City of Fullerton

Final

2010 Urban Water Management Plan

July 2011

MALCOLM PIRNIE | ARCADIS

The Water Division of ARCADIS

City of Fullerton

303 W. Commonwealth • Fullerton, CA 92832

2010 Urban Water Management Plan

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Acronyms Used in the Report

20x2020	20% water use reduction in GPCD by year 2020
Act	Urban Water Management Planning Act
AF	acre-feet
AFY	acre-feet per year
Basin	Orange County Groundwater Basin
BDCP	Bay Delta Conservation Plan
BEA	Basin Equity Assessment
BMP	Best Management Practice
Board	Metropolitan's Board of Directors
BPP	Basin Production Percentage
CDR	Center for Demographic Research
cfs	cubic feet per second
CII	Commercial/Industrial/Institutional
CIMIS	California Irrigation Management Information System
City	City of Fullerton
CRA	Colorado River Aqueduct
CSUF	California State University, Fullerton
CUP	Conjunctive Use Program
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DWR	Department of Water Resources
EOCF #2	East Orange County Feeder #2
ETo	Evapotranspiration
Festival	Children's Water Education Festival
FY	Fiscal Year
FYE	Fiscal Year Ending
GAP	Green Acres Project
GPCD	gallons per capita per day
gpm	gallons per minute
GWRS	Groundwater Replenishment System
H2O2	hydrogen peroxide
HECW	High Efficiency Clothes Washer
HET	high efficiency toilet
HOA	Homeowners Association
IRP	Integrated Water Resources Plan
IWA	International Water Association
LOI	Letter of Intent
MCL	Maximum Contaminant Level
Metropolitan	Metropolitan Water District of Southern California

MF	Microfiltration
MG	million gallons
MGD	million gallons per day
MOU	Memorandum of Understanding
MWDOC	Municipal Water District of Orange County
NDMA	N-nitrosodimethylamine
NOAA	National Oceanic and Atmospheric Administration
OCSD	Orange County Sanitation District
OCWD	Orange County Water District
Poseidon	Poseidon Resources LLC
PPCP	Pharmaceuticals and Personal Care Product
QSA	Quantification Settlement Agreement
RA	Replenishment Assessment
RHNA	Regional Housing Needs Assessment
RO	Reverse Osmosis
RUWMP	Regional Urban Water Management Plan
SBx7-7	Senate Bill 7 as part of the Seventh Extraordinary Session
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SDCWA	San Diego County Water Authority
SWP	State Water Project
TCE	Trichloroethylene
TDS	Total Dissolved Solids
ULFT	ultra-low-flush toilet
UW	ultraviolet
UWMP	Urban Water Management Plan
WACO	Water Advisory Committee of Orange County
WEROC	Water Emergency Response Organization of Orange County
WOCWBF #2	West Orange County Water Board Feeder #2
WSAP	Water Supply Allocation Plan
WSDM	Water Surplus and Drought Management Plan
WSSCP	Water Supply Shortage Conservation Plan

Executive Summary

This report serves as the 2010 update of the City of Fullerton's (City) Urban Water Management Plan (UWMP). The UWMP has been prepared consistent with the requirements under Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act), which were added by Statute 1983, Chapter 1009, and became effective on January 1, 1984. The Act requires "every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually" to prepare, adopt, and file an UWMP with the California Department of Water Resources (DWR) every five years. 2010 UWMP updates are due to DWR by August 1, 2011.

Since its passage in 1983, several amendments have been added to the Act. The most recent changes affecting the 2010 UWMP include Senate Bill 7 as part of the Seventh Extraordinary Session (SBx7-7) and SB 1087. Water Conservation Act of 2009 or SBx7-7 enacted in 2009 is the water conservation component of the Delta package. It stemmed from the Governor's goal to achieve a 20% statewide reduction in per capita water use by 2020 (20x2020). SBx7-7 requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020 and an interim 10% goal by 2015.

Service Area and Facilities

The City provides water to a population of approximately 138,000 throughout its 22.3 square mile service area. The City receives its water from two main sources, the Lower Santa Ana River Groundwater Basin (Basin), which is managed by the Orange County Water District (OCWD) and imported water from the Metropolitan Water District of Southern California (Metropolitan). Groundwater is pumped from 11 active wells located throughout the City, and imported water is treated at the Diemer Filtration Plant and is delivered to the City through six (operational) imported water connections.

Water Demand

Currently, the total water demand for retail customers served by the City is approximately 27,860 acre-feet annually consisting of 10,587 acre-feet of imported water and 17,273 acre-feet of local groundwater. In the last five years, the City's water demand has decreased by 12% while population has increased by 2% percent. With its diligence in the promotion of water conservation as well as financial incentives to customers to retrofit their homes and businesses with water efficient devices and appliances, the City is projecting an 18% increase in demand with a projected 11% population growth in the next 25 years.

After reviewing calculation of the City's base daily per capita use and water use targets,, the City has selected compliance with **Option 1** of the SBx7-7 compliance options. The City is a member of the Orange County 20x2020 Regional Alliance formed by MWDOC. This regional alliance consists of 29 retail agencies in Orange County. Under Compliance Option 1, the City's 2015 interim water use target is 199.9 GPCD and the 2020 final water use target is **177.7 GPCD**.

Water Sources and Supply Reliability

The City was, for many years, an agricultural community specializing in growing oranges and walnuts. To serve this growing agricultural and domestic community, a municipal water system was formed on August 25, 1906. The original source of water supply for the City was from shallow irrigation wells. As the City continued to grow and change from an agricultural to an urban community, the need for additional sources of water was recognized if economic development were to continue.

The need for additional water sources led the City to join with twelve other Southern California cities to form Metropolitan on February 27, 1931. Metropolitan, as a regional wholesaler, supplies imported water to southern California from the Colorado River and from the State Water Project (SWP). Metropolitan's primary purpose is to develop, store, and distribute water at wholesale rates to its member public agencies for domestic and municipal uses. The City became a member of OCWD in 1953, 20 years after OCWD was formed by a special act of the State Legislature to manage Orange County's groundwater supply and protect the County's rights to water in the Basin. The sources of imported water supplies include the Colorado River and the SWP. Metropolitan's 2010 Integrated Water Resources Plan (IRP) update describes the core water resource strategy that will be used to meet full-service demands (non-interruptible agricultural and replenishment supplies) at the retail level under all foreseeable hydrologic conditions from 2015 through 2035.

It is required that every urban water supplier assess the reliability to provide water service to its customers under normal, dry, and multiple dry water years. Metropolitan's 2010 RUWMP finds that Metropolitan is able to meet full service demands of its member agencies with existing supplies from 2015 through 2035 during normal years, single dry year, and multiple dry years. The City is therefore capable of meeting the water demands of its customers in normal, single dry, and multiple dry years between 2015 and 2035, as illustrated in Table 3-12, Table 3-13, and Table 3-14, respectively.

Future Water Supply Projects

While the City recognizes the potential uses of recycled water in its community, such as landscape irrigation, parks, industrial and other uses, the City does not have the recycled water infrastructure to support the use of recycled water. The cost-effectiveness analyses

that have been conducted throughout the years regarding recycled water infrastructure have not shown to be beneficial at this time. Therefore, the City supports, encourages and contributes to the continued development of recycled water and potential uses throughout the region through the GWRS. At this time, the City does not have any potential and projected uses for recycled water.

In Orange County, there are three proposed ocean desalination projects that could serve the City. Of these projects, the Huntington Beach Seawater Desalination Project may be of specific benefit to the City through exchange program. On November 6, 2009, the City signed a non-binding LOI for 2.2 MGD (2,500 AFY) of Project supplies.

1. Introduction

1.1. Urban Water Management Plan Requirements

Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act) requires "every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually" to prepare, adopt, and file an UWMP with the California Department of Water Resources (DWR) every five years. 2010 UWMP updates are due to DWR by August 1, 2011.

This UWMP provides DWR with information on the present and future water resources and demands and provide an assessment of the City's water resource needs. Specifically, this document will provide water supply planning for a 25-year planning period in 5-year increments. The plan will identify water supplies for existing and future demands, quantify water demands during normal year, single-dry year, and multiple-dry years, and identify supply reliability under the three hydrologic conditions. The City's 2010 UWMP update revises the 2005 UWMP. This document has been prepared in compliance with the requirements of the Act as amended in 2009, and includes the following analyses:

- Water Service Area and Facilities
- Water Sources and Supplies
- Water Use by Customer Type
- Demand Management Measures
- Water Supply Reliability
- Planned Water Supply Projects and Programs
- Water Shortage Contingency Plan
- Recycled Water

Since its passage in 1983, several amendments have been added to the Act. The most recent changes affecting the 2010 UWMP include Senate Bill 7 as part of the Seventh Extraordinary Session (SBx7-7) and SB 1087. Water Conservation Act of 2009 or SBx7-7 enacted in 2009 is the water conservation component of the Delta package. It stemmed from the Governor's goal to achieve a 20% statewide reduction in per capita water use by 2020 (20x2020). SBx7-7 requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020 and the interim 10% goal by 2015. Each urban retail water supplier must include in its 2010 UWMPs the following information from its target-setting process:

- Baseline daily per capita water use
- 2020 Urban water use target
- 2015 Interim water use target
- Compliance method being used along with calculation method and support data

Wholesale water suppliers are required to include an assessment of present and proposed future measures, programs, and policies that would help achieve the 20x2020 goal.

The other recent amendment made to the UWMP Act to be included in the 2010 UWMP is set forth by SB 1087, Water and Sewer Service Priority for Housing Affordable to Low-Income Households. SB 1087 requires water and sewer providers to grant priority for service allocations to proposed developments that include low income housing. SB 1087 also requires UWMPs to include projected water use for single- and multi-family housing needed for low-income households.

This 2010 UWMP update also incorporates water use efficiency efforts the City has implemented or is considering implementing pursuant to the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU).[1] The City became signatory and adopted the MOU in January 1996.

The sections in this UWMP correspond to the outline of the Act, specifically Article 2, Contents of Plans, Sections 10631, 10632, and 10633. The sequence used for the required information, however, differs slightly in order to present information in a manner reflecting the unique characteristics of the City's water utility. The UWMP Checklist has been completed, which identifies the location of Act requirements in this Plan and is included as Appendix A.

[1] The *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) was adopted in September 1991 by a large number of water suppliers, public advocacy organizations and other interested groups. It created the *California Urban Water Conservation Council* and established 16 Best Management Practices (BMPs) for urban water conservation, recently refined to 14 BMPs.

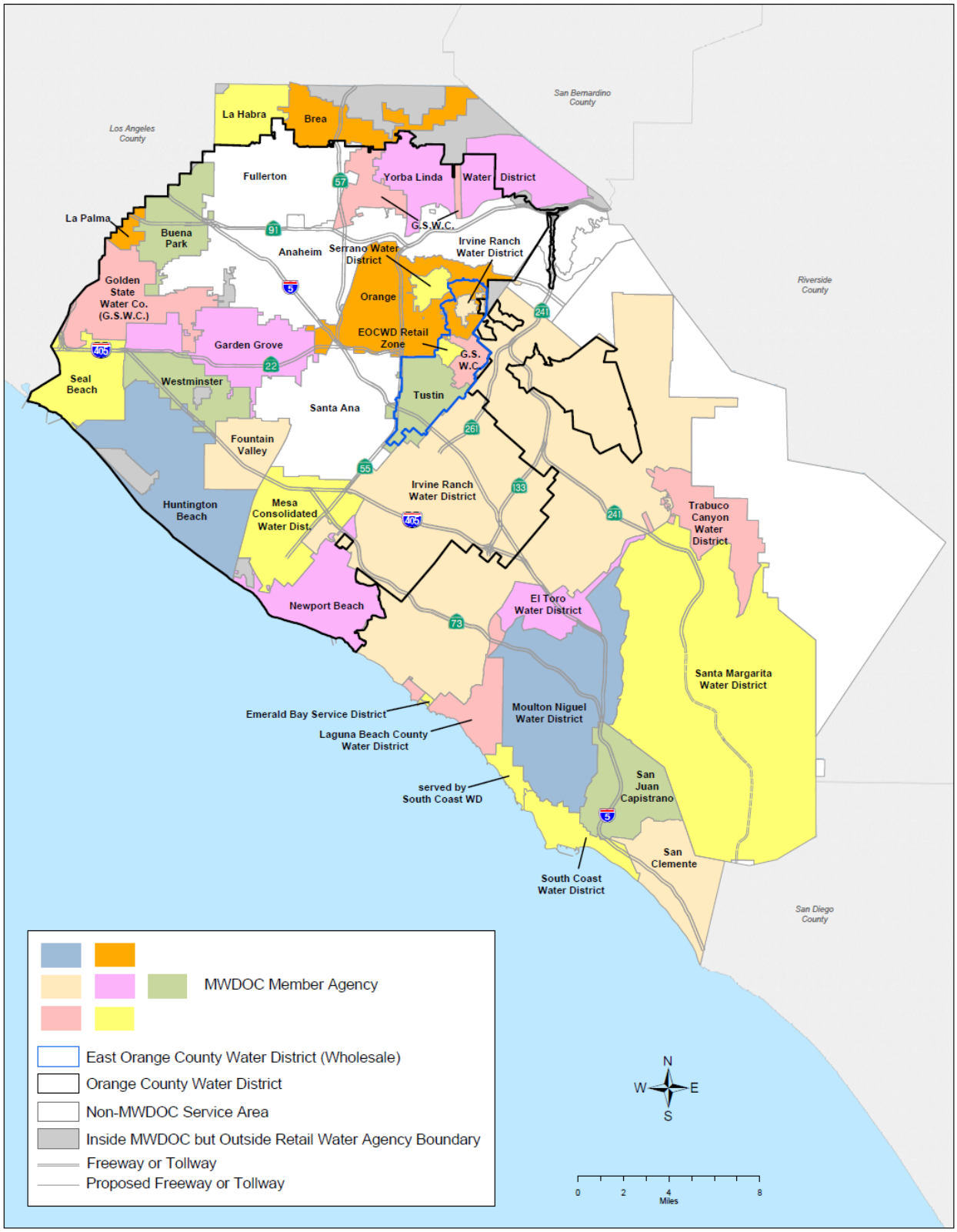

Figure 1-1: Regional Location of Urban Water Supplier

1.2. Agency Overview

The City is governed by a five-member council elected at large, who serves four-year staggered terms. As the City's legislative body, the Council is responsible for all municipal programs and services, as well as local policy decisions. Current Council Members include:

- Mayor F. Richard Jones
- Mayor Pro Tem Don Bankhead
- Council Member Pat McKinley
- Council Member Sharon Quirk-Silva
- Council Member Bruce Whitaker

The City receives its water from two main sources, the Basin, which is managed by OCWD and imported water from the Metropolitan. The City is a member agency of Metropolitan.

1.3. Service Area and Facilities

The City regards an adequate supply of water as an essential service to ensure public health and safety, economic growth, and community well being. Water supply goals of the City are as follows:

- Quality - to provide water to the customer that complies with State and Federally mandated water quality regulations
- Reliability - to provide water service with minimum interruptions at acceptable pressures
- Efficient Operation - to operate the Water Utility at the lowest feasible cost

1.3.1. Fullerton's Service Area

The City is located in north Orange County bounded to the north by the cities of La Habra and Brea, Placentia to the east, Buena Park to the west, and Anaheim to the south. Today, the City's Water Utility provides water service to approximately 138,000 persons within its 22.3-square mile service area. The service area and City boundary are contiguous. A map of the City's service area is shown in Figure 1-2.

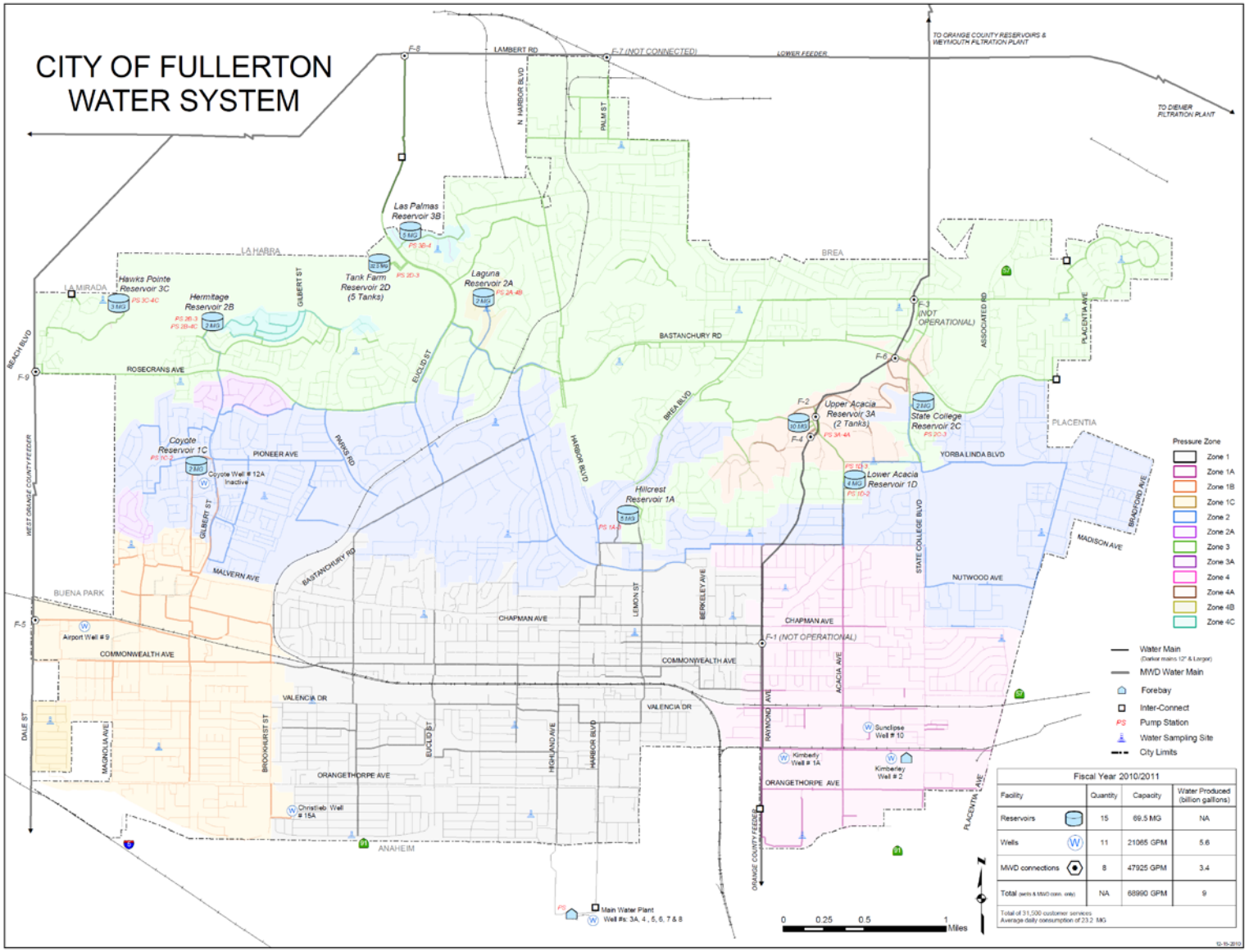

Figure 1-2: City of Fullerton's Service Area

1.3.2. Fullerton's Water Facilities

Since the formation of the City's Water Utility in 1906, millions of dollars of water facilities have been installed. Today, the City has over 420 miles of transmission and distribution mains, 15 reservoirs with a capacity of 69.5 million gallons, 12 booster pumping stations, and 11 active wells. The City has 6 imported water connections to Metropolitan and 6 emergency interconnections.

The City has 11 wells, located in the southern sector of the City. Six of these wells are located at the main plant in the City of Anaheim just south of the City boundary. Five of these 6 wells pump into a forebay before pumping the water into the distribution system. The other main plant well pumps directly into the system; outside the main plant, 1 well pumps into a forebay before pumped into the distribution system. Water pumped from these wells has been naturally filtered as it passes through underlying aquifers of sand, gravel, and soil. This well water delivered into the City's water system requires only disinfectant treatment.

2. Water Demand

2.1. Overview

Currently, the total water demand for retail customers served by the City is approximately 27,860 acre-feet annually consisting of 10,587 acre-feet of imported water and 17,273 acre-feet of local groundwater. In the last five years, the City's water demand has decreased by 12% while population has increased by 2% percent. With its diligence in the promotion of water conservation as well as financial incentives to customers to retrofit their homes and businesses with water efficient devices and appliances, the City is projecting an 18% increase in demand with a projected 11% population growth in the next 25 years.

The passage of SBx7-7 will increase statewide efforts to reduce the use of potable supplies in the future. This new law requires all of California's retail urban water suppliers serving more than 3,000 AFY or 3,000 service connections to achieve a 20% reduction in potable water demands (from a historical baseline) by 2020. Due to water conservation efforts in the past decade, the City is on its way to meeting this requirement on its own. Moreover, the City has elected to join the Orange County 20x2020 Regional Alliance formed by MWDOC. The City, together with 28 other retail agencies in Orange County, are committed to reduce the region's water demand by 2020.

This section will explore in detail the City's current water demands by customer type and the factors which influence those demands as well as providing a perspective of its expected future water demands for the next 25 years. In addition, to satisfy SBx7-7 requirements, this section will provide details of the City's SBx7-7 compliance method selection, baseline water use calculation, and its 2015 and 2020 water use targets.

2.2. Factors Affecting Demand

Water consumption is influenced by many factors from climate characteristics of that hydrologic region, to demographics, land use characteristics, and economics. The key factors affecting water demand in the City's service area are discussed below.

2.2.1. Climate Characteristics

The City is located in an area known as the South Coast Air Basin (SCAB). The SCAB climate is characterized by Southern California's "Mediterranean" climate: a semi-arid environment with mild winters, warm summers and moderate rainfall. The general region lies in the semi-permanent high pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatologically pattern

is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The City's average temperature ranges from 58.0°F in January to 74.3°F in August. Average annual rainfall is 14.3 inches per year (Table 2-1). The average Evapotranspiration (ETo) is 49.6 inches per year which is roughly four times the annual average rainfall. This translates to a high demand for landscape irrigation for homes, commercial properties, parks, and golf courses. Moreover, a region with low rainfall like Southern California is also more prone to droughts.

Table 2-1: Climate Characteristics

	Standard Monthly Average ETo (inches) [1]	Annual Rainfall (inches) [2]	Average Temperature (˚F) [3]
Jan	2.18	2.92	58.0
Feb	2.49	3.31	59.1
Mar	3.67	2.30	60.2
Apr	4.71	0.94	63.0
May	5.18	0.19	65.7
Jun	5.87	0.08	69.3
Jul	6.29	0.02	72.9
Aug	6.17	0.05	74.3
Sep	4.57	0.30	73.2
Oct	3.66	0.55	68.9
Nov	2.59	1.38	62.4
Dec	2.25	2.25	57.9
Annual	**49.63**	**14.32**	**65.4**

[1] CIMIS Station #75, Irvine, California from October 1987 to Present
[2] City of Fullerton weather station located at Hillcrest Reservoir Roof from 1931 to June 2005 and Kimberly 2 Well Forebay Roof from July 2005 to Present.
[3] NOAA, Santa Ana Fire Station, California 1971 to 2000, Mean Temperature

The sources of the City's imported water supplies, the SWP and Colorado River Aqueduct (CRA), are influenced by weather conditions in Northern California and along the Colorado River. Both regions have recently been suffering from multi-year drought conditions and record low rainfalls which directly impact demands and supplies to Southern California.

2.2.2. Demographics

The City serves a population of 138,600. The population within the City's service area is expected to increase by 11% in the next 25 years, or 0.44% annually. Table 2-2 shows the

population projections for the next 25 years based on the California State University at Fullerton, Center for Demographic Research (CDR) projections. Due to proactive water conservation efforts, future water demands are expected to increase at a much lower rate compared to the population growth. In fact, the City's demands are expected to stabilize after the year 2015. Multi-family housing units are expected to increase at a faster rate than the single-family housing units. In the older areas of the City, multi-family and mixed use units are increasingly replacing older single-family dwellings.

Table 2-2: Population – Current and Projected

	2010	2015	2020	2025	2030	2035-opt
Service Area Population [1]	138,600	141,603	144,605	147,608	150,610	153,613

[1] Center for Demographic Research, California State University, Fullerton 2010

California State University, Fullerton (CSUF) occupies 236 acres within the east-central part of the City. The present student population is above 35,000 students and 1900 full and part-time faculty. The City participates with CSUF on its sub-area master planning to determine the effects of planned improvements on the City's water and sewer system.

2.2.3. Economic Factors

Another factor influencing the City's water demands is economics. In the early 1990's, the rate of economic growth declined due to the severity and duration of the recession. The recession affected declines in the manufacturing sector, particularly in the defense and aerospace. During the late 1990's and early 2000's, the economy strengthened water demands and increased water usage. However, even with the strong economy, industrial demands have decreased. This has been partly due to changes in operation such as installation of on-site recycled water systems. In addition, several large companies have moved out of the area and have been replaced with different sectors whose water usage is lower.

2.2.4. Land Use

Land uses include 5,750 acres residential, 1,650 acres commercial, 1,250 acres industrial and 960 acres institutional. The largest area still to be developed is the proposed West Coyote Hills. This master planned community will compose of 760 single family attached and detached dwellings, 18.4 acres multiple use (public), 5.2 acres commercial, 282.9 acres habit conservation and 72.3 acres nature preserve.

2.3. Water Use by Customer Type

The knowledge of an agency's water consumption by type of use or by customer class is key to developing that agency's water use profile which identifies when, where, how, and

how much water is used, and by whom within the agency's service area. A comprehensive water use profile is critical to the assessment of impacts of prior conservation efforts as well as to the development of future conservation programs.

This section provides an overview of the City's water consumption by customer type in 2005 and 2010, as well as projections for 2015 to 2035. The customer classes are categorizes as follows: single-family residential, multi-family residential, commercial/industrial/institutional (CII), dedicated landscape, and agriculture. Other water uses including sales to other agencies and non-revenue water are also discussed in this section.

2.3.1. Overview

The City has approximately 31,500 customer connections to its potable water distribution system. All connections are metered. Water consumption within the City can be categorized into five customer classes: residential, commercial, industrial, municipal, and agricultural. The City does not provide any sales to other agencies, saline water intrusion barriers, groundwater recharge, or conjunctive use.

Approximately 60% of the City's water demand is residential. CII including dedicated landscape accounts for approximately 40% of the City's total demand. Demand from each sector is expected to remain the same proportionally. An 18% increase in water demand between 2010 and 2035 is anticipated for the City's service area while population is projected to increase by 11% over the same period.

Tables 2-3 and 2-4 provide a summary of the past, current, and projected number of water service customers and water use by customer class, respectively, in five-year increments from 2005 through to 2035.

