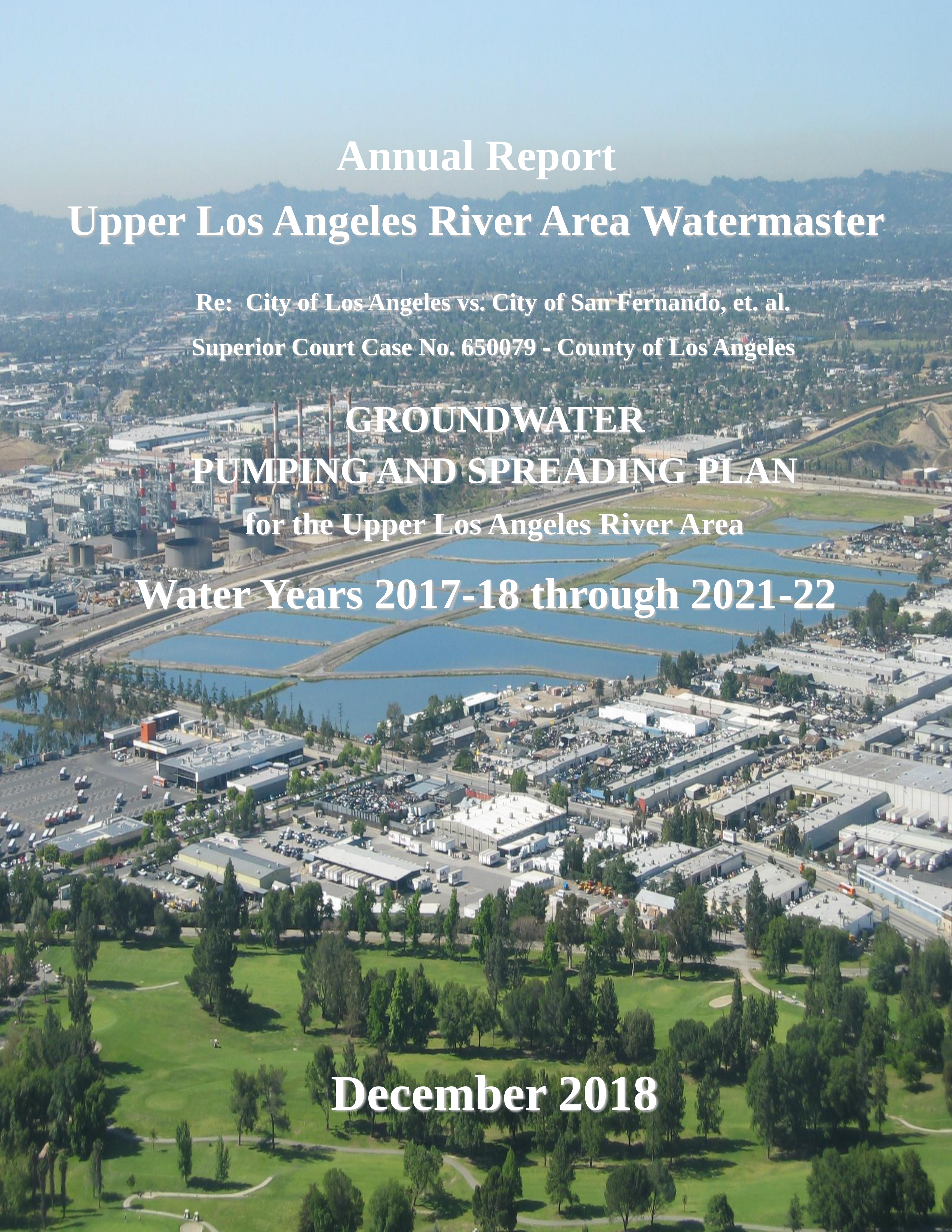

Annual Report

Upper Los Angeles River Area Watermaster

Re: City of Los Angeles vs. City of San Fernando, et. al.

Superior Court Case No. 650079 - County of Los Angeles

GROUNDWATER PUMPING AND SPREADING PLAN

for the Upper Los Angeles River Area

Water Years 2017-18 through 2021-22

December 2018

ANNUAL REPORT

UPPER LOS ANGELES RIVER AREA WATERMASTER

Re: City of Los Angeles vs. City of San Fernando, et. al.
Superior Court Case No. 650079 - County of Los Angeles

GROUNDWATER PUMPING AND SPREADING PLAN FOR THE UPPER LOS ANGELES RIVER AREA (ULARA) LOS ANGELES COUNTY, CALIFORNIA

Water Years 2017-18 through 2021-22
(October 2017 – September 2022)

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Copies of this report may be downloaded from the
ULARA Watermaster Website (http://ULARAwatermaster.com).

