CHAPTER 8

WATER AND WASTEWATER

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CHAPTER 8 - WATER AND WASTEWATER

TABLE OF CONTENTS

LIST OF TABLES

THE GENERAL PLAN

WATER AND WASTEWATER MANAGEMENT

INTRODUCTION

The City's General Plan guides the use and protection of various resources to meet community purposes. It reflects consensus and compromise among a wide diversity of citizens' preferences, within a framework set by State law. The General Plan contains elements that address various topics.

The City decided to adopt an element addressing water resources and wastewater treatment because of the vital role of these resources and the far-reaching impacts of water policies on community growth and character. This element translates the Land Use Element's capacity for development into potential demand for water supply and wastewater treatment. This element outlines how the City plans to provide adequate water and wastewater services for its citizens, consistent with the goals and policies of other General Plan elements.

Before adopting or revising any General Plan element, the Planning Commission and the City Council must hold public hearings. The City publishes notices in the local newspaper to let citizens know about the hearings at least ten days before they are held. Also, the City prepares environmental documents to help citizens understand the expected consequences of its planning policies before the hearings are held.

Anyone may suggest or apply for amendments to General Plan elements. The City will probably update this element about every five years, or more frequently if necessary.

WATER SECTION

SAFE ANNUAL YIELD

1.0 POLICIES

1.0.1 Basis for Planning

The City will plan for future development and for water supplies based on the amount of water which can be supplied each year, under critical drought conditions. This amount, called "safe annual yield," will be formally adopted by the Council. The safe annual yield determination will be revised as significant new information becomes available, and as water sources are gained or lost. The determination will consider a staff analysis, which will recommend an amount based on coordinated use of all water sources. Each change to safe annual yield will be reflected in an amendment of this Plan.

1.0.2 Safe Yield Amount

The City's safe annual yield, from the coordinated operation of Salinas and Whale Rock reservoirs and 500 acre feet of groundwater, is shown in Table 1. The safe annual yield includes reductions due to siltation at the reservoirs, discussed in more detail in Section 5.0.

1.0.3 Groundwater

The amount of groundwater which the City will rely upon towards safe annual yield is identified in policy 1.1.2. The City will maximize the use of groundwater in conjunction with other available water supplies to maximize the yield and long-term reliability of all water resources and to minimize overall costs for meeting urban water demands. The City shall monitor water levels at the well sites to determine whether reduction or cessation of pumping is appropriate when water levels approach historic low levels.

1.1 BACKGROUND

Safe annual yield is the amount of water that can reliably be produced by the City's water supply to meet the water demand. It is estimated by simulating the operation of the City's water supply sources over an historical period to determine the maximum level of demand that could be met during the most severe drought for which records are available.

The safe annual yield of an individual source of water supply is defined as the quantity of water which can be withdrawn every year, under critical drought conditions. Safe annual yield analyses of water supply sources are based on rainfall, evaporation and stream flow experienced during an historical period. The City of San Luis Obispo uses a period beginning in 1943, which covers drought periods in 1946-51, 1959-61, 1976-77, and 1986-91. The historical period used in the latest computer analysis to determine safe annual yield extends from 1943 through 1991 and includes the most recent drought. Although future conditions are unlikely to occur in the precise sequence and magnitudes as have occurred historically, this technique provides a reliable estimate of the future water supply capability of the existing sources, since the long term historical record is considered a good indicator of future conditions.

The safe annual yield gradually declines as silt accumulates in the reservoirs, thereby reducing storage capacity (discussed in more detail on page 10).

Prior to 1991, the "controlling drought period" for determining safe annual yield was 1946 to 1951. The critical period for determining safe annual yield from the two reservoirs is now the period from 1986 to 1991. The safe annual yield is reflected in the table below and includes estimated losses associated with siltation.

TABLE 1: SAFE ANNUAL YIELD

1.2 SAFE ANNUAL YIELD			
Year	**Salinas & Whale Rock Reservoirs**	**Groundwater**	**Total**
2000	7,040 acre feet	500 acre feet	7,540 acre feet
2001	7,030 acre feet	500 acre feet	7,530 acre feet
2002	7,020 acre feet	500 acre feet	7,520 acre feet
2003	7,010 acre feet	500 acre feet	7,510 acre feet
2004	7,000 acre feet	500 acre feet	7,500 acre feet
2005	6,990 acre feet	500 acre feet	7,490 acre feet
2006	6,980 acre feet	500 acre feet	7,480 acre feet
2007	6,970 acre feet	500 acre feet	7,470 acre feet
2008	6,960 acre feet	500 acre feet	7,460 acre feet
2009	6,950 acre feet	500 acre feet	7,450 acre feet

Previous Safe Annual Yield Studies

Previous studies of the critical historical drought periods at Salinas and Whale Rock reservoirs have indicated the following safe annual yields were available to the City:

Water Supply	Safe Annual Yield	Reference
Salinas Reservoir	4,800 acre-feet	Corps of Engineers, 1977
Whale Rock Reservoir*	2,060 acre-feet	Dept Water Resources, 1974
Coordinated Operation	500 acre-feet	CH2M-Hill, 1985
Groundwater	500 acre-feet	Water Operational Plan, 1993
TOTAL	7,860 acre-feet	

*City's share of Whale Rock Reservoir safe annual yield

Past safe annual yield analyses for the two reservoirs assumed independent operation and historical data to the date of each report. The critical drought period for the previous studies was 1946-51. The studies also assumed a minimum pool at Salinas and Whale

Rock of 400 and 500 acre-feet respectively. "Coordinated operation" is a concerted effort to operate the two reservoirs together for maximum yield. Since Salinas Reservoir spills more often than Whale Rock Reservoir, due to its larger drainage area and more favorable runoff characteristics, and has higher evaporation rates, the combined yield from the two reservoirs can be increased by first using Salinas to meet the City's demand and then using Whale Rock as a backup source during periods when Salinas is below minimum pool or unable to meet all of the demand. The 500 acre-feet increase in safe annual yield was a preliminary estimate of the additional yield attributed to coordinated operations of the reservoirs identified in the 1985 report prepared by CH2M-Hill.

