Appendix L

Water Supply Assessment

THE CITY OF SAN DIEGO

M E M O R A N D U M

DATE: July 17, 2017

TO: Susan Morrison, Associate Planner, Development Services Department

FROM: Shelby Gilmartin, Assistant Engineer - Civil, Public Utilities Department SG

SUBJECT: Water Supply Assessment for Midway-Pacific Highway Community Plan Update (SAP No. 21003875)

In response to your request, please find attached a Water Supply Assessment (WSA) for the Midway-Pacific Highway Community Plan Update (CPU) approved by the Assistant Director of Public Utilities on behalf of the Director of the Public Utilities Department.

The Public Utilities Department (Department) prepared this WSA to assess whether sufficient water supplied is, or will be, available to meet the projected water demands of the CPU. The findings verify that there is sufficient water supply to serve the existing water demands, projected water demands, and future water demands of the CPU within the Department's water service area, in normal and dry year forecasts during a 20-year projection.

If you have any questions, please call me at (619) 533-5454.

SG/kw

cc: Ray Palmucci, Deputy City Attorney, Office of the City Attorney
Lan C. Wiborg, Deputy Director, Public Utilities Department
George Adrian, P.E., Program Manager, Public Utilities Department
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RMU 6.8.4

WATER SUPPLY ASSESSMENT REPORT

Midway-Pacific Highway Community Plan Update

Prepared by:

City of San Diego Public Utilities Department

Reviewed by:

H. Razak for 7/12/17

Halla Razak, Director **Date**
Public Utilities Department

Prepared: July 2017

City of San Diego Public Utilities Department
Water Supply Assessment Report

Midway-Pacific Highway Community Plan Update

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Section 1 - Purpose

On January 1, 2002, Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) took effect. The intent of SB 610 and SB 221 was to improve the link between information on water supply availability and certain land use decisions made by cities and counties. Under SB 610 (codified in the Water Code beginning at Section 10910), a water supply assessment (WSA) must be furnished to cities and counties for inclusion in any environmental documentation of projects (defined in the Water Code) that propose to construct 500 or more residential units, or that will use an amount of water equivalent to what would be used by 500 residential units, and are subject to the California Environmental Quality Act (CEQA). Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply or water supply verification (WSV).

Not every project that is subject to the requirements of SB 610 is subject to the mandatory water verification of SB 221. Conversely, not every project that is subject to the requirements of SB 221 is subject to SB 610.

A foundational document for compliance for both SB 610 and SB 221 is the Urban Water Management Plan (UWMP) of the relevant water agency. Both SB 610 and SB 221 identify the UWMP as a planning document that can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete UWMPs will allow water suppliers to fulfill the specific requirements of the two statutes. Cities, counties, water districts, property owners, and developers utilize their respective UWMPs when planning for and proposing new projects. It is crucial that cities, counties, and water suppliers work together when developing and updating these planning documents. The City of San Diego's 2015 UWMP was developed in collaboration with the San Diego County Water Authority (Water Authority) and adopted by the San Diego City Council in June 2016, and serves as the basis for this Water Supply Assessment Report (Report).

The City of San Diego Development Services Department (DSD) requested that the City of San Diego Public Utilities Department (PUD) prepare this Report as part of the environmental review for the Midway-Pacific Highway Community Plan Update (CPU). A more detailed description of the CPU is provided in Section 2 of this Report. This Report evaluates water supplies that are or will be available during normal, single-dry year, and multiple-dry water years during a 20-year projection to meet the projected demands of the CPU, in addition to existing and planned future water demands of the PUD. This Report provides an assessment of the availability of water supplies for the CPU only, and does not constitute approval of the CPU.

This Report also includes identification of existing water supply entitlements, water rights, water service contracts, or agreements relevant to the identified water supply for the CPU and quantities of water received in prior years pursuant to those entitlements, rights, contracts, and agreements.

This Report has been prepared in compliance with the requirements under SB 610 by the PUD in consultation with DSD, the Water Authority, and the Metropolitan Water District of Southern California (MWD).

Section 2 - Project Description

Midway-Pacific Highway is a centrally located urban community in close proximity to Downtown, the bays and beaches, and the San Diego River. Midway-Pacific Highway encompasses approximately 1,313 acres and is located south of the San Diego River, north of the San Diego International Airport, west of Interstate-5, and several blocks east of Nimitz Boulevard. The community is comprised of three areas: the relatively flat Midway area, the linear Pacific Highway corridor, and the Marine Corps Recruit Depot. The CPU vicinity map is shown in Figure 2-1.

FIGURE 2-1
VICINITY MAP OF CPU

The Midway-Pacific Highway Community was historically an area of tidal marshes and flats where the San Diego River branched and flowed into the San Diego Bay and Mission Bay. A dike was constructed south of the present flood channel to help drain the area.

The first Midway Community Plan was adopted in 1970. The 1991 update to the Community Plan incorporated the Pacific Highway Corridor into the community planning area and removed the West Point Loma Boulevard area.

This CPU serves to address changes in development conditions since the 1991 Community Plan was adopted. The CPU includes modifications to the various elements of the plan to incorporate relevant policies from the City of San Diego General Plan, updated and adopted in 2008, as well as to provide a long-range, comprehensive policy framework for growth and development in the community.

The proposed zoning for Midway-Pacific Highway uses applicable Citywide zoning standards which allow for mixed-use village development and base-sector employment uses, consistent with the proposed community plan land-use designations. A proposed Community Plan Implementation Overlay Zone would allow flexibility in application of development regulations for mixed-use development projects in commercial zones within areas designated for Mixed Commercial Residential use.

Section 3 - Findings

Water Assessment

Project:
This Report identifies that the proposed water demand projections for the CPU are included in the regional water resource planning documents of the City, Water Authority and MWD. Current and future water supplies, as well as actions necessary to develop the future water supplies, have been identified. This Report demonstrates that there will be sufficient water supplies available during normal, single-dry year, and multiple-dry water years over a 20-year projection to meet the unanticipated demands of the CPU.

For the purposes of this Report the drafted CPU will have a housing, household, and employment populations that will not exceed that of the San Diego Association of Governments (SANDAG) Series-13 Forecast (Forecast) for the year 2040 - as demonstrated in Table 3-1 of this Report. The build out of the community plan would occur beyond 2040, consistent with the SANDAG Series 13 Forecast.

TABLE 3-1
WATER DEMAND ANALYSIS

City Planned Water Demands for Project (2015 UWMP)			
Category	**Quantity** (units/employees)	**Estimated Potable Water Demand**	
		Gallons per Day (GPD)	**Acre-Foot per Year (AFY)**
SANDAG SERIES 13: 2040			
Single-Family Units[1]	481	172,968	193.7
Multi-Family Units[2]	4,143	729,168	816.8
Employees[3]	17,939	1,076,340	1,205.7
Total		**1,978,476**	**2,216.2**
Projected Water Demands for Community Plan Update by Year 2040			
Category	**Quantity** (units/employees)	**GPD**	**AFY**
Single-Family Units[1]	481	172,968	193.7
Multi-Family Units[2]	4,143	729,168	816.8
Employees[3]	17,939	1,076,340	1,205.7
Total		**1,978,476**	**2,216.2**
Net Water Demands			
Projected Demand		**1,978,476**	**2,216.2**
City of San Diego 2015 UWMP – Planned Demand		**1,978,476**	**2,216.2**
Water Authority AFG – Planned Demand		0	0
Net Unanticipated Demands		0	0

Table 3-1 Notes:

1. 116 gallons per capita per day (gpcd) is the standard for single-family water consumption (includes small landscaping water demands). The standard for single-family housing density is 3.1 persons per household.
2. 80 gpcd is the standard for multi-family unit water consumption (includes small landscaping water demands). The standard for multi-family housing density is 2.2 persons per unit.
3. The utilization of 60 gallons per person day is the standard for employment water use (includes nominal landscaping water demand).

Existing and Future Developments Planned to occur by 2040:
The City's 2015 UWMP demonstrates there will be sufficient water supplies available to meet demands for existing and planned future developments that are projected to occur by 2040. Based on a normal water supply year, the estimated water supply projected in five-year increments for a 20-year projection will meet the City's projected water demand of 200,984 acre-feet[A] (AF) in 2020 to 273,408 AF in 2040 (**Table 6-6**) for these developments. Similarly, based on a single-dry year forecast (**Table 6-7**), the estimated water supply will meet the projected water demand of 290,292 AF (2040). Based on a multiple-dry year, third year supply (**Table 6-8**), the estimated water supply will meet the projected demands of; 208,665 AF (2020); 251,402 AF (2025); 275,139 AF (2030); 284,412 AF (2035); and 284,058 AF (2040).

Conclusion

In summary, these findings substantiate that there is sufficient planned water supply to serve this CPU's future water demands within the PUD's water service area in normal, single-dry year, and multiple-dry water year forecasts.

Therefore, this Report concludes that the projected level of water demand for this CPU is within the regional water resource planning documents of the City, Water Authority, and MWD. Current and future water supplies, as well as the actions necessary to develop these supplies, have been identified in the water resources planning documents of the PUD, Water Authority, and MWD to serve the projected demands of the CPU, in addition to existing and planned future water demands of the PUD.

[A] An acre-foot of water equals 325,851 gallons, which is enough water for two (2) average families of four (4) for one (1) year.

Section 4 - City of San Diego Public Utilities Department

The City purchased its initial water system in 1901, from the privately owned San Diego Water & Telephone Company. Since then, continual expansion of the water system has been required to meet the demands of the growing population of the City. To meet the demand, the PUD purchased a number of reservoirs between 1913 and 1935 to supplement local water supplies. Despite low annual precipitation in the area (approximately 10 inches per year), these reservoirs supplied the City's growing demands until 1940.

The need to import water emerged with the increased demand generated by the presence of the United States Navy prior to and during World War II, and the ensuing population growth. As a result, the PUD and other local retail water distributors formed the Water Authority in 1944 for the purpose of purchasing Colorado River water from MWD. The PUD and other local retail water distributors began receiving imported water from the Colorado River in 1947.

Today, the PUD treats and delivers more than 155,000 AFY of water to approximately 1.38 million residents. The water system extends over 400 square miles, including 330 square miles in the City. The PUD potable water system serves the City and certain surrounding areas, including both retail and wholesale customers. The Project is located within the PUD's water service area.

In addition to delivering potable water, the City has a recycled water program. Its objectives are to: optimize the use of local water supplies, lessen reliance on imported water, and free up capacity in the potable system. Recycled water provides the City a dependable, year-round, locally produced and controlled water resource.

4.1 Overview of Potable System Facilities

The water system consists of: nine (9) raw water storage facilities with over 569,000 AF of storage capacity, three (3) water treatment plants, 29 treated water storage facilities, and over 3,295 miles of transmission and distribution lines.

