking-water standards and guidelines to ensure safety.
7. To minimize any risks that might be associated with the vulnerability of groundwater to fecal contamination, the Panel recommends disinfecting all production wells in the study area that are found positive for phage.

Centers for Disease Control and Prevention, Health Studies Branch. (2003) Potable Water Reuse and Public Health Workshop.

"The presenters were asked about any experience with adverse health effects or outbreaks associated with reclaimed water use. None of the presenters knew of any outbreaks directly attributable to reclaimed water use."

Water Quality Comparison - Colorado River (CR), State Project Water (SPW), City of San Diego (SD)

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)	Colorado River Yearly Average [2,3]	State Water Project Yearly Average [2]	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Inorganics and Physical Parameters								
Asbestos	MFL	MFL	7	ND	ND	ND	na	ND [h]
Bicarbonate	mg/L	ppm	none	159	107	142	na	7.88 [h]
Boron	mg/L	ppm	1 [d]	0.14	0.18	0.115	0.379	0.275 [g, p]
Bromide	mg/L	ppm	none	0.09	0.22	0.207	0.455	ND [g]
Calcium	mg/L	ppm	none	71	25	50.7	na	ND [h]
Carbonate	mg/L	ppm	none	0	0	3.51	na	ND [h, i]
Chloride	mg/L	ppm	250 [a]	87	70	100	255	6.9
Cyanide	mg/L	ppm	0.2	ND	ND	ND	na	ND [h]
Fluoride	mg/L	ppm	2 [a]	0.34	0.13	0.28	na	ND [h]
Free Carbon Dioxide	mg/L	ppm	none	1.5 [h]	1.8	2.9 [h]	na	3.86 [h, j]
Magnesium	mg/L	ppm	none	29	14	25.6	na	ND [h]
Nitrate as NO_3	mg/L	ppm	45	0.9	2.3	0.85	45.3	5.3 [p]
Nitrate as N	mg/L	ppm	10	na	na	ND [i]	na	1.0 [h, p]
Nitrite, N	mg/L	ppm	1	na	na	0.078	na	ND [h]
Phosphorous	mg/L	ppm	none	na	na	0.041	na	na
Potassium	mg/L	ppm	none	4.9	3.1	5.10	19.4	ND
Silica	mg/L	ppm	none	8.5	10.5	11.3	16.0	0.607 [g]
Sodium	mg/L	ppm	none	95	53	79.6	190	6.0 [h]
Sulfate	mg/L	ppm	250 [a]	245	45	142	241	0.722
Foaming Agents (Detergents, Surfactants, MBAS)	mg/L	ppm	0.5 [a]	ND	ND	ND	na	ND [h]
Total Organic Carbon (TOC)	mg/L	ppm	none	3.30	3.89	6.49	8.77	ND [g]
Total Dissolved Solids (TDS)	mg/L	ppm	500 [a]	620	275	508	998	40
Total Hardness as $CaCO_3$	mg/L	ppm	none	297	118	234	356	ND [l]
Total Alkalinity as $CaCO_3$	mg/L	ppm	none	131	88	123	144	6.96
H^+ Concentration (pH)	pH	pH	6.5-8.5 [a]	8.24	8.00	8.33	na	6.6 [h]
Specific Conductance (Conductivity)	µmho/cm	µmho/cm	900 [a]	1003	505	1117	1957	58
Color	CU	CU	15 [a]	5	14	15	na	ND [h]
Turbidity	NTU	NTU	5 [a]	3.8	3.5	1.76	na	0.20 [h]
Alkalinity_Partial	mg/L	ppm	none	na	na	3.71	ND	ND [g]
Hardness_Ca	mg/L	ppm	none	na	na	128	201	3.37 [g]

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)	Colorado River Yearly Average[2]	State Water Project Yearly Average[2]	San Diego Source Water Yearly Average[5A]	NCWRP Tertiary Effluent Average[5B]	NCWRP UV + Peroxide Average[6]
Radionuclides[6,9]								
Gross Alpha	pCi/L	pCi/L	15	4.05	1.93	<3**	na	<3[h]
Gross Beta	pCi/L	pCi/L	50	4.04	3.20	3.4**	na	<3[h]
Radium226	pCi/L	pCi/L	5[f]	ND	ND	na	na	na
Radium228	pCi/L	pCi/L	5[f]	ND	ND	<1**	na	<1[h]
Strontium90	pCi/L	pCi/L	8	ND	ND	na	na	na
Tritium	pCi/L	pCi/L	20,000	ND	ND	na	na	na
Uranium, Total	pCi/L	pCi/L	20	2.74	0.54	na	na	na
Radon 222	pCi/L	pCi/L	none	49	39	na	na	na
Metals								
Aluminum	µg/L	ppb	200[a]	93	87	26.7	11.6	ND
Antimony	µg/L	ppb	6	ND	ND	ND	ND[f]	ND[h]
Arsenic[12]	µg/L	ppb	10	3.0	2.3	ND[f]	2.18	ND
Barium	µg/L	ppb	1,000	151	41	65.6	55.7	ND
Beryllium	µg/L	ppb	4	ND	ND	ND	ND	ND
Cadmium[12]	µg/L	ppb	5	ND	ND	ND	ND	ND
Chromium	µg/L	ppb	50	ND	ND	ND	na	ND[h]
Chromium 6	µg/L	ppb	50	ND	0.12	na	na	na
Copper	µg/L	ppb	1,300[d] (1,000[a])	ND	ND	7.01	6.66	ND[f]
Iron	µg/L	ppb	300[a]	17	20	58.1	na	ND[h]
Lead[12]	µg/L	ppb	15[d]	ND	ND	ND	ND[f]	ND
Lithium	µg/L	ppb	none	47	ND	na	na	na
Manganese	µg/L	ppb	500[d] (50[a])	ND	6	34.7	107	ND[f]
Mercury[12]	µg/L	ppb	2	ND	ND	ND[f]	na	ND[h]
Molybdenum	µg/L	ppb	none	6	3	na	na	na
Nickel	µg/L	ppb	100	3	ND	1.11	5.81	ND
Selenium	µg/L	ppb	50	ND	ND	ND	3.31	ND
Silver	µg/L	ppb	100[a]	ND	ND	ND	ND	ND
Strontium	µg/L	ppb	8	1,100	255	na	na	na
Thallium	µg/L	ppb	2	ND	ND	ND	ND	ND
Vanadium	µg/L	ppb	50[d]	2.8	3.9	1.89	3.3	ND[g]
Zinc	µg/L	ppb	5,000[a]	ND	ND	2.72	29.1	ND

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [1E, 5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Oxygenates								
diisopropyl ether (DIPE)	µg/L	ppb	none		ND	ND	ND	ND
ethyl-tert-buty-ether (ETBE; tert butyl ethyl ether)[13]	µg/L	ppb	none		ND	ND	ND	ND
methy-tert-butyl-ether (MTBE)	µg/L	ppb	5[a]		ND	ND	ND	ND
t-Butyl alcohol (TBA)[13]	µg/L	ppb	12[d]		ND	ND	ND	ND[g]
tert-amyl-methyl-ether (TAME)[13]	µg/L	ppb	none		ND	ND	ND	ND
Volatile Organic Compounds (VOCs)								
benzene	µg/L	ppb	1		ND	ND	ND	ND
bromobenzene	µg/L	ppb	none		ND	ND	ND	ND
bromochloromethane	µg/L	ppb	none		ND	ND	ND	ND
bromomethane (methyl bromide)	µg/L	ppb	none		ND	ND	ND	ND
bromoethane (ethyl bromide)	µg/L	ppb	none		na	ND	na	ND[h]
n-butylbenzene	µg/L	ppb	260[d]		ND	ND	ND	ND
sec-butylbenze	µg/L	ppb	260[d]		ND	ND	ND	ND
tert-butylbenzene	µg/L	ppb	260[d]		ND	ND	ND	ND
carbon disulfide	µg/L	ppb	160[d]		ND	na	na	na
carbon tetrachloride	µg/L	ppb	0.5		ND	ND	ND	ND
chlorobenzene (monochlorobenzene)	µg/L	ppb	70		ND	ND	ND	ND
chloroethane	µg/L	ppb	none		ND	ND	ND	ND
chloromethane (methyl chloride)	µg/L	ppb	none		ND	ND	0.537	ND
2-chlorotoluene (o-chlorotoluene)	µg/L	ppb	140[d]		ND	ND	ND	ND
4-chlorotoluene (p-chlorotoluene)	µg/L	ppb	140[d]		ND	ND	ND	ND
dibromomethane (methylene dibromide)	µg/L	ppb	none		ND	ND	ND	ND
1,2-dichlorobenzene(o-dichlorobenzene; 1,2-DCB)	µg/L	ppb	600		ND	ND	ND	ND
1,3-dichlorobenzene (m-dichlorobenzene; 1,3-DCB)	µg/L	ppb	600[d]		ND	ND	ND	ND
1,4-dichlorobenzene (p-dichlorobenzene; 1,4-DCB)	µg/L	ppb	5		ND	ND	0.20	ND
dichlorodifluoromethane (Freon 12)[13]	µg/L	ppb	1,000[d]		ND	ND	ND	ND
1,1-dichloroethane	µg/L	ppb	5		ND	ND	ND	ND
1,2-dichloroethane (1,2-DCA)	µg/L	ppb	0.5		ND	ND	0.331	ND
1,1-dichloroethene (1,1-dichloroethylene; 1,1-DCE)	µg/L	ppb	6		ND	ND	ND	ND
cis-1,2-dichoroethene (cis-1,2-dichloroethylene; cis-1,2-DCE)	µg/L	ppb	6		ND	ND	ND	ND
trans-1,2-dichloroethene (trans-1,2-dichloroethylene; trans-1,2-DCE)	µg/L	ppb	10		ND	ND	ND	ND
1,2-dichloropropane (1,2-DCP)	µg/L	ppb	5		ND	ND	ND	ND
1,3-dichloropropane	µg/L	ppb	none		ND	ND	ND	ND

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Volatile Organic Compounds (VOCs) (cont'd)								
2,2-dichloropropane	µg/L	ppb	none		ND	ND	ND	ND
1,1-dichoropropene	µg/L	ppb	none		ND	ND	ND	ND
cis-1,3-dichloropropene	µg/L	ppb	0.5[c]		ND	ND	ND	ND
trans-1,3-dichloropropene	µg/L	ppb	0.5[c]		ND	ND	ND	ND
1,3-dichloropropene (1,3-dichloropropylene) Total	µg/L	ppb	0.5[c]		ND	ND	ND	ND
ethylbenzene	µg/L	ppb	300		ND	ND	ND	ND
hexachlorobutadiene	µg/L	ppb	none		ND	ND	ND	ND[h]
isopropylbenzene	µg/L	ppb	770[d]		ND	ND	ND	ND
p-isopropyltoluene (4-isopropyltoluene)	µg/L	ppb	none		ND	ND	ND[i]	ND
methylene chloride (dichloromethane; DCM)	µg/L	ppb	5		ND	ND	0.276	ND
methyl ethyl ketone (MEK; 2-butanone)	µg/L	ppb	none		ND	ND	na	ND[h]
methyl isobutyl ketone (MIBK; 4-methyl-2-pentanone)	µg/L	ppb	120[d]		ND	ND	na	ND[h]
naphthalene	µg/L	ppb	17[d]		ND	ND	ND	ND
n-propylbenzene	µg/L	ppb	260[d]		ND	ND	ND	ND
styrene	µg/L	ppb	100		ND	ND	ND	ND
1,1,1,2-tetrachloroethane	µg/L	ppb	none		ND	ND	ND	ND
1,1,2,2-tetrachloroethane	µg/L	ppb	1		ND	ND	ND	ND
tetrachloroethene (tetrachloroethylene; PCE)	µg/L	ppb	5		ND	ND	ND	ND
toluene	µg/L	ppb	150		ND	ND	ND	ND
1,2,3-trichlorobenzene	µg/L	ppb	none		ND	ND	ND	ND
1,2,4-trichlorobenzene (1,2,4-TCB)	µg/L	ppb	70		ND	ND	ND	ND
1,1,1-trichloroethane (1,1,1-TCA)	µg/L	ppb	200		ND	ND	ND	ND
1,1,2-trichloroethane	µg/L	ppb	5		ND	ND	ND	ND
1,1,2-trichloroethene (trichloroethylene; 1,1,2-trichloroethylene; 1,1,2-TCE)	µg/L	ppb	5		ND	ND	ND	ND
trichlorofluoromethane (fluorotrichloromethane; freon 11)	µg/L	ppb	150		ND	ND	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane (1,1,2-trichlorotrifluoroethane; freon 113)	µg/L	ppb	1,200		ND	ND	ND	ND
1,2,3-Trichloropropane (1,2,3-TCP)	µg/L	ppb	.005[d]		ND	ND	na	ND[h]
1,2,4-trimethylbenzene	µg/L	ppb	330[d]		ND	ND	ND	ND
1,3,5-trimethylbenzene	µg/L	ppb	330[d]		ND	ND	ND	ND
vinyl chloride	µg/L	ppb	0.5		ND	ND	ND	ND
m-xylene	µg/L	ppb	1750[b]		ND	ND	ND	ND
o-xylene	µg/L	ppb	1750[b]		ND	ND	ND	ND
p-xylene	µg/L	ppb	1750[b]		ND	ND	ND	ND

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Volatile Organic Compounds (VOCs) (cont'd)								
xylenes (total)	µg/L	ppb	1750[b]		ND	ND	ND	ND
Organochlorine pesticides								
Aldrin [12]	µg/L	ppb	0.002[d]		ND	ND	ND	ND
α-BHC [12]	µg/L	ppb	0.015[d]		ND	na	na	na
β-BHC [12]	µg/L	ppb	0.025[d]		ND	na	na	na
δ-BHC [12]	µg/L	ppb	none		ND	na	ND	na
γ-BHC (Lindane) [12]	µg/L	ppb	0.2		ND	ND	ND	ND
Chlordane [12]	µg/L	ppb	0.1		ND	ND	ND	ND
Chlorothalonil (1,3-dicyano-2,4,5,6-tetrachlorobenzene)	µg/L	ppb	none		ND	na	na	na
4,4'-DDD (Dichlorodiphenyldichloroethane)	µg/L	ppb	none		ND	na	na	na
4,4'-DDE [12]	µg/L	ppb	none		ND	na	na	na
4,4'-DDT [12]	µg/L	ppb	none		ND	na	na	na
Dieldrin [12]	µg/L	ppb	0.002[d]		ND	ND	ND	ND
Endosulfan I [12]	µg/L	ppb	none		ND	na	na	na
Endosulfan II [12]	µg/L	ppb	none		ND	na	na	na
Endosulfan sulfate [12]	µg/L	ppb	none		ND	na	na	na
Endrin	µg/L	ppb	2		ND	ND	ND	ND
Endrin aldehyde	µg/L	ppb	none		ND	na	na	na
Heptachlor [12]	µg/L	ppb	0.01		ND	ND	ND	ND
Heptachlor epoxide [12]	µg/L	ppb	0.01		ND	ND	ND	ND
Hexachlorobenzene	µg/L	ppb	1		ND	ND	ND	ND
Hexachlorocyclopentadiene	µg/L	ppb	50		ND	ND	ND	ND
Methoxychlor [12]	µg/L	ppb	30		ND	ND	ND	ND
Propachlor	µg/L	ppb	90[d]		ND	ND	ND	ND[g]
Toxaphene [12]	µg/L	ppb	3		ND	ND	ND	ND
Polychlorinated biphenyls (PCB)12	µg/L	ppb	0.5		ND	ND	ND	ND
Trifluralin [12]	µg/L	ppb	none		ND	ND	ND	ND[g]
Carbamates								
Aldicarb	µg/L	ppb	3[e] (7[d])		ND	ND	ND	ND
Aldicarb Sulfone	µg/L	ppb	2[e]		ND	ND	ND	ND
Aldicarb Sulfoxide	µg/L	ppb	4[e]		ND	ND	ND	ND
Baygon (Propoxur)	µg/L	ppb	30[d]		ND	ND	ND	ND
Carbofuran (Furadan)	µg/L	ppb	18		ND	ND	ND	ND
Carbaryl [12]	µg/L	ppb	700[d]		ND	ND	ND	ND

