SECTION 8

WATER RECYCLING

8.1 WASTEWATER SYSTEM DESCRIPTION

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area…

The City of Beaumont's WWTP is within the service area of the District. The City of Beaumont is responsible for the collection and treatment of municipal wastewater. Although the District is not responsible for wastewater collection and treatment, the District is coordinating with the City of Beaumont on recycle water projects for reuse of treated wastewater. The present capacity of the plant is approximately 2 million gallons per day (mgd). The City of Beaumont is presently making modifications and enhancements to the plant to increase the plant capacity to 4 mgd. The ultimate capacity of the plant will be approximately 8 mgd. It is not known at this time when the next major expansion to the plant is scheduled. It is planned that the community of Cherry Valley will be sewered to the City of Beaumont's treatment plant through BCVWD's latent wastewater power. This will increase the flow to the City of Beaumont's treatment plant by about 1 mgd by the year 2030.

Raw wastewater from the City of Beaumont enters the plant and flows through a mechanical screening and flow metering facility before flowing to the influent pumping station. From there the wastewater is pumped to a pair of combination flow equalization/aeration basins for secondary treatment. The effluent from the equalization/aeration basins flows to two secondary clarifiers where the activated sludge is separated and returned to the equalization/aeration basins. The plant will incorporate a centrifuge system for dewatering in their current modifications. The clarified secondary effluent flows to two shallow bed, traveling bridge filters then through an ultraviolet light facility for final disinfection. The disinfected effluent then flows through a metering flume and down a stair-step cascade aeration channel to Coopers Creek, which is tributary to San Timoteo Creek. It should be noted that the outfall to Coopers Creek is outside and not tributary to the BSU. The plant currently meets Title 22 requirements for unrestricted use and will provide tertiary treated effluent for water recycling. Additions will be made at the treatment facility for recycled water pumping and for chlorine application to maintain water quality within the recycled water distribution system.

8.2 WASTEWATER GENERATION, COLLECTION, AND TREATMENT

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A […] quantification of the amount of wastewater collected and treated…

Table 8-1 summarizes the estimated wastewater generation and collection within the existing service area of the District and estimated flows through 2030 based on known developments. Wastewater generation includes all flows received by the City of Beaumont's WWTP and estimated flow from Cherry Valley .

Table 8-1
Wastewater Generation and Collection

	2000	2005	2010	2015	2020	2025	2030
Wastewater collected and treated at City of Beaumont WWTP from the City of Beaumont, mgd	1.2	1.65	5.37	7.37	7.71	7.88	7.94
Wastewater collected from Cherry Valley and treated at the City of Beaumont WWTP, mgd		-	-	0.56	.76	.86	.97
Total Wastewater Flow, mgd	1.2	1.65	5.37	7.93	8.47	8.74	8.91
Total Wastewater Flow, acre-ft/yr		1848	6099	8885	9561	9901	9983
Wastewater Flow for Environmental Mitigation, acre-ft/yr		300	300	300	300	300	300
Wastewater Flow Available for Recycled based on 95 utilization		1471	5509	8156	8798	9121	9199

8.2.1 Overview of the Recycled Water Plan

The City of Beaumont has previously expanded and upgraded its WWTP to a full reclamation facility. This is in response to the California Regional Water Quality Control Board (RWQCB), Santa Ana River Region to upgrade the level of treatment to allow continued discharge to Cooper's Creek, a tributary of San Timoteo Creek. In lieu of discharging effluent to the creek, the City of Beaumont and District, through the two party Cooperative Agreement, have agreed to implement a water recycling project, since the effluent limits for discharge to the creek currently are equivalent to that required for water recycling.

The City of Beaumont will operate the treatment facility and deliver treated water to the District for recycling. The District will own and operate the recycled water pumping stations, storage reservoirs and distribution piping. The District will then enter into agreements with various users, such as the City of Beaumont, Parks and Recreation District, Caltrans, Golf Courses, etc. for providing recycled water. The District will be

responsible for metering and revenue collection as well as overall recycled water pumping, storage and distribution system operation and maintenance.