The PUD maintains and operates nine (9) local surface raw water storage facilities, which are connected to the City's water treatment operations. The Lower Otay, Barrett and Morena Reservoirs (135,348 AF total capacity) service the Otay Water Treatment Plant (Otay WTP) in south San Diego; the El Capitan, San Vicente, Sutherland, and Lake Murray Reservoirs (396,357 AF total capacity) service the Alvarado Water Treatment Plant (Alvarado WTP) in central San Diego; and the Miramar Reservoir (6,682 AF total capacity) services the Miramar Water Treatment Plant (Miramar WTP) in north San Diego. Lake Hodges Reservoir has a total capacity of 30,632 AF and is connected to Olivenhain Reservoir, which is owned by the Water Authority. Olivenhain Reservoir is connected to the Water Authority's second aqueduct. Through this connection, Hodges water can be delivered to all City treatment plants. The City has the ability to access 50 percent of the local water available in Hodges Reservoir via the Water Authority's delivery system.

The PUD maintains and operates three (3) water treatment plants mentioned above with a combined total rated capacity of 423,637 AFY, or 378.2 million gallons per day (MGD). The Miramar WTP, originally constructed in 1962, has a rated capacity of 161,300 AFY (144 MGD), with the ability to increase to 240,830 AFY (215 MGD) after the replacement of the two (2) old clearwells. Construction to replace the two (2) old clearwells began in June 2016, and is scheduled to be completed in July 2020. The Miramar WTP generally serves the City's geographical area north of the San Diego River (north San Diego). The Alvarado WTP,

operational since 1951, had an initial capacity rating of 134,417 AFY (120 MGD). Several hydraulic improvements and upgrades were completed in 2011, which increased the capacity of the plant to 224,028 AFY (200 MGD). The State Water Resources Control Board (SWRCB) has approved this rating for the Alvarado WTP. The plant generally serves the geographical area from National City to the San Diego River (central San Diego). The Otay Water Treatment Plant (Otay WTP) was constructed in 1940, and has a current rated capacity of 38,309 AFY (34.2 MGD). The Otay WTP has hydraulic capacity to increase to 67,209 AFY (60 MGD) in the future. Upgrade work was completed in 2012, including the construction of a third (3rd) flocculation and sedimentation basin, filter piping, and media improvements. The Otay WTP generally serves the geographical area bordering Mexico (south San Diego) and parts of the southeastern portion of central San Diego.

The PUD maintains and operates 29 treated water storage facilities including steel tanks, standpipes, concrete tanks and rectangular concrete reservoirs, with capacities varying from less than one to 35 million gallons.

The water system consists of more than 3,295 miles of pipelines, including transmission lines up to 84 inches in diameter and distribution lines as small as four (4) inches in diameter. Transmission lines are pipelines 16 inches and larger in diameter that convey raw water to the water treatment plants and convey treated water from the water treatment plants to the treated water storage facilities. Distribution lines are pipelines 16 inches and smaller in diameter that directly service the retail users connected to a meter. In addition, the PUD maintains and operates 49 water pump stations that deliver treated water from the water treatment plants to approximately 279,030 metered service connections in 128 individual pressure zones in the City's retail service area. PUD also maintains several emergency connections to and from neighboring water agencies, including the Santa Fe Irrigation District (connected to Miramar WTP), the City of Poway (connected to Miramar WTP), Olivenhain Municipal Water District (connected to Miramar WTP), the Cal-American Water Company (connected to Alvarado and Otay WTPs), Sweetwater Authority (connected to Otay WTP), and the Otay Water District (connected to Otay WTP).

4.2 Overview of Recycled System Facilities

The City's recycled water system consists of two (2) water reclamation plants with a combined total wastewater treatment capacity of 50,406 AFY (45.00 MGD), and three (3) recycled water storage facilities with over 12 million gallons of storage capacity, and more than 97 miles of transmission and distribution lines.

Located in the Miramar area, the North City Water Reclamation Plant (NCWRP) treats an average of 18,523 AFY (16.49 MGD) of wastewater, and has an ultimate treatment capability of 33,604 AFY (30.00 MGD). In fiscal year (FY) 2016, a total of 6,851 AFY (6.09 MGD) was beneficially reused. The PUD maintains and operates the Northern Service Area distribution system which consists of approximately 94 miles of recycled water pipeline, two (2) storage facilities (reservoirs), and two (2) pump stations. The City has completed Phase II of the 2011 Recycled Water Master Plan, which extends recycled water distribution along the Highway 56 corridor to the Carmel Valley area. By the end of FY 2016, 683 meters were served by the recycled water distribution system. In addition, there are plans to extend the recycled water distribution system through the Sorrento Mesa area, east of Interstate 5 (I-5), and north of Mira Mesa Boulevard. PUD staff continues to work with potential "in-fill" customers interested in using recycled water for irrigation and/or industrial purposes, who are located within close proximity of the recycled water distribution system.

Located at the end of Dairy Mart Road, near the International Border with Mexico, the South Bay Water Reclamation Plant (SBWRP) treats an average of 8,200 AFY (7.30 MGD) of wastewater. The SBWRP has a treatment capability of 16,802 AFY (15.0 MGD). In FY 2016, an average of 3,743 AFY (3.33 MGD) was beneficially reused. The PUD maintains and operates the Southern Service Area distribution system which consists of three (3) miles of recycled water pipeline, one (1) storage tank, one (1) pump station and service to seven (7) meters. Due to the limited size of the distribution system, the majority of the recycled water is sold to the Otay Water District.

Section 5 - Existing and Projected Supplies

The PUD relies on purchased water from a regional wholesale water provider, the Water Authority, as its major water supply source. The Water Authority is a public agency that is governed by its 24 member retail water agencies, including the City of San Diego. The Water Authority maintains a diverse portfolio of water supplies including purchases of imported water from a large wholesale water provider, the Metropolitan Water District of Southern California (MWD). The Water Authority, in turn, is a member agency of MWD and participates in its governance along with 25 other water agencies. The statutory authorities granted to the Water Authority and MWD, establish the scope of the PUD's entitlements to water. Due to the PUD's reliance on purchased water from these two (2) agencies, this Report relies and includes information on the existing and projected supplies, supply programs, and related projects of the Water Authority and MWD.

The City relies on the long-term water resources planning documents of the Water Authority and MWD to support the work on this Report. Each agency must update its Urban Water Management Plans every five (5) years. The 2015 UWMPs were completed and submitted to the State on July 1, 2016, and are the most current point of reference. The 2015 UWMP documents are available at the following websites and contacts:

San Diego County Water Authority – Contact:
Ms. Dana Friehauf, Water Resources Manager (858) 522-6749

http://www.sdcwa.org/uwmp

Metropolitan Water District of Southern California – Contact:
Ms. Grace Chan, Resource Planning & Development Manager (213) 217-6798

http://mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf

Until the 1990s, the Water Authority was 95 percent dependent on imported water supplies from MWD to meet demands in the San Diego region. In 1991, the Water Authority faced a potential 50 percent cutback in supplies from MWD that was abated by the "March Miracle" rains. Immediately following, the Water Authority embarked upon an aggressive water supply diversification strategy coupled with an aggressive water storage program that has resulted in much greater water supply reliability for the region. Additionally, MWD has increased its regional storage ten-fold, and has provided financial incentives towards local water supply development by its member agencies. A brief overview of MWD and the Water Authority, including the PUD relationship to these agencies, is included below.

A description of local surface and local recycled water supplies available to the PUD can be found in Section 5.4 of this Report.

This information was current at the time this document was prepared.

5.1 Metropolitan Water District of Southern California

The MWD was created in 1928, under the authority of the Metropolitan Water District Act[B] (the "MWD Act"). MWD's primary purpose is to provide a supplemental supply of wholesale water for domestic and municipal uses to its constituent agencies. When MWD began delivering water, its service area consisted of approximately 625 square miles. Its service area has increased by 4,575 square miles since that time. The expansion is primarily the result of annexation of the service areas of member agencies.

Today, MWD's service area comprises approximately 5,200 square miles. It includes portions of six (6) counties: Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura. There are 26 member agencies of MWD, consisting of 14 cities, 11 municipal water districts and the Water Authority. The Water Authority is MWD's largest customer, purchasing or exchanging 28.3 percent of all water flowing through MWD's system[C].

A Board of Directors, currently numbering 38 members, governs MWD. Each constituent agency has at least one (1) representative on the MWD Board. Representation and voting rights are based upon the assessed valuation of property within each constituent agency. The Water Authority has four (4) members represented on the MWD Board with 17.47 percent of the weighted vote. The total population of the MWD service area is currently estimated at more than 19 million.

MWD's existing water supplies have been historically sufficient to meet demands within its service area during years of normal precipitation. Although MWD plans and manages reserve supplies to account for normal occurrences of dry conditions, regulatory actions, including, but not limited to, restrictions under the Federal and California Endangered Species Acts, have at times placed limitations on MWD's ability to provide water to its member agencies. Extreme drought conditions have also caused MWD supply restrictions occasionally.

In the future, population growth, regulatory restrictions, and other factors such as climate change could impact MWD's ability to supply its member agencies even in normal years. However, it is important to note that the cost of MWD's water supplies is approaching a point at which the development of local water supplies is increasingly cost-competitive. As such, major initiatives are underway by retail water agencies to develop local water supplies and reduce MWD deliveries. This suggests that a new scenario may be emerging in which MWD may have surplus water supplies on a more regular basis as its member retail water agencies increasingly roll off imported water supplies in favor of available, more reliable, local water supplies.

MWD Water Supply

The Water Authority has preferential rights to 18.42 percent of MWD's water supplies, which currently include water from its two (2) sources, the Colorado River and the State Water Project (SWP).

Colorado River Water

The Colorado River was MWD's original source of water after its establishment in 1928. MWD owns and operates the 242 mile-long Colorado River Aqueduct, which starts at Lake Havasu in Arizona, and terminates at Diamond Valley Lake in Riverside County.

[B] California Statutes 1927, Chapter 429, as reenacted in 1969 as Chapter 209, as amended
[C] http://www.mwdh2o.com/PDF_Who_We_Are/2015-MWD-Annual-Report-web.pdf, page 139

Under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines, collectively known as the "Law of the River," that govern the use of water from the Colorado River, California is entitled to 4.4 million acre-feet of Colorado River water annually. Additionally, California is entitled to one-half (1/2) of any surplus water that may be available for shared use with Arizona and Nevada as determined on an annual basis by the United States Secretary of the Interior. Under the priority system that governs the distribution of Colorado River water made available to California, MWD holds the fourth (4^{th}) priority right of 550,000 acre-feet per year, and a fifth (5^{th}) priority right of 662,000 acre-feet per year. MWD's fourth (4^{th}) priority right is within California's basic annual apportionment of 4.4 million acre-feet; however, the fifth (5^{th}) priority right is outside of this entitlement and is not considered a firm supply of water. MWD also retains a "call" on 100,000 acre-feet per year on water transferred to the Coachella Valley Water District and the Desert Water Agency, if needed, so long as they pay for the financial obligations associated with the water during the call period.