In 1988, the City contracted with the engineering firm of Leedshill-Herkenhoff, Inc., to prepare a detailed analysis of the City's water supplies and safe annual yield, based on coordinated operation of the reservoirs. The report "Coordinated Operations Study for Salinas and Whale Rock Reservoirs" was completed in 1989. The study estimated total safe annual yield for the City from the two reservoirs to be 9,080 acre-feet per year. Since the study period was only to 1988 and the City was in a drought period of unknown length, this amount was never adopted by Council. It should be emphasized that this estimate assumed that the "controlling drought period" was 1946 to 1951 and that Whale Rock Reservoir is used only when Salinas is below minimum pool or can not meet the monthly City demand, and does not consider limitations on the use of Salinas water due to water quality constraints. Following the end of the 1986-1991 drought, staff updated the computer program created by Leedshill-Herkenhoff to estimate the impact of the drought on safe annual yield of the reservoirs. The analysis determined that the recent drought was the critical drought of record for the two reservoirs and resulted in a reduction in the safe annual yield.

Groundwater Resources

The groundwater basin that underlies the City of San Luis Obispo is relatively small. Therefore, extractions in excess of 500 acre-feet per year during extended drought periods cannot be relied upon. Because the basin is small, it tends to fully recharge following significant rainfall periods. Following periods of above average rainfall, the groundwater basin may be capable of sustaining increased extraction rates to meet City water demands. Since both Salinas Reservoir and the groundwater basin fill up and "spill" following significant rain periods, there is a benefit in drawing from these sources first and leaving Whale Rock Reservoir as a backup supply. The conjunctive use of the groundwater basin and surface water supplies in this manner will provide an effective management strategy that increases the reliability of all the resources to meet current and future water demands.

Another benefit of maximizing groundwater use is that it typically requires minimal treatment that reduces costs compared to surface water supplies. Even with treatment for nitrates and PCE, the projected costs associated with that treatment show groundwater to be comparable to other alternative future water supply projects.

Past City policy has been not to compete with agriculture for use of groundwater resources. Recognizing the importance of the production of food and fiber as well as open space provided by agricultural land outside the urban reserve line, the City will continue to endorse this policy.

THE GENERAL PLAN

WATER CONSERVATION

1.3 POLICIES

1.3.1 Long-term Water Efficiency

The City will implement water-efficiency programs which will maintain long-term, per-capita usage at or below the per capita use rate as identified in Policy 3.1.2.

1.3.2 Short-term Water Shortages

Short-term mandatory measures, in addition to the long-term programs, will be implemented when the City's water supplies are projected to last three years or less based on projected water consumption, coordinated use of all city water supply sources, and considering the drought pattern on which safe yield is based (or response to other situations which may interrupt supply).

1.4 BACKGROUND

Water conservation was referenced as a part of the City's water management policy in 1973. In 1985, the City adopted the Annual Water Operational Plan policy that established water conservation as a means of extending water supplies during projected water shortages. Since 1985, many technological and philosophical changes have occurred which are proving water conservation to be both a short term corrective measure for immediate water supply shortages and a long term solution to water supply reliability.

A comprehensive evaluation of the potential water savings from current water conservation technologies and programs is included as Appendix V to this Plan. Based on the reliability of the water conservation measures which were evaluated, and the cost effectiveness of the proposed programs, a long term reduction in water demand of approximately twenty percent from the average per capita use recorded in 1986-87 is used for planning for future water conservation programs as well as future water supply needs.

Because of the experience during the drought of 1986 to 1991, the City has developed a short term plan to deal with immediate water shortages and has recognized the importance of water efficiency by supporting long term programs. The City will reevaluate and update its water conservation efforts in response to changing water demand, supplies, technology and economic conditions.

WATER DEMAND PROJECTIONS

1.5 POLICIES

1.5.1 Basis of Projections

The City will project water requirements, considering long-term conditions and the full range of water uses in the City.

1.5.2 Water Use Rate

The City shall use 145 gallons per person per day (this equates to approximately 0.162 acre-foot per person per year) and the number of City residents to plan total projected future water demand. This quantity will be revised if warranted by long-term water use trends, including differences in the relationship between residential and nonresidential usage. (Throughout this Plan, 145 gallons per person per day is used in computations of future water demand.)

1.5.3 Overall Projected Demand

Applying 145 gallons per person per day to a projected City resident population of about 56,000 at General Plan build-out results in a projected water demand of 9,096 acre-feet per year (excluding demand from the Cal Poly campus, which has separate entitlements).

1.5.4 Present Water Demand

Present water demand shall be calculated by multiplying the water use identified in Policy 3.1.2 by the current city population (as determined by the California Department of Finance, Population Research Unit).

1.5.5 Peak Daily Water Demand

The City shall strive to develop and maintain water supply sources and facilities appropriate to ensure sufficient supply and system capacity to provide the peak daily water demand of the City.

1.6 BACKGROUND

The City must know how much water will be needed to serve residents, businesses, and other users to accommodate the General Plan. This quantity can be projected using different methods. All methods involve assumptions about both future usage rates and the numbers and types of users expected in the future. The quantity expressed in the policy above corresponds closely with both (1) total city-wide usage compared with total resident population and (2) projections of water demand based on usage by various land use categories. There always will be some uncertainty in estimating development capacity (such as the number of dwellings or residents) as well as the usage per customer type (such as acre-feet per dwelling or per resident). The estimating method must use reasonable assumptions, based on experience, to assure an adequate level of water supply while not overstating demands.