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Carbamates (cont'd)								
3-Hydroxycarbofuran	µg/L	ppb	none		ND	ND	ND	ND
Methiocarb	µg/L	ppb	none		ND	ND	ND	ND
Methomyl [12]	µg/L	ppb	none		ND	ND	ND	ND
Oxamyl	µg/L	ppb	50		ND	ND[c]	ND	ND
Organophosphorous Pesticides and Triazine Herbicides								
Alachlor [12]	µg/L	ppb	2		ND	ND	ND	ND
Atrazine [12]	µg/L	ppb	1		ND	ND	ND	ND
Bromacil	µg/L	ppb	none		ND	na	na	na
Butachlor	µg/L	ppb	none		ND	na	na	na
Diazinon	µg/L	ppb	6[d]		ND	na	na	na
Dimethoate	µg/L	ppb	1[d]		ND	na	na	na
Metolachlor	µg/L	ppb	none		ND	na	na	na
Metribuzin [12]	µg/L	ppb	none		ND	na	na	na
Molinate	µg/L	ppb	20		ND	ND	ND	ND
Prometon	µg/L	ppb	none		ND	na	na	na
Prometryn	µg/L	ppb	none		ND	na	na	na
Simazine	µg/L	ppb	4		ND	ND	ND	ND
Thiobencarb	µg/L	ppb	70 (1[e])		ND	ND	ND	ND
Organochlorine Herbicides								
Acifluorfen	µg/L	ppb	none		ND	ND	ND	ND
Bentazon	µg/L	ppb	18		ND	ND	ND	ND
Chloramben	µg/L	ppb	none		na	ND	ND	ND[g]
2,4-D	µg/L	ppb	70		ND	ND	ND	ND
2,4-DB	µg/L	ppb	none		ND	ND	ND	ND
3,5-Dichlorobenzoic Acid	µg/L	ppb	none		ND	ND	ND	ND
Dacthal (DCPA)	µg/L	ppb	none		ND	ND[f]	na	na
Dalapon	µg/L	ppb	200		ND	ND[f]	ND	ND
Dicamba	µg/L	ppb	none		ND	ND	ND	ND
Dichlorprop	µg/L	ppb	none		ND	ND	ND	ND
Dinoseb	µg/L	ppb	7		ND	ND	ND	ND
MCPA	µg/L	ppb	none		na	ND	ND	ND[g]
MCPP	µg/L	ppb	none		na	ND	ND	ND[g]
Pentachlorophenol [12]	µg/L	ppb	1		ND	ND	ND	ND
Picloram	µg/L	ppb	500		ND	ND	ND	ND

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Organochlorine Herbicides (cont'd)								
2,4,5-TP (Silvex)	µg/L	ppb	50		ND	ND	ND	ND
2,4,5-T	µg/L	ppb	none		ND	ND	ND	ND
Fumigants								
Dibromochloropropane (1,2-dibromo-3-chloropropane; DBCP)	µg/L	ppb	0.2		ND	ND	ND	ND
Ethylene dibromide (EDB; 1,2-dibromoethane) [12]	µg/L	ppb	0.05		ND	ND	ND	ND
Semi-Volatile Organic Compounds (SVOCs)								
Benzo(a)pyrene [12]	µg/L	ppb	0.2		ND	ND	ND	ND
Di(2-ethylhexyl)adipate (Bis(2-ethylhexyl)adipate)	µg/L	ppb	400		ND	ND	ND	ND
Di(2-ethylhexyl)phthalate (Bis(2-ethylhexyl)phthalate; DEHP) [12]	µg/L	ppb	4		ND	ND	ND	ND
Trihalomethanes								
Chloroform (trichloromethane) [12]	µg/L	ppb	none		na	0.81	1.34	1.9
Bromodichloromethane (BDCM)	µg/L	ppb	none		na	0.67	0.414	0.6
Bromoform (tribromomethane)	µg/L	ppb	none		na	0.113	ND	ND
Chlorodibromomethane (Dibromochloromethane)	µg/L	ppb	none		na	0.20	0.36	ND
Total THMs	µg/L	ppb	80		na	1.80	2.11	2.4 [k,p]
Haloacetic acids (HAAs)								
Dibromoacetic acid	µg/L	ppb	none		na	na	ND	ND [g]
Dichloroacetic acid	µg/L	ppb	none		na	na	ND	ND [g]
monobromoacetic acid	µg/L	ppb	none		na	na	ND	ND [g]
monochloroacetic acid	µg/L	ppb	none		na	na	ND	ND [g]
trichloroacetic acid	µg/L	ppb	none		na	na	2.60	ND [g]
HAA5 (Total HAAs)	µg/L	ppb	60		na	na	2.60	ND [g]
Miscellaneous								
Diquat	µg/L	ppb	20		ND	ND**	ND	ND
Diuron	µg/L	ppb	none		ND	na	na	na
Endothall	µg/L	ppb	100		ND	ND**	na	ND [h]
Glyphosate	µg/L	ppb	700		ND	ND	na	ND [h]
Dioxin (2,3,7,8-TCDD) [12]	µg/L	ppb	0.00003		ND	ND**	na	ND [h]
1,4-Dioxane	µg/L	ppb	3 [d]		ND	ND**	na	ND [h,l]
2-methylisoborneol(MIB)	µg/L	ppb	none		ND	4.7	na	na
4-isopropyltoluene (Cymene)	µg/L	ppb	none		na	ND	na	na
4-nitrophenol	µg/L	ppb	none		na	ND	ND	ND [g]

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Miscellaneous (cont'd)								
dibenzo(a,h)anthracene	µg/L	ppb	none		na	ND	na	na
Diethyl phthalate (DEP) [12]	µg/L	ppb	none		na	ND	ND	ND[g]
Dimethyl phthalate	µg/L	ppb	none		na	0.068	ND	ND[g]
Di-n-butyl phthalate (DBP) [12]	µg/L	ppb	none		na	0.103	ND	ND[g]
Acenaphthylene	µg/L	ppb	none		na	ND	ND	ND[g]
Anthracene	µg/L	ppb	none		na	ND	ND	ND[g]
Benzo(A)anthracene	µg/L	ppb	none		na	ND	ND	ND[g]
Benzo(G,H,I)perylene	µg/L	ppb	none		na	ND	ND	ND[g]
Benzo(b)fluoroanthene	µg/L	ppb	none		na	ND	ND	ND[g]
Benzo(K)fluoroanthene	µg/L	ppb	none		na	ND	ND	ND[g]
Butyl benzyl phthalate [12]	µg/L	ppb	none		na	ND	ND	ND[g]
Chrysene	µg/L	ppb	none		na	ND	ND	ND[g]
Fluorene	µg/L	ppb	none		na	ND	ND	ND[g]
Geosmin	µg/L	ppb	none		na	6.25	na	na
Indeno(1,2,3-CD)pyrene	µg/L	ppb	none		na	ND	ND	ND[g]
N-nitroso dimethylamine (NDMA)	ng/L	ppt	10[d]		na	ND**	na	ND[h,i]
Ortho Phosphates	mg/L	ppm	none		na	ND	5.34	ND[g]
Phenanthrene	µg/L	ppb	none		na	ND	ND	ND[g]
Pyrene	µg/L	ppb	none		na	ND	ND	ND[g]
Paraquat	µg/L	ppb	none		na	ND**	ND	ND
						ND		

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)		All Imported Water Sources [10A,10B] (CR, SPW & Blended)	San Diego Source Water Yearly Average [5A]	NCWRP Tertiary Effluent Average [5B]	NCWRP UV + Peroxide Average [6]
Unregulated Contaminant Monitoring Rule (UCMR) List 1								
DCPA mono and di-acid degradate	µg/L	ppb	none		ND	ND	na	ND[h]
MTBE	µg/L	ppb	5[a]		na	ND	na	ND[h]
Nitrobenzene[14]	µg/L	ppb	none		na	na	na	na
2,4-dinitrotoluene	µg/L	ppb	none		ND	na	na	na
2,6-dinitrotoluene	µg/L	ppb	none		ND	na	na	na
Acetochlor[12]	µg/L	ppb	none		ND	na	na	na
EPTC	µg/L	ppb	none		ND	na	na	na
DDE[12]	µg/L	ppb	none		ND	na	na	na
Molinate	µg/L	ppb	20		ND	ND	ND	ND[h]
Terbacil	µg/L	ppb	none		ND	na	na	na
Perchlorate	µg/L	ppb	6[d]		na	ND	na	ND[h]
UCMR List 2								
1,2-Diphenylhydrazine	µg/L	ppb	none		ND	na	na	na
Diazinon	µg/L	ppb	6[d]		ND	na	na	na
Disulfoton	µg/L	ppb	none		ND	na	na	na
Fonofos	µg/L	ppb	none		ND	na	na	na
Nitrobenzene[14]	µg/L	ppb	none		ND	na	na	na
Prometon	µg/L	ppb	none		ND	na	na	na
Terbufos	µg/L	ppb	none		ND	na	na	na
2,4,6-Trichlorophenol	µg/L	ppb	none		ND	na	na	na
2,4-Dichlorophenol	µg/L	ppb	none		ND	na	na	na
2,4-Dinitrophenol	µg/L	ppb	none		ND	na	na	na
2-Methyl-phenol	µg/L	ppb	none		ND	na	na	na
Alachlor ESA[15]	TBD		none		na	na	na	na
RDX[15]	µg/L	ppb	0.3[d]		na	na	na	na
Diuron	µg/L	ppb	none		ND	na	na	na
Linuron[12]	µg/L	ppb	none		ND	na	na	na
UCMR List 3								
Lead-210	TBD		none		na	na	na	na
Polonium-210	TBD		none		na	na	na	na

Constituent	Metric Units	Units	Maximum Contaminant Level (MCL)			San Diego Source Water Average SNWA[16]	NCWRP Tertiary Effluent Average SNWA[17]	NCWRP UV + Peroxide Average SNWA[18]
Endocrine Disrupting Compounds (EDCs), Pharmaceuticals and Personal Care Products (PPCPs)								
Hydrocodone	ng/L	ppt	none			<1.0	84	<1.0
Trimethoprim	ng/L	ppt	none			<1.0	365	<1.0
Acetaminophen	ng/L	ppt	none			<1.0	<1.0[n]	<1.0
Caffeine	ng/L	ppt	none			<10	<10	<10
Erythromycin-H_2O	ng/L	ppt	none			<1.0	323	<1.0
Sulfamethoxazole	ng/L	ppt	none			3.0	788	<1.0
Fluoxetine	ng/L	ppt	none			<1.0	41	<1.0
Pentoxifylline	ng/L	ppt	none			<1.0	<1.0	<1.0
Meprobamate	ng/L	ppt	none			4	262	<1.0
Dilantin	ng/L	ppt	none			<1.0[n]	125	<1.0
TCEP	ng/L	ppt	none			<10	289	<10
Carbamazepine	ng/L	ppt	none			<1.0[n]	275	<1.0
DEET	ng/L	ppt	none			6.8	270	<1.0[l]
Atrazine	ng/L	ppt	1			12.0	1	<1.0
Diazepam	ng/L	ppt	none			<1.0	2.9	<1.0
Oxybenzone	ng/L	ppt	none			<1.0	<1.0[n]	<1.0[l]
Estriol[11]	ng/L	ppt	none			<5.0	<5.0	<5.0
Ethynylestradiol[11]	ng/L	ppt	none			<1.0	<1.0	<1.0
Estrone[11]	ng/L	ppt	none			<1.0	12	<1.0
Estradiol[11]	ng/L	ppt	none			<1.0	<1.0	<1.0
Progesterone[11]	ng/L	ppt	none			<1.0	<1.0	<1.0
Testosterone	ng/L	ppt	none			<1.0	<1.0	<1.0
Androstenedione	ng/L	ppt	none			<1.0	4.7	<1.0
Iopromide	ng/L	ppt	none			<1.0[n]	543	<1.0
naproxen	ng/L	ppt	none			<1.0	36	<1.0
Ibuprofen	ng/L	ppt	none			1.3	26	<1.0
Diclofenac	ng/L	ppt	none			<1.0	62	<1.0
Triclosan	ng/L	ppt	none			na[7]	na[7]	<1.0[m]
Gemfibrozil	ng/L	ppt	none			<1.0	184	<1.0

End Notes

na = Not Analyzed or Not Available.

ND = Not Detected.

LE = Laboratory Error.

TBD = To Be Determined.

MFL = million fibers per liter.

mg/L = milligrams per liter.

μg/L = micrograms per liter.

ng/L = nanograms per liter.

μmho/cm = micromhos per centimeter.

NTU = nephelometric turbidity unit.

CU = color unit.

pCi/L = picocuries per liter.

ppm = parts per million.

ppb = parts per trillion.

ppt = parts per trillion.

1 = Primary drinking water standards; lowest standard is used from the United States Environmental Protection Agency (EPA) or California Department of Health Services (DHS).

2 = CR and SPW general mineral, physical analysis and trace metals data provided by Metropolitan Water District of Southern California (MWD); all data reported are annual arithmetic averages based on analysis of samples collected during fiscal year 2004-2005.

3 = *Sample data provided by Montgomery Watson Harza Laboratory (MWH) or their contract laboratory.*

4 = Average yearly data for calendar year 2005 provided by the City of San Diego Water Quality Laboratory (WQL) or their contract laboratory.

5A = Average yearly data for calendar year 2005 provided by the WQL or their contract laboratory, except where noted;

5B = WQL average data of three samples collected 3/25/2005, 4/13/2005 and between 7/14/2005 - 7/19/2005.

7 = No data available due to contaminated samples.

6 = Average of data obtained by the WQL and MWH for three sample dates, unless otherwise noted.

8 = MWD radiological samples collected during the four quarters of fiscal year 2002-2003.

9 = One radiological sample each from Lake Murray and Lake Miramar analyzed by MWH; sample date 4/13/2005.

10A = MWD: VOC data are averages for first three quarters of 2005 (fourth quarter data *na* at this time) of all source and treated water;

10B = MWD: pesticide, herbicide, SVOC and UCMR data are averages from source and treated water samples collected in August, 2004; 2005 data *na* at time of this comparison.

11 = Estrogens

12 = Compound/element in red is a suspected endocrine disruptor;

13 = DHS unregulated VOCs (April 11, 2005)

14 = Nitrobenzene is on List 1 and 2 Federal UCMR Contaminants with two different reporting levels and analytical method requirements.

15 = Monitoring will be required when List 3 requirements are finalized.

16 = Average of data provided by the Southern Nevada Water Authority Laboratory (SNWA) from analysis on samples collected on 3/25/05 and 04/13/2005.

17 = Average of data provided by the SNWA from analysis of samples collected on 4/13/2005 from Lake Murray and Lake Miramar.

18 = Average of data provided by the SNWA from analysis of samples collected on 4/13/2005 and 12/30/2005.

