



**CITY OF MONROVIA
UTILITIES DIVISION**

URBAN WATER MANAGEMENT PLAN

October 2013



**City of Monrovia Public Works Department
600 S. Mountain Avenue, Monrovia, CA 91016**

CONTACT SHEET

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The water supplier is a: **Municipality**

The water supplier is a: **Retailer**

Utility Services provided by the water supplier include: **Water, Sewer**

Is this agency a Bureau of Reclamation contractor? **No**

Is this agency a State Water project contractor? **No**

Website for digital copy: www.cityofmonrovia.org

TABLE OF CONTENTS

	<u>Page No.</u>
Chapter 1	
Introduction.....	3
Chapter 2	
History and Water Facilities	5
Description of Area	5
Water Facilities.....	6
Chapter 3	
Past, Current, and Projected Water Supply.....	7
General.....	7
Three Year Worst Case Supply Deficiency.....	9
Chapter 4	
Past, Current, and Projected Water Use.....	10
Chapter 5	
Water Conservation Programs.....	16
Demand Managment Measures.....	16
Chapter 6	
Water Shortage Contingency Analysis.....	23
Chapter 7	
Recycled Water Opportunities.....	25

CITY OF MONROVIA

URBAN WATER MANAGEMENT PLAN 2011

Chapter 1

INTRODUCTION

This report was prepared in accordance with the Urban Water Management Planning Act (“Act”)*, which became effective on January 1, 1995. The Act requires every “urban water supplier” to prepare and adopt an Urban Water Management Plan (herein “Plan” or “Management Plan”), and to periodically review its plan at least once every five years and make amendments or changes which are indicated by the review. An “urban water supplier” is defined by the Act to be “...a supplier, either publicly or privately owned, providing water for municipal purposes whether directly or indirectly to more than 3,000 acre-feet of water annually”. An urban water supplier also includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells water for ultimate resale to customers.

The City of Monrovia’s Urban Water Management Plan is intended to review the activities of the City of Monrovia’s Utility Division as retail supplier to approximately 40,000 people, and to cite the operations of the San Gabriel Ground Water Basin by the Upper San Gabriel Valley Municipal Water District to achieve the maximum practicable conservation and efficient use of the water resources of the area, both local and imported.

In accordance with the State of California Water Code section 10620, the City of Monrovia’s Utility Division must review its Plan and make certain amendments and changes every 5 years.

The City of Monrovia's Utility Division will make the Draft Plan available for public review and will hold a public hearing thereon. Public notification of the hearing is required pursuant to Section 6066 of the Government Code. Upon completion of public hearing, the City Council of Monrovia will adopt the Draft Plan, including any modifications resulting from the public hearing, as its Urban Water Management Plan. Within 30 days of adoption of the Plan by the City of Monrovia, a copy of the Plan will be filed with the State of California, Department of Water Resources.

Chapter 2

HISTORY AND WATER FACILITIES

The City of Monrovia is located in the southeastern portion of Los Angeles County and is bounded on the north by the San Gabriel Mountains, on the west by the City of Arcadia, on the south by an unincorporated portion of Los Angeles County, and on the east by the City of Duarte. Monrovia occupies an area of about 13.73 square miles. Incorporation of the City occurred in 1887, and water service is provided for all residential, commercial, industrial, and for environmental and fire protection uses.

On December 15, 1887, Monrovia became the fourth city in Los Angeles County to incorporate. The town consisted of 60 acres of cleared land, but in visionary policy the City Fathers left the native California Oaks standing. One of the stipulations of each sale was the requirement that the new owner construct a house worth at least \$2,000 within six months.

Since its humble beginnings, Monrovia has mirrored the development of the Southern California region from primarily an agricultural economy to one of the largest concentrations of urban populations in the nation.

Over the years, orange and lemon groves have given way to a fine residential community consisting of restored Victorian homes and post World War II housing stock.

During the 1940's and 1950's a significant increase in both population and in the manufacturing sector took place, with a renewed burst of development starting in the 1980's and continuing into today.

Almost totally built-out, Monrovia's project annual growth rate is minimal. A large percentage of development occurs through the redevelopment process, but annual growth by redevelopment in the commercial sector is not anticipated to put any undue

strain on the ability of the water system to maintain adequate supplies for either domestic or fire demands.