Several fish and other wildlife species either directly or indirectly have the potential to affect Colorado River operations, thus changing the amount of water deliveries to the Colorado River Aqueduct. A number of species that are on either "endangered" or "threatened" lists under the federal and/or California Endangered Species Acts (ESAs) are present in the area of the Lower Colorado River. MWD and other stakeholder agencies have developed a multi-species conservation program that allows MWD to obtain federal and state permits for any incidental take of protected species resulting from current and future water and power operations of its Colorado River facilities, and to minimize any uncertainty from additional listings of endangered species.

In order to maximize the potential for Colorado River supplies, MWD has established partnering opportunities with the Imperial Irrigation District to fund and implement a joint agricultural conservation program.

State Water Project

The State Water Project is owned by the State of California and operated by the State Department of Water Resources (DWR). The SWP's source waters originate in Northern California with water captured from the Feather River Watershed behind Lake Oroville Dam. The Oroville Dam releases water into the Feather River which is tributary to the Sacramento River, where it combines with other drainages from the western Sierras in the Sacramento-San Joaquin River Delta east of the San Francisco Bay Estuary. MWD receives water pumped from the Harvey O. Banks Pumping Plant in the southern portion of the Sacramento-San Joaquin River Delta, via the 444 mile-long California Aqueduct, to four (4) delivery points near the northern and eastern boundaries of MWD. MWD is one (1) of 29 agencies (Contractors) that have long-term contracts for water service from DWR, and is the largest agency in terms of the population served, the share of SWP water to which it is entitled, and the total amount of annual payments made to DWR. MWD's contract with DWR provides for the ultimate delivery of up to 1,911,400 acre-feet per year (46 percent of the total SWP entitlement). The SWP was originally intended to meet demands of 4.2 million acre-feet per year. Initial SWP facilities were completed in the early 1970s, and it was envisioned that additional facilities would be constructed as contractor demands increased. Several factors, including public opposition, increased costs, and increased non-SWP demands for limited water supplies, combined to delay the construction of additional facilities.

The quantity of SWP water available for delivery each year is controlled by hydrology, environmental and operational considerations. In addition to its importance to urban and agricultural water users, the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is of critical ecological importance. The Bay-Delta is the largest estuary on the west coast of the United States and provides habitat for more than 750 plant and animal species. One-hundred-fifty (150) years of human activity have contributed to the destruction of habitat, the decline of several estuarine and anadromous fish species, and the deterioration of water quality. These activities include: increasing water demands from urban and agricultural uses, the dredging and filling of tidal marshes, the construction of levees, urban runoff, agricultural drainage, runoff from abandoned mines, and the introduction of non-native species, thus affecting the supply and reliability of this source.

California Water Fix

The California Department of Water Resources (DWR) is in the process of introducing a plan known as the *California Water Fix.* Which would construct 35 miles of twin tunnels capable of transferring 9,000 cubic feet per second of freshwater from three intake facilities north of the Delta to the expanded Clifton Court Forebay located south of the Delta. There two (2) pumping plants would be constructed to maintain optimal water levels in the forebay for the existing State Water Project (SWP) and Central Valley Project (CVP) pumping facilities to better facilitate water exports during times of large rain events.

The proposed project is expected to provide additional water supply reliability for water importers, although the benefits will still be weather dependent.

DWR has altered the operations of the SWP to accommodate species of fish listed under the ESAs. These changes in project operations have reduced SWP deliveries. The impact on total SWP operations attributable to the ESA listed Delta smelt and salmon species biological opinions combined is estimated to be one (1) million acre-feet in an average year, reducing SWP deliveries from approximately 3.3 million acre-feet to approximately 2.3 million acre-feet for the year under average hydrology. The reduction in SWP deliveries attributable to these biological opinions can vary greatly depending on the level of precipitation and are estimated to range from 0.3 million acre-feet during critically dry years to 1.3 million acre-feet in above normal water years.

The year 2016 proved to be an extremely difficult water year for California as it endured a fifth (5th) year of drought and record high temperatures.

On November 13, 2015, Governor Brown issued Executive Order B-36-15 calling for an extension of urban water use restrictions (based on Executive Order B-29-15) until October 31, 2016, should drought conditions persist through January 2016. The State Water Board modified the restrictions at its February 2, 2016 meeting to allow credit to a water agency's conservation standard for growth, climate and the development of local drought-resilient supplies, with a cap of eight (8) percent total credit. The City of San Diego was credited eight (8) percent for the development of desalinated seawater supplies at Carlsbad. As a result, San Diego's conservation standard was reduced from 16 percent to 8 percent – compared to 2013 water demands. On May 18, 2016 the State Water Board adopted a statewide water conservation approach that allowed urban water supplies to replace their previously assigned reduction target with a local stress test approach, if the supplier could show that they had at least a three (3) year water

supply under extended drought conditions[D]. The City was able to meet the stress test analysis requirements and moved to a zero (0) percent conservation requirement by the State, but locally the City is still enforcing permanent restrictions and conservation as a lifestyle for residents.

The 2016-2017 water year has been unusually wet, with precipitation in most parts of the State trending at levels exceeding the wettest year on record. On January 18, 2017, Governor Brown declared a State of Flood Emergency in 50 counties, including San Diego, as a result of the immense and persistent rain events. On April 7, 2017 Governor Brown declared an end to the drought conditions in California with Executive Order B-40-17, which rescinded the State of Emergency proclamation for most counties[E]. Current prohibitions against wasteful water use practices and requirements for monthly water use reporting remain in place. Executive Order B-37-16 remains in effect and directed State staff to develop a report to the legislature entitled "Making Water Conservation a California Way of Life." The report[F] was finalized in April 2017 and was submitted to the legislature.

5.2 San Diego County Water Authority

The Water Authority service area lies within the foothill and coastal areas of the westerly third (3rd) of San Diego County, encompassing 952,208 acres (1,488 square miles). When the Water Authority was established in 1944, its service area consisted of 94,707 acres. Of the total population of San Diego County, 97 percent live within the Water Authority's service area. Growth has primarily resulted from the addition and annexation of service areas by member agencies. The City, with a population of approximately 1.38 million served and a service area of 210,726 acres, is by far the Water Authority's largest member agency and customer.

The Water Authority's service area is a semi-arid region where the natural occurrence of water from rainfall and groundwater provides a firm water supply for only a small portion of the water demands of the current population. Since 1990, the Water Authority has provided an average of 85 to 91 percent of the water supply within its service area. As a wholesaling entity, the Water Authority has no retail customers, only water delivery, storage and treatment services to its member agencies.

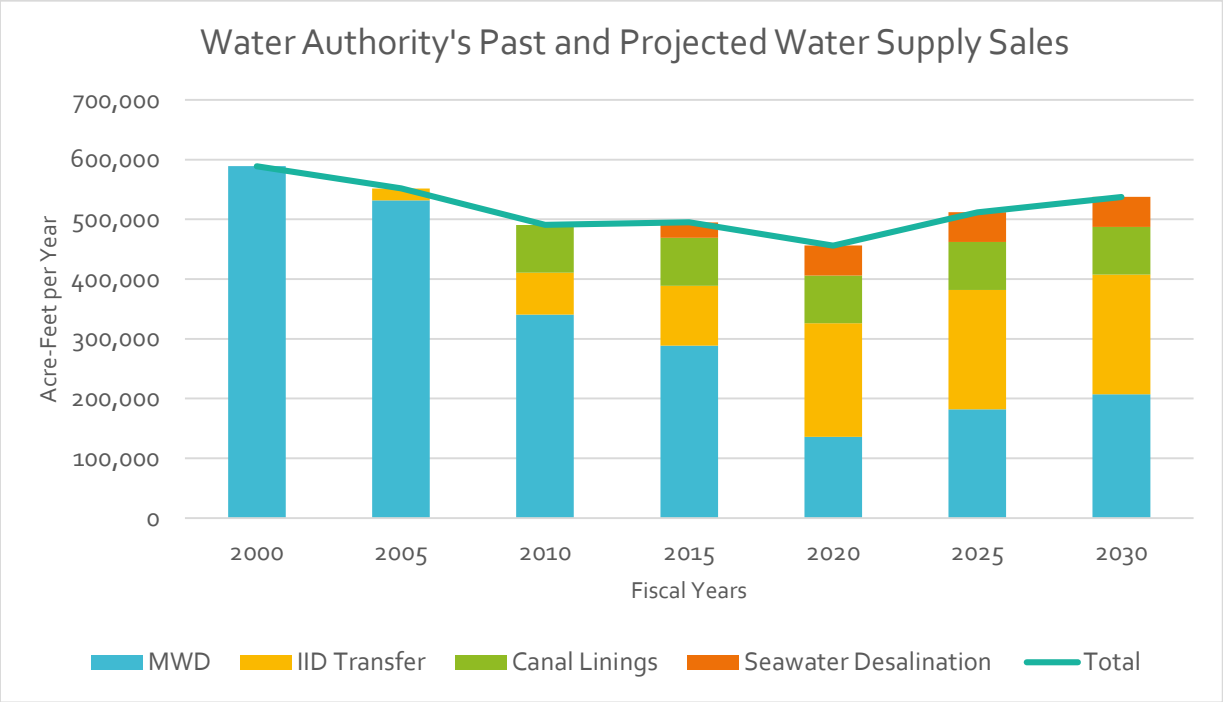
The Water Authority's mission is to provide its member agencies with a safe and reliable water supply. Historically, the principal source of supply for the Water Authority's service area has been water purchased from MWD for sale to the Water Authority's member agencies. However, drought conditions and population growth in the Water Authority's service area have highlighted the need for diversification of the region's water supplies. Consistent with its mission statement, the Water Authority has actively pursued a strategy of supply diversification that includes the acquisition and importation of additional water supplies, the development of additional local water supply projects and augmentation of its water supply via local and regional water storage capacity – as seen in Figure 5-1.

[D] http://www.sdcwa.org/regional-supply-sufficiency

[E] The drought emergency was lifted in all of California counties except Fresno, Kings, Tulare, and Tuolumne, where emergency drinking water projects continue to help address diminished groundwater supplies.

[F] www.water.ca.gov/wateruseefficiency/conservation/

FIGURE 5-1
WATER AUTHORITY'S HISTORIC AND PROJECTED WATER SALES



Sources: Water Authority's 2015 and 2007 Comprehensive Annual Financial Reports (CAFR) and 2015 UWMP

Water supplies utilized within the Water Authority service area originate from two sources: (1) water imported by the Water Authority that is either purchased directly from MWD or from proprietary sources of the Colorado River water that are transported via MWD's conveyance system, and (2) local supplies that are produced by the retail member agencies or is desalinated seawater purchased from Poseidon Water as part of the public-private partnership. Although MWD remains the Water Authority's largest source of water, recent years have also seen the diversification of sources of local and imported water, such that purchases of water from MWD are expected to decrease to represent only 10 to 15 percent of the region's water supply portfolio in 2021.

The Water Authority also invests in water conservation and orchestrates regional responses to drought emergencies. The 2016 demands for water purchased from the Water Authority dropped by 39 percent (or 250,000 AFY) from a high in 2007. As the State of California institutes a long-term framework for water-use efficiency in 2017, it is expected that per capita water use will remain lower than historical averages.