End Notes:

A = Secondary drinking water standard.

b = MCL for xylene is either for a single isomer or for the sum of the three isomers.

c = MCL for 1,3-dichloropropene is either for a single isomer or for the sum of the cis & trans isomers.

d = Notification level. NOTE: action levels became notification levels in 2005 and some action levels have been archived but may be used by agencies per DHS.

e = Effective date of January 1, 1993 has been postponed, Federal Register, May 27, 1992, pending revised MCL.

f = MCL is for radium-226 & -228 combined.

g = WQL data only, based on analysis of one sample, sample date 4/13/2005.

h = MWH data only, based on average of two samples dated 4/13/2005 and 12/30/2005.

j = While data is greater than the San Diego Source Water Average, this analyte does not have a notification level or MCL.

k = Analyte not required analysis for source water.

l = Analyte detected in one or more samples, however, the average of the data is below the method detection limit and thus ***ND*** per state reporting protocols.

m = Data based on one sample, sample date 12/30/2005.

n = Analyte detected in one or more samples, however, the average of the data is below the method detection limit and thus ***<1*** per state reporting protocols.

p = While data is greater than the San Diego Source Water Average, it is below the MCL considered a human health concern.

** = No City of San Diego data available, average value taken from MWH's analysis of two samples, one each from Lake Murray and Lake Miramar, sample date 4/13/2005.

METRO WASTEWATER JPA

February 14, 2006

Mayor Sanders and City Council
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

Honorable Mayor and Councilmembers:

The Metro Commission[1] has reviewed the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005, and supports the recommendations set forth therein. We recognize that it is imperative that the region maximize the potential use City of San Diego's recycled water system, especially because of the region's reliance on imported water. San Diego County imports 90% of the region's water from the Colorado, Sacramento, and San Joaquin Rivers. Interestingly, this imported water includes treated wastewater discharged from the communities and agricultural urban runoff discharges within those river basins—in essence this water is already recycled either naturally or through a treatment process.

In particular, we strongly support the North City Strategy #3 set out in the Water Reuse Study. Strategy #3 not only expands non-potable resources, but also advocates for large scale indirect potable reuse. This strategy affords us all the opportunity to conserve this precious resource and maximize the potential of the City of San Diego's recycled water system. It is our collective opinion that increasing the production and use of recycled water in the San Diego metropolitan area will greatly benefit the region by providing greater local control of our water supply by decreasing the region's reliance on imported water, decreasing the amount of treated wastewater discharged into our local beaches, and assisting in avoiding potential drought restrictions that may be imposed on our residents in the future. Most importantly, water reuse will help in meeting the future water needs of our region's growing population.

We reiterate our strong support for the City of San Diego's work with regard to water reuse as delineated in its Water Reuse Study.

Sincerely,

Henry Abarbanel
Metro Wastewater JPA, Chair

cc: Richard Haas
Marsi Steirer

[1] By way of introduction, the Metro Commission is an advisory body established by the 1998 "Regional Wastewater Disposal Agreement between the City of San Diego and the Participating Agencies in the Metropolitan Sewerage System." The purpose of the Metro Commission is to provide the position of the "Participating Agencies" on matters affecting the Metro System. The Metro Commission membership includes the cities of Chula Vista, Coronado, Del Mar, El Cajon, Imperial Beach, La Mesa, National City and Poway, the County of San Diego (representing the Winter Gardens Sewer Maintenance District, Alpine Sanitation District, Lakeside Sanitation District and Spring Valley Sanitation District), the Lemon Grove Sanitation District, the Otay Water District and the Padre Dam Municipal Water District.

PADRE DAM
Municipal Water District

9300 Fanita Parkway
Santee, CA 92071
T 619 448 3111
F 619 449 9469

PO Box 719003
Santee, CA 92072-9003
WWW.PADREDAM.ORG

March 7, 2006

Mr. Jerry Sanders, Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

1955 50 ANNIVERSARY YEARS OF SERVICE 2005

Dear Mayor Sanders:

On behalf of the Padre Dam Municipal Water District Board of Directors please accept our full support of the City's 2005 Water Reuse Study and its recommendations. As a pioneer in the field of recycled water, Padre Dam knows all to well that without recycled water it may be difficult to meet the water demands of a growing county population. Water reuse, and its companion water conservation, will serve to augment this region's water supply and reliability for decades to come.

We support the study's options to maximize the use of recycled water that can be produced by the City's two reclamation plants, North City and South Bay. And while we clearly support the traditional uses of recycled water for landscape irrigation, construction, and industrial processing, we also support advanced water treatment technology to produce highly treated recycled water that can be used for reservoir augmentation. This repurifed water is clearly the next evolution of water reuse in our communities. We want to commend City staff and the Council leadership for your furtherance of the use of recycled water as a sustainable water supply for our region. Please let us know how we may be of assistance as you pursue the goals of the study.

Sincerely,

Joel Anderson
Board President

c: Padre Dam Board of Directors

City of La Mesa

ART MADRID
Mayor

February 9, 2006

Mr. Jerry Sanders
City of San Diego Water Department
City Administration Building
11th Floor, 202 C Street
San Diego, CA 92101

Dear Mr. Sanders: Jerry

The City of La Mesa has received and reviewed the video presentation about the Water Reuse Study 2005, as well as the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005. The Study indicates options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. In fact, all of the water we use has been recycled (naturally or through a treatment process).

The City of La Mesa understands that the Study is analyzing several options to maximize the amount of recycled water that can be produced by the City's two water reclamation plants. Some options involve traditional uses of recycled water such as for landscape irrigation, outdoor construction, and industrial processing. Other options involve using advanced treatment technologies to produce highly treated recycled water. This technology allows recycle water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water. The majority of the La Mesa City Council supports these options as well as the expansion of the recycled water distribution system.

Increasing the production and use of recycled water in the metropolitan area will provide the following benefits:

- Provide greater local control of our water supply.
- Provide a local source of water that can be used beneficially in a variety of ways.

8130 ALLISON AVENUE, P.O. BOX 937, LA MESA, CALIFORNIA 91944-0937 / (619) 667-1106, FAX (619) 462-7528

- Decrease and/or offset the amount of water that must be imported into the metropolitan area.
- Decrease the amount of treated wastewater that must be discharged into the ocean.
- Help meet the future water needs of an increasing population.
- Help avoid potential drought restrictions on outdoor watering that could be mandated on imported water used for this purpose.

The majority of the La Mesa City Council is supportive of the City of San Diego's Water Reuse Study 2005 in its efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Art Madrid
Mayor

cc: Members of the City Council
City Manager
Director of Public Works

CITY OF EL CAJON

MAYOR AND CITY COUNCIL

January 30, 2006

Mr. Jerry Sanders, Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, CA 92101

Dear Mayor Sanders:

The City of El Cajon has received and reviewed the video presentation about the Water Reuse Study 2005, as well as the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and recently had a presentation to our City Council on the Water Reuse Study presented by Marsi Steirer of your staff. The study indicates options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is vital, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. In fact, all of the water we use has been recycled (naturally or through a treatment process).

The City of El Cajon understands that the study has indicated several options to maximize the use of recycled water that can be produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water. This technology allows recycled water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water.

The City of El Cajon supports the City of San Diego's Water Reuse Study 2005 in its efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Mark Lewis
Mayor

ML:th

c: Teri Basta, Padre Dam Municipal Water District
Dennis Davies, Public Works Department

200 E. MAIN STREET • EL CAJON, CA 92020-3996 • TEL: (619) 441-1788 • FAX: (619) 441-1770

City of Imperial Beach, California

www.cityofib.com

OFFICE OF THE MAYOR

January 27, 2006

Mr. Jerry Sanders
Mayor, City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

Dear Mayor Sanders:

The City of Imperial Beach views with great interest the the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005. The Study indicates options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is vital, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges.

We understand that the Study has indicated several ways to maximize the use of recycled water that can be produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water that can be added to groundwater storage basins and water storage reservoirs to supplement other sources of potable water. We support these options as well as the expansion of the recycled water distribution system.

825 Imperial Beach Blvd., Imperial Beach, CA 91932 Tel: (619) 423-8303 fax: (619) 628-1395

Increasing the production and use of recycled water in the metropolitan area will provide the following benefits:

- Provide greater local control of our water supply
- Provide a local source of water than can be used beneficially in a variety of ways
- Decrease and/or offset the amount of water that must be imported into the metropolitan area
- Decrease the amount of treated wastewater that must be discharged into our ocean
- Help meet the future water needs of an increasing population
- Help avoid potential drought restrictions that could be mandated on water uses

We support the City of San Diego's Water Reuse Study 2005 in its analysis of all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Diane Rose

Diane Rose
Mayor

City of Del Mar
Where the Turf meets the Surf
1050 Camino Del Mar · Del Mar, California 92014-2698

January 24, 2006

Mr. Jerry Sanders, Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

Dear Mayor Sanders:

The City of Del Mar supports the City of San Diego's efforts to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is vital, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. In fact, all of the water we use has been recycled (naturally or through a treatment process).

The City of Del Mar understands that several options to maximize the use of recycled water can be utilized for the water produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water. This technology allows recycled water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water. Del Mar supports these options as well as the expansion of the recycled water distribution system.

Increasing the production and use of recycled water in the metropolitan area will provide the following benefits:

- Provide greater local control of our water supply
- Provide a local source of water than can be used beneficially in a variety of ways
- Decrease and/or offset the amount of water that must be imported into the metropolitan area
- Decrease the amount of treated wastewater that must be discharged into our ocean
- Help meet the future water needs of an increasing population
- Help to avoid potential drought restrictions on outdoor watering that could be mandated on imported water used for this purpose

The City of Del Mar is supportive of the City of San Diego's efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Crystal Crawford

Crystal Crawford, Mayor
City of Del Mar

cc: City of San Diego Water Department
City Council
City Manager
Public Works Director

CITY OF POWAY

January 17, 2006

The Honorable Jerry Sanders, Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, CA 92101

Dear Mayor Sanders:

The City of Poway has received and reviewed the video presentation about the Water Reuse Study 2005, as well as the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005. The Study specifies options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is essential, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. Actually, all of the water we use has been recycled (naturally or through a treatment process).

The City of Poway understands that the Study has specified several options to maximize the use of recycled water that can be produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water. This technology allows recycled water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water. Poway supports these options, as well as the expansion of the recycled water distribution system.

Increasing the production and use of recycled water in the metropolitan area will provide many benefits, including:

- Provide greater local control of our water supply;
- Provide a local source of water than can be used effectively in a variety of ways;
- Decrease and/or offset the amount of water that must be imported into the metropolitan area;
- Decrease the amount of treated wastewater that must be discharged into our ocean;
- Help meet the future water needs of an increasing population;
- Help to avoid potential drought restrictions on outdoor watering that could be mandated on imported water used for this purpose.

The City of Poway is supportive of the City of San Diego's Water Reuse Study 2005 in its efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Mickey Cafagna
Mayor

cc: Members of the City Council
Rod Gould, City Manager
Penny Riley, Assistant City Manager
Jim Howell, Director of Public Works

January 11, 2006

Mr. Jerry Sanders
Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

Dear Mayor Sanders:

The City of National City has received and reviewed the video presentation about the Water Reuse Study 2005, as well as the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005. The Study indicates options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is vital, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. In fact, all of the water we use has been recycled (naturally or through a treatment process).

The City of National City understands that the Study has indicated several options to maximize the use of recycled water than can be produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water. This technology allows recycled water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water. Coronado supports these options as well as the expansion of the recycled water distribution system.

Increasing the production and use of recycled water in the metropolitan area will provide the following benefits:

- Provide greater local control of our water supply
- Provide a local source of water than can be used beneficially in a variety of ways
- Decrease and/or offset the amount of water that must be imported into the metropolitan area
- Decrease the amount of treated wastewater that must be discharged into our ocean
- Help meet the future water needs of an increasing population
- Help to avoid potential drought restrictions on outdoor watering that could be mandated on imported water used for this purpose

The City of National City is supportive of the City of San Diego's Water Reuse Study 2005 in its efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Nick Inzunza
Mayor

cc: City Council
City Manager
Assistant City Manger
Director of Public Works

January 9, 2006

The Honorable Jerry Sanders
Mayor
City of San Diego
City Administration Building
11th Floor, 202 C Street
San Diego, California 92101

Dear Mayor Sanders:

The City of Coronado has received and reviewed the video presentation about the Water Reuse Study 2005, as well as the Interim Report of the Water Reuse Study 2005, prepared in June of 2005, and the American Assembly II Statement adopted July 14, 2005. The Study indicates options to increase the use of recycled water in the City of San Diego and surrounding cities, from Poway/Del Mar south to the international border. This is vital, since 90% of the region's water is imported from the Colorado River and the Sacramento and San Joaquin Rivers, hundreds of miles away. This water supply includes, among other things, treated wastewater discharged from communities within those river basins, as well as agricultural and urban runoff discharges. In fact, all of the water we use has been recycled (naturally or through a treatment process).

The City of Coronado understands that the Study has indicated several options to maximize the use of recycled water that can be produced by the City of San Diego's two water reclamation plants. Some options involve familiar uses of recycled water such as landscape irrigation, construction, and industrial processing. Other options involve using advanced water treatment technology to produce highly treated recycled water. This technology allows recycled water to be added to groundwater storage basins and water storage reservoirs so that it can help supplement other sources of drinking water. Coronado supports these options as well as the expansion of the recycled water distribution system.

Increasing the production and use of recycled water in the metropolitan area will provide the following benefits:

- Provide greater local control of our water supply.
- Provide a local source of water that can be used beneficially in a variety of ways.
- Decrease and/or offset the amount of water that must be imported into the metropolitan area.
- Decrease the amount of treated wastewater that must be discharged into the ocean.
- Help meet the future water needs of an increasing population.
- Help to avoid potential drought restrictions on outdoor watering that could be mandated on imported water used for this purpose.

The City of Coronado is supportive of the City of San Diego's Water Reuse Study 2005 in its efforts to analyze and evaluate all possible options to increase the production and use of recycled water in the region and in our community.

Sincerely,

Tom Smisek
Mayor

cc: City of Coronado
City Council
City Manager
Director of Public Services

EXECUTIVE SUMMARY SHEET

DATE ISSUED: July 19, 2006 REPORT NO.: 06-100
ATTENTION: Natural Resource & Culture Committee, Agenda of July 26, 2006
ORIGINATING DEPT: Water Department
SUBJECT: Water Reuse Study
COUNCIL DISTRICT: Citywide
STAFF CONTACT: Marsi Steirer (619-533-4112)

REQUESTED ACTION:

Committee acceptance of the Water Reuse Study Final Draft Report (Study Final Draft Report) as fulfillment of the elements outlined in Council Resolution R-298781 evaluating all aspects of a viable increased water reuse program.

STAFF RECOMMENDATION:

Staff recommends the following:

- Accept the Study Final Draft Report as fulfillment of the elements outlined in Resolution R-298781.
- Accept the Study Final Draft Report as fulfillment of the Recycled Water Master Plan Update as required by Municipal Code Chapter 66, Article 4, Division 8.

EXECUTIVE SUMMARY:

On January 13, 2004, the San Diego City Council (Council) directed the City Manager to conduct a study to evaluate options for increasing the beneficial use of the City's recycled water (Resolution R-298781). During the Council hearing, staff was directed to research and produce a report on specific opportunities for increasing recycled water use, to compile research studies on the health effects of various reuse options, and include a public participation component in the effort. The Study Final Draft Report outlines the process undertaken and includes, but is not limited to, details of stakeholder involvement and public outreach, developing criteria, refining options, formulating strategies and water quality research. Details are provided in the attached Staff Report.