Since the early 1970's, usage estimates have ranged from 0.17 to 0.22 acre-foot per resident per year (about 155 to about 195 gallons per person per day). The estimates have varied so widely due to actual differences in consumption over time and to confusion about accounting for Cal Poly usage. (The City treats and delivers much of the water used by Cal Poly, even though Cal Poly has separate entitlements.) Table 2 shows recent water usage compared with City resident population. Table 3 compares the "per capita" and "land use" methods of estimating water needs.

TABLE 2: WATER USE 1980-1999

Year	Water from Treatment Plant and Wells acre-feet (1)	Total City Water Demand acre-feet (2)	Population (3)	Total Gallons per Person per Day	City Gallons per Person per Day
1980	6,745	6,145	34,252	176	160
1981	6,941	6,341	34,759	178	163
1982	6,584	5,984	34,239	167	152
1983	6,800	6,200	35,660	169	155
1984	7,862	7,262	36,407	182	178
1985	8,025	7,425	37,378	193	177
1986	8,367	7,767	38,205	196	181
1987	8,399	7,799	38,282	196	182
1988	8,411	7,811	39,858	188	175
1989	***6,004***	***5,404***	***41,027***	***129***	***118***
1990	***4,796***	***4,196***	***41,958***	***102***	***89***
1991	***4,640***	***4,040***	***42,178***	***98***	***86***
1992	5,316	4,716	42,922	110	98
1993	5,572	4,972	43,415	115	102
1994	5,775	5,200	43,919	117	106
1995	6,075	5,574	41,295	131	120
1996	6,379	5,742	41,404	138	125
1997	6,868	6,220	41,807	147	133
1998	6,399	5,852	42,201	135	124
1999	6,736	6,172	42,446	142	129

Bold, italicized years (1989 - 1991) indicate mandatory conservation period.

Notes from Table 2:

(1) Data from City Water Treatment Plant production reports; includes Cal Poly potable water.

(2) Cal Poly water use assumed constant for years before 1994, at 600 acre-feet.

(3) January 1 population estimates from the California Department of Finance, Population Research Unit, as revised through 1999.

TABLE 3: PER CAPITA WATER USE

Method 1: Water treatment plant production and Population		**Method 2:** Metered use by development type and Land Use Element	
Per capita water use – based on historic demand, population, and conservation		**Per capita water use** – based on historic demand, land use, and conservation	
Annual demand		General Plan build-out (1992 draft)	
1987 year highest use	8,397 acre feet	**Land use types** (with 20% reduction from pre-1987 usage rates)	
Less Cal Poly		Single Family Residential	3,630 acre-feet
subtract 6700 acre-feet from total, based on average demand	7,797 acre-feet	Multifamily Residential	2,633
		Retail commercial	422
Per capita use		Office	393
		Services & manufacturing	438
Convert to gallons and divided by 365. Divide by Dept of Finance population estimate (38,282)	182 gallons/day	Motel/hotel	608
		Hospitals, schools, parks	1,432
		Total	9,577 acre-feet
Less 20% long-term conservation	145 gallons/day	Per capita use	152 gallons/day
		Convert to gallons and divided by 365. Divide by estimated 56,000 build-out population (excludes Cal Poly residents)	

Based on the analysis of these two approaches and the inclusion of long term water conservation programs, 145 gallons per day per person is used throughout this element for long term water supply planning purposes.

TABLE 4: CALCULATION OF PRESENT (2002) WATER DEMAND

Gallons per person per day	City Population	Gallons per Acre Foot	Days in aYear	Current Demand
145	44,426	1 acre foot equals 325,851 gallons	365	7,216 acre feet

[Contents of Section 4.0 deleted by September 2002 amendment. Numbering of following sections retained to avoid confusion in references among documents.]

SILTATION AT SALINAS AND WHALE ROCK RESERVOIRS

1.7 POLICY

1.7.1 Accounting for Siltation

The City shall account for siltation in the adoption of the safe annual yield as identified in Policy 1.1.2. The estimated annual reduction in safe annual yield from Salinas and Whale Rock Reservoirs is 10 acre-feet per year. As Council considers and develops new water supply opportunities, Council should consider planning for additional water to address siltation losses over a longer term.

1.8 BACKGROUND

Siltation at reservoirs is a natural occurrence that can substantially reduce the storage capacity over long periods. The reduction of available storage will reduce the safe annual yield of the reservoirs. Siltation at reservoirs varies depending on factors such as rainfall intensity and watershed management practices. There have been numerous reports addressing siltation at Salinas Reservoir, but no studies have been done for Whale Rock Reservoir.

Table 5 lists the studies for Salinas Reservoir and the estimated storage capacities. During the recent drought, water at Salinas Reservoir fell to record low levels. Recognizing the unique opportunity presented by the low water level, the County contracted with a local engineering consultant to provide an aerial survey of the lake and prepare revised storage capacity information. The latest information reveals that the survey conducted in 1975 may have over estimated the siltation rate at the reservoir. Early studies indicated average annual siltation rates from 23 acre-feet per year to 34 acre-feet per year. The study done by the U.S. Geological Survey in 1975 estimated that the siltation rate was approximately 82 acre-feet per year. The latest information indicates that the siltation rate is on the order of 40 acre-feet per year.

Since Whale Rock is used as a backup supply for the City, it may be many years until the lake level drops to the point where an aerial survey of siltation can be economically performed. Since no information is available to indicate what rate of siltation is occurring at the Whale Rock Reservoir, it is assumed for planning that the annual average rate of siltation is similar to Salinas Reservoir. New water supply opportunities can be utilized to offset the long term siltation losses, as discussed elsewhere in this document.