Table 2-3: Past, Current and Projected Service Accounts by Water Use Sector

Fiscal Year Ending	Number of Accounts by Water Use Sector							
	Single Family	Multi-Family	Commercial	Industrial	Institutional /Gov	Landscape	Agriculture	Total Accounts
2005	25,765	1,943	1,937	541	228	320	10	**30,744**
2010	26,371	1,912	2,005	597	278	379	4	**31,546**
2015	26,957	2,033	2,027	566	239	335	10	**32,166**
2020	27,087	2,043	2,036	569	240	336	11	**32,322**
2025	27,223	2,053	2,047	572	241	338	11	**32,484**
2030	27,359	2,063	2,057	574	242	340	11	**32,646**
2035	27,515	2,075	2,069	578	243	342	11	**32,832**

Table 2-4: Past, Current and Projected Water Demand by Water Use Sector

Fiscal Year Ending	Water Demand by Water Use Sectors (AFY)							
	Single Family	Multi-Family	Commercial	Industrial	Institutional /Gov	Landscape	Agriculture	Total Demand
2005	14,372	5,066	5,688	4,109	672	1,336	16	**31,260**
2010	12,403	4,254	4,810	2,642	586	1,265	15	**25,975**
2015	14,500	4,973	5,624	3,089	685	1,479	17	**30,367**
2020	14,759	5,061	5,724	3,144	697	1,506	18	**30,908**
2025	14,659	5,027	5,685	3,123	692	1,495	17	**30,699**
2030	14,634	5,018	5,675	3,117	691	1,493	17	**30,646**
2035	14,719	5,048	5,708	3,136	695	1,502	18	**30,824**

2.3.2. Residential

Residential water use accounts for the majority of the City's water demands. The single family residential sector accounts for approximately 48% and multi-family residential accounts for 16% of the total water demand. Water consumption by the residential sector is projected to remain at about 64% through the 25-year planning horizon. The remaining demands are for the non-residential sector and system losses.

2.3.3. Non-Residential

In 2010 non-residential demand was 36% of the overall demand and is expected to remain so through 2035. The City has a mix of commercial uses (markets, restaurants, etc.), public entities (such as schools, fire stations and government offices), office complexes, light industrial, warehouses and facilities serving the public. Commercial water use represents 19% of total water sales in the City's service area. Although the numbers of accounts have increased, usage has decreased. A majority of this decrease is attributable to conservation.

Industrial water use represents about 10% of total water sales in the City's service area. For the industrial customer class, major users include paper goods manufacturing, food processing, electronics, beverages, and other industries that use water as a major component of the manufacturing process.

Today, agricultural water use represents only 0.1% of the City's total water sales. This is an insignificant amount compared with the City's agricultural demands during the 1950's. The four remaining agricultural customers generally raise high-value crops such as nursery stock or strawberries.

Municipal water use represents about 2% of total water sales in the City's service area. Municipal water use includes parks, buildings, and facilities operated and maintained by the City.

2.3.4. Other Water Uses

2.3.4.1. Sales to Other Agencies

The City does not sell water to other agencies. The City has connections to surrounding cities for emergency purposes only. The City has the following emergency interconnections: 1-Placentia, 1-Anaheim, 1-La Habra, 1-Brea, and 1-La Mirada.

The City serves a small portion of Buena Park and La Habra directly and the City receives service in a small portion from Anaheim, Page Mutual Water and La Mirada-(Suburban Water).

2.3.4.2. Non-Revenue Water

Non-revenue water is defined by the International Water Association (IWA) as the difference between distribution systems input volume (i.e. production) and billed authorized consumption. Non-revenue water consists of three components: unbilled authorized consumption (e.g. hydrant flushing, fire fighting, and blow-off water from well start-ups), real losses (e.g. leakage in mains and service lines), and apparent losses (unauthorized consumption and metering inaccuracies).

The City's non-revenue water in the last five years has averaged around 4.5%. The City has achieved this low percentage primarily through an aggressive meter testing and replacement program and a water main replacement program. For water production projections as discussed below, non-revenue water is assumed to be 6% of total water use through 2035.

Table 2-5: Additional Water Uses and Losses (AFY)

Water Use	Fiscal Year Ending						
	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	-	-	-	-	-	-	-
Groundwater Recharge	-	-	-	-	-	-	-
Conjunctive Use	-	-	-	-	-	-	-
Raw Water	-	-	-	-	-	-	-
Recycled Water	-	-	-	-	-	-	-
Unaccounted-for System Losses	1,876	1,885	1,938	1,973	1,959	1,956	1,968
Total	**1,876**	**1,885**	**1,938**	**1,973**	**1,959**	**1,956**	**1,968**

2.4. SBx7-7 Requirements

2.4.1. Overview

SBx7-7, which became effective on February 3, 2010, is the water conservation component to the Delta legislative package. It seeks to implement Governor

Schwarzenegger's 2008 water use reduction goals to achieve a 20% statewide reduction in urban per capita water use by December 31, 2020. As discussed above, the bill requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020 and an interim 10% goal by 2015. The bill establishes methods for urban retail water suppliers to determine targets to help achieve water reduction targets. The retail water supplier must select one of the four compliance options. The retail agency may choose to comply to SBx7-7 as an individual or as a region in collaboration with other water suppliers. Under the regional compliance option, the retail water supplier still has to report the water use target for its individual service area. The bill also includes reporting requirements in the 2015, and 2020 UWMPs. An agency that does not comply with SBx7-7 requirement will not be eligible for water related grant, or loan, from the state on and after July 16, 2016. However, if an agency that is not in compliance documents a plan and obtains funding approval to come into compliance then could become eligible for grants or loans.

2.4.2. SBx7-7 Compliance Options

DWR has established four compliance options for urban retail water suppliers to choose from. Each supplier is required to adopt one of the four options to comply with SBx7-7 requirements. The four options include:

- *Option 1* requires a simple 20% reduction from the baseline by 2020 and 10 percent by 2015.
- *Option 2* employs a budget-based approach by requiring an agency to achieve a performance standard based on three metrics
    - Residential indoor water use of 55 GPCD
    - Landscape water use commiserate with Model Landscape Ordinance
    - 10 percent reduction in baseline CII water use
- *Option 3* is to achieve 95% of the applicable state hydrologic region target as set forth in the State's 20x2020 Water Conservation Plan.
- *Option 4* requires the subtraction of Total Savings from the Base GPCD:
    - Total Savings includes indoor residential savings, meter savings, CII savings, and landscape and water loss savings.

Fullerton's Compliance Option Selection

After reviewing calculation of the City's base daily per capita use and water use targets, the City has selected compliance with **Option 1**.

While each retail agency is required to choose a compliance option in 2010, DWR allows for the agency to change its compliance option in 2015. This will allow the City to determine its water use targets for Compliance Option 2 and 4 as it anticipates more data to be available for targets calculation in the future.

2.4.3. Regional Alliance

Retail agencies can choose to meet the SBx7-7 targets on its own or several retail agencies may form a regional alliance and meet the water use targets as a region. The benefit for an agency that joins a regional alliance is that it has multiple means of meeting compliance.

The City is a member of the Orange County 20x2020 Regional Alliance formed by MWDOC. This regional alliance consists of 29 retail agencies in Orange County as described in MWDOC's 2010 RUWMP. The Regional Alliance Weighted 2015 target is 174 GPCD and 2020 target is 157 GPCD.

2.4.4. Baseline Water Use

The first step to calculating an agency's water use targets is to determine its base daily per capita water use (baseline water use). This baseline water use is essentially the agency's gross water use divided by its service area population, reported in gallons per capita per day (GPCD). The baseline water use is calculated as a continuous 10-year average during a period which ends no earlier than December 31, 2004 and no later than December 31, 2010. Agencies that recycled water made up 10 percent or more of 2008 retail water delivery can use up to a 15-year average for the calculation.

The City has no recycled water; therefore, a 10-year instead of a 15-year rolling average was calculated. The City's baseline water use is **222.1 GPCD,** which was obtained from the 10-year period July 1, 1995 to June 30, 2005.

Tables 2-6 and 2-7 provide the base period ranges used to calculate the baseline water use for the City as well as the service area population and annual water use data which the base daily per capita water use was derived. Data provided in Table 2-6 was used to calculate the continuous 10-year average baseline GPCD. Moreover, regardless of the compliance option adopted by the City, it will need to meet the minimum water use target of 5% reduction from a five-year baseline as calculated in Table 2-7. Because the City is an OCWD agency, the City's gross water use includes deductions for indirect potable recycled water use from the Groundwater Replenishment System (GWRS) and Water Factory 21 managed by OCWD. The calculations for the gross water use are described in MWDOC's 2010 RUWMP.

Table 2-6: Base Daily per Capita Water Use – 10-year range

Highest Available Baseline [1]	Beginning	Ending
10 Year Avg	July 1, 1995	June 30, 2005

Fiscal Year Ending	Service Area Population	Gross Water Use (gallons per day)	Daily Per Capita Water Use
1996	120,633	28,555,852	237
1997	121,846	29,377,068	241
1998	123,167	25,629,514	208
1999	124,485	27,560,701	221
2000	126,275	29,653,434	235
2001	128,049	27,959,810	218
2002	129,440	28,848,608	223
2003	131,517	27,904,980	212
2004	134,148	29,507,079	220
2005	135,044	27,711,390	205
		Base Daily Per Capita Water Use:	222.1

[1] The most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010. The base period cannot exceed 10 years unless at least 10 percent of 2008 retail deliveries were met with recycled water.

Table 2-7: Base Daily per Capita Water Use – 5-year range

Highest Available Baseline [2]	Beginning	Ending
5 Year Avg	July 1, 2003	June 30, 2008

Fiscal Year Ending	Service Area Population	Gross Water Use (gallons per day)	Daily Per Capita Water Use
2004	134,148	29,507,079	220
2005	135,044	27,711,390	205
2006	136,006	28,161,171	207
2007	136,318	29,538,560	217
2008	136,827	28,170,314	206
		Base Daily Per Capita Water Use:	211.0

[2] The base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

2.4.5. SBx7-7 Water Use Targets

Under Compliance Option 1, the simple 20% reduction from the baseline, the City's 2015 interim water use target is 199.9 GPCD and the 2020 final water use target is **177.7 GPCD** as summarized in Table 2-8.

Table 2-8: Preferred Compliance Option and Target Water Use

	Baseline	2015 Target	2020 Target
Option 1 - Simple 20% Reduction	222.1	199.9	177.7

2.4.6. Water Use Reduction Plan

In order to meet the SBx7-7 targets, the City joined the Orange County 20x2020 Regional Alliance along with 28 other retail urban water suppliers in Orange County. The Orange County 20x2020 Regional Alliance was created to allow local water suppliers to meet their 20% by 2020 reduction targets under SBx7-7 on a regional basis through the successful implementation of region-wide programs.

The Orange County 20x2020 Regional Alliance will achieve its water use reduction by building on the existing collaboration between Metropolitan, the City, MWDOC and the local agencies in Orange County. MWDOC as a regional wholesale water provider for Orange County implements many of the urban water conservation Best Management Practices (BMPs) on behalf its member agencies as well as the cities of Anaheim, Fullerton, and Santa Ana. The City's conservation measures are detailed in Section 4 of this UWMP. MWDOC's conservation measures are detailed in MWDOC's RUWMP Section 4, and Metropolitan's conservation measures detailed in Metropolitan's 2010 RUWMP Section 3.4.

Additionally, Metropolitan in collaboration with its member agencies is in the process of developing a Long Term Conservation Plan,[2] which seeks an aggressive water use efficiency target in order to achieve a 20% reduction in per capita water use by 2020 for the entire Metropolitan service area.

Metropolitan Long Term Conservation Plan

Metropolitan's Long Term Conservation Plan will build on Metropolitan's traditional programs of incentives, education and broad outreach while developing a new vision of water use efficiency by altering the public's perspective on water through market transformation. The overreaching goals of the Long Term Conservation Plan are as follows:

- Achieve the 2010 IRP conservation target – The target for new water savings through conservation is a regional per capita use of 159 gallons per day in 2015 and 141 gallons per day in 2020.
- Pursue innovation that will advance water conservation

[2] Metropolitan Water District of Southern California Long Term Conservation Plan Working Draft Version 6 (November 30, 2010)

- Transform the public's value of water within this region – A higher value on water within this region can lead to a conservation ethic that results in permanent change in water use behavior, earlier adoption of new water saving technologies, and transition towards climate-appropriate landscapes.

Achieving these goals requires the use of integrated strategies that leverage the opportunities within this region. It requires regional collaboration and sustained support for a comprehensive, multi-year program. It requires a commitment to pursue behavioral changes and innovation in technologies that evolve the market for water efficient devices and services. It requires strategic, focused implementation approaches that build from broad-based traditional programs. It requires that research be conducted to provide the basis for decisions. Lastly, it requires the support of local leaders to communicate a new value standard for water within this region. Metropolitan and its member agencies will implement the five strategies through a traditional program, a market acceleration program, and legislation and regulation. The five strategies include:

- **Use catalysts for market transformation.** Metropolitan and member agencies will pursue market transformation to affect the market and consumer choices for water efficient devices and services.
- **Encourage action through outreach and education.** Metropolitan and member agencies will provide outreach, educational workshops, and training classes through a range of media and formats which are essential to changing public perceptions of the value of water.
- **Develop regional technical capability.** Metropolitan and member agencies will conduct research, facilitate information sharing, and/or provide technical assistance to member agencies and retail agencies to develop technical capabilities within the region for water budgeting, advanced metering infrastructure, ordinances, retail rate structures, and other conservation measures.
- **Build strategic alliances.** Metropolitan and member agencies will form strategic alliances with partners to leverage resources, opportunities and existing momentum that support market transformation.
- **Advance water efficiency standards.** Metropolitan and member agencies will work to advance water efficiency codes and standards to increase efficiency and reduce water waste.

Successful market transformation requires the integrated use of all five strategies. It is implemented through three complementary programs: traditional and market acceleration programs, and legislation and regulation. When used together, these approaches can be catalytic and transform markets.

Traditional Program: A traditional program of incentives, outreach, education, and training will be used to provide a foundation of water savings, establish baseline

conditions, provide market data, and help determine devices and services that are primed for market acceleration. Implementation may include regional incentive programs, pilot programs, regional outreach, and research for a variety of devices and services.

Market Acceleration Program: A portion of Metropolitan's resources will be used for market acceleration of devices and services that have potential for market change. Metropolitan will use a strategic focus for a specified time period to affect the market for a particular device or service. Tactics may include strategic outreach to manufacturers, retailers, contractors, and consumers; enhanced incentives; and collaboration on implementation.

Legislation and Regulation: Are important tools and often the primary means for ensuring future water savings from devices and services. Regulation, ordinances and codes establish conditions that will ensure a minimum level of water efficiency for a particular device or service in the future. Markets are dynamic, and the influences on manufactures, retailers, and consumers are constantly changing. Progress made on changing consumer preferences a market share of efficient products is protected through legislation and regulations requiring a minimum efficiency standard. This benefits both water agencies and manufactures who invest in bringing water-efficiency technologies to the market. Legislation and regulation are also effective exit strategies to discontinue traditional incentive programs so that resources can be redirected to new technologies and approaches.

Implementation of the combined programs, Traditional - Market Acceleration – Legislation and Regulation, will be closely coordinated between Metropolitan, member agencies and sub-agencies to maximize synergies. An adaptive management approach will be employed using research, implementation and evaluation to guide decisions on program activities and intensity.

Periodic Review

A periodic review of conservation actions to measure progress towards the water savings goals will be an integral component of the effort. The review will include work that is completed or in progress. It will consider factors that have affected the results as well as the opportunities to improve cost effectiveness and water savings.

2.5. Demand Projections

2.5.1. 25 Year Projections

One of the main objectives of this UWMP is to provide an insight into the City's future water demand outlook. As discussed above, currently, the City's total water demand is 27,860 acre-feet comprising of 62% local groundwater, and 38% imported water.

Table 2-9 provides a projection of the City's water demands for the next 25 years. Groundwater supply is projected to account for approximately 62% of the City's total water demand in the next 25 years. Imported water from Metropolitan meets the remaining demand. The BPP is projected to be 62% for all years.

Table 2-9: Current and Projected Water Demands (AFY)

Water Supply Sources	Fiscal Year Ending					
	2010	2015	2020	2025	2030	2035-opt
MET (Imported Treated Full Service (non-int.))	10,587	12,276	12,495	12,410	12,389	12,461
BPP Groundwater	17,273	20,029	20,386	20,248	20,213	20,331
Total	**27,860**	**32,305**	**32,881**	**32,658**	**32,602**	**32,792**

The City is a member agency of Metropolitan. The City's 20-year demand projections for imported water shown in Table 2-10 are those provided to Metropolitan, the regional wholesaler of imported water. The City is projecting a stabilized demand for imported water of 12,276 AFY from 2015 to 12,461 AFY in 2035. The projections are based on an increase in population of approximately 0.4 percent per year given that the City is mostly built out.

Table 2-10: Fullerton's Demand Projections Provided to Wholesale Suppliers (AFY)

Wholesaler	Fiscal Year Ending				
	2015	2020	2025	2030	2035-opt
Metropolitan	12,276	12,495	12,410	12,389	12,461

2.5.2. Low Income Household Projections

One significant change to the UWMP Act since 2005 is the requirement for retail water suppliers to include water use projections for single-family and multifamily residential housing needed for lower income and affordable households. This requirement is to assist the retail suppliers in complying with the requirement under Section 65589.7 of the Government Code that suppliers grant a priority for the provision of service to housing units affordable to lower income households. A lower income household is defined as a household earning 80% of the County of Orange's median income or less.

In order to identify the planned lower income housing projects within its service area, DWR[3] recommends that retail suppliers may rely on Regional Housing Needs Assessment (RHNA) or Regional Housing Needs Plan information developed by the

[3] California Department of Water Resources, Guidebook to Assist Urban Water Suppliers to Prepare a 2010 UWMP, Final (March 2011)

local council of governments, the California Department of Housing and Community Development.

The RHNA is an assessment process performed periodically as part of Housing Element and General Plan updates at the local level. Regional Council of Governments in California are required by the State Housing Element Law enacted in 1980 to determine the existing and projected regional housing needs for persons at all income levels. The RHNA quantifies the need for housing by income group within each jurisdiction during specific planning periods. The RHNA is used in land use planning, to prioritize local resource allocation and to help decide how to address existing and future housing needs. The RHNA consists of two measurements: 1) existing need for housing, and 2) future need for housing.

The current RHNA planning period is January 1, 2006 to June 30, 2014 completed by the Southern California Association of Governments (SCAG) in 2007. The next RHNA which will cover the planning period of January 1, 2011 to September 30, 2021 is not expected to be completed until fall of 2012; therefore, the 2007 RHNA will be used for the purpose of this 2010 UWMP.

Based on the 2007 Final Regional Housing Need Allocation Plan[4], the projected housing need for low and very low income households (hereafter referred to as low-income) in the City of Fullerton are 17.2% and 20.9%, respectively or 38.1% combined.

Therefore, from inference, it is estimated that approximately 38.1% of the projected water demands within the City's service area will be for housing needed for low income households. Table 2-11 provides a breakdown of the projected water needs for low income single family and multifamily units. The projected water demands shown here represent 38.1% of the projected water demand by customer type for single-family and multifamily categories provided in Table 2-4 above. For example, the total single family residential demand is projected to be 14,500 AFY in 2015 and 14,719 AFY in 2035. The projected water demands for housing needed for single family low income households are 5,525 and 5,608 AFY for 2015 and 2035, respectively.

[4] Southern California Association Governments, Final Regional Housing Need Allocation Plan for Jurisdictions within the Six County SCAG Region (July 2007)

Table 2-11: Projected Water Demands for Housing Needed for Low Income Households

Water Use Sector	Fiscal Year Ending				
	2015	2020	2025	2030	2035
Total Retail Demand	32,305	32,881	32,658	32,602	32,792
Total Residential Demand	19,473	19,820	19,686	19,652	19,767
Total Low Income Households Demand	***7,419***	***7,552***	***7,500***	***7,487***	***7,531***
SF Residential Demand - Total	14,500	14,759	14,659	14,634	14,719
SF Residential Demand - Low Income Households	***5,525***	***5,623***	***5,585***	***5,575***	***5,608***
MF Residential Demand - Total	4,973	5,061	5,027	5,018	5,048
MF Residential Demand - Low Income Households	***1,895***	***1,928***	***1,915***	***1,912***	***1,923***

3. Water Sources and Supply Reliability

3.1. Overview

The City was, for many years, an agricultural community specializing in growing oranges and walnuts. To serve this growing agricultural and domestic community, a municipal water system was formed on August 25, 1906. The original source of water supply for the City was from shallow irrigation wells. As the City continued to grow and change from an agricultural to an urban community, the need for additional sources of water was recognized if economic development were to continue.

The need for additional water sources led the City to join with twelve other Southern California cities to form Metropolitan on February 27, 1931. Metropolitan, as a regional wholesaler, supplies imported water to southern California from the Colorado River and from the SWP. Metropolitan's primary purpose is to develop, store, and distribute water at wholesale rates to its member public agencies for domestic and municipal uses. The City became a member of OCWD in 1953, 20 years after OCWD was formed by a special act of the State Legislature to manage Orange County's groundwater supply and protect the County's rights to water in the Basin.

The City works together with two primary agencies – Metropolitan and OCWD to insure a safe and high quality water supply, which will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include the Colorado River and the SWP. Metropolitan’s 2010 IRP update describes the core water resource strategy that will be used to meet full-service demands (non-interruptible agricultural and replenishment supplies) at the retail level under all foreseeable hydrologic conditions from 2015 through 2035. The imported water supply numbers shown here represent only the amount of supplies projected to meet demands and not the full supply capacity.

Today, the City relies on 62% local groundwater and 38% imported water. It is projected that by 2035, demand will increase by 18% and water supply mix will remain proportionally the same. Figure 3-1 provides a projection of the City’s water supply sources for the next 25 years.

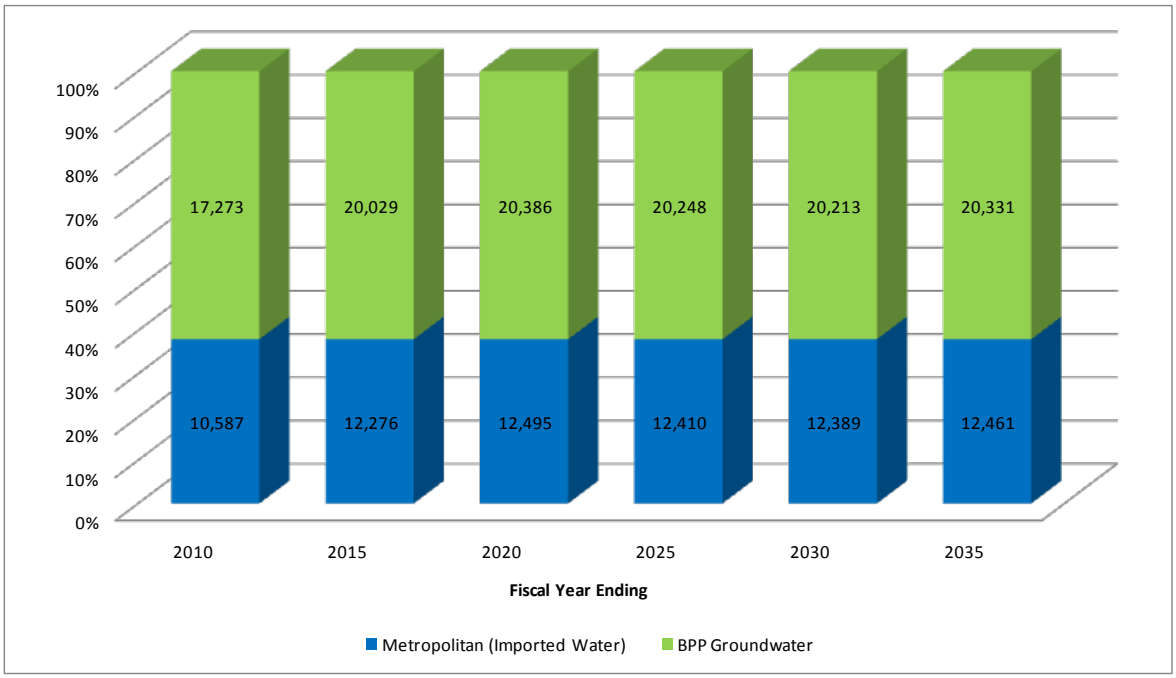

Figure 3-1: Current and Projected Water Supplies (AFY)

The following sections provide a detailed discussion of the City's two main water sources as well as projections to the City's future water supply portfolio for the next 25 years. Moreover, this compares projected supply and demand under various hydrological conditions to determine the City's supply reliability for the 25 year planning horizon. This section satisfies the requirements of § 10631 (b) and (c), and 10635 of the Water Code.

3.2. Imported Water

The City currently relies on 10,587 AFY of imported water wholesaled by Metropolitan to supplement local groundwater. Imported water represents 38% of the City's total water supply. Metropolitan's principal sources of water originate from two sources - the Colorado River via the Colorado Aqueduct and the Lake Oroville watershed in Northern California through the SWP. This water is treated at the Robert B. Diemer Filtration Plant located north of Yorba Linda and the F.E. Weymouth Treatment Plant in the city of La Verne. Typically, the Diemer Filtration Plant receives a blend of Colorado River water from Lake Mathews through the Metropolitan Lower Feeder and SWP water through the Yorba Linda Feeder. The City currently maintains six (operational) connections to the Metropolitan system along the Orange County, West Orange County, and Second Lower Feeder pipelines. The total available capacity is 48,000 gallons per minute.

3.2.1. Metropolitan's 2010 Regional Urban Water Management Plan

Metropolitan's 2010 Regional Urban Water Management Plan (RUWMP) reports on its water reliability and identifies projected supplies to meet the long-term demand within its service area. It presents Metropolitan's supply capacities from 2015 through 2035 under the three hydrologic conditions specified in the Act: single dry-year, multiple dry-years, and average year.

Colorado River Supplies

Colorado River Aqueduct supplies include supplies that would result from existing and committed programs and from implementation of the Quantification Settlement Agreement (QSA) and related agreements to transfer water from agricultural agencies to urban uses. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 MAF on an as-needed basis.

State Water Project Supplies

Metropolitan's SWP supplies have been impacted in recent years by restrictions on SWP operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008 and June 4, 2009, respectively. In dry, below-normal conditions, Metropolitan has increased the supplies received from the California Aqueduct by developing flexible Central Valley/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Banks pumping capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions.

In June 2007, Metropolitan's Board approved a Delta Action Plan that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta action plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Bay-Delta while the long-term solution is implemented.

State and federal resource agencies and various environmental and water user entities are currently engaged in the development of the Bay Delta Conservation Plan (BDCP), which is aimed at addressing the basic elements that include the Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development. In evaluating the supply capabilities for the 2010 RUWMP, Metropolitan assumed a new Delta conveyance is fully operational by 2022 that would return supply reliability similar to 2005 condition, prior to supply restrictions imposed due to the Biological Opinions.

Storage

Storage is a major component of Metropolitan's dry year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing its Water Supply Allocation Plan (WSAP), is dependent on its storage resources. In developing the supply capabilities for the 2010 RUWMP, Metropolitan assumed a simulated median storage level going into each of five-year increments based on the balances of supplies and demands.