December 2018

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I. EXECUTIVE SUMMARY

As the Watermaster for the Court-adjudicated Upper Los Angeles River Area (ULARA), I am pleased to submit this Annual Report for the Groundwater Pumping and Spreading Plan for Water Years 2017-18 through 2021-22 (i.e., for the period of October 1, 2017 through September 30, 2022). Note that this Groundwater Pumping and Spreading Plan is being submitted to the Court later than its anticipated July 2018 filing date. Due to the delayed receipt of data necessary for analysis, reporting, and timely finalization of the report, this current report is being provided to the Court in August 2020. To avoid confusion with the submittal to the Court of the subsequent Annual Pumping and Spreading Plan for Water Years 2018-19 through 2022-23, this current report has been purposely dated December 2018.

Preparation of this Annual Report is in compliance with Section 5.4 of the Policies and Procedures document (as developed by the original ULARA Watermaster), which established the Watermaster's responsibility for management of the four groundwater basins in ULARA (the San Fernando, Verdugo, Sylmar and Eagle Rock basins). Also provided in this Groundwater Pumping and Spreading Plan, as appendices, are the individual pumping and spreading plans submitted by each of the five major pumping Parties in ULARA (the cities of Burbank, Glendale, Los Angeles and San Fernando, and the Crescenta Valley Water District) for their proposed operations during Water Years 2017-18 through 2021-22. Further, this report discusses the possible changes in recharge, spreading, pumping rates and pumping patterns; especially in relation to the available plans for cleanup of the contaminated groundwater in the eastern portion of the San Fernando Groundwater Basin (SFB).

Spreading operations in ULARA are projected to be nearly as high as the recent 5-year average, but less than one-half of the long-term average (1968-2017). Overall pumping in all three ULARA basins (there is no municipal pumping from Eagle Rock Basin) is expected to be less than its recent 5-year and long-term averages during the upcoming water year. Consistent with past practices, and as pumped as part of groundwater cleanup operations within their respective operable units, the cities of Burbank and Glendale are on track to produce more than their adjudicated water rights from SFB. The City of Los Angeles continues to experience considerable challenges with groundwater contamination in the eastern portion of the SFB and continues to implement changes to their system (such as wellhead treatment facilities) where possible. In addition, work by the City of Los Angeles to construct new and/or replacement water wells in the Sylmar Basin has been ongoing to further increase the supply of local groundwater. The City of Los Angeles projects that municipal-supply extractions from the Sylmar Basin will resume in Water Year 2018-19; no extractions are projected to occur from this basin in the current Water Year by this City. The City of San Fernando also continued to experience pumping difficulties in the Sylmar Basin as a result of groundwater contamination and expects to pump less than its annual entitlements from this basin. In the Verdugo Basin, the Crescenta Valley Water District (CVWD) pumped less than its adjudicated water rights in Water Year 2016-17 because of wells being out of service for rehabilitation, recurring bacteriological problems and declining water levels. CVWD expects to produce less than its adjudicated water rights in Water Year 2017-18 as well. Glendale similarly produced less than its adjudicated water rights in the Verdugo Basin in Water Year 2016-17 due to its limited local pumping capacity and expects to produce less than its adjudicated water rights from this basin during this current Water Year as well. There are no municipal-supply wells in the Eagle Rock Basin, the smallest of the four separate groundwater basins in ULARA.

There are currently five major groundwater cleanup facilities in operation in ULARA; each facility has its own extraction wells and treatment plant. These include: the North Hollywood Operable Unit (NHOU) and the Pollock Wells Treatment Plant, both of which are located in the City of Los Angeles; the Burbank Operable Unit (BOU) in Burbank; the Glendale Operable Unit (GOU), which includes the Glendale North Extraction Wells in Glendale and the Glendale South Extraction Wells in the City of Los Angeles; and the CVWD Glenwood Nitrate Water Treatment Plant in La Crescenta. In addition, the City of Los Angeles continues to operate wellhead treatment facilities on a few of its 12 wells at its Tujunga Wellfield in the SFB. CVWD recently brought online a new nitrate treatment plant at its Well No. 2 site. The City of San Fernando in November 2018 was able to bring its new nitrate treatment plant online in the Sylmar Basin.