In what may be nationally unprecedented move, Monrovia's residents voted overwhelmingly in July 2000 to preserve open space and tax themselves to purchase the hillside land from private owners and keep it from future development.

Replacement of older single-family residences with multiple-unit type residences occurs on a limited basis, as well as the construction of new homes on the few remaining undeveloped lots.

Monrovia has a Mediterranean climate with typically mild winter temperatures rarely falling below freezing. Summers are warm with periods of extremely hot weather lasting for up to two weeks. Average annual precipitation is 22.64 inches, but there are wide variations in the annual amount of precipitation from year to year.

The City delivers potable water supplies through its pressurized distribution system which consists of 87 miles of piping from 4" to 30" in diameter. The City's water supply system currently consists of five (5) active wells with a combined capacity of approximately twenty (20) million gallons per day; a standby connection to Metropolitan Water District (MWD) of Southern California which is capable of delivering up to fourteen (14) million gallons per day; eleven (11) reservoirs with a combined storage capacity of approximately 25.08 million gallons; and six (6) booster pump stations. The City's distribution system is compromised of five (5) different pressure zones. The City of Monrovia maintains a 4-inch emergency connection to California American Water Company – Duarte District, to sell water. Wastewater treatment is conducted by the Los Angeles Sanitation District at the San Jose Creek Treatment Facility. Reclaimed water is currently not available within reasonable proximity of Monrovia to be a cost-effective alternative source of supply.

Chapter 3

PAST, CURRENT AND PROJECTED WATER SUPPLY 1975-2015 AND THREE YEAR WORST CASE SUPPLY PROJECTS [Section 10631 (e)(2)(f)]

The City projects pumping approximately 7,250 acre-feet per year from five wells from an average depth of 165' (static level). The Main San Gabriel Groundwater Basin was adjudicated in 1973*; the City of Monrovia is a party to this adjudication. The City of Monrovia is entitled to extract 5,261 acre-feet of water annually, and holds surface diversion rights to an additional 1,098 acre-feet per year. Though the surface diversion is no longer utilized as a supply source, the City retains the right to produce groundwater from an equivalent amount, for a grand total of 6,359 acre-feet. In years of plentiful rainfall when the operating safe yield is increased above 190,000 acre-feet, Monrovia is entitled to a pumper's share of 3.09472% of that increase, thereby enabling Monrovia to extract additional water without incurring replacement water charges.

The Main Basin Judgment does not restrict the quantity of water which parties may extract from the Basin. Rather, it provides a means for replacing with supplemental Water all annual extractions in excess of Party's annual right to extract water. (Reference: Upper San Gabriel Valley Municipal Water District Urban Water Management Plan 2010.)

The City has experienced no supply deficiencies in the previous 25 years, even during periods of drought (please see Table 1). During the drought years of the late 1980's through early 1990's, Monrovia's Utility Division, through conservation programs and enforcement of City Ordinances, was able to curtail the annual increase in demand for water and effectively educate the water consuming public of the importance of saving water for the future.

TABLE #1 WATER SUPPLY PROJECTIONS
2000-2030 ACRE-FEET PER YEAR

Sources of Supply	2000	2005	2010	2015	2020	2025	2030
Groundwater	8,803	8,035	7,250	7,100	6,960	6,820	6,690
Imported Water (MWD)	0	0	0	0	0	0	0
Water Transfers	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Totals	8,803	8,035	7,250	7,100	6,960	6,820	6,690

Based on experiences during the recent drought, the community recognizes the importance of water conservation and resource utilization planning. Monrovia has adopted AB 325 (The California State landscape efficiency law), continually stresses to consumers the value of water conservation, and aggressively prevents “water waste” wherever observed or reported.

In the worst case scenario of a three-year supply deficiency, Monrovia is prepared to implement strict water conservation Ordinance 13.20 to reduce the demand for available water. This would have the desired effect of lessening the amount of water extraction required from the Main San Gabriel Groundwater Basin.

Even though there are no supply deficiencies due to availability as shown in Table 2 should be experienced by the City of Monrovia, the availability of replacement water to maintain the groundwater level at the adjudicated level could temporarily curtailed.