<u>The Quantification Settlement Agreement</u>
The Quantification Settlement Agreement (QSA) for the Colorado River was completed in October 2003. This historic agreement was enacted to help settle disputes regarding the persistent over-drafting of the state's 4.4 million acre-foot basic annual apportionment of Colorado River water. The agreement includes a long-term transfer of conserved water from the Imperial Irrigation District (IID) to the Water Authority. The QSA also commits the state to a restoration path for the environmentally sensitive Salton Sea and provides full mitigation for these water supply programs. Specific programs under the QSA that directly benefit the Water Authority include the Water Authority-IID water transfer agreement, which currently transfers 100,000 acre-feet of high priority Colorado River water to the Water Authority and

will provide up to 200,000 acre-feet of water a year through water conservation measures in Imperial Valley in 2021. The QSA also allows for the transfer of water from the IID for water conserved through the implementation of the Water Authority performed projects to install concrete linings on portions of the previously earthen All-American and Coachella Canals. The canal lining projects reduced the losses of water that historically occurred through seepage. MWD assigned to the Water Authority its right to develop approximately 77,700 acre-feet of conserved Colorado River water annually.

The QSA ensures that the San Diego region receives a minimum of 75 years of stable Colorado River water supplies. On November 5, 2003, the IID filed a validation action in Imperial County Superior Court, seeking a judicial determination that 13 agreements associated with the Water Authority-IID water transfer and the QSA are valid, legal and binding. Other lawsuits also were filed contemporaneously challenging the execution, approval and implementation of the QSA on various grounds. All of the QSA cases were coordinated in the Sacramento Superior Court. A final judgment, invalidating 11 of the 13, agreements in Phase 1 of the trial was entered on February 11, 2010, and subsequently appealed. On December 7, 2011, the Court of Appeal issued its opinion reversing the judgment and remanding to the trial court for further proceedings. The appellate Court decision resolved many issues in the case, including the validity and constitutionality of the QSA. A trial on compliance with the California Environmental Quality Act was held in November 2012. On June 4, 2013, the court validated the 2003 QSA and related 12 agreements regarding transfers and exchanges of Colorado River water between southern California water agencies. The IID, Coachella Valley Water District, MWD, and Water Authority all sought validation of the agreements from the court under California Water Code section 22762 and California Code of Civil Procedure section 860 et seq., quantifying the amount of Colorado River water each agency may divert and subsequently transfer. The court found the agreements to be valid and adopted in compliance with the requirements of the Brown Act and the California Environmental Quality Act (CEQA).

Conserved Water from Canal Lining Projects

In 2003, as part of the execution of the QSA on the Colorado River, the Water Authority contracted for 77,700 AFY of conserved water from projects to line the All American Canal (AAC) and Coachella Canal (CC). Deliveries of this conserved water from the CC reached the region in 2007, and deliveries from the AAC reached the region in 2010.

Seawater Desalination

In late November 2012, the Water Authority's Board of Directors approved a 30-year Water Purchase Agreement with Poseidon Water, a private investor-owned company, to purchase water from the proposed Carlsbad Desalination Plant, which is a fully-permitted ocean desalination plant and conveyance pipeline. The plant began producing 50 MGD in December 2015, and is now operating at full-scale. The Water Authority has contracted to purchase between a minimum of 42,000 AFY and a maximum of 50,000 AFY while two of the Water Authority's retail member agencies (Carlsbad and Vallecitos MWD) have contracted to purchase 6,000 AFY, for a total available production of 56,000 AFY.

In addition to developing its own regional supplies of water, the Water Authority has also encouraged the development of additional local water supply projects such as water recycling and groundwater projects, through the award of Local Water Supply Development (LWSD) incentives of up to $200 per acre-foot for recycled water and groundwater produced and beneficially reused within the Water Authority's service area. The purpose of the Water Authority's LWSD program is to promote the development of cost-effective water recycling and groundwater projects that prevent or reduce a demand for imported water and improve regional water supply reliability. The LWSD Program reimburses member agencies for all, or a

portion of the difference between the actual per acre-foot cost of producing recycled water, and the revenue generated by the LWSD participant through the sale of that acre-foot of recycled water (not to exceed $200 per acre-foot). In February 2008, the program was expanded to include funding for local brackish and seawater desalination projects. However, funding for new LWSD program projects is no longer appropriated in the Water Authority's budget.

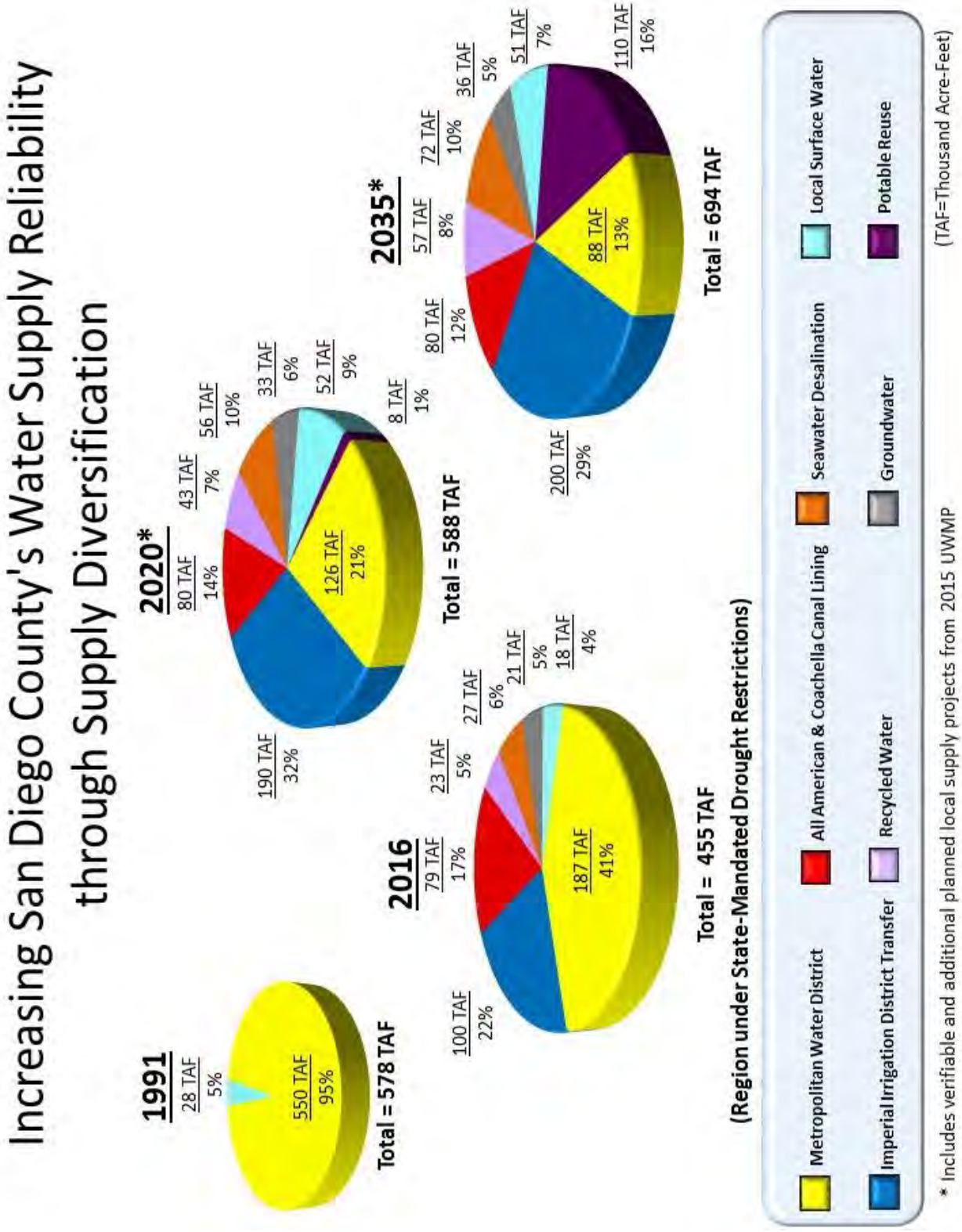
Emergency and Carryover Storage Programs

In addition to the region's investments in new supplies, the Water Authority has also undertaken a multi-phased Emergency Storage Program (ESP) aimed at increasing the amount of water available in storage to help attenuate dry year availability of water. In 2003, the Water Authority completed construction of a dam, creating the Olivenhain Reservoir that created 24,000 AFY of emergency storage capacity. In 2015, the Water Authority raised the City owned and operated San Vicente Dam, to increase emergency and carryover storage in the region by 176,000 acre-feet (AF). The additional in-region storage capacity will allow the Water Authority and its member agencies to be prepared for emergency conditions and also to buffer against dry year reductions in deliveries from imported supplies. Additionally, the Water Authority has rights to an additional 70,000 AF of groundwater storage in the Central Valley. These accounts with the Semitropic-Rosalind Water Bank Authority and the Semitropic Original Water Bank allow for annual withdrawals of 14,000 AFY.

As a result of the efforts undertaken by the Water Authority and its member agencies to diversify supplies and augment local storage, the region was able to certify supply sufficiency and achieve a zero percent conservation standard in response to the State Water Board's May 18, 2016 adopted rule requiring stress test analyses[E].

[G] http://www.sdcwa.org/regional-supply-sufficiency

FIGURE 5-2
SAN DIEGO COUNTY WATER AUTHORITY'S WATER SUPPLY DIVERSIFICATION



5.3 2009 Comprehensive Water Package

On November 4, 2009, the California State Legislature passed a comprehensive package of water legislation (the "2009 State Water Legislation") that included five (5) bills (four (4) of which were subsequently signed by Governor Schwarzenegger) addressing California's statewide water situation, with particular emphasis on the San Francisco Bay/Sacramento-San Joaquin-Delta (Bay-Delta). The 2009 State Water Legislation included an urban water conservation mandate of 20 percent for most localities in the State by 2020 (also known as the "20x2020 requirement"), and new regulations establishing strategic monitoring of groundwater levels around the state. The 2009 State Water Legislation also created two (2) new governmental agencies – the Delta Stewardship Council and the Sacramento-San Joaquin Delta Conservancy. The Delta Stewardship Council is charged with developing and implementing a Delta Plan, which would include the Bay Delta Conservation Plan, upon meeting certain conditions. The Sacramento-San Joaquin Delta Conservancy will implement ecosystem restoration activities in the Bay-Delta. In addition, the 2009 State Water Legislation included legislation addressing unauthorized Bay-Delta water diversions. At this time, it is not known what effect the 2009 State Water Legislation will have on future water supplies.

