Final Draft

2015

URBAN WATER MANAGEMENT PLAN

City of Inglewood

Public Works

August 2016

PSOMAS

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CITY OF INGLEWOOD

2015 URBAN WATER MANAGEMENT PLAN
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E.1. Basis for Preparing 2015 UWMP

The City, and any water agency serving over 3,000 acre-feet of water annually or providing service to more than 3,000 customers, is required to prepare an UWMP in years ending in 5 and 0, and submit it to the Department of Water Resources (DWR). The UWMP Act requires applicable water agencies to develop an UWMP to provide a framework for long term water planning and to inform the public of the supplier's plans to ensure adequate water supplies for existing and future demands.

The UWMP is required to assess the reliability of the agency's water supplies over a 20-year planning horizon, and report its progress on 20 percent reduction in per-capita urban water consumption by the year 2020 as required in the Water Conservation Bill of 2009 (SBx7-7). DWR reviews the agency's UWMP to make sure they have completed the requirements identified in the Water Code Sections 10608-10656, then submits a report to the Legislature summarizing the status of the plans.

E.2. City Water Supply

The City obtains its potable water supply from two sources: imported surface water purchased from the Metropolitan Water District of Southern California (Metropolitan) through West Basin Municipal Water District (WBMWD), and local groundwater produced from the West Coast Groundwater Basin (WCGB) via City wells. The imported water is treated by Metropolitan, and the groundwater is treated at the City's Sanford M. Anderson Water Treatment Plant for the removal of iron and manganese. Treatment includes disinfection. The groundwater and imported water supplies are blended prior to entering the City's water distribution system.

In 2015, the City purchased approximately 80% of its potable water supply from WBMWD and produced approximately 20% of its potable water supply from the local groundwater basin via City owned and operated wells. However, the City is constructing a new well and rehabilitating existing wells to increase groundwater production, and it is estimated that approximately 44% of the City's potable water supply will come from City groundwater in 2020.

The City purchases recycled water from WBMWD. The City currently has 18 service connections to the WBMWD recycled water system. City purchases of recycled water have averaged 721 AFY since 2005, which is approximately 6% of its total water supply. City recycled water use is projected to increase to approximately 1,060 AFY by 2020.

E.3 City Water Service Area Demographics and Planned Growth

The City's water service area (WSA) comprises 79.4% of the City of Inglewood in terms of land area with Golden State Water Company (GSWC) and Cal-American Water Company (CAWC) serving water to the remaining land area of the City. The population of the City's WSA ranged from 73.1% to 77.6% of the City's total population between 2000 and 2015. Projected City populations as estimated by the City's Planning Department, which are consistent with Southern California Association of Governments

(SCAG) population projections, were multiplied by a factor of 0.75 to estimate projected populations for the City's WSA, which are shown in Table E-1. The water service area population is projected to increase from 84,790 in 2015 to 96,384 in 2040, which is a 13.7% increase.

Table E-1: City's WSA Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040	% Increase[(a)]
	84,790	89,890	93,650	94,561	95,472	96,384	13.7

(a) Relative to 2015

The population increase of 5,100 people between 2015 and 2020 is primarily attributable to the Hollywood Park redevelopment project, termed "City of Champions Revitalization Project". The buildout population of 7,500 people is estimated to occur by 2025.

E.4 Historical, Current and Projected City Water Use

Through the implementation of City water conservation ordinances and measures, total water use for the City's WSA area has decreased 10.9% since 2010 and 24.1% since 2005. City WSA per-capita water use, which is total water use divided by the service area population, has decreased by similar amounts. Likewise, City water supply, which comes from imported water purchases and groundwater production, has also decreased from 2005 to 2015.

In April 2015, Governor Jerry Brown issued Executive Order B-29-15 requiring the State Water Resources Control Board to implement measures to cut the State's overall water usage by 25% due to the continuing drought. Cities and water agencies were assigned various reduction goals, and the City of Inglewood's reduction goal was set at 12% and was reduced to 11% in February 2016 after the City received a climate consideration. City water use has decreased a cumulative 15.7% for the first twelve recording months (June 2015 through May 2016) relative to year 2013 water usage in response to the City's conservation goal set by the State, which has been extended to October 2016 or as long as the drought continues.

Projected City water use through the year 2040 is shown in Table E-2. City per-capita water use is projected to increase slightly to 100.6 gallons per capita per day (gpcd) in 2020 (from 92.9 gpcd in 2015) assuming some bounce-back once the drought ends, but then gradually decrease back to 92.5 gpcd by 2040. Total water use is projected to increase from 8,826 acre-feet per year (AFY) in 2015 to 9,991 AFY in 2040 (13.2%). The potable water demand for Hollywood Park (City of Champions Revitalization Project) is estimated at 789 AFY at build-out in 2025.

Table E-2: Projected City WSA Demands						
	2015	2020	2025	2030	2035	2040
Population	84,790	89,890	93,650	94,561	95,472	96,384
Per-Capita Water Use (gpcd)	92.9	100.6	98.3	96.4	94.4	92.5
Water Use (afy)	8,826	10,131	10,317	10,209	10,100	9,991

E.5 Senate Bill x7-7 (SBx7-7)

Senate Bill x7-7 (SBx7-7) was enacted in November 2009 (Water Conservation Act of 2009), requiring all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per-capita urban water use by 20% by December 31, 2020 and to make incremental progress towards this goal by reducing per capita water use by at least 10% by December 31, 2015. In preparing the 2010 UWMP, each urban retail water supplier was required to develop baseline daily per-capita water use, minimum baseline daily per-capita water use, and target daily per-capita water use for 2015 and 2020 that were to be 10% and 20% less, respectively.

In preparing the 2015 UWMP, most water agencies including the City were required to recalculate their baseline population using 2010 Census data and then recalculate their target daily per-capita water use for 2015 and 2020. The 2015 and 2020 water use targets were calculated to be 116.6 and 112.0 gpcd, respectively. In 2015, the City's per-capita water use was 92.9 gpcd, which was significantly lower than its 2015 target of 116.6 gpcd and is also lower than its 2020 target of 112.0 gpcd.

E.8 City Water Supply Reliability

Dating back to 2008, imported water purchases have averaged 69% of the City's water supply and groundwater has averaged 24.5%. Recycled water supply has averaged 6.5%. Due to wells being out of service, groundwater supply decreased from 34% of total water supply in 2009 to 17% in 2013 and was 18% in 2015, with imported water supply increasing proportionally. This is significant because City groundwater production is much more economical than imported water purchases.

The City currently produces groundwater from the WCGB via four active groundwater wells, Well Nos. 1, 2, 4 and 6, that were constructed in 1974, 1974, 1990, and 2003, respectively. Well No. 1 was rehabilitated in late 2014 and placed back in service in 2015. Well No. 2 is currently out of service and is scheduled for rehabilitation in late 2016. Well Nos. 4 and 6 are scheduled for rehabilitation in 2017.

A new City well, Well No. 7, will be designed and constructed and is planned for operation beginning in 2017 with an estimated supply of 1,950 AFY. With well rehabilitation and the construction of new Well No. 7, City groundwater production capacity is projected to increase to 5,300 AFY by the year 2017, which is an increase of approximately 200% relative to groundwater production in 2015 (1,763 AFY). It is estimated that the City will rehabilitate and replace wells as required to maintain average

annual well supply at approximately 4,450 AFY, equivalent to their current groundwater rights, through the planning period.

Two of the most significant constraints on water supply for the City and for Southern California have been the drought that started in 2012 and has persisted into 2016, and Sacramento-San Joaquin River Delta ecosystem issues that affect imported water supply from the State Water Project (SWP), which provides water to 29 urban and agricultural agencies throughout California. More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta system.

The Bay-Delta's declining ecosystem, caused by a number of factors that include agricultural runoff, predation of native fish species, urban and agricultural discharge, changing ecosystem food supplies, and overall system operation, has led to reduction in imported water supply deliveries. SWP delivery restrictions due to regulatory requirements resulted in the loss of about 1.5 million acre feet (MAF) of supplies to Metropolitan from 2008 through 2014, reducing the likelihood that regional storage can be refilled in the near-term.

In April 2015, the Brown Administration announced California WaterFix, as well as a separate ecosystem restoration effort called California EcoRestore. Together, the California WaterFix and California EcoRestore will make significant contributions toward achieving the coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem established in the Sacramento-San Joaquin Delta Reform Act of 2009.

In their 2015 UWMP dated June 2016, Metropolitan estimated supply capability and projected demands through the year 2040 for an average (normal) year based on an average of hydrologies for the years 1922-2012; for a single dry-year based on a repeat of the hydrology in the year 1977; and for multiple dry years based on a repeat of the hydrology of 1990-1992. For each of these scenarios there is a projected surplus of supply in every forecast year through 2040. Projected supply surpluses, based on the capability of current supplies, range from 0.1 percent to 87 percent of projected demands. With the inclusion of supplies under development, potential surpluses range from 5 percent to 110 percent of projected demands.

As Metropolitan has determined it can meet all full-service demands of its member agencies through 2040 with surplus supplies, and because of the City's goal to regularly upgrade and rehabilitate its well supply system to maintain groundwater supply equivalent to its groundwater rights of 4,500 AFY, it is projected the City can meet all normal year, single dry year, and multiple dry year demands through the year 2040.

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ACRONYMS and ABBREVIATIONS

AB	Assembly Bill
AF	Acre Feet
AFY	Acre Feet per Year
AMI	Area Median Income
AVEK	Antelope Valley-East Kern Water Agency
AWWA	American Water Works Association
BMP	Best Management Practices
BDCP	Bay Delta Conservation Plan
CAWCD	Central Arizona Water Conservation District
CAWC	Cal-American Water Company
CCF	Hundred Cubic Feet of Water
CEQA	California Environmental Quality Act
CFS	Cubic Feet Per Second
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
COC	Constituents of Concern
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVWD	Coachella Valley Water District
CWC	California Water Code
DDW	Division of Drinking Water
DMM	Demand Management Measure
DOF	Department of Finance
DWR	Department of Water Resources
DWCV	Desert Water Agency/Coachella Valley Water District
ECLWRF	Edward C. Little Water Recycling Facility
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EOP	Emergency Operation Plan
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ET	Evapotranspiration
ETc	Actual Evapotranspiration
Eto	Evapotranspiration From a Standardized Grass Surface
Etr	Evapotranspiration From a Standardized Alfalfa Surface
Fe	Iron
FY	Fiscal Year
GIS	Geographic Information Systems
GPCD	Gallons Per Capita Per Day
GPD	Gallons Per Day
GPF	Gallons Per Flush
GPM	Gallons Per Minute

GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GSWC	Golden State Water Company
HET	High Efficiency Toilet
HCD	Department of Housing and Commercial Development
HPSP	Hollywood Park Specific Plan
ICS	Intentionally Created Surplus
IID	Imperial Irrigation District
IAWP	Interim Agricultural Water Program
IRP	Integrated Resources Plan
ITP	Independent Technical Panel
JWCP	Joint Water Pollution Control Board
Kc	Crop Coefficient
L2L	Laundry to Landscape
LAA	Los Angeles Aqueduct
LACSD	Sanitation Districts of Los Angeles County
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LIEP	Landscape Irrigation Efficiency Program
M&I	Municipal and Industrial
MAF	Million Acre Feet
MCL	Maximum Contaminant Level
Metropolitan	Metropolitan Water District of Southern California
MGD	Million Gallons per Day
Mg/L	Milligrams Per Liter
Mn	Manganese
MOU	Memorandum of Understanding
MWELO	Model Water Efficient Landscape
ND	Not Detectible
NDMA	N-Nitrosodimethylamine
NL	Notification Level
NMCL	No Maximum Contaminant Level
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWDDF	Ocean Water Desalination Demonstration Facility
PCI/L	Picocuries per Liter
PMCL	Primary Maximum Contaminant Level
PPCP	Pharmaceuticals and Personal Care Products
PVID	Palo Verde Irrigation District
PW	Potable Water
QMCP	Quagga Mussel Control Program
QSA	Quantification Settlement Agreement
RHNA	Regional Housing Needs Assessment
RDM	Robust Decision Making
RA	Replenishment Assessment

RO	Reverse Osmosis
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SBESC	South Bay Environmental Services Center
SBCCOG	South Bay Cities Council of Governments
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SDCWA	San Diego County Water Authority
SF	Square Feet
SGMA	Sustainable Groundwater Management Act
SMCL	Secondary Maximum Contaminant Level
SNWA	Southern Nevada Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	Thousand Acre Feet
TDS	Total Dissolved Solids
ULF	Ultra-Low Flow
USBR	U.S. Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WBMWD	West Basin Municipal Water District
WCGB	West Coast Groundwater Basin
WRCC	Western Regional Climate Center
WRD	Water Replenishment District of Southern California
WQCP	Water Quality Control Program
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management
WSA	Water Service Area
WSO	Water Systems Optimization
WUCA	Water Utility Climate Alliance
WW	Wastewater

1 INTRODUCTION AND OVERVIEW

1.1 BACKGROUND AND PURPOSE

The City of Inglewood has prepared the 2015 update of its Urban Water Management Plan to fulfill the requirements outlined in the California Urban Water Management Planning Act (1983), as amended, and the Water Conservation Bill of 2009.

1.2 URBAN WATER MANAGEMENT PLANNING AND THE CALIFORNIA WATER CODE

This report has been prepared in compliance with 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. This Act requires that "every urban water supplier shall prepare and adopt an urban water management plan" (Water Code § 10620(a)). An "urban water supplier" is defined as a supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually (Water Code § 10617).

These plans must be filed with the California Department of Water Resources (DWR) every five years ending in 0 and 5 and submitted by December 31 of that year. However, the 2015 plans are due to be submitted to DWR by July 1, 2016. The Act's requirements include:

- Detailed evaluation of the supplies necessary to meet demands over at least a 20-year period, in five-year increments, for a single dry water year, in multi-year droughts, and during average year conditions;
- Documentation of the stages of actions an urban water supplier would undertake to address up to a 50% reduction in its water supplies;
- Description of the actions to be undertaken in the event of a catastrophic interruption in water supplies; and
- Evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

1.2.1 Changes in the Act Since 2010

Since 2010, several amendments have been made to the Act. The following is a summary of the significant changes in the Act that have occurred from 2010 to the present:

- Changes the deadline for water suppliers to submit their 2015 UWMPs to DWR by July 1, 2016 (Water Code § 10621(d)).
- Adds "distribution system water loss" to the list of past, present, and projected future water uses that the UWMP is to quantify to the extent that records are available and over the same 5-year increments described in Water Code §

10631(a). (Water Code § 10631(e)(1)(J)). For the 2015 UWMP, the distribution system water loss must be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss must be quantified for each of the 5 years preceding the plan update. (Water Code § 10631(e)(3)(A)). The distribution system water loss quantification must be reported in accordance with a worksheet approved or developed by DWR through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association (AWWA) (Water Code § 10631(e)(3)(B)).

- If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area (Water Code § 10631(e)(4)(A)). To the extent that an urban water supplier reports the information described in § 10631(e)(4)(A), an urban water supplier shall do both of the following: (1) provide citations of the various codes, standards, ordinances, or transportation and land use plans used in making the projections; and (2) indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall note that fact (Water Code § 10631(e)(4)(B)).
- Requires plans by retail water suppliers to include a narrative description that addresses the nature and extent of each water demand management measure (DMM) implemented over the past 5 years. The narrative must describe the water DMMs that the supplier plans to implement to achieve its water use targets pursuant to Water Code § 10608.20 (Water Code § 10631(f)(1)(A)). The narrative must also include descriptions of the following water DMMs: water waste prevention ordinances, metering, conservation pricing, public education and outreach, programs to assess and manage distribution system real loss, water conservation program coordination and staffing support; and other DMMs that have a significant impact on water use as measured in gallons per capita per day (gpcd), including innovative measures, if implemented (Water Code § 10631(f)(1)(B).
- Requires plans by wholesale water suppliers to include a narrative description of metering, public education and outreach, water conservation program coordination and staffing support, and other DMMs that have a significant impact on water use as measured in gpcd, including innovative measures, if implemented, as well as a narrative description of their distribution system asset management and wholesale supplier assistance programs (Water Code § 10631(f)(2)).
- Adds the voluntary reporting in the UWMP of any of the following information: an estimate of the amount of energy used: (1) to extract or divert water supplies; (2) to convey water supplies to water treatment plants or distribution systems; (3) to treat water supplies; (4) to distribute water supplies through the distribution system; (5) for treated water supplies in comparison to the amount used for non-treated water supplies; and (6) to place water into or to withdraw water from

storage; and (7) any other energy-related information the urban water supplier deems appropriate (Water Code § 10631.2(a)). DWR included in its UWMP guidance a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems (Water Code § 10631.2(b))

- Requires urban water suppliers to submit plans or amendments to plans electronically and to include any standardized forms, tables, or displays specified by DWR (Water Code § 10644(a)(2)).

1.2.2 Senate Bill 7 of the Seventh Extraordinary Session of 2009, Water Conservation in the Delta Legislative Package

In addition to changes to the Act, the state Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBx7-7, on November 10, 2009, which became effective February 3, 2010. This law was the water conservation component to the historic Delta legislative package, and seeks to achieve a 20% statewide reduction in urban per capita water use in California by December 31, 2020. This implements the Governor's similar 2008 water use reduction goals. The law requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020, and an interim urban water reduction target by 2015.

The bill states that the legislative intent is to require all water suppliers to increase the efficiency of use of water resources and to establish a framework to meet the state targets for urban water conservation called for by the Governor. The bill establishes methods for urban retail water suppliers to determine targets to help achieve increased water use efficiency by the year 2020. The law is intended to promote urban water conservation standards consistent with the California Urban Water Conservation Council's (CUWCC) adopted best management practices.

An urban retail water supplier may update its 2020 urban water use target in its 2015 UWMP (Water Code § 10608.20(g)).

2 PLAN PREPARATION

2.1 BASIS FOR PREPARING A PLAN

Per CWC 10617, "urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems. The City of Inglewood is a public water supplier that meets the definition of an urban water supplier with 15,952 municipal water service connections and a total 9,554 acre-feet (AF) of water supplied to customers in their water service area in 2015. See Table 2-1.

Table 2-1: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Water Supplied 2015 (AF)
1	City of Inglewood	15,952	9,554

2.2 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

The City of Inglewood has developed an individual UWMP that reports solely on its service area; addresses all requirements of the California Water Code (CWC); and notifies and coordinates with appropriate regional agencies and constituents. See Table 2-2.

Table 2-2: Plan Identification

☑	Individual UWMP
☐	Regional UWMP (RUWMP)

2.3 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

The City of Inglewood is a water retailer (as opposed to a water wholesaler). The City's 2015 UWMP has been prepared using calendar years (as opposed to fiscal years) and has been prepared using acre-feet (AF) as the units of water volume measure. See Table 2-3.

2.4 COORDINATION AND OUTREACH

Per CWC 10631(j), an urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that

agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan.

Table 2-3: Agency Identification	
Type of Agency	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
Units of Measure Used in UWMP	
Unit	AF

The City of Inglewood has provided West Basin Municipal Water District (WBMWD), the City's water wholesaler, with projected water use in accordance with CWC 10631 and has relied upon water supply information provided by WBMWD, as well as from the Metropolitan Water District of Southern California (Metropolitan) in preparing its 2015 UWMP.

Table 2-4: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
West Basin Municipal Water District

The intent of the 2015 UWMP is to focus on specific issues unique to the City's water service area. While some regional UWMP issues are introduced in this UWMP, more detailed regional information is presented in WBMWD's and Metropolitan's 2015 UWMPs.

Table 2-4A lists the entities that the City or Psomas coordinated with in the development of the City's 2015 UWMP. Information from the Final WBMWD and Metropolitan 2015 UWMPs, and the *"Guidebook to Assist Urban Water Suppliers to Prepare a 2015 Urban*

Water Management Plan" prepared by DWR was utilized in preparing the City's 2015 UWMP. The City's water supply planning considers the programs of local and regional water agencies. This UWMP details the specifics as they relate to the City and its service area and will refer to Metropolitan, WBMWD, the Water Replenishment District of Southern California (WRD) and other agencies throughout.

Table 2-4A: City of Inglewood Coordination and Public Involvement

	Participated in UWMP preparation	Used Agency Data as an Information Resource	Sent Draft UWMP and/or Available to on City Website	Commented on Draft UWMP	Sent Notice of Public Hearing	Attended Public Hearing
City Water Division	x	x	x	x	x	x
City Planning Department	x	x	x	x	x	x
City Finance Department	x	x	x	x	x	x
City Clerk	x	x	x		x	x
DWR		x	x			
WBMWD		x	x			
Metropolitan		x	X			
WRD		x	X			
LACSD		x	X			
LA County			x		x	
GSWC			x			
CAWC			x			
General Public			x		x	x

The City relies on Metropolitan through WBMWD and WRD for its long-term water supply. Accordingly, the City's water supply planning is partially based on the policies, rules, and regulations of these three water agencies. Development of the City's UWMP was coordinated with WBMWD, which serves as the City's wholesaler of potable water received from Metropolitan, and recycled water it produces at its own treatment plant; WRD, which is responsible for managing, regulating, replenishing, and protecting the quality of the groundwater supplies within the region, and the Sanitation Districts of Los Angeles County (LACSD), which manages wastewater generated within the City of Inglewood.

The 2015 UWMP is intended to serve as a general, flexible, and open-ended document that is updated every five years (or more often if necessary) to reflect changes in the City's water supply trends, and conservation and water use efficiency policies. The 2015

UWMP will be used by City staff to guide the water use and management efforts through the year 2020, when the 2015 UWMP will require an update.

3 SYSTEM DESCRIPTION

3.1 GENERAL DESCRIPTION

The City of Inglewood is located in southwest Los Angeles County approximately ten miles southwest of downtown Los Angeles and two miles east of Los Angeles International Airport (LAX) as shown on Figure 3-1. The City is bordered to the south by Hawthorne and to the east, north and west by portions of unincorporated Los Angeles County and the City of Los Angeles. The City encompasses approximately 9.14 square miles and is predominantly residential land use. Elevations in the City vary from approximately 65 to 200 feet above sea level.

The City of Inglewood has a five-member City Council comprised of the Mayor and four Council Members with members elected by registered voters to staggered four-year terms. The City Manager is appointed by the Mayor and City Council. Other City managerial positions are filled by the City Manager. The Public Works Director is responsible for the operation and management of the City's water system.

Inglewood was incorporated as a City on February 8, 1908, but the first water system was established in 1888 by the Centinela-Inglewood Land Company. Inglewood voted to acquire the water system from the Centinela-Inglewood Land Company in 1920, thereby creating a municipal water utility.

3.1.1 City Water System Description

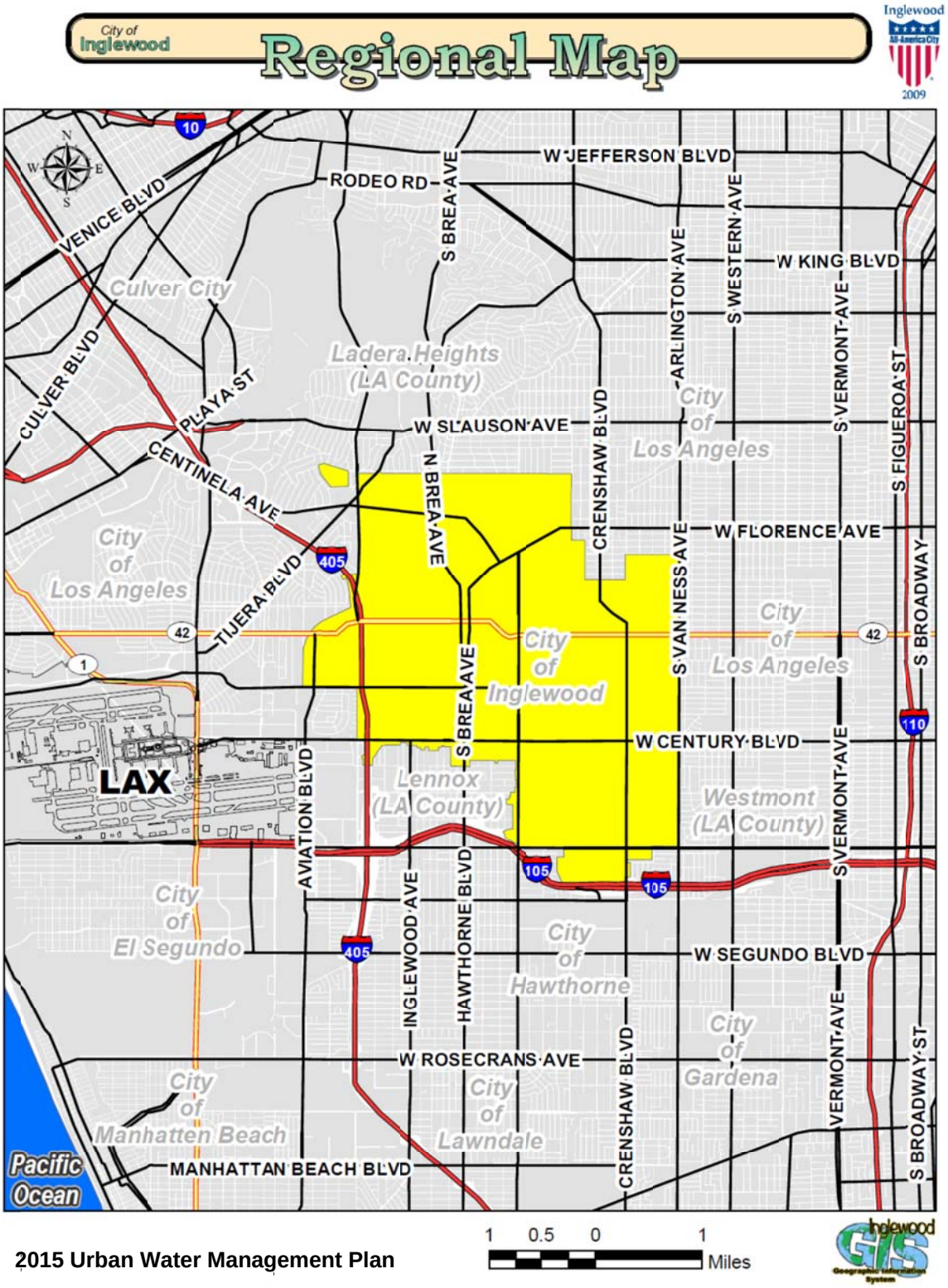
3.1.1.1 Domestic (Potable) Water System

Early on and for many years after the City became a municipal water utility, the City's only source of water supply was local groundwater produced by City owned and operated wells. A water treatment plant and a water quality laboratory were added to the system in 1975.

The City of Inglewood became a member of the newly formed WBMWD in 1947. As a member of Metropolitan, WBMWD purchases wholesale potable water from Metropolitan that is imported from the Colorado River and the State Water Project (SWP), for sale to local retail water agencies including the City of Inglewood. The imported water is provided, in part, to supplement existing regional groundwater supplies in all areas of WBMWD and to provide a barrier, through injection wells, to seawater intrusion into the West Coast Groundwater Basin (WCGB).

In 2015, the City purchased approximately 80% of its potable water supply from WBMWD and produced approximately 20% of its potable water supply from the local groundwater basin via City owned and operated wells. However, as discussed in Chapter 6, the City is constructing a new well and rehabilitating existing wells to increase groundwater production.

Figure 3-1. City of Inglewood Location Map



The City's water system consists of the following major facilities and transmission/distribution piping:

- **Four Active Groundwater Wells:** Well Nos. 1, 2, 4 and 6
- **Raw Well Water Transmission Main:** Transmission main (12 inches to 18 inches to 27 inches in diameter) that transmits groundwater from the wells to the Sanford M. Anderson Water Treatment Plant
- **Sanford M. Anderson Water Treatment Plant:** Treats groundwater for the removal of iron and manganese with a treatment capacity of 8.64 mgd (6,000 gpm) and a clearwell capacity (to store treated water) of 500,000 gallons
- **Treatment Plant Effluent Pump Station:** One set of five vertical turbine pumps pump treated water into the Zone 3 or Zone 2 distribution systems or to the Morningside Reservoir Facility and a second set of five vertical turbine pumps pump treated water into the Zone 3 or Zone 2 distribution systems or to the North Inglewood Reservoir Facility
- **Treated Water Transmission Mains:** One 24-inch transmission main transmits treated water from the effluent pump station dedicated to the Morningside Reservoir Facility and a second 24-inch transmission main transmits treated water from the effluent pump station dedicated to the North Inglewood Reservoir Facility
- **North Inglewood Reservoir Facility:** 4.6 MG covered, underground, concrete water storage reservoir and associated pump station (with four pumps) to pump water from the reservoir into the Zone 1, Zone 2 and Zone 3 distribution systems
- **Morningside Reservoir Facility:** 16.0 MG above-ground, concrete, water storage reservoir and associated pump station (with 10 pumps) to pump water from the reservoir into the Zone 1, Zone 2 and Zone 3 distribution systems. The Morningside Reservoir Facility is currently out of service due to reservoir structural issues
- **Imported Water Connections:** Metropolitan imported water is delivered to the City via service connections WB-17 and WB-38, each with a rated capacity of 4,400 gpm
- **Emergency Water Connections:** The City has six emergency water connections with Golden State Water Company (GSWC) and two emergency water connections with the Los Angeles Department of Water and Power (LADWP)
- **Transmission and Distribution Piping:** There are 156 miles of piping in the water system ranging in diameter from 2 to 42 inches

3.1.1.2 Recycled (Non-Potable) Water System

The City purchases recycled water from WBMWD. The WBMWD recycling plant located in El Segundo, the Edward C. Little Water Recycling Facility (ECLWRF), provides tertiary treatment to secondary-treated wastewater received from the City of Los

Angeles' Hyperion Wastewater Treatment Plant to produce recycled water that meets California Title 22 treatment requirements. WBMWD produces five different qualities of recycled water including: 1) Disinfected Tertiary Water, 2) Nitrified Water, 3) Softened Reverse Osmosis Water, 4) Pure Reverse Osmosis Water, and 5) Ultra-Pure Reverse Osmosis Water.

The City currently has 18 service connections to the WBMWD recycled water system including Inglewood Park Cemetery (the City's largest recycled water user), Centinela (Vincent) Park and other City parks, Hollywood Park, Inglewood Unified School District facilities, and Caltrans right-of-way. City purchases of recycled water have averaged 694 AFY since 2008, constituting approximately 6.5% of its total water supply.