A component of the Study work is the completion of the Recycled Water Master Plan Update 2005 (Master Plan Update). This update was underway by the Water Department at the time of the January 2004 Council direction to implement the Study. The Master Plan Update includes a market assessment and a development and planning effort to expand the reclaimed water system to serve more customers for non-potable uses such as irrigation, manufacturing and commercial operations.

The Master Plan Update was undertaken to comply with the City's Water Reclamation Ordinance, adopted by the City Council in 1989 and incorporated into the Municipal Code (Chapter 66, Article 4, division 8), that requires the City to have a Recycled Water Master Plan to define, encourage, and develop the use of recycled water within City boundaries.

Master Plans are to be updated every five years, with the most recent update in 2000. The objective of a Master Plan is to define, encourage and develop the use of recycled water.

The Water Department's Water Policy and Strategic Planning Division undertook implementation of the Study. The Department assembled a team of City staff, consultants and technical experts. Staff gave a presentation of Study activities to the Natural Resources and Culture Committee (NR&C) on July 20, 2005. The presentation included study options, criteria, public outreach activities, Independent Advisory Panel, and an update on the second City of San Diego Assembly Workshop on Water Reuse (Assembly) held the previous week. In that meeting, a description of public involvement activities and timeline of the activities was also presented. NR&C directed staff to present the same information to the Public Utilities Advisory Commission (PUAC). On November 21, 2005, the PUAC adopted a resolution supporting the Study effort. The resolution in part, acknowledged a completion of assignments in Resolution R-298781.

FISCAL CONSIDERATIONS:
None. The Study was undertaken to provide a comprehensive analysis of potential water reuse strategies without making a recommendation for further funding.

PREVIOUS COUNCIL COMMITTEE ACTIONS:
A list of all the Council and Committee actions from August 1997 through November 21, 2005 is provided in detail in the attached Staff Report.

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:
City staff used a variety of ways to inform City residents about the Study. A key component was a 67-member stakeholder group, the City of San Diego Assembly on Water Reuse. The Assembly convened twice to discuss and provide input on the Study's direction and water reuse options. Assembly workshop statements support all options to increase the use of recycled water and, at Workshop II, the Assembly affirmed unanimous support for indirect potable reuse options.

Public involvement activities also included a speakers bureau, stakeholder interviews, Study website, telephone survey, electronic news brief, a telephone hotline and informal opinion surveys. Media coverage has been very visible through exposure in local newspapers and television stations. An educational video on the Study airs on City TV, available on both local cable companies, and many copies of the video have been distributed in the community. Details are provided in the attached Staff Report.

KEY STAKEHOLDERS:
Stakeholders affected by each strategy are described in detail in the attached Staff Report and would include both City and non-City residents

J. M. Barrett
Water Department Director

R.F. Haas
Deputy Chief of Public Works

THE CITY OF SAN DIEGO

REPORT TO THE CITY COUNCIL

DATE ISSUED: July 19, 2006 REPORT NO.: 06-100

ATTENTION: Natural Resources and Culture Committee, Agenda of July 26, 2006

SUBJECT: Water Reuse Study

REFERENCE: Resolution of the City Council Regarding the Study of Increased Aspects of Water Reuse, Resolution Number R-298781 adopted on January 13, 2004

City Manager's Report 05-156, issued July 13, 2005

Natural Resources and Culture Committee actions November 19, 2003

REQUESTED ACTION:

1. Should the City Council accept the Water Reuse Study Final Draft Report (Study Final Draft Report) as fulfillment of the elements outlined in Resolution R-298781?

STAFF RECOMMENDATION:

1. Accept the Study Final Draft Report as fulfillment of the elements outlined in Resolution R-298781.
2. Accept the Study Final Draft Report as fulfillment of the Recycled Water Master Plan Update as required by Municipal Code Chapter 66, Article 4, Division 8.

EXECUTIVE SUMMARY:

On January 13, 2004, the San Diego City Council (Council) directed the City Manager to conduct a study to evaluate options for increasing the beneficial use of the City's recycled water (Resolution R-298781). During the Council hearing, staff was directed to research and produce a report on specific opportunities for increasing recycled water use, to compile research studies on the health effects of various reuse options, and include a public participation component in the effort. The Study Final Draft Report outlines the entire process undertaken including, but not limited to, details of stakeholder involvement and public outreach, developing criteria, refining options, formulating strategies, and water quality research. **(Attachment 1)**

NR&C Authorization and Study Scope of Work

The City's Natural Resources and Culture Committee (NR&C) met on November 19, 2003, and heard presentations on alternative water sources. At this meeting, the NR&C moved unanimously to authorize the City Manager to embark on a study of all aspects of water reuse, including potable reuse, as well as all other alternative water supply issues and to report back to the Committee. Presentations at the meeting included testimony on the State of California's June 2003 report titled *Water Recycling 2030: Recommendations of California's Recycled Water Task Force*. Presentations were also made by representatives of local and state water agencies, the Bay Council group and others.

The NR&C's consideration to authorize the Study has its basis in a Settlement Agreement between the City and the Bay Council, a consortium of environmental groups consisting of Coastkeeper (formerly Baykeeper), Surfrider Foundation and Sierra Club over the City's National Pollutant Discharge Elimination System (NPDES) permit to discharge treated sewage off Point Loma. The Bay Council filed an appeal with the Environmental Appeals Board (EAB) concerning the continued applicability of the Ocean Pollution Reduction Act (OPRA) to the NPDES permit. In an effort to resolve these differences, the parties met regularly from January 2003 to March 2004 and agreed on a Settlement Agreement and Joint Stipulation for Withdrawal of Appeals. The Settlement Agreement commits the City to (a) evaluate improved ocean monitoring, (b) pilot test biological aerated filters as a form of technology to increase solids removal, and (c) study increased water reuse including reservoir augmentation. The Water Reuse Study is intended to fulfill the City's commitment to study increased water reuse.

Specifics for the Study's scope of work as listed in the NR&C action on November 19, 2003, were:

- embark on a year-long study on all aspects of water reuse
- include potable reuse as well as all other alternative water supply issues
- include a general assessment of costs and benefits of water reuse projects
- include a consideration of public health, public acceptance, water costs, and water supply reliability issues
- include a compilation of research/studies concerning reservoir augmentation
- include information concerning potential impacts of pharmaceuticals, endocrine disruptors, personal care products and additional constituents of the wastewater stream on water quality and health

At the January 13, 2004, Council meeting which authorized and designated funding for the Study, Council discussed and directed the addition of the following components to the NR&C designated parameters for the Study:

- include a participatory process to discuss/develop reuse opportunities
- account for diverse stakeholder viewpoints,
- base study upon sound technical analysis/science
- build upon past City efforts, and
- utilize recent knowledge and information gained through growth in the use of recycled water nationwide and abroad, and
- analyze the use of graywater

Recycled Water Master Plan Update 2005 Combined with Water Reuse Study

A component of the Study work is the completion of the Recycled Water Master Plan Update 2005 (Master Plan Update). This update was underway by the Water Department at the time of the January 2004 Council direction to implement the Study. The Master Plan Update includes a market assessment and a development and planning effort to expand the reclaimed water system to serve more customers for non-potable uses such as irrigation, manufacturing and commercial operations.

The Master Plan Update was undertaken to comply with the City's Water Reclamation Ordinance, adopted by the City Council in 1989 and incorporated into the Municipal Code

(Chapter 66, Article 4, Division 8), that requires the City to have a Recycled Water Master Plan to define, encourage, and develop the use of recycled water within City boundaries. Master Plans are to be updated every five years, with the most recent update in 2000.

The Master Plan Update analyzed existing and future recycled water systems including the location and sizes of the reclamation treatment plants, distribution pipelines, pump stations and reservoirs. This information would also help the City make preliminary determinations as to which existing potable water customers could be converted to use recycled water for irrigation and commercial purposes.

One of the water reuse options included in the scope of work for the Study is to continue expanding the system for irrigation and industrial customers. The Mater Plan Update documents the Study's evaluation of opportunities to expand the City's existing recycled water distribution system for additional non-potable uses.

The City's Master Plan Update has been completed and is dated September 2005. Details on the Master Plan Update can be found in the Study Final Draft Report in the "Non-potable Reuse Opportunities" section.

Study Implementation and Funding

Implementation of the Study was undertaken by the Water Department's Water Policy and Strategic Planning Division. The Department assembled a team of City staff, consultants and technical experts. The environmental engineering firm working on the Master Plan Update was retained to produce the Study Report. The City's Metropolitan Wastewater and Water Departments jointly shared Study costs. Funding for the Study was authorized on January 13, 2004 (Resolution R-298781), to supplement the amount previously authorized for the Master Plan Update work.

Reporting back to the Natural Resources & Culture Committee

Staff reported back to the NR&C on July 20, 2005, with a presentation of Study activities to date. The presentation included Study options, criteria, public outreach activities, Independent Advisory Panel (IAP), and an update on the second City of San Diego Assembly on Water Reuse (Assembly) held the previous week. Several members of the public testified, including an Assembly participant, representatives from Surfrider, Coastkeeper and the Chair of the Public Utilities Advisory Commission (PUAC) who indicated the Commission would begin reviewing the Study the following month. Committee members present expressed their interest in reading the Study Report and encouraged City staff to make presentations to community groups and in each council district to inform and educate residents about the Study strategies.

Public Utilities Advisory Commission

A presentation on the Study was made at the August 15, 2005, meeting of the PUAC. Following the presentation, Commissioners engaged in a lengthy discussion on Study strategies and asked City staff a number of questions about those areas of the Study associated with advanced water treatment results, public involvement efforts, outcome of the Assembly workshop and the nexus between water supply and population growth. Commissioners adopted a motion to accept the Water Reuse Study Interim Report (Study Interim Report), and referred the report to the Public Education Committee for technical review.

The PUAC Public Education Committee met on November 4, 2005, to discuss the Study. In advance of the meeting, committee members reviewed the Study Draft Report and the Assembly Workshop II Statement. City staff gave an overview of the Study process and technical findings. Following a lengthy discussion, the Committee approved four recommendations on the Study to present at the November PUAC meeting.

1. Recommend Council and Mayor adopt the Assembly Workshop II Statement as the City's policy on water reuse.
2. Acknowledge completion of tasks listed in the January 2004 Council Resolution R-298781 on the Study.
3. Urge Council and Mayor to direct staff to develop a scope of work and strategy to implement recommended actions detailed in the Assembly Workshop II Statement.
4. Request City staff report back at least annually to the PUAC on implementation progress.

At the November 21, 2005 meeting of the PUAC, the Public Education Committee chair reported on the results of the November 4th meeting. Several members of the public spoke in favor of increased water reuse, including three Assembly participants and a representative from the San Diego Regional Chamber of Commerce. After extensive discussion, Commissioners adopted a resolution that included the four recommendations forwarded by the PUAC Public Education Committee.

An Identified Need for Local Water Supplies

Currently, the 1.3 million people living in San Diego use an average of 210 million gallons per day (MGD) of potable water. The City's population is projected to increase 50 percent in the next 25 years. Even with additional water conservation measures, projections show that population growth will increase the demand for potable water by approximately 25 percent, or an additional 50 MGD, by 2030.

An annual average of 85% percent of the City's existing water supply is imported from the Colorado River and Northern California. The City has long recognized the need to develop local water supplies to balance and reduce this dependence on imported water. The City's 1997 *Strategic Plan for Water Supply* and the *City of San Diego Long-Range Water Resources Plan (2002-2030)* both identify the need for the City to develop additional local water supply sources as a means of providing reliability and protection from water supply shortages. This goal was also echoed in a 1999 Grand Jury report.

On October 10, 2003, the City Manager issued City Manager's Report 03-203, *Status Report on City of San Diego Long-Range Water Resources Plan (2002-2030)* which identified reclaimed water as an important source of a locally produced water supply. The report also identified the City's two water reclamation plants as important sources of reclaimed water to reduce the City's dependence on imported water.

Current Recycled Water System

The City has been delivering recycled water to customers for non-potable irrigation and industrial use since the completion of the North City Water Reclamation Plant (NCWRP) in 1997. The NCWRP was a major investment that highlighted the City's commitment to recycled water and achieving the beneficial reuse goals associated with the Plant has been a compelling

factor in the decision-making process associated with projects identified in the Recycled Water Master Plans. The U.S. Environmental Protection Agency (EPA) awarded the City a construction grant of $69.5 million for the NCWRP. The total project cost of the plant was $205 million. The EPA grant award included conditions establishing reuse goals for the NCWRP. These goals were created to measure the City's progress in achieving the beneficial reuse of recycled water produced at the plant. The goals are: reuse 25% of flows treated, or 6 MGD, by 2003; and, reuse 50% of the flows treated, or 12 MGD, by 2010.

The South Bay Water Reclamation Plant (SBWRP) was completed in 2002 to provide recycled water to the southern areas of the region. The NCWRP is a 30 MGD treatment capacity plant, with a non-potable recycled water production capability of 24 MGD. The SBWRP is a 15 MGD treatment capacity plant with a non-potable recycled water production capability of 13.5 MGD. As of March 31, 2006, there are 363 meters connected to the system, which includes a single meter connection to the City of Poway. Of the City of San Diego's retail customers, 99% of their recycled water use is for irrigation and the other 1% for commercial and industrial use.

Recycled Water Options Included in the Study and Evaluation Criteria

Staff was directed to conduct a year-long study evaluating all aspects of a viable increased water reuse program, including, but not limited to, the following reuse options:

- continued expansion of the system for irrigation and industrial customers
- create storage reservoirs
- add to streams or create wetlands
- recharge, improve or protect groundwater basins
- add to aquifers used for drinking water supplies after additional advanced water treatment
- add to reservoirs storing untreated drinking water supplies after additional advanced water treatment (reservoir augmentation)
- analysis of graywater use.

The greatest challenge to maximizing water reuse is the seasonality of usage. As the majority of water produced is used for irrigation purposes, usage naturally increases when the weather is warm and dry, and conversely decreases when it is cool and raining. As a result of this seasonal variation, reclaimed water usage may always be approximately half of the annual amount available.

The following evaluation criteria for each water reuse option were ratified by the first City of San Diego Assembly on Water Reuse at their October 2004 workshop (Assembly Workshop I).

- health and safety
- social value
- environmental value
- local water reliability
- water quality
- operational reliability
- cost
- ability to implement

Water Reuse Study Mission Statement and Objective

The Study team developed a Mission Statement and Study Objective:

Mission Statement: To pursue opportunities to increase local water supply and reliability, and optimize local water assets, through a comprehensive study of recycled water.

Objective: To conduct an impartial, balanced, comprehensive and science-based study of all recycled water opportunities so that the City can meet current and future water supply and reuse needs.

Public Involvement Process

The Study developed a variety of ways to inform City residents about the Study. A key component was creating a 67-member group, the City of San Diego Assembly on Water Reuse (Assembly). Members of this stakeholder group were selected by the Mayor, Council offices, community groups, business organizations, and professional associations. City recycled water customers, and environmental representatives were also part of the Assembly group. Two three-day American Assembly-style workshops were conducted in October 2004 and July 2005. Assembly participants produced statements of opinion at the conclusion of each workshop. The first workshop focused on the study parameters, options under consideration and the evaluation criteria proposed for analyzing each option. Participants at the second workshop reviewed the June 2005 Interim Report that outlined strategies to increase the use of recycled water.