Supply Reliability

Metropolitan evaluated supply reliability by projecting supply and demand conditions for the single- and multi-year drought cases based on conditions affecting the SWP (Metropolitan's largest and most variable supply). For this supply source, the single driest-year was 1977 and the three-year dry period was 1990-1992. Metropolitan's analyses are illustrated in Tables 3-1, 3-2, and 3-3 which correspond to Metropolitan's 2010 RUWMP's Tables 2-11, 2-9 and 2-10, respectively. These tables show that the region can provide reliable water supplies not only under normal conditions but also under both the single driest year and the multiple dry year hydrologies.

Table 3-1: Metropolitan Average Year Projected Supply Capability and Demands for 2015 to 2035

AverageYear
Supply Capability[1] and Projected Demands
Average of 1922-2004 Hydrologies
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	685,000	931,000	1,076,000	964,000	830,000
California Aqueduct[2]	1,550,000	1,629,000	1,763,000	1,733,000	1,734,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,507,000	1,529,000	1,472,000	1,432,000	1,429,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**3,485,000**	**3,810,000**	**4,089,000**	**3,947,000**	**3,814,000**
Demands					
Firm Demands of Metropolitan	1,826,000	1,660,000	1,705,000	1,769,000	1,826,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,006,000**	**1,933,000**	**1,985,000**	**2,049,000**	**2,106,000**
Surplus	**1,479,000**	**1,877,000**	**2,104,000**	**1,898,000**	**1,708,000**
Programs Under Development					
In-Region Storage and Programs	206,000	306,000	336,000	336,000	336,000
California Aqueduct	382,000	383,000	715,000	715,000	715,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**588,000**	**689,000**	**1,051,000**	**1,051,000**	**1,051,000**
Potential Surplus	**2,067,000**	**2,566,000**	**3,155,000**	**2,949,000**	**2,759,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3-2: Metropolitan Single-Dry Year Projected Supply Capability and Demands for 2015 to 2035

Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	685,000	931,000	1,076,000	964,000	830,000
California Aqueduct[2]	522,000	601,000	651,000	609,000	610,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,416,000	1,824,000	1,669,000	1,419,000	1,419,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,457,000**	**2,782,000**	**2,977,000**	**2,823,000**	**2,690,000**
Demands					
Firm Demands of Metropolitan	1,991,000	1,889,000	1,921,000	1,974,000	2,039,000
IID-SDCWA Transfers and Canal Linings	180,000	273,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,171,000**	**2,162,000**	**2,201,000**	**2,254,000**	**2,319,000**
Surplus	**286,000**	**620,000**	**776,000**	**569,000**	**371,000**
Programs Under Development					
In-Region Storage and Programs	206,000	306,000	336,000	336,000	336,000
California Aqueduct	556,000	556,000	700,000	700,000	700,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**762,000**	**862,000**	**1,036,000**	**1,036,000**	**1,036,000**
Potential Surplus	**1,048,000**	**1,482,000**	**1,812,000**	**1,605,000**	**1,407,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3-3: Metropolitan Multiple-Dry Year Projected Supply Capability and Demands for 2015 to 2035

Multiple Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1990-1992 Hydrology
(acre-feet per year)

Forecast Year	2015	2020	2025	2030	2035
Current Programs					
In-Region Storage and Programs	246,000	373,000	435,000	398,000	353,000
California Aqueduct[2]	752,000	794,000	835,000	811,000	812,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	1,318,000	1,600,000	1,417,000	1,416,000	1,416,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**2,248,000**	**2,417,000**	**2,520,000**	**2,459,000**	**2,415,000**
Demands					
Firm Demands of Metropolitan	2,056,000	1,947,000	2,003,000	2,059,000	2,119,000
IID-SDCWA Transfers and Canal Linings	180,000	241,000	280,000	280,000	280,000
Total Demands on Metropolitan[5]	**2,236,000**	**2,188,000**	**2,283,000**	**2,339,000**	**2,399,000**
Surplus	**12,000**	**229,000**	**237,000**	**120,000**	**16,000**
Programs Under Development					
In-Region Storage and Programs	162,000	280,000	314,000	336,000	336,000
California Aqueduct	242,000	273,000	419,000	419,000	419,000
Colorado River Aqueduct					
Colorado River Aqueduct Supply[3]	187,000	187,000	187,000	182,000	182,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**404,000**	**553,000**	**733,000**	**755,000**	**755,000**
Potential Surplus	**416,000**	**782,000**	**970,000**	**875,000**	**771,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes water management programs, IID-SDCWA transfers and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfers and canal linings.

[5] Firm demands are adjusted to include IID-SDCWA transfers and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

3.2.2. Fullerton's Imported Water Supply Projections

Based on Metropolitan's supply projections that it will be able to meet full service demands under all three hydrologic scenarios, the City projects that it would also be able to meet its customers' demands under these conditions.

California Water Code section 10631 (k) requires the wholesale agency to provide information to the urban retail water supplier for inclusion in its UWMP that identifies and quantifies the existing and planned sources of water available from the wholesale agency. Table 3-4 indicates the wholesaler's water availability projections by source for the next 25 years as provided to the City by Metropolitan. The water supply projections shown in Table 3-4 represent the amount of supplies projected to meet demands. They do not represent the full supply capacity.

Table 3-4: Wholesaler Identified & Quantified Existing and Planned Sources of Water (AFY)

Wholesaler Sources	Fiscal Year Ending				
	2015	2020	2025	2030	2035-opt
Metropolitan	12,276	12,495	12,410	12,389	12,461

3.3. Groundwater

Local groundwater has been the cheapest and most reliable source of supply for the City. The City relies on approximately 17,273 acre-feet of groundwater from the Basin each year. This local source of supply meets approximately 62% of the City's total annual demand.

In the effort to maximize local resources, Metropolitan has partnered with OCWD, the cities of Anaheim, Fullerton, and Santa Ana, and MWDOC and its member agencies, to encourage the development of local resources. Metropolitan's Groundwater Replenishment Program is a program where a groundwater producer may purchase imported water from Metropolitan at a reduced rate when "surplus" water is available in lieu of extracting groundwater. This program indirectly replenishes the basin by avoiding pumping.

This section provides description of the Basin and the management measures taken by OCWD the basin manager to optimize local supply and minimize overdraft. Moreover, this section provides information on historical groundwater production as well as a 25-year projection of the City's groundwater supply.

3.3.1. Lower Santa Ana River Groundwater Basin

The Basin, also known as the Orange County Groundwater Basin underlies the north half of Orange County beneath broad lowlands. The Basin covers an area of approximately

350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the southwest, and terminates at the Orange County line to the northwest, where its aquifer systems continue into the Central Basin of Los Angeles County. The aquifers comprising this Basin extend over 2,000 feet deep and form a complex series of interconnected sand and gravel deposits.

OCWD was formed in 1933 by a special legislative act of the State of California Legislature to protect and manage the County's vast, natural, underground water supply with the best available technology and to defend its water rights to the Basin. This legislation is found in the State of California Statutes, Water – Uncodified Acts, Act 5683, as amended. The Basin is managed by OCWD under the Act, which functions as a statutorily-imposed physical solution. Section 77 of the Act states that, *'nothing in this act contained shall be so construed as to affect or impair the vested right of any person, association or corporation to the use of water.*[5]

The Basin is managed by OCWD for the benefit of municipal, agricultural and private groundwater producers. The Basin meets approximately 60 to 70 percent of the water supply demand within the boundaries of OCWD. There are 19 major producers including cities, water districts, and private water companies, extracting water from the Basin serving a population of approximately 2.55 million.[6]

Groundwater levels are managed within a safe basin operating range to protect the long-term sustainability of the basin and to protect against land subsidence. In 2007, OCWD established a new methodology for calculating accumulated overdraft and establishing new full-basin benchmarks.[7] Based on OCWD's 2009 Groundwater Management Plan, the optimal accumulated overdraft is between 100,000 and 434,000 AF. At the top of the range, OCWD will be able to provide at least three years of drought supply. An accumulated overdraft condition minimizes the localized high groundwater levels and increases ability to recharge storm events from the Santa Ana River. At an accumulated overdraft of 200,000 AF, the Basin is considered 99.7 percent full. OCWD estimates that the Basin can safely be operated on a short-term emergency basis with a maximum accumulated overdraft of approximately 500,000 AF.

In an effort to eliminate long-term overdraft conditions, OCWD developed a comprehensive computer-based groundwater flow model to study and better understand the Basin's reaction to pumping and recharge. OCWD manages the Basin by establishing

[5] Orange County Water District Act, Section 77.
[6] MWDOC and Center for Demographics Research (2008)
[7] The *Report on Evaluation of Orange County Groundwater Basin Storage and Operational Strategy*, published in February 2007,

on an annual basis the appropriate level of groundwater production known as the Basin Production Percentage (BPP) as described below.

3.3.2. Basin Production Percentage

No pumping right exists for Basin. Total pumping from the basin is managed through a process that uses financial incentives to encourage groundwater producers to pump an aggregate amount of water that is sustainable without harming the Basin. The framework for the financial incentives is based on establishing the BPP which is the percentage of each Producer's total water supply that comes from groundwater pumped from the basin. Groundwater production at or below the BPP is assessed the Replenishment Assessment (RA). While there is no legal limit as to how much an agency could pump from the Basin, there is a financial disincentive to pumping above the BPP. Pumping above the BPP is also assessed a Basin Equity Assessment (BEA), which is calculated so that the cost of groundwater production is based on an average of Metropolitan's Tier 1 and Tier 2 rate.

The BPP is set uniformly for all Producers by OCWD on an annual basis. The BPP for the 2008-2009 water year (July 1, 2008 to June 30, 2009) was established at 69.0. The overall BPP achieved within OCWD for non-irrigation use in the 2008-09 water year was equal to 72.5 percent. The BPP has recently been set at 62 percent for the 2010-2011 water year. For the purpose of this UWMP, the BPP is assumed to be 62 percent for the entire 25-year planning horizon (Table 3-5).

Table 3-5: Current Basin Production Percentage

Basin Name	Basin Production Percentage
Orange County Groundwater Basin	62%
Total	**62%**

The BPP is set based on groundwater conditions, availability of imported water supplies, and Basin management objectives. The BPP is also a major factor in determining the cost of groundwater production from the Basin for that year. When Metropolitan has an abundance of water, they may choose to activate their Groundwater Replenishment Program also known as In-Lieu Program, where imported water is purchased in-lieu of pumping groundwater.

In some cases, OCWD encourages the pumping of groundwater that does not meet drinking water standards in order to protect water quality. This is achieved by using a financial incentive called the BEA Exemption. A BEA Exemption is used to encourage pumping of groundwater that does not meet drinking water standards in order to clean up and contain the spread of poor quality water. OCWD uses a partial or total exemption of

the BEA to compensate a qualified participating agency or Producer for the costs of treating poor-quality groundwater. When OCWD authorizes a BEA exemption for a project, it is obligated to provide the replenishment water for the production above the BPP and forgoes the BEA revenue that OCWD would otherwise receive from the producer.

3.3.3. Recharge Facilities

Recharging water into the basin through natural and artificial means is essential to support pumping from the basin. Active recharge of groundwater began in 1949, in response to increasing drawdown of the basin and consequently the threat of seawater intrusion. In 1949, OCWD began purchasing imported Colorado River water from Metropolitan, which was delivered to Orange County via the Santa Ana River upstream of Prado Dam. The Basin's primary source of recharge is flow from the Santa Ana River. OCWD diverts river flows into recharge basins located in and adjacent to the Santa Ana River and its main Orange County tributary, Santiago Creek. Other sources of recharge water include natural infiltration and recycled water. Today OCWD owns and operates a network of recharge facilities that cover 1,067 acres. An increase in recharge capacity of greater than 10,000 AFY occurred with the addition of the La Jolla Recharge Basin which came online in 2008. The La Jolla Recharge Basin is a 6-acre recharge basin.

One of OCWD's primary efforts has been the control of seawater intrusion into the Basin, especially via the Talbert and Alamitos seawater intrusion barriers. OCWD began addressing the Alamitos Gap intrusion by entering a partnership in 1965 with the Los Angeles County Flood Control District to operate injection wells in the Alamitos Gap. Operation of the injection wells forms a hydraulic barrier to seawater intrusion. To address seawater intrusion in the Talbert Gap, OCWD constructed Water Factory 21, a plant that treated secondary-treated water from the Orange County Sanitation District (OCSD) to produce purified water for injection. Water Factory 21 operated for approximately 30 years until it was taken off line in 2004. It was replaced by an advanced water treatment system, the Groundwater Replenishment System (GWRS).

The GWRS is a cooperative project between OCWD and OCSD that began operating in 2008. Secondary-treated wastewater from OCSD undergoes treatment consisting of microfiltration, reverse osmosis, and advanced oxidation with ultraviolet light and hydrogen peroxide. It is the largest water purification project of its kind, Phase 1 of the GWRS began operating in 2008 with a capacity of purifying 72,000 AFY of water. The GWRS provides recharge water for the Talbert Injection Barrier as well as to recharge basins in the City of Anaheim. The Expanded Talbert Injection Barrier included 8 new injection wells which operation began in 2008. The GWRS increased reliable, local water supplies available for barrier injection from 5 MGD to 30 MGD.

3.3.4. Metropolitan Groundwater Replenishment Program

OCWD, MWDOC, and Metropolitan have developed a successful and efficient groundwater replenishment program to increase storage in the Basin. The Groundwater Replenishment Program allows Metropolitan to sell groundwater replenishment water to OCWD and make direct deliveries to agency distribution systems in lieu of producing water from the groundwater basin when surplus water is available. This program indirectly replenishes the basin by avoiding pumping. In the in-lieu program, OCWD requests an agency to halt pumping from specified wells. The agency then takes replacement water through its import connections, which is purchased by OCWD from Metropolitan (through MWDOC). OCWD purchases the water at a reduced rate, and then bills the agency for the amount it would have had to pay for energy and the Replenishment Assessment (RA) if it had produced the water from its wells. The deferred local production results in water being left in local storage for future use. In 2008 and 2009, OCWD did not utilize replenishment water because such water was not available to purchase from Metropolitan.

3.3.5. Metropolitan Conjunctive Use Program

Since 2004, OCWD, MWDOC, and participating producers have participated in Metropolitan's Conjunctive Use Program (known as the Metropolitan Long-Term Groundwater Storage Program). This program allows for the storage of Metropolitan water in the Basin. The existing Metropolitan storage program provides for Metropolitan to store 66,000 AF of water in the basin in exchange for Metropolitan's contribution to improvements in basin management facilities. These improvements include eight new groundwater production wells, improvements to the seawater intrusion barrier, construction of the Diemer Bypass Pipeline. This water can be withdrawn over a three-year time period. The preferred means to store water in the Metropolitan storage account has been through the in-lieu deliveries to participating groundwater producers.

3.3.6. Historical Groundwater Production

Since its founding, OCWD has grown in size from 162,676 to 229,000 acres. Groundwater pumping from the basin has grown from approximately 150,000 AFY in the mid-1950s to over 300,000 AFY. During the water year July 2008 to June 2009, total basin production for all agencies was approximately 324,147 acre-feet (AF).[8]

Currently, the City produces its water supply from eleven active wells at 62% of the total water supply. Table 3-6 shows the City's recent groundwater production from the Basin in the past five years from 2005 to 2009. During certain seasons of 2005, 2006, and 2007, OCWD has operated the In-lieu Program with Metropolitan by purchasing water from

[8] *2008-2009 Engineer's Report on Groundwater conditions, Water Supply and Basin Utilization in the Orange County Water District,* February 2010

Metropolitan to meet demands of member agencies rather than pumping water from the groundwater basin. In 2008 and 2009, OCWD did not utilize in-lieu water because such water was not available to purchase from Metropolitan.[9]

Table 3-6: Amount of Groundwater Pumped in the Past 5 Years (AFY)

Basin Name(s)	Fiscal Year Ending				
	2005	2006	2007	2008	2009
BPP GW	13,773	13,970	16,222	22,520	21,033
Plus In-Lieu taken for OCWD	6,848	6,345	6,639	-	-
Subtotal OCW Basin GW	20,621	20,315	22,861	22,520	21,033
% of Total Water Supply	**66%**	**64%**	**69%**	**71%**	**68%**

3.3.7. Projections of Groundwater Production

The mission of the OCWD is to provide local water retailers with a reliable, adequate, high quality water supply at the lowest reasonable cost in an environmentally responsible manner. Efforts have been made to develop and secure new supplies. Also in December 2008, OCWD secured the rights to divert and use up to 362,000 AFY of Santa Ana River water through a decision of the State Water Resources Control Board. Description to other recent OCWD projects can be found in OCWD's 2009 GWMP.

Based on the annual MWDOC survey completed by each Producer in the spring of 2008, the estimated demand for groundwater in the OCWD boundary will increase from 519,000 AFY in 2015 to 558,000 AFY in 2035 representing a 7.5 percent increase over a 20 year period. OCWD's estimated total annual groundwater production for the water year 2010-2011 is 295,000 AF based on a BPP of 62 percent and includes 22,000 AF of production from water quality improvement projects.

The City owns and operates a network of groundwater wells to supply water to their customers. Table 3-7 shows the amount of groundwater projected to be pumped from the Basin in the next 25 years. The BPP is assumed to remain at 62% for the entire planning horizon.

[9] *2008-2009 Engineer's Report on Groundwater conditions, Water Supply and Basin Utilization in the Orange County Water District,* February 2010

Table 3-7: Amount of Groundwater Projected to be Pumped (AFY)

Basin Name(s)	Fiscal Year Ending					
	2010	2015	2020	2025	2030	2035-opt
BPP GW	17,273	20,029	20,386	20,248	20,213	20,331
% of Total Water Supply	**62%**	**62%**	**62%**	**62%**	**62%**	**62%**

3.3.8. TCE Blending Facilities

The City's blending treatment is conducted in accordance with an approved Operations Plan dated September 16, 1997. Wells 4, 5, 6, 7, 8 in the La Palma Well Field produces water that contains Trichloroethylene (TCE) and other volatile organic chemicals. The five wells pump into a common transmission line, which flows into a blending Forebay.

The City collects weekly samples from the effluent of the Forebay to monitor the TCE concentration in blended water. Monthly samples from wells are also taken to monitor the variations of the sources.

3.4. Supply Reliability

3.4.1. Overview

It is required that every urban water supplier assess the reliability to provide water service to its customers under normal, dry, and multiple dry water years. The City depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to insure it has adequate supplies. Development of groundwater and desalination opportunities augments the reliability of the imported water system. There are various factors that may impact reliability of supplies such as legal, environmental, water quality and climatic which are discussed below. The water supplies are projected to meet full service demands; Metropolitan's 2010 RUWMP finds that Metropolitan is able to meet with existing supplies, full service demands of its member agencies starting 2015 through 2035 during normal years, single dry year, and multiple dry years.

Metropolitan's 2010 IRP update describes the core water resource strategy that will be used to meet full service demands at the retail level under all foreseeable hydrologic conditions from 2015 through 2035. The foundation of Metropolitan's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities through its IRP preferred resource mix. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance and infrastructure improvements. The City is reliant on Metropolitan for all of its imported water. With the addition of planned

supplies under development, Metropolitan's 2010 RUWMP finds that Metropolitan will be able to meet full-service demands from 2015 through 2035, even under a repeat of the worst drought. Table 3-8 shows the reliability of the wholesaler's supply for single dry year and multiple dry year scenarios.

Table 3-8: Wholesaler Supply Reliability - % of Normal AFY

		Multiple Dry Water Years		
Wholesaler Sources	**Single Dry**	**Year 1**	**Year 2**	**Year 3**
Metropolitan	100%	100%	100%	100%

In addition to meeting full service demands from 2015 through 2035, Metropolitan projects reserve and replenishment supplies to refill system storage. Table 3-9 shows the basis of water year data used to predict drought supply availability.

Table 3-9: Basis of Water Year Data

Water Year Type	Base Year	Base Year	Base Year
Normal Water Year	Average 1922-2004		
Single-Dry Water Year	1977		
Multiple-Dry Water Years	1990	1991	1992

3.4.2. Factors Impacting Reliability

The Act requires a description of the reliability of the water supply and vulnerability to seasonal or climatic shortage. The City relies on import supplies provided by Metropolitan. The following are some of the factors identified by Metropolitan that may have an impact on the reliability of Metropolitan supplies.

Environment – Endangered species protection needs in the Sacramento-San Joaquin River Delta have resulted in operational constraints to the SWP system. The Bay-Delta's declining ecosystem caused by agricultural runoff, operation of water pumps and other factors has led to historical restrictions in SWP supply deliveries. SWP delivery restrictions due to the biological opinions resulted in the loss of about one-third of the available SWP supplies in 2008.

Legal – Listings of additional species under the Endangered Species Act and new regulatory requirements could impact SWP operations by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations. Additionally, the Quantification Settlement Agreement has been challenged in courts and may have impacts on the Imperial

Irrigation District and San Diego County Water Authority transfer. If there are negative impacts, San Diego could become more dependent on the Metropolitan supplies.

Water Quality –Water imported from the CRA contains high level of salts. The operational constraint is that this water needs to be blended with SWP supplies to meet the target salinity of 500 mg/L of total dissolved solids (TDS). Another water quality concern is related to quagga mussel. Controlling the spread and impacts of quagga mussels within the Colorado River Aqueduct require extensive maintenance and results in reduced operational flexibility.

Climate Change – Changing climate patterns are expected to shift precipitation patterns and affect water supply. Unpredictable weather patterns will make water supply planning even more challenging. The areas of concern for California include the reduction in Sierra Nevada snowpack, increased intensity and frequency of extreme weather events, and rising sea levels causing increased risk of levee failure.

Legal, environmental, and water quality issues may have impacts on Metropolitan supplies. It is felt however climatic factors would have more of an impact than the others. Climatic conditions have been projected based on historical patterns; however severe pattern changes may occur in the future. Table 3-10 shows the factors resulting in inconsistency of supply.

Table 3-10: Factors Resulting in Inconsistency of Supply

Name of Supply	Legal	Environmental	Water Quality	Climatic
State Water Project	X	X		
Colorado River			X	X

These and other factors are addressed in greater detail in Metropolitan's 2010 RUWMP.

3.4.2.1. Water Quality

Imported Water - Metropolitan is responsible for providing water of a high quality throughout its service area. The water that Metropolitan delivers is tested both for currently regulated contaminants and for additional contaminants of concern as over 300,000 water quality tests are conducted each year to regulate the safety of its waters. Metropolitan's supplies originate primarily from the CRA and from the SWP. A blend of these two sources, proportional to each year's availability of the source, is then delivered throughout Metropolitan's service area.

Metropolitan's primary sources of water, the CRA and SWP, face individual water quality issues of concern. The CRA water source contains a higher level of total

dissolved solids (TDS) and a lower level of organic material while the SWP contains a lower TDS level while its level or organic materials is much higher, lending to the formation of disinfection byproducts. To remediate the CRA's high level of salinity and the SWP's high level of organic materials, Metropolitan has been blending CRA water with SWP supplies as well as implementing updated treatment processes to decrease the disinfection byproducts. In addition, Metropolitan has been engaged in efforts to protect its Colorado River supplies from threats of uranium, perchlorate, and chromium VI while also investigating the potential water quality impact of emerging contaminants, N-nitrosodimethylamine (NDMA) and pharmaceuticals and personal care products (PPCPs). Metropolitan has assured its ability to overcome the above mentioned water quality concerns through its protection of source waters, implementation of renovated treatment processes, and blending of its two sources. While unforeseeable water quality issues could alter reliability, Metropolitan's current strategies ensure the deliverability of high quality water.

Groundwater - OCWD is responsible for managing the Basin. To maintain groundwater quality, OCWD conducts an extensive monitoring program that serves to manage the Basin's groundwater production, control groundwater contamination, and comply with all necessary laws and regulations.[10] A network of nearly 700 wells provides OCWD a source for samples, which are tested for a variety of purposes. OCWD collects 600 to 1,700 samples each month to monitor the quality of the basin's water. These samples are collected and tested according to approved federal and state procedures as well as industry-recognized quality assurance and control protocols.

OCWD recognizes the importance of maintaining the basin's high water quality. OCWD's 2009 Groundwater Management Plan Update includes a section labeled, "Water Quality Management," which discusses the water quality concerns as well as management programs that OCWD is currently involved with.

Table 3-11 shows the amount in acre-feet per year that water quality would have on supply.

Table 3-11: Water Quality – Current and Projected Water Supply Impacts (AFY)

Water Source	Fiscal Year Ending					
	2010	2015	2020	2025	2030	2035-opt
Imported	0	0	0	0	0	0
Local	0	0	0	0	0	0

[10] The information in this section is referenced from the Groundwater Management Plan 2009 Update "Groundwater Monitoring" section (pages 3-1 through 3-20) and "Water Quality Management" section (pages 5-1 through 5-30).

3.4.3. Normal-Year Reliability Comparison

The City has entitlements and/or written contracts to receive imported water from Metropolitan via the regional distribution system. Although pipeline capacity rights do not guarantee the availability of water, per se, they do guarantee the ability to convey water when it is available through Metropolitan distribution system. All imported water supplies assumed in this section are available to the City from existing water transmission facilities. Table 3-12 shows supply and demand under normal year conditions. Water supplies are projected to be available from Metropolitan; however, it is not included here since projected supplies meet projected demands.

Table 3-12: Projected Normal Water Supply and Demand (AFY)

	Fiscal Year Ending				
	2015	2020	2025	2030	2035
Total Demand	**32,305**	**32,881**	**32,658**	**32,602**	**32,792**
BPP GW	20,029	20,386	20,248	20,213	20,331
Imported	12,276	12,495	12,410	12,389	12,461
Total Supply	32,305	32,881	32,658	32,602	32,792

3.4.4. Single Dry-Year Reliability Comparison

The City has documented that it is 100% reliable for single dry year demands from 2015 through 2035 with a demand increase of 5.7% using FY 2001-02 as the single dry year. Table 3-13 compiles supply and demand projections for a single dry water year. The available imported supply is greater than shown; however, it is not included because all demands are met.

Table 3-13: Projected Single-Dry Year Water Supply and Demand (AFY)

	Fiscal Year Ending				
	2015	2020	2025	2030	2035
Total Demand	**34,146**	**34,755**	**34,520**	**34,460**	**34,661**
BPP GW	21,171	21,548	21,402	21,365	21,490
Imported	12,976	13,207	13,117	13,095	13,171
Total Supply	34,146	34,755	34,520	34,460	34,661

3.4.5. Multiple Dry-Year Reliability Comparison

The City is capable of providing their customers all their demands with significant reserves in multiple dry years from 2015 through 2035 with a demand increase of 5.7% using FY 2001-02 as the multiple dry years. This is true even if the demand projections were to be increased by a large margin. Table 3-14 shows supply and demand projections under multiple dry year conditions.