3.2 SERVICE AREA BOUNDARY MAPS

The City itself is comprised of three water service areas. As shown on Figure 3-2, the City of Inglewood serves water to the largest area of the City; Golden State Water Company (GSWC) serves water to a portion of the City in the south; and Cal-America Water Company (CAWC) serves water to a small area in the northwest part of the City. The City's water service area (WSA) comprises 79.4% of the City's 5,825 acres of land (4,625 acres). GSWC's water service area consists of 1,113 acres (19.1%) and only 27 acres (less than 1%) is in the CAWC water service area. The City's WSA is the subject of this UWMP.

3.3 SERVICE AREA CLIMATE

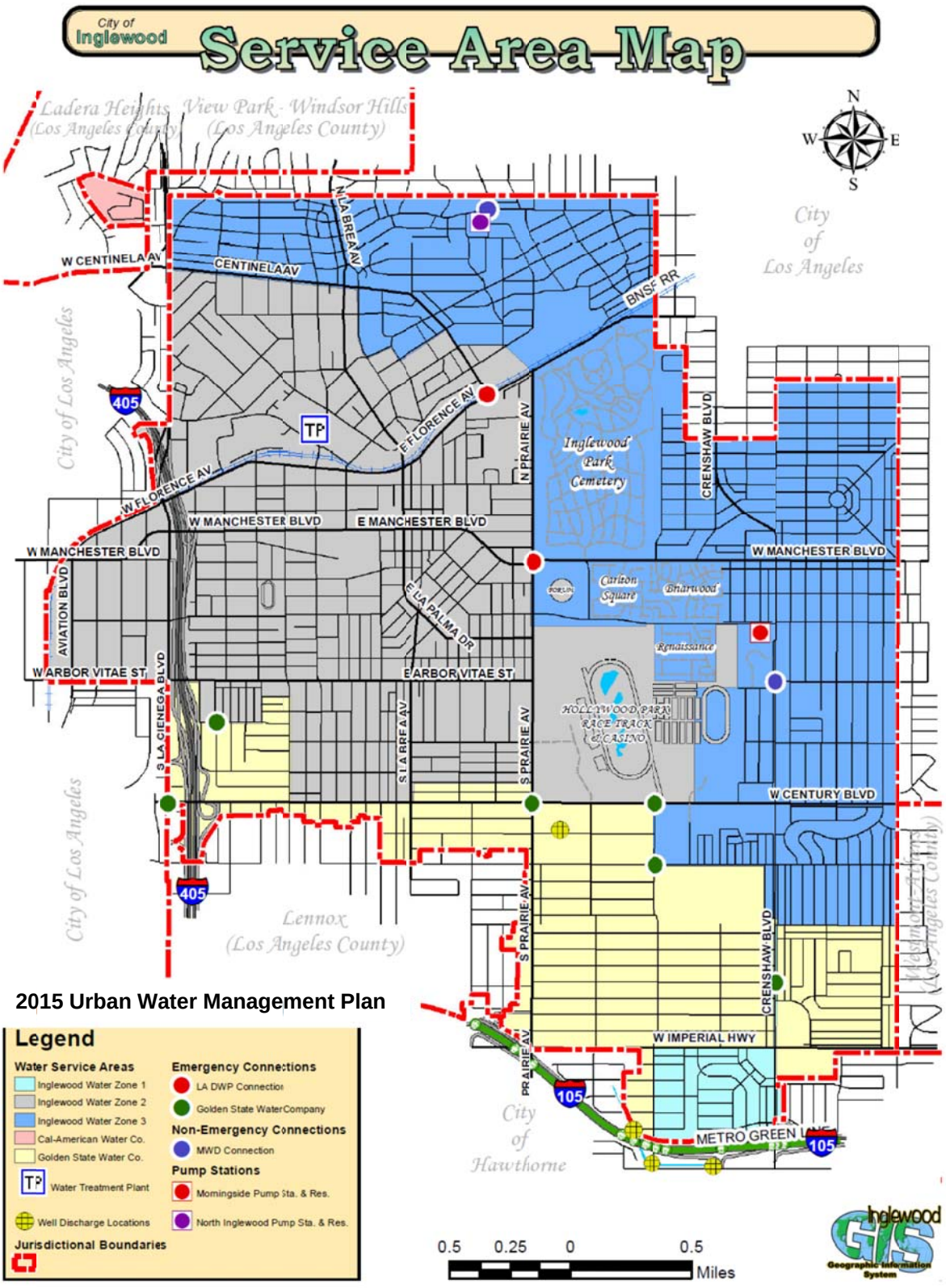
The City has a Mediterranean climate with moderate, dry summers and cool winters that receive the majority of rainfall. The climate for the City is consistent with coastal Southern California. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

As shown in Table 3-1A, the average maximum temperature of 76.3°F occurs in August, and the average minimum temperature of 47.5 °F occurs in January. The average annual maximum temperature for the City is 70.1°F and the average annual minimum temperature is 55.3 °F. Approximately 93% of the City's average annual rainfall of 12.02 inches occurs between November and March (5 month period).

Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indication of how much water crops, lawn, garden, and trees need for healthy growth and productivity.

For ET to take place, the following conditions have to be met. First, water has to be present at the surface. Second, there must be some form of energy to convert the liquid water into a water vapor. Third, there must be a mechanism to transport the water vapor away from the evaporating surface.

Figure 3-2. City of Inglewood Water Service Areas



Precipitation and irrigation are the two primary sources of water that plants use. Plant leaves and soil surfaces temporarily retain some part of the water applied to the field. This part is readily available for evaporation. The remaining part infiltrates into the soil. Plants extract the infiltrated water through their roots and transport it up to their leaves for photosynthesis, a process by which plants produce glucose (sugar).

Table 3-1A: Historical City Climate Characteristics

Month	Standard Average ETo[a] (inches)	Average Rainfall[b] (inches)	Daily Max Temperature[b] (degrees F)	Daily Min Temperature[c] (degrees F)
January	2.33	2.65	65.2	47.5
February	2.52	2.67	65.3	48.9
March	3.70	1.85	65.3	50.5
April	4.70	0.77	67.4	53.0
May	5.14	0.17	69.1	56.4
June	5.24	0.05	71.9	59.7
July	5.62	0.02	75.1	62.9
August	5.57	0.07	76.3	63.8
September	4.31	0.16	76.0	62.6
October	3.40	0.39	73.6	58.5
November	2.48	1.40	70.2	52.3
December	2.15	1.82	65.9	47.9
Annual	47.16	12.02	70.1	55.3

a) Standard Average ETo from California Irrigation Management Information System (CIMIS) Station 99, Santa Monica, CA. Station 99 is CIMIS station closest to the City of Inglewood; Average for 12/11/1992 through 1/27/2016.

b) Data obtained from Western Regional Climate Center (WRCC), Desert Research Institute, Reno, Nevada (http://www.wrcc.dri.edu/cgi-bin/cliRECtM.pl?ca9152); WRCC program administered by the National Oceanic and Atmospheric Administration (NOAA); data extracted from monitoring Station 045114 at Los Angeles International Airport, Average 01/01/1936 through 1/20/2015.

Many factors affect ET including:

- Weather parameters such as solar radiation, air temperature, relative humidity and wind speed;
- Soil factors such as soil texture, structure, density and chemistry; and
- Plant factors such as plant type, root depth, foliar density, height and stage of growth.

Although ET can be measured using such devices as lysimeters, estimating ET using analytical and empirical equations is a common practice because measurement methods are expensive and time consuming. Most ET equations were developed by correlating measured ET to measured weather parameters that directly or indirectly affect ET. Since there are so many factors affecting ET, it is extremely difficult to formulate an equation

that can produce estimates of ET under different sets of conditions. Therefore, the idea of a reference crop evapotranspiration was developed by researchers. Reference ET is the ET rate of a reference crop expressed in inches or millimeters.

Reference crops are either grass or alfalfa surfaces whose biophysical characteristics have been studied extensively. ET from a standardized grass surface is commonly denoted as ETo whereas ET from a standardized alfalfa surface is denoted as ETr. The American Society of Civil Engineers (ASCE) recommends the use of ETos and ETrs, respectively, where "s" stands for standardized surface conditions. The logic behind the evapotranspiration idea is to set up weather stations on standardized reference surfaces for which most of the biophysical properties used in ET equations are known. ET from such surfaces can then be estimated using these known parameters and measured weather parameters. Then a crop factor, commonly known as the "crop coefficient" or "Kc" is used to calculate the actual evapotranspiration (ETc) for a specific crop in the same microclimate as the weather station site.

The California Irrigation Management Information System (CIMIS), Department of Water Resources, Office of Water Efficiency is using well-watered actively growing closely clipped grass that is completely shading the soil as a reference crop at most of its over 130 weather stations. Therefore, reference evapotranspiration is mostly referred to as ETo on the CIMIS website, although there are a few notable exceptions with ETr. There are many theoretical and empirical equations around the world to estimate ETo. The choice of any one method depends on the accuracy of the equation under a given condition and the availability of the required data. For reference surfaces with known biophysical properties, the main factors affecting ETo include solar radiation, relative humidity/vapor pressure, air temperature and wind speed. Therefore ETo can be estimated quite accurately using a model (a series of mathematical equations).

The monthly average ETo data shown in Table 3-1A has been extracted from the CIMIS Santa Monica station (#99), which is the closest station to Inglewood (located near Franklin Street approximately 2,000 feet northwest of Wilshire Boulevard in Santa Monica). This station was activated on December 11, 1992. As shown in Table 3-1A, the average annual evapotranspiration (ETo) is 47.16 inches.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 Service Area Population

As shown in Figure 3-2, the City's WSA comprises 79.4% of the City of Inglewood in terms of land area with GSWC and CAWC serving water to the remaining land area of the City. The City's WSA, which is the subject of this UWMP, has a population that is less than the City's population. For the preparation of the 2015 UWMP, the DWR Population Tool was utilized to estimate the City's water service area population from 1990 through 2010 and for 2015 based on inputting single-family and multi-family residential water service connections for the years 2010 and 2015, along with the water service area boundary in electronic format. Population Tool worksheets are included in Appendix C.

Historical and current City population as reported by the Census (2000 and 2010) and the DOF (2005 and 2015) is shown in Table 3-1B compared with historical and current population for the City's water service area (WSA) as determined by the DWR Population tool. As shown, the population of the water service area ranged from 73.1% to 77.6% of the City population.

Table 3-1B: Population – Historical and Current

Area	2000	2005	2010	2015
City[(a)]	112,580	112,417	109,673	115,966
City's WSA [(b)]	87,090	86,095	85,100	84,790
WSA/City %	77.4	76.6	77.6	73.1

(a) Reported census and/or DOF data
(b) DWR Population Tool

Projected City populations as estimated by the City's Planning Department, which are consistent with Southern California Association of Governments (SCAG) population projections in their 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS), were multiplied by a factor of 0.75 to estimate projected populations for the City's WSA, which are shown in Table 3-1. The water service area population is projected to increase from 84,790 in 2015 to 96,384 in 2040, which is a 13.7% increase.

Table 3-1: City's WSA Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040	% Increase[(a)]
	84,790	89,890	93,650	94,561	95,472	96,384	13.7

(b) Relative to 2015

The population increase of 5,100 people between 2015 and 2020 is primarily attributable to the Hollywood Park redevelopment project, termed "City of Champions Revitalization Project", which is discussed in Section 3.4.3. The buildout population for this development of 7,500 people is estimated to occur by 2025.

3.4.2 Water-Use-Related Demographics

Of the 15,952 City WSA water service connections in 2015, 13,669 were residential connections (85.6 %). Of the 13,669 residential connections, 12,191 were single family (89.2%) and 1,478 were multi-family (10.8%). City WSA land use is shown in Table 3-2. The predominant land use is residential at 44.7% of total WSA land use. Single-family residential land use makes up 18.1% of total WSA land use and commercial land use is 19.8%. At 237.7 acres, the Hollywood Park Specific Plan makes up 5.1% of the total

WSA land use.

Table 3-2: City WSA Land Use

Zoning Code	Land Use Category per City Zoning	City Service Area	% of Total
	Residential		
R-1	Single-Family Residential	848.5	18.1%
R-1.5	Limited Two-Family Residential	4.0	0.1%
R-1Z	One-Family Residential	5.5	0.1%
R-2	Limited Multi-Family Residential	214.6	4.6%
R-2A	Limited Multi-Family Residential	235.9	5.0%
R-3	Multiple-Family Residential	651.5	13.9%
R-4	Multiple-Family Residential	54.6	1.2%
R-M	Residential Medical	77.8	1.7%
Subtotal	Residential	2,092.5	44.7%
	Specific Plan		
HPSP	Hollywood Park Specific Plan	237.7	5.1%
	Commercial		
C-1	Limited Commercial	59.4	1.3%
C-2	General Commercial	578.9	12.4%
C-2A	Airport Commercial	12.1	0.3%
C-3	Heavy Commercial	77.3	1.6%
C-R	Commercial Recreation	176.0	3.8%
C-S	Commercial Service	24.5	0.5%
Subtotal	Commercial	928.2	19.8%
	Public		
C-C	Civic Center	47.9	1.0%
	Manufacturing		
M-1	Light Manufacturing	242.4	5.2%
M-1L	Limited Manufacturing	20.3	0.4%
M-2	Heavy Manufacturing	0.0	0.0%
Subtotal	Manufacturing	262.7	5.6%
	Open Space		
O-S	Open Space	94.1	2.0%
	Other		
S-2	Special Cemetery	294.1	6.3%
P-1	Parking	64.7	1.4%
T-C	Transportation Corridor	18.8	0.4%
	405 Freeway	37.0	0.8%
	Local Streets &Alleys	607.0	13.0%
Subtotal	Other	1,021.5	21.8%
	Total	4,684.5	100.0%

In 2015, the number of people per dwelling unit inside the City was 3.03, according to DOF E-5 City/County Population and Housing Estimates, January 1, 2015. Of the 38,643 housing units inside the City limits in 2015, 15,863 (41.1%) were 5-unit or more residences; 14,754 (38.2%) were single-detached houses; 5,503 (14.2%) were 2- to 4-unit residences; 2,314 (0.6%) were single-attached homes; and 209 were mobile homes. The vacancy rate in 2015 was 2.2%.

The water service area is built out, but there are infill and re-development projects on-going and planned for the future. The major redevelopment project in the City and in the City's WSA is the Hollywood Park redevelopment project.

3.4.3 Hollywood Park Redevelopment

Hollywood Park, located at 1050 South Prairie Avenue, was developed as a 238-acre site in 1938 with two main structures: a racetrack/grandstand and the Pavilion/Casino gaming facility. A specific plan and an environmental impact report (EIR) were prepared in 2009 to redevelop the site that included the demolition of the racetrack/grandstand; the rehabilitation of the 120,000 square-foot Pavilion/Casino; and construction of a new mixed-use development containing approximately 2,995 dwelling units, 620,000 square feet (sf) of retail space, 75,000 sf of office/commercial space, a 300-room hotel, 10,000 sf of community serving uses, and a 25-acre park system with passive and active recreational opportunities. On June 3, 2009, the Inglewood City Council certified the Final Environmental Impact Report and on July 8, 2009, approved the Hollywood Park Specific Plan (HPSP) and other entitlements associated with the project.

Construction on the Hollywood Park redevelopment, termed "Hollywood Park Tomorrow", began in 2012. On February 24, 2015, the City Council approved changes to the previously approved specific plan to include an 80,000-seat NFL stadium and a 6,000-seat music venue. The remaining mixed-use redevelopment plan was also modified slightly and now includes 890,000 sf of regional and entertainment retail; 780,000 sf office space; a 300-room hotel; 2,123 apartments, 111 detached single-family homes and 266 townhomes; and major infrastructure improvements, including 25 acres of improved public parks. The Hollywood Park redevelopment is now termed "City of Champions Revitalization Project."

The site is still under construction and only the Pavilion/Casino gaming facility is in operation at this time. Most of the existing water use is for construction. It is estimated that Hollywood Park will be approximately 70% developed by 2020 and 100% developed by 2025.

4 SYSTEM WATER USE

4.1 RECYCLED VERSUS POTABLE AND RAW WATER DEMAND

The City obtains its potable water supply from two sources: imported surface water purchased from Metropolitan through WBMWD, and local groundwater produced from the West Coast Groundwater Basin (WCGB) via City-owned and operated wells. The imported water is treated by Metropolitan, and the groundwater is treated at the City's Sanford M. Anderson Water Treatment Plant for the removal of iron and manganese. Treatment includes disinfection. The groundwater and imported water supplies are blended prior to entering the City's water distribution system.

In 2015, the City purchased approximately 80% of its potable water supply from WBMWD and produced approximately 20% of its potable water supply from the local groundwater basin via City owned and operated wells. However, as discussed in Chapter 6, the City is constructing a new well and rehabilitating existing wells to increase groundwater production.

The City purchases recycled water from WBMWD. The City currently has 18 service connections to the WBMWD recycled water system. City purchases of recycled water have averaged 721 AFY since 2005, which is approximately 6% of its total water supply.

4.2 WATER USES BY SECTOR

Historical water service connections by customer sector are shown in Table 4-1A. The total number of water service connections increased only by 2.0% between 2010 and 2015. Residential (single-family plus multi-family) connections account for approximately 86% of total water service connections.

Table 4-1A: Historical City Water Service Connections

Customer Sector	2010	2015
Single Family	12,383	12,191
Multi Family	1,468	1,478
Commercial	1,320	1,791
Industrial	73	65
Municipal	133	130
Fire	261	297
	15,638	15,952

Historical metered and billed water use by customer sector is shown in Table 4-1B. Total water use including unaccounted-for (lost or non-revenue) water decreased from 11,634 AFY in 2005 to 9,906 AFY in 2010 (14.9% decrease); and to 8,827 AFY in 2015 (24.1%

decrease relative to 2005). Per-capita water use also decreased and is discussed in Section 4.4. System water loss has decreased from 7.9% in 2005 to 6.3% in 2015 and is discussed in Section 4.3. Note that water loss in Table 4-1B includes treatment plant losses and unbilled & unmetered authorized consumption, i.e. hydrant flushing and other water system maintenance, etc. Residential water use has accounted for approximately 70% of total system water use.

Table 4-1B: Historical Potable Water Use and Water Loss (AFY)

	2005 Water Use/ Supply	2010 Water Use/ Supply	% Change (2005-2010)	2015 Water Use/ Supply	% Change (2010-2015)	% Change (2005-2015)
Residential PW Use	7,902	7,101	-10.1%	6,002	-15.5%	-24.0%
Population	86,095	85,100	-1.2%	84,790	-0.4%	-1.5%
Residential Per-Capita (gpcd)	81.9	74.5	-9.1%	63.2	-15.2%	-22.9%
Commercial PW Use	2,589	2,533	-2.2%	2,144	-15.4%	-17.2%
Industrial PW Use	69	45	-34.8%	48	6.7%	-30.4%
Municipal PW Use	152	270	77.6%	79	-70.7%	-48.0%
Fire PW Use	5	6	20.0%	2	-66.7%	-60.0%
Unaccounted-for PW Use	917	(49)	-105.3%	552	-	-39.8%
Total Potable Water Use	11,634	9,906	-14.9%	8,827	-10.9%	-24.1%
Total Per-Capita (gpcd)	120.6	103.9	-13.9%	92.9	-10.6%	-23.0%
Potable Water Supply	11,634	9,906	-14.9%	8,827	-10.9%	-24.1%
Potable Water Loss[(a)]	917	(49)		552		
Potable Water Loss %	7.9%	-0.5%		6.3%		

(a) Includes treatment plant losses and unbilled & unmetered authorized consumption. In 2015, water loss equals 3.8% when discounting treatment plant losses and unbilled & unmetered authorized consumption

4.2.1 Hollywood Park Water Demands

The proposed "New Project Alternative" for the Hollywood Park redevelopment (City of Champions Revitalization Project) is a mixed-use development that includes a stadium, performance venue, various commercial land uses, and both high and low-density residential land uses. Other than for single-family residential, irrigation water demands will be met with recycled water and not domestic water.

The development will include 890,000 square feet (sf) of regional and entertainment retail; 780,000 sf office space; a 300-room hotel; 2,123 apartments, 111 detached single-

family homes; and 266 townhomes; and major infrastructure improvements, including 25 acres of improved public parks. A seating capacity of 80,000 is planned for the stadium. It is anticipated that the stadium will host approximately 10 NFL games annually and will be used for another eight large events and 20 medium events at seatings of 50,000 and 10,000, respectively. Estimated buildout annual potable water demand for Hollywood Park by land use category is shown in Table 4-1C.

Single-family residences will be irrigated with potable water, but all other development irrigation will be met with recycled water.

The site is still under construction and only the existing Pavilion/Casino gaming facility is in operation at this time. Most of the existing water use is for construction. It is estimated that Hollywood Park will be 70% developed by 2020 and 100% developed by 2025. Potable and recycled water demands are included in all City water service area demand projections.

Table 4-1C: Projected Hollywood Park Potable Water Demands

Hollywood Park Land Use	Annual PW Demand (gpd)	Annual PW Demand (AFY)
Stadium	4,400	5
Performance Venue	7,800	9
Residential	401,665	450
Non-Residential	289,710	325
Total	703,575	789

City water system demands for potable (drinking) water for 2015 are shown in Table 4-1. The City purchases treated imported water from Metropolitan through WBMWD and produces groundwater from the local WCGB, which is then treated at the City's water treatment plant. City water use by customer sector plus system water losses represent 100% of the water demands for the City's water system.

Projected City water demands for the planning period (2020-2040) by water use sector and water loss are shown in Table 4-2. The methodology for developing these projected demands is presented in Section 4-4. Projected water demands for the City consisting of potable water demands and recycled water demands are shown in Table 4-3. Recycled water demands are discussed in Section 6.5.

4.3 DISTRIBUTION SYSTEM WATER LOSSES

In accordance with CWC 10631, distribution system water loss is to be quantified for the most recent 12-month period available for the 2015 urban water management plan update and is to be reported in accordance with a worksheet approved or developed by DWR

through a public process. The water loss worksheet is to be based on the water system balance methodology developed by the American Water Works Association (AWWA).

Table 4-1: Demands for Potable Water – Actual

Use Type	2015 Actual		
	Additional Description	Level of Treatment When Delivered	Volume (AFY)
Other	Total Residential	Drinking Water	6,002
Commercial	-	Drinking Water	2,144
Industrial	-	Drinking Water	48
Institutional/Governmental	Municipal	Drinking Water	79
Other	Fire water	Drinking Water	2
Other[(a)]		Drinking Water	109
Other[(b)]	-	Drinking Water	104
Losses[(c)]	-	Drinking Water	339
Total			8,827

(a) Authorized but unmetered and unbilled water use for flushing hydrants and other water system maintenance estimated at 1.25% of billed water use
(b) Treatment plant losses
(c) Losses not including authorized but unmetered water use and treatment plant losses

Table 4-2: Demands for Potable Water - Projected

Use Type	Projected Water Use				
	2020	2025	2030	2035	2040
Other - Total Residential	6,888	7,015	6,942	6,868	6,793
Commercial	2,461	2,506	2,480	2,453	2,427
Industrial	55	56	56	55	54
Institutional/Governmental	91	92	91	90	89
Other[(a)]	2	2	2	2	2
Losses[(b)]	634	645	638	632	625
Total	10,131	10,317	10,209	10,100	9,991

(a) Fire hydrant water
(b) Includes authorized but unmetered water use and treatment plant losses

The AWWA Water Audit Software Version 5.0 was used to quantify distribution water loss for the City for calendar year 2015. As shown in Table 4-4, a water loss volume of 339.0 AFY was calculated, which is 3.9% of the water supplied into the distribution

system assuming 1.25% of authorized consumption (109.0 AFY) was unbilled and unmetered water use, i.e. water typically used for flushing water mains and other water system maintenance, etc. AWWA Water Audit worksheets are included in Appendix D.

Table 4-3: Total Water Demands

	2015	2020	2025	2030	2035	2040
Potable Water Demand	8,827	10,131	10,317	10,209	10,100	9,991
Recycled Water Demand	727	1,060	1,060	1,060	1,060	1,060
Total Water Demand	9,554	11,191	11,377	11,269	11,160	11,051

Table 4-4: 12 Month Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss (AF)
(01/2015)	339.0

A project was conducted as part of a greater effort, sponsored by Southern California Edison (SCE), to better understand the relationship between water loss control and direct and embedded energy savings. Five local governments in the SCE service territory, including the City of Inglewood, were selected as part of this pilot program. As part of the study, Water Systems Optimization (WSO) worked with the City to accurately quantify water loss volumes by conducting a thorough water audit. In parallel, WSO performed leak detection at Inglewood. A water balance was established for the City for the audit period July 1, 2012 – June 30, 2013 (FY 2013). Some of the key findings and recommendations for the City of Inglewood are discussed in Section 9.2.5.

The City has an ongoing water pipeline replacement program. Between FY 2010 and FY 2014, the City replaced 35,600 linear feet of pipe at a capital cost of $6.0 million.

4.4 ESTIMATING FUTURE WATER SAVINGS

In September 2014, two legislative bills amending sections of the Act were approved and chaptered: AB 2067 and SB1420. Key among the changes to existing statutes was the addition of CWC Section 10631(e)(4). This specific addition provides the option for urban water suppliers to reflect its and its customer's efficiency efforts as part of its future demand projection. The new statutes added the following to CWC Section 10631(e):

> *(4) (A): If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.*

(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

4.4.1 Reduced City Water Use Since 2005

Through the implementation of City water conservation ordinances and measures discussed in Chapter 9, and as shown in Table 4-1B, total City per-capita water use has decreased 10.6% since 2010 and 23.0% since 2005; and residential per-capita water has decreased 15.2% since 2010 and 22.9% since 2005.

In April 2015, Governor Jerry Brown issued Executive Order B-29-15 requiring the State Water Resources Control Board to implement measures to cut the State's overall water usage by 25% due to the continuing drought. The executive order mandates a 25% reduction in supply to California's approximately 400 water control agencies and requires water agencies and cities to reduce water use 25% (on average) below 2013 levels by the end of February 2016, with usage reported to the State by water suppliers. Cities and water agencies were assigned various reduction goals, and the City of Inglewood's reduction goal was originally set at 12% and was reduced to 11% in February 2016 after the City received a climate consideration.

City water use has decreased a cumulative 15.7% for the first twelve recording months (June 2015 through May 2016) relative to year 2013 water usage in response to the City's conservation goal set by the State, which has been extended to October 2016 or as long as the drought continues.

On May 9, 2016 Governor Brown issued Executive Order B-37-16 that builds on temporary statewide emergency water restrictions to establish longer-term water conservation measures, including permanent monthly water use reporting, new permanent water use standards in California communities and bans on clearly wasteful practices. Through a public process and working with partners such as urban water suppliers, local governments and environmental groups, DWR and the SWRCB will develop new water use efficiency targets as part of a long-term conservation framework for urban water agencies. These targets go beyond the 20% reduction in per capita urban water use by 2020 that was embodied in SBx7-7, and will be customized to fit the unique conditions of each water supplier.

4.4.2 Reduced Future City Water Use due to Existing and Future Conservation Measures

As shown in Table 4-1B, through the implementation of City water conservation ordinances and measures discussed in Chapter 9, total per-capita City water use has significantly dropped from 120.6 gpcd in 2005 to 103.9 gpcd in 2010 to 92.9 gpcd in 2015 (a reduction of 23.0% since 2005). Residential per-capita City water use has also significantly dropped from 81.9 gpcd in 2005 to 74.5 gpcd in 2010 to 63.2 gpcd in 2015 (a reduction of 22.9% since 2005).

It is not known how long the current drought will last or when new droughts will start and end in the future. However, many of the water conservation measures already implemented and being implemented by City customers such as turf removal, conversion to drought resistance landscapes, conversion to more efficient irrigation systems and ET-based irrigation controllers, retrofits to high efficiency clothes washers and toilets, implementation of weather-based irrigation controllers, etc. will have permanent effects on water use (reduction) in the future.

It is anticipated that once the drought ends, water use may increase to some degree, and per-capita water use will increase some relative to 2015 water use. However, it is also anticipated that a great deal of water conservation will remain due to permanent measures that have already been implemented for exiting City residences and other development.

As shown in Table 4-5A, it is estimated in this UWMP that total City water system per-capita water use will increase from 92.9 gpcd in 2015 to 101.1 in 2020 (approximately a 8.8% increase) for existing residences and development after the end of the drought, which is similar to the water use in 2010, and with a water loss of 6.0% (similar to the 6.3% loss in 2015). However, it is estimated that water conservation retrofits will continue for existing houses and development as aged plumbing and irrigation appurtenances are replaced over time, and that per-capita water use will decrease to 92.5 gpcd in 2040 (a reduction of approximately 8.5% relative to 2020). Water loss (including treatment plant losses and authorized but unmetered water use) is estimated to remain at 6.0% for existing development through 2040.

However, more significant future per-capita water use will occur for the City due to new building codes and landscape ordinances for new residential developments compared with existing residential land use. California's newly adopted green building code will have a direct impact on new home building and water conservation in the State. The new code aims to cut indoor water consumption by at least 20%, primarily through more efficient indoor water fixtures. For a three-bedroom house, the savings is estimated to be about 10,000 gallons of water per year, on average.

The California Green Building program also includes outdoor water conservation by reducing the area devoted to high-irrigation lawns and plants, emphasizing natural drought-tolerant plantings, and installing irrigation controls that respond to local weather conditions. This is consistent with the new Model Water Efficient Landscape Ordinance (MWELO), which was adopted by the State on July 15, 2015 and was adopted by the

City on December 1, 2015, by default.

Table 4-5A: Historical & Projected City Per-Capita Water Use

	2005	2010	2015	2020	2040
Existing Households					
Residential Per-Capita (gpcd)	81.9	74.5	63.2	69.0	63.0
CII Per-Capita[(a)] (gpcd)	29.2	29.9	23.9	26.0	24.0
Water Loss Per-Capita [(b)](gpcd)	9.5	-0.5	5.8	6.1	5.5
Total Per-Capita (gpcd)	120.6	103.9	92.9	101.1	92.5
New Households					
Residential Per-Capita (gpcd)	-	-	-	65.0	65.0
CII Per-Capita (gpcd)	-	-	-	22.0	22.0
Water Loss Per-Capita (gpcd)	-	-	-	5.1	5.6
Total Per-Capita (gpcd)	-	-	-	92.1	92.6

(a) Commercial, industrial, institutional, municipal and fire per-capita water use
(b) Water loss was 6.3% in 2015; and is estimated to be 6.0% and ranging from 5.5% (2020) to 6.0% (2040) in the future for existing & new development, respectively.