Public involvement activities also included a speakers bureau, stakeholder interviews, creation of a Study website, a telephone survey, electronic news briefs, a telephone hotline and informal opinion surveys, among others. Media coverage has been extensive with front page stories in the local newspaper and news stories on local television stations. An educational video on the Study airs on City TV, available on both local cable company channels, and many copies of the video have been distributed in the community.

Public Involvement Summary* **(Attachment 2)**

Speakers Bureau – 135 total presentations (99 to community groups and 36 to non-community groups)
Stakeholder interviews - 27
Media coverage – 29 newspaper articles, 1 radio interview, 4 TV news stories
Letters of Support – 22 received
Website visits - 6,933
Electronic newsletters – posted on website, published monthly since December 2004
Media briefings – 3 held with editorial staff
Informal opinion survey – 432 completed, on-line and hardcopy version
Facility tours – 16 tours of City reclamation plants
Telephone opinion survey - 406 respondents (surveys conducted 5/19/04-6/7/04)
Miscellaneous:
- Water bill insert - fall 2005 reaching 265,000 customer accounts
- Voter pamphlet, full page ad (for city-wide election on 7/26/05)
- Article in Water Department's 2004 Annual Drinking Water Quality Report; 565,744 copies mailed June 2005
- 25-minute educational video – airing continuously on City TV24 since Sept. 2005

Telephone hotline and e-mail account – posted on Study materials, checked by staff
Focus groups – two (conducted on 6/9/04 and 7/27/04)

* As of March 31, 2006 except where noted

Technical Review of Study Work

The Study has an Independent Advisory Panel (IAP), whose role is to ensure all technical and scientific components of the Study are accurate, current and thoroughly reviewed. Panel members are contracted through the National Water Research Institute Research. IAP members are renowned experts in the fields of water and wastewater technology, public health, epidemiology, toxicology, medicine, microbiology, water quality, economics, environmental engineering and chemistry, public utilities administration and industry regulations. Three of the 11 panel members reside in San Diego, one of whom is a local citizen representing City ratepayers.

The IAP was formed to ensure an unbiased and thorough examination of all possible water reuse opportunities. Panelists attended three meetings in San Diego to hear presentations on Study aspects, local water reuse issues and to hold face-to-face discussions on the Study. Several IAP members attended the two Assembly workshops. Panelists also reviewed and provided written comments on local aspects of water reuse, the Study Interim Report and all technical memoranda within their respective areas of expertise. Following an IAP meeting held in December 2005 to review the Study Draft Report, panel members prepared and sent to the City a letter that summarized their findings. The following are excerpts from this letter:

The Panel determined that a thorough technical review of viable water reuse strategies has been conducted by the City and the proposed water reclamation technologies will produce water that will meet or exceed all health and safety requirements.

It is the unanimous conclusion of the Panel (IAP) that appropriate alternative water reuse strategies for the City of San Diego have been identified, and that these alternatives have been presented clearly so that the citizens of the City of San Diego can make informed choices with respect to water reuse.

Water Quality Research Studies Related to Reservoir Augmentation Option

Specific components in the Study's scope of work, according to the NR&C action on November 19, 2003 were:

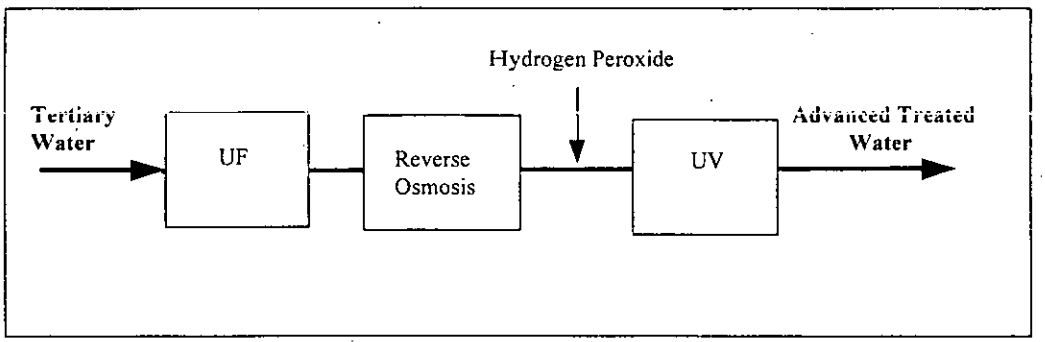
- include a compilation of research/studies concerning reservoir augmentation
- include information concerning potential impacts of pharmaceuticals, endocrine disruptors, personal care products and additional constituents of the wastewater stream on water quality and health

In addition to a comprehensive review of successful and planned indirect potable reuse (IPR) projects and a discussion of the most relevant case studies in the Study Draft Report, research studies were undertaken at the NCWRP to analyze and test the water quality of an advanced water treatment (AWT) process on tertiary level recycled water produced at the plant. The AWT steps would be necessary and required by the State of California Department of Health Services before recycled water could be used to supplement drinking water supplies in underground aquifers or open reservoirs. The AWT steps are ultrafiltration (UF), reverse osmosis and advanced oxidation with ultraviolet light (UV) and hydrogen peroxide. The final AWT product water is similar in quality to distilled water. The Orange County Water District is using the same

treatment process for its 70 MGD Groundwater Replenishment Project that will go online in 2007. (See illustration on next page)

Researchers conducted analyses for a wide range of inorganic and organic compounds on tertiary level recycled water and product water at each step of the AWT process. Analyses conducted in 2005 included all water quality criteria required to monitor compliance with federal and state drinking water standards, plus inorganic constituents, organic compounds, microbial contaminants, endocrine disrupting compounds (EDCs) and pharmaceutical and personal care products (PPCPs).

Initial testing of the recycled water produced by the NCWRP found that some EDCs and PPCPs were present in low concentrations. The AWT process was determined to remove EDC's &PPCP's present in the recycled water to levels below the detection limits of the most sophisticated test methods currently available. Regulated contaminants in the AWT product water also were well below federal and California drinking water standards. The AWT process provides an effective multiple barrier approach to producing recycled water suitable for reservoir augmentation projects as outlined in the Study water reuse strategies.



Introduction to the Six Water Reuse Strategies Identified in the Report

The Study team began by using the water reuse options identified by the Council in Resolution R-298781, and researched possible strategies to utilize more recycled water from the City's two water reclamation plants. As each reuse option was reviewed, it was also evaluated based on the criteria approved by the Assembly at their first workshop in October 2004.

Each strategy begins with the City's existing and planned recycled water projects, and then adds projects over a series of steps. The projects included in each step were organized based on a number of considerations including:

- maximizing the use of recycled water based on available supplies at each phase
- selecting lower-cost projects before a higher-cost project
- maximizing the ability to build upon existing or previous phase infrastructure.

The strategies were designed in part to provide:

- a balanced and diverse set of non-potable and indirect potable strategies
- a range of phases for each strategy that adds new amounts of recycled water usage
- a geographically balanced mix of projects, utilizing both water reclamation plants and their potential service areas.

Some water reuse options did not meet the criteria for inclusion as a viable strategy in the Study Final Draft Report. All options were analyzed in the same manner as the other options for cost effectiveness, feasibility, etc. The two water reuse options that were not included as part of the six strategies outlined in the Study Final Draft Report are: 1) recharge, improve or protect groundwater basins; and, 2) add to aquifers for storage or as drinking water supplies after advanced water treatment. The Study evaluated the feasibility of a groundwater recharge project and a groundwater indirect potable reuse project for the City's groundwater basins. These options were not included in any Study strategies due to regulatory and permitting hurdles, groundwater basin capacity, cost, ability to implement and capability to discharge brine.

The Assembly adopted a statement at the conclusion of its July 2005 workshop supporting all strategies to varying degrees. There was unanimous support for North City strategy NC-3 which includes a reservoir augmentation project at San Vicente Reservoir. The Assembly was split on supporting the South Bay strategies between a reservoir augmentation project at Lower Otay Reservoir (SB-3) and the expansion of the existing distribution system (SB-1). (See the Assembly Workshop II Statement included in the Study Final Draft Report). Summaries of the three strategies for the NCWRP (**NC-1, NC-2** and **NC-3**) and for the SBWRP (**SB-1, SB-2 and SB-3**) can be found in **Attachment 3.**

Other Recycled Water Indirect Potable Reuse Projects

There are several other indirect potable reuse projects utilizing advanced treated recycled water for groundwater recharge, aquifer protection or reservoir augmentation. These projects, which serve as models for public acceptance of projects utilizing recycled water as a source of drinking water, were researched as part of the Study and are similar to **NC-2, NC-3, SB-2,** and **SB-3.**

Location of Project	**Recycled water produced**
El Paso, TX	4-5 MGD
Fairfax County, VA	54 MGD
Orange County, CA	70 MGD (on line 2007)
Singapore	3 MGD

Graywater Use

Graywater is included in the Study to complete a comprehensive review of opportunities associated with beneficially reusing the community's wastewater. Graywater is domestic wash water, typically from sinks, showers and clothes washing machines, and excludes "blackwater" from toilets, kitchen sinks with garbage disposals and other sources containing high concentrations of organic waste. Some of the benefits provided by graywater use: conserves potable water (potential cost savings reflected in water bills), environmental (less discharge of fertilizers into the environment due to nutrients contained in graywater), possible cost savings to graywater system owners due to less fertilizer needed, and may be viewed as a valuable domestic water source by homeowners and policymakers in communities with limited water resources due to rising water costs, water shortages or drought restrictions.

In California, graywater may be used for landscape irrigation on a wide range of sites, from single-family to industrial locations. However, graywater may not be used to irrigate vegetable gardens and may only be used on the property where it is generated.

Individual property owners are responsible for installing and maintaining graywater systems. Typically, graywater systems require a separate plumbing system, surge tank, transfer pump and a subsurface irrigation system. Graywater is subject to little or no treatment, though there are commercially available systems that include sand filters and settling tanks. Graywater differs from recycled water in that it has not undergone a high level treatment process at a centralized water reclamation plant. Use of graywater is a decentralized form of untreated wastewater reuse and is permitted only for subsurface irrigation contained within the property where it is generated.

The cost benefit of a graywater system will vary depending on potable water rates, the type of system installed, whether the installation is for a new structure or a retrofit of an existing structure, soil composition, the duration that the system is used, operation and maintenance costs, and whether incentives are available from agencies to offset costs born by the user. Typically, it is easier to install graywater systems in new structures as dual piping can be designed and installed appropriately from the start. Retrofitting existing structures in most instances may be cost prohibitive.

FISCAL CONSIDERATIONS:
Not applicable at this time. An analysis of the costs to implement each water reuse strategy is included in the Study Final Draft Report; however, any strategy that is pursued will require a detailed analysis such as feasibility studies, facility citing analysis, research to fulfill regulatory requirements, etc. This additional work goes beyond that contained in this Study will need additional authorization and funding.

PREVIOUS COUNCIL AND COMMITTEE ACTIONS:

August 12, 1997
Council adopted the Strategic Plan for Water Supply (1997-2015) that identifies options for developing and using local water supplies with emphasis on the utilization of reclaimed water.

January 19, 1999
Council adopted Resolution R-291210, directing the City Manager not to spend any monies on water repurification until options for such reuse are evaluated and further direction is given by Council.

December 9, 2002
Council adopted the Long-Range Water Resources Plan which emphasizes a diverse water portfolio by developing local water supplies.

October 10, 2003
City Manager's Report 03-203, "Status Report on City of San Diego Long-Range Water Resources Plan (2002-2030)" was issued identifying reclaimed water as an important source of a locally produced water supply. The report also identified the City's two water reclamation plants as important sources of reclaimed water to reduce the City's imported potable water demand.

November 19, 2003
The NR&C heard a full presentation on Alternative Water Sources and unanimously recommended that the City Manager conduct a study of all aspects of increased water reuse to satisfy a settlement agreement with environmental groups.

January 13, 2004
Council directed the City Manager to conduct a study to evaluate options for increasing the beneficial use of the City's recycled water (Resolution R-298781).

July 20, 2005
The NR&C heard a presentation on the status of the Study including public outreach activities and the outcome of the Assembly workshops.

August 15, 2005
The PUAC heard a presentation on the Study, adopted a motion to accept the Study Interim Report, and referred the report to the Public Education Committee for technical review.

November 4, 2005
The PUAC Public Education Committee met to discuss the Study and approved four recommendations on the Study at the November PUAC meeting.

November 21, 2005
The PUAC adopts a resolution in support of the Study based upon the Assembly Workshop II Statement.

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:
Public outreach and public involvement efforts are summarized in the SUMMARY section. Details on all activities are available. **See Attachment 2**

Declared Supporters
Letters of Support: The City has received letters of support from local community groups, business associations, and other cities, many of which would be impacted by the implementation of the six reuse strategies. Letters received to date:

BIOCOM
Biosite Incorporated
Carmel Mountain Ranch Community Council
Chollas View Neighborhood Council
City of Coronado
City of Del Mar
City of El Cajon
City of Imperial Beach
City of La Mesa
City of National City
City of Poway

Del Mar Mesa Community Planning Board
Greater Skyline Hills Community Association
Metro Wastewater Joint Powers Authority
Padre Dam Municipal Water District
Ramona Municipal Water District
San Diego Audubon Society
San Diego Coastkeeper
San Dieguito Water District
San Diego Regional Chamber of Commerce
Sweetwater Authority
Torrey Hills Community Planning Board
University City Mens Club

Stakeholder group opinions: The 67-member City of San Diego Assembly on Water Reuse has supported all options to increase the use of recycled water, and their Assembly Workshop II Statement affirmed unanimous support for indirect potable reuse, specifically **NC-3.**

Informal opinion surveys: An informal online opinion survey was linked to the Study website when the site was launched August 5, 2004. Paper copies of the survey were distributed at speaking engagements and surveys received were added to the website survey statistics. As of February 28, 2006, there were 404 surveys completed. Respondents were given the option of indicating residency and 88% provided a zip code. 292 of the total respondents provided a zip code within the City of San Diego, which is 72% of total respondents. Of 292 respondents indicating a San Diego zip code, 176 or 60% answered "yes" to the question "Do you favor using advanced treated recycled water as a drinking water source?" and 116 or 40% answered "no." These percentages closely match the overall total results to this question: 59% "yes", 41% "no."

Known Opposition

Known opposition has been documented from the Revolting Grandmas, former Councilmember Bruce Henderson, Stephen Bilson, Chairman and CEO of ReWater Systems, Inc., a gray water systems vendor, and Association of Concerned Taxpayers, which filed a lawsuit against the City challenging the Study as it relates to reservoir augmentation.

KEY STAKEHOLDERS AND PROJECTED IMPACTS:

The Study team has sought to identify and offer presentations to key community stakeholders. The impact on various groups and citizens of San Diego varies with each water reuse strategy. For the recycled water non-potable use strategies (**NC-1, SB-1**) existing customers currently receiving potable water for irrigation and industrial uses, once connected to the recycled water system, will benefit from the lower cost of recycled water, compared to potable water. New customers connected to the system will also benefit from the lower cost of recycled water.

For the recycled water strategies that could utilize created wetlands (all strategies except **SB-1**) the potential environmental benefits include: natural treatment, recreational opportunities, aesthetic enhancements to surrounding communities, water quality improvements (e.g. lower salt content, dilution of urban runoff) and restoration of historic wetlands.

For the recycled water strategies utilizing indirect potable reuse via reservoir augmentation projects (**NC-2, NC-3, SB-2, SB-3**), the extent of San Diego citizens who would benefit varies according to their location within the geographic service area of each City drinking water plant.