Table 3-14: Projected Multiple Dry Year Period Supply and Demand (AFY)

		Fiscal Year Ending				
		2015	**2020**	**2025**	**2030**	**2035**
First Year Supply	**Total Demand**	**34,146**	**34,755**	**34,520**	**34,460**	**34,661**
	BPP GW	21,171	21,548	21,402	21,365	21,490
	Imported	12,976	13,207	13,117	13,095	13,171
	Total Supply	34,146	34,755	34,520	34,460	34,661
Second Year Supply	**Total Demand**	**34,146**	**34,755**	**34,520**	**34,460**	**34,661**
	BPP GW	21,171	21,548	21,402	21,365	21,490
	Imported	12,976	13,207	13,117	13,095	13,171
	Total Supply	34,146	34,755	34,520	34,460	34,661
Third Year Supply	**Total Demand**	**34,146**	**34,755**	**34,520**	**34,460**	**34,661**
	BPP GW	21,171	21,548	21,402	21,365	21,490
	Imported	12,976	13,207	13,117	13,095	13,171
	Total Supply	34,146	34,755	34,520	34,460	34,661

4. Demand Management Measures

4.1. Overview

Water conservation, often called demand-side management, can be defined as practices, techniques, and technologies that improve the efficiency of water use. Such practices are referred to as demand management measures (DMM). Increased efficiency expands the use of the water resources, freeing up water supplies for other uses, such as population growth, new industry, and environmental conservation.

The increasing efforts in water conservation are spurred by a number of factors: growing competition for limited supplies, increasing costs and difficulties in developing new supplies, optimization of existing facilities, delay of capital investments in capacity expansion, and growing public support for the conservation of limited natural resources and adequate water supplies to preserve environmental integrity.

The City recognizes the importance of water conservation and has made water use efficiency an integral part of water use planning. The City has been a signatory to the California Urban Water Conservation Council's (CUWCC) Best Management Practices (BMPs) Memorandum of Understanding (MOU) since January 1996. Demand Management Measures as defined by the California Water Code corresponds to the CUWCC's BMPs. The City is currently implementing all 14 DMMs described in the BMPs.

This section of the UWMP satisfies the requirements of § 10631 (f) & (j). It describes how each DMM is being implemented by the City and how the City evaluates the effectiveness of the DMMs implemented. This section also provides an estimate of existing conservation savings where information is available.

4.2. Water Use Efficiency Programs

As Signatory to the CUWCC MOU, the City has committed to using good-faith efforts to implement the 14 cost-effective BMPs. The City is actively participating in many water use efficiency activities. An Emergency Water Conservation Plan was adopted by the City Council in 1991 (Ordinance No. 2752) and subsequently the Water Supply Shortage Conservation Plan in 2008 (Ordinance No. 3118).

Moreover, the City actively participates in various Metropolitan residential and CII rebate programs, as well as school and public education and outreach programs, and other programs administered by MWDOC, the regional wholesaler. MWDOC implements

many of the urban water conservation BMPs on behalf of its member agencies as well as the cities of Anaheim, Fullerton, and Santa Ana. MWDOC's 2010 RUWMP should be referred to for a detailed discussion of each regional BMP program. MWDOC's current Water Use Efficiency Program, detailed in their 2010 RUWMP, following three basic focuses:

1. Regional Program Development – MWDOC develops, obtains funding for, and implements regional BMP programs on behalf of all retail water agencies in Orange County as well as the cities of Anaheim, Fullerton, and Santa Ana.
2. Local Program Assistance - MWDOC assists retail agencies to develop and implement local programs within their individual service areas.
3. Research and Evaluation – MWDOC conducts research programs which allow an agency to measure the water savings benefits of a specific program and then compare those benefits to the costs of implementing the program in order to evaluate the economic feasibility of the program.

At the local level, the City develops and manages DMM programs for the Fullerton community. Table 4-1 provides an overview of the City's DMM program status.

Table 4-1: Urban Supplier's Demand Management Measures Overview

Demand Management Measure (DMM)	DMM Status		
	Past	Current	Future
Residential Water Surveys		X	
Residential Plumbing Retrofits		X	
System Water Audits, Leak Detection and Repair		X	
Metering with Commodity Rates		X	
Large Landscape Conservation Programs		X	
High-Efficiency Washing Machine Rebates		X	
Public Information Programs		X	
School Education Programs		X	
Commercial, Industrial and Institutional Programs		X	
Wholesale Agency Assistance		N/A	
Conservation Pricing		X	
Conservation Coordinator		X	
Water Waste Prohibition		X	
Residential ULFT Replacement Programs	X		

4.2.1. DMM 1: Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Residential Survey Program - MWDOC implemented single-family residential survey program in Orange County including for the City of Fullerton. As reported in the City's 2007-2008 CUWCC BMP Coverage Report, a total of 20 surveys were completed between 1999 and 2008 representing 0.08% of single-family residential accounts in the base year (1997). As a benchmark, the number of housing units in the City's service area in the base year was 23,649 and 1,940 for single and multi-family units, respectively.

The City has phased out the formal survey program and currently conducts residential survey on an as-needed basis. When a high bill complaint is received, staff is sent out to conduct an audit. The City also participates in regional landscape programs aimed at helping residential and small commercial customers to be more water efficient through MWDOC. A thorough site inspection that includes a landscape survey is conducted as part of the Smart Timer and Rotating Nozzle Rebate Programs. Details of these residential landscape water use efficiency programs are provided below.

Smart Timer Rebate Program - The Smart Timer Rebate Program started in FY 2004/05. Under this regional program, residential and small commercial properties are eligible for a rebate when they purchase and install a weather-based irrigation controller which has the potential to save 41 gallons per day per residence and reduce runoff and pollution by 49%. Once residents are enrolled in the rebate program, a detailed residential outdoor water survey is conducted to inspect the irrigation system, distribution uniformity, and irrigated area. Water savings from the program can be estimated from information obtained from the water surveys pre- and post-installation of the Smart Timer. As of FY 2010-11, 29 rebates have been given out to residential customers and 41 rebates to small commercial customers within the City's service area which translate to a water savings of 55 acre-feet. The City will continue to provide on-site meetings, literature and incentives related to this program. As part of the MWDOC Grant for the SmarTimers a site audit and inspection is required and provided by contract through MWDOC.

Rotating Nozzle Rebate Program – This rebate program started in 2007 and is offered to both residential and commercial customers. Through this program, site owners will purchase and install rotary nozzles in existing irrigation systems. Following the submittal of a rebate application, water bill, and original purchase receipt, MWDOC will direct a third party installation verification contractor to perform installation verifications on up to 100% of the sites that installed devices. As of FY 2010-11 the total rotating nozzle program participation includes 64 residential and 976 small and 1,484 large commercial customers representing 113 acre-feet of savings, collectively, since the beginning of the program.

Synthetic Turf Rebate Program – Through this program, residential and small commercial customers of participating retail water agencies are eligible to receive rebate money for qualifying synthetic turf projects. To date 16,920 sq. ft. of synthetic turf have been installed on residential properties and another 876 sq. ft. on commercial properties translating to a combined savings 7.38 acre-feet since the beginning of the program.

California Friendly Landscape Training (Residential) **-** The California Friendly Landscape Training provides education to residential homeowners and professional landscape contractors on a variety of landscape water efficiency practices they can employ. These classes are hosted by Metropolitan and/or the retail agencies to encourage participation across the county. The residential training program consists of either a half-day Mini Class or individual, topic-specific, four-hour classes.

4.2.2. DMM 2: Residential Plumbing Retrofit

The City participated in Metropolitan's showerhead distribution program which began in 1991. To determine whether the 75% saturation requirement was achieved within Orange County, the *Orange County Saturation Study* was conducted by MWDOC and Metropolitan in 2001. Data was obtained through telephone surveys and on-site inspections. Using the saturation findings of the study, MWDOC estimates that today low flow showerhead saturation is at nearly 100% for single-family homes and at 94% for multi-family homes. As a result, the City does not have plans for any future showerhead distributions.

Additionally, the City previously enforced the plumbing code requirement of ultra-low-flush toilets (ULFTs) in all new construction. A total of 16,321 ULFTs were distributed under this program to single-family and multi-family homes representing a cumulative water savings of 6,354 acre-feet. The ULFT program ended in 2009 and was replaced by the high efficiency toilets (HETs) rebate program. HETs are toilets which use 1.28 gallons per flush or less. The ULFT and HET rebate programs are discussed in more detail under DMM 14 in Section 4.2.14.

As a benchmark, the numbers of the City's pre-1992 single-family and multi-family accounts were 23,000 and 1,920, respectively.

4.2.3. DMM 3: System Water Audits, Leak Detection and Repair

In 1985, the City completed a detailed water audit of its water distribution system and a leak detection survey of 25% of its distribution system. An audit measures the water into the water distribution system and the water delivered to users. It is a tool to quantify unaccounted (unbilled) water losses and evaluate the effectiveness of measures to reduce those losses. These programs were developed through DWR, which provided partial funding. A leak detection consultant conducted an electronic survey of the City's old

downtown service area where most of the older mains are located. No main line leaks were found.

The City's annual prescreening audit between 1999 and 2008 determined that over 91.7% of total supply into the system (imported water and groundwater) is typically captured in sales. According to MWDOC's 2009 Water Rate Survey, 96% of the City's total supplies are captured in sales. A full audit is not required when the prescreening audit result is equal to or greater than 90%. The City has met the CUWCC BMP coverage requirement for this BMP.

The City's water loss averaged 5.5% for the past five years. The City will continue to monitor annual water losses; however, it does not appear a distribution system water audit would be cost effective based on the low percentage of unaccounted water losses.

The City has not developed a formal methodology to estimate the water savings attributable to this DMM. There are, however, real water savings as a result of the proactive pre-screening leak detections and repair program which maintains an acceptable non-revenue water of 5.5%.

4.2.4. DMM 4: Metering with Commodity Rates

All water service connections supplied by the City are fully metered and customers are billed by volume of water used.

The City's on-going large water meter upgrade program and the aggressive testing of these meters has been the single most important factor in reducing unaccounted water losses to below 5%. The City replaces 1½" and smaller meters every 15 years. Other size meters are tested according to the City's current meter testing schedule is provided in Table 4-2.

Table 4-2: City of Fullerton's Meter Testing Schedule

Meter Size	Testing Frequency
2"	3 years
3"	1 year
4"	1 year
6"	6 months
8"	6 months
10"	6 months

Until approximately fifteen years ago, a single meter generally served all customer demands, except fire. Since that time, many of the large multi-residential, commercial,

and industrial customers have had separate meters installed for landscaping purposes. In recent years, the City is becoming more aware of the potential benefits of separate landscape meters. Separate landscape metering can measure the effectiveness of landscape water conservation efforts and be utilized for future drought allocation purposes. However, the City has not developed a formal methodology to estimate the water savings attributable to this DMM. Therefore, at this time, there is no formal evaluation to determine the efficacy of this DMM.

4.2.5. DMM 5: Large Landscape Conservation Programs and Incentives

The City adopted a new Landscape Ordinance in January 2010 in accordance with AB 1881. The new provisions add Chapter 15.50 to create a comprehensive Landscape Ordinance with all requirements in one location; revise Title 15 chapters pertaining to individual zoning classifications to include threshold for when Chapter 15.50 applies; adds definitions to Chapter 15.04 to clarify terminology utilized in the Landscape Ordinance; and replace the existing Section 15.56.140 with requirements for synthetic turf.

The City collaborates with Metropolitan and MWDOC on several large landscape water use efficiency programs. Many of Metropolitan and MWDOC's landscape water use efficiency programs target both residential and commercial customers as described under DMM 1. Programs which specifically assist large landscape customers are summarized below:

Save Water Save A Buck Rebate Program – As a member agency of Metropolitan, the City takes part in the Save Water Save a Buck Rebate Program which offers financial incentives to CII customers who purchase approved weather-based irrigation controllers (smart timers), Central Computer Irrigation Controller, rotating nozzles for pop-up spray head retrofits, and large rotary nozzles.

Water savings achieved through this program is tracked by MWDOC. As of FY 2010-11 the total rotating nozzle program participation includes 589 small residential, 64 small commercial, and 1,484 large commercial customers representing 112 acre-feet of savings, collectively. A total of 41 smart timers rebates to have been given out commercial customers and 31 smart timer rebates to residential customers translating to 55 acre-feet of savings, collectively.

California Friendly Landscape Training (Professional) – The California Friendly Landscape Training provides education to residential homeowners and professional landscape contractors on a variety of landscape water efficiency practices they can employ. These classes are hosted by MWDOC and/or the member agencies to encourage participation across the county. The Professional Training Program course consists of four consecutive classes in landscape water management, each building upon principles

presented in the preceding class. Each participant receives a bound handbook containing educational materials for each class. These classes are offered throughout the year and taught in both English and Spanish languages.

In addition to regional incentive program participation, the City takes advantage of regional and local efforts which target and market to large landscape properties including bill inserts, direct marketing efforts, ads in various publications, educational seminars/symposiums for property owners, and presentations at homeowners association (HOA) board meetings. The City also performs large landscape audits on an as-needed basis. To date, one large landscape audit has been performed.

4.2.6. DMM 6: High-Efficiency Washing Machine Rebate Programs

The City participates in the SoCal Water Smart residential rebate program offered by Metropolitan. This program offers financial incentives to single-family and multifamily residential customers through the form of a rebate. Orange County residents were eligible to receive an $85 rebate when they purchase of a new High Efficiency Clothes Washer (HECW). This program began in 2001 and sponsored by Metropolitan. Rebates are available on a first-come, first-served basis, while funds last. Participants must be willing to allow an inspection of the installed machine for verification of program compliance. To qualify for a rebate, the must have a water factor of 4.0 or less. Depending on use, these machines can save 10,000 gallons of water per year Participants are encouraged to contact their local gas and/or electric utility as additional rebates may be available. As of FY 2010-11, Metropolitan has given out 2,452 high-efficiency washing machine rebates to Fullerton's customers. This equates to a water savings of 279 acre-feet. The City has met the coverage requirements for this BMP.

4.2.7. DMM 7: Public Information Programs

Most of the City's public information programs are ongoing programs and will be continued at the present level or expanded. The main goal is to help the public understand current issues and the challenges, opportunities and costs involved in securing a reliable supply of high quality water.

City of Fullerton's Local Public Information Programs

The City distributes conservation literature at City Hall and a number of other public venues. Monthly bill inserts and messages on water bills furnish customers tips and information on the efficient use of water. The City's Water Service website provides information on the City's water conservation programs and links to Metropolitan's rebate programs. The website also provides water conservation related news, water saving tips as well as helpful information to customers who suspect water leaks and other problems. The City's Water Service website can be found at http://www.ci.fullerton.ca.us/depts/admin_serv/water_service/default.asp.

The City has participated with the Fullerton Arboretum and Metropolitan to provide landscape irrigation classes that promote efficient use of irrigation systems. Currently, the Arboretum offers a class on California Native Landscaping twice per year.

MWDOC's Regional Public Information Programs

MWDOC currently offer a wide range of public information programs in Orange County in collaboration with its member agencies as well as the cities of Anaheim, Fullerton, and Santa Ana. Current regional public information programs within the MWDOC's service area are summarized below.

Water Facility Inspection Trip Program **-** The inspection trip program is sponsored by MWDOC and Metropolitan. Each year, Orange County elected officials, residents, business owners, and community leaders are invited to attend educational inspection trips to tour key water facilities throughout the state of California. The goal is to educate members of our community about planning, procurement and management of southern California's water supply and the issues surrounding delivery and management of this vital resource.

O.C. Water Hero Program - The goal of this program is to engage children in water use efficiency activities while facilitating discussion with friends and family members about how to save water. Any Orange County child can become a Water Hero by pledging to save 20 gallons of water per day. In exchange for their pledge, they receive a free Water Hero kit, which includes a variety of fun, water-saving items like a 5-minute shower timer and "fix-it" ticket pad for busting water wasters. To become a Superhero, a student must get their parents to also pledge to save 20 gallons of water per day. To date, more than 13,000 children in Orange County have become Water Heroes and more than 4,000 have become Superheroes.

eCurrents **-** This monthly electronic newsletter is designed to keep Orange county water agencies, residents and businesses, stakeholder groups, opinion leaders, and others apprised of MWDOC news, programs, events, and activities. The publication also serves to keep readers informed about regional, state, and federal issues affecting water supply, water management, water quality, and water policy and regulation.

Water Advisory Committee of Orange County (WACO) **-** WACO was formed in 1983 to facilitate the introduction, discussion, and debate of current and emerging water issues among Orange County policymakers and water professionals. The committee's membership has evolved to include elected officials and management staff from Orange County cities and water districts, engineers, attorneys, consultants, and other industry professionals. Monthly meetings are open to the public and are typically held on the first Friday of each month at 7:30 a.m. at MWDOC.

4.2.8. DMM 8: School Education Programs

Water Education School Program **-** One of the most successful and well-recognized water education curriculums in Southern California is MWDOC's Water Education School Program. For more than 30 years, School Program mascot "Ricki the Rambunctious Raindrop" has been educating students in grades K-5 about the water cycle, the importance and value of water, and the personal responsibility we all have as environmental stewards.

The School Program features assembly-style presentations that are grade-specific and performed on-site at the schools. The program curriculum is aligned with the science content standards established by the State of California. Since its inception in 1973, nearly three million Orange County students have been educated through the School Program. The City contracts with MWDOC to provide a school education program within the City's service area. The school program began in Fullerton on January 1, 1989.

In 2004, MWDOC formed an exciting partnership with Discovery Science Center that has allowed both organizations to reach more Orange County students each year and provide them with even greater educational experiences in the areas of water and science. Discovery Science Center currently serves as the School Program administrator, handling all of the program marketing, bookings, and program implementation. During the 2010-11 school year, more than 70,000 Orange County students will be educated through the program.

Water Education Poster & Slogan Contest - Each year, MWDOC holds a Water Education Poster and Slogan Contest to increase water awareness. To participate, children in grades K-6 develop posters and slogans that reflect a water awareness message. The goal is to get children thinking about how they can use water wisely and to facilitate discussion about water between children and their friend, parents, and teachers. Each year, more than 1,500 poster and slogan entries are received through the contest.

During a special judging event, approximately 16 posters and 10 slogans are selected as the winners. All of the winners – and their parents, teachers, and principals – are invited to attend a special awards ceremony with Ricki Raindrop at Discovery Science Center. At the awards ceremony, the winners are presented with their framed artwork as well as a custom t-shirt featuring their poster or slogan, a trophy, a certificate, and other fun water-saving prizes. Fullerton students consistently win top honors in the poster and slogan contest and these students and their teachers are recognized by the City Council.

Orange County Children's Water Education Festival **-** The largest water education festival of its kind is the annual Children's Water Education Festival (Festival). The Festival is presented by OCWD, the National Water Research Institute, Disneyland Resort, and MWDOC. Each year, more than 5,000 Orange County students participate in

the Festival over the course of this two-day event. The Festival is currently held at the Richard Nixon Library and Birthplace in Yorba Linda, California.

The Festival presents a unique opportunity to educate students in grades four through six about local water issues and help them understand how they can protect our water resources and the environment. Students attend the Festival with their teacher and classmates, visiting a variety of booths focused on different water-related topics throughout the day. Participating organizations (presenters) engage the students through interactive educational presentations that are aligned with the science content standards established by the State of California.

4.2.9. DMM 9: Conservation Programs for Commercial, Industrial and Institutional Accounts

The City has met the CUWCC BMP requirement for ranking consumption by CII accounts. While, the City has not conducted surveys, it continues to assess the cost effectiveness of CII surveys.

The City offers financial incentives through Metropolitan's Save Water Save A Buck Rebate Program which offers rebates for various water efficient devices to CII customers. The City also participates in MWDOC's Water Smart Hotel Program as described below.

Save Water Save a Buck – This program began in 2002 and offers rebates to assist commercial, industrial, and institutional customers in replacing high-flow plumbing fixtures with low-flow fixtures. Facilities where low-flow devices are installed must be located in Orange County. Rebates are available only on those devices listed in Table 4-3 below and must replace higher water use devices. Installation of devices is the responsibility of each participant. Participants may purchase and install as many of the water saving devices as is applicable to their site.

Table 4-3: Retrofit Devices and Rebate Amounts Available Under Save Water Save a Buck Program

Retrofit Device	Rebate Amount
High Efficiency Toilet	$50
Ultra-Low-Water or Zero Water Urinal	$200
Connectionless Food Steamers	$485 per compartment
Air-Cooled Ice Machines (Tier III)	$300
Cooling Tower Conductivity Controller	$625
pH / Conductivity Controller	$1,750
Dry Vacuum Pumps	$125 per HP
Water Pressurized Broom	$110

As of FY 2010/11, the City's CII customers have installed a total 1,406 water-saving fixtures representing a water savings of 736 acre-feet. The City will continue to educate CII customers to meet the DMM requirements.

Water Smart Hotel Program – In 2008 and 2009, MWDOC received grants from DWR and the US Bureau of Reclamation to conduct the Water Smart Hotel Program, a program designed to provide Orange County hotels and motels with commercial and landscape water saving surveys, incentives for retrofits and customer follow-up and support. The goal of the program is to implement water use efficiency changes in hotels to achieve an anticipated water savings of 7,078 acre feet over 10 years.

The Program is offered to hotels in MWDOC's service area as identified by retail water agencies. It is anticipated that detailed survey of the indoor and outdoor water using aspects of up to 105 participating hotels will be performed. Participating hotels will receive survey reports that recommend indoor and outdoor retrofits, upgrades, and other changes that should, based on the survey, result in significant water savings. Quantities of each device and associated fixture and installation costs, water savings and payback information (based on rebate amount Incentives offered through the Save Water Save A Buck Rebate Program will be augmented using DWR and USBR Water Use Efficiency grant funds to bridge the gap between existing incentives and the actual costs of Hotel Water Survey recommendations. To date, over 24 surveys have been performed county-wide, and over 9,500 water-saving devices have been installed through the program. These devices are saving 351 acre feet per year or 3,510 acre feet over the ten year device life.

4.2.10. DMM 10: Wholesale Agency Programs

Since the City is a retail agency this section does not apply. The City purchases a portion of its water supply from Metropolitan, the largest wholesale water agency in Southern California. Therefore, Metropolitan is responsible for the implementation and reporting requirements of this BMP.

4.2.11. DMM 11: Conservation Pricing

The City has employed both conserving water and sewer rate structures and has met the CUWCC BMP coverage requirements for this BMP. The City's implementation program under this BMP is described below.

The City is currently conducting a water rate study. It is expected to be completed in July 2011. The City's water rate structure is evaluated for its ability to provide adequate, stable revenues; promote equity among customer classes; facilitate implementation and administration; and encourage water conservation. Water rate schedules consist of two component charges: the customer charge, which varies by the size of the meter; and the water commodity charge, which depends on the actual consumption of water.

The current water rate structure was put in place in May 2005 which evolved from the three-block ascending rate structure, the City first approved in January 1996. After experiencing a shortfall in revenue as a result of the low customer charge and higher commodity charge rate structure during high rainfall/low demand year coming out of the early 1990s drought, the City adopted a three-block ascending tiered rate structure over the uniform rate structure it was using. The three-block, ascending tiered rate structure meets the City's goal of a schedule of water rates that provides for equitable cost recovery for customers while also promoting conservation of water by the use of pricing signals. This tiered rate structure applies only to single-family and multi-family residential class customers with all other classes remaining on a uniform one-block rate structure. This action has had an effect on water demands, as 68% of total water sales are from the residential sector. In May of 2000, the City Council approved a new rate structure for landscape accommodation. It is applicable to single-family and multi-family customers for landscape purposes.

As the City is unable to serve reclaimed water in its service area, it has no reclaimed water rate. Reasons for the inability to serve reclaimed water are described in Section 4.

4.2.12. DMM 12: Water Conservation Coordinator

The City has assigned staff with the responsibilities to handle water conservation programs. During the droughts these responsibilities were increased, and extra staff was provided. Presently, the City has a designated water conservation coordinator responsible for managing and implementing the City's Water Use Efficiency BMPs. This involves

coordinating and working closely with DWR, MWDOC, Metropolitan, OCWD, and CUWCC.

4.2.13. DMM 13: Water Waste Prohibition

City Ordinance 3118 Fullerton Municipal Code Section 12.04.090 prohibits water wasting. The City's adopted Water Supply Shortage Conservation Plan (Ordinance No. 3118) as described in Section 5 deals effectively with the wasting of water. The City also reviews new construction and tenant improvement plans for potential water efficiency.

In accordance with Ordinance 3118, the following uses of water are prohibited at all times:

1. Permitting the excess use or loss of water through breaks, leaks, or other malfunctions in the water user's plumbing or distribution system for any period of time after such loss of water should have reasonably been discovered and corrected;
2. No water runoff from landscaped areas into adjoining streets, sidewalks, or other paved areas due to incorrectly-directed or incorrectly-maintained sprinklers or excessive watering shall be allowed;
3. No water shall be used to clean, fill, or maintain levels in decorative fountains, or other similar aesthetic structures, unless such water is part of a recycling system;
4. Washing of motor vehicles, trailers, boats, and other types of mobile equipment shall be done only with a hand-held water container or a hose equipped with a positive shut-off nozzle for quick rinses, except for washing done at the immediate premises of a commercial car wash or with reclaimed water;
5. Installation of single pass cooling systems in buildings requesting new water connections; and
6. Installation of non-recirculating systems in new conveyor car wash systems and new commercial laundry systems.

Ordinance 3118 is provided in Appendix D. The City has met the CUWCC BMP coverage requirements for this BMP. However, the City has not conducted an evaluation of the water savings attributable to this BMP.

4.2.14. DMM 14: Residential Ultra-Low-Flush Toilet Replacement Programs

Over the past 19 years, the City has continuously participated in MWDOC's regional ULFT Rebate and Distribution Program targeting single- and multi-family homes in Orange County. Since the end of distribution program in 2004, MWDOC's program has focused solely on providing rebate incentives for retrofitting non-efficient devices with either ULFTs or HETS. The ULFT portion of this program concluded in June 2009, and over 363,926 ULFTs were replaced in single family and multi-family homes, with an overall program to date savings of approximately 138,457 acre feet of water. The HET

rebate program, which concluded in 2010, has incentivized over 26,817 devices, with an overall program to date savings of approximately 3,419 acre-feet.

To date 16,321 ULFTs and 401 HETs have been installed in the City representing a combined water savings of 6,402 acre-feet within the City's service area. The City has met the CUWCC BMP coverage requirements for this DMM.

5. Water Supplies Contingency Plan

5.1. Overview

Recent water supply challenges throughout the American Southwest and the State of California have resulted in the development of a number of policy actions that water agencies would implement in the event of a water shortage. In southern California, the development of such policies has occurred at both the wholesale and retail level. This section describes how new and existing policies that Metropolitan, MWDOC and the City have in place to respond to water supply shortages, including a catastrophic interruption and up to a 50 percent reduction in water supply.

5.2. Shortage Actions

Metropolitan

As an importer of water from multiple sources, including both the Colorado River and Sierra Nevada, a number of water supply challenges have impacted the reliability of Metropolitan's imported supplies. In response to these challenges, Metropolitan has implemented existing policies as well as developed new ones.