As shown in Table 4-5A, total per-capita water use for new housing and development is estimated to range from 92.1 gpcd in 2020 to 92.6 gpcd in 2040. A residential per-capita water use of 65.0 gpcd is estimated for the planning period. Future commercial, industrial, and institutional (CII) per-capita water use is estimated at 22.0 gpcd and water loss for new developments is estimated to range from 5.5% in 2020 to 6.0% in 2040, with the slight increase accounting for aging of new facilities.

Based on per-capita water use developed for existing and new housing and other development in Table 4-5A, projected City water demands were developed and are shown in Table 4-5B. As shown, total water use is estimated to increase from 8,826 AFY in 2015 to 9,991 AFY in 2040 (an increase of approximately 13.2%, which is primarily attributable to new development.

Total per-capita water use is estimated to decrease from 92.9 gpcd in 2015 to 92.5 gpcd in 2040. It should be noted that the 2020 through 2040 projections are based on normal,

non-drought years. These per-capita water use projections are less than the 2015 and 2020 SBx7-7 targets of 116.6 and 112.0 gpcd, respectively, developed for the City in this UWMP as detailed in Chapter 5.

Table 4-5B: Projected City Water Demands

	2015	2020	2025	2030	2035	2040
Existing Households						
Population	84,790	84,750	84,938	85,125	85,313	85,500
Total Per-Capita Water Use (gpcd)	92.9	101.1	99.0	96.8	94.7	92.5
Water Use (AFY)	8,826	9,600	9,417	9,233	9,047	8,861
New Households						
Population	0	5,140	8,712	9,436	10,159	10,884
Total Per-Capita Water Use (gpcd)	0	92.1	92.2	92.4	92.5	92.6
Water Use (AFY)	0	530	900	976	1,053	1,129
Total Per-Capita Water Use (gpcd)	92.9	100.6	98.3	96.4	94.4	92.5
Total Water Use (AFY)	8,826	10,131	10,317	10,209	10,100	9,991

4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

For planning and funding purposes, the State Department of Housing and Community Development (HCD) categorizes households into five income groups based on the County Area Median Income (AMI):

- Extremely Low Income — up to 30% of AMI
- Very Low Income - 31 to 50% of AMI
- Low Income - 51 to 80% of AMI
- Moderate Income - 81 to 120% of AMI
- Above Moderate Income — greater than 120% of AMI

Combined, extremely low, very low, and low income households are often referred to as lower income household.

State Housing Element law requires that a local jurisdiction accommodate a share of the region's projected housing needs for the planning period. This share, called the Regional Housing Needs Allocation (RHNA), is important because State law mandates that a jurisdiction provide sufficient land to accommodate a variety of housing opportunities for all economic segments of the community. Compliance with this requirement is measured by the jurisdiction's ability in providing adequate land with adequate density and appropriate development standards to accommodate the RHNA. The Southern California

Association of Governments (SCAG), as the regional planning agency, is responsible for allocating the RHNA to individual jurisdictions within the region.

SCAG assigned a RHNA of 1,013 units to the City of Inglewood for the 2014-2021 RHNA period, in the following income distribution:

Extremely Low/Very Low Income:	250 units
Low Income:	150 units
Moderate Income:	167 units
Above Moderate Income:	446 units

The lower income households total 400 units for the City of Inglewood. Assuming all 400 lower income housing units are built by 2025, and based on the current people per dwelling unit factor for the City of approximately 3.0 and a per-capita residential water usage of 65.0 gpcd (see Table 4-5A), the water demand increase for these 400 lower income housing units is estimated at 87 AFY, which is included in the estimated demand increase between 2015 and 2025 of 1,491 AFY.

Confirmation that future water savings and demands for lower income households are included in demand projections is provided in Table 4-5.

Table 4-5: Inclusion in Water Use Projections

Are Future Water Savings Included in Projections?	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc., utilized in demand projections are found.	Chapter 9 2015 UWMP
Are Lower Income Residential Demands Included In Projections?	Yes

4.6 CLIMATE CHANGE

As presented in Metropolitan's 2015 UWMP: Climate change adds its own uncertainties to the challenges of planning. Metropolitan's water supply planning has been fortunate in having almost one-hundred years of hydrological data regarding weather and water supply. This history of rainfall data has provided a sound foundation for forecasting both the frequency and the severity of future drought conditions, as well as the frequency and abundance of above-normal rainfall.

But, weather patterns can be expected to shift dramatically and unpredictably in a climate driven by increased concentrations of carbon dioxide in the atmosphere. These changes in weather significantly affect water supply planning, irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses. As a major steward of the region's water supply resources, Metropolitan is committed to performing its due diligence with respect to climate change.

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events; and
- Rising sea levels resulting in
    - Impacts to coastal groundwater basins due to seawater intrusion
    - Increased risk of damage from storms, high-tide events, and the erosion of levees; and
    - Potential pumping cutbacks on the SWP and Central Valley Project (CVP)

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater;
- Changes in urban and agricultural demand levels and patterns;
- Impacts to human health from water-borne pathogens and water quality degradation;
- Declines in ecosystem health and function; and
- Alterations to power generation and pumping regimes.

4.6.1 Metropolitan's Activities Related to Climate Change Concerns

Under the 2015 Integrated Resource Plan (IRP) Update, Metropolitan recognizes additional risks and uncertainties from a variety of sources:

- Water quality
- Climate change
- Regulatory and operational changes
- Project construction and implementation issues
- Infrastructure reliability and maintenance
- Demographic and growth uncertainty

Any of these risks and uncertainties, should they occur individually or collectively, may result in a negative impact to water supply reliability. While it is impossible to know how much risk and uncertainty to guard against, the region's reliability will be more secure with a long-term plan that recognizes risk and provides resource development to offset that risk. Some risk and uncertainty will be addressed by following the findings of the 2015 IRP Update. But there are other risks that may take longer to manifest, like climate change or shifts in demographic growth patterns that increase or move the demands for water.

Metropolitan has established an intensive, comprehensive technical process to identify key vulnerabilities. This Robust Decision Making (RDM) approach was used with the 2010 IRP Update resource plan. The RDM approach can show how vulnerable the region's reliability is to longer-term risks and can also establish "signposts" that can be monitored to see when critical changes may be happening. Signposts include monitoring the direction of ever-changing impacts from improved Global Climate Models, and

housing and population growth patterns. The RDM approach will be revisited with the new resource reliability targets identified in the 2015 IRP Update.

Initial 2015 IRP analysis indicated an additional 200,000 AF of water conservation and local supplies may be needed to address these risks. This additional supply goal will be considered when examining implementation polices and approaches as the IRP process continues.

Metropolitan is an active and founding member of the Water Utility Climate Alliance (WUCA). WUCA consists of ten nationwide water providers collaborating on climate change adaptation and greenhouse gas mitigation issues. As a part of this effort, WUCA pursues a variety of activities on multiple fronts.

Member agencies of WUCA annually share individual agency actions to mitigate greenhouse gas emissions to facilitate further implementation of these programs. WUCA also monitors development of climate change-related research, technology, programs, and federal legislation.

In addition to supporting federal and regional efforts, WUCA released a white paper in January 2010 entitled "Options for Improving Climate Modeling to Assist Water Utility Planning for Climate Change." The purpose of this paper was to assess Global Circulation Models, identify key aspects for water utility planning, and make seven initial recommendations for how climate modeling and downscaling techniques can be improved so that these tools and techniques can be more useful for the water sector. Another recent WUCA publication related to water planning is: "Embracing Uncertainty: A Case Study Examination of How Climate Change is Shifting Water Utility Planning" (2015). A fundamental goal of this recent white paper is to provide water professionals with practical and relevant examples, with insights from their peers, on how and why to modify planning and decision-making processes to better prepare for a changing climate.

In addition to these efforts, the member agencies of WUCA annually share individual agency actions to mitigate greenhouse gas emissions to facilitate further implementation of these programs. At a September 2009 summit at the Aspen Global Change Institute, WUCA members met with global climate modelers, along with federal agencies, academic scientists, and climate researchers to establish collaborative directions to progress climate science and modeling efforts. WUCA continues to pursue these opportunities and partnerships with water providers, climate scientists, federal agencies, research centers, academia and key stakeholders.

Metropolitan also continues to pursue knowledge sharing and research support activities outside of WUCA. Metropolitan regularly provides input and direction on California legislation related to climate change issues. Metropolitan is active in collaborating with other state and federal agencies, as well as non-governmental organizations, on climate change related planning issues. The following list provides a sampling of entities that Metropolitan has recently worked with on a collaborative basis:

- USBR
- U.S. Army Corps of Engineers
- AWWA Research Foundation
- National Center for Atmospheric Research
- California Energy Commission
- California Department of Water Resources

Metropolitan continues to incorporate current climate change science into its planning efforts. A major component of the current IRP update effort is to explicitly reflect uncertainty in Metropolitan's future water management environment. This involves evaluating a wider range of water management strategies, and seeking robust and adaptive plans that respond to uncertain conditions as they evolve over time, and that ultimately will perform adequately under a wide range of future conditions. The potential impacts and risks associated with climate change, as well as other major uncertainties and vulnerabilities, will be incorporated into the update and accounted. Overall, Metropolitan's planning activities strive to support the Board adopted policy principles on climate change by:

- Supporting reasonable, economically viable, and technologically feasible management strategies for reducing impacts on water supply,
- Supporting flexible "no regret" solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts, and
- Evaluating staff recommendations regarding climate change and water resources under the California Environmental Quality Act (CEQA) to avoid adverse effects on the environment.

Metropolitan has made great efforts to implement greenhouse gas mitigation programs and policies for its facilities and operations. To date, these programs and policies have focused on:

- Exploring water supply/energy relationships and opportunities to increase efficiencies;
- Participating in the Climate Registry, a nonprofit greenhouse gas emissions registry for North America that provides organizations with the tools and resources to help them calculate, verify, report, and manage their greenhouse gas emissions in a publicly transparent and credible way;
- Acquiring "green" fleet vehicles, and supporting an employee Rideshare program;
- Developing solar power at both the Skinner Water Treatment Plant (completed) and the Weymouth Water Treatment Plant (in progress); and
- Identifying and pursuing development of "green" renewable water and energy programs that support the efficient and sustainable use of water.

Metropolitan also continues to be a leader in efforts to increase regional water use efficiency. Metropolitan has worked to increase the availability of incentives for local conservation and recycling projects, as well as supporting conservation Best Management Practices for industry and commercial businesses.

5 SB X7-7 BASELINES AND TARGETS

Senate Bill x7-7 (SBx7-7) was enacted in November 2009 (Water Conservation Act of 2009), requiring all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per-capita urban water use by 20% by December 31, 2020 and to make incremental progress towards this goal by reducing per capita water use by at least 10% by December 31, 2015.

In preparing the 2010 UWMP, each urban retail water supplier was required to develop baseline daily per-capita water use, minimum baseline daily per-capita water use, and target daily per-capita water use for 2015 and 2020 that were to be 10% and 20% less, respectively, than the baseline daily per-capita water use based on utilizing one of four methods provided; with the target reduction for 2020 greater than the legislation's minimum water use reduction requirement. The four methods are:

- Method 1: 80% of the water supplier's baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscape area water use; and commercial, industrial, and institutional uses
- Method 3: 95% of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan
- Method 4: A BMP Option based on standards that are consistent with the California Urban Water Conservation Council's (CUWCC) best management practices (BMPs).

As part of the process, all four methods were evaluated to find the lowest 2020 SB x7-7 target for the City, which must be lower than the minimum 2020 SB x7-7 target allowed by DWR. Method 3 was found to have the lowest 2020 SB x7-7 target for the City (141.6.5 gpcd); however, this was greater than the minimum 2020 SB x7-7 target allowed for the City by DWR, and the minimum 2020 SB x7-7 target of 112.0 gpcd was substituted. Further detailed information on the evaluation leading to the derivation of this target is presented in Section 5.6.

Baseline daily per-capita water use is defined as a continuous 10 or 15 year base period (baseline) for water use ending no earlier than December 31, 2004 and no later than December 31, 2010.

If the average baseline daily per-capita water use is greater than 100 gpcd for a defined 5-year baseline period, the legislation's minimum water use reduction requirement must also be met as set in Section 10608.22 of Senate Bill No. 7 SBx7-7. Per SBx7-7, the minimum water use reduction baseline period must end no earlier than December 31, 2007 and no later than December 31, 2010 and the minimum reduction shall be no less than 5% of this 5-year base daily per capita water use.

For the 2015 UWMP, water agencies must demonstrate compliance with their established water use target for 2015, which will also demonstrate whether the agency is on currently on track to achieve its 2020 target.

5.1 UPDATING CALCULATIONS FROM 2010 UWMP

In the 2010 UWMP, water agencies calculated a 2020 Urban Water Use Target through the use of a selected target method. In 2015 UWMPs, water agencies may update their 2020 Target and may make this calculation using a different target method than was used in 2010.

DWR determined that significant discrepancies exist between State Department of Finance (DOF) projected populations for 2010 (based on 2000 U.S. Census data) and actual populations for 2010 based on 2010 U.S. Census data. The average difference between projected and actual was approximately 3%, but the difference for some cities was as high as 9%.

Therefore, if an agency did not use 2010 Census data for their baseline population calculations in the 2010 UWMP (the full census data set was not available until 2012) DWR has determined that these agencies must recalculate their baseline population for the 2015 UWMPs using 2000 and 2010 Census data. This may affect the baseline and target values calculated in the 2010 UWMP, which must be modified accordingly in the 2015 UWMP. The City's 2010 UWMP did not use 2010 census data for its baseline population calculations and it is therefore recalculated in the 2015 UWMP in developing new SBx7-7 targets.

5.2 BASELINE PERIODS

City recycled water demand in 2008 was 683 AFY, which was 5.8% of the City's total 2008 retail water demand of 11,717 AFY. As this is less than 10%, a 10-year baseline period is used as opposed to a 15-year baseline period. The baseline period must end no earlier than December 31, 2004 and no later than December 31, 2010. The most advantageous sequence of years for calculating per-capita water use is the sequence that generates the highest per-capita water use, making subsequent water conservation easier to achieve. Accordingly, the 10-year period 1996 through 2005 was selected as the average per-capita water use baseline for the 2015 UWMP, which is the same baseline period used in the 2010 UWMP, as shown in Table 5-1A.

Per SBx7-7, the minimum 5-year water use reduction baseline period must end no earlier than December 31, 2007 and no later than December 31, 2010. A 5-year minimum water use reduction baseline period between 2003 through 2007 was selected to calculate the most advantageous 5-year minimum water use reduction target as shown in Table 5-1B. The minimum 5-year water use reduction baseline period is used to calculate the legislation's minimum water use reduction requirement.

Table 5-1A: Baseline Daily Per-Capita Water Use				
Sequence Year	**Calendar Year**	**Water Service Area Population**	**Daily System Gross Water Use (AFY)**	**Annual Daily Per Capita Water Use (gpcd)**
1	1996	85,653	12,178	126.9
2	1997	86,012	12,942	134.3
3	1998	86,372	11,266	116.4
4	1999	86,731	11,603	119.4
5	2000	87,090	11,647	119.4
6	2001	86,891	11,626	119.4
7	2002	86,692	11,519	118.6
8	2003	86,493	11,610	119.8
9	2004	86,294	11,397	117.9
10	2005	86,095	11,488	119.1
Baseline Daily Per Capita Water Use:				121.1

Table 5-1B: Minimum Baseline Daily Per-Capita Water Use				
Sequence Year	Calendar Year	Water Service Area Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (GPCD)
1	2004	86,294	11,397	117.9
2	2005	86,095	11,488	119.1
3	2006	85,896	11,686	121.5
4	2007	85,697	11,234	117.0
5	2008	85,498	10,927	114.1
Minimum Baseline Daily Per Capita Water Use:				117.9

5.3 SERVICE AREA POPULATION

The City's WSA comprises 79.4% of the City of Inglewood in terms of land area with GSWC and CAWC serving water to the remaining land area of the City. The City's WSA, which is the subject of this UWMP, has a population that is less than the City's population. For the preparation of the 2015 UWMP, the DWR Population Tool was utilized to estimate the City's water service area population from 1990 through 2010 and for 2015 based on inputting single-family and multi-family residential water service connections for the years 2010 and 2015, along with the water service area boundary in electronic (KML) format. The Population Tool utilizes US Census data and electronic

maps of the agency's service area. Using the number of agency residential service connections, the tool will calculate the population for the non-census years. Population Tool worksheets are included in Appendix C.

5.4 GROSS WATER USE

For the baseline and minimum baseline periods, 56% and 63%, respectively, of City potable water use was supplied with Metropolitan imported water and the remaining potable water demands were supplied by treated City groundwater production. Gross water use is treated imported water and treated groundwater from the City's treatment plant entering the distribution system.

The City also purchases recycled water from WBMWD with recycled water accounting for approximately 6% of the City's total water supply, which is not included as SBx7-7-defined gross water. The City has no indirect recycled water use; no water placed in long-term storage; no water delivered to another urban supplier; no water delivered for agricultural use; and no significant process water use. Gross water use for the baseline and minimum baseline periods are shown in Table 5-1A and 5-1B, respectively.

5.5 BASELINE DAILY PER CAPITA WATER USE

As shown in Table 5-1A, the baseline per-capita water use is calculated to be 121.1 gpcd. In the 2010 UWMP, the baseline per-capita water use was calculated to be 115.4 gpcd. As shown in Table 5-1B, the minimum baseline per-capita water use is calculated to be 117.9 gpcd. In the 2010 UWMP, the baseline per-capita water use was calculated to be 108.1 gpcd.

5.6 2015 AND 2020 TARGETS

As shown in Table 5-1B, the minimum baseline water use averages 117.9 gpcd. The minimum per capita water use target for 2020 must therefore be 112.0 gpcd (95% of 117.9). The calculations of the 2020 water use reduction target for the four methods are as follows:

- Method 1: Using a baseline per-capita average of 121.1 gpcd (shown in Table 5-1A) the City of Inglewood 2020 target would be 96.9 gpcd (80% of 121.1). Since the target water use for Method 1 is less than the one found using the legislation's minimum requirement criteria (112.0), no further adjustments to this water use target would be required, if this method is selected.
- Method 2: The City does not currently maintain records of lot size, irrigated landscaped area for each parcel, reference evapotranspiration for each parcel, etc. to split its residential, commercial, industrial, or institutional uses into inside and outside (landscape irrigation) uses. The use of Method 2 to calculate conservation targets is therefore not feasible.
- Method 3: The City of Inglewood falls within the South Coast Hydrologic Region (Hydrologic Region 4). According to the State's 20x2020 Water Conservation

Plan, the 2020 Target for Hydrologic Region 4 is 149 gpcd. Using Method 3, the City's 2020 water use target would be 141.6 gpcd (95% of 149). Since the target water use generated by Method 3 is greater than the one found using the minimum requirement, the minimum requirement would be used, if this method is selected.

- Method 4: DWR's Target Method 4 Calculator was utilized to calculate 2020 target water use for the City under this method based on standards consistent with CUWCC BMPs. The City currently meters all water services, so there is no projected metering savings. A default indoor residential water savings of 15 gpcd was assumed. CII savings was calculated to be 3.0 gpcd; landscape irrigation and water loss savings was calculated to be 4.6 gpcd; and total savings was calculated to be 22.6 gpcd. Using Method 4, the City's 2020 water use target would be 98.5 gpcd. Since the target water use generated by Method 4 is less than the one found using the minimum requirement, no further adjustments to this water use target would be required, if this method is selected.

The discussion and calculations above are summarized in Table 5-1C.

Table 5-1C: 2020 Targets by Method

Method	2020
1	96.9
2	Not Applicable
3	112.0
4	98.5

As shown in Table 5-1, Method 3 results in the most favorable 2020 water use target level for the City: 112.0 gpcd. The 2015 interim target would then be 116.6 gpcd (mid-point between baseline of 121.1 and 2020 target of 112.0). In the City's 2010 UWMP, the City's 2020 target water use was calculated to be 102.7 gpcd using Method 3 and the 2015 interim target was calculated to be 109.1 gpcd. These baselines and targets are summarized in Table 5-1.

Table 5-1: Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline gpcd[(a)]	2015 Interim Target[(a)]	Confirmed 2020 Target[(a)]
10-15 year	1996	2005	121.1	116.6	112.0
5 Year	2004	2008	117.9		

(a) All values are in gallons per capita per day (gpcd)

5.7 2015 COMPLIANCE DAILY PER CAPITA WATER USE (GPCD)

In 2015, the City's per-capita water use was 92.9 gpcd, which was significantly lower than its 2015 target of 116.6 gpcd as demonstrated in Table 5-2. There were no adjustments to the 2015 target for extraordinary events, economic adjustment, or weather normalization. The City's 2015 per-capita water use of 92.9 gpcd is also lower than its 2020 target of 112.0 gpcd.

5.8 REGIONAL ALLIANCE

The City is not participating in a regional alliance and is submitting their 2015 UWMP individually.

Table 5-2: 2015 Compliance

Actual 2015 gpcd	2015 Interim Target gpcd	Optional Adjustments to 2015 gpcd Enter "0" for adjustments not used *From Methodology 8*					2015 gpcd	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events	Economic Adjustment	Weather Normal-ization	TOTAL Adjustments	Adjusted 2015 gpcd		
92.9	116.6	0	0	0	0	92.9	92.9	Yes

(a) All values are in gallons per capita per day (gpcd)

6 SYSTEM SUPPLIES

The City obtains its water supply from three sources: treated imported surface water purchased from Metropolitan through WBMWD; local groundwater produced from the WCGB via City-owned and operated wells; and recycled water purchased from WBMWD. The groundwater is treated for high iron and manganese at the City's water treatment plant. The imported water and groundwater is chlorinated and enters the City's distribution system as potable water. The City currently has 18 service connections to the WBMWD recycled water system, utilizing the Title 22 recycled water for irrigation.

Historical water supply for the City dating back to 2008 is shown in Table 6-1A. As shown, imported water purchases have averaged 69% of the City's water supply and groundwater has averaged 24.5%. Due to wells being out of service, groundwater supply decreased from 34% of total water supply in 2009 to 17% in 2013 and was 18% in 2015, with imported water supply increasing proportionally. However, as discussed later in this chapter, the City is constructing a new well and rehabilitating existing wells to increase groundwater production, which will decrease imported water purchases.

Recycled water purchases have been a fairly consistent percentage of the City's total water supply, averaging 6.5% since 2008.

Table 6-1A: Historical City Water Supply (AFY)

Water Supply	2008	2009	2010	2011	2012	2013	2014	2015	Avg.
Imported Water	7,582	6,816	6,515	7,670	7,560	8,425	7,867	7,063	7,437
% Total	65%	61%	62%	72%	68%	77%	74%	74%	69%
Groundwater	3,452	3,786	3,389	2,383	2,760	1,844	1,879	1,764	2,657
% Total	29%	34%	32%	22%	25%	17%	18%	18%	24.5%
Recycled Water	683	647	586	578	818	662	849	726	694
% Total	6%	6%	6%	5%	7%	6%	8%	8%	6.5%
Total	11,717	11,249	10,490	10,631	11,138	10,931	10,595	9,554	10,788

6.1 PURCHASED IMPORTED WATER

The City purchases imported water from Metropolitan through its Metropolitan member agency, WBMWD. Metropolitan acquires and imports water into Southern California through two major water supply systems:

- The Colorado River Aqueduct, constructed and operated by Metropolitan, which transports water from the Colorado River, and
- The State Water Project (SWP), owned and operated by the Department of Water Resources (DWR), which transports water from the Sacramento-San Joaquin Delta through the California Aqueduct.

Faced with a declining water table and over-reliance on water from the West Coast Groundwater Basin in the 1940's, water authorities established WBMWD in 1947, which became a member agency of Metropolitan in 1948. WBMWD purchases imported water from Metropolitan and wholesales the imported water to cities and private companies in southwest Los Angeles County. In addition to imported domestic water, WBMWD delivers recycled water to the same service area.

WBMWD's service area includes 17 cities and several unincorporated portions of southwest Los Angeles County. WBMWD serves the cities and communities of Carson, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills, Rolling Hills Estates, Inglewood, South Ladera Heights, a portion of Lennox, Lomita, Manhattan Beach, Redondo Beach, Culver City, El Segundo, Malibu, West Hollywood, Gardena, Hawthorne, and Lawndale. WBMWD also serves portions of unincorporated areas of Los Angeles County such as Athens, Howard, Ross-Sexton, North Ladera Heights, Del Aire, Topanga, View Park, Windsor Hills, and portions of Lennox and El Camino Village. WBMWD's service area is shown in Figure 6-1.

Los Angeles, Orange, and Ventura counties make up Metropolitan's Central Pool service area, which is served by three Metropolitan water treatment plants: the Jensen Plant in Granada Hills, the Weymouth Plant in La Verne, and the Diemer Plant in Yorba Linda. Each of these plants serves its local area as well as a portion of a common area (Common Pool). The City of Inglewood is located within the Common Pool service area.

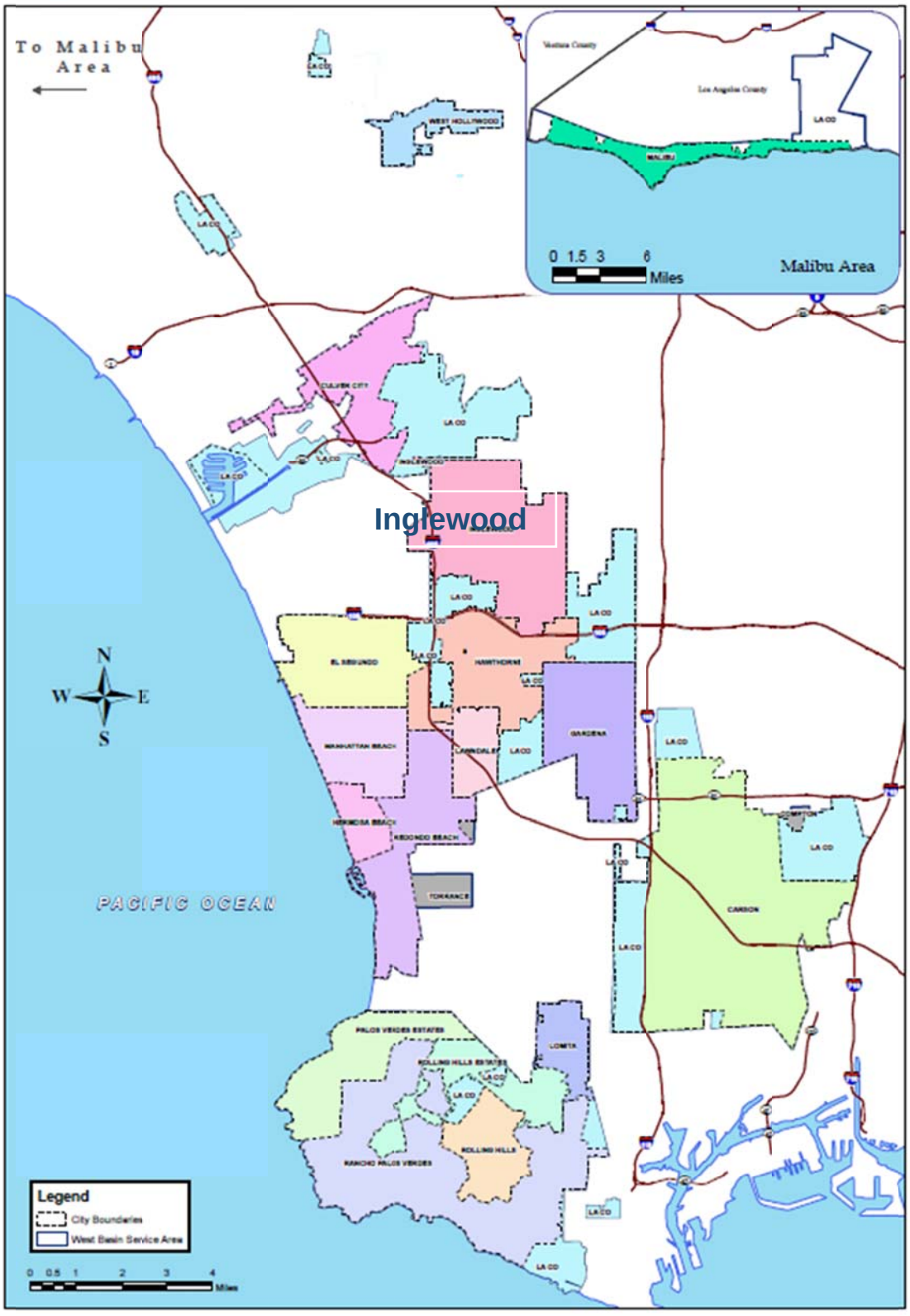
The City's water system receives imported water via Metropolitan service connections WB-17 and WB-38. The characteristics of the City's two Metropolitan connections are shown in Table 6-1B. WB-17 is connected to Metropolitan's Middle Cross Feeder and receives treated domestic water from the Weymouth Filtration Plant. WB-17 delivers imported water to the Morningside Facility via a 24-inch diameter pipeline, where it is mixed with the City's treated groundwater before entering the system. The capacity of WB-17 is 9.8 cubic feet per second (cfs) (4,400 gpm).

Table 6-1B: City Imported Water Connection Characteristics

Metropolitan Connection	Capacity (cfs)	Capacity (gpm)	Metropolitan Feeder	Metropolitan Treatment Plant
WB-17	9.8	4,400	Middle Cross	Weymouth
WB-38	9.8	4,400	Sepulveda	Jenson
Total	19.6	8,800	-	-

WB-38 is connected to Metropolitan's Sepulveda Feeder and receives treated domestic water from the Jensen Filtration Plant. WB-38 delivers imported water to the North Inglewood Facility via a 20-inch diameter pipeline, where it is mixed with the City's treated groundwater before entering the system. The capacity of WB-17 is 9.8 cubic feet per second (cfs) (4,400 gpm).