The City of Los Angeles has had to reduce pumping in some of its wellfields in the SFB in response to ongoing water quality concerns regarding the existence of certain contaminants in the groundwater at concentrations that exceed their respective regulatory limits for public supply. As a result, the Los Angeles Department of Water and Power (LADWP) has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of its various wellfields in the eastern portion of the SFB. These efforts include the study of appropriate response actions as well as other analyses and activities to help evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that produce water for potable use. In addition, wellhead treatment in the Tujunga Wellfield has allowed for increased groundwater extraction from the SFB.

The groundwater model for the SFB is updated annually by the Watermaster Support Services group at the LADWP and continues to be used to simulate the combined effects of the projected pumping and spreading operations on groundwater elevations in the SFB for the five-year period ending September 30, 2022. Water levels simulated by this model are projected to increase in some areas of the SFB as a result of the projected future spreading of stormwater and if water imported from the Metropolitan Water District of Southern California (MWD) is in excess of groundwater extractions in this basin over the model simulation period. In that model, some "pumping troughs," or areas of declining water levels, were identified as a result of ongoing pumping operations in the areas exhibiting these troughs in the eastern portion of the SFB.

Also noteworthy are the simulated groundwater elevation contours in the areas near the BOU wells, which appear to show some possible effects of plume containment by those wells. The estimated cumulative amounts of extraction were projected to exceed the cumulative amounts of recharge by approximately 22,970 acre-feet (AF) over the next five years, as simulated by the LADWP model using projections of future pumping and spreading operations provided by the ULARA Parties for the LADWP modeling effort.

In closing, I thank each Party for taking the time and making the effort to provide its individual Spreading and Pumping Plan for the next five water years, and express my appreciation to each of these Parties for providing information and data that were essential to the preparation of this Annual Pumping and Spreading Plan document for Water Years 2017-18 through 2021-22. Also, much appreciated has been the continued assistance of the Watermaster Support Services group at LADWP (including Mr. Hadi Jonny, Ms. Fatema Akhter, Mr. Rafael Villegas, Mr. Manuel Aguilar, Mr. Chris Repp, and Ms. Sarah Mouakkad) in helping with data analyses, modeling and preparation of the figures for this report.

Respectfully Submitted,

RICHARD C. SLADE
ULARA Watermaster

II. INTRODUCTION

As a result of the groundwater contamination that was detected in certain municipal-supply water wells in the eastern portion of the San Fernando Basin in the late-1970s, the original ULARA Watermaster and Administrative Committee, together with the Los Angeles Regional Water Quality Control Board (RWQCB-LA), revised the ULARA Watermaster's Policies and Procedures document in late-1993 to consider measures or actions oriented to help prevent further degradation of groundwater quality and to help limit the spread of contamination in the ULARA groundwater basins. The Policies and Procedures document was revised again by that Watermaster in February 1998 to organize the material into a more comprehensive document.

Section 5.4 of the Policies and Procedures requires each of the five municipal-supply purveyors (Parties) in ULARA to prepare its own annual Groundwater Pumping and Spreading Plan for each successive five-year period. These five Parties include the cities of Burbank, Glendale, Los Angeles and San Fernando as well as CVWD. Each of these municipal-supply pumpers is tasked to annually submit (on or before May 1 of each water year) its own Groundwater Pumping and Spreading Plan to the ULARA Watermaster in fulfillment of this requirement. Each plan is to include the projected groundwater pumping and spreading volumes, recent water quality data for each active water well, and possible modifications planned for key facilities owned and/or operated by that Party (e.g., constructing or destroying wells, constructing or modifying treatment plants, etc.) for the next five-year period.

The ULARA Watermaster is required to: evaluate the five individual plans with regard to the potential impacts of the combined pumping and spreading activities by all Parties related to the implementation of the San Fernando Judgment of January 26, 1979; and provide, if needed, recommendations for improving groundwater management and/or for helping to protect groundwater quality in the ULARA groundwater basins. The Watermaster's evaluation and recommendations are to be included in each annual Groundwater Pumping and Spreading Plan, and the Administrative Committee is to review and approve the plan so that it may be provided to the Court in July of each water year.