The District intends to serve recycled water to the full extent possible for non-potable uses and as permitted by law. This would make potable water, now used for irrigation, available for new development. As new development occurs, the new projects would include appropriate piping systems to permit the use of recycled water for irrigation of street medians, greenbelts, schools, parks and common areas. This concept then envisions limiting the use of potable quality water to potable water purposes to the extent practical. Surplus recycled water will be available during certain times of the year when normal irrigation demands are reduced. During these times, the surplus will be piped to spreading basins for surface spreading of recycled water for recharge to the BSU.

The recycled water system will be developed in phases to match both demand for recycled water and the availability of treated effluent to be recycled. Currently about 18 to 20 miles of recycled water piping are in place.

8.3 WASTEWATER DISPOSAL AND RECYCLED WATER USES

> 10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:
>
> 10633 (a) A description of the […] methods of wastewater disposal.
>
> 10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.
>
> 10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
>
> 10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

8.3.1 History of Water Recycling in the Service Area

The District has considered the use of recycled water to supplement the water supply for a number of years. As early as 1987 the District began discussing water recycling in earnest with the City of Beaumont and the Pass Agency.

In June of 1989 the District prepared an internal memorandum on the potential for using recycled water in the Pass area. The report discussed the installation and operation of a conceptual project, which included treatment facilities serving the cities of Banning and Beaumont. Included in this plan were conceptual alignments for recycled water distribution and storage facilities. The concept involved the formation of a Joint Powers Reclamation Agency with each city operating its own treatment facilities. The effluent would be provided to the JPA for distribution. Surplus recycled water was proposed to be percolated into the ground for recharge.

In August of 1989 the cities of Beaumont and Banning along with the District sent letters to the Pass Agency to have the Pass Agency take the lead on the conceptual project.

Since that time, the District, the City of Beaumont and several large developers took the lead in developing a conceptual regional wastewater collection and reclamation study. The District's Engineer completed the study in 1993. The plan envisioned a regional reclamation facility in San Timoteo Canyon in the vicinity of San Timoteo Canyon and Singleton Roads. The plan also envisioned continued use of the City of Beaumont's WWTP as a satellite reclamation plant. The current plan, however, is to keep the City of Beaumont's WWTP in operation supplying recycled water up to at least 8 mgd (or 9 mgd including the Cherry Valley flow.) Flow will not reach this level until well into the future.

With increasing interest in development in the City of Beaumont, the District and the City of Beaumont entered into a cooperative agreement that funded a new recycled water master plan from Community Facilities District Bonds. This work was completed as part of the 1995 Master Plan.

8.3.2 Type and Place of Recycled Water Currently Being Used

At the present time treated wastewater is not being used to offset potable water demands. Pipelines are being installed as development occurs in accordance with the District's Recycled Water Master Plan, which is presently being updated. Certain facilities need to be in place such as a booster station, chlorination facility, and water storage at the City of Beaumont's WWTP in addition to pipelines before water recycling can be begin. The chlorination facility is not for disinfection, but to provide a residual disinfectant in the recycled water to maintain water quality in the recycled water distribution system.

8.3.3 Projections of Recycled Water Use in 2002 UWMP Update

The District's UWMP 2002 Update included potential recycled water demands as follows:

2002 UWMP Recycled Water Demand Projections

2005	0.9 mgd	1000 acre-ft/yr
2010	2.9 mgd	3250 acre-ft/yr
2015	4.9 mgd	5500 acre-ft/yr
2020	5.3 mgd	5900 acre-ft/yr
2025	5.4 mgd	6050 acre-ft/yr

These quantities have increased significantly in this 2005 UWMP update

2005 UWMP Recycled Water Demand Projections

2005	1.92 mgd	2153 acre-ft/yr
2010	5.72 mgd	6410 acre-ft/yr
2015	6.10 mgd	6828 acre-ft/yr
2020	6.27 mgd	7028 acre-ft/yr
2025	6.27 mgd	7028 acre-ft/yr
2030	6.27 mgd	7028 acre-ft/yr

Note that the above projections for the 2005 Update do not include the amount of recycled water which is recharged. The District's philosophy of operation is to utilize the recycled water first for irrigation and then if there is any unused recycled water available, it shall be used for groundwater recharge. This was the basis for Table 2.8.