The safe annual yield from the two reservoirs will be continually reduced as a result of siltation. The City's computer model can be used to calculate the reduction in safe annual

yield from Salinas and Whale Rock reservoirs to date. The model can then be used to calculate estimated annual reductions in the future assuming siltation occurs in an average pattern.

Since the storage capacity for Salinas Reservoir was last estimated in 1990, the annual loss of 40 acre-feet per year can be applied from that date. However, since siltation at Whale Rock Reservoir has never been factored into the total available water storage, the loss of 40 acre-feet per year would apply to the period since the reservoir was constructed in 1961.

TABLE 5: SALINAS RESERVOIR CAPACITY STUDIES

Year	Agency	Total Capacity (acre-feet)	Usable Capacity (acre-feet)	Average Annual Loss Usable Capacity (acre-feet/year)
1941	U.S. Army	44,800	26,000	-
1947	U.S. Soil Conservation Service	-	25,860	23.3
1953	U.S. Soil Conservation Service and U.S. Forest Service	-	25,590	34.2
1975	U.S. Geological Survey	41,400	23,200	82.4
1990	County of San Luis Obispo	41,791	24,035	40.1

Usable capacities are shown at the 1,301.0-foot spillway elevation because the usable capacity at the 1,300.7-foot elevation for the 1947 and 1953 studies could not be accurately determined. Usable capacity at the 1,300.7-foot elevation for the 1941 survey was determined to be 25,800 acre-feet and for the 1975 survey was 23,000 acre-feet.

The estimated loss in storage capacity for Salinas Reservoir between 1990 and 2000 is 400 acre-feet. The estimated loss at Whale Rock Reservoir between 1961 and 2000 is 1,560 acre-feet. Based on these reduced storage capacities, the computer model projects a loss of 250 acre-feet of safe annual yield from the combined operation of the two lakes. With an estimated loss of 40 acre-feet per year at each reservoir, the total safe annual yield from the two lakes will be reduced by 10 acre-feet per year. This loss of yield is accounted for in the adopted safe annual yield figures shown in Table 1.

SUPPLEMENTAL WATER REQUIREMENTS

1.9 POLICIES

1.9.1 Supplemental Water Requirement

The City shall develop additional water supplies to provide for the Primary Supply Requirements identified below, and strive to develop additional water supplies to provide for the Secondary Supply Requirements identified below, in the consideration of available water supply opportunities.

1. Primary Supply Requirements – Develop supplemental water supplies to provide sufficient water for General Plan build-out using the per-capita planning use rate identified in Policy 3.1.2 multiplied by the projected General Plan build-out population, and
2. Secondary Supply Requirements – Develop supplemental water supplies to provide additional yield to account for future siltation losses, drought contingency, loss of yield from an existing supply source, operational requirements necessary to meet peak operating demands, and other unforeseen conditions.

1.9.2 Supplemental Water Sources

In deciding appropriate sources of supplemental water, the City will evaluate impacts on other users of the water and other environmental impacts, total and unit costs, reliability, water quality, development time, and quantity available.

1.9.3 Paying for Supplemental Water for New Development

The cost for developing new water supplies necessary for new development will be paid by impact fees set at a rate sufficient to cover the annual debt service cost of the new water supplies attributable to new development.

1.10 BACKGROUND

Based on the Land Use Element adopted by the City Council in August 1994 and a per capita use rate of 145 gallons per person per day, the projected total amount of water for the City to serve General Plan build-out is 9,096 acre-feet. Many of the Secondary Supply Requirements identified in Policy 6.1.1 are unquantifiable at this time, and their development should be considered by Council in the review of new water supply opportunities.

TABLE 6: REQUIRED SAFE ANNUAL YIELD FOR GENERAL PLAN BUILD-OUT

Source of Demand	Population	Acre-feet (at 145 gallons per day per person)	Percent of Total
Existing (2002) Development	44,426	7,216	79.3%
New Development	11,574	1,880	20.7%
Total	**56,000**	**9,096**	**100.0%**

City policy adopted in 1987 as part of the Water Element states that the costs of developing supplemental water sources will be borne by those making new connections to the water system. Policy 6.1.3 continues this policy and is consistent with the Land Use Element (policy 1.13.4.)

MULTI-SOURCE WATER SUPPLY

1.11 POLICY

1.11.1 Multi-Source Water Supply

The City shall continue to develop and use water resources projects to maintain multi-source water supplies, and in this manner, reduce reliance on any one source of water supply, to provide for peak operating demands in the event one of the City's major water supply sources is unavailable, and to increase its supply options in future droughts or other water supply emergencies.

1.12 BACKGROUND

Having several sources of water can avoid dependence on one source that would not be available during a drought or other water supply reduction or emergency. There may be greater reliability and flexibility if sources are of different types (such as surface water and ground water) and if the sources of one type are in different locations (such as reservoirs in different watersheds).

The Water Element of the General Plan, adopted in 1987, identified multiple water projects to meet projected short and long term water demand. In November of 1990, the Council again endorsed the multi-source concept.

ALLOCATION OF NEW WATER SUPPLIES

1.13 POLICIES

1.13.1 Balancing Safe Yield and Overall Demand

When new water sources are obtained, the additional safe yield shall be allocated first to eliminate any deficit between the adopted safe annual yield (Section 1.0) and the present demand as defined in Policy 3.1.4, second to eliminate any deficit between adopted safe yield and General Plan build-out, and third to supply for the Secondary Supply Requirements as identified in Policy 6.1.1.