The first action that Metropolitan implements in the event of a water shortage is the suspension and/or reduction of its interruptible supplies, which are supplies sold at a discount in return for the buyers agreeing to be the first to be cutback in the event of a shortage. Metropolitan currently has two interruptible programs for agricultural users and groundwater replenishment, under which supplies were either suspended or reduced in 2007.

In addition, in preparation for the possibility of being unable to the meet "firm demands" (non-interruptible supplies) of its member agencies, in February 2008, the Metropolitan's Board of Directors (Board) adopted the WSAP, which was subsequently updated in June 2009.

Metropolitan's plan includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering an allocation. Metropolitan's WSAP is the foundation for the urban water shortage contingency analysis required under Water Code Section 10632 and is part of Metropolitan's 2010 RUWMP.

Metropolitan's WSAP was developed in consideration of the principles and guidelines described in Metropolitan's 1999 Water Surplus and Drought Management Plan

(WSDM), with the objective of creating an equitable needs-based allocation. The plan's formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of Metropolitan supplies of up to 50 percent. The formula takes into account: impact on retail customers and the economy; growth and population; changes in supply conditions; investments in local resources; demand hardening aspects of non-potable recycled water use; implementation of conservation savings program; participation in Metropolitan's interruptible programs; and investments in facilities.

The formula is calculated in three steps: based period calculations, allocation year calculations, and supply allocation calculations. The first two steps involve standard computations, while the third section contains specific methodology developed for the WSAP.

Step 1: Base Period Calculations – The first step in calculating a water supply allocation is to estimate water supply and demand using a historical based period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the three most recent non-shortage years, 2004-2006.

Step 2: Allocation Year Calculations – The next step in calculating the water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population or economic growth and changes in local supplies.

Step 3: Supply Allocation Calculations – The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2. Each element and its application in the allocation formula are discussed in detail in Metropolitan's WSAP.

In order to implement the WSAP, the Metropolitan Board makes a determination on the level of the regional shortage, based on specific criteria, in April each year. If it is determined allocations are necessary, they go into effect in July for that year and remain for a 12-month period, although the schedule is at the discretion of Metropolitan's Board.

Metropolitan's 2010 RUWMP forecasts that Metropolitan will be able to meet projected firm demands throughout the forecast period from 2015 to 2035. However, these projections do not mean that Metropolitan would not implement its WSAP during this period.

City of Fullerton

The City's Water Supply Shortage Conservation Plan (WSSCP) was established to provide procedures, rules and regulations for mandatory conservation to minimize the effect of a water supply shortage emergency on the City's water customers. The City Council will vote to implement the WSSCP if it finds and determines one or more of the following: a shortage could exist due to increased demand or limited supplies; storage or distribution facilities of the City become inadequate; a major local or regional supplier experiences a major failure or contamination; or the City's wholesale water providers call for an allocation of water supply combined with a penalty rate and/or extraordinary water conservation measures. When a water shortage appears imminent, the City Manager shall notify the City Council and recommend holding a public hearing to determine whether a shortage exists and determine the appropriate phase of the water supply shortage. The measures that the Council has set are sufficient to meet the necessary reductions with up to a 50% reduction. The four shortage phases and supply conditions are detailed in Table 5-1.

Table 5-1: Water Supply Shortage Stages and Conditions – Rationing Stages

Stage No.	Water Supply Conditions	% Shortage
Phase I Water Supply Shortage	Increased demand or limited supply; distribution or storage facilities of the City become inadequate; a major failure or contamination of the supply, shortage, storage and/or distribution facilities of Metropolitan, OCWD, and/or the City occurs; and/or the City's whole sale water providers, Metropolitan and OCWD, call for an allocation of water supply combined with an allocation penalty rate and/or other extraordinary water conservation measures.	10%
Phase II Water Supply Shortage		15%
Phase III Water Supply Shortage		20%
Phase IV Water Shortage Emergency		20% +

5.3. Three-Year Minimum Water Supply

As a matter of practice, Metropolitan does not provide annual estimates of the minimum supplies available to its member agencies. As such, Metropolitan member agencies must develop their own estimates for the purposes of meeting the requirements of the Act.

Section 135 of the Metropolitan Act declares that a member agency has the right to invoke its "preferential right" to water, which grants each member agency a preferential right to purchase a percentage of Metropolitan's available supplies based on specified, cumulative financial contributions to Metropolitan. Each year, Metropolitan calculates

and distributes each member agency's percentage of preferential rights. However, since Metropolitan's creation in 1927, no member agency has ever invoked these rights as a means of acquiring limited supplies from Metropolitan.

As an alternative to preferential rights, Metropolitan adopted the Water Shortage Allocation Plan (WSAP) in February 2008. Under the WSAP, member agencies are allowed to purchase a specified level of supplies without the imposition of penalty rates. The WSAP uses a combination of estimated total retail demands and historical local supply production within the member agency service area to estimate the firm demands on Metropolitan from each member agency in a given year. Based on a number of factors, including storage and supply conditions, Metropolitan then determines whether it has the ability to meet these firm demands or will need to allocate its limited supplies among its member agencies. Thus, implicit in Metropolitan's decision not to implement an allocation of its supplies is that at a minimum Metropolitan will be able to meet the firm demands identified for each of the member agencies.

In order to estimate the minimum available supplies from Metropolitan for the period 2011-2013, an analysis was performed to assess the likelihood that Metropolitan would re-implement mandatory water use restrictions in the event of a 1990-92 hydrologic conditions over this period. Specific water management actions during times of water shortage are governed by Metropolitan's Water Shortage and Drought Management Plan (WSDM Plan). Adopted by the Metropolitan Board in 1999, the WSDM Plan provides a general framework for potential storage actions during shortages, but recognizes that storage withdrawals are not isolated actions but part of a set of resource management actions along with water transfers and conservation. As such, there is no specific criterion for which water management actions are to be taken at specific levels of storage. The implementation of mandatory restrictions is solely at the discretion of the Metropolitan Board and there are no set criteria that require the Board to implement restrictions. Given these conditions, the analysis relies upon a review of recent water operations and transactions that Metropolitan has implemented during recent drought.

The first step in the analysis was a review of projected SWP allocations to Metropolitan, based on historical hydrologies. As with the recent drought, potential impacts to SWP supplies from further drought and the recently implemented biological opinions are anticipated to be the biggest challenges facing Metropolitan in the coming three years.

A review of projected SWP allocations from the DWR's State Water Project Delivery Reliability Report 2009 (2009 SWP Reliability Report) was made to estimate a range of conservative supply assumptions regarding the availability of SWP supplies. The 2009 SWP Reliability Report provides estimates of the current (2009) and future (2029) SWP delivery reliability and incorporates regulatory requirements for SWP and CVP

operations in accordance with USFWS and NMFS biological opinions. Estimates of future reliability also reflect potential impacts of climate change and sea level rise.

The analysis assumes a maximum SWP allocation available to Metropolitan of 2,011,500 AF and a Metropolitan storage level of 1,700,000 AF at 2010 year-end. The analysis also assumes a stable water supply from the Colorado River in the amount of 1,108,000 AF through 2015. Although the Colorado River watershed has also experienced drought in recent years, Metropolitan has implemented a number of supply programs that should ensure that supplies from this source are relatively steady for the next three years. Based on estimated "firm" demands on Metropolitan of 2.12 MAF, the annual surplus or deficit was calculated for each year of the three-year period, as shown in Table 5-2.

A review of recent Metropolitan water management actions under shortage conditions was then undertaken to estimate the level of storage withdrawals and water transfers that Metropolitan may exercise under the 1990-92 hydrologic conditions were identified. For this analysis, it was assumed that, if Metropolitan storage levels were greater than 2 MAF at the beginning of any year, Metropolitan would be willing to take up to 600 TAF out of storage in that year. Where Metropolitan storage supplies were between 1.2 MAF and 2 MAF at the beginning of the year, it was assumed that Metropolitan would be willing to take up to 400 TAF in that year. At storage levels below 1.2 MAF, it was assumed that Metropolitan would take up to 200 TAF in a given year.

It was also assumed that Metropolitan would be willing to purchase up to 300 TAF of water transfer in any given year. For years where demands still exceeded supplies after accounting for storage withdrawals, transfer purchases were estimated and compared against the 300 TAF limit.

Table 5-2: Metropolitan Shortage Conditions

Study Year	Actual Year	SWP Allocation (%)	SWP (AF)	CRA (AF)	Total (AF)	Demand (AF)	Surplus/ Shortage (AF)	Storage at YE (AF)	Transfers (AF)
2011	1990	30%	603,450	1,108,000	1,711,450	2,124,000	(400,000)	1,300,000	(12,550)
2012	1991	27%	542,820	1,108,000	1,650,820	2,123,000	(200,000)	1,100,000	(272,180)
2013	1992	26%	522,990	1,108,000	1,630,990	2,123,000	(200,000)	900,000	(292,010)

Based on the analysis above, Metropolitan would be able to meet firm demands under the driest three-year hydrologic scenario using the recent water management actions described above without re-implementing the WSAP for its member agencies. Given the assumed absence of an allocation, the estimated minimum imported water supplies available to the City from Metropolitan is assumed to be equal to Metropolitan's estimate of demand for firm supplies for the City, which Metropolitan uses when considering

whether to impose mandatory restrictions. Thus, the estimate of the minimum imported supplies available to the City is 15,512 AF[11].

As captured in its 2010 RUWMP, Metropolitan believes that the water supply and demand management actions it is undertaking will increase its reliability throughout the 25-year period addressed in its plan. Thus for purposes of this estimate, it is assumed that Metropolitan will be able to maintain the identified supply amounts throughout the three year period.

Metropolitan projects reliability for full service demands through the year 2035. Additionally, through a variety of groundwater reliability programs conducted by OCWD and participated in by the City, local supplies are projected to be maintained at demand levels. Based on Metropolitan's WSAP, the City is expected to fully meet demands for the next three years assuming Metropolitan is not in shortage, a BPP of 62% for Local Supplies, and zero allocations are imposed for Imported Supplies. The Three Year Estimated Minimum Water Supply is listed in Table 5-3.

Table 5-3: Three-Year Estimated Minimum Water Supply (AFY)

Source	Year 1	Year 2	Year 3
	2010/2011	2011/2012	2012/2013
Local Water	17,980	17,980	17,980
Imported Water	15,512	15,512	15,512
Total	*33,492*	*33,492*	*33,492*

5.4. Catastrophic Supply Interruption

Given the great distances that imported supplies travel to reach Orange County, the region is vulnerable to interruptions along hundreds of miles aqueducts, pipelines and other facilities associated with delivering the supplies to the region. Additionally, this water is distributed to customers through an intricate network of pipes and water mains that are susceptible to damage from earthquakes and other disasters.

Metropolitan

Metropolitan has comprehensive plans for stages of actions it would undertake to address a catastrophic interruption in water supplies through its WSDM and WSAP Plans. Metropolitan also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the

[11] Metropolitan 2010/11 Water Shortage Allocation Plan model (March 2011)

southern California region, including seismic events along the San Andreas Fault. In addition, Metropolitan is working with the State to implement a comprehensive improvement plan to address catastrophic occurrences that could occur outside of the Southern California region, such as a maximum probable seismic event in the Delta that would cause levee failure and disruption of SWP deliveries. For greater detail on Metropolitan's planned responses to catastrophic interruption, please refer to Metropolitan's RUWMP.

Water Emergency Response Organization of Orange County

In 1983, the Orange County water community identified a need to develop a plan on how agencies would respond effectively to disasters impacting the regional water distribution system. The collective efforts of these agencies resulted in the formation of the Water Emergency Response Organization of Orange County (WEROC) to coordinate emergency response on behalf of all Orange County water and wastewater agencies, develop an emergency plan to respond to disasters, and conduct disaster training exercises for the Orange County water community. WEROC was established with the creation of an indemnification agreement between its member agencies to protect each other against civil liabilities and to facilitate the exchange of resources. WEROC is unique in its ability to provide a single point of contact for representation of all water and wastewater utilities in Orange County during a disaster. This representation is to the county, state, and federal disaster coordination agencies. Within the Orange County Operational Area, WEROC is the recognized contact for emergency response for the water community.

City of Fullerton

The City relies on Metropolitan's catastrophic planning, based on a major earthquake damaging the aqueduct that transports southern California water. The adopted criteria assume that damage from such an event could render the aqueducts out of service for six months. To safeguard the region from catastrophic losses of water, Metropolitan has made substantial investments in emergency storage. Metropolitan completed construction of Diamond Valley Lake, which reached its capacity in 2002. Metropolitan has reserved half of Diamond Valley Lake storage capacity to meet emergencies. Listed in Table 5-4, Metropolitan can deliver emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted by a major earthquake.

Table 5-4: Preparation Actions for Catastrophe

Possible Catastrophe	Preparation Actions
Regional Power Outage	Investments in Emergency Storage
Earthquake	
Supply Contamination	
Terrorist Act which Interrupts Service	

5.5. Prohibitions, Penalties and Consumption Reduction Methods

Prohibitions

The WSSCP lists water conservation requirements which shall take effect upon implementation by the City Council. These prohibitions shall promote the efficient use of water, reduce or eliminate water waste, complement the City's Water Quality regulations and urban runoff reduction efforts, and enable implementation of the City's Water Shortage Contingency Measures. Prohibitions include, but are not limited to, restrictions on outdoor watering, washing of vehicles, food preparation establishments, repairing of leaks and other malfunctions, swimming pools, decorative water features, construction activities, and water service provisions which can be found in Table 5-5.

Table 5-5: Prohibitions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
The excess use or loss of water through breaks, leaks, or other malfunctions in plumbing or irrigation systems by neglecting to correct such malfunctions in a timely manner	Year round
No water runoff from landscaped areas into adjoining streets, sidewalks, or other paved areas due to incorrectly-directed or incorrectly-maintained sprinklers or excessive watering	Year round
No water shall be used to clean, fill, or maintain levels in decorative fountains or other similar aesthetic structures, unless such water is part of a recycling system	Year round
Washing of motor vehicles, trailers, boats, and other types of mobile equipment shall be done only with hand-held water container or a hose equipped with a positive shut-off nozzle for quick rinses, except for washing done at the immediate premises of a commercial car wash or with	Year round

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
reclaimed water	
Installation of single pass cooling systems in building requesting new water connections	Year round
Installation of non-recirculating systems in new conveyor car wash systems and new commercial laundry systems	Year round
No hose washing of sidewalks, walkways, driveways, parking areas, or other paved surfaces, except as required for health and safety purposes	Phase I
No restaurant, hotel, café, cafeteria, or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested	Phase I
All leaks from indoor and outdoor plumbing fixtures shall be promptly repaired	Phase I
Watering of landscape or other turf area shall not be allowed between 10:00 a.m. and 4:00 p.m., except that this provision shall not apply to commercial nurseries, golf courses, and other water-department industries; except that there shall be no restriction on water using reclaimed water, provided that signs are posted that identify reclaimed water is being used	Phase I
All provisions of Phase I are applicable	Phase II
All provisions of Phase II shall apply except that the restrictions on watering lawns, landscape or other turf areas shall be modified to prohibit watering on days other than Monday, Thursday, or Saturday, except for short periods of time for adjusting or repairing the irrigation system, and to prohibit watering between the hours of 8:00 a.m. and 6:00 p.m. Commercial nurseries, golf courses, and other water-dependent industries shall be prohibited from water their stock on days other than Monday, Thursday, or Saturday, except for short periods of time for adjusting or repairing the irrigation system, and prohibited from watering between the hours of 10:00 a.m. and 4:00 p.m. There shall be no restriction on watering using reclaimed water, provided that signs are posted that identify reclaimed water is being used	Phase III
All provisions of Phase III shall apply except there shall be no residential watering of lawn, landscaping, and other turf areas at any time	Phase IV

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
except by hand-held watering containers. Commercial nurseries, golf courses, and other water-dependent industries shall be prohibited from watering lawn, landscaping, and other turf areas on days other than Monday or Thursday, except for short periods of time for adjusting or repairing the irrigation system, and prohibited from watering between the hours of 8:00 a.m. and 6:00 p.m. There shall be no restriction on watering using reclaimed water, provided that signs are posted that identify reclaimed water is being used. The City Council may, in its sole discretion, impose additional restrictions or prohibitions on the use of water	

Consumption Reduction Methods

The City has established reduction methods in Chapter 12.06 of the Fullerton Municipal Code. The City Council is authorized to require reductions in water use when necessary. Certain conservation methods remain in effect throughout the year. However, when water shortage levels necessitate the implementation of water demand reduction Phases I through IV (outlined in the City's WSSCP), additional conservative measures can be put into effect. Methods to reduce the consumption of water are included in the prohibitions listed in the below Table 5-6; however, consumption reduction methods are not limited to these prohibitions. The City may implement further prohibited water uses as well as increase water rates.

Table 5-6: Consumption Reduction Methods

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Year Round Water Prohibitions	Year Round	5%
Phase 1 Water Supply Shortage Prohibitions	Phase 1	10%
Phase 2 Water Supply Shortage Prohibitions	Phase 2	15%
Phase 3 Water Supply Shortage Prohibitions	Phase 3	20%
Phase 4 Water Shortage Emergency Prohibitions	Phase 4	20% +

Penalties

Any customer who violates provisions of the WSSCP by either excess use of water or by specific violation of one or more of the applicable water use restrictions for a particular mandatory conservation stage may be cited by the City and may be subject to written notices, surcharges, fines, flow restrictions, service disconnection, and/or service termination which are detailed in Table 5-7.

Table 5-7: Penalties and Charges

Penalties or Charges	Stage When Penalty Takes Effect
Written Notice and possible fine	First Violation
Written Notice and possible fine	Second Violation
Written notice and possible installation of a flow restricting device with a charge for the installation and removal of such device. Plus possible fine.	Third Violation
Written notice and installation of a flow restrictor device or discontinuation of water service. Plus possible fine.	Fourth and Subsequent Violations

5.6. Financial Impacts Due to Reduced Water Sales

Reductions in projected water sales can have significant financial implications on the City's collection of adequate revenue to fund ongoing and planned expenditures related to capital improvements, and maintenance and operation of the water system. The City's WSSCP addresses two potential scenarios where such a reduction in water sales can result in significant loss in revenue, including: 1) water conservation efforts implemented during periods of prolonged drought, and 2) temporary water shortage/supply due to a catastrophic event that can impact the City's ability to deliver water.

Water Conservation Due To Drought

California's extensive history provides several lessons regarding the impacts of extended periods of below normal hydrology, increasing water demands of consumers, and the resulting strain on water supply resources. Prolonged drought conditions often require water agencies to promote and/or mandate water conservation in order to ensure the availability of water resources. While reductions in water demand by customers is environmentally responsible, the resulting reduction in water sales will have a financial impact on the City's capital improvement program, and maintenance and operation of the water system.

Catastrophic Event Interruption

During a catastrophic event, such as a power outage, earthquake, or other natural disaster, water production and/or distribution infrastructure may be disabled which would limit the City's ability to provide water to customers. Short-term shutdowns of any portion of the water system can be offset through redundancy in the distribution infrastructure and alternate sources of water supply and storage. However, should a catastrophic event result in a prolonged reduction in the supply of water available to customers, the resulting decrease in revenue from reduced water sales will need to be addressed.

Revenue Adjustment Measures

The following measures can be implemented by the City to overcome each reduction in water sales scenario outlined above depending on anticipated short-term and long-term financial impacts.

- The City can draw needed funds from its emergency operation and maintenance fund, which are kept in reserve to provide adequate revenue to allow the water system to function for up to 120 days of normal operations.
- The City can defer non-mission critical capital improvement projects and reallocate the funds to cover the cost of operations and critical maintenance.
- The City Manager can recommend the City Council to declare a water shortage and implement the City's WSSCP. Depending on the severity of the shortage and impact on revenue, the City Council may increase water rates, other than Tier 1 Lifeline rates, by an amount necessary, as determined by the City Council. The subsequent rate increases enacted will remain in effect until such time the City Council declares a water shortage no longer exists.

5.7. Records, Reports, and Monitoring

The City will use its CIS Infinity Customer Information and Billing Software to determining actual reductions in water use pursuant to the urban water shortage contingency analysis. By utilizing the data management capabilities of the CIS software the city can prepare detailed reports regarding present and historical data on a monthly, quarterly, semi-annual, and annual basis, including water consumption, sales, and revenues.

6. Recycled Water

6.1. Agency Coordination

The City does not own or operate wastewater treatment facilities and sends all collected wastewater to OCSD for treatment and disposal. The City relies on the Basin for the majority of its water supply. As manager of the Basin, OCWD strives to maintain and increase the reliability of the Basin by increasing recycled water usage to replace dependency on groundwater. To further this goal, OCWD and OCSD have jointly constructed two water recycling projects, described below:

OCWD Green Acres Project

The Green Acres Project (GAP) is a water recycling effort that provides recycled water for landscape irrigation at parks, schools and golf courses as well as for industrial uses, such as carpet dyeing.

GAP provides an alternate source of water to the cities of Fountain Valley, Huntington Beach, Newport Beach, Santa Ana, and Mesa Consolidated Water District. Current water users include Mile Square Park in Fountain Valley, Costa Mesa Golf Course, Home Ranch bean field and Chroma Systems carpet dyeing. Due to a growing demand for water in Orange County, it is sensible that recycled water be used whenever possible for irrigation and industrial uses to supplement groundwater. The use of GAP water will diminish to approximately 3 MGD upon completion of OCSD's P1-102 (Fountain Valley Wastewater Secondary Treatment Expansion) project in the fall of 2011.

OCWD Groundwater Replenishment System

The Groundwater Replenishment System (GWRS), which has been operational since January 2008, takes highly treated sewer water and purifies it to levels that meet state and federal drinking water standards. It uses a three-step process that includes reverse osmosis, microfiltration, and ultraviolet light and hydrogen peroxide advanced oxidation treatment. The treated water is then injected into the seawater barrier to help prevent seawater intrusion into the groundwater basin and is percolated into deep aquifers where it eventually becomes part of Orange County's drinking water supply.

The design and construction of the GWRS was a project jointly-funded by OCWD and OCSD. These two public agencies have worked together for more than 30 years. They are leading the way in water recycling and providing a locally-controlled, drought-proof and

reliable supply of high-quality water in an environmentally sensitive and economical manner.

The GWRS has a current production capacity of 70 MGD, and a total production of 23.5 billion gallons per year. Once the water has been treated with the three-step process at the GWRS as described above, approximately 35 MGD of GWRS water is pumped into injection wells where it serves as a seawater intrusion barrier. Another 35 MGD is pumped to recharge basins in the City of Anaheim, where GWRS water filters through sand and gravel to replenish the deep aquifers of north and central Orange County's groundwater basin. At this time, OCWD has designed Phase 2 of the expansion, which will recycle approximately another 28 MGD of effluent. Investments beyond Phase 2 have not been approved by OCWD and would require further review before proceeding. If the further envisioned phase of the project is approved and developed, it is projected that up to 118 MGD of water will be produced.

Table 6-1: Participating Agencies

Participating Agencies	Participated
Water Agencies	Fullerton
Wastewater Agencies	OCSD
Groundwater Agencies	OCWD

6.2. Wastewater Description and Disposal

The direct projected use of recycled water within the City's service area is expected to be zero for the next 25 years because of the lack of a source of reclaimed wastewater. Indirectly, the City will be part of a reclamation program by participating in the reclamation projects of OCWD and the OCSD as described below.

Wastewater generated in the City is transported via large trunk sewer mains approximately 15 miles to the OCSD facilities located in the cities of Fountain Valley and Huntington Beach. A portion of these treated effluents is reclaimed through tertiary treatment for injection into a seawater intrusion barrier. The remaining treated effluent is released into the ocean, four miles off the coast, via a pipeline from the Huntington Beach Facility.

Table 6-2 summarizes the past, current, and projected wastewater volumes collected and treated, and the quantity of wastewater treated to recycled water standards for treatment plants within OCSD's service area. Table 6-3 summarizes the disposal method, and treatment level of discharge volumes.

Table 6-2: Wastewater Collection and Treatment (AFY)

Type of Wastewater	Fiscal Year Ending						
	2005	2010	2015	2020	2025	2030	2035-opt
Wastewater Collected & Treated in Service Area	273,017	232,348	302,400	312,704	321,104	329,392	333,536
Volume that Meets Recycled Water Standards	12,156	75,000	105,000	105,000	105,000	105,000	105,000

Table 6-3: Disposal of Wastewater (Non-Recycled) (AFY)

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035-opt
Ocean Outfall	Secondary	157,348	197,400	207,704	216,104	224,392	228,536

6.3. Current Recycled Water Uses

There are currently no recycled water uses within the City's service area.

6.4. Potential Recycled Water Uses

While the City recognizes the potential uses of recycled water in its community, such as landscape irrigation, parks, industrial and other uses, the City does not have the recycled water infrastructure to support the use of recycled water. The cost-effectiveness analyses that have been conducted throughout the years regarding recycled water infrastructure have not shown to be beneficial at this time. Therefore, the City supports, encourages and contributes to the continued development of recycled water and potential uses throughout the region through the GWRS. At this time, the City does not have any potential and projected uses for recycled water.

Table 6-4 compares the recycled water use projections from the City's 2005 UWMP with the actually 2010 recycled water use.

Table 6-4: Recycled Water Uses – 2005 Projections compared with 2010 Actual (AFY)

User Type	2005 Projection for 2010	2010 Actual Use
Agriculture	0	0
Landscape	0	0
Wildlife Habitat	0	0
Wetlands	0	0
Industrial	0	0
Groundwater Recharge	0	0
Total	**0**	**0**

6.4.1. Direct Non-Potable Reuse

In recent years, the City has drilled two pilot wells in an effort to produce non-potable water for golf course, cemetery, median, slope, and park uses. These projects have proven unsuccessful for finding an alternative source of non-potable water.

6.4.2. Indirect Potable Reuse

The City benefits indirectly from the replenishment of the Basin using GWRS water that meets state and federal drinking water standards for potable reuse.

6.5. Optimization Plan

Because the City is not using recycled water at this time, it is not practical to provide a recycled water optimization plan. The City has positioned itself to receive recycled water if it becomes available to serve some of the large development areas.

In Orange County, the majority of recycled water is used for irrigating golf courses, parks, schools, business and communal landscaping. However, future recycled water use can increase by requiring dual piping in new developments, retrofitting existing landscaped areas and constructing recycled water pumping stations and transmission mains to reach areas far from the treatment plants. Gains in implementing some of these projects have been made throughout the county; however, the additional costs, large energy requirements and facilities to create such projects are very expensive to pursue.

To determine if a recycled water project is cost-effective, cost/benefit analyses must be conducted for each potential project. This brings about the discussion on technical and economic feasibility of a recycled water project requiring a relative comparison to alternative water supply options. Analyses indicate that capital costs of water recycling in the City exceed the cost of purchasing additional imported water from Metropolitan.

The City will continue to conduct cost/benefit analyses for recycled various water projects, and seek creative solutions and a balance to recycled water use, in coordination with OCWD, Metropolitan and other cooperative agencies. These include solutions for funding, regulatory requirements, institutional arrangements and public acceptance.