When the 2002 UWMP Update was being prepared there were only a few developments, e.g., Three Rings Ranch, that installed recycled water mains and plumbed their system for recycled water. As of the December 2005, the District has between 18 to 20 miles of recycled water transmission main in place. This does not include the distribution mains installed by developers to serve parks and playgrounds etc.

8.3.4 Recycled Water Quantity

Successful recycled water systems require the recycled water to be available not only in sufficient quantities, on demand, but also be of the highest quality possible.

With respect to quantity, the demand must not outpace the supply and sufficient storage must be provided to match hourly demand with supply.

Currently there is about 1.1.65 to 1.8 mgd of wastewater treated at the City of Beaumont's WWTP. This water, once treated, is discharged into Coopers Creek, which is tributary to San Timoteo Creek. Because it provides a portion of the streamflow to San Timoteo Creek, the RWQCB has indicated that some portion of the flow should continue to be discharged to the creek. For purposes of this plan this is assumed to be 20 percent of the current discharge or about 0.25 mgd. Based on this there is currently about 1.25 to 1.55 mgd available for recycling. Other alternative mitigation measures may be implemented such that the total present flow from the wastewater treatment plant would be available for recycling. Any mitigation measures would require approval by the RWQCB.

The recycled water will be supplemented by untreated State Project Water which will be blended with the recycled water at the District's groundwater recharge facility.

8.3.5 Recycled Water Quality

Current users of potable water recognize the value of water quality; changes from potable water to recycled water are sometimes met with resistance, primarily due to the unknowns. These unknowns relate to both quality and quantity. Golf course

superintendents are concerned about the mineral water quality and its impact on very sensitive grasses. Nursery owners are concerned about the impact of the water on sensitive ornamentals. School site administrators want to know how the play areas will react to recycled water.

Water quality parameters of interest to recycled water users are typically:

- Mineral content
- Metals
- Organics and pesticides
- Microbiological content

8.3.5.1 Mineral Content

The mineral content is extremely important to landscape irrigation, nursery users, irrigators and golf course superintendents. From an irrigation standpoint the important parameters are the total dissolved solids (TDS) concentration, the concentration of specific ions such as sodium, chloride, and boron; and the impact the use of the water will have on the soil structure as measured by the Sodium Adsorption Ratio (SAR) or the Modified SAR.

The mineral content is also of importance when groundwater recharge is considered. If the recycled water has excessive mineral content, the quality of the groundwater will eventually deteriorate. In groundwater recharge projects, the quality of the recharge water must be of such quality, that it will not cause the groundwater basin water quality objectives to be exceeded. Basin water quality objectives are established by the RWQCB and are published in the Basin Plan.

Table 8-2 presents a summary of the mineral quality characteristics of the wastewater currently being discharged by the City of Beaumont's WWTP between 1995 and 2001. The quality today (2005) is anticipated to be about the same since the source water quality has not changed significantly.

Table 8-2
Recycled Water Mineral Quality (1995-2001)