The City's three water treatment plants, Miramar, Alvarado and Otay, would each receive source waters that contain a blend of advanced treated recycled water from a storage reservoir

Implementation of any of the strategies will increase the use of recycled water and create a locally controlled, reliable source of supply that will reduce the region's dependency upon imported water.

J. M. Barrett	R. F. Haas
Water Department Director	Deputy Chief of Public Works

Attachments:

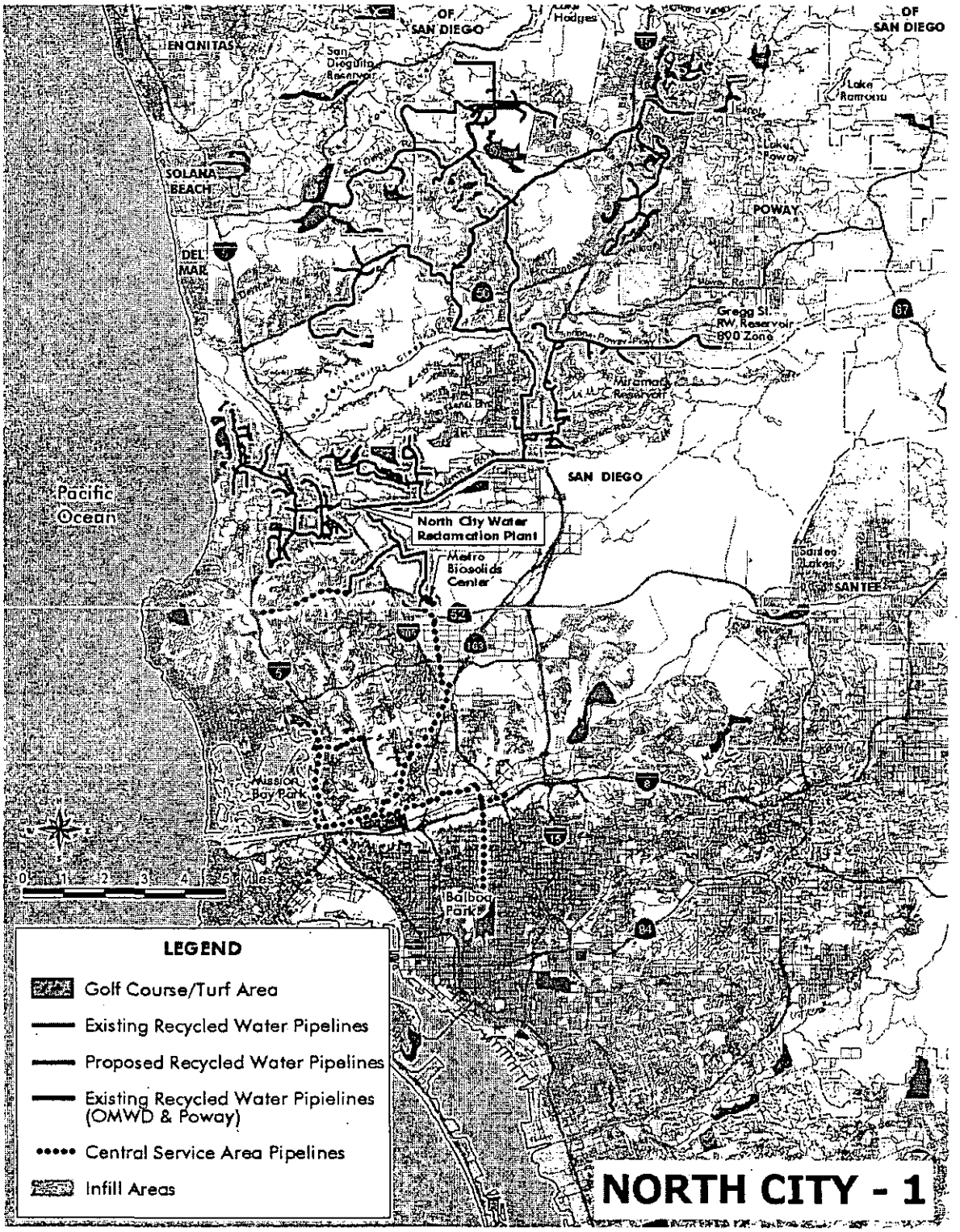
Attachment 1 – Water Reuse Study Final Draft Report (not available on the Web)
Attachment 2 – Public Involvement Activities (not available on the Web)
Attachment 3 – Summary of Reuse Strategies (not available on the Web)

Note: Due to the size of the document (and attachments) a limited distribution was made. Copies are available in the offices of the City Clerk located at 202 C Street, 2nd floor, and Water Department's Water Policy and Strategic Planning Division, located at 600 "B" Street, Ste 600, San Diego, Ca. 92101.

Water Reuse Strategies Identified in Final Draft Report

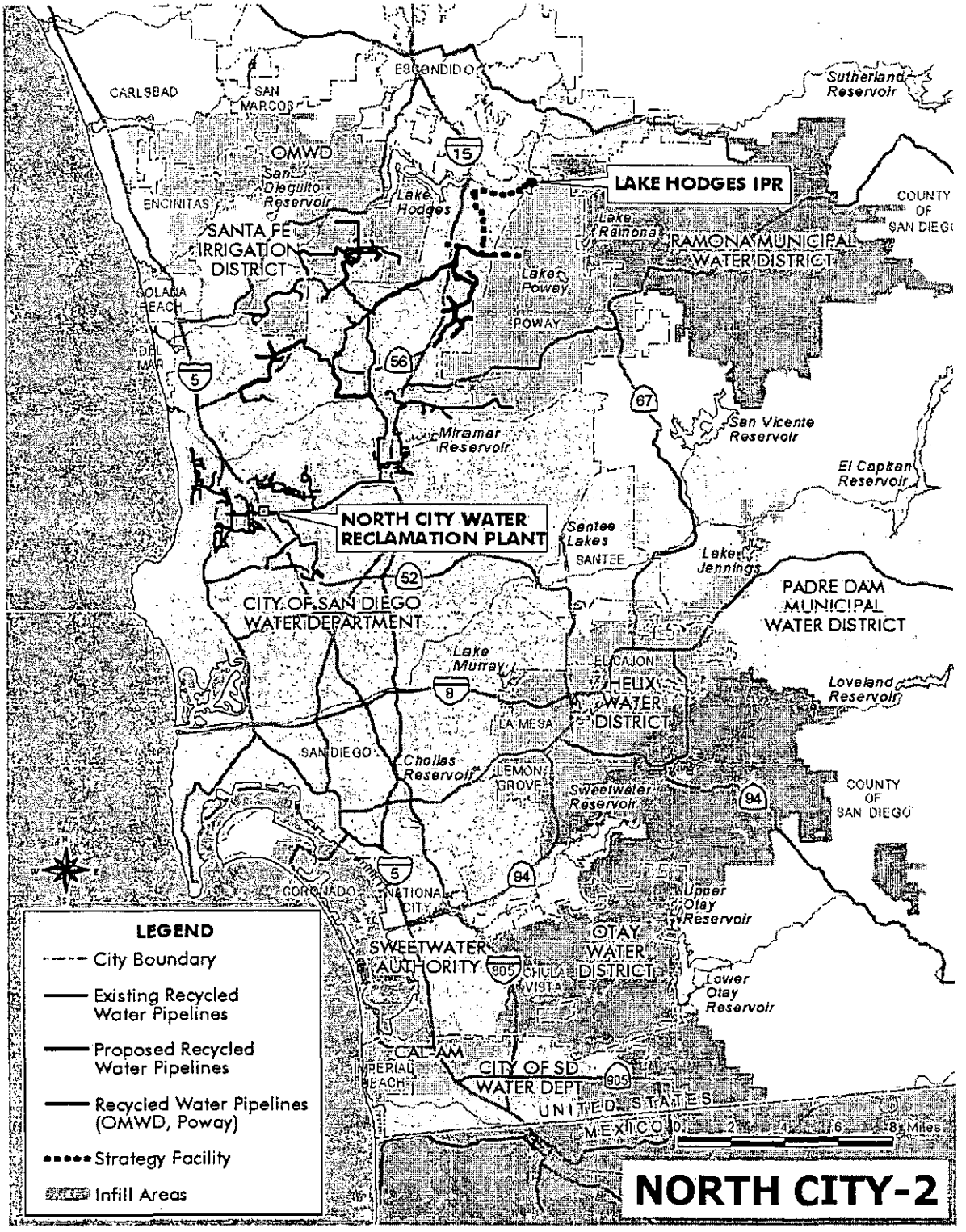
North City–1 (NC-1)

Type of Use	Non-potable
System	Expand the distribution system through infill (new customers within one-quarter mile of the existing infrastructure); construct a 17- mile distribution main with two-2 million gallon reservoirs to serve customers on the I-15 corridor including Rancho Bernardo; and, a 17-mile system expansion to the Central Service Area consisting of Balboa Park, Mission Valley, Mission Bay and a possible wetland in Rose Canyon. Seasonal storage, either an above ground reservoir or utilization of a groundwater basin, would need to be created to maximize this strategy.
Area served	Existing recycled water customers (e.g., UCSD, University Towne Center area, Mira Mesa, Poway, Black Mountain Ranch, Olivenhain Municipal Water District), I-15 corridor (e.g., Sabre Springs, Rancho Bernardo, etc.), Mission Valley, Mission Bay (including Sea World & USD), Balboa Park and Rose Canyon.
Type of Customer	Irrigation, commercial, industrial, environmental enhancement
Study options used	Expand the current distribution system, create wetlands
Amount of recycled water used	Of available 24 MGD, 17.6 MGD can be used
Total available plant utilization	73%
Total Project Cost	$284,700,000
Cost increase estimated on monthly bill	$2.34
Cost analysis	Distribution system installation costs initially low with lowest unit cost by maximizing current infrastructure, via infill and enforcement of Mandatory Reuse Ordinance and construction of the Phase III pipeline to Rancho Bernardo. However subsequent steps have higher costs and make this alternative comparatively more expensive overall. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Increased beneficial reuse of available supply, locally controlled drought-proof supply, less dependence on imported water, less use of fertilizers, environmental enhancement of Rose Canyon and Mission Bay, offsets discharge of wastewater into the ocean.


OF SAN DIEGO
ENCINITAS
SOLANA BEACH
DEL MAR
Pacific Ocean
SAN DIEGO
North City Water Reclamation Plant
Metro Biosolids Center
Mission Bay Park
Balboa Park
Miramar Reservoir
Gregg St. RW Reservoir 890 Zone
POWAY
Lake Ramona
Lake Poway
SANTEE
Sabre Springs
0 1 2 3 4 5 Miles
LEGEND
Golf Course/Turf Area
Existing Recycled Water Pipelines
Proposed Recycled Water Pipelines
Existing Recycled Water Pipielines (OMWD & Poway)
Central Service Area Pipelines
Infill Areas
NORTH CITY - 1

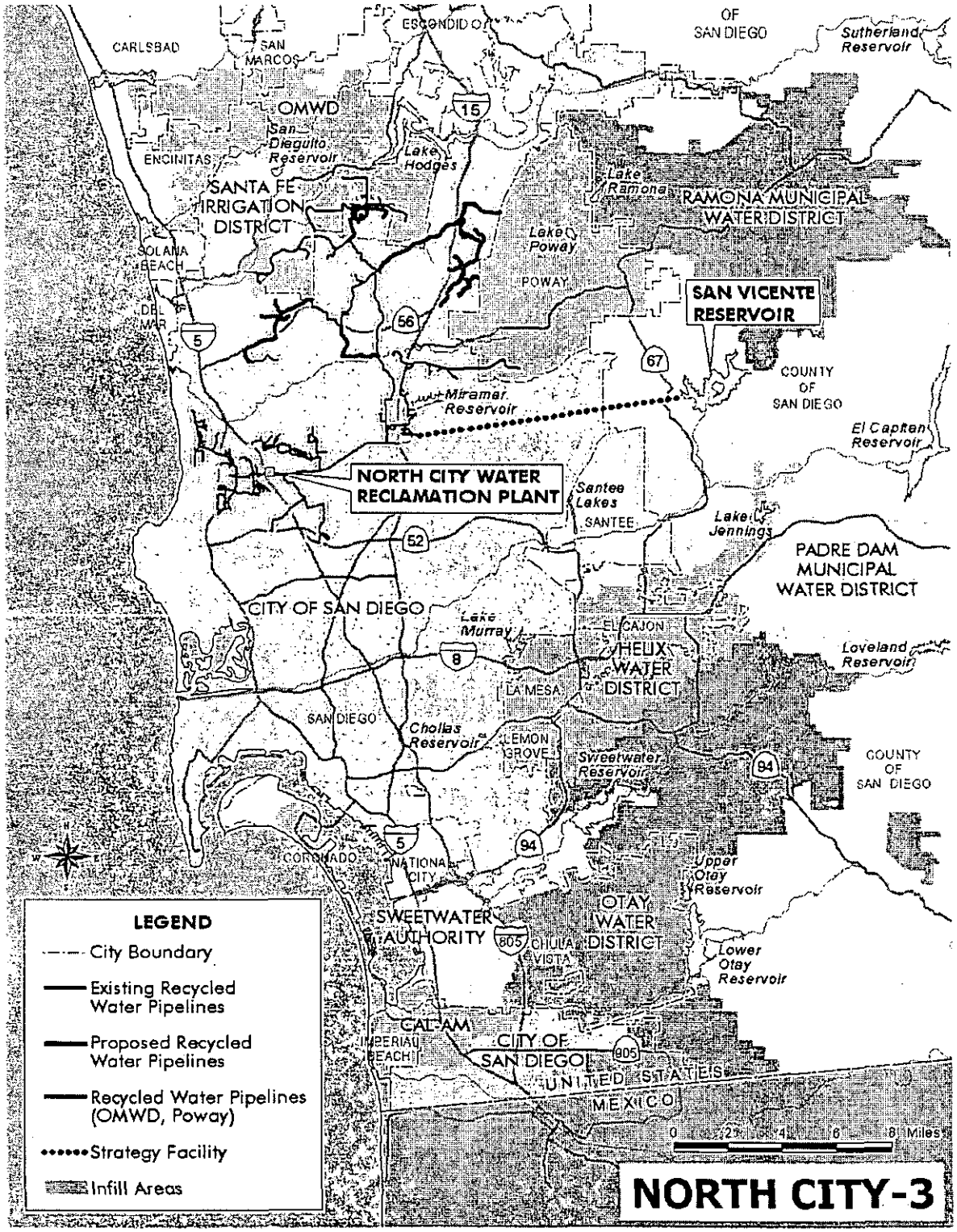
North City-2 (NC-2)

Type of Use	Non-potable and indirect potable reuse
System	Expand the distribution system through infill (new customers within one-quarter mile of the existing infrastructure); and, construct a 17- mile distribution main with two-2 million gallon reservoirs to serve customers on the I-15 corridor including Rancho Bernardo. Construct a 2 MGD advanced water treatment facility that would discharge into wetlands above Lake Hodges where water would be stored during winter months. Blended water would be sent to the San Diego County Water Authority aqueduct which serves all water agencies adjacent to and south of Lake Hodges.
Area served	Existing recycled water customers (e.g. UCSD, Torrey Pines, Mira Mesa, Poway, Black Mountain Ranch, Olivenhain Municipal Water District), I-15 corridor (e.g. Sabre Springs, Rancho Bernardo, etc.), Rancho Bernardo, Rancho Santa Fe Irrigation District, San Dieguito, Encinitas, Leucadia, Solana Beach, Cardiff, etc.). All water agencies south of Lake Hodges (Olivenhain Municipal Water District, Santa Fe Irrigation District, City of Poway, Ramona Municipal Water District, Otay Water District, Padre Dam Water District, San Dieguito Water District, Sweetwater Authority, Helix Water District and the entire City of San Diego water service area including the Cities of Imperial Beach and Coronado).
Type of Customer	Irrigation, commercial, industrial and potable water customers served by Olivenhain Municipal Water District and all water agencies south of Lake Hodges.
Study options used	Expand the current distribution system, add water to raw water reservoir after additional treatment
Amount of recycled water used	Of available 23.4 MGD, 16.1 MGD can be used
Total available plant utilization	69%
Total Project Cost	$188,300,000
Cost increase estimated on monthly bill	$1.17
Cost analysis	Has lowest overall cost of all North City alternatives, after infill and Phase III to Rancho Bernardo. Requires construction of a small advanced water treatment facility at Lake Hodges. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Increased beneficial reuse of available supply, locally controlled drought-proof supply, less dependence on imported water, less use of fertilizers, environmental enhancement to western end of San Pasqual Valley, offsets discharge of wastewater into the ocean. Provides the opportunity to switch from non-potable to indirect potable reuse.