(Reference: Upper San Gabriel Valley Municipal Water District Urban Water Management Plan 2010.)

**TABLE #2 THREE YEAR WORST CASE
SUPPLY PROJECTIONS ACRE-FEET PER
YEAR**

Sources of Supply	2010	2011	2012	2013
Groundwater	9,220	9,220	9,220	9,220
Carry-over Rights	0	0	0	0
Totals	9,220	9,220	9,220	9,220
Shortage %	0	0	0	0

The City of Monrovia, in conjunction with the San Gabriel Water Quality Authority, constructed two packed-tower air stripping facility to insure that water available from Monrovia’s Wells is within acceptable Federal and State Maximum Contaminant Levels for volatile organic contaminants. This treatment option further insures adequate supply availability by mitigating any potential loss of production capability due to pumping restricting being imposed on these sources. The City also incorporates a blending plan for Nitrate and Perchlorate which was amended and approved by the Department of Public Health in June of 2010.

Long term water supply options, water transfers, and supplemental water supplies are fully discussed in the Upper San Gabriel Valley Municipal Water District’s Urban Water Management Plan, as well as in the Main San Gabriel Basin WaterMaster Urban Water Management Plan, of which Monrovia is a member agency.

Chapter 4

PAST, CURRENT, AND PROJECTED WATER USE

1975-2015

[Sections 10631 (a) (e) (1), 106.812 (b) (3), 10608.20, 10608.22]

Ascertaining the rate of annual growth is a somewhat inexact science. As a contractor for utility billing services for the City's Utility Division, the Finance Department maintained all consumption, customer data, and revenue information.

With the installation of the utility billing system, trends have emerged which indicated the annual growth of new connections at a rate of no more than 1% but because of new plumbing efficiency standards, landscape guidelines, and other conservation programs, water demand will decrease at a predicted average rate of about 0.5% per year for the next several years.

Table #3 illustrates current and projected water use 2010-2030 in number of customers per year, and Table #4 illustrates current and projected water use 2010-2030 in acre-feet per year. Table #5 illustrates current and projected water use 2010-2030 in gallons per day per capita (GPCD).

**TABLE #3 CURRENT AND PROJECTED WATER USE
NUMBER OF CONNECTIONS BY CUSTOMER TYPE**

Customer Type	2010	2015	2020	2025	2030
Single-Family Residential	6,433	6,465	6,497	6,530	6,563
Multi-Family Residential	1,627	1,635	1,643	1,652	1,660
Commercial	724	728	731	735	739
Industrial ¹	23	23	23	23	23
Other ²	260	261	263	264	265
Landscape	183	184	185	186	187
Totals	9,250	9,296	9,342	9,390	9,437

1) Manufacturing and Process Plants.

2) Hotels, Motels, Trailer Parks, and Public Facilities

**TABLE #4 CURRENT AND PROJECTED WATER USE
ACRE-FEET PER YEAR**

Customer Type	2010	2015	2020	2025	2030
Single-Family Residential	3,581	3,511	3,442	3,375	3,309
Multi-Family Residential	2,086	2,045	2,005	1,965	1,927
Commercial	1,050	1,031	1,010	990	970
Industrial	24	23	23	22	22
Other	264	258	253	248	243
Landscape	406	398	390	383	376
Totals	7,411	7,266	7,123	6,983	6,847

**TABLE #5 CURRENT AND PROJECTED WATER USE
GALLONS PER CAPITA PER DAY**

Customer Type	2010	2015	2020	2025	2030
Single-Family Residential	80	78	77	75	74
Multi-Family Residential	47	46	45	44	43
Commercial	23	23	23	22	22
Industrial	1	1	1	0	0
Other	6	6	6	6	5
Landscape	9	9	9	9	8
Totals	165	162	159	156	153

With the signing of SBX7-7, The Water Conservation Act of 2009, all urban water retailers are required to reduce their water usage by 20% by the year 2020. Several Methodologies and Methods were designed to calculate the baseline, target, and compliance year urban per capita water use in GPCD. The City of Monrovia utilized Methodology 3: Base Daily Per Capita Water Use and Method 1. Table #6 & #7 illustrates the 10 year and 5 year baseline per capita water usage; target GPCD and maximum allowable GPCD per Sections 10608.20 and 10608.22 to determine these figures.