Figure 6-1
West Basin Municipal Water District Service Area



The City has redundant imported water supply because each Metropolitan connection receives supply from different treatment plants via different transmission mains and from different feeder connections. In the event one treatment/transmission train is taken out of service due to an emergency condition such as earthquake damage to the treatment plant or a transmission main, or for maintenance, the second independent treatment/transmission train could still remain in service.

6.1.1 Metropolitan Import Deliveries under Water Supply Allocation

In April 2015, citing continued drought conditions and reduced allocations from the State Water Project and Colorado River, the Metropolitan Board of Directors approved implementing their Water Supply Allocation Plan (WSAP) at a Regional Shortage Level 3 starting July 1, 2015, to cut imported water deliveries to its member agencies by 15%. Under a Level 3 WSAP, Metropolitan could impose a surcharge, ranging from $1,480 to $2,960/AF of additional water for any member agency that failed to meet the 15% reduction. The allocation plan limits water usage for its 26 member agencies based on their dependency on Metropolitan supplies, while considering local supply conditions and past water-saving actions.

In response, WBMWD developed a drought allocation plan model for its member agencies and the City of Inglewood was limited to imported water purchases totaling 7,381 AF for FY 2015/16 at the Tier 1 imported water rate. Imported water above 7,381 AF would have to be purchased by the City at a surcharge of $2,960/AF.

On May 10, 2016, the Metropolitan Board of Directors reduced the WSAP to a Level 2, which is a 10% reduction in imported water deliveries, effective immediately, due to lower demands achieved through the region's water saving efforts and improved supply conditions, particularly in Northern California; and declared there would be no WSAP set forth for FY 2017.

6.1.2 Imported Water Quality

The City purchases imported water from WBMWD, which comes from the SWP and Colorado River via Metropolitan pipelines and aqueducts. Metropolitan is proactive in its water quality efforts, protecting its water quality interests through active participation in the regulatory arena and using treatment processes that provide the highest water quality from both sources. Metropolitan has one of the most advanced laboratories in the country where water quality staff can examine the efficacy of existing treatment by performing tests and reviewing results as well as researching new treatment technologies. Over 300,000 water quality tests are performed per year on Metropolitan's water to test for regulated contaminants and additional contaminants of concern to ensure 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 water sources face individual water quality issues of concern. The CRA water source contains higher total dissolved solids (TDS) and lower levels of

organic matter, conversely the SWP contains a lower TDS, but higher levels of organic matter, lending to the formation of disinfection byproducts. To remediate the CRA's high level of salinity and the SWP's high level of organic matter, Metropolitan blends CRA and SWP supplies and provides appropriate treatment processes to decrease the formation of 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). While unforeseeable water quality issues could alter reliability, Metropolitan's current strategies ensure the deliverability of high quality water.

The presence of Quagga mussels in water sources is a water quality concern. Quagga mussels are an invasive species that was first discovered in 2007 at Lake Mead, on the Colorado River. This species of mussels form massive colonies in short periods of time, disrupting ecosystems and blocking water intakes. They are capable of causing significant disruption and damage to water distribution systems. Controlling the spread and impacts of this invasive species within the CRA requires extensive maintenance and results in reduced operational flexibility.

6.1.2.1 Source Water Protection

Source water protection is the first step in a multi-barrier approach to provide safe and reliable drinking water. In accordance with California's Surface Water Treatment Rule, Title 22 of the California Code of Regulations, DDW requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to identify possible sources of drinking water contamination, evaluate source and treated water quality, and recommend watershed management activities that will protect and improve source water quality. The most recent sanitary surveys for Metropolitan's water sources were completed in 2010 and 2011. The next Sanitary Surveys for the watersheds of the Colorado River and the SWP will report on water quality issues and monitoring data through 2015. Metropolitan has an active source water protection program and continues to advocate numerous SWP and Colorado River water quality protection issues.

6.1.2.2 DWR SWP Water Quality Programs

Metropolitan supports DWR's policies and programs aimed at maintaining or improving the quality of SWP water delivered to Metropolitan, especially the ability to govern the quality of non-project water conveyed by the California Aqueduct. In addition, Metropolitan has supported the expansion of DWR's Municipal Water Quality Investigations Program beyond its Bay-Delta core water quality monitoring and studies to include enhanced water quality monitoring and forecasting of the Delta and SWP. These programs are designed to provide early warning of water quality changes that will affect treatment plant operations both in the short-term (hours to weeks) as well as seasonally. The forecasting model is currently suitable for use in a planning mode. It is expected that

with experience and model refinement, it will be suitable to use as a tool in operational decision making.

6.1.2.3 Water Quality Exchanges

Metropolitan has implemented selective withdrawals from the Arvin-Edison storage program and exchanges with the Kern Water Bank to improve water quality. Although these programs were initially designed to provide dry-year supply reliability, they can also be used to store SWP water at periods of higher water quality for withdrawal at times of lower water quality, thus diluting SWP water deliveries.

Although, elevated arsenic levels have been a particular concern with groundwater banking programs. However, there are short-term water quality benefits that can be realized such as groundwater pumped into the California Aqueduct with lower total organic carbon (TOC) levels, lower bromide levels, and lower TDS.

6.1.2.4 Water Supply Security

Changes in national and international security have led to increased concerns about protecting the nation's water supply. In coordination with its member agencies, Metropolitan added new security measures in 2001 and continues to upgrade and refine procedures. Metropolitan increased the number of water quality tests conducted each year to over 300,000 analytical tests on samples collected within its service area and source waters and developed contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.

6.2 GROUNDWATER

City wells produce groundwater from the WCGB. Prior to 1961, up to 94,000 AFY was extracted from the underground aquifer, which led to a serious overdraft in the WCGB. This over-pumping, coupled with similar heavy groundwater extraction from the adjoining Central Basin led to sea water intrusion into the WCGB. To mitigate these concerns, groundwater in the West Coast and Central Basins was adjudicated by court order (Judgment) to protect the underground water supply within the two basins.

6.2.1 Basin Adjudication

In 1961, by order of the Los Angeles Superior Court, pumping in the WCGB was limited to 64,468.25 AFY[1]. While this Judgment resulted in significantly reduced pumping from the WCGB, the adjudicated pumping limits were set higher than the natural replenishment of groundwater, which continued to result in annual overdrafts. Inglewood's adjudicated share of that water right is 4,449.89 AFY[2].

[1] Per Water Replenishment District of Southern California website
[2] Inglewood's original adjudicated right was for 4,382 AFY; the City subsequently purchased an additional 67.89 AFY in water rights from Frank Abell, Boise Cascade Building Company, Georgia Pacific Corporation, Kaufman, Leo and Sheldon Baer, and George R. Murdock

Groundwater production in the Basin has been declining over the past ten years, from a high of 53,870 AFY in the water year 2000/01 to a low of 36,808 AFY in 2005/06 with 36,328 AFY being pumped in 2014/15.[3] The amount of water member agencies are allowed to pump is set annually by the Water Replenishment District of Southern California (WRD), but the values remain fairly constant. The Judgment also allows water users to carry over and extract any unused water rights, which originally was up to 10% of such unused water right and up to 10% beyond their allowable pumping rights within a given year.[4]

Beginning in the 2014-2015 Administrative Year for the WCGB Judgment (July 1- June 30) and each year thereafter, the WCGB carryover is 100% of allotted pumping rights. The amount of carryover is reduced by the quantity of water held in a pumper's storage account, but in no event is carryover less than 20% of the allotted pumping right (see Section 6.2.3 for a discussion on the new Court Judgement).

WRD tracks the amount of groundwater production (pumping) that occurs every year in the Central and West Coast groundwater basins to identify trends that may impact groundwater resources. As previously noted, the groundwater basins currently face overdraft every year because pumping exceeds natural groundwater replenishment. Sources of replenishment water to WRD include recycled water, imported water, and natural runoff captured in the regional spreading grounds.

6.2.2 West Coast Groundwater Basin Aquifer

The WCGB is approximately 160 square miles and occupies 37 percent of the southwestern part of the Coastal Plain of the Los Angeles groundwater basin and has a total storage capacity of 6,500,000 AF (based on the Silverado Aquifer, the primary water producing aquifer).

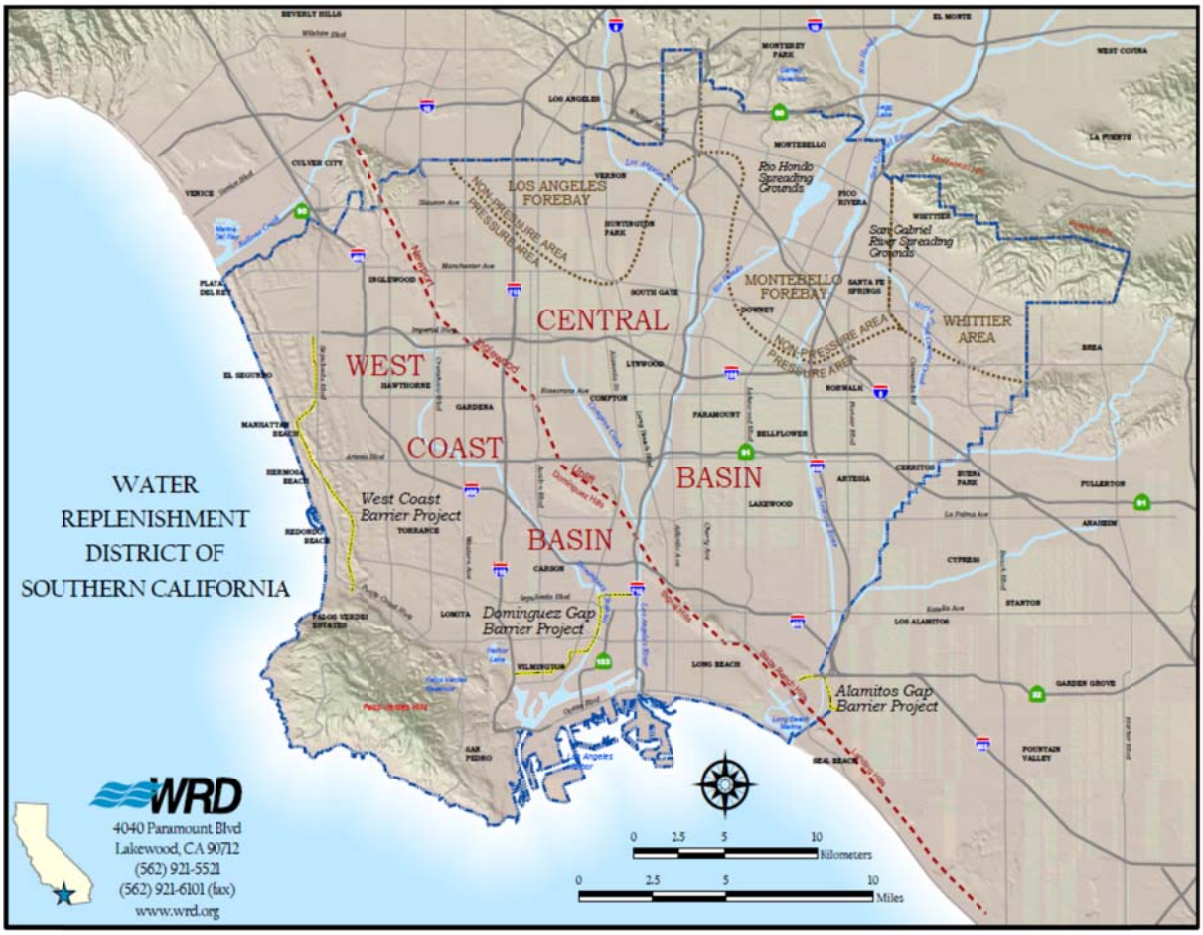
The location of the WCGB and Central Basin within the greater Los Angeles metropolitan region is shown on Figure 6-2. On the north, the WCGB is bounded by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the East, the Basin is bounded by the Newport-Inglewood fault zone. The WCGB is bounded on the south and west by the Pacific Ocean and by consolidated rocks of the Palos Verdes Hills. The surface of the WCGB is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both then flowing into the San Pedro Bay.[5]

Water bearing formations include Holocene, Pleistocene, and Pliocene age sediments. The semiperched aquifer of the Holocene age is unconfined. The groundwater in the underlying aquifers is confined throughout most of the WCGB; and the Gage and Gardena aquifers are unconfined where water levels have dropped below the Bellflower

[3] Information extracted from WRD's 2016 Engineering Survey and Report which can be found on their website at: http://www.wrd.org/engineering/reports/May9_2016_ESR_Final_Report.pdf
[4] July 21, 1961 Judgment, Section V
[5] DWR, California's Groundwater Bulletin 118, 2004

aquitard. These aquifers merge with adjacent aquifers, particularly near the Redondo Beach area. The Silverado aquifer, underlying most of the Basin, is the primary production aquifer and yields between 80 to 90 percent of the groundwater extracted from the WCGB.

Figure 6-2
West Coast Basin and Central Basin Location Map



6.2.3 Groundwater Production and Overdraft

In the early 1940s, extensive over pumping of the WCGB had led to critically low groundwater levels, resulting in seawater intrusion along the coast, serious overdraft, and the decline of water levels. Annual pumping prior to the adjudication of groundwater rights in the early 1960s reached levels as high as 94,100 AF. This situation precipitated an adjudication that limits the allowable extraction that could occur in any given year and assigned water rights to WCGB pumpers. The adjudication for the WCGB was set at total of 64,468.25 AFY (for all pumpers in the WCGB) with the City having an adjudicated right of 4,449.89 AFY. The total pumpage of the WCGB was set higher than the natural replenishment amounts, creating an annual deficit known as the "Annual Overdraft." In

order to combat this Annual Overdraft, WRD purchases and recharges additional water to make up for the overdraft (WBMWD, 2016).

In December 2014, the Superior Court granted a motion by WRD, City of Inglewood, City of Long Beach, City of Manhattan Beach, City of Los Angeles, City of Torrance, California Water Service, Golden State Water Company and other parties to amend the WCGB Judgment to establish a legal framework for the storage and extraction of stored water in the WCGB.

The Judgment Amendment, which is included in Appendix E, will permit the storage of up to 120,000 acre-feet, which is the available, safe storage capacity of that basin. The legal framework permits a groundwater pumper with adjudicated rights to store water and subsequently extract that stored water without the extraction counting against its water rights and without having to pay the Replenishment Assessment (RA). The Judgment Amendment makes possible the storage of "surplus" imported water in the rare instances when it is available for use in the more frequent instances when it is not, further enhancing the region's water supply reliability (WBMWD, 2016).

The court's decision culminated a journey that started in 1999. After a failed facilitated process among the multiple water rights stakeholders and WRD and a two-year state-sponsored mediated effort that resulted in the filing of the petition in April 2009, several legal challenges travelled to the Appellate court for resolution. After several rounds of negotiation and modest changes to the petition, the parties that originally opposed the petition ended up supporting it. Pursuant to the Judgment Amendment, WRD assumed administrative Watermaster duties from the California Department of Water Resources on July 1, 2015 (WBMWD, 2016).

To allow full WCGB rights to be pumped while limiting seawater intrusion, WRD purchases non-interruptible imported and recycled water supplies from WBMWD for injection by the Los Angeles County Department of Public Works at the West Coast and Dominguez Gap Seawater Intrusion Barriers.

WRD is the entity responsible for maintaining and replenishing the WCGB. WRD is a special district created by the State and governed by a five-member elected body to replenish and protect the WCGB with imported water and recycled water (WRD, Engineering Survey and Report, May 2015). Groundwater pumped from the WCGB has been declining over the past 5 years due to strong water conservation efforts as shown in Table 6-1C, which also shows groundwater replenishment and average recharge.

Table 6-1C: WCGB Groundwater Production, Replenishment and Recharge (AFY)[(a)]

Basin Activity	2011	2012	2013	2014	2015
Groundwater Pumped	34,646	33,701	31,381	31,288	28,700
Groundwater Replenishment (Imported & Recycled)	20,853	15,070	17,942	21,658	19,757

Average Natural Mountain-Front Recharge[(b)]	14,500	14,500	14,500	14,500	14,500

(a) Derived from WBMWD (2016).
(b) From Reichard et al., (2003) for average 5-year conditions (1996-2000).

WRD's 2016 Engineering Survey and Report notes groundwater levels within the WCGB in 2015 rose in some areas, fell in others, but over the entire WCGB, the average water level change was a rise of 3.4 feet (WRD, 2016). Although water levels rose in some areas of the WCGB, water levels fell up to 10 feet in some areas of the Central Basin, resulting in an overall loss in groundwater storage between the two basins. WRD estimates the annual change in storage for 2014/2015 water year for both basins was -12,700 AF. The Accumulated Overdraft at the end of FY 2014/2015 was 832,300 AF, or 220,300 AF below the Optimum Quantity[6].

In an effort to eliminate long-term overdraft conditions, WRD closely monitors the groundwater basins for fluctuations in groundwater levels. WRD utilizes a groundwater model developed by the United States Geological Survey (USGS) to study and better understand the Basin's reaction to pumping and recharge. WRD works closely with the Los Angeles County Department of Public Works, Metropolitan, and Sanitation Districts of Los Angeles County on current and future replenishment supplies.

6.2.4 Recharge

Another method for controlling overdraft is through recharge management programs. Natural groundwater replenishment through percolation of precipitation and irrigation waters is insufficient to sustain the groundwater pumping that takes place in the WCGB. WRD must therefore depend on artificial recharge programs to replace the annual overdraft. The amount of water available for recharge will vary from year to year. In 2014/2015, WRD recharged 120,124 AF to both basins. The various methods of recharging the Basin using imported and recycled water are described below:

- Injection – WRD recharges the WCGB by injecting water into it to prevent seawater intrusion. A barrier is formed by injection of recycled water or treated imported water from Metropolitan in wells along the West Coast Barrier Project (between Redondo Beach and El Segundo) and the Dominguez Gap Barrier Project (east of Palos Verdes Peninsula).
- In-lieu Replenishment Water – The In-lieu program allows the natural recharge of the WCGB by offsetting groundwater production with the use of imported water. The reduction in pumping naturally recharges the WCGB.
- Transfer from Central Groundwater Basin – Although not well quantified, groundwater from the Central Groundwater Basin flows into the WCGB through the Newport Inglewood Uplift. This, along with natural percolation due to

[6] All references in this paragraph are extracted from WRD's 2016 Engineering Survey and Report.

stormwater and irrigation, make up a small part of the overall recharge to the WCGB.

6.2.5 City Groundwater Production

The City owns and operates wells that extract groundwater from the WCGB. The City's adjudicated share of water rights is 4,449.89 AFY. The City also has carry-over rights as described in Section 6.2.1. The City currently produces groundwater from the WCGB via four active groundwater wells, Well Nos. 1, 2, 4 and 6, that were constructed in 1974, 1974, 1990, and 2003, respectively. Historical production by these wells dating back to 2008 is shown in Table 6-1D.

Table 6-1D: Historical City Well Production (AFY)

Well	2008	2009	2010	2011	2012	2013	2014	2015	Avg.
Well No. 1	183	673	515	299	121	0	0	197	249
% Total	5%	18%	15%	12%	4%	0%	0%	11%	9%
Well No. 2	306	423	770	702	524	302	178	86	411
% Total	9%	11%	23%	30%	19%	16%	9%	5%	16%
Well No. 4	908	880	663	320	281	253	208	150	458
% Total	26%	23%	20%	13%	10%	14%	11%	9%	17%
Well No. 6	2,055	1,810	1,441	1,062	1,835	1,288	1,493	1,330	1,539
% Total	60%	48%	42%	45%	67%	70%	80%	75%	58%
Total	3,452	3,786	3,389	2,383	2,761	1,843	1,879	1,763	2,657

The pumping capacity and specific capacity of each well has declined over the years primarily due to age, and in some cases, due to physical defects. Well No. 1 was rehabilitated in late 2014 and placed back in service in 2015. Well No. 2 is currently out of service and is scheduled for rehabilitation in late 2016. Well No. 4 is producing less than its design capacity and is scheduled for rehabilitation in 2017. Well No. 6 is currently in operation and is scheduled for rehabilitation in 2017. Groundwater pumped by the City from the WCGB from 2011 through 2015 is summarized in Table 6-1.

A new City well, Well No. 7, will be designed and constructed and is planned for operation beginning in 2017 with an estimated supply capacity of 1,500 gpm (1,950 AFY). With well rehabilitation and the construction of new Well No. 7, City groundwater production capacity is projected to increase to 5,300 AFY by the year 2017 as shown in Table 6-1E, which is an increase of approximately 200% relative to groundwater production in 2015 (1,763 AFY). It is estimated that the City will rehabilitate and replace wells as required to maintain average annual well supply at approximately 4,450 AFY, equivalent to their current groundwater rights, through the planning period.

Table 6-1: Groundwater Volume Pumped						
Groundwater Type	Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	WCGB	2,383	2,761	1,843	1,879	1,764
Total		2,383	2,761	1,843	1,879	1,764

Raw groundwater from Wells 1, 2, 4, and 6 is conveyed to the City's 13-mgd Sanford M. Anderson Treatment Plant for manganese and iron removal. Iron and manganese are secondary contaminants, i.e. taste, odor, and/or aesthetics concerns, as opposed to a primary contaminant, i.e. health concerns.

Water loss occurs during the treatment process. In 2015, raw groundwater totaling 1,763 AFY was pumped to the treatment plant and treated effluent totaling 1,660 AFY was pumped from the plant to the distribution system for a water loss of approximately 6%.

Table 6-1E: Projected City Well Capacity for 2017		
Well	2017 Well Capacity (gpm)	2017 Well Capacity (AFY)[(a)]
Well No. 1	550	700
Well No. 2	450	550
Well No. 4	450	550
Well No. 6	1,200	1,550
Well No. 7	1,500	1,950
Total	4,150	5,300
Groundwater Rights	-	4,450

a) Based on using each well 80% of the year

6.2.6 Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA) consists of three legislative bills, Senate Bill SB 1168 (Pavley), Assembly Bill AB 1739 (Dickinson), and Senate Bill SB 1319 (Pavley) that provide a framework for long-term sustainable groundwater management across California. Under the legislation, local and regional authorities in medium and high priority groundwater basins will form Groundwater Sustainability Agencies (GSAs) that oversee the preparation and implementation of a local Groundwater Sustainability Plan (GSP). Groundwater in the WCGB and Central Groundwater Basin are adjudicated by court order to protect the underground water supply within the two basins. As such, these basins are already managed and are not required to submit a GSP but are required to submit groundwater monitoring data annually to the California Department of Water Resources.

6.2.7 Groundwater Quality

City wells have historically produced and currently produce groundwater that meets Federal and State water quality standards. The water quality constituents of concern (COC) for groundwater produced by City wells are iron (Fe), manganese (Mn), and total dissolved solids (TDS). In some groundwater samples from certain City wells, each COC has occasionally been detected at concentrations exceeding its respective California Division of Drinking Water (DDW) applicable primary or secondary Maximum Contaminant Level (MCL). Historic water quality data for Well Nos. 1, 2, 4 and 6 is presented in Table 6-1F.

TDS concentrations in City well water have ranged from 277 milligrams per liter (mg/L) to 640 mg/L. The current State Water Resources Control Board (SWRCB) secondary (recommended) MCL for TDS are: 500 mg/L (lower); 1,000 mg/L (upper); and 1,500 mg/L (short-term). Hence, the detected concentrations range from below to above the lower recommended SWRCB secondary MCL, but below the upper and short-term secondary MCLs for TDS. Generally, TDS concentrations sampled from City wells were below the lower recommended MCL. The five reported elevated detections (between 500 and 640 mg/L) were primarily from samples collected from Well No 6 between 2006 and 2011.

Iron (Fe) was present at concentrations ranging from Not Detectable (ND) to as high as 13,000 µg/L. The secondary MCL for iron is 300 µg/L. The unusually high concentrations of Fe (i.e. 13,000 µg/L in Well No. 1, and 5,500 µg/L in Well No. 6) are very likely related to laboratory testing of a turbid water sample and not reflective of actual field water quality. Manganese (Mn) was listed in the SWRCB database at concentrations ranging from ND to 670 µg/L, with all four City wells reporting concentrations above the current SWRCB secondary MCL of 50 µg/L for Mn on one or more occasions.

Groundwater from City wells is treated for iron and manganese at the City's Sanford M. Anderson Water Treatment Plant to meet the secondary MCLs for these two inorganic constituents (Trace Elements). The process to remove the iron and manganese includes chemical addition of chlorine and potassium permanganate, detention in two 202,500 gallon contact tanks to achieve adequate oxidation, and gravity filtration using six dual media greensand filters. Then ammonia is added at the end of the treatment process to create chloramine for a disinfectant. The total chlorine (chloramine) residual varies between 2.5 and 3.5 mg/L.

6.3 SURFACE WATER

The City does not use, or plan to use, self-supplied surface water as part of its water supply at this time.

6.4 STORMWATER

The City does not use, or plan to use stormwater to meet local water supply demands at this time.

6.5 WASTEWATER AND RECYCLED WATER

LACSD manages the wastewater collection and treatment system within the City of Inglewood. Wastewater generated within the City is conveyed to the Joint Water Pollution Control Plant (JWPCP) in Carson, via LACSD interceptor sewers. The JWPCP has an advanced primary treatment with 60 percent secondary treatment.

Table 6-1F: Historical City Groundwater Quality[a]

NMCL = No Maximum Contaminant Level (MCL); SMCL = Secondary MCL; PMCL = Primary MCL

Constituent Analyzed	Units	MCL	Well No. 1	Well No. 2	Well No. 4	Well No. 6
General Physical Constituents						
Turbidity (SMCL)	NTU	5	0.1-30	ND-2.8	ND-7.2	ND-2
Specific Conductance (SMCL)	µmhos/cm	900; 1,600; 2,200[b]	500-920	540-675	550-760	615-1,100
pH (SMCL)	units	6.5 to 8.5	7.2-8.2	7.6-8.3	7.6-8.1	7.6-7.9
Color (SMCL)	CU	15	ND-200	ND-30	ND-20	ND-7.5
Odor (SMCL)	TON	3	ND-8	ND-40	ND-2	ND-2
General Mineral Constituents						
Total Dissolved Solids (SMCL)	mg/L	500; 1,000; 1,500[b]	277-540	320-390	281-460	380-640
Total Organic Carbon (NMCL)		None	0.8-7.0	0.4-3.2	0.6-4.0	ND-3.5
Total Hardness (NMCL)		None	120-170	152-207	167-210	200-330
Ammonia (NMCL)		None	1.3-5.9	0.53-2.6	0.88-3.6	ND-2.2
Calcium (NMCL)		None	27-45	42-56	44-61	54-92
Magnesium (NMCL)		None	11.7-15	14-16.4	12.3-18	15-24.6
Sodium (NMCL)		None	53.6-150	51-69	45.3-83	50-70
Potassium (NMCL)		None	4.4-12	2.9-6.8	4.5-9.3	3.6-7.1
Bicarbonate (HCO_3) (NMCL)		None	263-430	240-320	278-380	210-280
Sulfate (SMCL)		250, 500, 600[b]	1.1-53	2.7-53	1-7.7	49-60
Chloride (SMCL)		250, 500, 600[b]	28-43	30-120	31.2-67	64-170
Fluoride (SMCL)		2	0.21-0.5	0.29-0.42	0.24-0.7	0.2-0.3
Nitrate as NO_3 (PMCL)		45	ND-0.68	0.08[c] (1989)	ND	ND
Detected Inorganic Constituents (Trace Elements)						
Aluminum (SMCL)	µg/L	200	ND-480	ND-540	ND-111	8.8[c] (2004)
Arsenic (PMCL)		10	ND-1.0	ND	ND	ND
Barium (PMCL)		1,000	ND-110	ND-26	30-32	54-100
Boron (PMCL)		1,000 (NL)	160-460	200-450	150-270	110[c] (2003)
Chromium (Total) (PMCL)		50	ND-14	ND-6	ND-0.22	ND-0.28
Copper (PMCL)		1,000	ND-9	2.1-21	ND-7.1	4.3-15
Iron (SMCL)		300	ND-13,000	ND-1,565	ND-910	ND-5,500
Lead (PMCL)		15	1[c] (1989)	0.76-5	3.3[c] (1989)	0.43-0.47

Manganese (SMCL)		50	ND-670	24-540	ND-170	ND-220
Mercury (PMCL)		2	ND-2	ND-0.9	ND	ND
Selenium (PMCL)		50	2[(c)] (1989)	2[(c)] (2006)	ND	ND
Zinc (SMCL)		5,000	ND-46	26[(c)] (1991)	ND	ND-14
Detected Volatile Organic Compounds						
Total Trihalomethanes (PMCL)	µg/L	80	ND	5.2[(c)] (2004)	ND	ND
Detected Radiological Constituents						
Gross Alpha (PMCL)	pCi/L	15	0.6-3.2	0.19-4.87	0.026-3.5	0.148-2.72
Radium-228 (PMCL)		2	.044[(c)] (2008)	0.223-0.298	0.012-0.47	.274[(c)] (2004)
Uranium (PMCL)		20	ND	0.3[(c)] (2002)	ND	ND

a) Periods of records for Well Nos. 1, 2, 4 & 6 are 1989-2014, 1989-2014, 1992-2015 & 2003-2015, respectively
b) The 3 numbers represent the recommended, upper and short-term State MCLs for the constituent.
c) The listed concentration is reported for one sample. The year in parenthesis is the date of the reported detection
ND = Not Detected; NL = State Department of Public Health Notification Level;

The dry-weather, average-design treatment capacity of the JWPCP is 400 mgd and the maximum-design-peak flow is 540 mgd.[7] Treated wastewater from the JWPCP is conveyed to an ocean outfall that has a discharge two miles offshore from White Point on the Palos Verdes Peninsula. The depth of the discharge is approximately 200 feet below sea level.[8]

Municipal wastewater is generated in Inglewood's water service area from residential, commercial, industrial, and public/institutional land uses. Wastewater generation in the City's WSA in 2015 is estimated at 6,179 AFY, as shown in Table 6-2, which is 70% of WSA potable water use in 2015.

Table 6-2: Wastewater Collected Within Service Area in 2015

Wastewater Collection			Recipient of Collected Wastewater		
Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AFY)	Wastewater Treatment Agency	Treatment Plant Name	Is WWTP Located Within UWMP Area?
LACSD	Estimated	6,179	LACSD	JWPCP	No
Total		6,179			

Because the wastewater treated at the JWPCP is discharged to the ocean, none of the wastewater generated within Inglewood is treated to recycled water standards.