CARLSBAD
SAN MARCOS
ESCONDIDO
Sutherland Reservoir
OMWD
San Dieguito Reservoir
ENCINITAS
Lake Hodges
LAKE HODGES IPR
COUNTY OF SAN DIEGO
Lake Ramona
RAMONA MUNICIPAL WATER DISTRICT
SANTA FE IRRIGATION DISTRICT
Lake Poway
SOLANA BEACH
POWAY
DEL MAR
Miramar Reservoir
San Vicente Reservoir
El Capitan Reservoir
NORTH CITY WATER RECLAMATION PLANT
Santee Lakes
SANTEE
Lake Jennings
PADRE DAM MUNICIPAL WATER DISTRICT
CITY OF SAN DIEGO WATER DEPARTMENT
Lake Murray
EL CAJON
HELIX WATER DISTRICT
Loveland Reservoir
LA MESA
SAN DIEGO
Chollas Reservoir
LEMON GROVE
Sweetwater Reservoir
COUNTY OF SAN DIEGO
CORONADO
NATIONAL CITY
Upper Otay Reservoir
SWEETWATER AUTHORITY
OTAY WATER DISTRICT
CHULA VISTA
Lower Otay Reservoir
CAL-AM
IMPERIAL BEACH
CITY OF SD WATER DEPT
UNITED STATES
MEXICO
0 2 4 6 8 Miles
LEGEND
City Boundary
Existing Recycled Water Pipelines
Proposed Recycled Water Pipelines
Recycled Water Pipelines (OMWD, Poway)
Strategy Facility
Infill Areas
NORTH CITY-2

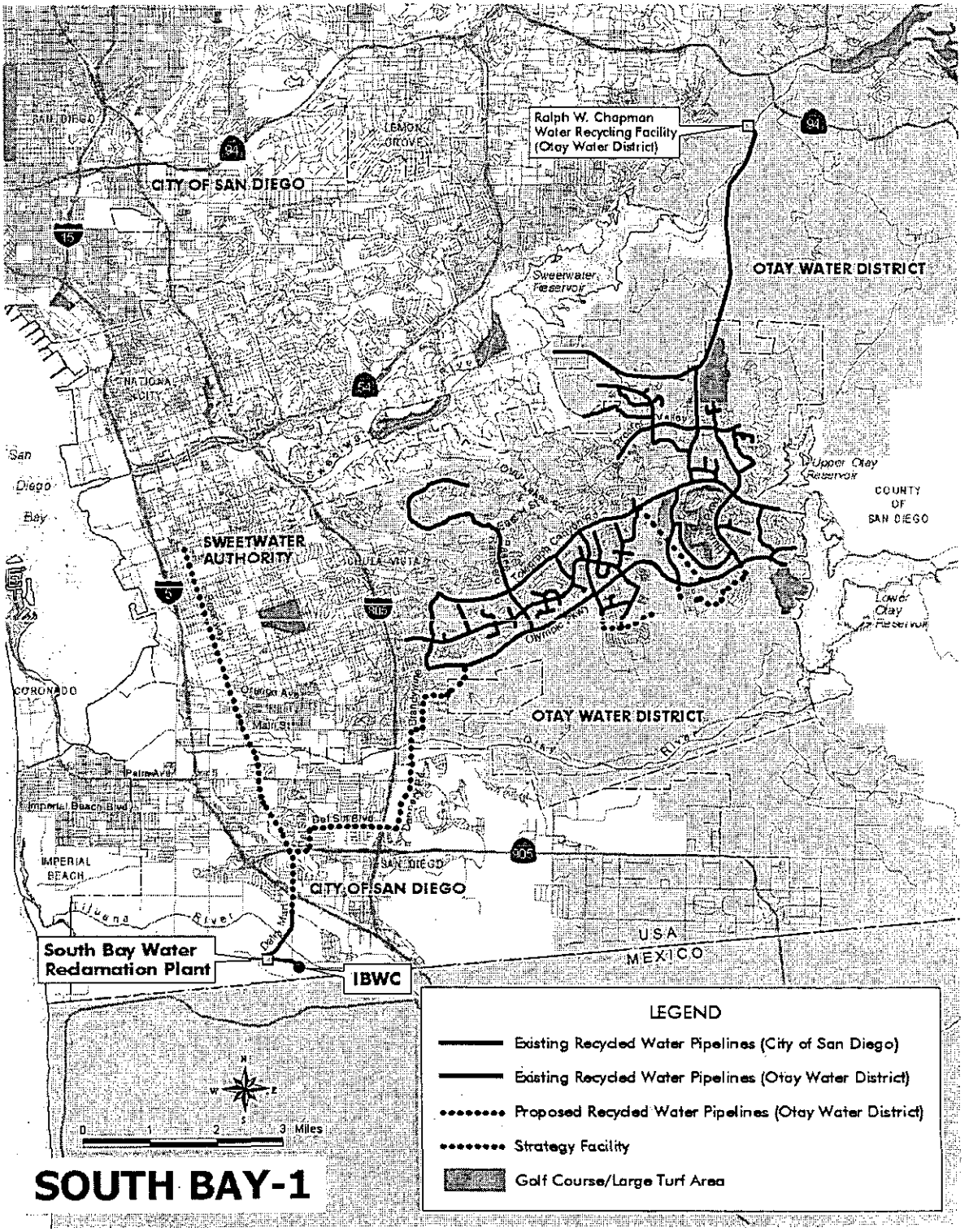
North City-3 (NC-3)

Type of Use	Non-potable and indirect potable reuse
System	Expand the distribution system through infill (new customers within one-quarter mile of the existing infrastructure). Construct a 16 MGD advanced water treatment facility and a 23 mile pipeline to convey water to San Vicente Reservoir for blending with other water sources during non-peak months. Advanced treated water could potentially flow through a created wetland for natural treatment before entering the reservoir. Water would be sent to Alvarado and/or Miramar WTPs for potable uses.
Area served	Existing recycled water customers (e.g. UCSD, Torrey Pines area, Mira Mesa, Poway, Black Mountain Ranch). Alvarado and Miramar WTP service areas. Cities of Del Mar, Coronado, Imperial Beach, Chula Vista, Helix, Otay Water District, La Mesa, Lemon Grove, Santee, and El Cajon.
Type of Customer	Irrigation, commercial, industrial. City wholesale and retail potable water customers receiving water from the Alvarado and Miramar WTP service areas. Potable water customers of the cities of Del Mar, Coronado, Imperial Beach, Chula Vista, La Mesa, Lemon Grove, Santee, El Cajon, and San Diego County unincorporated areas served by the Helix Water District (such as Mt. Helix, Bostonia and Spring Valley).
Study options used	Expand the current distribution system, add water to raw water reservoir after additional treatment, potentially create wetlands
Amount of recycled water used	Of available 21.2 MGD, 21.2 MGD can be used
Total available plant utilization	100%
Total Project Cost	$237,600,000
Cost increase estimated on monthly bill	$1.63
Cost analysis:	Highest capital investment for construction of advanced water treatment facility and distribution pipeline, but overall lowest unit cost. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Maximizes the available North City water supply through indirect potable reuse, less dependence on imported water, locally controlled drought-proof supply, and offsets discharge of wastewater into the ocean. Provides the lowest overall unit cost and greatest geographic area of utilization.


CARLSBAD
SAN MARCOS
ESCONDIDO
OF SAN DIEGO
Sutherland Reservoir
OMWD
San Dieguito Reservoir
Lake Hodges
ENCINITAS
SANTA FE IRRIGATION DISTRICT
Lake Ramona
RAMONA MUNICIPAL WATER DISTRICT
Lake Poway
SOLANA BEACH
POWAY
SAN VICENTE RESERVOIR
DEL MAR
COUNTY OF SAN DIEGO
Miramar Reservoir
El Capitan Reservoir
NORTH CITY WATER RECLAMATION PLANT
Santee Lakes
SANTEE
Lake Jennings
PADRE DAM MUNICIPAL WATER DISTRICT
CITY OF SAN DIEGO
Lake Murray
EL CAJON
HELIX WATER DISTRICT
Loveland Reservoir
LA MESA
SAN DIEGO
Chollas Reservoir
LEMON GROVE
Sweetwater Reservoir
COUNTY OF SAN DIEGO
CORONADO
NATIONAL CITY
Upper Otay Reservoir
SWEETWATER AUTHORITY
OTAY WATER DISTRICT
CHULA VISTA
Lower Otay Reservoir
CAL-AM
IMPERIAL BEACH
CITY OF SAN DIEGO
UNITED STATES
MEXICO
0 2 4 6 8 Miles
LEGEND
City Boundary
Existing Recycled Water Pipelines
Proposed Recycled Water Pipelines
Recycled Water Pipelines (OMWD, Poway)
Strategy Facility
Infill Areas
NORTH CITY-3

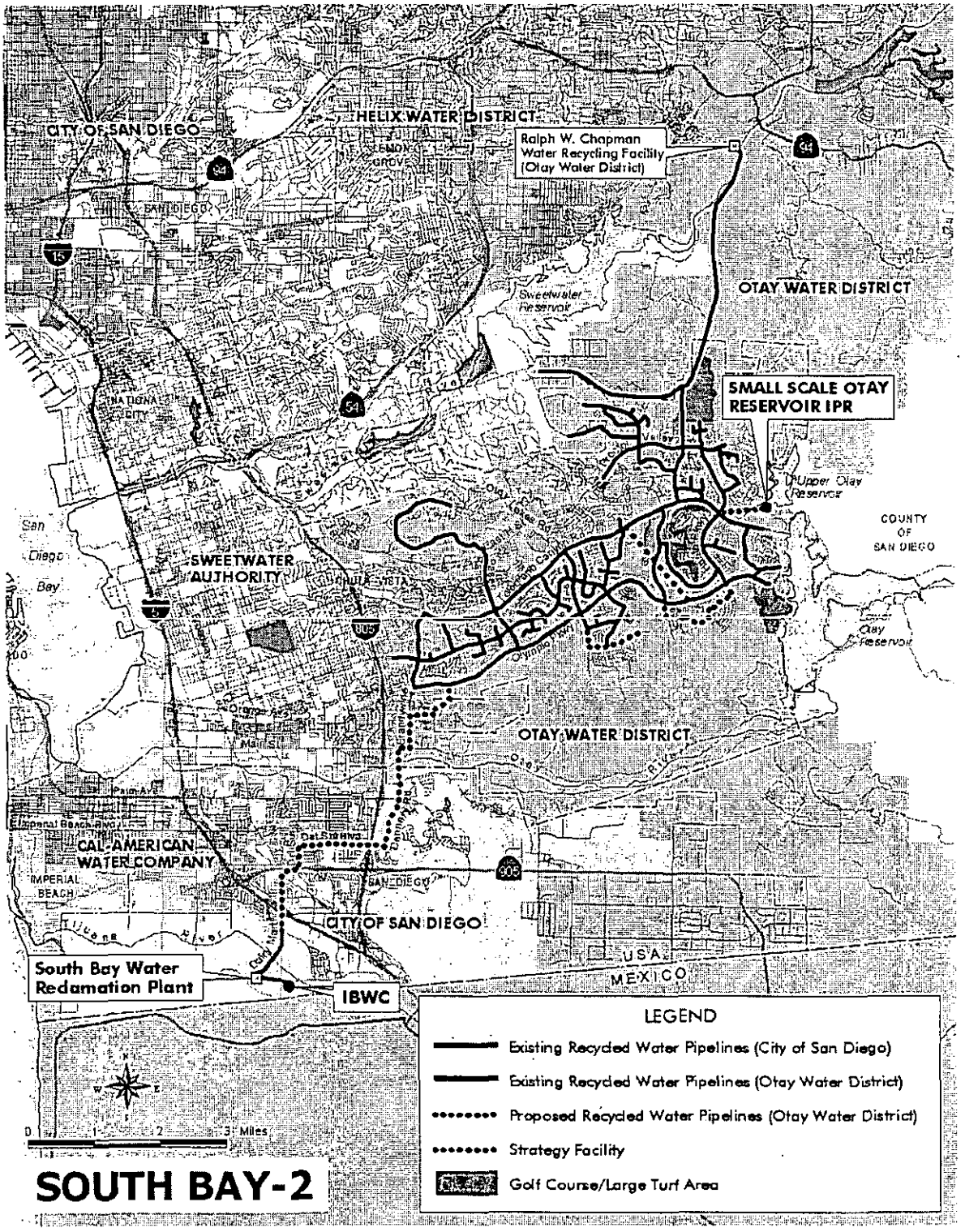
South Bay-1 (SB-1)

Type of use	Non-potable
System	Dual piping system for non-potable customers and wholesale distribution mains.
Area served	Area adjacent to South Bay facility, portions of the Otay Water District service area (Eastlake, Telegraph Canyon, etc.) and portions of the Sweetwater Authority service area in western Chula Vista and National City.
Type of Customer	Irrigation, commercial, industrial
Study options used	Expand the current distribution system
Amount of recycled water used	Of available 13.5 MGD, 11.6 MGD can be used
Total available plant utilization	86%
Total Project Cost	$1,000,000
Cost increase estimated on monthly bill	$0.00. (see cost analysis below)
Cost analysis	Assumes no additional expenditures on City infrastructure system. Expansion costs would be paid by other water agencies to serve their customers, thus resulting in lowest capital investment by the City and lowest unit cost of South Bay strategies. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Less dependence on imported water, locally controlled drought-proof supply, offsets discharge of wastewater into the ocean. Results in lowest capital investment and lowest unit cost of all South Bay strategies. Note: This strategy would require a large user in the Sweetwater Authority's service area.