7. Future Water Supply Projects and Programs

7.1. Water Management Tools

With the eventual replacement of older wells with new more efficient wells, increasing the capacity of some existing booster stations, and continued efforts in reducing water waste, the City can meet projected demands with existing facilities and distribution system. The City's Water System Master Plan Update identifies a Capital Improvement Program of facilities planned for construction. In addition, the City is conducting a rate study to include an analysis of CIP's for the next 10-year to be completed in June 2011.

System Pressures

Reducing distribution system pressures will, to a certain degree, conserve water and pumping energy by reducing leaking in water and plumbing systems, as well as reducing water waste when turning water fixtures on and off. The City has conducted pressure zone studies to determine the feasibility of reducing system pressures by either lowering settings on distribution system pressure regulators or changing pressure zone boundaries. Results of these studies have indicated that potential fire protection (fire sprinkler systems) requirement deficiencies occur when pressures are reduced. Installing individual customer pressure regulators in high-pressure areas of the City's distribution system could reduce water demands but does not appear practical or cost effective.

Peak Demand

Water system demand patterns are a result of climatological, land use, sociological, and institutional factors, all of which affect the amount of water consumed. Reductions in peak demands can reduce the need for construction of new water storage and conveyance facilities and in certain instances, the development of new water sources. The City has a computerized telemetry system that allows water system operators to operate the system more efficiently by being able to alter water production facilities to meet these ever changing demand patterns. The City's addition of new wells in recent years, as described earlier, helps in reducing Metropolitan's summer peak demands.

7.2. Transfer or Exchange Opportunities

At the present time, the City relies on its wholesalers, Metropolitan and OCWD, to be the responsible parties for negotiating water transfers and exchanges. At this time, the City is not currently involved in any transfer or exchange opportunities.

7.3. Planned Water Supply Projects and Programs

At this time, the City does not have any planned water supply projects or water supply programs.

7.4. Desalination Opportunities

Desalination is viewed as a way to develop a local, reliable source of water that assists agencies reduce their demand on imported water, reduce groundwater overdraft, and in some cases make unusable groundwater available for municipal uses. Currently, there are no identified projects for desalination of seawater, given that the City is located at a distance from the ocean. Additionally, there are no identified projects for impaired groundwater, since the City has been fortunate to have exceptionally good groundwater resources in the past and does not anticipate any changes because of the continued efforts of the City, OCWD and Metropolitan. However, from a regional perspective, desalination projects within the region indirectly benefit the City.

In Orange County, there are three proposed ocean desalination projects that could serve the City. These are the Huntington Beach Seawater Desalination Project, the South Orange Coastal Desalination Project, and Camp Pendleton Seawater Desalination Project. Of these projects, the Huntington Beach Seawater Desalination Project may be of specific benefit to the City through groundwater coastal pumping transfer program coordinated by OCWD.

Table 7-1: Opportunities for Desalinated Water

Sources of Water	Check if Yes
Ocean Water	X
Brackish Ocean Water	X
Brackish Groundwater	

8. UWMP Adoption Process

8.1. Overview

Recognizing that close coordination among other relevant public agencies is the key to the success of its UWMP, the City worked closely with other entities such as MWDOC to develop and update this planning document. The City also encouraged public involvement through the holding of a public hearing to learn and ask questions about their water supply.

This section provides the information required in Article 3 of the Water Code related to adoption and implementation of the UWMP. Table 8-1 summarizes external coordination and outreach activities carried out by the City and their corresponding dates. The UWMP checklist to confirm compliance with the Water Code is provided in Appendix A.

Table 8-1: External Coordination and Outreach

External Coordination and Outreach	Date	Reference
Encouraged public involvement (Public Hearing)	June 2, 9, 2011 & July 7, 14, 2011	Appendix F
Notified city or county within supplier's service area that water supplier is preparing an updated UWMP (at least 60 days prior to public hearing)	March 21, 2011	Appendix E
Held public hearing	June 21, 2011 & July 19, 2011	Appendix F
Adopted UWMP	July 19, 2011	Appendix G
Submitted UWMP to DWR (no later than 30 days after adoption)	August 18, 2011	
Submitted UWMP to the California State Library and city or county within the supplier's service area (no later than 30 days after adoption)	August 18, 2011	
Made UWMP available for public review (no later than 30 days after filing with DWR)	September 17, 2011	

This UWMP was adopted by the City Council on July 19, 2011. A copy of the adoption minutes is provided in Appendix G.

A change from the 2004 legislative session to the 2009 legislative session required the City to notify any city or county within its service area at least 60 days prior to the public

hearing. The City sent a Letter of Notification to OCWD on March 21, 2011 that it is in the process of preparing an updated UWMP (Appendix E).

8.2. Public Participation

The City encouraged community and public interest involvement in the plan update through a public hearing and inspection of the draft document. Public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix F. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to the City's plans for providing a reliable, safe, high-quality water supply. Copies of the draft plan were made available for public inspection at the City Clerk's and Utilities Department offices.

8.3. Agency Coordination

All of the City's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. The City is dependent on imported water from Metropolitan, its regional wholesaler and on local groundwater from OCWD. OCWD manages the Basin. As such, the City involved these water providers in the development of its 2010 UWMP at various levels of contribution as summarized in Table 8-2.

Table 8-2: Coordination with Appropriate Agencies

	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Copy of Draft Plan	Sent Notice of Intention to Adopt	Not Involved/No Information
Metropolitan	X		-	X		X	
OCWD	X		-	X		X	
MWDOC	X		-	X		X	
Golden State Water Company			-			X	
City of La Habra			-			X	
City of Anaheim			-			X	
City of Brea			-			X	
City of Placentia			-			X	
City of Buena Park			-			X	
Fullerton City Council		X	-				
Energy and Resource Management Committee		X	-			X	

While the City is not a member agency of MWDOC, a regional wholesaler of imported water in the County of Orange, it contracts and joins with MWDOC in conducting water education, conservation programs, and other activities as discussed elsewhere in this Plan. Based on this relationship, MWDOC participated in the development of the City's 2010 UWMP. MWDOC provided assistance to the City's 2010 UWMP development by providing much of the data and analysis such as, population projections from the California State University at Fullerton, Center of Demographic Research (CDR) and SBx7-7 modeling. MWDOC provided information that quantifies water availability to meet their projected demands for the next 25 years, in five-year increments. Based on the projections of retail demand and local supplies completed by the City, and the imported

supply availability described in Metropolitan's 2010 Draft Urban Water Management Plan, MWDOC prepared an informational package with data specific to the City, that incorporated additional calculations for the required planning efforts. The City's UWMP was developed in collaboration with MWDOC's 2010 RUWMP to ensure consistency between the two documents as well as Metropolitan's 2010 RUWMP and 2010 IRP.

As a groundwater producer who relies on supplies from the OCWD-managed Basin, the City coordinated the preparation of this 2010 UWMP with OCWD. OCWD provided projections of the amount of groundwater the City is allowed to extract in the 25-year planning horizon. In addition, information from OCWD's 2009 Groundwater Management Plan and 2008-2009 Engineer's Report were incorporated in this document where relevant.

Notice of intention to adopt the 2010 UWMP was sent out to other cities within the City's water service area including the cities of Anaheim, Brea, Buena Park, and Placentia.

8.4. UWMP Submittal

8.4.1. Review of Implementation of 2010UWMP

As required by California Water Code, the City summarizes the implementation of the Water Conservation Programs to date, and compares the implementation to those as planned in its 2005 UWMP.

Comparison of 2005 Planned Water Conservation Programs with 2010 Actual Programs

As a signatory to the MOU regarding urban water use efficiency, the City's commitment to implement BMP-based water use efficiency program continues today. For the City's specific achievements in the area of conservation, please see Section 4 of this Plan.

8.4.2. Filing of 2010 UWMP

The City Council reviewed the Final Draft Plan on June 21, 2011. The five-member City Council approved the 2010 UWMP on July 19, 2011. See Appendix G for the adoption minutes approving the Plan.

By August 18, 2011, the City's Adopted 2010 UWMP was filed with DWR, California State Library, County of Orange, and cities within its service area.

Appendices

A. Urban Water Management Plan Checklist
B. Orange County Water District Groundwater Management Plan 2009 Update
C. Calculation of Dry Year Demands
D. Chapter 12.06; Ordinance No. 3134
E. 60 Day Notification Letters
F. Public Hearing Notice
G. Energy and Resource Management Committee Memorandum, Copy of Plan Adoption

Appendix A

Urban Water Management Plan Checklist

Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 8.3
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Appendix E
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Section 8.4
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 8.4
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Section 8.2
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Appendix F
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix G
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 8.4

No.	UWMP requirement a	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 8.4
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 8.4
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 1.3.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 2.2.1
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M	Section 2.2.2
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.2.2
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.2.3 Section 2.2.4
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 2.4.4 Section 2.4.5
2	Wholesalers: Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. Retailers: Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Appendix F Section 2.4.6

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not applicable
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 2.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 2.5
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 2.5.2
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 3.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 3.3
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Appendix B
16	Describe the groundwater basin.	10631(b)(2)		Section 3.3
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Not applicable

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Not applicable
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.3
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 3.3.6
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 3.3.7
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 7.2
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 7.3
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 7.4
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 6.1
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 6.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 6.2
47	Describe 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)		Section 6.3
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 6.4
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 6.4
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 6.5
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Section 6.5
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 3
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 3.4.1
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 3.4.2
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 5.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 5.3
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Section 5.4
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 5.5
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 5.5
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 5.5
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 5.6
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Appendix D
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 5.7
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	Four years 2010, 2015, 2020, 2025, and 2030	Section 3.4.2.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 3.4.3 Section 3.4.4 Section 3.4.5
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 4
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 4
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 4
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Not applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not applicable

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review

Appendix B

Orange County Water District Groundwater Management Plan 2009 Update

Refer to OCWD Website for GWMP.

http://www.ocwd.com/Publications---Newsletters/ca-43.aspx

Appendix C

Calculation of Dry Year Demands

Demand "Bump" Factors for 2010 UWMP
Description of Methodology

Water agencies must develop estimates of the impacts of single dry years (Single-Dry) and multiple consecutive dry years (Multiple-Dry) on both supplies and demands in future years. In these cases, demands increase somewhat above the normal or average level. The increase can be expressed as a percent "bump" up from the normal level. For example, if dry year demand was 105 percent of normal, this would be a 5% "bump". As the methodology to estimate the Single-Dry and Multiple-Dry "bumps" was developed, several issues needed to be decided, as follows:

1. The methodology used existing data from MWDOC records for each agency, to allow the estimates to reflect the characteristics and differences of demands relative to the makeup of each retail entity. The overall MWDOC estimate was developed from a weighted sum of all of OC's agencies.

2. Total potable demands, including agricultural demands, were used to derive the "bumps" because Orange County agencies have opted to have water that is used for agricultural uses be considered as full service demands. Non-potable demands are included; these demands will be met with non-potable supplies.

3. The methodology focused on per-capita usage (in units of AF/capita) because this removes the influence of growth from the analysis. Overall population growth in Orange County has been about 1% per year over the past two decades, creating about a 20% increase in demand over two decades. Some of the agencies have had even higher growth.

4. The period that was used for the analysis was limited to FY 1992-93 thru FY 2008-09 because fiscal years 1991-92 and 2009-10 were years of extraordinary conservation-- pricing disincentives for using over the allocated amounts were implemented in order to curtail demands-- and so these years were not considered. The Orange County total per-capita water usage in the period FY 1992-93 thru FY 2008-09 is plotted in Figure 1. Per-capita water use in Orange County has been on a decreasing trend in recent years as shown by the trend line in Figure 1. The downward trend is likely due to water use efficiency efforts, principally the plumbing codes since 1992 that have required low-flush toilets in all new construction and prohibited the sale of high-flush toilets for replacement purposes. Because of this drop in per-capita usage over time, the more recent data is a better predictor of future usage than the earlier data. Therefore, we narrowed the focus to the period FY 2001-02 thru FY 2008-09.

5. **Single-Dry "Bump" Methodology:** Per-capita usage for each participant agency from FY 2001-02 thru FY 2008-09 is shown in Table 1. The Single-Dry Bump for each agency was derived using the highest per-capita usage in the period, divided by average per-capita usage for that period. Because of suspect data for Fountain Valley and Santa Ana, the highest year data was eliminated and the second-highest usage in the period was used (when data was suspect, it was also removed from the average for the agency). The resulting Single-Dry "bumps" are shown in Table 2. The OC-average Single-Dry "bump" came to 6.6%

6. **Multiple-Dry "Bump" Methodology:** DWR guidelines recommend that "multiple" years is three years. There are various methods that can be used to derive demand "bumps" for those three years. The same "bump" can be used for all three years, or different "bumps" can be assumed for each of the three years. A pattern can be selected based on historical demand data or on historical water supply data or on another basis. MWDOC selected a Multiple-Dry Bump as the same as the Single-Dry Bump for each agency. This means having three highest-demand years in a row. This is conservative because it would be extremely unlikely for three driest years to occur in a row. However, it should be noted that future demand in any particular year depends on other factors in addition to rainfall, such as the economic situation, and cloudiness, windiness, etc. The OC-average Multiple-Dry "bump" came to 6.6%.

Figure 1
Per-Capita Water Use in Orange County (AF/person)

FY Ending	OC Actual AF/person	Least Sq AF/person	approx high	approx "bump"
1993	0.223327	0.233	0.250	7%
1994	0.223528	0.232		
1995	0.221986	0.230		
1996	0.235919	0.229		
1997	0.244071	0.228		
1998	0.217014	0.226		
1999	0.228797	0.225		
2000	0.242408	0.224		
2001	0.223537	0.222		
2002	0.228534	0.221		
2003	0.214602	0.219		
2004	0.222155	0.218		
2005	0.204941	0.217		
2006	0.207720	0.215		
2007	0.223599	0.214		
2008	0.211873	0.212		
2009	0.202396	0.211	0.225	7%

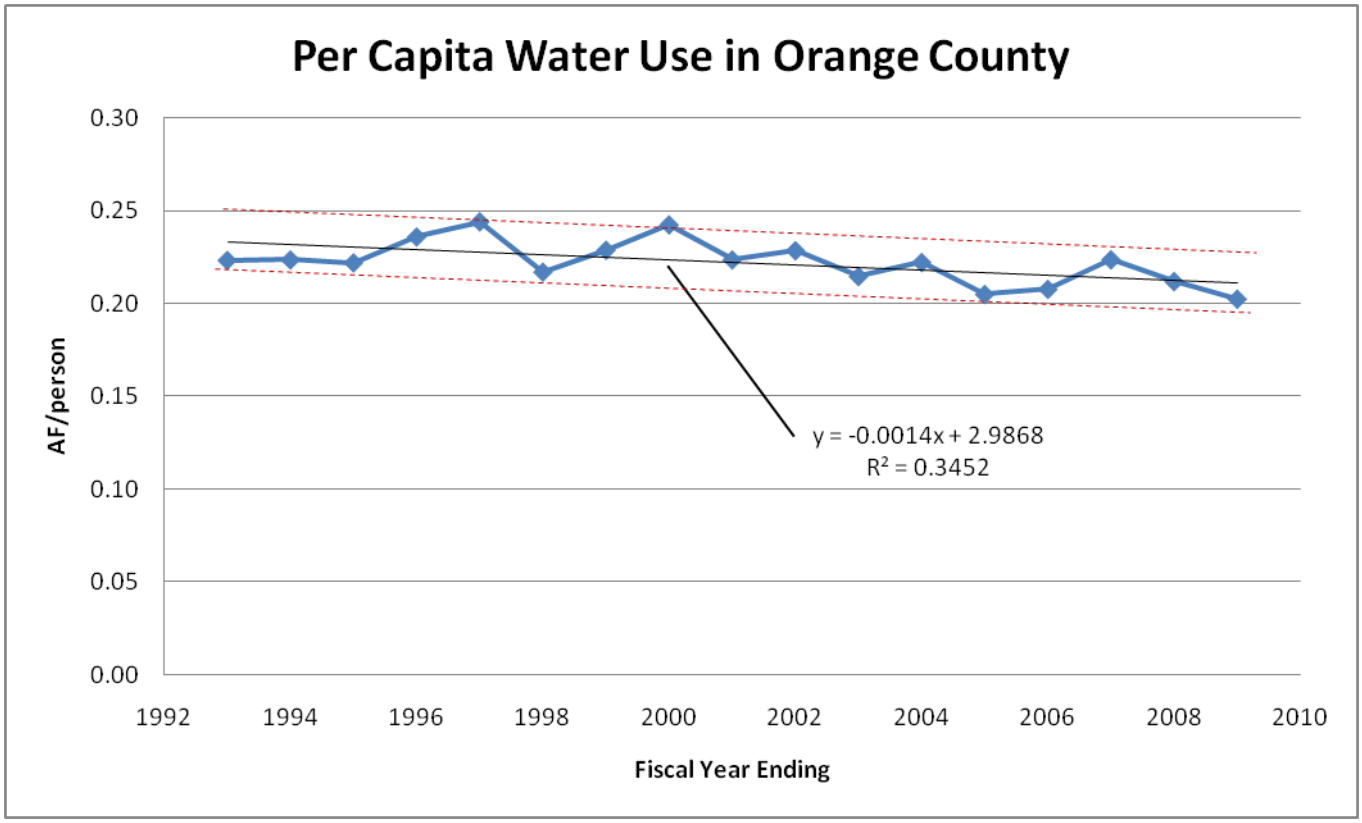

Table 1. Per-Capita Retail Water Usage by Retail Water Agency [1] [2]

Fiscal Year ->	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
				Per Capita Retail Water Usage (AF/person)				
Fullerton	0.25174	0.23968	0.24862	0.23148	0.23355	0.24431	0.23200	0.22367

[1] Retail water usage (includes recycled water and Agricultural usage) divided by population.
[2] Population is for Jan. 1 of each fiscal year ending. Source: Center for Demographic Research, CSU Fullerton.

Table 2
Demand Increase "Bump" Factors for Single Dry Years and Multiple Dry Years
for OC Water Agencies participating in MWDOC's 2010 UWMP group effort

	Single	Multiple	
Fullerton	5.7%	5.7%	
OC Average	6.6%	6.6%	weighted average of all OC water agencies

Appendix D

Chapter 12.06; Ordinance No. 3134

Chapter 12.06

Chapter 12.06
WATER SUPPLY SHORTAGE CONSERVATION PLAN

Sections:

12.06.010. Statement of policy, declaration of purpose and objectives.

A. Water supplies in the city and at the source of Fullerton's water are now and from time to time in the future expected to be in a state of shortage. The general welfare requires that water resources available to the City must be put to their maximum beneficial use, and waste or unreasonable uses must be prevented. The conservation of water must be practiced so that the limited supply of water will be available to serve the interests of the people of the City and for the public welfare.

B. The purpose of this chapter is to provide procedures, rules and regulations for mandatory water conservation to minimize the effect of a water supply shortage emergency on the City's water customers.

C. The objectives of this chapter are:

1. To prevent water supply shortages through aggressive and effective water management programs such as water conservation, water education, and use of reclaimed water;

2. To minimize the impact of a water supply shortage on the City's population and economy;

3. To provide first for public health, fire protection, and other essential services, then to provide for the economic health of the City, and then provide for other uses of water;

4. To ensure that water users who conserve water during normal-year rainfall and wet-year rainfall are not disadvantaged during water supply shortages requiring mandatory water conservation.

(Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.020. Water supply shortage findings.

The City Council finds and determines that a water supply shortage could exist based upon the occurrence of one or more of the following conditions:

A. A general water supply shortage takes place due to increased demand or limited supplies.

B. Distribution or storage facilities of the City become inadequate.

C. A major failure or contamination of the supply, storage and/or distribution facilities of the Metropolitan Water District of Southern California, the Orange County Water District and/or the City occurs.

D. The City’s wholesale water providers, MWD and OCWD, call for an allocation of water supply combined with an allocation penalty rate and/or other extraordinary water conservation measures. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.030. CEQA exemption.

The City Council finds that this chapter and actions taken hereafter pursuant to this chapter are exempt from the provisions of the California Environmental Quality Act of 1970 as specific actions

necessary to prevent or mitigate an emergency pursuant to Section 15307 of the CEQA Guidelines. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.040. Definitions.

The following words and phrases, whenever used in this chapter, shall be construed as defined in this section, unless from the context a different meaning is intended, or unless a different meaning is specifically defined within the individual sections of this chapter:

A. "Applicant" means the person, association, developer, corporation or governmental agency applying for water service.

B. "Billing unit" equals one thousand gallons of water: this is the unit amount of water used to calculate commodity charges for customer usage.

C. "Citizens Appeals Board" means a board, consisting of at least three but not more than five members, appointed by the City Council to hear appeals concerning applications for relief or violations that a customer or water user cannot resolve with the Hearing Officer.

D. "City" means the City of Fullerton, California, a municipal corporation.

E. "City Council" means the City Council of the City of Fullerton, California.

F. "City Manager" means the chief administrative officer of the City appointed by the City Council.

G. "Cost" means the actual cost to the Utility, including all labor, material, supplies, equipment and miscellaneous items, together with any applicable indirect and general charges, plus the general administrative overhead, in accordance with the accounting practices of the Utility.

H. "Customer" means water customer or water user.

I. "Director of Engineering" means the chief administrative officer of the Engineering Department of the City.

J. "Director of Administrative Services" means the chief administrative officer of the Administrative Services Department of the City.

K. "Flow restricting device" or "flow restrictor" means a fitting inserted into the service connection to reduce flow capacity.

L. "Hearing Officer" means the person appointed by the City Manager at the utility level to resolve applications for relief.

M. "Lifeline rate" means the tier one (1) rate of the applicable rate schedule for single family and multifamily residential customers.

N. "Person" means any individual, group, developer or organization operating as a single entity.

O. “Premises” means the integral property or area, including improvements thereon, to which water service is provided, or for which an application for service is filed.

P. “Process water” means water used to manufacture, alter, convert, clean, heat or cool a product, or the equipment used for such purpose; water used for plant and equipment washing and for transporting the raw materials and products; and water used to grow trees or plants for sale or installation.

Q. “Reclaimed water” means the process of recapturing or treating water, degraded or contaminated groundwater, or other nonpotable water.

R. “Recycled water” means the process of recirculating or reusing water with a minimum of waste occurring.

S. “Service connection” means the pipe or tubing, fittings, and valves necessary to conduct water from the distribution main to and through the meter.

T. “Utility” means the municipal water organization, its staff and the system serving the city.

U. “Utility rates, rules and regulations” means the rate structure of the Utility and any rules and regulations as approved by the City Council.

V. “Water customer” means the person in whose name service is rendered as evidenced by the signature on the application, contract or agreement for that service, or in the absence of a signed instrument, by the receipt and payment of bills regularly issued in his/her name, regardless of the identity of the actual user of the service.

W. “Water supply shortage rates” means the retail price of water determined by the City Council during a City Council declared Phase I, II, III or IV water supply shortage.

X. “Water user” means any user of water including a water customer. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.050. Application.

The provisions of this chapter shall apply to all customers, water users and premises served by the Utility wherever situated and shall also apply to all premises and facilities owned, maintained, operated or under the jurisdiction of the various officers, boards, departments or agencies of the City. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.060. Water supply shortage notice and implementation.

A. The Utility staff shall monitor any water shortage and evaluate the supply and demand for water by its customers and shall recommend to the City Manager the extent of water conservation required for the Utility to plan for and supply water to its customers. When a water shortage appears imminent, the City Manager shall notify the City Council and recommend holding a public hearing for the purpose of determining whether a water shortage exists and determining the appropriate phase of the water supply shortage and to protect the public welfare and safety. The public hearing shall be noticed by publishing said notice one time only in a newspaper of general circulation. Upon completion of the hearing, the

City Council shall make its decision on said phase implementation by Council resolution. Said resolution shall be published one time only in a newspaper of general circulation, and the prohibited use provisions shall become effective immediately upon such publication.

B. The implemented phase of the water supply shortage shall be in effect until the City Council declares the water supply shortage has ended or until another phase has been implemented pursuant to this chapter. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.070. Public communication.

Once a water supply shortage phase is in effect, the Utility will inform its customers of the effective date of the prohibited uses of water and the water supply shortage rates associated with the relevant phase, and will encourage its customers to take additional voluntary actions to conserve water. The Utility will inform and prepare its customers about possible restrictions on use of water and rate increases related to the higher levels of water conservation required by this Plan. The Utility will continue to educate its customers for the duration of any water supply shortage phase. The Utility will communicate effectively with its diverse customer base. (Ord. 3118 (part), 2008)

12.06.080. Water supply shortage conservation plan fund established.

The Director of Administrative Services shall hereby establish a Water Supply Conservation Plan Fund, within the Utility's account system, to be used for the Utility's costs and expenses of administering and enforcing this chapter, and for any revenue shortfall due to water shortages and conservation measures. Revenue collected from water supply shortage rates associated with Phases I, II, III, and IV that exceed the revenue that pre-water shortage rates would have provided, shall be placed in the fund. The fund may also be used to offset the cost of, and provide a Council-approved citywide incentive for, customer conservation efforts and retrofits. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.090. Prohibited uses of water at all times.

A. The following uses of water are prohibited at all times:

1. Permitting the excess use or loss of water through breaks, leaks, or other malfunctions in the water user's plumbing or distribution system for any period of time after such loss of water should have reasonably been discovered and corrected;

2. No water runoff from landscaped areas into adjoining streets, sidewalks, or other paved areas due to incorrectly-directed or incorrectly-maintained sprinklers or excessive watering shall be allowed;

3. No water shall be used to clean, fill, or maintain levels in decorative fountains, or other similar aesthetic structures, unless such water is part of a recycling system;

4. Washing of motor vehicles, trailers, boats, and other types of mobile equipment shall be done only with a hand-held water container or a hose equipped with a positive shut-off nozzle for quick rinses, except for washing done at the immediate premises of a commercial car wash or with reclaimed water,

B. Effective one (1) year after the adoption of this chapter, the following uses of water are prohibited:

1. Installation of single pass cooling systems in buildings requesting new water connections; and

2. Installation of non-recirculating systems in new conveyor car wash systems and new commercial laundry systems.

(Ord. 3118 (part), 2008)

12.06.100. Water supply shortage phases.

No water user or water customer of the City shall use, cause the use, or permit the use of water from the Utility in a manner contrary to any provision of this chapter which has been mandated by the City Council in accordance with the provisions of this chapter.

A. Phase I water supply shortage.

1. Prohibited uses: In addition to the prohibited uses of water identified in Section 12.06.090, the following prohibited uses are applicable to all Utility users:

a. There shall be no hose washing of sidewalks, walkways, driveways, parking areas, or other paved surfaces, except as required for health and safety purposes;

b. No restaurant, hotel, café, cafeteria, or other public place where food is sold, served, or offered for sale, shall serve drinking water to any customer unless expressly requested;

c. All leaks from indoor and outdoor plumbing fixtures shall be promptly repaired;

d. Watering of landscape or other turf area shall not be allowed between ten a.m. and four p.m., except that this provision shall not apply to commercial nurseries, golf courses, and other water-dependent industries; except that there shall be no restriction on watering using reclaimed water, provided that signs are posted that identify reclaimed water is being used.