	RANGE			
PARAMETER	**UNITS**	**MIN**	**MAX**	**AVERAGE**
Total Hardness as CaCO3	mg/L	150	200	177
Calcium (Ca)	mg/L	39	53	46
Magnesium (Mg)	mg/L	12	18	15
Sodium (Na)	mg/L	57	82	68
Potassium (K)	mg/L	11	14	12
Ammonium Nitrogen (NH4-N)	mg/L	ND	8	0.62
Total Alkalinity as CaCO3	mg/L	160	250	202
Hydroxide (OH)	mg/L	ND	<3	0
Carbonate (CO3)	mg/L	ND	3	2
Bicarbonate (HCO3)	mg/L	140	310	247
Sulfate (SO4)	mg/L	36	67	46
Chloride (Cl)	mg/L	30	65	49
Nitrate Nitrogen (NO3-N)	mg/L	<1	20	7
Fluoride (F)	mg/L	0.4	2.0	0.66
Cyanide (CN)	mg/L	ND	0.02	<0.01
Total Phosphorus	mg/L	0.1	4.6	2.21
Nitrite Nitrogen (NO2-N)	mg/L	ND	0.8	0.18
Inorganic Nitrogen	mg/L	1	31	9
Total Dissolved Solids (TDS)	mg/L	360	510	428
Total Organic Carbon (TOC)	mg/L	3	24	6
Sodium Adsorption Ratio	meq/L	2.0	2.5	2.2

Overall the mineral water quality of the recycled water is excellent. The TDS ranges from 360 to 510 mg/L with an average of 428 mg/L. The TDS of the District supplied groundwater ranges from 220 to 320 mg/L and averages about 260 mg/L. The water quality varies depending on the source i.e. Edgar Canyon supply or the BSU. Water from Edgar Canyon has slightly lower mineral concentration than water pumped from the BSU. The recycled water concentration shows an increase of 168 mg/L from the supply water. This is lower than that typically experienced and is reflective of the good quality water source and the predominately residential character of the wastewater.

The concentration of sulfates, chlorides and sodium in the recycled water, of concern to irrigators, averages 46, 49 and 68 mg/L, respectively. In the District supplied groundwater these concentrations average 30, 10 and 20 mg/L, respectively. The recycled water concentrations show an increase of 16, 39, and 48 mg/L from the supply water. This is typical.

The SAR for the reclaimed water averages 2.2. SAR values less than 3 present a low risk

of decreasing soil permeability with long-term use of the water.

This water can be used for irrigation without any fear of damage to grasses or landscaping.

The recycled water contains a total phosphorus (as P) of 2.2 mg/L and total inorganic nitrogen (as N) of 9 mg/L. This translates into a fertilizer equivalent of 6 lb. of P/acre/foot of water applied and 25 lb. of N/acre/foot of water applied. On the basis that 5 feet of water will be applied per year per acre, the recycled water will supply about 30 lb. of P/acre/year and 125 lb. of N/acre/year. Use of the recycled water for irrigation will reduce the need to purchase and apply chemical fertilizers.

8.3.5.2 Metals

Table 8-3 presents the quality of the recycled water in terms of metals. Metals are present in only trace amounts and all comply with the maximum contaminant levels (MCLs) set for potable water.

The boron concentration ranges from <0.1 to 0.3 mg/L with an average of 0.22 mg/L. Boron is of concern in concentrations above about 0.75 mg/L.

8.3.5.3 Organics and Pesticides

Organics and pesticides are essentially below detection levels except for chloroform. Chloroform is a disinfection by-product formed during the disinfection process using chlorine and is a trihalomethane (THM). The WWTP uses ultraviolet disinfection so chloroform levels should be minimal. The chloroform concentration in recent samples was below 30 µg/L. The drinking water MCL for total trihalomethanes is 80 µg/L and hence the concentration in the recycled water would not appear to be of concern.

The total organic carbon (TOC) in the recycled water ranges from 3 to 24 mg/L with an average value of 6 mg/L. TOC is an important consideration in groundwater recharge involving recycled water because it is reflective of refractory organic material, which was not removed in the treatment process. This level of TOC may be an issue in groundwater recharge and some additional effluent “polishing” may be required at some point in time.

8.3.5.4 Microbiological Content

The regulations for recycled water use are based on producing virus and pathogen free water. The upgraded and expanded WWTP will provide recycled water that meets these objectives.