This Annual Report represents the Groundwater Pumping and Spreading Plan for the five-water year period of 2017-18 through 2021-22 for ULARA, and it has been prepared pursuant to Section 5.4 of the Policies and Procedures document. This Groundwater Pumping and Spreading Plan provides basic information to the Administrative Committee for use in possibly improving basin management, providing protection of the water rights of each Party, and protecting water quality within ULARA.

III. PLANS FOR THE 2017-18 THROUGH 2021-22 WATER YEARS

A. Projected Groundwater Pumping for 2017-18 Water Year

The estimated pumping capacities of the municipal-supply water wells owned by each of the five Parties within the San Fernando, Sylmar and Verdugo basins are listed on Table 3-1. There are no municipal-supply wells in the Eagle Rock Basin, so this small basin is not listed on Table 3-1 and is not discussed further herein. Also shown on Table 3-1 are the number of active wells owned by each Party in each basin, the total number of municipal-supply wells owned by each Party in each basin and the estimated pumping capacity of each well (as reported by each Party). The SFB has the most Parties (3) and the total largest number of currently active municipal-supply water wells (76); Sylmar Basin has the fewest active wells (5). The number of active wells in each basin is subject to change each year as a result of various problems such as water level declines, mechanical problems with a well or pump, and impacts from groundwater contamination.

Table 3-1A shows the actual and projected volumes of groundwater pumped by the five Parties for Water Year 2017-18 in the San Fernando, Sylmar and Verdugo groundwater basins. Values listed on Table 3-1A represent the volume of groundwater pumped by each Party for the period of October 2017 through March, April, May or June 2018 (depending on the Party), as reported to the Watermaster by each Party. Projected values shown on Table 3-1A are the groundwater extractions estimated (or projected) by each Party for the remainder of Water Year 2017-18 (i.e., from April, May, June or July 2018 through September 2018) for each of the three ULARA groundwater basins. As seen on Table 3-1A, the five Parties expect to pump 70,630 acre-feet (AF) of groundwater during Water Year 2017-18 from the three ULARA groundwater basins. Total groundwater extractions for Water Year 2017-18 by the five Parties are projected to be: 65,120 AF from SFB; 2,900 AF from Sylmar Basin; and 2,610 AF from Verdugo Basin.

The total volume of groundwater expected to be pumped by all Parties during the current water year (70,630 AF) is 34,522 AF less than the 105,151 acre-feet per year (AFY) long-term historical average extractions from the three ULARA groundwater basins for the period of Water Years 1979-80 to 2016-17, and 17,482 AF less than the five-year average of 88,111 AFY. The estimated volume of pumping by all Parties for the next water year (2018-19) is shown on Table 3-1B to be 98,204 AF, which is also less than the historic long-term (1979-2017) average for these basins, although it is higher than the recent five-year average.

As shown on Tables 3-1A and 3-1B, the City of Burbank plans to pump 11,099 AF of groundwater from the SFB in the 2017-2018 Water Year; this volume exceeds its annual pumping entitlement from this basin. Groundwater extractions by Burbank for Water Year 2017-18 are projected to be 760 AF greater than its five-year average of 10,339 AFY, and 4,659 AF higher than its long-term average of 6,440 AFY for the period of Water Years 1979-80 to 2016-17 (these latter historic averages include groundwater extractions by wells owned by Valhalla Mortuary in Burbank). Valhalla Mortuary no longer extracts groundwater because it converted to recycled water use in January 2016. Burbank's annual entitlement for the 2017-18 Water Year is 3,657 AFY, based on its 20 percent import return credit (as reported in the 2016-17 Annual Watermaster Report).

Existing and planned extractions by Burbank are required by its United States Environmental Protection Agency (USEPA)-mandated groundwater clean-up operations by its BOU facilities, which have a total pumping capacity of 9,000 gallons per minute (gpm, or about 14,000 AFY). Burbank can account for its pumping in excess of its annual import return credit by electing to purchase as much as 4,200 AFY of Physical Solution water from the City of Los Angeles. Burbank can also purchase and import water from MWD and store it in the SFB, or it may choose to deliver that imported water to the City of Los Angeles in exchange for water credits from the City of Los Angeles. Since the completion of the Foothill Feeder connection, Burbank can spread MWD water in the Pacoima spreading grounds and thereby accumulate credits for the spread water. Burbank spread 8,094 AF of MWD water in the Pacoima spreading grounds during Water Year 2017-2018 during the months of October through December 2017. Burbank can also use a portion of its *available* groundwater storage credits, which were 2,244 AF as of October 1, 2017 (Burbank also has an additional 17,580 AF of stored water credits *on reserve*). Burbank reports that it will not purchase Physical Solution water from the City of Los Angeles in the current water year. For the remaining four water years covered by this plan, Burbank plans to purchase about 6,950 AFY of Physical Solution credits, untreated imported water, or a combination of the two.