2. Water supply shortage rates: During a Phase I water supply shortage, the City Council may increase water rates, other than Tier 1 Lifeline rates, by an amount necessary, as determined by the City Council. The increase in water rates, which could average approximately up to 10 percent above the pre-water shortage rates, may vary among categories of customers. Examples of categories are single family residential, multi-family residential, commercial, industrial, agricultural, temporary service, municipal, landscape, and fire lines.

B. Phase II water supply shortage.

1. Prohibited uses applicable to all Utility users: All the provisions of Phase I are applicable.

2. Water supply shortage rates. During a Phase II water supply shortage, the City Council may increase water rates, other than Tier 1 Lifeline rates, by an amount necessary, as determined by the City Council. The increase in water rates, which could average approximately 10 to 15 percent above the pre-water shortage rates, may vary among categories of customers.

C. Phase III water supply shortage.

1. Prohibited uses applicable to all Utility users: All the provisions of Phase II shall apply except that the restrictions on watering of lawns, landscape or other turf areas shall be modified to prohibit watering on days other than Monday, Thursday, or Saturday, except for short periods of time for adjusting or repairing the irrigation system, and to prohibit watering between the hours of eight a.m. and six p.m. Commercial nurseries, golf courses, and other water-dependent industries shall be prohibited from watering their stock on days other than Monday, Thursday, or Saturday, except for short periods of time for adjusting or repairing the irrigation system, and prohibited from watering between the hours of ten a.m. and four p.m. There shall be no restriction on watering using reclaimed water, provided that signs are posted that identify reclaimed water is being used.

2. Water supply shortage rates. During a Phase III water supply shortage, the City Council may increase water rates, other than Tier 1 Lifeline rates, by an amount necessary, as determined by the City Council. The increase in water rates, which could average approximately 15 to 20 percent above the pre-water shortage rates, may vary among categories of customers.

D. Phase IV water shortage emergency.

1. Prohibited uses applicable to all Utility users: All the provisions of Phase III shall apply except there shall be no residential watering of lawn, landscaping, and other turf areas at any time except by hand-held watering containers. Commercial nurseries, golf courses, and other water-dependent industries shall be prohibited from watering lawn, landscaping, and other turf areas on days other than Monday or Thursday, except for short periods of time for adjusting or repairing the irrigation system, and prohibited from watering between the hours of eight a.m. and six p.m. There shall be no restriction on watering using reclaimed water, provided that signs are posted that identify reclaimed water is being used. During a Phase IV water supply shortage, the City Council may, in its sole discretion, impose additional restrictions or prohibitions on the use of water.

2. Water supply shortage rates. During a Phase IV water supply shortage, the City Council may, in its sole discretion, make additional adjustments to the water rates.

E. General Exception. The prohibitions described in this chapter are waived when such use of water is necessary, as determined by the Utility, to maintain an adequate level of public health and safety, and is necessary to provide an essential government service such as police, fire and emergency repairs.

(Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.110. Sudden catastrophic water supply shortage.

When the City Manager determines that a sudden event has, or threatens to, significantly diminish the reliability or quality of the City's water supply, the City Manager may declare a catastrophic water supply shortage and impose whatever emergency water allocation or conservation actions deemed necessary, in the City Manager's professional judgment, to protect the reliability and quality of the City's water supply, until the emergency passes or the City Council takes other action. (Ord. 3118 (part), 2008)

12.06.120. Failure to comply.

A. Penalties. It shall be unlawful for any customer of the Utility to fail to comply with any of the provisions of this chapter. The penalties set forth in this section shall be additional to those penalties provided in any other section of this code. The penalties for failure to comply with any of the prohibited use provisions of this chapter shall be as follows:

1. For the first violation by any person of any of the provisions of Sections 12.06.090, 12.06.100, and 12.06.110 the Utility shall issue a written notice, pursuant to Section 12.06.130, of the fact of such violation to the customer whose water has been used.

2. For a second violation by any person of any of the provisions of Sections 12.06.090, 12.06.100, and 12.06.110 within the preceding twelve calendar months, the Utility shall issue a written notice, pursuant to Section 12.06.130 of the fact of such second violation to the customer whose water has been used.

3. For a third violation by any person of any of the provisions of Sections 12.06.090, 12.06.100, and 12.06.110 within the preceding twelve calendar months, the Utility shall issue a third written notice, pursuant to Section 12.06.130, of its intent to install a flow restrictor no earlier than ten working days after the notice date. Thereafter, the Utility may install a flow restricting device of approximately one gallon-per-minute capacity for services up to one and one-half inch size, and comparatively sized restrictors for larger services, on the service of the customer at the premises at which the violation occurred for a period of not less than forty-eight hours. The charge for installing and removing flow-restricting devices shall be the actual cost based upon the size of the meter and the reasonable cost of installation, but shall not be less than twenty-five dollars each during regular hours and forty dollars each during any other time. The Utility may use a schedule of charges based on meter size and average installation cost. The charge shall be paid along with the regular bill.

4. For any subsequent violation, by any customer of the Utility, of any of the provisions of Sections 12.06.090, 12.06.100, and 12.06.110 within the preceding twelve calendar months, the Utility shall issue a written notice, pursuant to Section 12.06.130, of its intent to install a flow restrictor no earlier than ten working days after the notice, and thereafter the Utility may either install a flow restricting device for a period of time of not less than one hundred sixty-eight hours or discontinue water service to that customer at the premises at which the violation occurred. The charges shall be the same as detailed in Subsection A.3 of this section.

B. Hearing. Any customer against whom (1) a penalty has been levied pursuant to this section, or (2) a notice on flow restrictor installation has been served, shall have a right to a hearing by the Utility upon the written request of that customer to the Utility. Said request must be received within ten days of notification of the violation. If the issue is not resolved to the customer's satisfaction then the customer shall have the right to appeal to the Citizen's Appeals Board, as provided in Section 12.06.140.

C. Reservation of Rights. The rights of the Utility hereunder shall be in addition to any other rights of the Utility, including those to discontinue service.

D. Use of Penalty Funds. All monies collected by the Utility pursuant to any of the penalty provisions of this chapter shall be deposited in the Water Supply Shortage Conservation Plan Fund.

(Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.130. Notice of violation.

Except as otherwise provided in this section, any written notice required by the Water Supply Shortage Conservation Plan to be given to a customer for failure to comply with the provisions hereof shall set forth the fact of the customer's failure to comply with the applicable provision or provisions of the plan, and any proposed action taken by the Utility for such failure to comply. The notice shall inform the customer of his/her right to a hearing and the procedure to be followed to obtain such hearing. The Utility shall give notice of each violation to the customer committing such violation as follows:

A. For a first or second violation of the provisions of Sections 12.06.090, 12.06.100, and 12.06.110 the Utility shall give written notice of the fact of such violation to the customer, either personally or by regular mail, to the customer's billing address.

B. If the penalty assessed is or includes the installation of a flow restrictor or the discontinuance of water service to the customer, for any period of time whatsoever, notice of the violation shall be given in the following manner:

1. By delivering a written notice to the customer personally; or

2. If the customer is absent from or unavailable at the premises at which the violation occurred, by leaving a copy with a responsible person at the premises and sending a copy through the regular mail to the address at which the customer is normally billed; or

3. If a responsible person cannot be found, then by affixing a copy in a conspicuous place at the premises at which the violation occurred, and also sending a copy through the mail to the address at which the customer is normally billed.

(Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.140. Relief from compliance.

A. Administrative Relief. A customer may file an application for relief from any provisions of this chapter. The Utility shall appoint a Hearing Officer for all such cases, and shall develop such procedures as it considers necessary to resolve such applications at the department level. Upon the filing by a customer of an application for relief, the Hearing Officer shall take such steps as he/she deems reasonable to resolve the application. The application may include requests for relief from penalties and prohibited uses, and requests for relief from an increase in water bill associated with the water supply shortage rate provisions of Sections 12.06.090, 12.06.100, and 12.06.110.

A written decision of the Hearing Officer, including notice to the customer of his right to appeal to the Citizens Appeals Board, shall be given to the customer personally or by mail within fifteen days. A customer shall exhaust all administrative remedies provided by this section prior to filing an appeal with the Citizens Appeals Board.

B. Citizens Appeals Board(s) Established. The City Council shall establish one or more Citizens Appeals Boards, consisting of at least three but not more than five members, to hear appeals concerning applications for relief of violations that a customer or water user cannot resolve with the Hearing Officer. The City Council shall adopt such rules and regulations as it, in its sound discretion, deem reasonable and necessary to the formation, procedure and operation of the Citizens Appeals Board.

In all cases where a customer has filed an application for relief from the provisions of this chapter or has appealed a violation, and has failed to resolve said application or violation appeal with the Hearing

Officer, the customer shall have the right to appeal the decision of the Hearing Officer to the Citizens Appeals Board by filing a written request for appeal within ten days after receipt of the decision of the Hearing Officer. This shall automatically stay the implementation of the proposed course of action by the Utility pending the decision of the Citizens Appeals Board. The Citizens Appeals Board shall hear the appeal, within fifteen days after receipt of such a request, and shall issue a written decision within fifteen days, which decision shall be final.

C. Determining relief from an increase in water bill associated with the Water Supply Shortage Rate Provisions. In determining whether relief shall be granted, the Utility and the Citizens Appeals Board shall take into consideration all relevant factors, including but not limited to, whether the customer's total water bill was significantly greater than the bill normally received, coupled with a compelling reason for the account not conserving an amount of water such that, had it been conserved, the total bill would not have been significantly greater than the normal pre-water shortage bill.

(Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.150. General provisions.

A. Reports: The Utility may, by written request, require all commercial and industrial customers of the Utility using twenty thousand or more billing units per year to submit a water conservation plan to the Director of Engineering and to submit quarterly to said Director a report on the progress of their conservation plans.

B. City Conservation Reports: All City departments shall submit to the City Manager monthly reports on their water conservation efforts. Their reports shall be consolidated by the City Manager and reported from time to time to the City Council.

C. Additional Water Conservation Measures: The City Council may order implementation of water conservation measures in addition to those set forth in Sections 12.06.090, 12.06.100, and 12.06.110. Such additional water conservation measures shall be implemented in the manner provided in Section 12.06.060.

D. Enforcement. The Utility shall enforce the provisions of this chapter. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.160. Public nuisance.

In addition to the penalties provided in this chapter, any condition caused or permitted to exist in violation of any of the provisions of this chapter shall be deemed a public nuisance and may be, by the City, summarily abated as such, and each day such condition continues shall be regarded as a new and separate offense. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

12.06.170. Severability.

If any part of this chapter, or the application thereof to any person or circumstances, is for any reason held invalid by a court of competent jurisdiction, the validity of the remainder of the chapter or the application of such provision to other persons or circumstances shall not be affected. (Ord. 3118 (part), 2008; Ord. 2752 (part), 1991).

Ordinance No. 3134

ORDINANCE NO. 3134

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF FULLERTON, CALIFORNIA, AMENDING TITLE 15 OF THE FULLERTON MUNICIPAL CODE PERTAINING TO LANDSCAPING AND IRRIGATION REQUIREMENTS

PRJ09-00272 – LRP09-00008

CITY OF FULLERTON

THE CITY COUNCIL OF THE CITY OF FULLERTON DOES ORDAIN AS FOLLOWS:

1. That Title 15 of the Fullerton Municipal Code pertaining to landscaping and irrigation requirements will be amended as shown on Attachment A.

ADOPTED BY THE FULLERTON CITY COUNCIL ON December 15, 2009.

Don Bankhead, Mayor

ATTEST:

Beverley White City Clerk

Attachment A
Ordinance No. 3134

FULLERTON LANDSCAPE ORDINANCE

ADD ENTIRE CHAPTER

15.50 Landscaping and irrigation standards (Fullerton Landscape Ordinance)

15.50.010. Purpose and Intent

A. The purpose of the Fullerton Landscape Ordinance is to establish standards for the provision of landscaping within the City of Fullerton while promoting conservation and the efficient use of water, prevention of erosion, protection from fire, and restoration of natural systems.

B. The intent of the Fullerton Landscape Ordinance is to maximize the range of landscape materials and design possibilities within the framework established by this Chapter.

C. The Fullerton Landscape Ordinance includes by reference the following chapters of the Fullerton Municipal Code:

9.06 – Community Forestry
12.06 – Water Supply Shortage Conservation Plan
12.04 – Water Regulations
12.18 – Water Quality Ordinance
13.19 – Fire Prevention Standards
14.03 – Erosion Control

If a discrepancy arises between Chapter 15.50 and the above chapters, the provisions requiring the most landscaping quantities and the stricter design criteria shall apply, unless otherwise determined by the Directors of Development Services and Engineering and the Fire Chief.

15.50.015. Applicability and Exemptions

A. The Fullerton Landscape Ordinance applies to:

1. Landscaping required for single- and two-family residential zoned properties pursuant to Section 15.17.050.H;

2. Landscaping required for multi-family residential zoned properties pursuant to Section 15.17.070.G;

3. Landscaping required for planned residential development zoned properties pursuant to Section 15.20.050.E;

4. Landscaping required for specific plan district zoned properties pursuant to Section 15.21.060;

5. Landscaping required for oil-overlay zoned properties pursuant to Section 15.22.110;

6. Landscaping required for public-land zoned properties pursuant to Section 15.25.050;

7. Landscaping required for commercial zoned properties pursuant to Section 15.30.050.G;

8. Landscaping required for commercial-greenbelt zoned properties pursuant to Section 15.35.050.J;

9. Landscaping required for industrial zoned properties pursuant to Section 15.40.040.G

10. Landscaping required for commercial stables pursuant to Section 15.55.030.C.2.g; and

11. Landscaping required for parking areas pursuant to Section 15.56.130.

B. The Fullerton Landscape Ordinance does not apply to:

1. Local, state or federal historic or cultural resources where application of the Landscape Ordinance would be in conflict with the Secretary of the Interior's Standards for the Treatment of Historic Properties or other such relevant standards

2. Site alterations to intentionally establish or re-establish a defined, indigenous ecosystem without a permanent irrigation system

3. Plant collections, as part of botanical gardens and arboretums open to the public

15.50.25. General Provisions

A. Each landscaped area shall be located, designed and material selected such that at any time, including at maturity, it maximizes summer shade and winter solar gain and does not, interfere with visibility, access, building integrity, or utility infrastructure.

B. Each landscaped area shall be designed to minimize disruption to existing mature landscaping that is in good, healthy condition, and every effort shall be made to retain and incorporate said landscaping into the overall landscape theme.

C. Each landscaped area shall include a combination of materials compatible with the shape, topography and soil conditions of the site, as well as the architectural characteristics of the structure(s) on the site.

D. Each landscaped area shall use native and appropriate non-native plants adapted to site conditions, climate, and design intent to support biodiversity, reduced pesticide use, and water conservation, with particular avoidance of the use of invasive plant species defined by the California Invasive Plant Council.

E. Each landscaped area shall be designed with an efficient irrigation system that waters only targeted areas when needed in relation to soil and climatic conditions.

F. Each landscaped area shall be installed in accordance with approved landscape and irrigation plans.

G. Each landscaped area shall be regularly maintained following installation to reach and retain a healthy, established growing condition.

15.50.30. Requirements and Procedures for Review

A. A Landscape Documentation Package shall be submitted to the City for review and approval for all projects subject to the provisions of the Fullerton Landscape Ordinance.

B. A standard Landscape Documentation Package shall include:

1. Water Efficient Landscape Calculations pursuant to 15.50.35

2. Agricultural Suitability Report pursuant to 15.50.40

3. Certified Landscape Design Plan pursuant to 15.50.45

4. Certified Irrigation Design Plan pursuant to 15.50.50

5. Final Project Certification pursuant to 15.50.55

6. One-year Maintenance Deposit pursuant to 15.50.60

C. Certain projects shall require additional information as part of the Landscape Documentation Package as follows:

1. Irrigation Audit Report pursuant to Section 15.50.55.C

2. Private Yard and Open Space Documentation pursuant to Section 15.50.90.B

D. The following Landscape Documentation Package Items shall be submitted for review and approval prior to the issuance of building permits:

1. Water Efficient Landscape Calculations

2. Agricultural Suitability Report, where project grading is minimal such that the soil characteristics will not be significantly altered during construction

3. Certified Landscape Design Plan

4. Certified Irrigation Design Plan

E. Installation of landscaping and irrigation subject to a Landscape Documentation Package shall not proceed without the issuance of Landscape, Plumbing, and/or Water Engineering permits.

F. The following Landscape Documentation Package Items shall be submitted for review and approval as a prerequisite to the final occupancy approval of the property:

1. Agricultural Suitability Report, where project grading impacted the soil characteristics

2. Final Project Certification

3. One-year Maintenance Deposit

4. Irrigation Audit Report when required by Section 15.50.55.C

5. Private Yard and Open Space Documentation when required by Section 15.50.90.B

15.50.35. Water Efficient Landscape Calculations

A. Water Efficient Landscape Calculations shall be prepared by and bear the signature of a professional appropriately licensed in the State of California to provide professional landscape design services; the signature shall be accompanied by a date and the following statement: "I have complied with the City of Fullerton Landscape Ordinance in preparing the Water Efficient Landscape Calculations."

B. The licensed landscape professional shall calculate the Maximum Applied Water Allowance (MAWA) for the total landscaped area to establish the upper limit of irrigation water that shall be used by the project annually. The MAWA shall be calculated using the formula and methodology established in Exhibit A to the Fullerton Landscape Ordinance. A separate worksheet shall be prepared for each point of connection. Seasonal calculations can be aggregated for an annual total.

1. The MAWA for landscaped areas shall be calculated using an Evapotranspiration Adjustment Factor (ETAF) of 0.7. The MAWA for special landscaped areas shall be calculated using an ETAF of 1.0.

2. The MAWA shall be calculated using a Reference Evapotranspiration Rate (ETo) in accordance with Table 15.50.35.A.

Table 15.50.35.A. Reference Evapotranspiration (ETo) Table

County and City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
Orange													
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2

* The values in this table were derived from: 1) California Irrigation Management Information System (CIMIS), 2) Reference Evapotranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999, 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922, 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426. Measurements are from the city of Santa Ana which is the closest city in the same reference evapotranspiration zone for which data has been collected.

C. The licensed landscape professional shall calculate the Estimated Applied Water Use (EAWU) for the total landscaped area to determine the total annual irrigation water need of the project as required to keep plants in a healthy state. The EAWA shall be calculated using the formula and methodology established in Exhibit B to the Fullerton Landscape Ordinance. A separate worksheet shall be prepared for each point of connection. Seasonal calculations can be aggregated for an annual total.

1. The EAWU shall be calculated using a Reference Evapotranspiration Rate (ETo) in accordance with Table 15.50.35.A.

2. The EAWU shall be calculated using a Landscape Coefficient according to protocols defined in detail in the Water Use Classification of Landscape Species (WUCOLS). The species factor shall be determined for each hydrozone based on the highest-water-use plant species within the zone.

   a. The area of a special landscaped area or water feature shall be defined as a high water use hydrozone with a species factor of 1.0 unless a Landscape Coefficient according to protocols defined in detail in the Water Use Classification of Landscape Species (WUCOLS) is available.

   b. A temporarily irrigated hydrozone area, such as an area of highly drought-tolerant native plants that are not intended to be irrigated after they are fully established, shall be defined as a very low water use hydrozone with a species factor of 0.1.

3. The EAWU shall be calculated using an Irrigation Efficiency assumption by head type in accordance with Table 15.50.35.B. Other values may be used when supported by manufacturer's specifications or landscape professional's calculations when derived from measurements and estimates of irrigation system characteristics and management practices.

Table 15.50.35.B. Irrigation Efficiency (IE) Table

Head Type	Efficiency
Spray head	60%
Pop-up stream rotator heads	75%
Stream rotor heads	75%
Micro-spray	75%
Bubbler	80%
Drip emitter	85%
Subsurface irrigation	90%

D. The EAWU for the total landscaped area shall not exceed the MAWA.

15.50.40. Agricultural Suitability Report

A. The licensed landscape professional shall submit soil samples to a certified agronomic soils laboratory for analysis and recommendations in order to ensure landscaped area is designed to drain to promote healthy plant growth and to prevent excessive erosion and runoff. These samples shall be taken when the soil

conditions of the landscape areas will no longer be impacted by grading or other earthmoving activities.

B. Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

C. The minimum information to be included in the report shall be:

- Soil texture;
- Infiltration rate determined by laboratory test or soil texture;
- Infiltration rate table;
- pH;
- Total soluble salts;
- Sodium;
- Percent organic matter; and
- Recommendations to ensure landscaped areas are designed to drain to promote healthy plant growth and to prevent excessive erosion and runoff.

D. Information and recommendations from the Agricultural Suitability Report shall be incorporated into the Certified Landscape and Irrigation Design Plans, as set forth in Sections 15.50.45 and 15.50.50.

15.50.45. Certified Landscape Design Plan

A. Design Requirements

1. Landscaped areas shall be designed in accordance with the following:

a. Designs and materials shall be in accordance with the General Provisions as set forth in Section 15.50.25;

b. The EAWU for the total landscaped area shall not exceed the MAWA as set forth in Section 15.50.35;

c. The following Minimum Planting Requirements shall be applied:

i. A minimum of one tree (minimum size: 15-gallon container) shall be provided for every 200 square feet of landscaped area on the property. The number of required trees may be reduced by the Director of Development Services when it is determined that an alternative design will meet the intent of this section.

ii. A minimum of one shrub shall be provided for every 15 square feet of landscaped area other than turf areas. Fifty percent of the required shrubs shall be a minimum of a five-gallon container. The Director of Development Services may reduce the number of required shrubs when it is determined that an alternative design will meet the intent of this section.

iii. Turf shall not be treated as a fill in material, but rather as a planned element of the landscape. The use of turf grass is only recommended in active use areas where it provides a playing surface. Groundcovers and

drought tolerant grasses that require less water are recommended in non-active areas. Turf for non-active use shall be limited to 25% of the landscaped area or as otherwise restricted by the MAWA. Turf shall not be permitted in landscaped areas with a slope percentage greater than 25%. Where turf is utilized, it shall be separated from other landscape areas by a border, mow strip, or other material as approved by the Director of Development Services.

iv. Planting design (species, quantity, size and spacing) shall achieve 70% landscape area coverage within 2 growing seasons from installation.

v. The exposed soil surfaces on the ground plane shall be covered with a minimum two-inch layer of material to improve waterholding capabilities of soil through reduced evaporation and compaction. Material may be decorative gravel, stones, decomposed granite, compost, or mulch as appropriate for the plant material and of a size sufficient to remain in place once it has been installed. Stabilizing mulching products shall be used on slopes.

vi. Plant material shall be utilized to: screen trash enclosures and public utilities and connections; relieve solid, unbroken building elevations and soften continuous wall expanses; or as otherwise required by Fullerton Municipal Code 15.46.050.A and 15.47.050.A.

vii. All planting areas shall be separated from parking and vehicular circulation areas by a raised, continuous six-inch Portland cement concrete curb. The Director of Development Services may approve other materials that accomplish the same purpose.

viii. Projects including unimproved private yards or open spaces to be landscaped or otherwise completed by the buyer of the lot shall comply with Section 15.50.90.A.

ix. Artificial plants and surfaces painted to appear as plant material are not acceptable under any circumstances in a landscaped area. Synthetic turf shall be permitted pursuant to Fullerton Municipal Code Section 15.56.140.

d. Materials shall be located by hydrozone such that:

i. Hydrozones shall consist of plants materials with similar water use except where specified as a permitted mix.

ii. Individual hydrozones that mix plants of moderate and low water use or moderate and high water use shall be permitted if:

- The plant factor calculation is based on the proportions of the respective plant water uses and their respective plant factors; or
- The plant factor of the higher water using plant is used for the calculations.

iii. Individual hydrozones that mix high and low water use plants shall not be permitted.

e. No water shall be used to clean, fill, or maintain levels in decorative water features, or other similar aesthetic structures, unless such water is part of a recycling system.

B. Content

1. Plans shall:

a. Be prepared by and bear the signature of a professional appropriately licensed in the State of California to provide professional landscape design services; the signature shall be accompanied by a date and the following statement: "I have complied with the City of Fullerton Landscape Ordinance in preparing the Landscape Design Plan;

b. Provide project summary information which at a minimum includes:

- Project Number
- Project Location (Street Address)
- Zoning Classification of the Project Location
- Landscaped Area (in square feet)
  - Planting Area (in square feet)
  - Turf Area (in square feet)
  - Water Feature Area (in square feet)
- Special Landscaped Area (in square feet)

c. Identify components of the Total Landscaped Area:

i. Planting Areas and Turf Areas

- Delineate and label each hydrozone by number, letter, or other method for identification and indicate on a separate table the water use for each hydrozone (low, moderate, high, low-moderate mix, or moderate-high mix);

- Spatially locate the planting materials within each hydrozone and indicate on a separate table the size, quantity and WUCOLS species factor of each plant by hydrozone;

- Identify location type of material to cover exposed soil surfaces and application depth;

- Identify location and type of separation between turf and planting areas;

- Identify location and type of separation between planting areas and parking and vehicular circulation areas;

- Identify soil amendments, type, and quantity based on Agricultural Suitability Report;

- Indicate height of graded slopes and slope percentage;

- Indicate proposed drainage patterns, proposed topography of site with a separate identification of areas to be compacted, and location of retaining or non-retaining walls; alternatively the grading plan and wall plan submitted for the project shall be provided;

- Indicate methods of tree staking or guying for single and multi-trunk trees, as appropriate, and indicate time after which stakes or guys can be removed; a minimum of two stakes on either side of the tree or three guy wires equidistantly spaced around the tree shall be required; central nursery stakes shall be removed once staked or guyed per plan;

- Indicate method to espalier vines, as appropriate; nursery stakes or trellises shall be removed once espaliered per plan.

ii. Water Features

- Identify type of water features;

- Identify if water is recirculated;

- Identify if water is recycled;

- Identify surface area of water features;

d. Identify pervious or non-pervious hardscapes surrounded by or abutting landscape areas;

e. Identify location of, for reference purposes only, any storm water best management practices that encourage on-site retention and infiltration of storm water;

f. Identify any rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);

g. Identify locations of buildings and other structures on site;

h. Identify locations of above-ground utilities and connections as well as trash enclosures;

i. Include a schedule for on-going maintenance.