Table 6-3: Wastewater Treatment and Discharge Within Service Area in 2015

WW	Method	Does This	Treatment	2015 Volumes (AFY)

[7] LARWQCB Order No. ORDER NO. R4-2006-0042, Waste Discharge Requirements for the JWPCP, adopted April 6, 2006 available at: http://63.199.216.6/larwqcb/docs/1758_R4-2006-0042_WDR_PKG.pdf
[8] LACSD website: http://www.lacsd.org/waswater/wrp/jwpcp1.htm

Treatment Plant	of Disposal	Plant Treat Wastewater Generated Outside the Service Area?	Level	WW Treated	Discharged Treated WW	Recycled Within Service Area	Recycled Outside of Service Area
JWPCP	Ocean outfall	Yes	Advanced Primary/60% Secondary	290,000	290,000	0	0
Total				290,000	290,000	0	0

In 2015, Metropolitan and LACSD announced a joint proposal to add Advanced Wastewater Treatment facilities to JWPCP that could result in the reuse of up to 168,000 AFY of wastewater in a similar manner to Orange County Water District's Groundwater Replenishment System.

Under this program, water would be purified at the plant, then injected or spread into local groundwater basins, before being pumped out and used as drinking water. A 1-MGD demonstration plant is currently in the design phase. The new advanced water treatment plant will be located on LACSD's property at the Carson site, and the purified water will be distributed to groundwater basins in Los Angeles and Orange Counties through a 30-mile network of new distribution pipelines. The program's first operational phase could produce about 67,000 acre-feet of recycled water per year. Additional phases could bring total production up to 168,000 acre-feet per year.

Since 1995, the City of Inglewood has purchased recycled water from WBMWD, produced at the Edward C. Little Water Recycling Facility (ECLWRF) located in El Segundo, California. WBMWD obtains secondary treated wastewater effluent from the City of Los Angeles' Hyperion Wastewater Treatment Plant and provides additional tertiary treatment at ECLWRF to meet Title 22 recycled water requirements. WBMWD produces five different qualities of recycled water including: 1) Disinfected Tertiary Water, 2) Nitrified Water, 3) Softened Reverse Osmosis Water, 4) Pure Reverse Osmosis Water, and 5) Ultra-Pure Reverse Osmosis Water.

WBMWD purchases approximately 13% of Hyperion's secondary effluent for treatment at the ECLWRF, where most of the water is treated to meet California Code of Regulations Title 22 tertiary standards for uses as recycled water including groundwater replenishment, injection into the seawater intrusion barrier, industrial use, irrigation, and other reuse purposes. The plant, which has a current tertiary treatment capacity of 62,700 AFY, produced approximately 58,000 AFY tertiary Title 22 recycled water in 2015.

The City currently has 18 connections to WBMWD's recycled water system including service connections to Inglewood Park Cemetery, Hollywood Park Race Track, City parks, Inglewood Unified School District facilities, and Caltrans right-of-way. City recycled water use has averaged 694 AFY since 2008 (6.5% of total City water use) since 2008; and was 849 AFY in 2014 and 726 AFY in 2015.

Almost all recycled water use in the City is for landscaping irrigation with a very small amount of recycled water used City yard fire hydrant street sweeping. Current and projected recycled direct beneficial uses within the City's water service area are shown in Table 6-4 and a comparison of recycled water usage projected for 2015 in the City's 2010 UWMP compared with actual usage is shown in Table 6-5. The increase in recycled water demand in 2020 of 334 AFY relative to 2015 is primarily attributable to landscape irrigation planned at the new Hollywood Park development (200 AFY). Methods to expand future recycled water use is shown in Table 6-6.

Table 6-4: Current & Projected Recycled Direct Beneficial Uses within Service Area

Beneficial Use Type	Level of Treatment	2015	2020	2025	2030	2035	2040
Landscape irrigation	Tertiary	726	1,060	1,060	1,060	1,060	1,060
Total	-	726	1,060	1,060	1,060	1,060	1,060

Table 6-5: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

Use Type	2010 Projection for 2015	2015 Actual Use
Landscape irrigation	1,060	726
Total	1,060	726

Table 6-6: Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Increase in Recycled Water Use (AFY)
Customers/Mains	Add/retrofit customers & construct transmission mains to users	2018 - 2020	330
Total			330

6.6 DESALINATED WATER OPPORTUNITIES

Over an eight year period, WBMWD conducted ocean water desalination pilot testing at the El Segundo Power Generating Station and assessed the feasibility of converting ocean water into drinking water. Various water treatment technologies including high-rate pre-screening, microfiltration/ultrafiltration, reverse osmosis, etc. were piloted and extensive water quality monitoring of the raw ocean source water, discharge concentrate, and product water quality was performed. As a result of this testing, WBMWD concluded that ocean water desalination could be a viable alternative water supply and additional research was needed to further develop it as a future water supply resource.

WBMWD is currently conducting larger scale testing at their Ocean Water Desalination Demonstration Facility (OWDDF) at the SEA Lab in Redondo Beach. The OWDDF was completed in 2010 and has been operating continuously. The OWDDF is providing

WBMWD with the opportunity to build on the operational protocols and challenges from piloting to establish environmentally-effective and sustainable intake technologies, determine an approach to energy usage and optimization/minimization, develop process optimization protocols, determine operational requirements, establish target water quality goals, and evaluate concentrate discharge management options.

The OWDDF includes an evaluation of passive screening and subsurface intake systems, energy consumption and optimization analysis and an intensive brine discharge study. The results of the two to three year demonstration project will be used as the foundation for development of a full-scale design, permitting, and operations approach.

6.7 EXCHANGES OR TRANSFERS

The City currently does not participate with other water agencies on water exchanges or transfers into or out of the City's water service area and none are planned for the future at this time.

6.8 FUTURE WATER PROJECTS

The City currently produces groundwater from the WCGB via four active groundwater wells: Well Nos. 1, 2, 4 and 6. The pumping capacity and specific capacity of each well has declined over the years primarily due to age, and in some cases, due to physical defects.

Well No. 2 is currently out of service and is scheduled for rehabilitation in late 2016. Well No. 4 is producing less than its design capacity and is scheduled for rehabilitation in 2017. Well No. 6 is currently in operation and is scheduled for rehabilitation in 2017. A new City well, Well No. 7, will be designed and constructed and is planned for operation beginning in 2017 with an estimated supply capacity of 1,500 gpm (1,950 AFY).

With well rehabilitation and the construction of new Well No. 7, City groundwater production capacity is projected to increase to 5,300 AFY by the year 2017, which is an increase of approximately 200% relative to groundwater production in 2015 (1,763 AFY).

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

The City obtains its potable water supply from imported surface water purchased from Metropolitan through WBMWD, and local groundwater produced from the West Coast Groundwater Basin WCGB via City-owned and operated wells.

Due to wells being out of service, groundwater supply decreased from 34% of total water supply in 2009 to 17% in 2013 and was 18% in 2015, with imported water supply increasing proportionally. However, the City is constructing a new well and rehabilitating existing wells to increase groundwater production, which will decrease imported water purchases.

The City currently has 18 service connections to the WBMWD recycled water system, utilizing the Title 22 recycled water for irrigation. Recycled water purchases have been a fairly consistent percentage of the City's total water supply, averaging 6% since 2008.

A summary of expected future water supply projects or programs for the City is shown in Table 6-7. The City's actual water supplies for 2015 and projected supplies for 2020 through 2040 are shown in Table 6-8 and Table 6-9, respectively.

6.10 CLIMATE CHANGE IMPACTS TO SUPPLY

Climate change impacts to Metropolitan water supplies and Metropolitan's activities related to climate change concerns are discussed in Section 4.6.

Table 6-7: Expected Future Water Supply Projects or Programs

Name	Joint Project with other agencies?		Description	Year Planned	Planned Year- Type	Expected Supply (AFY)
Groundwater supply improvement projects	No	-	Rehabilitate Well Nos. 2, 4 & 6; construct new Well No. 7	2016 – 2017	All Year Types	2,650

Table 6-8: Water Supplies — Actual

Water Supply		2015	
Description	Additional Detail on Water Supply	Actual Volume (AF)	Water Quality
Purchased or Imported Water	Treated Metropolitan water via WBMWD	7,063	Drinking Water
Groundwater	WCGB	1,764	Drinking Water
Recycled Water	WBMWD	726	Recycled Water
Total		9,554	

Table 6-9: Water Supplies — Projected

Water Supply	Additional Detail	Projected Water Supply				
		2020	2025	2030	2035	2040
		Volume[(a)]	Volume[(a)]	Volume[(a)]	Volume[(a)]	Volume[(a)]

Purchased or Imported Water	Treated Metropolitan water via WBMWD	5,681	5,867	5,759	5,650	5,541
Groundwater	WCGB	4,450	4.450	4,450	4,450	4,450
Recycled Water	WBMWD	1,060	1,060	1,060	1,060	1,060
Total		11,191	11,377	11,269	11,160	11,051

(a) Supply expected to be reasonably available

7 WATER SUPPLY RELIABILITY ASSESSMENT

7.1 CONSTRAINTS ON WATER SOURCES AND RESPONSE PROGRAMS

Two of the most significant constraints on water supply for the City and for Southern California have been the drought that started in 2012 and has persisted into 2016, and Sacramento-San Joaquin River Delta ecosystem issues that affect imported water supply from the State Water Project. The water conditions that the region faced in 2015 were shaped by supply conditions and resource actions that occurred in the preceding years, including several extraordinary events, such as:

- Historic drought in California leading to record low contract supplies available from the State Water Project in 2014 (5% of contract supplies) and in 2015 (20% of contract supplies);
- An extended 16 year drought in the Colorado River watershed that has decreased storage levels in Lake Mead and Lake Powell to 38% and 51% of capacity respectively at the end of November 2015 and keeping storage below surplus levels despite an ease in drought conditions in 2014 and 2015;
- Groundwater basins and local reservoirs dropping to very low operating levels due to record dry hydrology in Southern California;
- Restrictions of SWP deliveries by federal court orders due to endangered Delta smelt and salmon which resulted in the combined loss of approximately 3 MAF of SWP supplies between 2008 and 2014. These losses have impacted Metropolitan's ability to meet demands and refill regional storage;
- In 2014, Lake Oroville storage dropped within 10 TAF of its lowest operating levels since the historic drought of 1977;
- Supply availability in the Los Angeles Aqueduct system continues to be affected by both the drought and environmental mitigation efforts related to Owens Lake and the Lower Owens River.

7.1.1 Imported Surface Water

The City purchases imported water from Metropolitan through its Metropolitan member agency, WBMWD. Imported water supply was approximately 74% of the City's total water supply (including recycled water) in 2015. It will remain a significant water supply source for the City in the future, but at a lower water supply percentage of 50% as it is expected the City will rehabilitate and replace wells as required to maintain average annual well supply at approximately 4,450 AFY, equivalent to their current groundwater rights, through the planning period.

Metropolitan acquires and imports water into Southern California through two major water supply systems:

- The Colorado River Aqueduct, constructed and operated by Metropolitan, which transports water from the Colorado River, and

- The State Water Project (SWP), owned and operated by the Department of Water Resources (DWR), which transports water from the Sacramento-San Joaquin Delta through the California Aqueduct.

As reported in their 2015 UWMP, Metropolitan faces a number of challenges in providing adequate, reliable and high quality supplemental water supplies for Southern California. One of those challenges is dry hydrologic conditions that can have a significant impact on Metropolitan's imported water supply sources.

The peak of the snowpack season traditionally occurs on April 1; however in 2015, the snowpack peaked in January at only 17% of the April 1 average measurement, resulting in the earliest and lowest snowpack peak in recorded history. The statewide snowpack was all but gone by April 1, 2015 and registered a record low of 5% of average for that day. This dry hydrology produced only 51% of average runoff for the water year and consequently kept state reservoirs below average storage levels. As a result, Metropolitan only received 20% of its contract water supplies from the State Water Project in 2015.

In 2015, the Upper Colorado River Basin snowpack peaked in March at 76% of normal. Runoff for that basin measured 94% of normal due to above normal rainfall in May, June and July, which averted a Colorado River shortage conditions for 2016. This allowed Metropolitan to implement new water management programs and bolster supplies in 2015. The Colorado River, however, is experiencing a historic16-year drought causing total storage levels in that system to steadily decline increasing the likelihood of shortage in future years beyond 2016. The restrictions on water use generated a record demand for water-saving rebates and refocused efforts to increase development of local water resources.

These dry hydrologic conditions and reduced imported water supplies, have led to significant withdrawals from Metropolitan's storage reserves, including Diamond Valley Lake (DVL) and its groundwater banking and conjunctive use programs to meet scheduled water deliveries. During the 2007-2009 drought, Metropolitan withdrew a combined 1.2 MAF from storage reserves to balance supplies and demands. In 2014 alone, Metropolitan withdrew 1.1 MAF from dry-year storage to balance supplies and demands because of the historic low final SWP allocation in that year.

In addition, challenges such as the detection of the quagga mussel in the Metropolitan's CRA supplies and increasingly stringent water quality regulations to control disinfection byproducts exacerbate the water supply condition and underscore the importance of flexible and adaptive regional planning strategies

7.1.1.1 Colorado River Water Supply Reliability Actions, Projects and Programs

The Colorado River Basin has been experiencing a prolonged drought where runoff above Lake Powell has been below average for twelve of the last sixteen years. Within those sixteen years, runoff in the Colorado River Basin above Lake Powell from 2000

through 2007 was the lowest eight-year runoff on record. While runoff returned to near normal conditions during 2008-2010, drought returned in 2012 with runoff in 2012 being among the four driest in history. During these drought conditions, Colorado River system storage has decreased to 50% of capacity.

In January 2007, Quagga mussels were discovered in Lake Mead and rapidly spread downstream to the Lower Colorado River. The presence and spawning of quagga mussels in the Lower Colorado River, and in reservoirs located in Southern California, poses an immediate threat to water and power systems serving more than 25 million people in the southwestern United States. Quagga mussels (Dreissena bugensis) are a related species to the better-known zebra mussels (Dreissena polymorpha) and indigenous to the Ukraine. They were introduced to the Great Lakes in the 1980s from fresh-water ballast of a transoceanic ship traveling from Eastern Europe.

Although the introduction of these two species into drinking water supplies does not typically result in violation of drinking water standards, invasive mussel infestations can adversely impact aquatic environments and infrastructure. If unmanaged, invasive mussel infestations have been known to severely impact the aquatic ecology of lakes and rivers; clog intakes and raw water conveyance systems; reduce the recreational and aesthetic value of lakes and beaches; alter or destroy fish habitats; and render lakes more susceptible to deleterious algae blooms.

Metropolitan's planning strategy recognized explicitly that program development would play an important part in reaching the target level of deliveries from the CRA. The implementation approach explored a number of water conservation programs with water agencies that receive water from the Colorado River or are located in close proximity to the CRA. Negotiating the QSA was a necessary first step for all of these programs. On October 10, 2003, after lengthy negotiations, representatives from Metropolitan, Imperial Irrigation District (llD), and Coachella Valley Water District (CVWD) executed the QSA and other related agreements. Parties involved also included San Diego County Water Authority (SDCWA), the California Department of Water Resources (DWR), the California Department of Fish and Wildlife, the U.S. Department of the Interior, and the San Luis Rey Settlement Parties. One of those related agreements was the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement which specifies to which agencies water will be delivered under priorities 3a and 6a of the Seven Party Agreement during its term.

Metropolitan has identified a number of programs that could be used to achieve the regional long-term development targets for the CRA. Metropolitan has entered into or is exploring agreements with a number of agencies.

Imperial Irrigation District / Metropolitan Water District Conservation Program

Under agreements executed in 1988 and 1989, Metropolitan has funded water efficiency improvements within IID's service area in return for the right to divert the water conserved by those investments. Under this program, IID implemented a number of structural and non-structural measures, including the lining of existing earthen canals with concrete, constructing local reservoirs and spill-interceptor canals, installing non-

leak gates, and automating the distribution system. Other implemented programs include the delivery of water to farmers on a 12-hour rather than a 24-hour basis and improvements in on-farm water management through the installation of drip irrigation systems. Through this program, IID has conserved an additional 105 TAF per year on average upon completion of program implementation. Execution of the QSA and amendments to the 1988 and 1989 agreements resulted in changes in the availability of water under the program, extending the term to 2078 if the term of the QSA extends through 2077 and guaranteeing Metropolitan at least 85 TAF per year. The remainder of the conserved water is available to CVWD when needed.

Palo Verde Land Management, Crop Rotation, and Water Supply Program

In May 2004, Metropolitan's Board authorized a 35-year land management, crop rotation, and water supply program with PVID. Under the program, participating farmers in PVID are paid to reduce their water use by not irrigating a portion of their land. A maximum of 29% of the lands within the Palo Verde Valley can be hallowed in any given year. Under the terms of the QSA, water savings within the PVID service area are made available to Metropolitan. This program provides up to 133 TAF of water to be available to Metropolitan in certain years. In 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, and 2014 approximately 108.7, 105.0, 72.4, 94.3, 120.2, 116.3, 122.2, 73.7, 32.8, and 43.0 TAF of water, respectively, were saved and made available to Metropolitan. In March 2009, Metropolitan and PVID entered into a one-year supplemental fallowing program within PVID that provided for the fallowing of additional acreage, with savings of 24.1 TAF in 2009 and 32.3 TAF in 2010.

Southern Nevada Water Authority and Metropolitan Storage and Interstate Release Agreement

Southern Nevada Water Authority (SNWA) has undertaken extraordinary water conservation measures to maintain its consumptive use within Nevada's basic apportionment of 300 TAF. The success of the conservation program has resulted in unused basic apportionment for Nevada. As SNWA expressed interest in storing a portion of the water with Metropolitan, the agencies, along with the United States and the Colorado River Commission of Nevada, entered into a storage and interstate release agreement in October 2004. Under the agreement, additional Colorado River water supplies are made available to Metropolitan when there is space available in the CRA to receive the water. SNWA will have stored approximately 330,000 AF with Metropolitan through 2015. SNWA is not expected to call upon Metropolitan to return water until after 2019.

Lower Colorado Water Supply Project

In March 2007, Metropolitan, the City of Needles, and the USBR executed a Lower Colorado Water Supply Project contract. Under the contract, Metropolitan receives, on an annual basis, Lower Colorado Water Supply Project water unused by Needles and other entities adjacent to the river that do not have rights or have insufficient rights to use Colorado River water. The water supply for the project comes from groundwater wells located along the All-American Canal. A portion of the payments made by Metropolitan

to Needles are placed in a trust fund for potentially acquiring a new water supply for the Project should the groundwater pumped from the project's wells become too saline for use. In 2014, Metropolitan received 6.1 TAF from this project and is projected to receive 5.8 TAF in 2015.

Lake Mead Storage Program

In May 2006, Metropolitan and the USBR executed an agreement for a demonstration program that allowed Metropolitan to leave conserved water in Lake Mead that Metropolitan would otherwise have used in 2006 and 2007. USBR would normally make unused water available to other Colorado River water users, so the program included a provision that water left in Lake Mead must be conserved through extraordinary conservation measures and not simply be water that was not needed by Metropolitan in the year it was stored. This extraordinary conservation was accomplished through savings realized under the Palo Verde Land Management, Crop Rotation and Water Supply Program. Through the two-year demonstration program, Metropolitan created 44.8 TAF of "Intentionally Created Surplus" (ICS) water.

In December 2007, Metropolitan entered into agreements to set both the rules under which ICS water is developed, stored in, and delivered from Lake Mead. The amount of water stored in Lake Mead, created through extraordinary conservation, that is available for delivery in a subsequent year is reduced by a one-time deduction of 5% resulting in additional system water in storage in the lake, and an annual evaporation loss of 3%, beginning in the year following the year the water is stored. Metropolitan created ICS water in 2009, 2010, 2011, and 2012 and withdrew ICS water in 2008, 2013, and 2014. As of January 1, 2015, Metropolitan had a total of 61.8 TAF of Extraordinary Conservation ICS water in Lake Mead.

The December 2007 federal guidelines concerning the operation of the Colorado River system reservoirs provided the ability for agencies to create "System Efficiency ICS" through the development and funding of system efficiency projects that save water that would otherwise be lost from the Colorado River. To that end, in 2008 the Central Arizona Water Conservation District (CAWCD), SNWA, and Metropolitan contributed funds for the construction of the Drop 2 (Brock) Reservoir by the USBR. The purpose of the Drop 2 (Brock) Reservoir is to increase the capacity to regulate deliveries of Colorado River water at Imperial Dam reducing the amount of excess flow downstream of the dam by approximately 70 TAF annually. In return for its $25 million net contribution toward construction, operation, and maintenance, 100 TAF of water that was stored in Lake Mead was assigned to Metropolitan as System Efficiency ICS. Through 2014, Metropolitan has diverted 35 TAF of this amount, with 65 TAF remaining in storage.

In 2009, Metropolitan entered into an agreement with the United States, SNWA, the Colorado River Commission of Nevada, and CAWCD to have USBR conduct a one-year pilot operation of the Yuma Desalting Plant at one-third capacity. The pilot project operated between May 2010 and March 2011 and provided data for future decision making regarding long-term operation of the Plant and developing a near-term water

supply. Metropolitan's contribution toward plant operating costs secured 24.4 TAF of System Efficiency ICS which was stored in Lake Mead as of January 1, 2015.

Quaqqa Mussel Control Program

The presence and spawning of quagga mussels in the lower Colorado River from Lake Mead through Lake Havasu poses a threat to Metropolitan and other Colorado River water users due to the potential to continuously seed water conveyance systems with mussel larvae. Chlorination is the most frequently used means to control mussel larvae entering water systems.

Metropolitan developed the Quagga Mussel Control Program (QMCP) in 2007 to address the long-term introduction of mussel larvae into the CRA from the lower Colorado River which is now heavily colonized from Lake Mead through Lake Havasu. The QMCP consists of surveillance activities and control measures. Surveillance activities are conducted annually alongside regularly scheduled 2 to 3 weeks long CRA shutdowns. Control activities consist of continuous chlorination at the outlet of Copper Basin Reservoir (five miles into the aqueduct), a mobile chlorinator for control of mussels on a quarterly basis at outlet towers and physical removal of mussels from the trash racks at Whitsett Intake Pumping Plant in Lake Havasu.

Since 2007, the CRA has had scheduled 2 to 3 week-long shutdowns each year for maintenance and repairs which provide the opportunity for direct inspections for mussels and the additions benefit of desiccating quagga mussels. Recent shutdown inspections have demonstrated that the combined use of chlorine and regularly scheduled shutdowns effectively control mussel infestation in the CRA since only few and small mussels have been found during these inspections.

In addition, Metropolitan has appropriated $9.55 million to upgrade chlorination facilities in the aqueduct and at two additional locations in its system, the outlets of Lakes Mathews and Skinner. It is likely that additional upgrade costs will be incurred for these facilities. Chemical control (chlorination) at Copper Basin Reservoir, Lake Mathews, and the Lake Skinner Outlet costs approximately $3.0 million to $3.2 million per year depending on the amount of Colorado River water conveyed through the aqueduct.

Achievements to Date

Metropolitan has developed a number of supply and conservation programs to increase the amount of supply available from the CRA. However, other users along the River have rights that will allow their water use to increase as their water demands increases. The Colorado River faces long-term challenges of water demands exceeding available supply with additional uncertainties due to climate change. Because Metropolitan holds the lowest priority rights in California during a normal Lake Mead storage condition, future supply available could decrease.

7.1.1.2 State Water Project Supply Reliability Actions, Projects and Programs

Much of the SWP water supply passes through the Sacramento-San Joaquin Bay-Delta (Bay-Delta). The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta system.

The Bay-Delta's declining ecosystem, caused by a number of factors that include agricultural runoff, predation of native fish species, urban and agricultural discharge, changing ecosystem food supplies, and overall system operation, has led to reduction in water supply deliveries. SWP delivery restrictions due to regulatory requirements resulted in the loss of about 1.5 MAF of supplies to Metropolitan from 2008 through 2014, reducing the likelihood that regional storage can be refilled in the near-term. Operational constraints will likely continue until a long-term solution to the problems in the Bay-Delta is identified and implemented.

In April 2015, the Brown Administration announced California WaterFix, as well as a separate ecosystem restoration effort called California EcoRestore. Together, the California WaterFix and California EcoRestore will make significant contributions toward achieving the coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem established in the Sacramento-San Joaquin Delta Reform Act of 2009. In addition to enhancing the Delta Ecosystem there are a number major actions, projects, and programs Metropolitan has undertaken to improve SWP reliability.

The Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) was prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. At the outset of the BDCP process, a planning agreement was developed and executed among the participating parties and a Steering Committee was formed. The BDCP identified a set of conservation measures including water conveyance improvements and restoration actions to contribute to the recovery of endangered and sensitive species and their habitats in California's Sacramento-San Joaquin Delta. The BDCP was formulated to contribute to the state's co-equal goals of water supply reliability and ecosystem restoration.

Lead agencies for the EIR/EIS were the California Department of Water Resources, the USBR, the United States Fish and Wildlife Service, and National Oceanic and Atmospheric Administration's National Marine Fisheries Service, in cooperation with the California Department of Fish and Game, the United States Environmental Protection Agency and the United States Army Corps of Engineers. Metropolitan served on the steering committee. DWR and USBR are the lead agencies for the California WaterFix.

In order to select the most appropriate elements of the final conservation plan, the BDCP considered a range of options for accomplishing these goals using information developed as part of an environmental review process. Potential habitat restoration and water supply

conveyance options included in the BDCP were assessed through an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The BDCP planning process and the supporting EIR/EIS process is being funded by state and federal water contractors. The First Administrative Draft BDCP was released in March 2012, a Second Administrative Draft BDCP and EIR/EIS was released in March 2012 and the Public Draft BDCP and EIR/EIS was released December 2013. Each of the above draft documents were released to the public. The official public comment draft was released in December 2013.

A new permitting approach and associated new alternatives to the BDCP were announced in April 2015. The California WaterFix and California EcoRestore would be implemented under a different Endangered Species Act permitting process. This would fulfill the requirement of the 2009 Delta Reform Act to contribute toward meeting the coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem. DWR and USBR serve as lead agencies for the California WaterFix. The new water conveyance facilities included in Alternative 4 (the BDCP) would be constructed and operated under the California WaterFix. Proposes changes to the design of the water conveyance facilities reduce the overall environmental/construction impacts to the environment, minimize disruptions to local communities, and increase long term operational and cost benefits.

Some of the engineering improvements configuration improvements would include moving the tunnel alignment away from local communities and environmentally sensitive areas. The elimination of pumping plants, reduction of permanent power lines and power use, and the reconfiguration of intake and pumping facilities sediment basins and reconfiguration/relocation of the construction staging sites in the North Delta will lessen construction and longer term operational impacts. If implemented, these would result in reduced environmental and construction impacts and increase improved long-term operational and cost benefits.

The main objective under the EcoRestore Program is to pursue at least 30,000 acres of Delta habitats over the next five years. These restoration programs would include projects and actions that are in compliance with pre-existing regulatory requirements designed to improve the overall health of the Delta. Other priority restoration projects would also be identified by the Delta Conservancy and other local governments. Funding would be provided through multiple sources including state bonds and other state-mandated funds, State Water Project/Central Valley Project contractors' funds as part of existing regulatory obligations and from various local and federal partners.

As part of the new alternatives and the State's proposed project, the regulatory approach to obtaining state and federal endangered species compliance is shifting from the BDCP Habitat Conservation Plan/Natural Community Conservation Plan strategy to an approach that contemplates a Biological Opinion pursuant to Federal ESA Section 7 and a State 2081 Permit. This approach as well as the proposed revision to the new water facilities and ecosystem restoration actions is evaluated in the partially Recirculated Draft EIR/EIS released in July 2015.

The State Water Resources Control Board (SWRCB) is continuing its phased review and update of the 2006 Water Quality Control Plan (WQCP) for the Bay-Delta. The first phase focuses on the southern Delta salinity objectives for the protection of agriculture, San Joaquin River flow objectives for the protection of fish and wildlife, and a program of implementation for achieving those objectives. The second phase considers the comprehensive review of the other elements of the Bay-Delta WQCP, including but not limited to Sacramento River and Delta outflow objectives.

Metropolitan has been collaborating with water users and other stakeholders to develop sound science and technical analyses in support of the WQCP review process, including sharing results in technical forums and publishing findings in peer-reviewed scientific journals. Metropolitan has been meeting with Board members and staff to share findings as new science and analyses are developed and to encourage close coordination between BDCP and WQCP updates.

Monterey Amendment

The Monterey Amendment originated from disputes between the urban and agricultural SWP contractors over how contract supplies are to be allocated in times of shortage. In 1994, in settlement discussions in Monterey, the contractors and DWR reached an agreement to settle their disputes by amending certain provisions the long-term water supply contracts. These changes, known as the Monterey Amendment, altered the water allocation procedures such that both shortages and surpluses would be shared in the same manner for all contractors, eliminating the prior “agriculture first" shortage provision. In turn, the agricultural contractors agreed to permanently transfer 130 TAF to urban contractors and permanently retire 45 TAF of their contracted supply.

The amendment facilitated several important water supply management practices including ground water banking, voluntary water marketing, and more flexible and efficient use of SWP facilities such as borrowing from Castaic Lake and Lake Perris and using carryover storage in San Luis Reservoir to enhance dry-year supplies. It also provided for the transfer of DWR land to the Kern County Water Agency for development of the Kern Water Bank. The Monterey Amendment was challenged in court, and the original Environmental Impact Report (EIR) invalidated. Following a settlement, DWR completed a new EIR and concluded the CEQA review in May 2010.

However, the project has been challenged again in a new round of lawsuits. Central Delta Water Agency, South Delta Water Agency, California Water Impact Network, California Sportfishing Protection Alliance, and the Center For Biological Diversity filed a lawsuit against DWR in Sacramento County Superior Court challenging the validity of the EIR under CEQA and the validity of underlying agreements under a reverse validation action (the “Central Delta I" case). These same plaintiffs filed a reverse validation lawsuit against the Kern County Water Agency in Kern County Superior Court ("Central Delta II").