Additionally, the 2009 Legislation package included an $11.1 billion State general obligation bond measure. The water bond measure was originally certified to be on the State's 2010 ballot, but was subsequently pulled due to unfavorable public polling. That same bond measure was subsequently delayed twice. During the previous 2013-2014 legislative session, several bills were introduced with the intent of reducing and reconfiguring the dedicated expenditures in the original water bond measure. In late 2014, the legislature introduced the "Water Quality, Supply, and Infrastructure Improvement Act of 2014," which proposed a trimmed down version of the 2009 bond measure for a total of $7.5 billion. It was subsequently placed on the November 4, 2014 statewide ballot as Proposition 1, and approved by voters. Proposition 1 is a general obligation bond measure to fund a variety of state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration. The bond funds will be distributed through a competitive grant process overseen by various state agencies, including the DWR, the SWRCB, and the California Water Commission. The State is in the process of developing and adopting guidelines for the various funding programs contained in Proposition 1. Some have been completed (such as the Water Recycling Funding Program/WRFP), and others are still in development (such as the Water Storage Investment Program/WSIP).

5.4 Public Utilities Department

The PUD currently purchases approximately 90 percent of its water from the Water Authority, which supplies the water (raw and treated) through two (2) aqueducts consisting of five (5) pipelines. While the PUD imports the majority of its water, it also uses four (4) local supply sources to meet or offset potable demands: local surface water, groundwater, conservation, and recycled water (Figure 5-2).

The adequacy of water supplies to serve existing and planned uses within the PUD's service area is demonstrated in the prior discussion on the water supply reliability of MWD and the Water Authority. The City has been receiving water from the Water Authority since 1947, and purchased between 155,300 and 228,300 AFY during the past 20 years. In CY 2016 water

purchases totaled approximately 155,300 AF. Depending on demands, growth and the success of local water supply initiatives, the volume purchases may remain constant, or increase to a projected maximum of 295,998 AFY in 2035 during normal years. For the purpose of this analysis the maximum is used.

5.4.1 Demonstrating the Availability of Sufficient Supplies

Imported Supplies

Section 5, Subdivision 11, of the County Water Authority Act, states that the Water Authority "as far as practicable, shall provide each of its member agencies with adequate supplies of water to meet their expanding and increasing needs." Depending on local weather and supply conditions, the Water Authority provides between 75 to 95 percent of the total supplies used by its 24-member agencies.

Local Surface Water Supplies

The PUD maintains and operates nine (9) local surface raw water storage reservoirs which are connected directly or indirectly to water treatment operations. In the San Diego region, approximately 13 percent of local precipitation produces surface run-off to streams that supply PUD reservoirs. Approximately half of this run-off is used for the municipal water supply, while the remainder evaporates during reservoir storage. In very wet years, the run-off remainder may spill over the reservoir dams and return to the Pacific Ocean. Average rainfall produces less than half (1/2) of the average run-off in San Diego. The local climate requires about average rainfall to saturate the soils sufficiently for significant surface run-off to occur. Therefore, most of the run-off to reservoirs is produced in years with much greater than average rainfall. Some flooding may occur even during average or below average rainfall years if the annual rainfall is concentrated in a few intense storms.

The use of local water is affected by availability and water resource management policies. The PUD's policy is to use local water first to reduce imported water purchases and costs. The PUD also operates emergency and seasonal storage programs in conjunction with its policy.

The purpose of emergency storage is to increase the reliability of the water supply system. This is accomplished by maintaining an accessible amount of stored water that could provide an uninterrupted supply of water to the City's water treatment facilities, should an interruption to the supply of imported water occur. The management of reservoirs is guided by Council Policy 400-04, which outlines the City's Emergency Water Storage Program. The policy mandates that the PUD store sufficient water in active, available storage to meet six-tenths (6/10) of the normal annual (7.2 months) City water demand requirements (conservation is not included). Active, available storage is that portion of the water that is above the lowest usable outlet of each reservoir.

The volume specific to the emergency storage requirement is adjusted monthly, based on the upcoming seven (7) months' anticipated water demand. This results in a seasonally fluctuating emergency storage requirement, generally peaking in April and reaching its minimum in October. This seasonally fluctuating requirement makes a portion of the required emergency storage capacity available for impounding or seasonal storage.

The purpose of seasonal storage is to increase imported water supply. This is done by storing surplus imported water in the wet winter season for use during the dry summer season. This may also be accomplished by increased use of imported water in lieu of local water in the

winter when local water may be saved in reservoirs or groundwater basins for summer use. In addition to increased water yield, this type of seasonal operation also reduces summer peaking on the imported water delivery system.

Conservation

The PUD's Water Conservation Program is effective in promoting permanent water savings. Established by the City Council in 1985, the Water Conservation Program accounts for more than 37,445 acre-feet of potable water savings in FY 2016. This savings has been achieved by creating a water conservation ethic, adopting programs, policies and ordinances designed to promote water conservation practices, and implementing comprehensive public information and education campaigns.

The City offers a broad range of conservation methods to help meet the needs of our residential and commercial water customers. These include, but are not limited to, the following:

- Rebate programs for high efficiency toilets, washing machines and residential and commercial water saving devices
- Rebates for replacing grass with water wise landscapes, micro-irrigation systems and weather based irrigation controllers
- Rain barrel and downspout redirection rebates
- Graywater rebates
- Incentives to replace malfunctioning pressure regulating valves
- Indoor commercial water use surveys
- Residential interior/exterior and commercial landscape survey programs
- Public education and outreach

Research conducted by the City, the Water Authority, and the Water Research Foundation has shown that prior to the current drought, more than half (1/2) of residential water-use is outdoors. Therefore, the City implemented outdoor water conservation programs to focus on water efficient landscaping and irrigation management, which provides the best opportunity to achieve significant water savings.

Tools and services available for customers include:
Commercial and Residential Water Use Survey Programs: This service includes an account for all water-use on the property. The surveyor also checks to see if the irrigation system is functioning properly and for uniform coverage. On average, residential surveys result in a savings in water of 15 percent, while commercial surveys, depending on type of facility, can achieve 15 to 25 percent water savings.

Together with the Transportation & Storm Water Department, the PUD has implemented a popular rain barrel and downspout redirect rebate program. Rain barrels are used to collect rainwater from hard surfaces such as household rooftops, while downspout redirects are used to channel rain water to landscape areas rather than draining into the streets. When citizens install a rain barrel at their home, they are helping to maintain a healthy urban watershed by reducing the demand on the potable water system, while also reducing the amount of wet weather runoff that is collected and sent into the public storm water system.

'San Diego Municipal Code (SDMC) 67.06 Water Submeters' was adopted in April 2010, to encourage water conservation in multi-family residential and mixed use buildings by requiring the use of water submeters for each individual residential unit. Billing individual

residential units based on the actual amount of water consumed in the unit creates a financial incentive for residents of multi-family residential units to conserve water.

As discussed in Section 5.1, the SWRCB revised the City's conservation requirement in February and May 2016. However, the City continues to maintain an active water conservation program, which has consistently resulted in water savings when compared to the baseline usage in 2013.

Planning efforts to increase water conservation is an ongoing process. The aforementioned water conservation programs undergo periodic reevaluation to ensure the realization of forecasted savings. Additionally, changes in water conservation technologies may require reassessment of long-range plans. The PUD continues to work with proven water conservation programs, while including irrigation management programs to maximize water savings; regularly examines new technologies and annually assesses progress toward conservation goals; and, continues to work collaboratively with MWD and the Water Authority to formulate new conservation initiatives. The City's most recent water conservation report, is available at http://www.sandiego.gov/water/pdf/purewater/2014/fy14annualwater140101.pdf. The report provides an ongoing assessment and status update, redirecting or enhancing efforts as needed.

Recycled Water Supplies

In FY 2016, the beneficial reuse of the recycled water was 10,278 AF (6,719 AF from the NCWRP and 3,559 AF from the SBWRP). Landscape irrigation continues to be the leading use of the recycled water, however, the customer base has become more varied over the years with an increase in the number of industrial and dual plumbed meter connections.

Proactive marketing activities targeting existing irrigation customers to encourage them to convert their cooling systems to recycled water, coupled with outreach efforts to connect new customers have been successful. Recycled water meter connections have increased over 63 percent since 2007. By the end of FY 2016, the City is providing recycled water service to 685 retail meters and five (5) wholesale meter connections, including the City of Poway, Olivenhain Municipal Water District (three (3) connections) and Otay Water District. The FY 2016 top 10 retail customers included: the City's Park & Recreation Department, Santaluz Golf Course, Miramar Marine Corps Air Station, Black Mountain Ranch and Del Sur Community Home Owners Association (HOA), El Camino Memorial Park, California Department of Transportation (Caltrans), the Irvine Company, University of California, San Diego (UCSD), Village Nurseries, and La Jolla Colony Association.

In FY 2016, financial incentives from the sale of recycled water resulted in over $1.9 million in savings towards imported water purchases. The financial incentives are a result of the Local Water Supply Development Program and the Local Resources Program agreements with the Metropolitan Water District and the San Diego County Water Authority.

The PUD, in cooperation with the Park & Recreation Department, has aggressively pursued the retrofitting of City parkland, street landscaping and open space to use recycled water for irrigation. Sites fronting recycled water distribution pipelines were targeted. Compared to 2007, where only 23 recycled water meters were serving City sites, by the end of FY 2016, the number has grown to 113 meter connections.

Groundwater Supplies

There are several groundwater basins in the San Diego region that PUD is planning to develop or is developing for municipal water supply or other beneficial use. Due to the recent addition of groundwater to PUD's water diversification portfolio, the annual groundwater that can be beneficially used is 500 AFY, which began in the year 2010 and has remained constant since. Currently, this usage is estimated to remain constant into the future.

Public Utilities Department's Capital Improvement Program

The PUD reevaluates the Water projects contained in the Capital Improvements Program (CIP) and the timing thereof periodically. Changes to the CIP are made to reflect changing priorities within the water system and occur as a result of project scope changes, date revisions, project sequencing, and operational considerations. The PUD expended approximately $813 million from July 1, 2007, through June 30, 2016 on CIP projects. Improvements included projects to upgrade and expand water treatment plants, rehabilitate raw and treated water storage facilities, construct major transmission pipelines, replace and/or upgrade existing pump stations, replace cast iron water mains citywide, expand the recycled water system, and other new supply initiatives. In November 2015, the City Council adopted water rate increases of 9.8 percent that began on January 1, 2016, and subsequent water rate increases of 6.4 percent that began on July 1, 2016. These rate increases will provide needed revenue to fund the upgrade and expansion of the water system in order to ensure a reliable water supply for all City residents, and to meet the SWRCB mandates.

The PUD updated the Water Facilities Master Plan in December 2015, and has identified 93 projects through the master planning effort for CIP implementation from fiscal years 2016-2035. The prioritization of CIP projects is based on City Council Policy 800-14.

Summary of Supplies

Historic imported water deliveries from the Water Authority to the PUD and local surface water, groundwater, conservation savings and recycled water deliveries are shown in **Table 5-1.**

Table 5-1
Historic Imported, Local and Recycled Water Demands*
Public Utilities Department

Fiscal Year	Imported Water (acre-feet)	Local Surface Water (acre-feet)	Conservation[1] (acre-feet)	Recycled Water (acre-feet)	Groundwater (acre-feet)	Total[2] (acre-feet)
1990	233,158	22,500	-	-	-	255,658
1995	162,404	59,024	8,914	-	-	230,342
2000	207,874	39,098	17,410	3,250	-	267,632
2005	204,144	26,584	29,410	4,294	-	264,432
2010	188,337	13,117	34,317	12,173	500	248,444

Table 5-1 Notes:
[1]Conserved water results in savings and is not a direct supply.
[2]Total includes water supplied and conserved.
*Includes retail and wholesale demands.