15.50.50. Certified Irrigation Design Plan

A. Design Requirements

1. Irrigation systems shall be designed in accordance with the following:

   a. Designs and materials shall be in accordance with the General Provisions as set forth in Section 15.50.25;

   b. The EAWU for the total landscaped area shall not exceed the MAWA as set forth in Section 15.50.35;

   c. The system shall be appropriate for and conform to the hydrozones of the landscape design plan;

   d. The system shall utilize "smart" automated irrigation technology as follows:

      i. Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data shall be required for irrigation scheduling in all irrigation systems;

      ii. Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions to avoid irrigation during windy or freezing weather or during rain;

      iii. High flow sensors that detect and report high flow conditions created by system damage or malfunction shall be provided for landscape areas with a slope greater than 5 feet height or for a landscape area over 25,000 square feet in size; and

   e. The following System Specifications shall be applied:

      i. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

      ii. Minimum average system irrigation efficiency shall be 0.71.

      iii. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

      iv. Trees shall utilize bubbler or drip irrigation and, where feasible, be placed on separate valves from shrubs, groundcovers, and turf.

      v. Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

      vi. In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

vii. Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

viii. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to high traffic areas.

ix. Check valves or anti-drain valves shall be utilized to minimize or prevent low-head drainage.

x. Narrow or irregularly shaped turf areas less than eight (8) feet in width shall be irrigated with subsurface irrigation or micro-spray heads.

xi. Spray heads, pop-up stream rotator heads, and stream rotor heads shall not be permitted within 24 inches of any non-permeable surface unless the adjacent non-permeable surface is designed and constructed to drain entirely to landscaping.

xii. Turf areas shall be irrigated with equipment that has a precipitation rate of one inch or less per hour as specified by the manufacturer.

xiii. Areas with a slope percentage greater than 25% shall be irrigated with equipment that has a precipitation rate of 0.75 inches or less per hour as specified by the manufacturer. An exception to the precipitation rate may be granted by the Director of Development Services for an area which is less than 5 feet high and 12 feet in long if it can be shown that the equipment meets the intent of this Ordinance.

xiv. Manual shut-off valves shall be provided as close as possible to the point of connection to minimize water loss in case of an emergency or routine repair.

xv. Dynamic or operating pressure at each emission device shall be within the manufacturer's recommended pressure range for optimal performance:

- Pressure (static and dynamic/operating) and water supply flow measurements shall be taken at the point of connection or nearest service point at the earlier of the design stage or installation;

- Pressure-regulating devices, booster pumps, or other devices shall be installed if the static pressure is above or below the pressure required by the irrigation system.

xvi. Projects including unimproved private yards or open spaces to be landscaped or otherwise completed by the buyer of the lot shall comply with Section 15.50.90.A.

f. Backflow shall be prevented in accordance with Plumbing Code and Engineering Department requirements.

g. Separate water meters for irrigation shall be provided when required by State law.

B. Content

1. Plans shall:

a. Be prepared by and bear the signature of a professional appropriately licensed in the State of California to provide professional irrigation design services; the signature shall be accompanied by a date and the following statement: "I have complied with the City of Fullerton Landscape Ordinance in preparing the Irrigation Design Plan;

b. Provide project summary information which at a minimum includes:

- Average irrigation efficiency of total landscaped area

- Percentage of total landscaped, based on square footage, irrigated with spray heads (spray, pop-up stream rotator, stream rotor, or other spray) versus non-spray heads (micro-spray, bubbler, drip emitter, subsurface, or other non-spray)

c. Identify components of the Landscaped Area:

i. Planting Areas and Turf Areas

- Delineate and label each hydrozone by number, letter, or other method for identification and indicate on a separate table the water use for each hydrozone (low, moderate, high, low-moderate mix, or moderate-high mix);

- Spatially locate the irrigation system components within each hydrozone and identify corresponding valves by number and indicate on a separate table the type and size of all components including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;

- Identify the location and size of separate water meters or sub-meters for landscape;

- Provide the static water pressure at the point of connection to the public water supply;

- Provide the flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;

- Provide irrigation schedule parameters necessary to program automatic irrigation controllers for the landscape establishment period

(first 6 months after installation unless otherwise specified by landscape professional); and

- Provide irrigation schedule parameters necessary to program automatic irrigation controllers following the establishment period.

ii. Water Features

- Spatially locate recirculating system and components; and

- Spatially locate recycled or reclaimed water system and components.

15.50.55. Final Project Certification

A. Installation of the landscape and irrigation in accordance with approved plans shall be certified by the licensed landscape professional who prepared the Certified Landscape Design Plans and the licensed professional who prepared the Certified Irrigation Design Plans;

B. Establishment period and post-establishment period irrigation schedule parameters shall be affixed inside irrigation controller boxes;

C. For landscaped areas with 75% or more of the total landscaped area irrigated with spray heads (spray, pop-up stream rotator, stream rotor, or other spray head), an irrigation audit report shall be provided from a certified irrigation auditor to verify that the irrigation system is operating as designed and that the design complies with the Fullerton Landscape Ordinance.

15.50.60. One-year Maintenance Deposit

A. A one-year maintenance deposit in the amount equal to 50 percent of the combined cost of the landscaping materials and irrigation system, or as otherwise agreed to by the Director of Development Services, but not less than 500 dollars, shall be posted as a prerequisite to the final approval/clearance of the use or development of property.

15.50.70. Modifications to Approved Plans

A. Modifications to approved Water Efficient Landscape Calculations, Certified Landscape Design Plans and/or Certified Irrigation Design Plan shall be reviewed and approved by the Director of Development Services prior to installation of said landscaping or irrigation system. All modifications require re-certification pursuant to 15.50.35.A, 15.50.45.B.1.a, or 15.50.50.B.1.a, respectively.

15.50.80. Landscape Maintenance Requirements

A. Each landscaped area shall be regularly maintained including proper pruning, staking, mowing and aerating of lawns, weeding, removing litter, fertilizing, and replenishing mulch as needed to replace mineral levels. Plants shall remain in a

healthy growing condition or replaced. Like-for-like replacements require no approval. Modifications shall be reviewed pursuant to 15.50.70.

B. The irrigation system shall be regularly maintained and evaluated to utilize the minimum amount of water required to maintain plant health. Broken or damaged parts shall be replaced. Like-for-like replacements require no approval. Modifications shall be reviewed pursuant to 15.50.70.

15.50.90. Treatment of Private Yards or Open Space

A. When a project is being developed that includes unimproved private yards or open spaces to be landscaped or otherwise completed by the buyer of the lot, the Landscape Documentation Package shall be prepared with assumptions as to the ultimate improvement of these areas such that the Water Efficient Landscape Calculations consider all outdoor water use of the project.

B. The CC&Rs, or other binding document provided to buyer at time of sale (if the project does not have CC&Rs), shall include sufficient parameters such that the private yard or open space improvements are completed consistent with the estimated water usage. The information provided to the buyer shall include, at a minimum, sample landscape and irrigation plans with plant and material pallets. It is recommended that multiple designs be developed with a menu of options from which the buyer could develop a design consistent with the Water Efficient Landscape Calculation assumptions.

Exhibit A

MAXIMUM APPLIED WATER ALLOWANCE WORKSHEET

This worksheet, or similar containing the same information, shall be filled out by the landscape professional for each point of connection.
All sections shall be completed. If multiple points of connection, a summary sheet shall be provided for total project MAWA.

Point of Connection #__

Maximum Applied Water Allowance (MAWA)

MAWA = (ETo x 0.7 x LA x 0.62) + (ETo x 1.0 x SLA x 0.62) = Gallons per year for LA+SLA

where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
ETAF = Evapotranspiration Adjustment Factor
LA = Landscaped Area (square feet)
SLA = Special Landscaped Area (square feet)
0.7 = ETAF for Landscaped Area
1.0 = ETAF for Special Landscaped Area
0.62 = Conversion factor (to gallons per square foot)

MAWA Calculation:

	ETo		ETAF		LA or SLA (ft^2)		Conversion		MAWA (Gallons Per Year)
MAWA for LA		x	0.7	x		x	0.62	=	
MAWA for SLA		x	1.0	x		x	0.62	=	
Total MAWA =									

Exhibit B

ESTIMATED APPLIED WATER USE WORKSHEET

This worksheet, or similar containing the same information, shall be filled out by the landscape professional for each point of connection.
All sections shall be completed. If multiple points of connection, a summary sheet shall be provided for total project EAWU.

Point of Connection #__

Estimated Applied Water Use (EAWU)

EAWU = ETo x K_L x LA x 0.62 ÷ IE = Gallons per year

where:

EAWU = Estimated Applied Water Use (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
K_L = Landscape Coefficient
LA = Landscaped Area (square feet)
0 62 = Conversion factor (to gallons per square foot)
IE = Irrigation Efficiency

$K_L = K_s \times K_d \times K_{mc}$

K_s = species factor (range = 0.1-0.9)
K_d = density factor (range = 0.5-1.3)
K_{mc} = microclimate factor (range = 0.5-1.4)

EAWU Calculation:

Hydrozone	ETo		K_L		LA or SLA (ft^2)		Conversion		IE		EAWU (Gallons Per Year)
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
		x		x		x	0.62	÷		=	
Total EAWU =											

DEFINITIONS

ADD
15.04.040

ACTIVE USE TURF means natural or synthetic turf that is installed for sports parks and fields, golf courses, or other playing surfaces and passive recreation areas.

HYDROZONE means a portion of the **LANDSCAPED AREA** having plants with similar water needs and if irrigated, it is by one valve/controller station.

INVASIVE PLANTS means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources.

LANDSCAPED AREA means all the planting areas, non-active use natural turf areas, and water features on a property, including that which is provided in setbacks, parking lots, usable open space areas (private and common), and as visual open space. The **LANDSCAPED AREA** does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, synthetic turf (without an irrigation system), or other non-irrigated areas designated for non-development (e.g. native vegetation). The **LANDSCAPED AREA** also does not include that which qualifies as a **SPECIAL LANDSCAPE AREA**.

NON-ACTIVE USE TURF means natural or synthetic turf that is installed for aesthetic purposes and does not serve a permanent recreational purpose.

NON-PERVIOUS means any surface or material that does not allow for the passage of water through the material and into the underlying soil.

OPEN PARKING AREA means that portion of a property delineated for surface parking and includes the area attributable to the driveways and drive aisles to provide access and circulation to and through the parking area.

PEDESTRIAN AND VEHICULAR ACCESS WAYS means any improved pervious or non-pervious hardscape surface for pedestrian and/or vehicular movement including walkways, driveways, fire access drives, and private streets.

PERVIOUS means any surface or material that allows the passage of water through the material into the underlying soil.

REHABILITATION OF EXISTING LANDSCAPED AREAS means the replacement of more than 50% of the material in existing planting or turf areas with species other than like of like.

SLOPE HEIGHT means the difference between the top of the slope and the bottom of the slope, representing the vertical elevation change.

SLOPE PERCENTAGE means the **SLOPE HEIGHT** divided by the linear (horizontal) distance in which the vertical elevation change occurs, multiplied by 100.

SPECIAL LANDSCAPED AREA means the portion of a property dedicated solely to edible plants, areas and water features using recycled water, and turf areas (including synthetic turf for which an irrigation system is installed) dedicated to active use.

TOTAL LANDSCAPE AREA means the **LANDSCAPED AREA** and the **SPECIAL LANDSCAPED AREA** on a property.

WATER FEATURE means a design element in a **LANDSCAPED AREA** where open water performs a decorative or recreational function and includes ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied).

SUPPORTING SECTIONS

R-1 & R-2
REPLACE SECTION
15.17.050.H. Landscaping requirements:

1. The front yard area of the lot shall be maintained with a combination of planting, turf and hardscape areas such that the total area of non-pervious surfaces shall be 40% or less of the total front yard area.

2. For non-residential uses permitted pursuant to Table 15.17.020.A, all open parking areas (e.g. non-structured, non-garage) shall be landscaped such that:

    a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

    b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

    a. Installation of new landscape with a total landscaped area equal to or greater than 5,000 square feet; or

    b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 5,000 square feet.

4. Landscaping and irrigation not subject to Chapter 15.50 shall be encouraged to:

    a. Utilize resources which identify plants that are native to California or are otherwise appropriate for the region and that have moderate to very low water use following establishment;

    b. Limit the use of turf to active areas; when turf is utilized, select a drought-tolerant variety;

    c. Utilize decorative gravel or pebbles or mulch on ground plane, as appropriate for type of plants, to improve water holding capabilities;

    d. Group plants of similar water requirements together to allow more effective use of irrigation; and

    e. Design the irrigation system to utilize point irrigation systems (including micro-spray, bubbler, drip emitter, or sub-surface) for more efficient delivery of water to root systems and to minimize run off.

R-3 THROUGH R-5
REPLACE SECTION
15.17.070.G. Landscaping requirements:

1. All street and alley setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured, non-garage) shall be landscaped such that:

    a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

    b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

    a. Installation of new landscaped areas; or

    b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

4. The governing documents of a common interest development (e.g. community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351) shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group or restricting compliance with a local water-efficient landscape ordinance or water conservation measure.

PRD
ADD SECTION
15.20.050.E. Landscaping requirements:

1. All public right-of-way setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured, non-garage) shall be landscaped such that:

    a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area,

whichever is greater, shall be provided and distributed throughout the open parking area; and

b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

4. The governing documents of a common interest development (e.g. community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351) shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group or restricting compliance with a local water-efficient landscape ordinance or water conservation measure.

SPD
ADD SECTION
15.21.060. Landscaping Requirements:

1. All public right-of-way setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured, non-garage) shall be landscaped such that:

   a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

   b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped area where affected landscaped area is equal to or greater than 2,500 square feet.

4. The governing documents of a common interest development (e.g. community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351) shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group or restricting compliance with a local water-efficient landscape ordinance or water conservation measure.

OIL OVERLAY ZONE
REPLACE SECTION
15.22.110. Landscape Requirements:

1. Landscaping shall be provided around wells and be designed to screen from view the full height of the well equipment.

2. Landscaping shall be provided in front of walls and in related setback areas.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

    a. Installation of new landscaped areas; or

    b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

PUBLIC LAND
ADD SECTION
15.25.050. Landscape Requirements:

1. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

    a. Installation of new landscaped areas; or

    b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

COMMERCIAL
REPLACE SECTION
15.30.050.G. Landscape Requirements:

1. All street setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured) shall be landscaped such that:

    a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

COMMERCIAL GREENBELT
ADD SECTION
15.35.050.J. Landscape Requirements:

1. All street setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured) shall be landscaped such that:

   a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

   b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

INDUSTRIAL
ADD SECTION; ELIMINATE 2nd SENTENCE IN 15.40.040.D
15.40.040.G. Landscape Requirements:

1. All street setbacks shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured) shall be landscaped such that:

a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

DEVELOPMENT PROJECT
CHANGE REFERENCED CODE SECTION FROM 15.56.140 TO CHAPTER 15.50.
15.46.080.F.4

SITE PLAN
CHANGE REFERENCED CODE SECTION FROM 15.56.140 TO CHAPTER 15.50.
15.47.060.F.4

COMMERCIAL STABLE
REPLACE SECTION
15.55.030.C.2.g. Landscape Requirements:

1. Landscaping shall be provided along all property lines and in minimum dimension of 10 feet.

2. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

   a. Installation of new landscaped areas; or

   b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

PARKING AREAS
ADD SECTION; ELIMINATE LAST SECTION OF 15.56.130.B.
15.56.130.D. Landscape Requirements:

1. All street setbacks as required by the underlying zoning classification shall be landscaped except for pedestrian and vehicular access ways, parking areas, or other non-irrigated areas designed for non-development (e.g. existing native vegetation).

2. All open parking areas (e.g. non-structured) shall be landscaped such that:

    a. Planters with a total landscaped area equaling a minimum of 25 square feet per parking space, or 8% of the square footage of the open parking area, whichever is greater, shall be provided and distributed throughout the open parking area; and

    b. Trees with a total shaded area (e.g. the area under the tree canopy or dripline 15 years after installation) equaling a minimum of 50% of the square footage of the open parking area shall be provided and distributed throughout the open parking area.

3. Landscaping and irrigation shall be provided for landscaped areas pursuant to Chapter 15.50 for the following:

    a. Installation of new landscaped areas; or

    b. Rehabilitation of existing landscaped areas where affected landscaped area is equal to or greater than 2,500 square feet.

SYNTHETIC TURF
REPLACE SECTION; CHANGE TITLE FROM LANDSCAPING AND IRRIGATION REQUIREMENTS TO SYNTHETIC TURF
15.56.140

f. The use of artificial plants and surfaces painted to appear as plant material are prohibited in a landscaped area except as provided by this section.

g. The use of synthetic turf on areas with a slope percentage greater than 5% shall not be permitted.

h. Synthetic turf that complies with the following standards shall be permitted:

    1. Material

        a. Synthetic turf shall:

            i. Simulate the appearance of live turf, organic turf, grass, sod or lawn;

            ii. Be of a type known as cut pile infill with pile fibers a minimum height of 1.75 inches;

            iii. Be manufactured from polyethylene;

            iv. Be affixed to a permeable backing;; and

            v. Have a minimum 8-year "No Fade" warranty.

        b. The use of indoor or outdoor plastic or nylon carpeting as a replacement for natural or synthetic turf shall be prohibited.

c. A material other than polyethylene may be approved by the Director of Development Services if the product has been certified to meet applicable environmental and health regulations regarding lead content.

2. Installation

   a. Synthetic turf shall:

      iv. Be installed by a licensed professional pursuant to manufacturer's requirements;

      v. Be installed over a subgrade prepared to provide positive drainage and an evenly graded mass of compacted, porous crushed rock aggregate material;

      vi. Be anchored at all edges and seams;

   b. A drainage system shall be installed underneath the turf to prevent excessive runoff or pooling;

   c. Where multiple panels are used, the change from one panel to the next shall not be readily visible and seams shall be joined in a tight and secure manner;

   d. An infill medium consisting of clean silica sand or other approved mixture shall be brushed into the fibers to ensure that the fibers remain in an upright position and to provide ballast that will help hold the turf in place and provide a cushioning effect.

   e. Areas of living plant material shall be installed or maintained in conjunction with the installation of synthetic turf when utilized in the front yard area or street, alley or other public right-of-way setback areas. Living plant material shall include shrubs, vines, trees and groundcovers in separate planter areas and tree wells.

   f. Synthetic turf shall be separated from planter areas and tree wells by a concrete mow strip, bender board, or other barrier with a minimum 3/8" thickness to prevent the intrusion of living plant material into the synthetic turf areas.

   g. Use of an irrigation system for non-active use turf shall be prohibited.

   h. An existing irrigation system that will not be utilized for the synthetic turf may remain, however, heads shall be removed and pipes shall be capped below ground.

3. Maintenance

   d. Synthetic turf shall be maintained in a green fadeless condition and free of weeds, debris, tears, holes, and impressions.

   e. The use of water to clean synthetic turf is discouraged.

4. Material Specifications and Plans

    a. Materials specifications and plans shall be provided to the Director of Development Services for review and approval prior to the installation of the synthetic turf.

    b. The submittal shall include:

        i. A landscape plan showing the area of synthetic turf, area of living plant material, and separation material between these areas;

        ii. A dimensioned cross section of proposed materials and installation details, including subgrade, drainage, base or leveling layer, and infill;

        iii. Edge material and detail for treatment of seams; and

        iv. Material description and specifications, including manufacturer, installer (with contact information), and warranty information.

LANDSCAPE MAINTENANCE REQUIREMENTS
ELIMINATE SECTION (INCLUDED IN 15.50)
15.56.150

City of Fullerton
ORDINANCE CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF ORANGE) SS
CITY OF FULLERTON)

ORDINANCE NO. 3134

I, Beverley White, City Clerk and ex-officio Clerk of the City Council of the City of Fullerton, California, hereby certifies that the whole number of the members of the City Council of the City of Fullerton is five; and that the above and foregoing Ordinance No. 3134 had first reading by title only, introduction, and further reading waived at the December 1, 2009 City Council regular meeting and was adopted at the December 15, 2009 City Council regular meeting by the following vote:

COUNCIL MEMBER AYES:	Bankhead, Keller, Jones, Nelson, Quirk-Silva
COUNCIL MEMBER NOES:	None
COUNCIL MEMBER ABSENT:	None

Beverley White, City Clerk

Appendix E

60 Day Notification Letters

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Mike Markus
General Manager
Orange County Water District
PO Box 8300
Fountain Valley, CA 92728

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Markus,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Kevin Hunt
General Manager
Metropolitan Water District of Orange County
PO Box 20895
Fountain Valley, CA 92728

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Hunt,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Deven Upadhyay
Manager, Water Resource Management Group
Metropolitan Water District
PO Box 54153
Los Angeles, CA 90054-0153

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Upadhyay,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Rob Hanford
District Manager
Golden State Water District
1920 W. Corporate Way
Anaheim, CA 92801

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Hanford,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON
Engineering Department

March 21, 2011

Mr. Thom Coughran
Director of Public Works
City of La Habra
201 E. La Habra Boulevard
La Habra, CA 90633

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Coughran,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

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Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Jim Biery
Director of Public Works
City of Buena Park
6650 Beach Boulevard
Buena Park, CA 90622

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Biery,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

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Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Tim O'Donnell
City Manager
City of Brea
One Civic Center Circle
Brea, CA 92821

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. O'Donnell,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

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If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON
Engineering Department

March 21, 2011

Mr. Rick Shintaku
Water Resources & Planning Manager
City of Anaheim
201 S. Anaheim Blvd., Suite 601
Anaheim, CA 92805

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Shintaku,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

CITY OF FULLERTON

Engineering Department

March 21, 2011

Mr. Steve Drinovsky
Director of Public Works
City of Placentia
401 E. Chapman Avenue
Placentia, CA 92870

Re: Fullerton's 2010 Urban Water Management Plan Preparation

Dear Mr. Drinovsky,

This letter serves as a notification that the City of Fullerton Water Utility is currently updating its Urban Water Management Plan (UWMP) in accordance with the Urban Water Management Planning Act of the California Water Code. The Act requires urban water suppliers supplying more than 3,000 acre feet of water annually or providing water to more than 3,000 customers to update their UWMP every five years.

A draft of Fullerton's 2010 UWMP will be available for review prior to the public hearing, which is tentatively scheduled for June 2011. Please contact us if you would like to have a draft sent to you.

If you would like more information or have any questions, please contact Lorrie Lausten at (714) 738-6895 or via email at Lorriel@ci.fullerton.ca.us.

Sincerely,

David Schickling
Water System Manager
City of Fullerton

cc: Don Hoppe, Director of Engineering
File

Appendix F

Public Hearing Notice

Eng= $111.00

(Lorrie)

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA,)
) ss.
County of Orange)

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the **Fullerton News Tribune**, a newspaper that has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, on February 29, 1952, Case No. A-21215 in and for the City of Fullerton, County of Orange, State of California; that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

June 2, 9, 2011

"I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct":

Executed at Santa Ana, Orange County, California, on

Date: June 9, 2011

Signature

Fullerton News Tribune
625 N. Grand Ave.
Santa Ana, CA 92701
(714) 796-7000 ext. 2209

PROOF OF PUBLICATION

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Fullerton City Council will hold a public hearing in the Council Chambers of the Fullerton City Hall, 303 West Commonwealth Avenue, **on Tuesday, June 21, 2011, at the hour of 6:30 o'clock p.m. to receive input on the City's Draft 2010 Urban Water Management Plan. Public input is encouraged, appreciated, and will be considered during finalization of the 2010 Urban Water Management Plan. A copy of the Draft 2010 Plan can be viewed at the Engineering Counter on the second floor at City Hall or on the City's website.**

ALL INTERESTED PERSONS are invited to attend said hearing and express opinions or submit evidence for or against the proposal outlined above.

Pursuant to California Government Code Section 65009 and California Public Resources Code Section 21177, if you challenge the decision of the City Council in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City of Fullerton at, or prior to, the public hearing.

Further information may be obtained at the Engineering Department, David Schickling, Water System Manager, at (714) 738-6382.

FULLERTON CITY COUNCIL
By: Lucinda Williams
City Clerk

Publish: Fullerton News Tribune June 2, 9, 2011 9371813

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA,)
) ss.
County of Orange)

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the **Fullerton News Tribune,** a newspaper that has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, on February 29, 1952, Case No. A-21215 in and for the City of Fullerton, County of Orange, State of California; that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

July 7, 14, 2011

"I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct":

Executed at Santa Ana, Orange County, California, on

Date: July 14, 2011

Signature

Fullerton News Tribune
625 N. Grand Ave.
Santa Ana, CA 92701
(714) 796-7000 ext. 2209

PROOF OF PUBLICATION

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Fullerton City Council will hold a public hearing in the Council Chambers of the Fullerton City Hall, 303 West Commonwealth Avenue, **on Tuesday, July 19, 2011, at the hour of 6:30 o'clock p.m. to receive input on the City's Draft 2010 Urban Water Management Plan. Public input is encouraged, appreciated, and will be considered during finalization of the 2010 Urban Water Management Plan. A copy of the Draft 2010 Plan can be viewed at the Engineering Counter on the second floor at City Hall or on the City's website.**

ALL INTERESTED PERSONS are invited to attend said hearing and express opinions or submit evidence for or against the proposal outlined above.

Pursuant to California Government Code Section 65009 and California Public Resources Code Section 21177, if you challenge the decision of the City Council in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City of Fullerton at, or prior to, the public hearing.

Further information may be obtained at the Engineering Department, David Schickling, Water System Manager, at (714) 738-6382.

FULLERTON CITY COUNCIL
By: Lucinda Williams
City Clerk

Publish: Fullerton News Tribune July 7, 14, 2011 9384165

Appendix G

Energy and Resource Management Committee Memorandum, Copy of Plan Adoption

Energy and Resource Management Committee Memorandum

MEMORANDUM

May 18, 2011

To: City Council / City Manager

CC: David Schickling, Water System Manager / Assistant City Engineer

From: Energy and Resource Management Committee / Citizens Infrastructure Review Committee

Subject: Urban Water Management Plan

At its regular meeting on May 18, 2011, the Energy and Resource Management Committee (ERMC) received a presentation from Lorrie Lausten and David Schickling on the Urban Water Management Plan (UWMP).

The ERMC unanimously voted to recommend to the City Council approval of the UWMP. (4 members present).

Patrick McNelly
Chair, Energy and Resource Committee

Copy of Plan Adoption

CITY OF FULLERTON
Office of the City Clerk

ACTION OF THE CITY COUNCIL/REDEVELOPMENT AGENCY CITY OF FULLERTON July 19, 2011

A Regular Meeting of the City Council/Redevelopment Agency/Public Financing Authority of the City of Fullerton, California, was held on Tuesday, July 19, 2011.

Council/Agency Members Present: Jones, Bankhead, Quirk-Silva, McKinley, Whitaker
Council/Agency Members Absent: None

CITY OF FULLERTON 2010 URBAN WATER MANAGEMENT PLAN

It was moved and seconded to:

1) Adopt the City of Fullerton 2010 Urban Water Management Plan.

Motion carried 5-0.

STATE OF CALIFORNIA)
COUNTY OF ORANGE) SS
CITY OF FULLERTON)

I, Mea Klein, Assistant City Clerk of the City of Fullerton, California, do hereby certify the foregoing to be an official action taken by the City Council/Redevelopment Agency/Public Financing Authority at the above meeting.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 20th day of July, 2011.

Mea Klein, Assistant City Clerk

8001 Irvine Center Drive, Suite 1100
Irvine, CA 92618
949.450.9901 Fax 949.450..9902

MALCOLM PIRNIE | ARCADIS

The Water Division of ARCADIS