This lawsuit targets a transfer of land from Kern County Water Agency to the Kern Water Bank, which was completed as part of the original Monterey Agreement. The third lawsuit is an EIR challenge brought by Rosedale—Rio Bravo Water Storage District and

Buena Vista Water Storage District against DWR in Kern County Superior Court ("Rosedale"). The Central Delta II and Rosedale cases were transferred to Sacramento Superior Court, and the three cases were consolidated for trial.

In January 2013, the Court ruled that the validation cause of action in Central Delta I was time-barred by the statute of limitations. On October 2, 2014, the court issued its final rulings in Central Delta I and Rosedale, holding that DWR must complete a limited scope remedial CEQA review addressing the potential impacts of the Kern Water Bank. However, the court's ruling also allows operation of the State Water Project to continue under the terms of the Monterey Agreement while the remedial CEQA review is prepared and leaves in place the underlying project approvals while DWR prepares the remedial CEQA review. The Central Delta II case was stayed pending resolution of the Central Delta I case. The plaintiffs have appealed the decision.

SWP Terminal Storage

Metropolitan has contractual rights to 65 TAF of flexible storage at Lake Perris (East Branch terminal reservoir) and 154 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir). This storage provides Metropolitan with additional options for managing SWP deliveries to maximize yield from the project. Over multiple dry years, it can provide Metropolitan with 73 TAF of additional supply. In a single dry year like 1977, it can provide up to 219 TAF of additional supply to Southern California.

Yuba Dry Year Water Purchase Program

In December 2007, Metropolitan entered into an agreement with DWR providing for Metropolitan's participation in the Yuba Dry Year Water Purchase Program between Yuba County Water Agency and DWR. This program provides for transfers of water from the Yuba County Water Agency during dry years through 2025.

Desert Water Agency/Coachella Valley WD SWP Table A Transfer

Under the transfer agreement, Metropolitan transferred 100 TAF of its SWP Table A contractual amount to Desert Water Agency/CVWD (DWCV). Under the terms of the agreement, DWCV pays all SWP charges for this water, including capital costs associated with capacity in the California Aqueduct to transport this water to Perris Reservoir, as well as the associated variable costs. The amount of water actually delivered in any given year depends on that year's SWP allocation. Water is delivered through the existing exchange agreements between Metropolitan and DWCV, under which Metropolitan delivers Colorado River supplies to DWVC equal to the SWP supplies delivered to Metropolitan. While Metropolitan transferred 100 TAF of its Table A amount, it retained other rights, including interruptible water service; its full carryover amounts in San Luis Reservoir; its full use of flexible storage in Castaic and Perris Reservoirs; and any rate management credits associated with the 100 TAF.

In addition, Metropolitan is able to recall the SWP transfer water in years in which Metropolitan determines it needs the water to meet its water management goals. The main benefit of the agreement is to reduce Metropolitan's SWP fixed costs in wetter

years when there are more than sufficient supplies to meet Metropolitan's water management goals, while at the same time preserving its dry-year SWP supply. In a single critically dry-year like 1977, the call-back provision of the entitlement transfer can provide Metropolitan about 5 TAF of SWP supply. In multiple dry years like 1990-1992, it can provide Metropolitan about 26 TAF of SWP supply.

Desert Water Agency/Coachella Valley WD Advance Delivery Program

Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and CVWD in advance of the exchange for their SWP Contract Table A allocations. In addition to their Table A supplies, Desert Water Agency and CVWD, subject to Metropolitan's written consent, may take delivery of SWP supplies available under Article 21 and the Turn-back Pool Program. By delivering enough water in advance to cover Metropolitan's exchange obligations, Metropolitan is able to receive Desert Water Agency and CVWD's available SWP supplies in years in which Metropolitan's supplies are insufficient without having to deliver an equivalent amount of Colorado River water. This program allows Metropolitan to maximize delivery of SWP and Colorado River water in such years.

Desert Water Agency/Coachella Valley WD Other SWP Deliveries

Since 2008, Metropolitan has provided Desert Water Agency and CVWD written consent to take delivery of non-SWP supplies separately acquired by each agency from the SWP facilities. These deliveries include water acquired from the Yuba Dry Year Water Purchase Program and the 2009 Drought Water Bank. Metropolitan has also consented to:

- 10 TAF of exchange deliveries to CVWD for non-SWP water acquired from the San Joaquin Valley from 2008 through 2010,
- 36 TAF of exchange deliveries to Desert Water Agency for non-SWP water acquired from the San Joaquin Valley from 2008 through 2015, and
- 16.5 TAF of exchange deliveries to CVWD from groundwater storage of Kern River flood flows or SWP water delivered from Kern County Water Agency provided by Rosedale Rio Bravo Water Storage District from 2012 through 2035.

7.1.1.3 Central Valley/State Water Project Storage and Transfer Programs

Metropolitan increases the reliability of supplies received from the California Aqueduct by developing flexible SWP storage and transfer programs. Over the years, Metropolitan has developed numerous voluntary SWP storage and transfer programs, to secure additional dry-year water supplies.

Metropolitan has a long history of managing the wide fluctuations of SWP supplies from year to year by forming partnerships with Central Valley agricultural districts along the California Aqueduct, as well as with other Southern California SWP Contractors. These partnerships allow Metropolitan to store its SWP supplies during wetter years for return

in future drier years. Some programs also allow Metropolitan to purchase water in drier years for delivery via the California Aqueduct to Metropolitan's service area.

In addition, the SWP storage and transfer programs have served to demonstrate the value of partnering, and increasingly, Central Valley agricultural interests see partnering with Metropolitan as a sensible business practice beneficial to their local district and regional economy. Metropolitan is currently operating several SWP storage programs that serve to increase the reliability of supplies received from the California Aqueduct. Metropolitan is also pursuing a new storage program with Antelope Valley-East Kern Water Agency, which is currently under development. In addition, Metropolitan pursues SWP water transfers on an as needed basis.

Semitropic Storage Program

Metropolitan has a groundwater storage program with Semitropic Water Storage District located in the southern part of the San Joaquin Valley. The maximum storage capacity of the program is 350 TAF. The specific amount of water Metropolitan can store in and subsequently expect to receive from the programs depends upon hydrologic conditions, any regulatory requirements restricting Metropolitan's ability to export water for storage, and the demands placed on the Semitropic Program by other program participants. In 2014, Metropolitan amended the program to increase the return yield by an additional 13.2 TAF per year.

The minimum annual yield available to Metropolitan from the program is currently 34.7 TAF, and the maximum annual yield is 236.2 TAF, depending on the available unused capacity and the State Water Project allocation. During wet years, Metropolitan has the discretion to use the program to store portions of its SWP water that are in excess of the amounts needed to meet Metropolitan's service area demand. In Semitropic, the water is delivered to local farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of SWP water.

Arvin-Edison Storage Program

Metropolitan amended the groundwater storage program with Arvin-Edison Water Storage District in 2008 to include the South Canal Improvement Project. The project increases the reliability of Arvin-Edison returning higher water quality to the California Aqueduct. In addition, Metropolitan and Arvin-Edison often enter into annual operational agreements to optimize program operations in any given year. The program storage capacity is 350 TAF. The specific amount of water Metropolitan can expect to store in and subsequently receive from the programs depends upon hydrologic conditions and any regulatory requirements restricting Metropolitan's ability to export water for storage. The storage program is estimated to deliver 75 TAF.

During wet years, Metropolitan has the discretion to use the program to store portions of its SWP supplies which are in excess of the amounts needed to meet Metropolitan's service area demand. The water can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater.

During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies. In 2015, Metropolitan funded the installation of three new wells at a cost of $3 million that will restore the return reliability by 2.5 TAF per year. The funding will ultimately be recovered through credits against future program costs.

San Bernardino Valley MWD Storage Program

The San Bernardino Valley MWD Storage program allows for the purchase of a portion of San Bernardino Valley MWD's SWP supply. The program includes a minimum purchase provision of 20 TAF and the option of purchasing additional supplies when available. This program can deliver between 20 TAF and 70 TAF in dry years, depending on hydrologic conditions. The expected delivery for a single dry year similar to 1977 is 20 TAF should supplies be available. The agreement with San Bernardino Valley MWD also allows Metropolitan to store up to 50 TAF of transfer water for use in dry years. The agreement can be renewed until December 31, 2035.

San Gabriel Valley Metropolitan Exchange Program

The San Gabriel Valley MWD program allows for the exchange of up to 5 TAF each year. For each acre-foot Metropolitan delivers to the City of Sierra Madre, a San Gabriel Valley MWD member agency, San Gabriel Valley MWD provides two acre-feet to Metropolitan in the Main San Gabriel Basin, up to 5 TAF. The program provides increased reliability to Metropolitan by allowing additional water to be delivered to Metropolitan's member agencies, Three Valleys MWD and Upper San Gabriel Valley MWD.

Antelope Valley-East Kern Water Agency Exchange and Storage Program

The Antelope Valley-East Kern Water Agency (AVEK) exchange and storage program provides Metropolitan with additional supplies and increased reliability. Under the exchange program, for every two acre-feet Metropolitan receives, Metropolitan returns one acre-foot to AVEK to improve its reliability. The exchange program is expected to deliver 30 TAF over ten years, with 10 TAF available in dry years. Under the program, Metropolitan will also be able to store up to 30 TAF in the AVEK's groundwater basin, with a dry year return capability of 10 TAF.

Kern-Delta Water District Storage Program

This groundwater storage program has 250 TAF of storage capacity. The program is capable of providing up to 50 TAF of dry-year supply. In 2015, Metropolitan funded the cross river pipeline that, when completed, will help improve Metropolitan's return reliability by reducing losses during exchanges. Water for storage can be either directly recharged into the groundwater basin or delivered to district farmers who use the water in-lieu of pumping groundwater. During dry years, the district returns Metropolitan's previously stored water to Metropolitan by direct groundwater pump-in return or by exchange of surface water supplies.

Mojave Storage Program

Metropolitan entered into a groundwater banking and exchange transfer agreement with Mojave Water Agency on October 29, 2003. This agreement was amended in 2011 to allow for the cumulative storage of up to 390 TAF. The agreement allows for Metropolitan to store water in on exchange account for later return. Through 2021, and when the State Water Project allocation is 60% or less, Metropolitan can annually

withdraw the Mojave Water Agency's State Water Project contractual amounts in excess of a 10% reserve. When the State Water Project allocation is over 60%, the reserved amount for Mojave's local needs increases to 20%. Under a 100% allocation, the State Water Contract provides Mojave Water Agency 82.8 TAF of water.

Central Valley Transfer Programs

Metropolitan secures Central Valley water transfer supplies via spot markets and option contracts to meet its service area demands when necessary. Hydrologic and market conditions, and regulatory measures governing Delta pumping plant operations, will determine the amount of water transfer activity occurring in any year. Recent transfer market activity, described below, provides examples of how Metropolitan has secured water transfer supplies as a resource to fill anticipated supply shortfalls needed to meet Metropolitan's service area demands.

In 2003, Metropolitan secured options to purchase approximately 145 TAF of water from willing sellers in the Sacramento Valley during the irrigation season. These options protected against potential shortages of up to 650 TAF within Metropolitan's service area that might have arisen from a decrease in Colorado River supply or as a result of drier-than-expected hydrologic conditions. Using these options, Metropolitan purchased approximately 125 TAF of water for delivery to the California Aqueduct.

In 2005, Metropolitan, in partnership with seven other State Water Contractors, secured options to purchase approximately 130 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was 113 TAF. Metropolitan also had the right to assume the options of the other State Water Contractors if they chose not to purchase the transfer water. Due to improved hydrologic conditions, Metropolitan and the other State Water Contractors did not exercise these options.

In 2008, Metropolitan, in partnership with seven other State Water Contractors, secured approximately 40 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 27 TAF.

In 2009, Metropolitan, in partnership with eight other buyers, participated in a statewide Drought Water Bank, which secured approximately 74 TAF, of which Metropolitan's share was approximately 37 TAF.

In 2010, Metropolitan, in partnership with three other State Water Contractors, secured approximately 100 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 88 TAF. Metropolitan also purchased approximately 18 TAF of water from Central Valley Project Contractors located in the San Joaquin Valley. In addition, Metropolitan entered into an unbalanced exchange agreement that resulted in Metropolitan receiving approximately 37 TAF.

In 2015, Metropolitan, in partnership with eight other State Water Contractors, secured approximately 20 TAF of water from willing sellers in the Sacramento Valley, of which Metropolitan's share was approximately 14 TAF.

In addition, Metropolitan has secured water transfer supplies under the Yuba Accord, which is a long-term transfer agreement. To date, Metropolitan has purchased approximately 165 TAF.

Finally, Metropolitan has secured water transfer supplies under the Multi-Year Water Pool Demonstration Program. In 2013 and 2015, Metropolitan secured 30 TAF and 1.3 TAF, respectively.

Metropolitan's recent water transfer activities demonstrated Metropolitan's ability to develop and negotiate water transfer agreements either working directly with the agricultural districts who are selling the water or through a statewide Drought Water Bank. Because of the complexity of cross-Delta transfers and the need to optimize the use of both CVP and SWP facilities, DWR and USBR are critical players in the water transfer process, especially when shortage conditions increase the general level of demand for transfers and amplify ecosystem and water quality issues associated with through-Delta conveyance of water. Therefore, Metropolitan views state and federal cooperation to facilitate voluntary, market-based exchanges and sales of water as a critical component of its overall water transfer strategy.

Achievements to Date

Metropolitan has made rapid progress to date developing SWP storage and transfer programs. Most notably, Metropolitan has utilized approximately 457 TAF to supplement its SWP supplies during the recent 2012-2015 unprecedented drought. Of this total, approximately 325 TAF are from SWP storage program extractions in Semitropic, Arvin, Kern Delta, and Mojave; 57 TAF are from the San Bernardino and SGV/MWD programs; and 78 TAF of SWP transfer supplies were purchased from the SWC Buyers Group, Multi-Year Water Pool, and Yuba water purchase programs.

7.2 RELIABILITY BY TYPE OF YEAR

In their 2015 UWMP dated June 2016, Metropolitan estimated supply capability and projected demands for an average (normal) year based on an average of hydrologies for the years 1922-2012; for a single dry-year based on a repeat of the hydrology in the year 1977; and for multiple dry years based on a repeat of the hydrology of 1990-1992. These estimates were summarized in Tables 2-4, 2-5, and 2-6 of their 2015 UWMP, which are included in the Appendix F of this report for reference.

Table 2-4 summarizes the sources of supply for the single dry year (1977 hydrology), while Table 2-5 shows the region's ability to respond in future years under a repeat of the 1990-92 hydrology. Table 2-5 provides results for the average of the three dry-year series rather than a year-by-year detail because most of Metropolitan's dry-year supplies are designed to provide equal amounts of water over each year of a three-year period. These tables show that the region can provide reliable water supplies under both the single driest year and the multiple dry-year hydrologies. Table 2-6 reports the expected situation on the average over-all historic hydrologies from 1922 to 2012. A summary of the information provided in Metropolitan Tables 2-4, 2-5, and 2-6 is shown in Table 7-1A.

For each of these scenarios there is a projected surplus of supply in every forecast year. Projected supply surpluses, based on the capability of current supplies, range from 0.1% to 87% of projected demands. With the inclusion of supplies under development, potential surpluses range from 5% to 110% of projected demands. Metropolitan's supply capabilities were developed using the following assumptions:

Table 7-1A: Metropolitan Supply Capability and Projected Demands (AFY)

Single Dry Year Metropolitan Supply Capability and Projected Demands (1977 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	2,584,000	2,686,000	2,775,000	2,905,000	2,941,000
Projected Demands	2,005,000	2,066,000	2,108,000	2,160,000	2,201,000
Projected Surplus	579,000	620,000	667,000	745,000	740,000
Projected Surplus %[(a)]	29%	30%	32%	34%	34%
Supplies under Development	63,000	100,000	316,000	358,000	398,000
Potential Surplus	642,000	720,000	983,000	1,103,000	1,138,000
Potential Surplus %[(a)]	32%	35%	47%	51%	52%
Multiple Dry Year Metropolitan Supply Capability and Projected Demands (1990-1992 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	2,103,000	2,154,000	2,190,000	2,242,000	2,260,000
Projected Demands	2,001,000	2,118,000	2,171,000	2,216,000	2,258,000
Projected Surplus	102,000	36,000	19,000	26,000	2,000
Projected Surplus %[(a)]	5%	2%	1%	1%	0.1%
Supplies under Development	43,000	80,000	204,000	245,000	286,000
Potential Surplus	145,000	116,000	223,000	271,000	288,000
Potential Surplus %[(a)]	7%	5%	10%	12%	13%
Average Year Metropolitan Supply Capability and Projected Demands (1922-2012 Hydrology)					
Fiscal Year	**2020**	**2025**	**2030**	**2035**	**2040**
Capability of Current Supplies	3,448,000	3,550,000	3,658,000	3,788,000	3,824,000
Projected Demands	1,860,000	1,918,000	1,959,000	2,008,000	2,047,000
Projected Surplus	1,588,000	1,632,000	1,699,000	1,780,000	1,777,000
Projected Surplus %[(a)]	85%	85%	87%	89%	87%
Supplies under Development	63,000	100,000	386,000	428,000	468,000
Potential Surplus	1,651,000	1,732,000	2,085,000	2,208,000	2,245,000
Potential Surplus %[(a)]	89%	90%	106%	110%	110%

(a) As a percentage of projected demand

Source – 2015 Metropolitan Urban Water Management Plan, June 2016

7.2.1 Assumptions for Colorado River Aqueduct Supplies

Colorado River Aqueduct supplies include supplies that would result from existing and committed programs and from implementation of the QSA and related agreements. The QSA establishes the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Colorado River Water Management Programs are potentially available to supply additional water up to the CRA capacity of 1.2 MAF on an as needed basis.

7.2.2 Assumptions for State Water Project Supplies

SWP supplies are estimated using the 2015 SWP Delivery Capability Report distributed by DWR in July 2015. The 2015 Delivery Capability Report presents the current DWR estimate of the amount of water deliveries for current (2015) conditions and conditions 20 years in the future. These estimates incorporate restrictions on SWP and CVP operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fisheries Service issued on December 15, 2008, and June 4, 2009, respectively.

Under the 2015 Delivery Capability Report with existing conveyance and low outflow requirements scenario, the delivery estimates for the SWP for 2020 conditions as percentage of Table A amounts, are 12%, equivalent to 230 TAF, under a single dry-year (1977) condition and 51%, equivalent to 975 TAF, under the long-term average condition.

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.

Over the last two years under the pumping restrictions of the SWP, Metropolitan has worked collaboratively with the other contractors to develop numerous voluntary Central Valley/SWP storage and transfer programs. The goal of these storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the California Aqueduct during dry hydrologic conditions and regulatory restrictions.

A key component of Metropolitan's water supply capability is the amount of water in Metropolitan's storage facilities. 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 the Water Supply Allocation plan (WSAP), is dependent on its storage resources.

In developing the supply capabilities for the 2015 UWMP, Metropolitan assumed the current (2015) storage levels at the start of simulation and used the median storage levels going into each of the five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50% probability that storage levels would be higher than the assumption used, and a 50% probability that storage levels would be lower than the assumption used.

All storage capability figures shown in the 2015 UWMP reflect actual storage program conveyance constraints. It is important to note that under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet demands.

The basis of water year and the available supply as a percentage of average projected demand for average year, single-dry year and multiple-dry years are shown in Table 7-1, but does not include Metropolitan-estimated surplus supplies as shown in Table 7-1A.

Table 7-1: Basis of Water Year Data

Year Type	Base Year	Available Supplies if Year Type Repeats % of Average Supply[(a)]
Average Year	1922 to 2012	100%
Single-Dry Year	1977	100%
Multiple-Dry Years 1st Year	1990 to 1992	100%
Multiple-Dry Years 2nd Year	1990 to 1992	100%
Multiple-Dry Years 3rd Year	1990 to 1992	100%

(a) Not including Metropolitan-estimated surplus supplies as shown in Table 7-1A.

7.3 SUPPLY AND DEMAND ASSESSMENT

As stated in CWC 10635(a):

Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional or local agency population projections within the service area of the urban water supplier.

Projected normal-year average-annual City supplies and demands as developed in Table 6-9 and Table 4-3, respectively, are shown in Table 7-2. City demands are estimated to increase by 3% during a single dry-year supply scenario and by 5% during a multiple dry-year supply scenario, which are the same assumptions made in WBMWD's 2015 UWMP. Projected single-dry-year average-annual City supplies and demands are shown in Table 7-3. Projected multiple dry-year average-annual City supplies and demands are shown in Table 7-4.

As Metropolitan has determined it can meet full-service demands of its member agencies for the period of 2020 through 2040 during normal years, single dry year, and multiple dry years with surplus supplies, and because of the City's goal to regularly upgrade and rehabilitate its well supply system to maintain groundwater supply equivalent to its groundwater rights of 4,500 AFY, it is projected the City can meet all normal year, single dry year, and multiple dry year demands as shown in Tables 7-2, 7-3, and 7-4, respectively.

Table 7-2: Normal-Year Supply and Demand Comparison

	2020	2025	2030	2035	2040
Supply totals *(from Table 6-9)*	11,191	11,377	11,269	11,160	11,051
Demand totals *(from Table 4-3)*	11,191	11,376	11,269	11,160	11,051
Difference	0	0	0	0	0

Table 7-3: Single-Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040
Supply totals	11,527	11,718	11,607	11,495	11,383
Demand totals	11,527	11,717	11,607	11,495	11,383
Difference	0	0	0	0	0

Table 7-4: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040
First year	Supply totals	11,751	11,946	11,832	11,718	11,604
	Demand totals	11,751	11,945	11,832	11,718	11,604
	Difference	0	0	0	0	0
Second year	Supply totals	11,751	11,946	11,832	11,718	11,604
	Demand totals	11,751	11,945	11,832	11,718	11,604
	Difference	0	0	0	0	0
Third year	Supply totals	11,751	11,946	11,832	11,718	11,604
	Demand totals	11,751	11,945	11,832	11,718	11,604
	Difference	0	0	0	0	0

7.4 REGIONAL SUPPLY RELIABILITY

Regional supply reliability, specifically, the reliability of Metropolitan's imported water supply for the City and for Southern California, is detailed in Section 7.1 in conjunction with presenting the constraints on water supply sources and the response programs developed and being developed to eliminate or lessen these constraints.

After learning from the droughts of 1977-78 and 1989-92, Metropolitan, in conjunction with its member agencies, instituted a resources planning process that is based on diversification of the region's water supply portfolio and continued efficient water use. This integrated resource planning process has recognized that only through a mix of imported and member agency local supplies, along with aggressive implementation of water conservation, can the Metropolitan service area attain overall reliability of water supply. This integrated planning effort has resulted in the following documents:

- 1996, 2004, 2010, and 2015 Integrated Resources Plans (IRP): Metropolitan's IRP process assessed potential future regional demand projections based upon anticipated population and economic growth as well as conservation potential. The IRP also includes regional supply strategies and implementation plans to better manage resources, meet anticipated demand, and increase overall system reliability.

- 1999 Water Surplus and Drought Management Plan (WSDM): The WSDM provides the policy guidance to manage the region's water supplies by integrating the operating activities of supply surplus and shortage to achieve the reliability goals of the IRP.

- 2015 Water Supply Allocation Plan (WSAP): The WSAP includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering the allocation. The need for the WSAP arose after the 2008 Bay-Delta biological opinions and rulings that limited SWP supplies to its contractors including Metropolitan. The WSAP 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 up to 50 percent.

All of these planning documents recognize that the reliability of the Metropolitan service area is dependent on improving the reliability of imported supplies from the Colorado River and State Water Project as well as the successful implementation of future local supplies. Metropolitan is a supplemental supplier of water to Southern California and that regional reliability cannot be achieved without successfully addressing challenges to imported water reliability, developing reliable local supplies and water use efficiency.

This dependence on an integrated approach to water reliability and diversification of supplies has been the foundation of DWR's Bulletin 160, the State Water Plan, through its last several updates and is the cornerstone of Governor Brown's Water Action Plan. Under its assumptions for the successful implementation of imported water reliability programs, future local water supplies and continued conservation, Metropolitan's 2015

UWMP finds that it is able to meet full-service demands of its member agencies for the period of 2020 through 2040 during normal years, single dry year, and multiple dry years. Some of the most significant factors affecting reliability for imported water supplies include legal, environmental, water quality and climatic changes.

Successful implementation of Metropolitan's UWMP is dependent on the continued successful implementation of local water supply projects. In this regard, a new City well, Well No. 7, will be designed and constructed and is planned for operation beginning in 2017 with an estimated supply capacity of 1,950 AFY. With well rehabilitation and the construction of new Well No. 7, City groundwater production capacity is projected to increase to 5,300 AFY by the year 2017, which is an increase of approximately 200% relative to groundwater production in 2015 (1,763 AFY). It is estimated that the City will rehabilitate and replace wells as required to maintain average annual well supply at approximately 4,450 AFY, equivalent to their current groundwater rights, through the planning period.

8 WATER SHORTAGE CONTINGENCY PLANNING

Water supplies may be interrupted or reduced by droughts, earthquakes, and power outages which hinder a City's ability to effectively delivery water. Drought impacts increase with the length of a drought, as supplies in reservoirs are depleted and water levels in groundwater basins decline. The ability to manage water supplies in times of drought or other emergencies is an important part of water resources management for a community.

California's extensive system of water supply infrastructure, reservoirs, groundwater basins, and inter-regional conveyance facilities, mitigate the effect of short-term dry periods. Defining when a drought begins is a function of drought impacts to water users. Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Droughts occur slowly, over a multi-year period. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

During water shortage emergencies, the City will implement water conservation stages, of actions outlined in City Ordinance 15-02, "Emergency Ordinance of the City of Inglewood, California Amending Section 5-110 of Article 7 of Chapter 5 and Adding an Article 19 to Chapter 10 (Public Works) to Establish a Water Conservation and Water Supply Shortage Program," adopted on October 21, 2014, which serves as the City's Water Shortage Contingency Plan (WSCP). Ordinance 15-02 is included in Appendix G.

The City has historically adopted municipal ordinances or resolutions relating to water conservation and water shortage contingency planning including:

- Resolution No. 90-45, "A Resolution of the City of Inglewood, California Requesting and Encouraging Water Conservation Practices by All Water Users" passed and approved on May 22, 1990.
- Ordinance No. 91-6, "An Ordinance of the City of Inglewood, California Declaring a Water Shortage and Adopting Mandatory Water Conservation Practices" adopted on March 5, 1991.
- Ordinance No. 93-20, "An Ordinance of the City of Inglewood, California, Amending the Inglewood Municipal Code, Chapter 5, Article 7, Water Conservation Practices, to provide for Water Efficiency in the Landscape" adopted on July 20, 1993.
- Resolution No. 03-13, "Resolution of the City Council of the City of Inglewood, California to Require Recycled Water to be used for Purposes Permitted by Regulatory Agencies," adopted in February 11, 2003.
- Ordinance No. 15-02, "An Ordinance of the City of Inglewood, California Amending Section 5-110 of Article 7 of Chapter 5 and Adding an Article 19 to Chapter 10 (Public Works) to Establish a Water Conservation and Water Supply Shortage Program," adopted on October 21, 2014

- Resolution No. 15-04, "A Resolution of the City Council of the City of Inglewood, California Declaring the Implementation of a Level 1 Water Supply Shortage Measure for all City of Inglewood Water Service Area Residents and Businesses," adopted on October 21, 2014.

The initial 1990 Ordinance was a purely voluntary program, which encouraged a 10% reduction in water usage among residents and businesses in the City by discouraging:

- Hosing off walkways, driveways, parking areas, and other hard surfaces;
- Washing vehicles without use of a hose end shut-off, while encouraging bucket washes;
- Cleaning, filling, or refilling non-re-circulating decorative fountains;
- Watering lawns, landscape areas, parks and school grounds, between 7:00 a.m. and 7:00 p.m.; and
- Serving water in restaurants unless requested.

The voluntary program also encouraged the installation of water efficient plumbing fixtures and the use of drought-tolerant landscaping whenever possible. The Parks and Code Enforcement Department assisted water users in reducing water usage by disseminating information on water conservation techniques including customer conservation practices, low-flow toilets and the use of recycled water.

Beginning in 1991, a series of mandatory water conservation Ordinances were adopted, which made most of the practices addressed in the 1990 voluntary ordinance mandatory. Ordinances 91-6 and 93-20 establish mandatory provisions prohibiting or restricting the following water consumption activities:

- Restricting watering landscape with potable water between the hours of 4:00 p.m. and 10:00 a.m.; watering with recycled water is allowed at any time;
- Prohibiting exterior washing practices with hand-held hose unless equipped with positive shut-off nozzle;
- Prohibiting hosing off walkways, driveways, parking areas, and other hard surfaces;
- Prohibiting flushing water mains except as necessary to protect public health;
- Requiring all water leaks to be repaired within 24 hours;
- Requiring the preparation of new landscape plans for all new developments or remodels requiring a building permit; plans must include estimated water use, irrigation schedules, soils testing, use of recycled water unless an exemption has been issued; and
- Requiring conducting water audits every five years for landscaped areas in excess of one acre.

On February 11, 2003, the City Council adopted Resolution No. 03-13, which requires the use of recycled water for future development projects in the City "where feasible, appropriate and acceptable to all regulatory agencies."

On October 21, 2014, the City adopted Ordinance 15-02, which serves as the City's WSCP. The ordinance also establishes 13 practices that residents and businesses must implement to avoid unreasonable water use and waste, thereby also serving as the City's Water Waste Prevention Ordinance as discussed in Section 9.2.1.

8.1 STAGE OF ACTION

Ordinance 15-02 authorizes the Mayor and City Council to declare a Level 1, 2, or 3 water supply shortage, depending on the severity of the shortage that describes actions the City water service area customers must initiate, above and beyond, the 13 water conservation practices normally prescribed (Water Waste Prevention).