Table 8-3
Recycled Water Metal Concentrations (1995-2001)

		RANGE		
PARAMETER	**UNITS**	**MIN**	**MAX**	**AVERAGE**
Antimony (Sb)	µg/L	<1	2	<1
Arsenic (As)	µg/L	<1	5	1
Barium (Ba)	µg/L	<20	24	<20
Beryllium (Be)	µg/L	<10	<10	<10
Boron (B)	mg/L	<0.1	0.3	0.22
Cadmium (Cd)	µg/L	<1	1	<1
Total Chromium (Cr)	µg/L	<10	10	<10
Cobalt (Co)	µg/L	<10	<10	<10
Copper (Cu)	µg/L	<10	15	<10
Iron (Fe)	µg/L	<20	110	20
Lead (Pb)	µg/L	<1	13	1
Manganese (Mn)	µg/L	<10	10	<10
Mercury (Hg)	µg/L	<0.5	0.5	<0.5
Nickel (Ni)	µg/L	<20	20	<20
Selenium (Se)	µg/L	<1	7	<1
Silver (Ag)	µg/L	<10	10	<10
Thallium (Tl)	µg/L	<5	200	<5
Zinc (Zn)	µg/L	35	150	60

8.3.5.5 Projected Water Quality

When the newly upgraded WWTP is on-line, it is expected that most of the mineral water quality constituents will not vary appreciably from those in Table 8-2. However, there could be a change in some of the constituents if treated SWP water is used in the service area for potable water.

SWP water contains higher concentrations of TDS, chlorides and sulfates than does the local groundwater. Table 8-4 presents data on the variation of these constituents in the SWP water from Silverwood Reservoir, the water source for the Pass Agency.

The variations of water quality are substantial and depend on the water supply conditions in Northern California. Drought conditions result in more intrusion of poor quality water into the Sacramento-San Joaquin River Delta, the source of the SWP exports. The expected value shown in Table 8-5 is not an average but rather is reflective of conditions believed to be representative in the future.

Table 8-4
State Water Project Water Quality

Parameter	Units	Range	Expected
TDS	mg/L	100 - 400	350
Chloride	mg/L	10 - 150	120
Sulfate	mg/L	30 - 120	80

If SWP water is used in the District water supply system, the concentrations of TDS, chlorides and sulfates in the recycled water will increase slightly; the amount of increase depends on the proportion of SWP water used. Most likely the water supply for the service area in the future will consist of a blend of local groundwater and SWP water, so the anticipated concentrations of TDS, chlorides and sulfates in the recycled water will be 490, 115 and 70 mg/L, respectively versus the 428, 49, and 46 mg/l respectively, currently experienced in the City of Beaumont's WWTP effluent.

8.3.6 Potential Uses of Recycled Water

8.3.6.1 Irrigation and Other Direct Uses

At the present time the only potential recycled water uses envisioned are those related to irrigation of freeway medians, golf courses, cemeteries, parks, playgrounds and schoolyards. Recycled water used for those purposes shall be disinfected tertiary recycled water. (Strictly speaking the irrigation of freeway medians and cemeteries only needs to be disinfected secondary effluent. Treating only a portion of the effluent to meet those reduced requirements is impractical and furthermore would require a separate piping system to distribute the water to those users.)

In the future the recycled water system could be expanded to irrigate cherry and other fruit orchards. The proposed requirement for this use is disinfected tertiary recycled water also. It is anticipated that future demand for irrigation of fruit trees will diminish as the orchards are replaced with other land uses.

The City of Beaumont's WWTP already produces effluent, which meets Title 22 requirements for unrestricted use. There are, however, a number of use area requirements and facility design requirements. These requirements assume disinfected tertiary recycled water is used.

1. No irrigation shall take place within 50 feet of any domestic, including municipal, water supply well and no impoundment shall occur within 100 feet of any domestic well.
2. Any irrigation runoff shall be confined to the use area and shall not enter a dwelling, outdoor eating area or a food handling facility. Drinking water fountains shall be protected against contact with recycled water spray, mist or runoff.

Irrigation of parks, playgrounds and schoolyards usually requires irrigation during the nighttime hours.