5.4.2 Plans for Acquiring Additional Supplies

Future Supplies

On December 10, 2013, the City Council approved 2012 Long-Range Water Resources Plan (2012 LRWRP), which is a high level strategy document that evaluates water supply and demand-side objectives against multiple planning objectives. The 2012 LRWRP was crafted based on a stakeholder-driven process that evaluated over 20 water supply options such as water conservation, recycled water, groundwater storage, brackish groundwater desalination, rainwater harvesting, graywater and potable reuse. The plan takes a long-range viewpoint through the year 2035 in addressing risk and the uncertainty of future water supply conditions. It is a plan that sets the tone or direction of where the City places its efforts in developing local water supplies.

Conservation and water recycling programs have been implemented and are under investigation for ways to be expanded or increased. The PUD is also actively developing groundwater resources and potable reuse.

Conservation

Like many agencies in California, the City is committed to reducing its per capita water consumption by at least 20 percent by the year 2020. Aside from the existing programs listed in Section 5.4.1 of this report, the City is also implementing the following programs to help reduce overall water consumption:

Conservation-oriented rate structures: A new rate structure, which took effect in January 2014, added a fourth (4^{th}) new tier for single-family residential customers that recognizes water conservation efforts, and increases the rates for higher tiers to discourage high volume usage. The City Council voted to maintain this four (4) tier residential rate structure through FY 2019.

Advanced Metering Infrastructure (AMI): The PUD has completed the installation of a citywide AMI fixed network, and the installation of all AMI meters is expected to be completed by February 2018. Data from the AMI system/endpoint became available to customers and customer service staff in July 2016. This information gives customers an additional tool to manage their water use and help detect leaks.

Potable Reuse / San Diego Pure Water

The City has taken multiple actions in recent years to investigate and expand its recycled water use. Based on the past recycled water investigations, the City has developed long-term water resources strategies that recommended the maximization of recycled water to be most cost-effectively achieved through potable reuse.

Potable Reuse is an approach the City is considering for maximizing the use of recycled water. Recycled water that is used for non-drinking uses, like irrigation and industrial processes, would undergo advanced water purification (AWP) to render it safe for reuse as a drinking water supply. The AWP process uses multiple treatment barriers to remove contaminants from the water and prevent them from re-entering the water supply. It begins with membrane filtration, followed by reverse osmosis, and ends with advanced oxidation. The result is purified water that meets all drinking water standards, and is similar in quality to distilled water. There are two (2) major types: Indirect Potable Reuse (IPR) and Direct Potable Reuse

(DPR). With IPR, the purified water is sent to an environmental buffer; for the City's IPR concept, San Vicente Reservoir would be the environmental buffer. The water in San Vicente is treated at a drinking water treatment plant before it is distributed for drinking purposes. Direct potable reuse differs in that there is no environmental buffer. The SWRCB is mandated to determine the feasibility of establishing DPR regulations. Industry experts expect that DPR regulatory criteria to include the use of additional treatment or engineered storage barriers to compensate for the absence of an environmental buffer. The City is monitoring the development of DPR regulations and how they might influence the viability of potable reuse implementation.

In order to assess the feasibility of indirect potable reuse with reservoir augmentation (IPR/RA), the City initiated a Water Purification Demonstration Project (Demonstration Project). The Demonstration Project evaluated the feasibility of using AWP technology to produce water that can be sent to a reservoir, undergo further treatment at a water treatment plant, and later be distributed as potable water. As part of the Demonstration Project, the City tested and operated a one (1) MGD demonstration-scale AWP Facility from June 2011 to August 2012. The purified water was routinely tested to determine the effectiveness of the treatment equipment, and operating data was gathered to develop a cost estimate for full-scale facilities. A study of San Vicente Reservoir was also conducted to establish residence time and short circuiting conditions of the purified water in the reservoir. An extensive public outreach and education program was implemented to educate the public about the potential benefits and implications of an IPR/RA project. The City also coordinated with the State's regulatory agencies to help define the requirements for an IPR/RA project.

The Final Project reports have been completed and are available at the following link: www.purewatersd.org/projectreports. The Demonstration Project reports were presented to full City Council on April 23, 2013. The City Council adopted the Demonstration Project Reports, and directed staff to determine a preferred implementation plan and schedule that considers potable reuse options for maximizing local water supply and reduced flows to the PLWTP. This continuation of effort, now known as the Pure Water San Diego Program (Pure Water), is described in more detail below.

Pure Water is a multi-year program which culminates in the year 2035. The program will create a safe and reliable local water supply through potable reuse, while reducing PLWTP's ocean discharges.

Using the technology and process developed in the Demonstration Project (described above), recycled water would undergo AWP to render it safe for use as a raw water supply.

Pure Water will be implemented in two (2) or three (3) phases. The first (1st) phase consists of 30 MGD advanced water purification facility will be located in the northern part of the City. The other two (2) phases may be located either all in the central area, or may be split between central and southern areas. Decision on the location for phase two (2) will be made once evaluations of benefits and challenges associated with each location is determined. Under all scenarios the water will be treated again at a drinking water plant before being distributed for consumption.

Other ongoing Pure Water work includes designing the treatment and conveyance facilities, finalizing the method for water-wastewater cost allocation, continued outreach and education, and collaborating with regulatory and other key stakeholders.

The City's application for a modified National Pollution Discharge Elimination Permit (modified permit) for the PLWTP was received by the USEPA and the Regional Water Quality Control Board (RWQCB) in January 2015. The current permit expired on July 31, 2015. In the interim, regulators administratively continue the present permit until final action on the renewal is taken. On October 28, 2016, the USEPA and RWQCB announced their tentative decision to approve the renewal of the modified permit, citing the benefits of Pure Water as a new source of potable water, while also reducing the discharge to the ocean. This action initiated the public hearing process that will culminate in a final decision expected by mid-2017. Pure Water is integral to both the application to renew PLWTP's permit and the proposed permanent solution for future permits to be considered a secondary equivalent.

This comprehensive effort will provide a secure and reliable long-term local water supply for San Diego, while resolving the decades long issues associated with PLWTP.

Groundwater

There are several groundwater basins in the San Diego region that the City has water rights, concerns, jurisdiction and an interest in developing for municipal water supply or other beneficial use. These basins are:

- San Pasqual Valley Basin
- Mission Valley Basin
- Santee/El Monte Basin
- Coastal Plain of San Diego (formerly known as the San Diego Formation, which includes the Sweetwater Valley Basin, Otay Valley Basin, and Tijuana Basin)[F]

The City of San Diego is committed to protecting its groundwater resources and preserving its established Pueblo water rights throughout the San Diego River Basin and in the San Diego Formation, which extend outside the municipal boundary. This right attaches to it, the use of all surface waters and groundwater of the streams that flowed through the original pueblo, including their tributaries, from their source to their mouth. The City's Pueblo right protects its ability to extract water from the basin to the extent of the needs of its inhabitants.

The City is presently assessing the development of all of its groundwater resources. While the City has no immediate plan to extract basin groundwater, it has stated its intent to develop the right and has asserted its right to develop any and all available groundwater needed for its inhabitants. The location of groundwater wells throughout the basin can be viewed as evidence of the City's intent, ability and preliminary efforts to develop basin groundwater resources.

The groundwater quality from these basins is predominantly brackish. Technological improvements over the last few decades have enhanced the treatability of certain water sources, such as brackish groundwater, and reduced the associated costs. Groundwater development is part of the City's planning effort and remains a viable and economic water resource. Local water supply projects, particular groundwater exploration, offer multiple

[H] A Basin Boundary Modification was submitted to the California Department of Water Resources (DWR) requesting a modification to the boundaries of the Sweetwater Valley, Otay Valley, and Tijuana Valley groundwater basins as defined by DWR Bulletin 118. The modification was approved July 2016, and the three (3) basins were consolidated to include the whole of the underlying San Diego Formation aquifer as a 'new' groundwater basin – referred to as the "Coastal Plain of San Diego."

benefits to City rate payers; including, protection against drought, interruptions in imported water supplies, and local control.

The City is the Monitoring Entity for the San Pasqual Valley Basin as identified by the California Statewide Groundwater Elevation Monitoring (CASGEM) program. Working cooperatively with the DWR, the City established a network of monitoring wells for CASGEM to regularly and systematically track seasonal and long-term trends in groundwater elevations for this alluvial groundwater basin. Included in the monitoring network plan are three (3) multi-level monitoring wells that were installed by the United States Geological Survey (USGS) under a cooperative agreement with the City. Participation in the statewide CASGEM program allows basin groundwater data to be maintained and readily available through DWR's public data base.

Furthermore, the Sustainable Groundwater Management Act (SGMA) of 2014 provides a framework for sustainable management of groundwater supplies by local authorities. Under guidance of DWR, local agencies involved in SGMA implementation must form local groundwater sustainability agencies by mid-2017. For agencies in basins deemed high or median priority, groundwater sustainability plans (GSPs) must be adopted by 2022. GSPs for critically overdrafted basins must be adopted by 2020. By 2040, groundwater agencies in critically overdrafted basins should achieve sustainable groundwater management to avoid undesirable results, such as chronic depletion of groundwater, reduction of groundwater storage, degradation of water quality, depletion of surface water, or subsidence.

In general, the groundwater basins in the San Diego region are characterized by stable groundwater levels, with a notable exception in the San Pasqual Valley Basin. Groundwater quality in the San Diego region is often brackish, with total dissolved solids, chloride, and sodium impairing its use as a potable supply.

Groundwater Basin Descriptions

<u>San Pasqual Valley Basin</u>
The San Pasqual Valley Basin is an alluvial aquifer that underlies the designated agricultural preserve San Pasqual Valley. San Pasqual Valley Basin is valued for its groundwater and surface water resources. Nearly all the land overlaying San Pasqual Valley Basin is owned and managed by the City. Much of this property is leased to individuals for various agricultural and commercial land uses. The San Pasqual Valley Basin is located approximately 25 miles northeast of downtown San Diego. The total surface area of the groundwater basin is approximately 4,540 acres, with storage capacity of 58,000 acre-feet, and a safe yield of approximately 5,800 acre-feet per year.

The City has completed several feasibility studies to understand the enhancement of the long-term sustainability and quality of surface and groundwater within the basin. Currently, the City is exploring synergistic opportunities for regional water use amongst North County agencies and water districts surrounding the San Pasqual Valley Basin. The City continues to explore opportunities for protecting the groundwater resources for beneficial uses, including: water supply, agriculture, and the environment.