8.1.1 City Water Supply Shortage Stages (Levels)

Ordinance 15-02 specifies actions to be undertaken by the City subsequent to the declaration of a Level 1, 2 or 3 Water Shortage as defined in Table 8-1:

Table 8-1: Stages of Water Shortage Contingency Plan

Stage	% Supply Reduction	Water Supply Condition
1	10%	That due to drought or other water supply conditions, a water supply shortage or threatened shortage exists and a consumer demand reduction is necessary to make more efficient use of water
2	20%	That due to drought or other water supply conditions, a higher level of water supply shortage or threatened shortage exists and a consumer demand reduction is necessary to make more efficient use of water
3	50%	That a water shortage emergency exists and that a significant reduction in consumer demand is necessary to maintain sufficient water supplies for public health and safety

8.1.1.1 Level 1 Water Supply Shortage

A Level 1 declaration will address water shortages of up to 10% and will result in implementation of the following mandatory restrictions:

1. Implementation of all 13 normal water waste prevention practices as stated in Ordinance 15-02, Section 10-208 and presented in Section 9.2.1 (Water Waste Prevention Ordinance).
2. All residential and commercial landscape irrigation (except commercial nurseries) will be limited to:
    a. no more than three days per week during the months of April through October, but no more than two days per week during the months of November through March;
    b. All landscaped areas must be irrigated by use of water efficient devices
3. All leaks must be repaired within 72 hours

8.1.1.2 Level 2 Water Supply Shortage

A Level 2 declaration will address water shortages of up to 20% and will result in implementation of the following mandatory restrictions:

1. Implementation of all 13 normal water waste prevention practices as stated in Ordinance 15-02, Section 10-208 and presented in Section 9.2.1 (Water Waste Prevention Ordinance).
2. All residential and commercial landscape irrigation will be limited to no more than two days per week, but no more than one day per week during the months of November through March;
3. All leaks must be repaired within 48 hours;
4. Ornamental lakes or ponds can no longer be filled unless required to maintain actively managed aquatic life of significant value

8.1.1.3 Level 3 Water Supply Shortage

A Level 3 declaration will address water shortages greater than 20% and up to and including 50% shortages. A level 3 declaration will result in implementation of the following mandatory restrictions:

1. Implementation of all 13 normal water waste prevention practices as stated in Ordinance 15-02, Section 10-208 and presented in Section 9.2.1 (Water Waste Prevention Ordinance).
2. Watering or irrigating of lawn, landscape or other vegetated areas is prohibited except for:
    a. Maintenance of vegetation, including trees and shrubs, that are watered using a hand-held bucket or similar container, hand held hose equipped with a positive self-closing water shutoff nozzle or device
    b. For fire protection
    c. To prevent soil erosion
    d. For maintenance of rare or essential protected species

e. For maintenance of landscape in public parks, day care centers, golf course greens, and school grounds as long as it does not exceed two days per week
f. Actively irrigated environmental mitigation projects

3. All leaks must be repaired in 24 hours;
4. No new permanent or temporary potable water services will be provided;
5. Discontinue the use of ornamental fountains or similar decorative devices unless recycled water is used
6. Filling of swimming pools and outdoor spas is prohibited

8.1.1.4 City Health and Safety Requirements

The primary goal of the City's water system is to preserve the health and safety of its personnel and the public. Meeting this goal is a continuous function of the system – before, during and after a disaster or water shortage. Fire suppression capabilities will continue to be maintained during any water shortage contingency stage. Some water needs are more immediate than others. The following list of public health needs and the allowable time without potable water is a guideline and will depend on the magnitude of the water shortage:

- Hospitals – continuous need
- Emergency shelters – immediate need
- Kidney dialysis – 24 hours
- Personal hygiene, waste disposal – 72 hours

Based on commonly-accepted estimates of interior residential water use in the United States, per-capita health and safety water use requirements are shown in Table 8-1A. During the initial stage of a shortage, customers may adjust either interior and/or outdoor water use to meet the voluntary water reduction goal.

8.1.2 Metropolitan's Water Shortage Stages and Water Supply Allocations

In addition to the City's defined actions in response to water supply shortage stages (levels), Metropolitan defines water shortage/drought management stages and calculates water supply allocations to guide resource management activities on a regional basis.

8.1.2.2 Metropolitan's Water Surplus and Drought Management Plan

In 1999, Metropolitan in conjunction with its member agencies developed the WSDM Plan.[9] This plan addresses both surplus and shortage contingencies. The WSDM Plan provides guidelines for the management of regional water supplies to achieve the long-

[9] Metropolitan Water District of Southern California. Water Surplus and Drought Management Plan, Report No. 1150, August, 1999.

term supply reliability goals set forth in Metropolitan's Integrated Resources Plan (IRP) and is set forth to:

- Encourage efficient water use and economical local resource programs;
- Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years;
- Pursue innovative transfers and banking programs to secure more imported water for use in dry years;
- And increase public awareness about water supply issues.

Table 8-1A: Per-Capita Health and Safety Water Use Requirements

	Non-Conserving Fixtures		Habit Changes[a]		Conserving Fixtures[b]	
Toilet	5 flushes x 5.5 gpf	27.5	3 flushes x 5.5 gpf	16.5	5 flushes x 1.28 gpf	6.4
Shower	5 min. x 4.0 gpm	20.0	4 min. x 3.0 gpm	12.0	4 min. x 2.5 gpm	10.0
Washer	12.5 gpcd	12.5	11.5 gpcd	11.5	11.5 gpcd	11.5
Kitchen	4 gpcd	4.0	4 gpcd	4.0	4 gpcd	4.0
Other	4 gpcd	4.0	4 gpcd	4.0	4 gpcd	4.0
Total		68.0	---	48.0	---	35.9
CCF per capita per year		33.0	---	23.0	---	17.5

gpcd = gallons per capita per day; gpf = gallons per flush; gpm = gallons per minute; CCF = hundred cubic feet (approximately 748 gallons)

(a) Reduced shower use from shorter time use and reduced flow. Reduced washer use from fuller loads.

(b) Fixtures include ULF 1.28 gpf toilets, 2.5 gpm showerheads, and efficient clothes washers.

The WSDM Plan guides the operations of water resources including local resources (groundwater), Colorado River water, SWP water, and regional storage to ensure regional reliability. It identifies the expected sequence of resource management actions Metropolitan will take during surpluses and shortages of water to minimize the probability of severe shortages that require curtailment of full-service demands. Mandatory allocations are avoided to the extent practicable; however, in the event of an extreme shortage Metropolitan's Water Supply Allocation Plan (as described later in this Section) will be implemented.

The WSDM Plan distinguishes between *Surpluses*, *Shortages*, *Severe Shortages*, and *Extreme Shortages.* Within the WSDM Plan, these terms have specific meaning relating to Metropolitan's capability to deliver water to the City as described below:

- Surplus: Metropolitan can meet full-service and interruptible program demands, and it can deliver water to local and regional storage.

- Shortage: Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.
- Severe Shortage: Metropolitan can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program (IAWP) deliveries in accordance with IAWP.
- Extreme Shortage: Metropolitan must allocate available supply to full-service customers.

The WSDM Plan also defines five surplus management stages and seven shortage management stages to guide resource management activities. Each year, Metropolitan will consider the level of supplies available and the existing levels of water in storage to determine the appropriate management stage for that year. Each stage is associated with specific resource management actions designed to: 1) avoid an Extreme Shortage to the maximum extent possible; and 2) minimize adverse impacts to retail customers should an "Extreme Shortage" occur. The current sequencing outlined in the WSDM Plan reflects anticipated responses based on detailed modeling of Metropolitan's existing and expected resource mix. This sequencing may change as the resource mix evolves.

WSDM Plan Shortage Actions by Shortage Stage

When Metropolitan must make net withdrawals from storage, it is considered to be in a shortage condition. However, under most of these stages, it is still able to meet all end-use demands for water. The following summaries describe water management actions to be taken under each of the seven shortage stages.

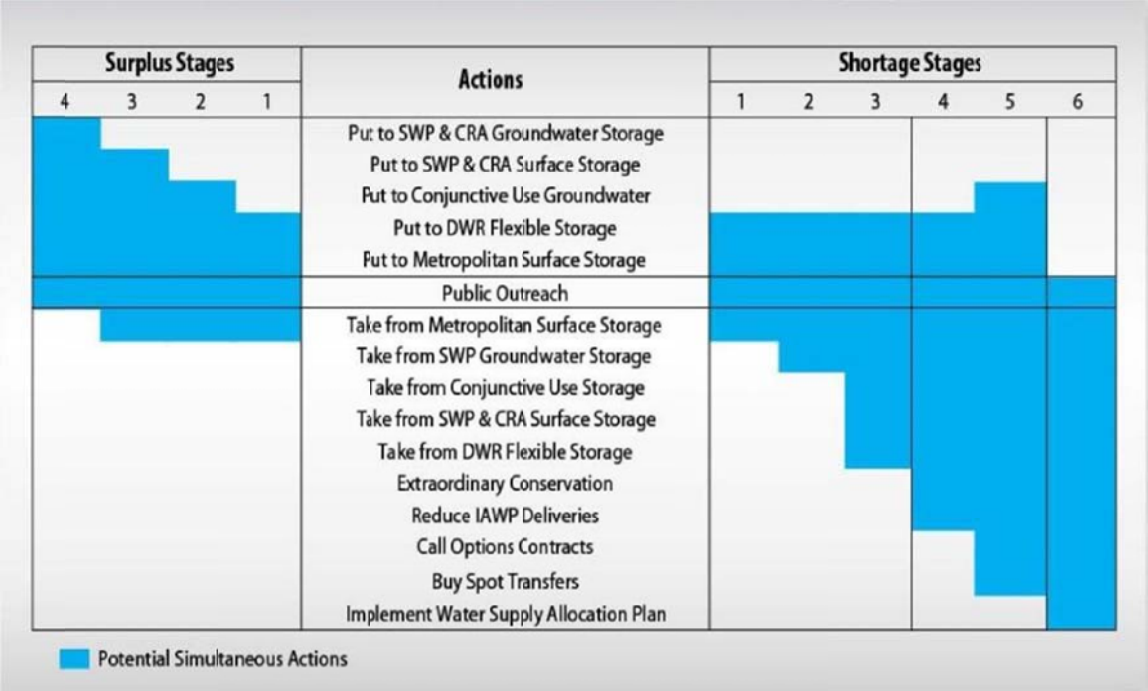
- Shortage Stage 1: Metropolitan may make withdrawals from Diamond Valley Lake.
- Shortage Stage 2: Metropolitan will continue Shortage Stage 1 actions and may draw from out-of-region groundwater storage.
- Shortage Stage 3: Metropolitan will continue Shortage Stage 2 actions and may curtail or temporarily suspend deliveries to Long Term Seasonal and Replenishment Programs in accordance with their discounted rates.
- Shortage Stage 4: Metropolitan will continue Shortage Stage 3 actions and may draw from conjunctive use groundwater storage and the SWP terminal reservoirs.
- Shortage Stage 5: Metropolitan will continue Shortage Stage 4 actions. Metropolitan's Board of Directors may call for extraordinary conservation through a coordinated outreach effort and may curtail Interim Agricultural Water Program deliveries in accordance with their discounted rates. In the event of a call for extraordinary conservation, Metropolitan's Drought Program Officer will coordinate public information activities with member agencies and monitor the effectiveness of ongoing conservation programs. The Drought Program Officer

will implement monthly reporting on conservation program activities and progress and will provide quarterly estimates of conservation water savings.

- Shortage Stage 6: Metropolitan will continue Shortage Stage 5 actions and may exercise any and all water supply option contracts and/or buy water on the open market either for consumptive use or for delivery to regional storage facilities for use during the shortage.
- Shortage Stage 7: Metropolitan will discontinue deliveries to regional storage facilities, except on a regulatory or seasonal basis, continue extraordinary conservation efforts, and implement its Water Supply Allocation Plan.

A summary of the various resource stages, anticipated actions, and supply declarations is presented in Figure 8-1.

Figure 8-1: Metropolitan's Resource Stages, Anticipated Actions & Supply Declarations



Reliability Modeling of the WSDM Plan

Using a technique known as "sequentially indexed Monte Carlo simulation," Metropolitan undertook an extensive analysis of system reservoirs, forecasted demands, and probable hydrologic conditions to estimate the likelihood of reaching each Shortage Stage through 2010. The results of this analysis demonstrated the benefits of coordinated management of regional supply and storage resources. Expected occurrence of a Severe Shortage is 4% or less in most years and never exceeded 6%; equating to an expected

shortage occurring once every 17 to 25 years. An Extreme Shortage was avoided in every simulation run.

8.1.2.2 Metropolitan's Water Supply Allocation Plan[10]

Metropolitan adopted its WSAP following critically dry conditions, which affected all of Metropolitan's main supply sources in 2007. Those dry conditions coupled with a Federal Court ruling in August 2007 providing protective measures for the Delta smelt in the Sacramento-San Joaquin River Delta, brought uncertainty about future pumping operations from the State Water Project.

Metropolitan worked jointly with the member agency managers and staff to develop a WSAP to address such needs. The WSAP that was eventually adopted includes specific formulas for calculating member agency supply allocations and the key implementation elements needed for administering an allocation should a shortage be declared. The adopted allocation formulas seek to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level, and takes into account growth, local investments, changes in supply conditions and the beneficial impacts of non-potable recycled water use and the implementation of conservation savings programs. The adopted formulas are calculated in three steps: (1) base period calculations; (2) allocation year calculations, and (3) supply allocation calculations. These steps are described in further detail below.

- Step 1: Base Period Calculations: The first step in calculating a water supply allocation is to estimate water supply and demand using a historical base 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 (base period), which for the current allocation were 2004-2006. The calculations take into account various factors including local supplies, wholesale supplies, retail supplies, demands, in-lieu deliveries, agricultural deliveries, conservation achieved and conservation rate structures.

- 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. A number of factors are taken into consideration in this step including: (1) allocation year retail demands; (2) allocation year local supplies; and (3) allocation year wholesale demands.

- 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. Again, several elements are considered at this stage including: (1) regional shortage levels; (2) regional shortage percentages; (3)

[10] Information presented in this section has been extracted from Metropolitan's Water Supply Allocation Plan, June 2009.

extraordinary increased production adjustments; (4) wholesale minimum allocations; (5) maximum retail impact adjustments; (6) interim agricultural water program reductions; (7) conservation demand hardening credits; (8) municipal and industrial allocations; and (9) total allocation

The WSAP takes effect when a regional shortage is declared by Metropolitan's Board of Directors. The allocation period covers twelve consecutive months, from July of a given year through the following June (this period was selected to minimize the impacts of varying SWP allocations and to provide member agencies with sufficient time to implement their outreach strategies and rate modifications).

The WSAP also allows for an appeals process to address any changes or corrections to an agency's allocation. Appeals can be made to request adjustments for (1) erroneous historical data used in base period calculations; (2) unforeseen loss or gain in local supply; (3) extraordinary increases in local supply; (4) population growth rates; and (5) reviewing calculation of base period, allocation year and supply allocation figures for consistency with the standards outlined in the WSAP.

The WSAP also allows for enforcement through a penalty rate structure. Penalty rates and charges will only be assessed to the extent that an agency's total annual usage exceeds its total annual allocation. Any funds collected will be applied towards investments in conservation and local resources development within the service area of the member agency by which the penalties are incurred. No billing or assessment of penalty rates will take place until the end of the twelve-month allocation period.

Additional information on Metropolitan's Water Supply WSAP can be found in that document as previously referenced by footnote.

8.2 PROHIBITIONS ON END USES

The prohibitions on end uses for City water supply shortage levels as defined in Ordinance 15-02 is summarized in Table 8-2 and discussed below.

8.2.1 Level 1 Water Supply Shortage

A Level 1 Water Supply Shortage exists when the mayor and City Council determines that due to drought or other water supply conditions, a water supply shortage or threatened shortage exists, and a consumer demand reduction is necessary to make more efficient use of water and appropriately respond to existing water conditions. The following restrictions shall apply:

1. Implementation of the 13 normal water conservation practices outlined in Ordinance 15-02, Section 10-208, that serves as the City's Water Waste Prevention Ordinance as discussed in Section 9.1.1.
2. All residential and commercial landscape irrigation (except commercial nurseries) will be limited to:

Table 8-2: Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1, 2, 3	Landscape - Limit landscape irrigation to specific times	Ordinance No.15-02, Section 10-208 (1) & (2)	Yes
1, 2, 3	Landscape - Restrict or prohibit runoff from landscape irrigation	Ordinance No.15-02, Section 10-208 (3)	Yes
1, 2, 3	Other - Prohibit use of potable water for washing hard surfaces	Ordinance No.15-02, Section 10-208 (4)	Yes
1, 2, 3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Ordinance No.15-02, Section 10-208 (5)	Yes
1, 2, 3	Other water feature or swimming pool restriction	Recirculating Water Required for Water Fountains and Decorative Water Features: Ordinance No.15-02, Section 10-208 (6)	Yes
1, 2, 3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Ordinance No.15-02, Section 10-208 (7)	Yes
1, 2, 3	CII - Restaurants may only serve water upon request	Ordinance No.15-02, Section 10-208 (8)	Yes
1, 2, 3	CII - Lodging establishment must offer opt out of linen service	Ordinance No.15-02, Section 10-208 (9)	Yes
1, 2, 3	CII - Other CII restriction or prohibition	No Installation of Single Pass Cooling Systems: Ordinance No.15-02, Section 10-208 (10)	Yes
1, 2, 3	CII - Other CII restriction or prohibition	No Installation of Non-recirculating Water Systems in Commercial Car Wash and Laundry Systems: Ordinance No.15-02, Section 10-208 (11)	Yes
1, 2, 3	CII - Commercial kitchens required to use pre-rinse spray valves	Ordinance No.15-02, Section 10-208 (12)	Yes

Table 8-2: Restrictions and Prohibitions on End Uses (Continued)

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1, 2, 3	CII - Other CII restriction or prohibition	All commercial conveyor car wash systems must have installed by 9/1/15 operational re-circulating water systems: Ordinance No.15-02, Section 10-208 (13)	Yes
1	Landscape - Limit landscape irrigation to specific days for odd & even numbered properties	Ordinance No.15-02, Section 10-210 (1.A.b.i)	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Within 72 hours: Ordinance No.15-02, Section 10-210 (1.A.b.ii)	Yes
2	Landscape - Limit landscape irrigation to specific times	Two days per week between April-October & one day per month between Nov.-March: Ordinance No.15-02, Section 10-210 (2.A.b.i)	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Within 48 hours: Ordinance No.15-02, Section 10-210 (2.A.b.ii)	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	No filling or re-filling of lakes or ponds except to sustain aquatic life: Ordinance No.15-02, Section 10-210 (2.A.b.iii)	Yes
3	Landscape - Prohibit all landscape irrigation	Ordinance No.15-02, Section 10-210 (3.A.b.i)	Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Within 24 hours: Ordinance No.15-02, Section 10-210 (3.A.b.ii)	Yes
3	Other	Limited Potable Water Service including no new services, construction meters, will serve letters, etc. : Ordinance No.15-02, Section 10-210 (3.A.b.iii)	Yes
3	Other water feature or swimming pool restriction	Prohibit the use of potable water for filling water features, pools & spas: Ordinance No.15-02, Section 10-210 (3.A.b.iv & v)	Yes

a. no more than three days per week during the months of April through October, but no more than two days per week during the months of November through March;

b. All landscaped areas must be irrigated by use of water efficient devices

3. All leaks must be repaired within 72 hours;

8.2.2 Level 2 Water Supply Shortage

In addition to the restrictions indicated for Level 1, the following restrictions shall apply:

1. All residential and commercial landscape irrigation will be limited to no more than two days per week, but no more than one day per week during the months of November through March;
2. All leaks must be repaired within 48 hours;
3. Ornamental lakes or ponds can no longer be filled unless required to maintain actively managed aquatic life of significant value;

8.2.3 Level 3 Water Supply Shortage

A Level 3 Water Supply Shortage condition is also referred to as an "Emergency" condition. In addition to the restrictions indicated for Levels 1 & 2, the following restrictions shall apply:

1. Watering or irrigating of lawn, landscape or other vegetated areas is prohibited except for:
    a. Maintenance of vegetation, including trees and shrubs, that are watered using a hand-held bucket or similar container, hand held hose equipped with a positive self-closing water shutoff nozzle or device
    b. For fire protection
    c. To prevent soil erosion
    d. For maintenance of rare or essential protected species
    e. For maintenance of landscape in public parks, day care centers, golf course greens, and school grounds as long as it does not exceed two days per week
    f. Actively irrigated environmental mitigation projects
2. All leaks must be repaired in 24 hours;
3. No new permanent or temporary potable water services will be provided;
4. Discontinue the use of ornamental fountains or similar decorative devices unless recycled water is used
5. Filling of swimming pools and outdoor spas is prohibited

8.3 PENALTIES, CHARGES, OTHER ENFORCEMENT OF PROHIBITIONS

As part of Ordinance 15-02, water use restrictions are set forth in Section 10-210 "Level of Water Shortage", and penalties imposed for violation are described in Section 10-212 "Penalties and Violations". The penalties are based upon the number and frequency of violations and are discussed below:

a. Any violation may be prosecuted as a misdemeanor punishable by imprisonment in the County jail for not more than thirty days or by fine not exceeding $1,000 or by both.

b. For the first violation a written notice will be given to the customer.

c. For the second violation within the preceding (12) twelve calendar months, a penalty of not to exceed one hundred dollars ($100.00) shall be imposed by written notice to the customer.

d. For the third violation within the preceding (12) twelve calendar months a penalty of not to exceed two hundred and fifty dollars ($250.00) shall be imposed by written notice to the customer.

e. For the fourth violation within the preceding twelve (12) calendar months, a penalty of not to exceed five hundred dollars ($500.00) shall be imposed by written notice to the customer.

   The City may also give written notice to the customer indicating that it will install a flow restricting device of 1 GPM capacity for services up to one and one half inch meter 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 (48) hours. The charge for installing such a flow restricting device will be based upon the size of the meter and the actual cost of installation. The charge for removal of the flow restricting device and restoration of normal service shall be based on the actual cost involved.

f. In addition to any fines and the installation of a flow restrictor, the City may disconnect a customer's water service for willful violations of mandatory restrictions.

8.4 CONSUMPTION REDUCTION METHODS

CWC 10632
(a)(5) 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.

Consumption reduction methods are actions that are taken by a water agency to reduce water demand within its service area, whereas the prohibitions, addressed in Section 8.2,

limit specific uses of water. Agencies make their own determination as to which consumption reduction methods, and which stages for employing the methods, are most appropriate for their service area. City of Inglewood consumption reduction methods by WSCP stage are summarized in Table 8-3.

Table 8-3: Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference
1,2,3	Expand Public Information Campaign	The City's main website contains information on water conservation including: • Current status of the water conservation program • Links to the water conservation ordinances • Tips regarding water use and conservation • Links to other websites concerning water conservation, rebate programs, & water saving ideas
1,2,3	Improve Customer Billing	The City has implemented a tiered rate structure which discourages increased water use.
1,2,3	Increase Frequency of Meter Reading	City monitors its water usage by water use category. Any changes in water demand patterns can be easily noticed and acted upon as required.
1,2,3	Provide Rebates on Plumbing Fixtures and Devices	City participates in several programs to encourage the retrofit of residential plumbing including: low flow showerheads, toilet dams, high eff. toilets, high-eff. washing machines, & SMART Irrigation Controllers.
1,2,3	Reduce System Water Loss	If, during routine inspection of the system, leaks are encountered or suspected, further evaluation is conducted, and if leaks are found, they are repaired.

8.4.1 Public Information Campaign

The City's main website contains information on water conservation including:

- Current status of the water conservation program and level of water shortage if applicable;
- Links to the water conservation ordinances including rules, regulations and fines associated with violations of watering restrictions; and
- Tips regarding water use and conservation

In addition, the City provides the following additional resource links that includes water conservation, rebate programs, water saving incentives and other information sources related to water conservation:

Education: http://saveourh2o.org

Rebates: http://socalwatersmart.com/

Conservation and water use efficiency: www.westbasin.org/water-reliability-2020/conservation/overview

The City in concert with the WBMWD have various public information campaigns that are directed at educating the public on water conservation and consumption reduction methods:

8.4.1.1 Landscape Irrigation Efficiency Program (LIEP)

The LIEP program provides free water audits for customers. Funded by the United States Bureau of Reclamation (USBR), the LIEP program includes a site survey or evaluation, a list of recommended improvements and repairs, a recommended water budget and schedule, and water efficient rotating sprinkler nozzles.

8.4.1.2 Ocean-Friendly Landscape Program

In 2006, WBMWD received a Proposition 50 grant from DWR to implement a comprehensive program called the Ocean-Friendly Landscape Program. Since 2006, this program has provided the public with the resources, education, devices and rebates to conserve water used in outdoor landscaping. This program is anticipated to end in December 2016 when the funding is exhausted. The components of this program are described below.

- Ocean-Friendly Demonstration Gardens

  WBMWD has worked with its cities and schools to construct 12 Ocean Friendly Demonstration Gardens to date. Four additional gardens are expected to be completed by the end of 2016. These gardens provide great examples of how California-friendly landscapes can conserve water, reduce runoff, reduce turf waste and pollution and also provide benefits to local wildlife, birds and insects.

- California Friendly Landscape Classes and "Hands-On-Workshops"

  During the period of 2010-2015, WBMWD worked closely with the South Bay Cities Council of Governments (SBCCOG), its cities and water retail agencies to implement over 30 California Friendly Landscape Classes and Ocean-Friendly Garden "Hands-on-Workshops" to teach residents how to construct a water-conserving garden. WBMWD used the opportunity of constructing the gardens to also have a trained professional teach residents how to install the water conserving plants and drip irrigation.

- Ocean-Friendly Landscape Program – Smart Irrigation Controllers

  As part of the Ocean-Friendly Landscape Program, WBMWD provides rebates and exchange programs for smart weather-based irrigation controllers to residents. In addition, these controllers have been installed at large landscape sites, such as parks, schools and city facilities throughout the WBMWD service area.

8.4.1.3 Smart Landscape Expo

The Smart Landscape Expo was held in 2010 and 2011 and was conducted at the Edward C. Little Water Recycling Facility. It featured two classroom workshops, two hands-on demonstrations, tours of the water recycling facility, and self-guided tours of the demonstration garden. There were 20-25 vendors including irrigation equipment vendors, water agencies and information booths as well as a native plant sale with local nurseries selling plants that could be found in the demonstration garden.

8.4.1.4 Greywater Workshops

In 2015, WBMWD launched its first greywater pilot workshop and in 2016, WBMWD plans on offering several greywater workshops to teach residents how to create a safe and legal Laundry-to-Landscape (L2L) greywater system.

8.4.2 Improved Customer Billing

In 1999, the City evaluated its water rate structure and modified it to include an increasing block rate structure, which was developed to discourage wasteful practices by increasing the unit cost of water as usage increased. The City adopted the increasing rate, in keeping with water conservation and good water system management, and phased the new rates over a three-year period. Customer billing and water rate schedules are discussed further in Section 9.2.1

8.4.3 Frequency of Meter Reading

The City meters water usage by water use category. In doing so, the City is able to gauge normal customer water use and recognize abnormal use. The City may alter its present program of usage monitoring and adopt an alternative water survey program if it becomes evident that such modification is necessary. City metering is discussed further in Section 9.2.1

8.4.4 Rebates or Giveaways of Plumbing Fixtures and Devices

The City participates in several programs to encourage the retrofit of residential plumbing. These include installation of low flow showerheads and toilet dams to conserve water. It also includes participation in ultra-low flush toilet replacement and rebate programs discussed later in this section.

The City has previously distributed water conservation kits, including showerheads, toilet dams, leak detection dye tablets, and a water conservation information booklet. Switching from a high flow showerhead to a low flow showerhead can save as much as 8,000 gallons per year per household.

The City has participated in ultra-low flush toilet distribution and rebate programs with WBMWD and Metropolitan (see below). These programs have proven to be very successful. In 2015, legislation was passed that mandates the use of toilets that are 1.28 gallon per flush or less. With funding contributions from Metropolitan and several member agencies, WBMWD provided free High-Efficiency Toilets (HET) through several one-day toilet distribution events. The annual goal was to distribute 2,000 HETs, estimated to conserve more than 26 million gallons of drinking water per year.

8.4.4.1High-Efficiency Toilet (HET) Replacement

The City has participated extensively with WBMWD in a HET replacement/distribution program.

In 1992, the City participated in a toilet replacement program (originally called the ultra-low flush toilet program) offered through an arrangement between the First African Methodist Episcopal (FAME) Church, WBMWD, Metropolitan and the U.S. Bureau of Reclamation. By March 1994, 2,000 ULFTs had been distributed. In 1995 an additional 1,000 toilets were distributed. The installation of those 3,000 toilets saved an estimated 94 AF per year. Since 2000, an additional 4,093 ULFTs have been installed.

In the early 1990s the City participated in a toilet rebate program with WBMWD whereby a $75 and $37.50 rebate were offered for the first and second ultra-low flush toilet installed in a dwelling unit. In fiscal year 1999-2000, WBMWD supplied over 900 rebates. Since 2010, an additional 9,000 HET have been distributed within the WBMWD service area.

8.4.4.2 High Efficiency Sprinkler Nozzles

Metropolitan in concert with a grant from the US Bureau of Reclamation has developed a program to replace wasteful old style sprinklers with high-efficiency sprinkler nozzles. The nozzles are multi-trajectory, rotating streams that apply water more slowly and uniformly encouraging healthy plant growth. The program is designed to use 20% less water than conventional spray heads with rebates starting at $2.00 per nozzle with a minimum quantity of 30 nozzles.

8.4.4.3 SMART Irrigation Timers

Weather Based “Smart” Controllers for landscape irrigation work on a simple principle: provide the appropriate watering schedule, adjust for weather changes and irrigate based on the needs of the landscape and soil conditions. A Smart controller will automatically

reduce the watering times as the weather gets cooler and less water is needed. Then as the weather begins to warm up, the controller will add more watering time. The way this typically works is that you set the controller for a default maximum watering time, based on the hottest time of year. Then the controller reduces that time amount by a percentage value when less water is needed.

8.4.4.4 Cash for Kitchens

WBMWD continues to partner with the SBCCOG and its South Bay Environmental Services Center (SBESC) to offer a program called, "Cash for Kitchens" for commercial kitchen facilities in the South Bay portion of our service area. Food service customers receive combined water and energy assessment and training materials for employees. Sites may also qualify to receive high-efficiency device upgrades such as pre-rinse kitchen sprayers, faucet aerators, flow restrictors and water brooms. The SBESC coordinates and conducts site visits with Southern California Gas Company commercial service technicians to provide a comprehensive water and energy review for the customers they visit. The program is available to all customers of WBMWD.