3. Recycled water use areas shall be posted with signs.
4. There shall be no physical connection between any recycled water system and a potable water system. Only an air gap separation is permitted on back-up supplies.
5. The recycled water system shall not have any hose bibs. Only quick couplers different from those used on the potable water system are permitted.
6. A reduced pressure principle backflow prevention device shall be placed on the potable water supply connection to each reuse area.
7. A detailed recycled water use report shall be prepared. This report shall contain
   - A detailed description of the use site including the person(s) responsible for operation and maintenance of the system,
   - Piping layout including backflow prevention devices, and
   - Methods used by the recycled water supplier to ensure no cross connections.

8.3.6.2 Groundwater Recharge by Surface Spreading

The following requirements, excerpted from the "Draft, dated April 23, 2001, Groundwater Recharge Reuse Regulations," affect the design and operation of a proposed recycled water project.

1. All reclaimed water shall be from a wastewater collection system operated under a comprehensive industrial pretreatment and pollutant source control program.

The City of Beaumont will have this in place, as it is part of the overall wastewater discharge permit.

2. Requires that the recycled water be oxidized, filtered and disinfected.

Essentially this is a filtered and disinfected secondary effluent. This is basically the same quality required for direct discharge to San Timoteo Creek. The current level of treatment meets this requirement.

Some polishing supplementary refractory organics removal may be needed.

3. The average quantity of recycled water in each aquifer shall be specified by the Department of Health Services. The amount will be a function of the TOC in the recycled water.
4. Recycled water shall be retained underground a minimum of 6 months prior to being withdrawn at a domestic (municipal) water supply well.
5. The minimum horizontal separation between a surface spreading area and a domestic (municipal) water supply well shall be 500 feet.
6. A detailed engineering report shall be prepared and contain the following information as a minimum:
   - A plan of the treatment, storage, transmission, spreading and monitoring facilities,
   - A project description,

- A detailed hydrogeologic study to address the aquifer travel time, percent recycled water intercepted by domestic wells, water quality impacts, etc.,
- A description of the operation and maintenance personnel, their qualifications, experience and responsibilities,
- A description of project operation including a contingency plan to preclude the recharge of water when conditions or quality does not meet requirements,
- A determination of anticipated TOC and total nitrogen levels, and
- A detailed mound monitoring plan.

Based on the requirements established above, there does not appear to be any reason why the surface spreading of recycled water would not be permitted.

8.3.7 Potential Recycled Water Demands

Table 8-5 summarizes the potential recycled water users in 5-year increments through 2025. To serve all of these users would involve a very extensive distribution and storage network. It is envisioned that the recycled water system could serve the entire area eventually.

Table 8-5
Existing and Projected Recycled Water Demands (2005 – 2030)
Acre-ft/yr

Year	2005	2010	2015	2020	2025	2030
Existing Potable Water Users converted to recycled water	0	1700	2153	2153	2153	2153
Future Recycled Water Users	0	1107	1525	1725	1725	1725
Recycled Water Supplied to Overlying Parties	0	3150	3150	3150	3150	3150
Recycled Water Recharge	0	0	1328	1678	1978	2171
DEMAND TOTAL	**0**	**5957**	**8156**	**8706**	**9006**	**9199**
AVAILABLE	**1471**	**5509**	**8156**	**8706**	**9006**	**9199**

Note: in 2010 there is a shortfall in recycled water supply that will need to be made up with imported State Project Water.

Table 8-5 also summarizes the comparison of recycled water available from the City of Beaumont's WWTP and the projected recycled water demands through 2030.

8.4 CITY OF BEAUMONT RECYCLED WATER ORDINANCES

The City of Beaumont has adopted several ordinances regulating the use of recycled water. The City of Beaumont, in conjunction with the District, has adopted polices such that when recycled water becomes available, recycled water will be used for non-potable uses such as irrigation of landscape medians, cemeteries, golf courses, and parks. The City of Beaumont also has ordinances that adopt the District's UWMP and the water conservation measures and procedures stated in the UWMP. The City of Beaumont's ordinances applicable to recycled water are attached in Appendices L, M, and N.