An agreement has been negotiated with LADWP to treat and deliver groundwater from Burbank to the City of Los Angeles during periods of low demand on the Burbank system, when the BOU would otherwise operate below capacity. The new interconnection to facilitate this exchange is currently under construction. As a result of the interconnection, there will be increased groundwater extraction and water purchased for blending by Burbank associated with deliveries of water to the City of Los Angeles. These deliveries are not and will not be included in Burbank's groundwater production or MWD purchases reported to the Watermaster because they will be reported by City of Los Angeles as part of their water use. There may be 500 AFY of such deliveries beginning in WY 2018-19.

CVWD plans to pump 1,430 AF in Water Year 2017-18 from Verdugo Basin, a volume that is less than half its current full right of 3,294 AFY from this basin. This planned pumping by CVWD from Verdugo Basin is 1,316 AF less than its long-term average of 2,746 AFY for the period of 1979-2017 and 613 AF less than its five-year average of 2,043 AFY (2012-2017).

In the 2017-18 Water Year, Glendale plans to pump 8,080 AF of groundwater from the SFB. This volume is 411 AF more than this City's five-year average of 7,669 AFY (2012-2017), and 3,602 AF higher than its long term historic (1979-2017) average pumping of 4,478 AFY from the SFB. Glendale's water right for this current water year is 4,237 AFY from SFB, based on its 20 percent import return credit for water delivered to its service area within this basin during the 2016-17 Water Year. Glendale has the right to purchase up to 5,500 AFY of Physical Solution water from the City of Los Angeles to cover the excess pumping. Glendale can also use a portion of its *available* stored water credits, which totaled 3,278 AF as of October 1, 2017 (Glendale also has an additional 25,681 AF of stored water credits *on reserve*).

In the Verdugo Basin, Glendale plans to pump 1,180 AF in Water Year 2017-18; this volume is 959 AF less than its long-term (1979-80 to 2016-17) historic average extraction of 2,139 AFY from this basin, and represents a decrease of 153 AF relative to its average pumping of 1,333 AFY during the recent five-year period of 2012-2017 (see Table 3-1B).

In the current water year, the City of Los Angeles expects to pump 45,941 AF of groundwater from the SFB. This volume is 37,880 AF less than this City's long-term (1979-80 to 2016-17) annual average of 83,821 AFY from this basin, and 17,199 AF less than its average pumping of 63,139 AFY over the last five years (2012 to 2017). As of October 1, 2017, the City of Los Angeles' *available* stored water credits were 62,773 AF in the SFB (this City also has an additional 491,727 AF of stored water credits *on reserve* in the SFB).

The City of Los Angeles does not expect to pump groundwater from the Sylmar Basin this current water year. This City's average groundwater extractions from this basin for Water Years 1979-80 to 2016-17 was 2,439 AFY, and 605 AFY for Water Years 2012-17. In this basin, the City of Los Angeles currently has 9,014 AF of "frozen" water credits, or 14,826 AF of credits using the 5-year calculation method.

For Water Year 2017-18, the City of San Fernando plans to pump 2,900 AF from the Sylmar Basin. This volume is 83 AF less than its average pumping from the Sylmar Basin for the past five years of 2,983 AFY, and 188 AF less than its long-term average for 1979 to 2017 of

3,088 AFY. The City of San Fernando currently has 404 AF of "frozen" water credits in the Sylmar Basin, or 2,657 AF of credits using the 5-year calculation method.

Estimated pumping capacities of the ULARA wellfields are provided in Table 3-1A. Actual and projected amounts of pumping and spreading by the major parties during Water Year 2017-18 are shown in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2017-18

Constraints on Pumping in the San Fernando Basin

City of Burbank - The USEPA Consent Decree Project (also known as the BOU) became fully operational on January 3, 1996. The source of groundwater for treatment at the BOU is pumped from Burbank Wells VO-1 through VO-8, and the treatment plant has a capacity of 9,000 gpm.