8.4.4.5 Commercial Restroom Retrofit

The Commercial Restroom Retrofit program provided qualifying businesses, schools, restaurants and other commercial and public facilities with installation of HETs, urinals and flow restriction devices to increase water-use efficiency in the non-residential sector.

8.4.4.6 Ocean Safe Car Wash Program

Ocean Safe Car Washes clean and recirculate their water to use 50-85% less than the average home car wash and help prevent runoff from entering the ocean. These car washes provide discount coupons to customers.

8.4.4.7 Turf Removal Rebates

In 2015, WBMWD was able to add an additional $1/square foot (sf) of turf removal rebate to the Metropolitan incentive of $2/sf through a grant received by USBR. The $3/sf rebate incentive for turf removal was a very successful program and funding only lasted for a few months.

8.4.5 Reduction of Water System Loss

The City works to reduce system water losses at each stage of their WSCP. The City has an ongoing water pipeline replacement program. Between FY 2010 and FY 2014, the City replaced 35,600 linear feet of pipe at a capital cost of $6.0 million.

A project was conducted as part of a greater effort, sponsored by Southern California Edison (SCE), to better understand the relationship between water loss control and direct- and embedded energy- savings. Five local governments in the SCE service territory,

including the City of Inglewood, were selected as part of this pilot program. As part of the study, Water Systems Optimization (WSO) worked with the City to accurately quantify water loss volumes by conducting a thorough water audit. In parallel, WSO performed leak detection at Inglewood. A water balance was established for the City for the audit period July 1, 2012 – June 30, 2013 (FY 2013). Some of the key findings and recommendations for the City of Inglewood are discussed in Section 9.2.5.

8.5 DETERMINING WATER SHORTAGE REDUCTIONS

In accordance with City Ordinance 15-02, water use reporting requirements will be adjusted to reflect the level of the declared shortage. Under normal water supply conditions, potable water production figures are recorded daily and totals are generally reported on a weekly basis.

During a declared water shortage, daily water production figures will be reported to applicable City staff. The water usage information will be compared to the target weekly production to verify that the reduction goal is being met. In the event targets are not being met, City staff will report that information to the City Manager. A monthly summary will be furnished to the City Council.

These modified reporting procedures will keep all levels of City government informed of water use during emergency water shortages so as to ensure responsive actions as required to protect public safety and provide essential water services.

8.6 REVENUE AND EXPENDITURE IMPACTS

A reduction in supply availability during a drought period would impact revenues for potable water. The anticipated shortfall in net operating revenues could be dealt with in a variety of individual approaches or combinations thereof including:

1. Increasing water commodity and service charges to offset revenue shortfalls;
2. Reducing annual operating expenses; including salaries, benefits, maintenance and improvement programs, and the use of outside professional services;
3. Utilizing appropriated and unappropriated fund balances and reserves earmarked for long range capital improvements to offset the operating shortfall; and
4. Temporarily diverting General fund tax revenues earmarked for future capital improvements to offset net operating losses.

The most feasible, and least disruptive alternative, would be to divert general tax revenues from future capital improvements to operating expenses. Because of prolonged drought periods affecting City water customers in the early 1990's as well as over the past few years, the City is prepared to implement both voluntary and mandatory conservation provisions when necessary. Conservation measures adopted during the two most recent drought periods proved effective. The City's drought and emergency

management measures are designed to deliver necessary water savings, while minimizing, to the extent possible, any negative effects on the lifestyles and economic basis of the City's customers. The cost of purchase of potable and recycled water from WBMWD at continuously increasing higher rates also affects operational expenses.

8.7 RESOLUTIONS OR ORDINANCE

The City has historically adopted municipal ordinances or resolutions relating to water conservation and water shortage contingency planning as summarized at the beginning of this chapter. During water shortage emergencies, the City will implement water conservation stages, of actions outlined in City Ordinance 15-02, "Emergency Ordinance of the City of Inglewood, California Amending Section 5-110 of Article 7 of Chapter 5 and Adding an Article 19 to Chapter 10 (Public Works) to Establish a Water Conservation and Water Supply Shortage Program," adopted on October 21, 2014, which serves as the City's Water Shortage Contingency Plan (WSCP). Ordinance 15-02 is included in Appendix G.

8.8 CATASTROPHIC SUPPLY INTERRUPTION

In addition to the previously-described water shortage contingency measures, the City will also implement its Emergency Operations Plan (EOP) during significant periods of drought. The EOP is designed to prepare the City for a planned response to emergency situations associated not only with intentional acts, but also with natural disasters, technological incidents, and national security emergencies. It also includes provisions for notifying and receiving direction from WBMWD and Metropolitan pertaining to imported water supply distribution. The key elements of the City's EOP include:

- Implementing an effective emergency response communication system;
- Developing an interagency mutual aid program;
- Addressing water supply, water quality, emergency operations center (EOC), and providing an information resource list which includes contact information on key personnel; and
- Training of water personnel on emergency response procedures.

During emergency situations, both the City and WBMWD are responsible for maintaining communications between the utilities and with the Metropolitan emergency response network. Good communications during emergencies will help facilitate requests for manpower and equipment, collect and process damage reports, coordinate available resources if and when Metropolitan implements its water supply allocation plan.

Since Metropolitan supplies a majority of the potable water to the City, it is important to understand the storage capability of Metropolitan and the emergency storage requirements that Metropolitan maintains. The following is a synopsis of Metropolitan's Emergency Storage Requirements.

Metropolitan's criteria for determining emergency storage requirements were established in the October 1991 Final Environmental Impact Report for the Eastside Reservoir, which is now named Diamond Valley Lake. They were again discussed in Southern California's 1996 Integrated Resources Plan. Metropolitan's Board has approved both of these documents.

Emergency storage requirements are based on the potential of a major earthquake damaging the aqueducts that transport Southern California's imported water supplies (SWP, CRA, and Los Angeles Aqueduct). The adopted criteria assume that damage from such an event could render the aqueducts out of service for six months. Metropolitan's planning, therefore, is based on 100% reduction in its supplies for a period of six months.

Metropolitan's emergency planning is based on a greater shortage than required to safeguard the region from catastrophic loss of water supply, Metropolitan has made substantial investments in emergency storage. The emergency plan outlines that under such a catastrophe, interruptible service deliveries would be suspended and firm supplies to member agencies would be restricted by a mandatory cutback of 25% from normal-year demand levels.

At the same time, water stored in surface reservoirs and groundwater basins under Metropolitan's interruptible program would be made available, and Metropolitan would draw on its emergency storage, as well as other available storage. Metropolitan has reserved approximately half of Diamond Valley Lake storage to meet such an emergency, while the remainder is available for dry-year and seasonal supplies. In addition, Metropolitan has access to emergency storage at its other reservoirs, at the SWP terminal reservoirs, and in its groundwater conjunctive use storage accounts.

With few exceptions, Metropolitan can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted by a major earthquake. The WSDM Plan (Metropolitan, 1999) shortage stages will guide Metropolitan's management of available supplies and resources during the emergency to minimize the impacts of the catastrophe.

Metropolitan has a long-standing policy to develop and maintain emergency storage reserves to ensure that Southern California has access to water during emergency conditions such as earthquakes and other disasters. Metropolitan's emergency storage planning criteria was codified in the 1991 Environmental Impact Report for Diamond Valley Lake. The emergency storage planning criteria defined that the region should maintain adequate surface storage reserves to serve 75% of the firm retail demands for a six-month period. Further, it defined that these surface storage reserves should reside inside of the major earthquake fault lines that cross the SWP, CRA and Los Angeles Aqueduct (LAA). In 2015, approximately 650,000 acre-feet of storage is maintained in the major surface reservoirs in Southern California. Although these storage reserves are

not part of the IRP resource portfolio, they serve to increase the overall water supply reliability and security for the people of the Metropolitan's service area.

Storage is a key component of water management. Storage enables the capture of surplus amounts of water in normal and wet climate and hydrologic conditions when it is plentiful for supply and environmental uses. Stored water can then be used in dry years and in conditions where augmented water supplies are needed to meet demands. Storage generally takes two forms: surface reservoirs and groundwater basin storage. Since 1990, Metropolitan has invested billions of dollars to develop both forms of storage. In total, Metropolitan has developed dry-year storage with a capacity of more than 5.5 million acre-feet, a thirteen fold increase in storage capacity available to manage regional water supplies.

Some examples of storage resources that have been developed since 1990 include:

Surface Water Reservoirs

- Diamond Valley Lake (810,000 acre-feet)
- SWP Article 56 Carryover Storage (up to 200,000 acre-feet)
- Flexible Storage in Castaic Lake and Lake Perris (219,000 acre-feet)
- Intentionally-Created Surplus in Lake Mead (1.5 million acre-feet)

Groundwater Storage

- Member Agency Conjunctive Use Programs (210,000 acre-feet)
- Semitropic Storage Program (350,000 acre-feet)
- Arvin-Edison Storage Program (350,000 acre-feet)
- San Bernardino Metropolitan Storage Program (50,000 acre-feet)
- Kern Delta Water District Storage Program (250,000 acre-feet)
- Mojave Storage Program (390,000 acre-feet)

Table 8-3A shows the total storage capacity, aggregated put and take capacities (i.e., how much that can be "put" into storage, or taken out) and the projected 2015 end of year storage balance.

The City has six emergency domestic water connections with Golden State Water Company (GSWC), which are located at:

1. Century Boulevard and La Cienega Boulevard
2. Redfern Avenue and 95th Street
3. Prairie Avenue north of Century Boulevard
4. Century Boulevard and Yukon Avenue

5. Yukon Avenue and 104th Street
6. Crenshaw Boulevard and 111th Street

Additionally, the City has two emergency domestic water connections with the Los Angeles Department of Water and Power (LADWP), which are located at:

1. Manchester Boulevard and Prairie Avenue
2. Centinela Avenue east of La Colina Drive

These emergency water connections allow the City and either GSWC or LADWP to share water as necessary when either the City or the participating agency are experiencing an emergency reduction in their normal water supplies (Tetra Tech, 2015).

Table 8-3A: Metropolitan Storage Capacities & Estimated 2015 Ending Balances (AF)

Element	Program Storage Capacity	Maximum Put Capacity	Maximum Take Capacity	Estimated 2015 Ending Balance[(a)]
Central Valley and SWP	1,630,000	540,000	560,000	460,000
Colorado River	2,390,000	650,000	600,000	290,000
In-Region	1,300,000	900,000	940,000	190,000
Subtotal Dry-Year Storage	5,320,000	2,090,000	2,100,000	940,000
Emergency Storage	647,000	647,000	0	647,000
Total Storage	5,967,000	2,737,000	2,100,000	1,587,000

Source: Draft Metropolitan 2015 Integrated Resources Plan

(a) Based on trend as of September 2015; may vary depending on demands and hydrologic conditions in any given future year.

8.8.1 Electrical Outages

Metropolitan has also developed contingency plans that enable it to deal with both planned and unplanned electrical outages. These plans include the following key points:

- In event of power outages, water supply can be maintained by gravity feed from Diamond Valley Lake, Lake Mathews, Castaic Lake, and Silverwood Lake.
- Maintaining water treatment operations is a key concern. As a result, all Metropolitan treatment plants have backup generation sufficient to continue operating in event of supply failure on the main electrical grid
- Valves at Lake Skinner (Riverside) can be operated by the backup generation at the Lake Skinner treatment plant

- Metropolitan owns mobile generators that can be transported quickly to key locations if necessary

8.9 MINIMUM SUPPLY NEXT THREE YEARS

Imported water supplies, like groundwater, are subject to demand increases and reduced supplies during dry years. However, Metropolitan modeling in its 2015 UWMP, as referenced in Chapter 7, results in 100 percent reliability for full-service demands through the year 2040 for all climatic conditions. Based on the conditions described above, the City anticipates the ability to meet water demand for all climatic conditions for the near future.

The minimum water supply estimated for the City for the next three years is shown in Table 8-4, which is interpolated from the City's actual 2015 water demand of 9,554 AFY and the demand projected for the City in 2020 of 11,191 AFY.

Table 8-4: Minimum Supply Next Three Years (AFY)

	2016	2017	2018
Available Water Supply	9,881	10,208	10,535

9 DEMAND MANAGEMENT MEASURES

The goal of this chapter on Demand Management Measures (DMM) is to provide a comprehensive description of the water conservation programs that a supplier has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets. This chapter describes the City of Inglewood's efforts to promote conservation and to reduce the demand on the water supply.

The section of the California Water Code (CWC 10631) addressing DMMs was significantly modified in 2014, based on recommendations from the Independent Technical Panel (ITP) to the legislature. The ITP was formed by DWR to provide information and recommendations to DWR and the Legislature on new demand management measures, technologies and approaches to water use efficiency. In its report to the Legislature, the ITP recommended that the UWMP Act should be amended to simplify, clarify, and update the demand management measure reporting requirements, and the legislature enacted, streamlining the retail agency requirements from 14 specific measures to six more general requirements plus an "other" category.

CWC 10631

(f)(A) The narrative shall describe the water demand management measure that the supplier plans to implement to achieve its water use targets pursuant to 0608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

i. Water waste prevention ordinances.
ii. Metering.
iii. Conservation pricing.
iv. Public education and outreach.
v. Programs to assess and manage distribution system real loss.
vi. Water conservation program coordination and staffing support.

Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

Historically, the City implements a wide array of conservation measures to discourage water waste and encourage water use efficiency. Additionally, the City participates in water conservation programs developed and implemented by its regional imported water supplier WBMWD.

9.1 DEMAND MANAGEMENT MEASURES FOR WHOLESALE AGENCIES

This section is not applicable as the City of Inglewood is a retail agency.

9.2 DEMAND MANAGEMENT MEASURES FOR RETAIL AGENCIES

9.2.1 Water Waste Prevention Ordinances

A water waste ordinance explicitly states that the waste of water is to be prohibited. The ordinance may prohibit specific actions that waste water, such as excessive runoff from

landscape irrigation, or use of a hose outdoors without a shut off nozzle. A water waste prevention ordinance is in place at all times and is not dependent upon a water shortage for implementation. However a water waste ordinance may include increasingly restrictive prohibitions that may be implemented in response to shortages.

On October 21, 2014, the City adopted Ordinance 15-02, "An Ordinance of the City of Inglewood, California Amending Section 5-110 of Article 7 of Chapter 5 and Adding an Article 19 to Chapter 10 (Public Works) to Establish a Water Conservation and Water Supply Shortage Program," which establishes thirteen practices residents and businesses must implement to avoid unreasonable water use and waste as summarized in Table 8-1, thereby serving as the City's Water Waste Prevention Ordinance. Ordinance 15-02 also serves as the City's Water Shortage Contingency Plan as discussed in Chapter 8.

Table 9-1A: City Water Regulations to Prevent Water Waste Per Ordinance 15-02

Regulated Water Use Activity	Water Waste Prevention Regulation[(a)]
Watering Hours	Prohibited between 9:00 am and 4:00 pm
Watering Duration	No more than fifteen minutes per station per day
Water Flow or Runoff	Excessive water flow or runoff onto adjoining sidewalk, driveway, street, alley, gutter, ditch or adjacent property is prohibited.
Hard or Paved Surfaces	Washing down hard or paved surfaces is prohibited.
Leaks, Breaks or Malfunctions	Must be repaired within 72 hours
Water Fountains & Decorative Water Features	Recirculating water is required for all water fountains & decorative water fountains.
Washing Vehicles	Using water to wash or clean a vehicle is prohibited.
Drinking Water at Eating/ Drinking Establishments	Drinking water served only on request
Commercial Lodging Establishments	Option to decline daily linen service.
Cooling Systems for New Buildings	Installation of single-pass cooling systems is prohibited for buildings requesting new service.
New Commercial Car Wash and Laundry Systems	Installation of non-recirculating water systems is prohibited for new commercial car wash or laundry services.
Dish Wash Spray valves in Restaurants	Restaurants or cafes are prohibited from using non-water conserving dish wash spray valves.
Commercial Car Wash Systems	Effective September 1, 2015 all commercial conveyor car wash systems must have operational recirculating water systems
Notes: a – Some exceptions may apply. See Ordinance 15-02, Section 10-208	

(a) Some exceptions may apply. See Ordinance 15-02, Section 10-208

9.2.2 Metering

The City meters all customers, including separate metering for residential, commercial, industrial, and municipal (governmental/institutional) facilities, and fire flow. The City

has an inclining block rate for water service based on the quantity of water consumed. Monthly service charges are added to the commodity rate to comprise the total water bill. The service charges are based on the size of the meter and range from $13.50 per month for a ¾-inch meter to $283.50 per month for a 12-inch meter. Water bills are sent out monthly.

Based on the current billing system, the more water a customer consumes, the higher the water bill because the commodity rates are per unit of water consumed. This applies to all water-use sectors (e.g., residential, industrial, municipal, etc.). In addition, the higher the quantity consumed within a billing cycle, the higher the per-unit cost of water. Therefore, there is a cost benefit to conserving water. The commodity rate for reclaimed water also varies depending upon the quantity of water used per billing cycle. The recycled water rate is 80% of the potable water rate. As with potable water, the more water used, the higher the unit cost. The City's water rate schedules are discussed in more detail in Section 9.2.3, Conservation Pricing.

The City calibrates and replaces meters in the system as needed, as part of its ongoing operations and maintenance program. Large increases in water consumption within a short period of time on any account is noted and investigated. In addition, if any customer questions the water use within his/her own residence or facility, and so informs City staff, the City will investigate the matter to determine the cause.

9.2.3 Conservation Pricing

In 1999, the City evaluated its water rate structure and modified it to include an increasing block rate structure. This structure was developed to discourage wasteful practices by increasing the unit cost of water as usage increased. The City adopted the increasing rate, in keeping with water conservation and good water system management, and phased the new rates over a three-year period. Accounts are billed monthly.

The City's current water rates were adopted in 2012. They include three tiers in both the potable and recycled water rate structures as shown in Tables 9-1 and 9-2, respectively.

Table 9-1: City Potable Water Rate Structure[(a)]

Tiered Usage (hcf)	Cost per Unit
Single-Family Residential	
0 - 15	$3.50
16- 39	$4.75
> 39	$6.00
All Other Customers	$4.50

(a) Effective since 2012

The recycled water rate schedule encourages water users to use recycled water wherever possible, and particularly benefits large water users (over 750 units) by lowering the unit

price. Between 2005 and 2015, recycled water sales for the City accounted for 7,201 AF and averaged 721 AFY.

Table 9-2: City Recycled Water Rate Structure[(a)]

Tiered Usage (AF/Month)	WBMWD Service Area
0-25	$1,176
25-50	$1,165
50-100	$1,154
100-200	$1,143
200+	$1,132

(a) Rates effective July 1, 2016

The City carefully considered the economic impact of conservation pricing, and determined that this rate structure provides additional revenues needed to maintain the water system and water quality and provide a higher level of service to its customers, in addition to encouraging conservation. The City periodically evaluates the water rate schedules and make appropriate modifications when needed.

9.2.4 Public Education and Outreach

The City has developed a public information program to educate the public on the benefits of water conservation. The program involves dissemination of information through literature provided at City Hall and other City facilities. Such information is also disseminated through articles published in the City newsletter, presented on local cable television and made available on the City's website. The City periodically includes informational flyers with the water bills to address water conservation and other important matters.

Southern California Edison Company, in cooperation with the City, printed and distributed 2,000 brochures providing residents and businesses with suggestions on water conservation. Entitled "*25 Ways to Conserve Water*," the brochure was distributed to the public at City information counters, library lobbies, school district offices and the local Chamber of Commerce office.

Another available brochure is entitled "*Southern California Lifestyle – We Value Water, A Defining Difference*." It was developed by a consortium of agencies including WBMWD, Metropolitan, and the Southern California Water Education Center. The brochure provides numerous household and landscaping water saving tips.

A brochure entitled "*A Homeowner's Guide to Garden and Lawn Water Savings*" has also been available. It was prepared by Metropolitan and contains water management topics, lawn care information, scrub and tree care items, hillside planting tips, and irrigation systems advice.

The City participates in a variety of school education programs in concert with WBMWD. In October 1999, WBMWD began the first annual "Water Harvest Festival", a free family event featuring booths, games, prizes with the purpose of educating the public about water. The City always participates in both the annual Water Harvest Festival hosted by WBMWD and the Treasure Beneath our Feet Festival hosted by WRD, by sponsoring a booth providing informational materials and giveaways, showcasing the use of recycled water and stressing the importance of water conservation.

WBMWD and WRD invited children and their parents to the West Basin Water Recycling Facility in El Segundo and the WRD headquarters in Lakewood where they participated in a variety of games and obtained information on the District's water conservation programs and recycling facilities.

WBMWD representatives have visited schools to discuss water conservation, interacting with school children in grades 3 through 9. This discussion is usually included as part of an overall presentation on the water system and how it works.

The City has provided colorful stickers about conserving water to children, and has distributed an interactive booklet entitled "Every Day is Coastal Cleanup Day," an activity and education guide sponsored by Heal the Bay. The booklet provides water facts, water sources, water environments, and the science of water, watershed designations, pollution consequences, and numerous ways to conserve water. These educational materials are prepared in an effort to reach even the youngest children. Educating school children is a way of indirectly educating the parents of the school children. The City also distributes key chains with water conservation logos.

The City will continue to support the school education programs to promote water conservation to that sector of the community. This will be done as a part of normal operation and administrative duties; no separate budget has been created for this program.

The City has participated in many programs to conserve water and educate the public to wise water use. The City increases its educational efforts during times of drought to reinforce the concept of practicing daily water conservation. The City may consider expanding the public education program on water conservation as the need arises, subject to the availability of funding.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

As a part of normal operation and maintenance of the water system, water division staff performs preventive maintenance on approximately 152 miles of water pipelines. This includes regular valve, meter, detector check, and pipeline maintenance. If, during routine inspection of the system, leaks are encountered or suspected, further evaluation is conducted, and if leaks are found, they are repaired. Additionally, City staff attend a monthly water audit meeting to evaluate and analyze water production, use and water losses that may impact water revenues.

9.2.5.1 Southern California Edison's Water Loss Control Program

A project was conducted as part of a greater effort, sponsored by Southern California Edison (SCE), to better understand the relationship between water loss control and direct- and embedded energy- savings. Five local governments in the SCE service territory, including the City of Inglewood, were selected as part of this pilot program. As part of the study, Water Systems Optimization (WSO) worked with the City to accurately quantify water loss volumes by conducting a thorough water audit. In parallel, WSO performed leak detection at Inglewood.

A water balance was established for the City for the audit period July 1, 2012 – June 30, 2013 (fiscal year 2012-2013). Some of the key findings were:

- City system-wide "real losses" (physical water losses such as leaks, breaks and overflows) were estimated at about 5% of total "system input volume" (groundwater production and imported water purchases).
- City apparent losses (non-physical losses, or "paper losses", that occur due to customer meter inaccuracies, data handling errors, and water theft) were calculated to be about 1% of total system input volume.

The performance indicators for Inglewood were compared against those of other North American water utilities. The volume of non-revenue water as a percentage of water supplied/system input volume was below the 25th percentile relative to the operational performance of 26 North American water utilities as were apparent losses. The City's real losses were just above the 25th percentile for the data set, which indicates strong performance in the management of real losses.

WSO offered detailed recommendations to the City including:

- Provide regular calibration and testing of the meters associated with Metropolitan imported water connections WB-17 and WB-38
- In regards to metered and unmetered consumption, investigate accounts where three or more zero-reads were observed in order to determine their status and investigate the meters/accounts highlighted for proper sizing and potential for revenue improvement.
- Initiate an ongoing small meter testing program consisting of 30 to 60 tests per year
- Test an average of 22.6 large meters per year
- Conduct an annual leak detection survey on 83% of the piping network

The City's leak repair records and work order management system indicated the City was addressing reported failures in a very timely manner and it was recommended that the City maintain its current location and repair policy

9.2.6 Water Conservation Program Coordination and Staffing Support

The City has assigned an individual to serve as water conservation coordinator and includes implementation of DMMs. The Cross Connection Specialist will conduct water conservation activities throughout the year and will include public outreach, implementation of DMMs, and other various duties related to water conservation within the City.

9.3 IMPLEMENTATION OVER THE PAST FIVE YEARS

The City calibrates and replaces meters in the system, as needed, as part of its ongoing operations and maintenance program. Large increases in water consumption within a short period of time on any account were noted and investigated.

The City developed a public information program to educate the public on the benefits of water conservation as discussed in Section 9.2.4.

The City's current water rates were adopted in 2012. They include rate tiers in both the potable and recycled water rate structures as shown in Tables 9-1 and 9-2, respectively.

In regards to programs to assess and manage distribution system real loss, the City has an ongoing water pipeline replacement program. Between FY 2010 and FY 2014, the City replaced 35,600 linear feet of pipe at a capital cost of $6.0 million.

9.4 PLANNED IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

Through the implementation of City water conservation ordinances and measures, total City per-capita water use has decreased 10.6% since 2010 and 23.0% since 2005; and residential per-capita water has decreased 15.2% since 2010 and 22.9% since 2005.

The City's actual per-capita water use for 2015 was 92.9, which is well below their calculated SBx7-7 2015 and 2020 targets of 116.6 and 112.0 gpcd, respectively.

City water use has decreased a cumulative 15.7% for the first eleven recording months (June 2015 through May 2016) relative to year 2013 water usage in response to the City's conservation goal set by the State, which is 4.7% ahead of their reduction goal of 11%.

The City will continue to implement water conservation measures to achieve its 2020 water use target and continue this downward trend in City water usage.

The City will continue to monitor, evaluate, and implement various water management strategies that may include rules and regulations that work to support water waste prevention.

The City will continue to calibrate and replace meters in the system as part of its ongoing operations and maintenance program.

The City in concert with WBMWD will continue with the Public education programs and messaging is continually being conveyed at various City events and public forums. In addition, City staff will continue to attend and present water sustainability concepts through numerous presentations to various community groups including but not limited to City Council presentations and Chamber of Commerce business partners.

The City in concert with WBMWD will also continue to promote rebate programs related to turf removal and water efficient devices.

The City will continue its ongoing water pipeline replacement program as a means to assess and manage distribution system real loss.

9.5 MEMBERS OF THE CALIFORNIA URBAN WATER CONSERVATION COUNCIL

The City is not a Signatory to the Memorandum of Understanding (MOU) Regarding Best Management Practices (BMPs) for Urban Water Conservation with the California Urban Water Conservation Council (CUWCC).

10 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

10.1 INCLUSION OF ALL 2015 DATA

The City's 2015 UWMP consists of water use and planning data for the entire year of 2015. The City is reporting on a 2015 calendar year basis.

10.2 NOTICE OF PUBLIC HEARING

The City will hold a public hearing on September 27, 2016, prior to adopting the 2015 UWMP. The public hearing provided an opportunity for the public to provide input to the Plan before it was adopted. The City considered all public input.

10.2.1 Notice to Cities and Counties

CWC 10621

(b) Every urban water supplier required to prepare a plan shall… at least 60 days prior to the public hearing on the plan … notify any city or county within which the supplier provides waters supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

CWC 10642
…The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area…

The City does not serve water to any other city other than the City of Inglewood, and does not serve water to any unincorporated areas of the county.

10.2.2 Notice to the Public

CWC 10642

…Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection…Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code…

A copy of the City's 60-day notice of the public hearing is included in Appendix H.

Government Code 6066

Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of

publication and terminates at the end of the fourteenth day, including therein the first day.

The City's public notice of the public hearing will be published in the newspaper on September 15, 2016 and September 22, 2016. A copy of the proof of publications are included in Appendix H.

10.3 PUBLIC HEARING AND ADOPTION

As part of the public hearing, the City will provide information on their baseline values, water use targets, and implementation plan required in the Water Conservation Act of 2009. The public hearing on the UWMP will take place before the adoption of the UWMP, which will allow the City the opportunity to modify the UWMP in response to public input before adoption. The City will formally adopt the UWMP before submitting the UWMP to DWR. A copy of the City's adoption resolution is included in Appendix H.

10.4 PLAN SUBMITTAL

The City's 2015 UWMP will be submitted to DWR within 30 days of adoption. UWMP submittal will be done electronically through WUEdata, an online submittal tool. After the UWMP has been submitted, DWR will review the plan and make a determination as to whether or not the UWMP addresses the requirements of the CWC. The DWR reviewer will contact the water supplier as needed during the review process. Upon completion of the Plan review, DWR will issue a letter to the agency with the results of the review.

No later than 30 days after adoption, the City will submit a CD or hardcopy of the adopted 2015 UWMP to the California State Library.

10.5 PUBLIC AVAILABILITY

Not later than 30 days after filing a copy of its plan with DWR, the City will make the plan available for public review during normal business hours by placing a copy of the UWMP at the front desk of the City's Public Works office, and by posting the UWMP on the City's website for public viewing.

10.6 AMENDING AN ADOPTED UWMP

If the City amends the adopted UWMP, each of the steps for notification, public hearing, adoption, and submittal will also be followed for the amended plan.

APPENDIX A

URBAN WATER MANAGEMENT PLANNING ACT

APPENDIX B

DWR UWMP CHECKLIST ORGANIZED BY SUBJECT

APPENDIX C

POPULATION TOOL DATA FOR SBX7-7 CALCULATION

APPENDIX D

AWWA WATER AUDIT WORKSHEETS

APPENDIX E

DECEMBER 2014 WEST COAST GROUNDWATER BASIN JUDGMENT AMENDMENT

APPENDIX F

SUPPLY CAPABILITY AND PROJECTED DEMANDS FOR SINGLE-DRY YEAR, MULTIPLE-DRY YEAR, AND AVERAGE CONDITIONS FROM 2015 METROPOLITAN URBAN WATER MANAGEMENT PLAN

APPENDIX G

ORDINANCE NO. 15-02, "AN ORDINANCE OF THE CITY OF INGLEWOOD, CALIFORNIA AMENDING SECTION 5-110 OF ARTICLE 7 OF CHAPTER 5 AND ADDING AN ARTICLE 19 TO CHAPTER 10 (PUBLIC WORKS) TO ESTABLISH A WATER CONSERVATION AND WATER SUPPLY SHORTAGE PROGRAM," ADOPTED ON OCTOBER 21, 2014

APPENDIX H

NOTICE OF PUBLIC HEARING AND RESOLUTION FOR PLAN ADOPTION