1.13.2 Supplying New Development

A. The City will determine the water available for allocation to new development by either; the adopted safe annual yield of the City's water supplies minus present demand as identified in Policy 3.1.4, or the projected demand at build-out as identified in Policy 3.1.3 minus present demand as identified in Policy 3.1.4; whichever is less. Available allocations will be assigned to development in a way that supports balanced growth, consistent with the General Plan. Allocations from a new water supply project shall be considered available at the time project construction is initiated.
B. Any safe annual yield from new water supply projects beyond that needed to balance safe annual yield and present demand will be allocated to development, subject to the requirements in Policy 8.1.3, "Reserve for Intensification and Infill."
C. A water allocation shall not be required for projects for which the developer makes changes in facilities served by the City that will reduce long-term water usage equal to twice the water allocation required for the project.

1.13.3 Reserve for Intensification and Infill Development

The City will annually update the water available for allocation based on the difference between the adopted safe annual yield (policy 1.1.2) and the present water demand (policy 3.1.4) as part of the annual Water Resources Status Report. One-half of the water available for allocation (not to exceed the total required for infill and intensification), as identified in the Water Resources Status Report, will be reserved to serve intensification and infill development within existing city limits as of July 1994.

1.13.4 Accounting for Reclaimed Water

Reclaimed water has an estimated potential of 1,200 acre feet per year of water available for appropriate non-potable uses. The amount to be added to the City's safe annual yield, and therefore available for development, will only be the amount projected actually to be used or offset (approximately 130 a.f. initially), increasing to 1,200 acre feet per year as additional offsetting uses are brought on-line. The amount of reclaimed water used each year will be reported to Council as part of the annual Water Resources Status Report and will be added to the safe annual yield identified in Section 1, Table 1 of this document to determine water available for new development.

1.13.5 Private Water Supplies

When developments are supplied by private groundwater wells, the yield of those wells will not be counted toward the City's safe annual yield. Such yield, however,

will result in the demand for City water supplies being lower than it otherwise would be, which may necessitate adjustments of the per capita water usage figure used to estimate overall demand.

1.14 BACKGROUND

The City has pursued numerous water supply projects over the years. (These projects are discussed in Chapter 3 of the Urban Water Management Plan.) This part of the element addresses allocation of these supplies once the yields from projects are realized. The City has identified these potential uses for new supplies:

- Eliminating any deficit between adopted planning figures and safe annual yield;
- Providing for water requirements for future development within the urban reserve area designated in the General Plan;
- Compensating for reduced yields due to reservoir siltation;
- Providing additional water supplies, as determined by Council, for drought, operational requirements for meeting peak demands, and other water supply emergencies;
- Providing water for habitat management.

Allocation of new supplies can balance the needs of all areas identified while not compounding the potential water shortage problems for existing City water customers.
The adoption of 145 gallons/per person/per day as a water supply planning figure would indicate water is available for development, eliminating the need for retrofitting. Because 145 gallons/per person/per day assumes that the retrofit component of the water conservation program is complete, new development will continue to retrofit until the entire city is essentially retrofitted as determined by the City Council.

WATER ALLOCATION AND OFFSETS

1.15 POLICIES

1.15.1 Exemptions for Offsets

A. The City will not allow a project to reduce or eliminate the amount of the required allocation or offset, to the extent that the project is supplied by a private well, with the following exceptions:

1. The City may reduce the amount of the required water allocation, to the extent that the project is supplied by a private well serving non-potable water needs (such as irrigation) which will not significantly affect the yield of City wells. Such a well may be operated by the owner of the property containing the well only for the owner's use. As an exemption, the City may allow a well to supply landscape irrigation on more then one parcel if the irrigation is:

   a) for the common area of a condominium complex or other developments with similar common areas as approved by the Utilities Director, and the well and irrigation system are under the control of an owner’s association; or

   b) a single commercial development, and the well and irrigation system are subject to a recorded agreement among parcel owners, which is acceptable to the Utilities Director and the City Attorney, and which establishes responsibilities for operation and maintenance of the common areas served by the well.

1. When an allocation or potential offset is not available, a well may be allowed to eliminate the required offset for potable water needs only as an interim source until a new City water source is available. Once a new source becomes available, the project will be required to acquire an allocation from the City. Impact fees will be due at the time the development is approved.
2. The City Council approves the well proposal as part of a specific land development project approval, and the proposed well system meets all City standards; and
3. A qualified, independent, hydrological investigation demonstrates that the well(s) reliably can provide sufficient quality and quantity of water for the proposed land development project and will not impact the yields from City wells.

1.15.2 Basis for Allocations and Offsets

Required allocations and offsets will be based on long-term usage for each type of development. (These use and offset factors will be determined and published by the City, and may be revised, as warranted, by new information.)

1.16 BACKGROUND

In 1988, the City began to formally account for long-term water usage in new development. The allocations have been based on histories of water usage for various kinds of development. At first, the City decided to allocate some water for new land development projects even though city-wide water usage exceeded safe yield. As the 1986-1991 drought continued, and the projected completion of proposed supplemental supply projects moved farther into the future, the City decided that there should be no new development that would increase water usage. As a result, nearly all construction since 1990 has been:

- Replacement buildings, using the same or less water;
- Additions or remodels which do not substantially affect water usage; and
- Projects that have retrofitted facilities served by the City, to save (offset) twice the amount of water that would be allocated to the project. Installation of low-flow toilets, showerheads, and faucets have accounted for most of the offset credit. Substantial credits were also earned by installing water-recycling equipment in businesses.

Also, a few relatively small projects were able to do little or no retrofitting because they were supplied with groundwater through private wells. Some projects have utilized more than one of these strategies to proceed despite the lack of water allocations.

RECLAIMED WATER

1.17 POLICIES

1.17.1 Reclaimed Water Quality

The City will produce high quality reclaimed water, suitable for a wide range of nonpotable uses.

1.17.2 Uses of Reclaimed Water

The City will make available reclaimed water to substitute for existing potable water uses as allowed by law and to supply new nonpotable uses.