<u>Mission Valley Basin</u>
The City has been investigating the Mission Valley Basin. Topographically, Mission Valley is a narrow, east-west trending valley carved out by the San Diego River as it drains westward from Mission Gorge to the Pacific Ocean. The most conducive portion of the aquifer lies within

the extent of a historical well field where the City has retained ownership of the property and where a substantial portion is overlain by Qualcomm Stadium and its parking lot.

In 1963 a fuel tank farm was built in Mission Valley at the mouth of Murphy Canyon, known as Mission Valley Terminal (MVT). Underground fuel contamination was suspected to begin in 1986. From 1986 to 1991, approximately 200,000 gallons of gasoline was released underground from the MVT located upstream of Qualcomm Stadium and contaminated the aquifer. The contamination extended from the tank farm, beneath Qualcomm property, to approximately where Interstate 805 crosses the San Diego River. Although remediation of the Mission Valley Basin has been ongoing for a period of time, the City is waiting for remediation to be complete before resuming its plans for development of the aquifer for municipal supply. The City settled litigations regarding the spill in June 2016.

Santee / El Monte Basin

The City has been producing groundwater from the Santee/El Monte Basin, which is located in the upper reach of the San Diego River. The City's existing San Vicente production well was constructed in 2004 and pumps a maximum of 600 gallons per minute. The well conveys groundwater directly to the City's existing raw water line and ultimately to the City's Alvarado Treatment Plant.

San Diego Formation

The San Diego Formation is a coastal plain, groundwater basin covering much of National City and the City of Chula Vista in the southern portion of San Diego County. The San Diego Formation is a confined groundwater basin that underlies the Otay Valley Basin, Sweetwater Valley Basin, and Tijuana Basin as identified by DWR in Bulletin 118. The City desires to use the San Diego Formation for groundwater municipal supply and seeks to manage the safe yield of the groundwater system in a prudent and efficient manner.

The City has been investigating the San Diego Formation for many years to gain a better understanding of the Basin and its possibilities. The City has been better able to characterize the water quality and quantity in the San Diego Formation through aquifer testing and monitoring well installation that have occurred since 2007. In addition, the City has been working with the USGS to develop an integrated and comprehensive understanding of the geology and hydrology of the San Diego Formation, and to use this understanding to evaluate a sustainable, long-term environmentally sound use of the basin for municipal supply.

In 2013, Sweetwater Authority reached an agreement with the City to share potable water from the Richard A. Reynolds Desalination Facility, after its expansion, and jointly fund the project. This project proposes to increase the capacity of the brackish groundwater desalination facility from 3,600 AFY to 8,800 AFY. Under the terms of this agreement, the City will receive 50 percent of any water produced over 3,600 AFY at the facility. Beginning in 2020, the projected volume will be approximately 2,600 AFY. Even with the projected supply reaching 2,600 AFY, the City is assumed to average 1,900 AFY. Sweetwater Authority will be responsible for owning, constructing, and operating the brackish groundwater desalination facility.

Section 6 - Projected Demands

Approximately every three (3) years the PUD calculates projected water demands within its service area for planning purposes. A computer model is used (IWR-MAIN) to break down water-use by four (4) major sectors: commercial, industrial, residential and public uses. Using past water-use data from the PUD and demographic data provided by SANDAG land use, the model is able to correlate the data to determine sector water demands. Using this correlated data, forecasted demographic data is used to project water demands. The model also accounts for water conservation, weather and water rate changes.

In addition to the PUD, the Water Authority and MWD use regional growth forecasts to calculate projected water demands within their respective service areas. This provides for consistency between the retail and wholesale agencies projected water demands, thereby ensuring that adequate supplies are being planned for the PUD's existing and future water users. The SANDAG forecasts are based on adopted community plan land use, but not citywide zoning. SANDAG forecasts the number of residents, dwelling units, and employees in an area, but not square footage, hotel rooms, or visitors (non-residents or non-employees). For urban areas the smallest forecast geography is typically at the block level, but the forecast geography can be larger for suburban and less developed areas. SANDAG typically updates the regional growth forecast every 3 to 4 years.

The PUD water demand projections, based on the SANDAG Series 13 Forecast land use, are incorporated in the City's 2015 UWMP, which is updated every five (5) years. The 2015 UWMP was completed and adopted in June 2016. The time extension was mandated by Assembly Bill 2067 and implemented by DWR.

The projections with the City's 2015 UWMP were forwarded to the Water Authority for use in the preparation of the Water Authority's UWMP, which is subsequently incorporated into MWD's UWMP to calculate the ultimate water demands of the region (**Figure 6-1**).

Recently, water demands for the City have been greatly suppressed due to mandatory water use restrictions and public education that were put in place by the City as a result of the current statewide mandate for conservation in response to emergency drought conditions. Because of these suppressed demands, the City developed near-term water demand projections for its 2015 Cost of Service Study, which was needed to set water rates through 2020.

A method was developed to bridge the gap between the short-term water demand projections and long-term water demand forecast. This method assumes that once mandatory water use restrictions are lifted, water demands would return to pre-drought (2008) levels within 15 years. In past droughts, it took 5 to 7 years for water demands to return to pre-drought levels; but because of the severity of the current drought it was assumed that it will take longer for the bounce back in water demands to occur.

The demands from the 2015 UWMP are used throughout this Report. The historical and projected water demands for a normal year are shown in **Table 6-1.**

As part of the requirement for complying with SB 610, Table 6-7 and Table 6-8, show the single-dry year and consecutive multiple-dry year demands. All tables in this section are based on data from the 2015 UWMP.

FIGURE 6-1
WATER DEMAND PROJECTIONS

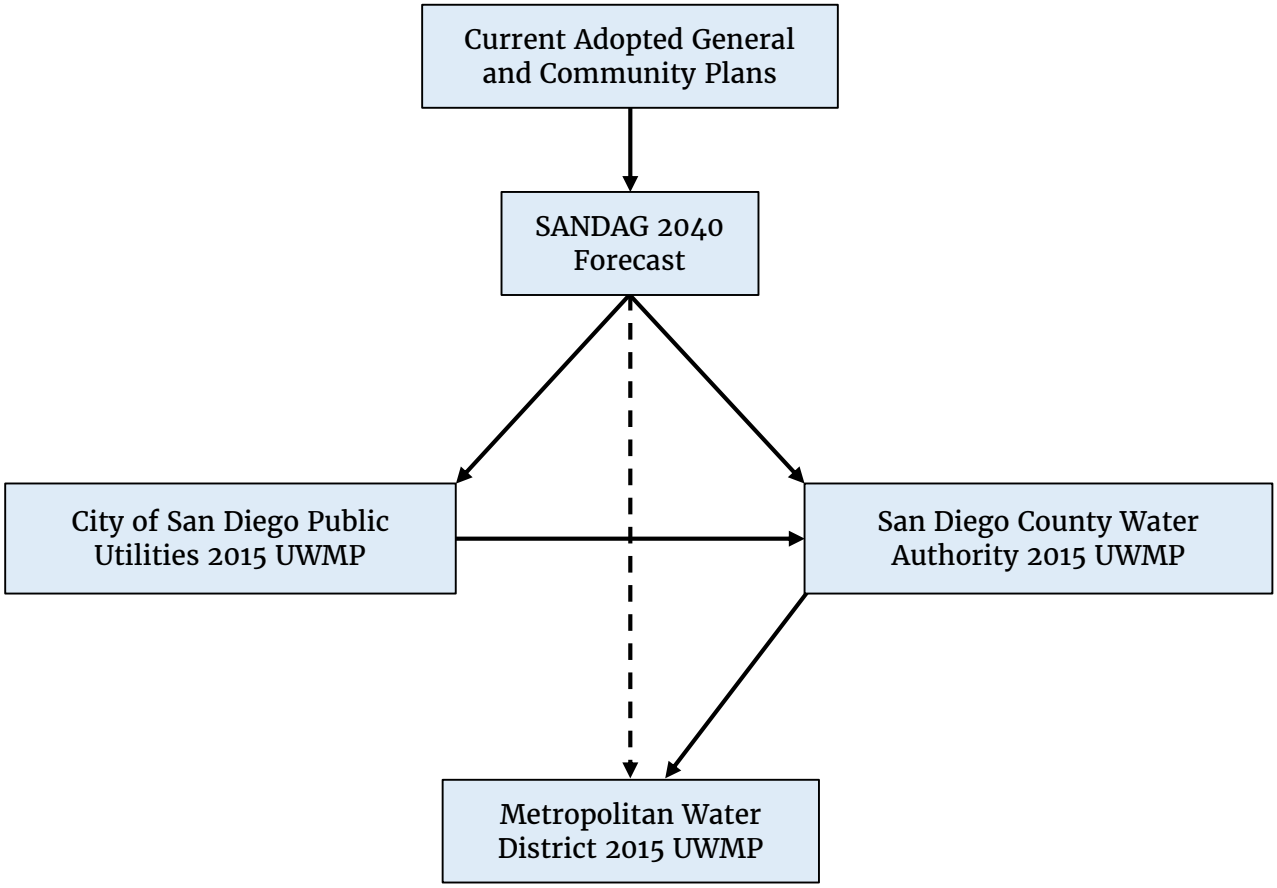


TABLE 6-1
PAST, CURRENT, AND PROJECTED WATER DELIVERIES

Sector	Type of Use	Treatment Level	Water Use (AFY)			
			2010		2015	
			Meters	Use	Meters	Use
Single-Family Residential	Indoor and outdoor uses	Drinking Water	219,555	67,267	224,162	60,573
Multifamily Residential	Indoor and outdoor uses	Drinking Water	28,992	40,124	30,471	37,799
CII	Indoor and outdoor uses	Drinking Water	15,539	46,350	17,064	46,072
Irrigation	Landscape irrigation	Drinking Water	7,359	23,537	7,679	22,668
Other	Dust mitigation, cleaning	Drinking Water	214	89	464	0
Subtotal of Retail Area			**271,659**	**177,367**	**279,840**	**167,112**

Sector	Water Use (AFY)				
	2020	2025	2030	2035	2040
Single-family Residential	62,638	80,762	86,340	87,932	87,180
Multifamily Residential	56,766	73,191	90,080	95,841	95,786
CII	48,936	48,238	47,542	47,755	48,014
Sub-Total (Retail Area)	**168,340**	**202,191**	**223,962**	**231,528**	**230,980**

Note: The billing categories shown in the 2020 to 2040 water deliveries do not include the irrigation category that was shown in the 2010 and 2015 water deliveries as that water use was distributed among the multifamily (to account for irrigation of common association property) and CII sectors.

Source: 2020 to 2030 is extrapolation from 2015 Cost of Service Study; 2030 and after is from City's Update of Long-Term Water Demand Forecast, July 2015

Table 6-2 Summarizes the current and planned water sources the City is relying on to meet future demands.