The BOU, funded by Lockheed-Martin under a USEPA Consent Decree, is owned and operated by the City of Burbank at the expense of Lockheed Martin. The BOU uses air stripping (vapor-phase) and liquid-phase granular activated carbon (VPGAC and LPGAC, respectively) to remove VOCs from groundwater (local groundwater also contains elevated concentrations of nitrate and chromium). Over the past few years, several process enhancements and repairs were made to the LPGAC vessels and to the VPGAC vessels. Following these treatments, the treated water is blended with imported water from the MWD for delivery within the City of Burbank.

The City of Burbank is also concerned about hexavalent chromium [Cr(VI)] in the groundwater produced by BOU.

More information about the BOU can be found via USEPA's website, https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

As part of the requirement to close the first consent decree, USEPA required Burbank to demonstrate that the BOU would operate at its design capacity. In the fall of 2010, Burbank successfully completed a 60-day performance test at the BOU operating at 9,000 gpm. To ensure the effectiveness of the remedy USEPA monitored water level drawdown and the extent of the cone of depression by conducting a multi-well pumping test for 30 days during the demonstration time frame. USEPA used water levels and pumping rate data monitored during this pumping test to update values of aquifer hydraulic conductivity, transmissivity and storativity for the BOU in the basin-wide groundwater model. The BOU treated 9,501 AF of groundwater in Water Year 2016-17.

Groundwater extracted by the City of Burbank also contains chromium, which cannot be removed by the BOU or by Burbank's other groundwater treatment facility (the Lake Street GAC Treatment Plant). Operations at BOU are currently limited by fluctuations in city-wide water demands and blending requirements for managing chromium concentrations. Burbank has been blending the pumped groundwater with imported water to keep the concentration of total chromium at or below 7 micrograms per liter (μg/L). The City of Burbank currently contracts with the consulting firm of TerranearPMC, for day-to-day operation of the BOU.

The GAC Treatment Plant treats the groundwater produced from Burbank Well No. 7. The well and treatment plant can deliver 1,100 gallons per minute (gpm). In the current water year, the well and treatment plant are being operated to replace recycled water in the Magnolia Power Project cooling towers for industrial cooling because the recycled water supply has been temporarily reduced due to the shutdown of a major sewer force main. The amount of water that will be produced and delivered to the Magnolia Power Project cooling towers is estimated to be 140 AF. Current plans are to keep the plant shut down, except for emergencies, water quality testing, or onsite non-potable use. As of July 2018, the Burbank's GAC Treatment Plant is being operated for non-potable use.

Burbank reports that its Well No. 15 was removed from service and properly destroyed in WY 2017-18. Also, no capital improvements are planned for other Burbank wells at this time.

<u>City of Glendale</u> - Construction of the Glendale Operable Unit (GOU) allowed for treated water to be available for delivery in December 2000. The system includes four Glendale North OU extraction wells (with a total pumping capacity of 3,300 gpm) and four Glendale South OU extraction wells (with a total capacity of 1,700 gpm). The treatment process uses aeration and LPGAC to treat VOC-contaminated groundwater and then blends the treated water with imported MWD water at the Grandview Pump Station. As a result of elevated Cr(VI) concentrations in the pumped groundwater, only a small quantity of water was initially pumped and delivered. Full operation started on January 6, 2002. The wells were being pumped and blended with MWD water in a manner to limit Cr(VI) concentrations to achieve the City's target concentration of 5 μg/L.

The City managed a major research effort on identifying viable treatment technologies for the removal of Cr(VI) from its pumped groundwater. In 2010, Glendale constructed the Weak Base Anion (WBA) Chromium Removal facility to remove Cr(VI) from groundwater pumped from GOU Well GS-3 using WBA exchange technology. The City also constructed a 100-gpm demonstration-scale facility next to the Glendale Water Treatment Plant (GWTP), which uses reduction, coagulation and filtration (RCF) technology to remove Cr(VI). These facilities effectively removed Cr(VI) in the extracted groundwater to concentrations below 5 μg/L The Hexavalent Chromium

Removal Research Project Report was published on February 28, 2013, and was completed in 2015, followed by a Supplemental Project Report in December 2015.