When deemed appropriate by the Utilities Director, new development shall be equipped with dual plumbing to maximize the use of reclaimed water for non-potable uses.

1.18 BACKGROUND

Reclaimed water is highly treated wastewater (sewage) which can be used for most nonpotable purposes. The City's Water Reclamation Facility (formerly known as the Wastewater Treatment Plant) has been upgraded to the point the effluent can be used directly for landscape and agricultural irrigation and other uses such as industrial processes and toilet flushing in certain types of buildings.

Most treated effluent, in the past, has been discharged to San Luis Obispo Creek. A small amount of effluent has been used at the treatment plant site for landscape irrigation. Reclaimed water will be used for additional landscape irrigation at the Water Reclamation Facility and on City-owned land in the vicinity, and for ponds to benefit wildlife.

Use of reclaimed water beyond the treatment plant area will require a distribution system separate from other water lines. Reclaimed water can be used to supply nonpotable uses in new development and to offset potable uses in existing development. These potential uses require a deliberate method to account for reclaimed water use, consistent with policies concerning total water requirements and other water sources.

Long-term funding for the necessary reclaimed water distribution system is expected to come from charges for the use of reclaimed water. Initial expenses may be funded from bonds, low-interest State loans, and developer contributions.

WATER SERVICE WITHIN THE CITY

1.19 POLICY

1.19.1 Water Service within the City

A. The City will be the only purveyor of water within the City.
B. Appropriate use of privately owned wells may be allowed with the approval of the Utilities Director, consistent with policies 8.1.5 and 9.1.1.

1.20 BACKGROUND

Historically, the City has been the sole water purveyor within the City limits. This allowed the City to maintain uniformity of water service and distribution standards, and to be consistent in developing and implementing water policy. In continuing to be the sole water purveyor, the City will maintain control over water quality, distribution and customer service, as well as ensure consistency with the City's General Plan policies and goals.

WASTEWATER SECTION

GOAL

San Luis Obispo's wastewater goal is to provide efficient and environmentally acceptable wastewater disposal service for the community.

THE GENERAL PLAN

2.0 SERVICE AREA AND POPULATION

2.1 POLICIES

2.1.1 Service Area

The current wastewater service area is the incorporated area of the City. The City shall provide wastewater service adequate for existing uses and new development pursuant to the Land Use Element for all areas within the city limits.

2.1.2 Areas Within the Urban Reserve Line

The urban reserve line (the outer limit to urban development) includes areas which the City may annex in the future. Wastewater service adequate for potential uses allowed by the Land Use Element (including hillside planning provisions) shall be provided for all areas within the urban reserve line.

2.1.3 Service Outside the City Limits

To receive City wastewater service, areas must be annexed to the city. The City will not provide wastewater service for areas outside the city limit, except for:

A. Customers which have prior agreements.
B. Uses which are consistent with the General Plan and which are located on areas of less than one acre, which are surrounded on at least three sides by areas that are already served.

2.1.4 Areas Outside the Urban Reserve Line

The City will not provide wastewater service to areas outside the urban reserve line.

2.1.5 Special Districts

Special districts should not provide wastewater service within the City's planning area to uses inconsistent with the City's General Plan.

2.1.6 Service Capacity

The City's wastewater collection and treatment systems must be able to support population and related service demands consistent with General Plan objectives. These basic objectives are stated in the Land Use Element (growth management) and in the Housing Element.

2.1.7 Annexation Criteria

The City will not annex an area unless it can meet the wastewater treatment needs of the area to be annexed, in addition to the wastewater treatment requirements for all development, consistent with the Land Use Element, within the city including the annexed area. The only exceptions to this policy are:

A. Areas which have prior agreements for wastewater service.
B. Minor infill parcels within areas which have prior agreements for wastewater service, as provided in policy 12.1.3.

THE GENERAL PLAN

2.2 PROGRAMS

2.2.1 Updates

The City will update this element's service area description and population projections as needed and in concert with any amendments to the Land Use Element.

Time frame: continuing

Responsible parties: Community Development Department; Planning Commission, City Council.

Funding: City general fund

2.2.2 Projections of Requirements

The City will refine this element's projections of wastewater treatment requirements on the basis of wastewater flows from specific land use categories and the likely development of those categories as provided in the Land Use Element.

Time frame: Following adoption of the Land Use Element update.
Responsible parties: Community Development Department; Utilities Department; Planning Commission; City Council.

Funding: City general fund.

2.2.3 Expanding Capacity

The City will expand the capacity of the wastewater treatment plant to provide adequate treatment for projected wastewater flows.

Time frame: Late 1980's to late 1990's.

Responsible parties: Utilities Department; City Council.

Funding: Development and connection charges, wastewater fees, and grants.

WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

2.3 POLICIES

2.3.1 Stormwater Infiltration

The City will minimize stormwater infiltration into the sewer system.

2.3.2 System Protection

The City will minimize damage to the wastewater collection and treatment systems by preventing discharge of materials that are toxic or which would obstruct flows.

2.3.3 Managing Treatment Demand

The City will manage wastewater treatment demand to assure that it can provide a high level of wastewater service.

2.3.4 Beneficial Use

The City will pursue treatment and disposal methods which, to the maximum extent feasible, provide for further beneficial use of wastewater and allow beneficial uses of land or water receiving the effluent.

2.3.5 City as Exclusive Provider

The City will be the only provider of public wastewater treatment within the City (but on-site pretreatment of wastewater to meet City Standards may be required).

2.3.6 Energy Efficiency

Wastewater operations will minimize energy use and will incorporate cost-effective energy recovery or production facilities.

2.4 PROGRAMS

2.4.1 Reducing Infiltration

The City will continue to investigate and carry out cost-effective methods for reducing stormwater flows into the wastewater system.