Ralph W. Chapman
Water Recycling Facility
(Otay Water District)
CITY OF SAN DIEGO
OTAY WATER DISTRICT
Sweetwater
Reservoir
Upper Otay
Reservoir
COUNTY
OF
SAN DIEGO
Lower
Otay
Reservoir
SWEETWATER
AUTHORITY
OTAY WATER DISTRICT
CORONADO
IMPERIAL
BEACH
CITY OF SAN DIEGO
South Bay Water
Reclamation Plant
IBWC
USA
MEXICO
LEGEND
Existing Recycled Water Pipelines (City of San Diego)
Existing Recycled Water Pipelines (Otay Water District)
Proposed Recycled Water Pipelines (Otay Water District)
Strategy Facility
Golf Course/Large Turf Area
0 1 2 3 Miles
SOUTH BAY-1

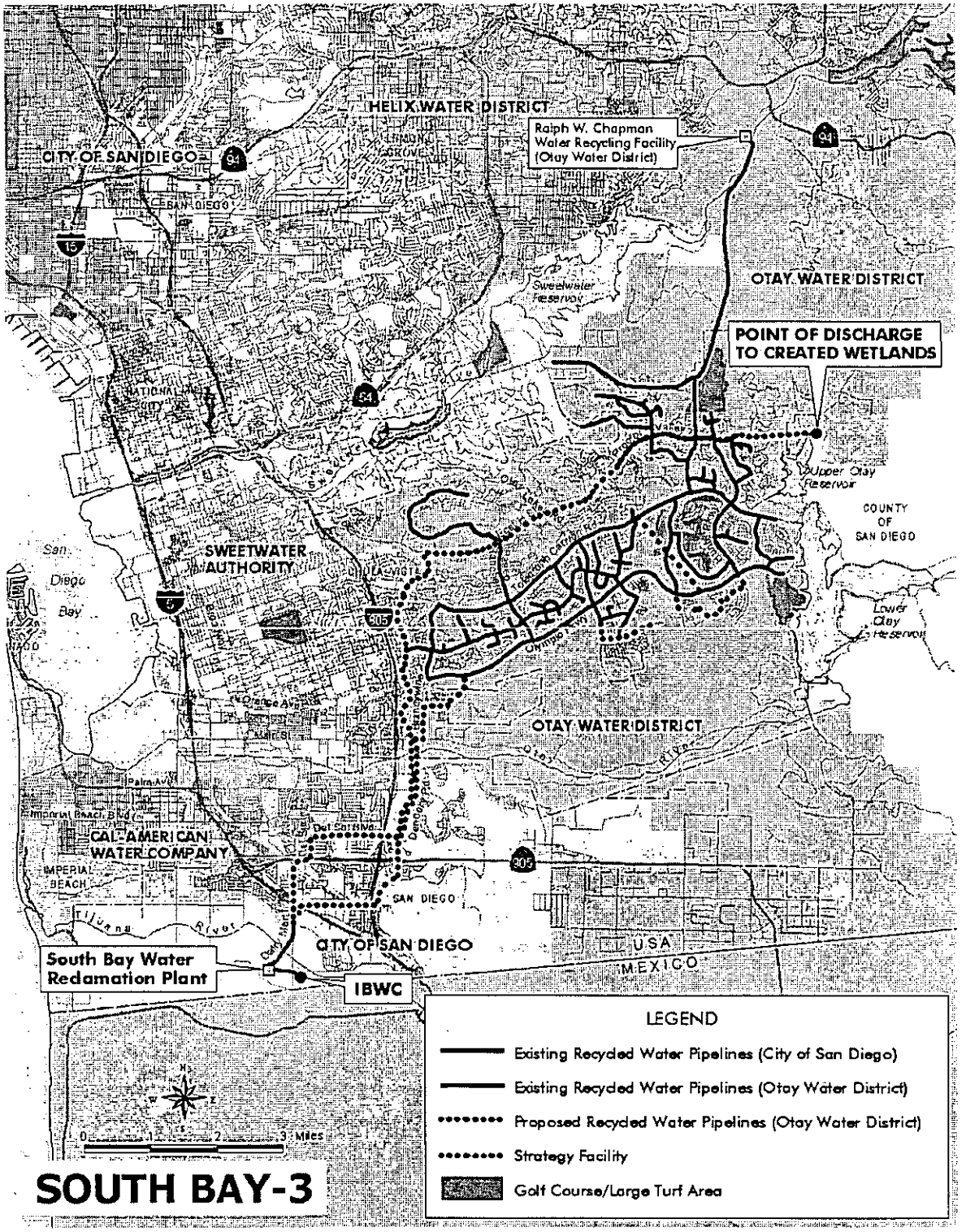
South Bay-2 (SB-2)

Type of use	Non-potable and indirect potable reuse
System	Dual piping system for non-potable customers and wholesale distribution mains. Construct a 2 MGD advanced water treatment facility at Upper Otay Reservoir with wetlands. Blended recycled water flows to Lower Otay Reservoir and is treated at the Otay WTP prior to distribution to drinking water customers.
Area served	Area adjacent to South Bay facility, portions of the Otay Water District service area (Eastlake, Telegraph Canyon, etc.), the Otay WTP service area and the cities of Imperial Beach and Coronado.
Type of Customer	Irrigation, commercial, industrial and City potable water customers receiving water from the Otay WTP.
Study options used	Expand the current distribution system, create wetlands, add water to raw water reservoirs after additional treatment.
Amount of recycled water used	Of available 12.9 MGD, 8 MGD can be used
Total available plant utilization	62%
Total Project Cost	$21,600,000
Cost increase estimated on monthly bill	$0.23
Cost analysis	Assumes City will utilize existing distribution system and construct a pipeline segment to reach Upper Otay Reservoir, and build a small (2 MGD) advanced water treatment plant. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Less dependence on imported water, locally controlled drought-proof supply, offsets discharge of wastewater into the ocean. It includes a mix of non-potable uses and a small-scale indirect potable reuse project.


HELIX WATER DISTRICT
CITY OF SAN DIEGO
Ralph W. Chapman Water Recycling Facility (Otay Water District)
OTAY WATER DISTRICT
SMALL SCALE OTAY RESERVOIR IPR
Sweetwater Reservoir
Upper Otay Reservoir
Otay Reservoir
COUNTY OF SAN DIEGO
SWEETWATER AUTHORITY
San Diego Bay
OTAY WATER DISTRICT
CAL-AMERICAN WATER COMPANY
IMPERIAL BEACH
CITY OF SAN DIEGO
South Bay Water Reclamation Plant
IBWC
USA
MEXICO
LEGEND
Existing Recycled Water Pipelines (City of San Diego)
Existing Recycled Water Pipelines (Otay Water District)
Proposed Recycled Water Pipelines (Otay Water District)
Strategy Facility
Golf Course/Large Turf Area
0 1 2 3 Miles
SOUTH BAY-2

South Bay-3 (SB-3)

Type of use	Non-potable and indirect potable reuse
System	Dual piping system for non-potable customers and wholesale distribution mains. Construct a 5.5 MGD advanced water treatment facility near the SBWRP and a 16 mile pipeline to a created wetlands above Upper Otay Reservoir. Advanced treated water blends with local runoff at Upper Otay Reservoir, flows to Lower Otay Reservoir and, after further natural treatment, is treated at Otay WTP prior to distribution to drinking water customers.
Area served	Area adjacent to South Bay facility, portions of the Otay Water District service area (Eastlake, Telegraph Canyon, etc.), the Otay WTP service area and the cities of Imperial Beach and Coronado.
Type of Customer	Irrigation, commercial, industrial and City potable water customers receiving water from the Otay WTP.
Study options used	Expand the current distribution system, create wetlands, add water to raw water reservoirs after additional treatment.
Amount of recycled water used	Of available 11.8 MGD, 11.3 MGD can be used
Total available plant utilization	96%
Total Project Cost	$96,100,000
Cost increase estimated on monthly bill	$0.89
Cost analysis	Assumes City will construct 16 mile pipeline to Upper Otay Reservoir and construct larger (5.5 MGD) advanced water treatment facility. These projects create higher initial impact on customer bill while utilizing more of the reclamation plant's capacity. NOTE: These are estimated costs and do not include grants or other incentives that may be available.
Benefit	Maximizes the available South Bay water supply through indirect potable reuse, less dependence on imported water, locally controlled drought-proof supply, offsets discharge of wastewater into the ocean. Provides low overall unit cost and greatest geographic area of utilization.


HELIX WATER DISTRICT
Ralph W. Chapman Water Recycling Facility (Otay Water District)
CITY OF SAN DIEGO
SAN DIEGO
OTAY WATER DISTRICT
Sweetwater Reservoir
POINT OF DISCHARGE TO CREATED WETLANDS
Upper Otay Reservoir
COUNTY OF SAN DIEGO
Lower Otay Reservoir
SWEETWATER AUTHORITY
San Diego Bay
OTAY WATER DISTRICT
CAL-AMERICAN WATER COMPANY
IMPERIAL BEACH
SAN DIEGO
CITY OF SAN DIEGO
USA
MEXICO
South Bay Water Reclamation Plant
IBWC
LEGEND
Existing Recycled Water Pipelines (City of San Diego)
Existing Recycled Water Pipelines (Otay Water District)
Proposed Recycled Water Pipelines (Otay Water District)
Strategy Facility
Golf Course/Large Turf Area
0 1 2 3 Miles
SOUTH BAY-3

000055 REQUEST FOR COUNCIL ACTION
CITY OF SAN DIEGO

1. CERTIFICATE NUMBER (FOR AUDITOR'S USE ON): WTR-14-06-011

TO:	2. FROM (ORIGINATING DEPARTMENT):	3. DATE:
CITY ATTORNEY	Water Department	10-18-07

4. SUBJECT:
Water Reuse Study

5. PRIMARY CONTACT (NAME, PHONE, & MAIL STA.)	6. SECONDARY CONTACT (NAME, PHONE, & MAIL STA.)	7. CHECK BOX IF REPORT TO COUNCIL IS ATTACHED
Marsi Steirer 533-4112, MS 906	Jim Barrett 533-7555, MS 904	☐

8.COMPLETE FOR ACCOUNTING PURPOSES

					9. ADDITIONAL INFORMATION / ESTIMATED COST:
FUND	41500				No Fiscal Impact. The Study was undertaken to provide a comprehensive analysis of potential water reuse strategies without making a recommendation for further funding.
DEPT.	760				
ORGANIZATION	8320				
OBJECT ACCOUNT	4222				
JOB ORDER	8500				
C.I.P. NUMBER	N/A				
AMOUNT	$0				

10. ROUTING AND APPROVALS

ROUTE (#)	APPROVING AUTHORITY	APPROVAL SIGNATURE	DATE SIGNED	ROUTE (#)	APPROVING AUTHORITY	APPROVAL SIGNATURE	DATE SIGNED
1	DEPARTMENT DIRECTOR		10/19/07	8	DEPUTY CHIEF	for	10/19/07
2				9	COO	- Not required -	
3				10	CITY ATTORNEY		
4				11	ORIG. DEPT		
5				✓	DOCKET COORD: _____ COUNCIL LIAISON _____		
6					COUNCIL PRESIDENT _____ ☐ SPOB ☐ CONSENT ☒ ADOPTION		
7	LIAISON OFFICE				☐ REFER TO: _____ COUNCIL DATE: 10/29		

11. PREPARATION OF: ☐ RESOLUTIONS ☐ ORDINANCE(S) ☐ AGREEMENT(S) ☐ DEED(S)

1. Requesting the acceptance of the Water Reuse Study Final Draft Report as fulfillment of the elements outlined in Resolution No. R-298781, dated January 13, 2004.

11A. STAFF RECOMMENDATIONS:

REQUESTING THE ACCEPTANCE OF THE WATER REUSE STUDY FINAL DRAFT REPORT AS FULFILLMENT OF THE ELEMENTS OUTLINED IN RESOLUTION NO. R-298781, DATED JANUARY 13, 2004 AND AS FULFILLMENT OF THE RECYCLED WATER MASTER PLAN UPDATE AS REQUIRED BY MUNICIPAL CODE CHAPTER 66, ARTICLE 4, DIVISION 8.

12. SPECIAL CONDITIONS (REFER TO A.R. 3.20 FOR INFORMATION ON COMPLETING THIS SECTION.)

COUNCIL DISTRICT(S): ALL

COMMUNITY AREA(S): ALL

ENVIRONMENTAL IMPACT: This action is exempt from the California Environmental Quality Act (CEQA) pursuant to State CEQA Guidelines, Section 15262. This determination is based on Section 15004 of the guidelines which provides direction to Lead agencies on the appropriate time for Environmental review. The project will require further review under the provisions of CEQA.

HOUSING IMPACT: NONE

OTHER ISSUES: NONE

000057

EXECUTIVE SUMMARY SHEET

DATE ISSUED: REPORT NO.:
ATTENTION: Council President and City Council
ORIGINATING DEPT: Water Department
SUBJECT: Water Reuse Study
COUNCIL DISTRICT: Citywide
STAFF CONTACT: Marsi Steirer (619-533-4112)

REQUESTED ACTION:

Council acceptance of the Water Reuse Study Final Draft Report (Study Final Draft Report) as fulfillment of the elements outlined in Council Resolution R-298781 evaluating all aspects of a viable increased water reuse program.

STAFF RECOMMENDATION:

Staff recommends the following:

- Accept the Study Final Draft Report as fulfillment of the elements outlined in Resolution R-298781.

EXECUTIVE SUMMARY:

On January 13, 2004, the San Diego City Council (Council) directed the City Manager to conduct a study to evaluate options for increasing the beneficial use of the City's recycled water (Resolution R-298781). During the Council hearing, staff was directed to research and produce a report on specific opportunities for increasing recycled water use, to compile research studies on the health effects of various reuse options, and include a public participation component in the effort. The Study Final Draft Report outlines the process undertaken and includes, but is not limited to, details of stakeholder involvement and public outreach, developing criteria, refining options, formulating strategies and water quality research.

The Water Department's Water Policy and Strategic Planning Division undertook implementation of the Study. The Department assembled a team of City staff, consultants and technical experts. Staff gave a presentation of Study activities to the Natural Resources and Culture Committee (NR&C) on July 20, 2005. The presentation included study options, criteria, public outreach activities, Independent Advisory Panel, and an update on the second City of San Diego Assembly Workshop on Water Reuse (Assembly) held the previous week. In that meeting, a description of public involvement activities and timeline of the activities was also presented. NR&C directed staff to present the same information to the Public Utilities Advisory Commission (PUAC). On November 21, 2005, the PUAC adopted a resolution supporting the Study effort. The resolution in part, acknowledged a completion of assignments in Resolution R-298781. Staff presented the completed Water Reuse Study Final Draft Report to the NR&C on July 26, 2006.

FISCAL CONSIDERATIONS:

None. The Study was undertaken to provide a comprehensive analysis of potential water reuse strategies without making a recommendation for further funding.

PREVIOUS COUNCIL COMMITTEE ACTIONS:
A list of all the Council and Committee actions from August 1997 through November 21, 2005 is provided in detail in the attached Staff Report. In addition, the draft report was presented to the NR&C Committee on July 26, 2006.

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:
City staff used a variety of ways to inform City residents about the Study. A key component was a 67-member stakeholder group, the City of San Diego Assembly on Water Reuse. The Assembly convened twice to discuss and provide input on the Study's direction and water reuse options. Assembly workshop statements support all options to increase the use of recycled water and, at Workshop II, the Assembly affirmed unanimous support for indirect potable reuse options.

Public involvement activities also included a speakers bureau, stakeholder interviews, Study website, telephone survey, electronic news brief, a telephone hotline and informal opinion surveys. Media coverage has been very visible through exposure in local newspapers and television stations. An educational video on the Study airs on City TV, available on both local cable companies, and many copies of the video have been distributed in the community. Details are provided in the attached Staff Report.

KEY STAKEHOLDERS:
Stakeholders affected by each strategy are described in detail in the attached Staff Report and would include both City and non-City residents

(Asst Dir. for)
J. M. Barrett
Water Department Director

for R.F. Haas
Deputy Chief of Public Works

The Water Reuse Study is available at http://www.sandiego.gov/water/waterreusestudy/index.shtml