To maintain the reliability of the GWTP water supply, the City also worked with the California Division of Drinking Water (DDW) and the Glendale Respondents Group (GRG) to construct a full-scale Weak-Base Anion Exchange (WBA) facility at the GWTP in dealing with the Cr(VI) at the GN-3 Well and the ninth GOU well in the City of Los Angeles. The new WBA facility and the GS-5 Well began full operation in December and November 2016, respectively. With the operation of the new WBA facility and the ability of blending with imported water from MWD, Glendale continues to meet its concentration goal of less than 5 μg/L Cr(VI) entering the distribution system.

City of Los Angeles - All wellfields operated by the City of Los Angeles within the SFB have been impacted to varying degrees by groundwater contamination. Most significantly this groundwater contamination has been caused by the volatile organic compounds (VOCs) trichloroethylene (TCE), perchloroethylene (PCE) and 1,4-dioxane. Furthermore, increasing concentrations of Cr(VI) and perchlorate, as well as other emerging chemicals have been detected in the City's wells in the eastern portion of the SFB. This contamination has greatly impacted the ability of the City of Los Angeles to pump groundwater from the SFB. VOC concentrations have exceeded their respective State Primary Maximum Contaminant Levels (MCLs) in a large percentage of the active wells operated by the City of Los Angeles. Whereas the City of Los Angeles' five-year pumping plans reflect continued reductions in its groundwater pumping, this City is responding to the challenges of groundwater contamination by pursuing plans to build new facilities for contaminant removal. When completed, these facilities will help restore the City of Los Angeles' ability to pump groundwater from the SFB and serve potable groundwater to its customers.

CONSTRAINTS ON PUMPING IN THE SYLMAR BASIN

City of San Fernando - All groundwater pumped by the City of San Fernando is extracted from the Sylmar Basin. VOC contamination has not been detected in any of this City's municipal-supply wells in this basin. However, two of its wells have pumped groundwater with nitrate concentrations that have exceeded the State's Primary MCL for nitrate (as NO_3) in groundwater for public supply of 45 milligrams per liter (mg/L). One of these wells (Well 7A) was placed on inactive status whereas the other well (Well 3) has been on stand-by status while awaiting implementation of a nitrate mitigation plan. Old septic systems and past agricultural practices in the region are the likely causes of these elevated nitrate concentrations in the local groundwater. This City reports that in November 2018, Well 7A was activated and operation of a new Envirogen ion exchange nitrate removal unit began.

City of Los Angeles - The City of Los Angeles has not been able to pump its full adjudicated water right from the Sylmar Basin as a result of elevated TCE concentrations in at least two wells in its Mission Wellfield and also due to the physical deterioration of the infrastructure at this facility. To help address these limitations, the City of Los Angeles has implemented the Mission Wells Improvement Project. This project's goal is the rehabilitation and replacement of the City's deteriorating groundwater facilities in Sylmar Basin, including construction of three replacement production wells and a few monitoring wells, along with new piping, pump station upgrades, electrical upgrades, and controls. An application has been submitted to DDW to permit the operation of Well No. 10, one of the three new production wells constructed for this city in the Sylmar Basin. The other three wells, Nos. 7, 8 and 9, will not be operated due to very low production capacity (Well No. 8) and/or concentrations of TCE that exceed the State's Primary MCL for the constituent for public supply. The recently constructed on-site Chlorination Generation System has been permitted and is in operation, and Well No. 10 is expected to have a new submersible pump and flowmeter installed in June 2019.

CONSTRAINTS ON PUMPING IN THE VERDUGO BASIN

Crescenta Valley Water District - The pumping rights of CVWD occur solely within the Verdugo Basin. Nitrate contamination is widespread and methyl tertiary butyl ether (MTBE), a component of gasoline, has also been detected in the past in a few CVWD-owned wells. Elevated nitrate concentrations are mitigated in the water supply by treating a portion of the pumped groundwater using anion exchange at the existing Glenwood Nitrate Water Treatment Plant, and by blending untreated groundwater with treated groundwater and/or with imported MWD supplies in order to meet drinking water standards.