TABLE 6-2
PLANNED WATER SUPPLY SOURCES

Basin	Average Year Water Supply (AFY)					
	2015*	2020	2025	2030	2035	2040
Verifiable Supply (Existing and Planned)						
Surface Water	6,279	22,900	22,800	22,700	22,600	22,500
Groundwater	500	3,100	3,100	3,100	3,100	3,100
Recycled Water (non-potable)	8,195	13,650	13,650	13,650	13,650	13,650
Total Verifiable Local Water Supplies	**14,974**	**39,650**	**39,550**	**39,450**	**39,350**	**39,250**
SDCWA Water Purchases with Verifiable Regional Water Supplies	**173,754**	**161,334**	**202,488**	**225,390**	**234,398**	**234,158**
Total Verifiable Water Supplies	**198,957**	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**

*2015 represents actual supplies under very dry hydrologic conditions – resulting in very low surface water supplies.

6.1 Water Sales to Other Agencies

Potable Water

The City, through past agreements, sells treated water to the California American Water Company (Cal-Am), which provides water service to the cities of Coronado and Imperial Beach, and Naval Air Station North Island. The population of Naval Station North Island is located within the City of Coronado, whereas the other military bases that the City serves are within the City. The City also sells untreated water to Santa Fe Irrigation District and San Dieguito Water District. **Table 6-3** presents the water sales to other agencies.

Per the agreement between the City and Cal-Am, only local surface water is sold to Cal-Am to provide water to supply Cal-Am customers. A portion of City residents in the South Bay area are also served by Cal-Am, and can be served by imported water as well. Per the agreement between the City and the City of Del Mar, the City takes deliveries of water, which the City of Del Mar purchases from the Water Authority, through the Second Aqueduct Connection at Miramar. This water is then treated at the City's Miramar WTP and transported to the City of Del Mar through several interconnections.

The City has agreements to provide surplus treated water to Otay Water District, and untreated exchange water to Ramona Municipal Water District. These water deliveries occur infrequently and for short periods of time, and are therefore not shown in **Table 6-3**.

TABLE 6-3
SALES TO OTHER AGENCIES-POTABLE

Sector	Water Use (AFY)					
	2015	2020	2025	2030	2035	2040
Wholesale Water Sales	10,229	12,200	14,106	15,453	15,759	15,821

Source: 2020 to 2030 is extrapolation from 2015 Cost of Service Study; 2030 and after is from City's Update of Long- Term Water Demand Forecast, July 2015

Recycled and Non-Revenue Water

The City has three (3) separate agreements to sell recycled water. Olivenhain Municipal Water District and the City of Poway are provided recycled water from the City's North City Water Reclamation Plant, while Otay Water District receives recycled water from the City's South Bay Water Reclamation Plant.

Non-Revenue Water (NRW) is the difference between the potable water supplied to the system (also known as potable water production), and the potable water sold to customers (also known as metered water deliveries). NRW typically includes legitimate uses that are not metered, such as street cleaning, line flushing and fire suppression, as well as unaccounted for water. Unaccounted for water can be attributed to unauthorized consumption, meter inaccuracies, data errors, leakage on mains, leakage and overflow at storage, and leakage at service connections. Typically, NRW is presented as a percentage of total potable water production. Historically, the City reported 4.3 percent of NRW in the 2005 UWMP, and 9.0 percent of NRW in the 2010 UWMP. Non-Revenue Water for 2015 was determined to be 7.4 percent (estimated at 13,421 AFY), based on the American Water Works Association's Water Audit Software, as required by the 2015 UWMP.

TABLE 6-4
ADDITIONAL WATER USES AND LOSSES

Use	Water Use (AFY)						
	2010	2015	2020	2025	2030	2035	2040
Non-Revenue Water	12,593	13,421	15,700	18,809	18,020	18,613	18,576
Recycled Water[1]	7,951	8,195	13,650	13,650	13,650	13,650	13,650

1. Excludes wholesale recycled water that City provides outside of its service area.

Table 6-5 is a summary of and displays City's past water use/demand from 2010 and 2015 with projected water use/demand shown for 2020 thru 2040.

TABLE 6-5
TOTAL WATER-USE

Use	Water Demand (AFY)						
	2010	2015	2020	2025	2030	2035	2040
Retail Potable Water Sales	177,368	167,112	168,340	202,191	223,962	231,528	230,980
Wholesale Potable Water Sales	11,493	10,229	12,200	14,106	15,453	15,759	15,821
Non-Revenue Water	12,593	13,421	15,700	18,809	18,020	18,613	18,576
Sub-Total (Potable)	**201,454**	**190,762**	**196,240**	**235,106**	**257,435**	**265,900**	**265,377**
Recycled Water (Non-Potable)	7,951	8,195	13,650	13,650	13,650	13,650	13,650
Total Demand	**209,405**	**198,957**	**209,890**	**248,756**	**271,085**	**279,550**	**279,027**

The analysis in **Table 6-6** compares the projected normal water supply and customer demands from 2010 to 2040, in five-year increments.

TABLE 6-6
PROJECTED NORMAL SUPPLY AND DEMAND COMPARISON

Normal Year Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	22,900	22,800	22,700	22,600	22,500
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**39,650**	**39,550**	**39,450**	**39,350**	**39,250**
Water Supply from SDCWA (purchased water)	161,334	202,488	225,390	234,398	234,158
Total City Water Supplies	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Estimated Water Shortages	0	0	0	0	0

6.2 Projected Single-dry Year Water Supply and Demand

Table 6-7 provides a comparison of a single-dry year water supply with projected total water demand over the next 25 years, in five (5)-year increments. The City's demands in single-dry years are projected to be higher similar in proportion to the increase in regional water demands projected in the Water Authority's 2015 UWMP. An increase in demand for landscape irrigation accounts for most of the increase in demands. It is assumed that recycled water demands would not increase in single-dry years. The wholesale water supplies from the Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies.

TABLE 6-7
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON

Single-Dry Year (1990) Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0

6.3 Projected Multiple-dry Year Water Supply and Demand

Table 6-8 compares the total water supply available in multiple-dry water years with projected total water demand over the next 25 years. The City's demands in multiple-dry years are projected to be higher, similar in proportion to the increase in regional water demands projected in Water Authority's 2015 UWMP. It is presumed that recycled water demands would not increase in multiple-dry years. The wholesale water supplies from Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies. Multiple-dry year scenarios represent hot, dry weather periods which may generate urban water demands that are greater than normal.

No extraordinary conservation measures are reflected in the demand projections. The recycled water supplies are assumed to experience no reduction in a dry year.

TABLE 6-8
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2040

Dry Year 1 (1990) Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0
Dry Year 2 (1991) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	**2025**	**2030**	**2035**	**2040**
Water Demand (with wholesale and conservation)	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,233	16,162	16,091	16,020	15,949
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**32,983**	**32,912**	**32,841**	**32,770**	**32,699**
Water Supply from SDCWA (purchased water)	167,627	208,669	231,469	240,457	240,189
Total City Water Supplies	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Estimated Water Shortages	0	0	0	0	0
Dry Year 3 (1992) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	**2025**	**2030**	**2035**	**2040**
Water Demand (with wholesale and conservation)	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	18,962	18,879	18,796	18,714	18,631
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**35,712**	**35,629**	**35,546**	**35,464**	**35,381**
Water Supply from SDCWA (purchased water)	175,953	215,773	239,592	248,948	248,677
Total City Water Supplies	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Estimated Water Shortages	0	0	0	0	0

Section 7 - Conclusion - Availability of Sufficient Supplies

The Project is consistent with water demand assumptions in the regional water resource planning documents of the City, the Water Authority and MWD. The PUD receives the majority of its water supply from MWD through the Water Authority. In addition, MWD and the Water Authority have developed water supply plans to improve reliability and reduce dependence upon existing imported supplies. MWD's Regional Urban Water Management Plan and Integrated Resources Plan, the Water Authority's 2015 UWMP and annual water supply report include projects that meet long-term supply needs through securing water from the State Water Project, Colorado River, local water supply development and recycled water.

The forecasted normal year water demands compared with projected supplies for the PUD are shown in **Table 7-1**. This demonstrates that with existing supplies and implementation of the projects discussed in the three agencies' planning documents there will be adequate water supplies to serve all anticipated growth (existing and future planned uses) and development.

TABLE 7-1
PROJECTED SUPPLY AND DEMAND COMPARISON – NORMAL YEAR

Normal Year Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	22,900	22,800	22,700	22,600	22,500
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**39,650**	**39,550**	**39,450**	**39,350**	**39,250**
Water Supply from SDCWA (purchased water)	161,334	202,488	225,390	234,398	234,158
Total City Water Supplies	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Estimated Water Shortages	0	0	0	0	0

Table 7-2 provides a comparison of a single-dry year water supply with projected total water use/demand over the next 25 years, in five (5)-year increments.

TABLE 7-2
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON

Single-Dry Year (1990)	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0

The multiple-dry year scenarios, within a 25-year projection, are shown in **Table 7-3**. This demonstrates that supplies will be adequate to meet all anticipated growth (existing and future planned uses) and development in multiple-dry year periods.

In summary, this Report demonstrates that there are sufficient water supplies over a 25-year planning horizon to meet the projected demands of the Project as well as the existing and other planned development projects within the PUD service area in normal, dry year, and multiple-dry year forecasts. This Project is proposing water demands which are included in the regional water resource planning documents of the City, the Water Authority, and MWD.

TABLE 7-3
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2040

Dry Year 1 (1990) Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0
Dry Year 2 (1991) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	**2025**	**2030**	**2035**	**2040**
Water Demand (with wholesale and conservation)	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,233	16,162	16,091	16,020	15,949
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**32,983**	**32,912**	**32,841**	**32,770**	**32,699**
Water Supply from SDCWA (purchased water)	167,627	208,669	231,469	240,457	240,189
Total City Water Supplies	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Estimated Water Shortages	0	0	0	0	0
Dry Year 3 (1992) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	**2025**	**2030**	**2035**	**2040**
Water Demand (with wholesale and conservation)	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	18,962	18,879	18,796	18,714	18,631
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**35,712**	**35,629**	**35,546**	**35,464**	**35,381**
Water Supply from SDCWA (purchased water)	175,953	215,773	239,592	248,948	248,677
Total City Water Supplies	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Estimated Water Shortages	0	0	0	0	0

Source Documents

California Department of Water Resources (DWR), Progress on Incorporating Climate Change into Management of California's Water Resources, July 2006 Report
California Climate Change Center, 2006 Biennial Report: Our Changing Climate: Assessing the Risks to California, 2006
California Department of Water Resources Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001, March 2011
DSD Memorandum - Request for assessment and project description, February 2013
MWD 2010 Regional Urban Water Management Plan
MWD Report on Metropolitan's Water Supplies, A Blueprint for Water Reliability, March 2003
MWD Integrated Resources Plan Update, Oct 2010
Public Utilities Department 2015 Urban Water Management Plan
Public Utilities Department Annual 2012 Water Conservation Report
Public Utilities Department Recycled Water Study July 2012
Public Utilities Department Recycled Water Master Plan August 2011
Public Utilities Department Water Purification Demonstration Project Report
Water Authority 2010 Urban Water Management Plan
Water Authority Regional Water Facilities Master Plan, 2003
Water Department Long-Range Water Resources Plan (2002-2030), December 2002
Water Department The City of San Diego Subordinated Water Revenue Bonds, Series 2002, October 2002