Time frame: Continuing
Responsible agencies: Utilities Department; City Council

Funding: Wastewater revenues

2.4.2 Discharge Standards

The City will update and enforce its standards for the quality of wastewater discharged to the system.

Time frame: Continuing

Responsible agencies: Utilities Department; City Council

Funding: Wastewater revenues

2.4.3 Project Evaluation

The City will continue to evaluate the potential for the wastewater flows of a proposed project to exceed the capacity of collection and treatment systems.

Time frame: Continuing

Responsible agencies: Utilities Department; Community Development Department; City Council

Funding: General fund

2.4.4 State and Federal Water Quality Standards

The City will change its treatment and disposal practices in an attempt to meet federal and state water-quality standards. The first step will be adoption of the Wastewater Management Plan and completion of pre-design technical reports that will describe a specific strategy for treatment and disposal. Any additional required environmental review would be integrated with the pre-design work. Then, plans

and specifications, and a budget, for the construction project would be prepared. The timing of these steps will be worked out in collaboration with the Regional Water Quality Control Board.

Time frame: Construction complete in the early 1990's

Responsible agencies: Utilities Department; City Council

Funding: Wastewater revenues; state or federal grants

WASTEWATER REVENUES AND FINANCING

2.5 POLICY

2.5.1 Enterprise Activity

The City's wastewater system will be operated as an enterprise activity, with costs to be borne by wastewater fees and charges. Costs of operating, maintaining, and replacing the wastewater system will be borne by all customers. Some portion of the costs of making major decisions about the wastewater systems --such as evaluating changes to citywide collection and treatment-- may be borne by the whole community. Costs of expanding treatment capacity and extending the collection system to serve new development shall be borne by those making new connections to the system, in proportion to expected wastewater flows. The City will seek any state or federal grants which may be available to fund sewer system improvements. Programs to fund wastewater projects should be consistent with the growth management policies of the General Plan.

2.6 PROGRAM

2.6.1 Revising Charges

The City will periodically revise its schedule of charges for wastewater service. The city will prepare a development fee schedule to fund expansion of collection and treatment facilities.

Time frame: Periodic rate evaluation; development fees to be adopted by July 1988 and updated as required.

Responsible parties: City staff; City Council.

WASTEWATER BACKGROUND

2.7 Current Wastewater Flows and Treatment

The City is responsible for collecting, treating, and disposing of wastewater from about 19,000 residential, commercial, industrial, and public customers every day, in a way that avoids environmental and public health problems. In addition to homes and businesses within the city limits, the City provides wastewater services for Cal Poly and the County airport.

The City's existing wastewater collection system partly determines the character of wastewater flows. About 150 miles of sewer pipes, ranging from six to 30 inches in diameter, collect wastewater flows. The oldest pipes date from the 1890's, when pipe

materials and trenches were less able to withstand the effects of corrosion and soil settlement. Eight pumping stations move the wastewater from areas where the slope of sewer pipes is not sufficient to allow gravity flow. Sewer lines cross creeks at 95 locations in the City; at some locations, siphons (U-shaped sections of pipe) allow the flows to continue. In some places, newer pipes have been installed parallel to older pipes to handle increased flows.

Despite the City's efforts to repair and replace older and deteriorated sewer pipes, some cracked joints between pipe sections, some manhole covers, and improperly connected storm-water drains allow water from rainfall and saturated ground to enter the sewage collection system. This storm-water infiltration significantly increases the amount of wastewater that must be treated during the wet season. Undersized and damaged lines, siphons, and parallel pipes are often the source of wastewater collection problems.

Collected flows are treated at the City's plant on Prado Road near Highway 101. The plant removes floating and large, gritty material, reduces the amount of nutrients and bacteria, separates sludge from the waste stream, and discharges the effluent into San Luis Obispo Creek near Los Osos Valley Road. Sludge is separated from the wastewater, dried in open ponds at the treatment plant, and hauled away for use on landscaping or crops. While the treatment plant uses tanks, pumps, and other mechanical equipment, most of the wastewater treatment is actually done by living microorganisms. The man-made features are largely to provide a suitable place for them to grow.

Wastewater flows are measured in millions of gallons per day --abbreviated “mgd.” (One million gallons would fill a tank 60 feet in diameter and 50 feet high.) In 1986, the average flow into the treatment plant during dry weather was 4.4 mgd. During wet weather, the peak flow was 22.4 mgd.

Standards for quality of the treated effluent follow from federal and state water-quality laws. The specific requirements for San Luis Obispo were most recently set by the state's Regional Water Quality Control Board in April 1986. The standards are to protect present and potential beneficial uses of the water which receives the effluent, including recreation, agricultural supply, and fish and wildlife habitat. The standards include:

- For the creek - maximum allowed changes in acidity/alkalinity, temperature, and oxygen;
- For the effluent - maximum allowed quantities of solid particles and dissolved solids, nutrients which deprive the water of oxygen through chemical and biological action, oil and grease, coliform bacteria, and chlorine left from the last treatment step.

Effluent quality has violated the standards, so the Regional Water Quality Control Board has ordered the City to improve the effectiveness of its treatment. The primary problem has been the amount of nitrogen in the form of ammonia. Other nutrients, suspended solids, oil and grease, and coliform bacteria have also exceeded the standards.

2.8 Projected Wastewater Flows

If the City grows to about 53,000 population in the year 2015, as outlined in the Land Use Element, the average dry-weather volume of wastewater is expected to increase by about 32 percent, from 4.4 mgd to 5.8 mgd. Other measures of required treatment capacity, such as flow in the peak month and the amount of nutrients and solids, are expected to increase in about the same proportion.