Once a baseline is determined, the projected water use is calculated to meet this 20% reduction by 2020. The formulas used to calculate these figures are below.

- The maximum allowable GPCD target in 2020 (per Section 10608.22) is $0.95 \times$ Baseline GPCD = maximum allowable GPCD.
 - $0.95 \times 191 \text{ GPCD} = 182 \text{ GPCD}$

- 2020 target under Method 1 is $0.8 \times 10 \text{ year Baseline GPCD} = \text{Target GPCD}$
 - $0.8 \times 203 \text{ GPCD} = \mathbf{162} \text{ GPCD}$ (Target for the City of Monrovia)

TABLE #6 BASE DAILY PER CAPITA WATER USE CALCULATION FOR SECTION 10608.20			
Utility Name:		City of Monrovia	
12-Month Period:		January	to December
(1)	(2)	(3)	(4)
Base Years	Service Area Population	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) / (2)
1995	36,320	7,016,108	193.17
1996	36,259	7,423,957	204.75
1997	36,212	7,771,055	214.60
1998	36,504	6,646,298	182.07
1999	36,837	7,653,508	207.77
2000	36,929	7,822,495	211.83
2001	37,399	8,704,283	232.74
2002	37,926	7,135,126	188.13
2003	38,373	7,440,392	193.90
2004	38,681	7,459,940	192.86
10 Year Baseline GPCD Target Reduction by 2020		Total of Column (4):	2021.81
		Divide Total by 10:	202.18
		0.8 x 202:	162

TABLE #7 BASE DAILY PER CAPITA WATER USE CALCULATION FOR SECTION 10608.22			
Utility Name:		City of Monrovia	
12-Month Period:		January	to December
(1)	(2)	(3)	(4)
Base Years	Service Area Population	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) / (2)
2003	38,373	7,440,392	193.90
2004	38,681	7,459,940	192.86
2005	38,871	7,173,318	184.54
2003	38,860	7,385,422	190.05
2007	38,932	7,584,736	194.82
5 Year Baseline GPCD Maximum Allowable GPCD		Total of Column (4):	956.17
		Divide Total by 5:	191.23
		0.95 x 191:	182

Unaccounted water loss amounts to approximately 2-5% of total production. The industry wide standards generally are a maximum of 5% unaccounted water loss.

In the City of Monrovia, total water use averages 165 gallons per capita per day. The ratio of population to meters was 4.20 in 2010.

The City of Monrovia has a complex mix of commercial and industrial customers, with the commercial sector dominating the non-residential usage of water. Single family residential constitute 70% of the total number of services, multiple family constitute 18%, Commercial 8% and the remaining 4% comprised of Industrial, Landscape and Other. Growth is projected to be steady for the next five years. As Monrovia anticipates additional growth in the multi-family, retail and commercial sector due to the redevelopment efforts taking place within the City which favors this type of business. The impacts of these developments should be mitigated by increased water efficiency improvements such as improved landscape irrigation techniques and low use fixtures, which will prevent a return to pre-drought levels of usage.

The City has a stable institutional/governmental sector consisting primarily of local government, schools, and a public hospital. This sector is not expected to increase over the next twenty years.

Landscape and recreational customer demand is expected to slightly decrease for the next twenty years. Recently completed irrigation system upgrades at most City parks, increased efficiencies, and further improvements within the School District's properties should reduce demand in this sector.

Monrovia has no significant agricultural water demands.

Table #8 compares current and projected water supply requirements and demand. It indicates that, in average precipitation years, the City of Monrovia has sufficient water to meet its customers' needs through 2030. This is based on projected rate of growth demand, continued commitment to conservation programs, and more efficient use of supplies.