Consulting engineers have concluded that the existing wastewater treatment plant site is big enough for a plant to handle the projected flows, but the treatment plant will have to be

changed to treat such flows effectively. The City plans a two-phased expansion of treatment capacity. The first phase would also improve the effectiveness of treatment. Both phases involve changing and enlarging certain facilities at the treatment plant.

2.9 Alternative Treatment and Disposal Methods

Many different methods of disposing of treated wastewater (effluent) have been considered. Each method has its own advantages and disadvantages. In evaluating treatment and disposal methods, the City will consider initial and continuing costs, environmental impacts, reliability, flexibility, and potential for increasing beneficial uses of treated wastewater. Preliminary evaluations have indicated that some of the options listed below are not feasible or cost-effective. The feasibility and desirability of others will not been known until additional evaluations are completed, and even then changing conditions may warrant reconsideration or further study.

The City does not want to preclude treatment and disposal options which may turn out to be feasible. However, the City must select an overall strategy for treatment and disposal and begin to carry it out, in order to meet established water-quality standards. Once a strategy is chosen and money is committed to certain physical projects, those funds would not be available to spend on significantly different strategies.

Several alternatives to conventional stream disposal, which could be used in various combinations, are briefly described below. With the exception of an ocean outfall, each alternative involves some beneficial use --reclamation-- of the treated wastewater, as does direct stream disposal (which helps maintain stream habitat and recharges downstream wells). Reclaiming all the effluent for uses that would otherwise need fresh City water, which is not likely in the time frame of this element, would displace the need for about 5,000 acre-feet of water in 1987, and about 6,600 acre-feet in 2015.

Irrigation

Effluent could be used to irrigate recreational land (such as a golf course) or agricultural land. Effluent used for pasture irrigation would probably not have to meet standards as high as those for creek disposal. However, to dispose of all projected effluent quantities during all seasons, the City would have to own or permanently control the use of about 2,000 acres of land. Even with availability of such a large area for irrigation, a substantial holding pond would be required for winter storage, when the ground is saturated. The main obstacles to this approach are obtaining the required disposal area, piping the effluent to it, and assuring no long-term harm to soil characteristics or groundwater supplies. Effluent used to irrigate landscaping or recreational land could replace water from other sources, or it could enable expansion of landscaped or recreational areas without drawing on limited supplies of fresh water.

Stream Improvement

The creek's ability to provide good wildlife habitat can be improved in ways other than removing certain contaminants from the effluent. Effluent, possibly with more nutrients or discoloring substances than now allowed, could be discharged at several points within an enlarged streamside forest. Additional streamside trees and plants (a riparian corridor) would help remove nutrients. They would also shade the water, and could therefore help keep it cooler. Along with using such natural treatment capacity, the City could restore some of the habitat downstream from the treatment plant, which has been harmed by vegetation removal and intensive livestock use. The City's improving the habitat might allow relaxation of

some discharge standards, since creation of a riparian corridor would enhance a beneficial use which the Regional Water Quality Control Board is trying to protect.

Groundwater Recharge
If suitable areas could be found and used by the City, effluent could be deliberately spread to percolate into the ground to recharge aquifers. While stream disposal does this for some downstream areas, disposal at other locations might allow more of the water to be retained where it could be withdrawn efficiently for use by the City.

Laguna Lake or Marsh
Effluent could be used to maintain a fairly constant level of Laguna Lake year-round. Much of the effluent would still make its way to San Luis Obispo Creek. If the effluent entered the lake directly, the required level of treatment would exceed that for direct stream disposal, since the lake is used for water-contact sports. Discharging the effluent into the marsh at the northerly end of the lake, or as pasture or landscape irrigation, would allow some natural filtering and might require a lower level of treatment than direct stream disposal.

Industrial Reuse
Some industries use large quantities of water that need not be of drinking quality. San Luis Obispo does not have significant manufacturing or processing industry, though it does have some businesses, such as laundries, which might be able to use properly treated effluent. Such effluent as a source of water also might enable industries that could not otherwise locate in San Luis Obispo to do so.

Aquaculture
Sewage is basically heavily fertilized water. If proper growth conditions are provided and harmful substances are controlled, the water-borne nutrients can be converted to useful plants and animals through aquaculture. Water hyacinth (used to produce methane, soil conditioner, or livestock feed) and several varieties of fish have been produced in municipal wastewater treatment plants. Difficulties with this approach include finding and maintaining markets for the products and continuously providing acceptable levels of treatment with widely varying wastewater flows and weather conditions.

Domestic Reuse
With substantially higher levels of treatment than now used and a suitable distribution system, wastewater could provide for the full range of household uses. However, meeting state and federal standards for quality of drinking water would be very difficult. The costs of adequate treatment and distribution, even for household landscape irrigation, far exceed other alternatives and are expected to be prohibitive for the foreseeable future.

Ocean Outfall
Coastal communities dispose of their effluent in the ocean. San Luis Obispo could pipe its treated effluent to San Luis Bay. However, the costs of building and maintaining a pipeline to the ocean appear greater than the savings that might be achieved through meeting the somewhat lower effluent standards for ocean disposal. Coastal Commission approval would be required for an ocean outfall.

2.10 Wastewater Costs and Revenues

The City budgets its wastewater activities separately from other City services and has a long-standing policy that wastewater revenues should fully fund wastewater services. Those making new connections to the sewer system pay for some of the cost of developing the existing system. Residential customers and most small businesses are billed at a uniform monthly rate, while some larger businesses pay according to the amount of water they use. In 1986-87, the City sewer system budget was $1.1 million.

To fund anticipated treatment-plant and collection-system changes through the 1990's, the City probably will need to substantially increase sewer rates, even with federal grant funding. Also, federal rules may require the City to revise its rate structure, so users are charged according to the average and peak quantities and concentration of contaminants of the wastewater they produce.