TABLE #8 PROJECTED SUPPLY AND DEMAND COMPARISON ACRE-FEET/YEAR					
	2010	2015	2020	2025	2030
Supply Total	7,600	7,450	7,300	7,150	7,000
Demand Total	7,411	7,266	7,123	6,983	6,847
Difference	189	184	177	167	153

However, in the event of series of critically dry years when the groundwater basin extraction is limited, Monrovia will enter into Phase 1 Water Shortage Response (which calls for voluntary rationing to achieve a 10% water use reduction) to ensure it can meet the needs of the community. Subsequent rationing stages would be implemented on an as-needed basis until the precipitation and ground water levels return to their historical ranges (see Chapter 6).

Chapter 5

WATER CONSERVATION PROGRAMS

[Sections 1063(b); (1) and (2), 10631 (c), 10631 (d), 10631 (h),
10631 (I) (1-4), 10631 (2), 10631 (a) (2-7), and 10633]

The City of Monrovia is committed to the efficient use of the most valuable natural resource; water. Descriptions of the City's water conservation program and the activities undertaken by other organizations of which Monrovia is a member are listed below. This section discusses water conservation programs and demand management measures (DMM) (see Section VII for Water Recycling).

DMM-1 – Interior and exterior water audits for single family and multi-family customers.

During the drought years of the late 1980's and early 1990's, the City conducted water audits for single family and multi-family customers on the basis of customer request only. All industrial and commercial customers were surveyed for leak detection and awareness of water conservation practices. Currently, if a customer requests, water use patterns and leak detection is available. The City has chosen at the present not to offer comprehensive water audits due to staffing and budget constraints.

Budget 2010-2011: Included in operations budget.

Implementation Schedule: Provide upon request.

DMM-4 – Metering with commodity rates.

The City is fully metered for all customers sectors, including separate meters for single-family residential, commercial, large landscapes, and all institutional/government facilities. Since approximately 1990, City policy has been to separately meter each dwelling unit in multi-family complexes if practicable. The City has a single block rate structure. A billing unit is one hundred cubic feet (749 gallons) commonly abbreviated HCF or CCF. All utility bills show current month and one year worth of water consumption (when available) so the customer can determine their individual water use and measure their conservation efforts.

The City has an ongoing program to replace older meter with modern meters of greater accuracy, which incorporate an integral low flow indication. During 2010, 520 meters were replaced to improve consumption reporting accuracy. This enables the customer and City to better identify small leaks and water waste.

Budget 2010-2011:	\$50,000 (replacement meters)
Implementation Schedule:	The City will continue to install and read meters on all new services, and will continue to conduct meter calibrations and replacement program.

DMM-5 – Large landscape water audits and incentives

The Utility Division continually works with the Park Division and School District to improve water use efficiency at public landscapes and greenbelts. Two of the Cities largest parks - Library and Recreation Park, have computer automated irrigation control systems, which calculate the optimal water usage, sophisticated (envirotranspiration) sensors. The most recent additions to this system include Julian Fisher Park and the Huntington Medians. In cooperation with State DWR, the City

installed weather-monitoring station CIMIS (California Irrigation Management Information System). CIMIS ALERT helps public and private agencies promote efficient irrigation, water and energy management programs.

Budget 2010-2011: \$12,000
Implementation Schedule: On going.

DMM-6 – High-efficiency Washing Machines

The City utilizes the Upper San Gabriel Valley Municipal Water District (USGV MWD) for assistance.

Budget 2010-2011: Included in USGVWD membership.
Implementation Schedule: As the program is funded and carried out by USGVWD and MWD.

DMM-7 – Public information

The City promotes water conservation through utility bill inserts, brochures, community speakers, local community cable, and many special events every year.

Budget 2010-2011: \$5,000
Implementation Schedule: The City will continue to provide public information services and materials to remind the public about water conservation goals.

DMM-8 – School education

The City utilizes the Upper San Gabriel Valley Municipal Water District (USGV MWD) to provide schools educational programs and materials. The City has an annual water conservation calendar contest in which local elementary schools participated. The City also provides Outdoor Education Program classes to elementary school students explaining where Monrovia’s water comes from, how water is precious and how they can conserve water.

Budget 2010-2011: \$5,000
Implementation Schedule: The City will continue to rely on USGVMWD
to assist with this DMM.

DMM-9 – Commercial, industrial and institutional water conservation

The City has recently completed a computerized analysis of all City customers by monthly and annual water usage to identify the top 20 users. The City will be offering audits to interested customers.

Budget 2010-2011: Included in operations budget
Implementation Schedule: Ongoing

DMM-10 – Wholesale agency programs

The Utility Division has designated the Utility Supervisor as the Water Conservation Coordinator.

Budget 2010-2015: N/A
Implementation Schedule: The City will continue to rely on USGVMWD to
assist with this DMM.

DMM-11 – Conservation pricing water service and sewer service.

The City of Monrovia has a single block rate structure for all customer sectors. Water and sewer rates are reviewed on an annual basis to provide sufficient operating revenues to fund the Water and Sewer Sections' activities and provide for necessary capital improvements.

No rate stabilization fund is currently in effect or being considered.

DMM-12 – Water Conservation Coordinator

The Utility Division has designated the Utility Supervisor as the Water Conservation Coordinator.

Budget 2010-2015:	Included in operations budget.
	No designated amount.
Implementation Schedule:	Ongoing.

DMM-13 – Water waste prohibition

The City established a no waste ordinance in 1977 (ordinance #13.04.360) prohibiting water waste. Utility Representatives routinely issue advisement to customers in noncompliance with the spirit of the ordinance.

Budget 2010-2015:	Included in operations budget.
	No designated amount.
Implementation Schedule:	Operation and management.

DMM-14 – Ultra-low flush toilet replacement Discussed in DMM 2.

Budget 2010-2015: Included in USGVWD membership.

Implementation Schedule: As the program is funded and carried

Chapter 6

WATER SHORTAGE CONTINGENCY ANALYSIS California Water Code Section 10631 (e)(1-9), 10631 (f)

As mentioned earlier, the City adopted a “No-Waste” Ordinance in 1977. Though no longer in effect, it is used as guidelines and tool for conservation. Based on drought experience, the City has developed a Resolution to Declare a Water Shortage Emergency. The City has developed a six stage rationing plan (see Table 6) to invoke during declared water shortages. The rationing plan includes voluntary and mandatory rationing depending on the causes, severity, and anticipated duration of the water supply shortage.

As a water purveyor, the City of Monrovia must provide the minimum health and safety water needs of the community at all times. The water shortage response is designed to provide a minimum of normal supply during a severe or extended water shortage. The rationing program triggering levels shown below were established to ensure that this goal is met.

The City’s potable water sources are groundwater and imported water (in the event of an emergency). Rationing stages may be triggered by a supply shortage or by contamination in the primary source, which renders it unusable.

Water allocation for each class of customers will be based solely on the percentage reduction shown in the following table for each stage. Each month, production and consumption figures will be compared to a determined baseline year, to measure the effects of the implemented stages of rationing on overall water usage.

TABLE #9 WATER RATIONING STAGES AND REDUCTION GOALS

Shortage Condition	Phase	Customer Reduction Goal	Type of Rationing Program
Up to 10%	I	10%	Voluntary
10%	II	10%	Mandatory
10-15%	III	15%	Mandatory
15-20%	IV	20%	Mandatory
20-25%	V	25%	Mandatory
25-50%	VI	50%	Mandatory

Chapter 7

RECYCLED WATER OPPORTUNITIES

California Water Code Sections 10631(b)(1) and 10632(a)(1)(A-F)

The Los Angeles County Regional Sanitation District manages wastewater treatment and collection for Los Angeles County. All of the wastewater flows from the City (excluding storm-water run off) are collected and treated at the San Jose Creek regional treatment facility. Because the City sewer mains are not separately metered, an exact inflow calculation is not available.

As discussed in Chapter 2, the cost of utilizing recycled water varies widely with the quantity to be used and the distance required conveying the water from the treatment plant to the point of use. Monrovia is located a considerable distance from all existing and proposed recycled water distribution mains, so the economic viability of using recycled water is not favorable at this time.

The Upper San Gabriel Municipal Water District has plans to augment existing recharge to the groundwater basin with an increase of recycled water. The City of Monrovia through its membership in Watermaster continued to collect water elevation and water quality data as part of the project's Background Water Quality Monitoring Plan. This proposal will increase the amount of water available for extraction and cyclic storage by sub-agencies.