From the initial detection of MTBE in 2005, groundwater pumped by the 12 wells in CVWD's service area has had MTBE concentrations as high as approximately 50 μg/L. In August 2006, concentrations of MTBE increased to values above its State Primary MCL of 13 μg/L in Well 7, whereupon this well was immediately taken out of service. In November 2006, the prior ULARA Watermaster responded by establishing the

Verdugo Basin MTBE Task Force. Task force members included the California Department of Public Health (CDPH, now known as DDW), the RWQCB-LA, the Watermaster, GWP, CVWD, and various oil companies and independent gas station owners in the Verdugo Basin. The Task Force had historically been meeting at the CVWD office on a bi-monthly basis to coordinate site-remediation activities among the various responsible parties.

In Water Year 2009-10, CVWD received a grant from CDPH under the Drinking Water Treatment and Research Fund for funding the installation of a GAC water treatment system for removal of MTBE at its Well 5. In February 2011, CVWD performed a pumping test at Well 5 to determine if MTBE concentrations might increase during operational pumping activity. The results of the pumping test were that the MTBE concentrations in the groundwater remained steady at 0.20 μg/L. CVWD was given permission by CDPH to place Well 5 back into service in March 2011 and, in addition, CDPH suspended CVWD's grant for funding the installation of the GAC at Well 5. Since the MTBE levels in Well 5 were below the constituent's State Secondary and State Primary MCLs, grant funding was put on hold until such time that MTBE concentrations might increase once again. In Water Year 2011-12, the grant funding was eliminated by the State, so if MTBE concentrations do rise again, CVWD will have to find a new funding source for the treatment. In Water Year 2015-16, the Task Force did not meet; it will reconvene if and when MTBE concentrations become higher than 1.0 μg/L in any CVWD well.

Declining water levels in the Verdugo Basin have also affected CVWDs ability to extract groundwater. In Water Year 2012-13, CVWD received a Local Groundwater Assistance (LGA) grant from DWR to perform a feasibility study for stormwater recharge within the Verdugo Basin. The study is a cooperative effort with the City of Glendale, the County of Los Angeles and other local stakeholders to determine if stormwater can be captured, stored and then recharged at Crescenta Valley County Park. The feasibility study started in August 2013 and work is still ongoing.

CVWD started well rehabilitation at its Well 8 at the end of Water Year 2015-16 and is planning to complete the work in Water Year 2016-17. In addition, CVWD is planning to perform well rehabilitation on its Well 7 in Water Year 2016-17 to obtain better well efficiency and to potentially increase groundwater production. CVWD also plans to construct a new production well within the next 3-5 years to help modernize and replace its aging well system.

CVWD received a 2015 Integrated Regional Water Management (IRWM) Grant as part of Proposition 84 in March 2016 to reactivate Well 2 and install a new nitrate removal treatment facility at CVWD's Ordunio Reservoir site. CVWD's Well 2 was drilled in 1927 and taken out of service in 1977 due to nitrate levels above the MCL and lack of a nitrate removal treatment facility. The project is estimated to produce 150 gpm, or 240 AFY, which will add to CVWD's groundwater production capacity. Project construction is planned to begin in November 2017 and be completed by June 2018. CVWD is working with the DDW for a permit amendment for the new nitrate removal treatment facility, which is anticipated to be completed by October 2018.

CVWD reports that water demands between WY 2012-13 and WY 2016-17 were affected by a number of factors including less than average annual rainfall, a five-year statewide drought, and water conservation efforts within the Crescenta Valley. In WY 2016-17, CVWD performed well rehabilitation on Well Nos. 5, 8 and 10 and is planning to perform well rehabilitation on Well Nos. 7, 11 and 14 in WY 2017-18 to obtain better well efficiency and to potentially increase groundwater production. Furthermore, CVWD has included a project to install a new water production well within the next 5 - 7 years as part of its 10-year Capital Improvement program.

City of Glendale - The City of Glendale has made only limited use of its current maximum adjudicated right of 3,856 AFY from the Verdugo Basin, due to water quality problems, groundwater level declines and limited extraction capacity in this basin. Over the years, Glendale has worked to increase the utilization of its water rights. The City completed construction of the Verdugo Park Water Treatment Plant (VPWTP) in 1996 as part of those efforts to increase production. This facility treats water from the City's two low-capacity wells (Verdugo Well A and B), and from a subsurface horizontal collection system within Verdugo Canyon. Recently, Glendale completed rehabilitation work of its Glorietta Well No. 6 in 2016, and Glorietta Well Nos. 3 and 4 in 2013. Glendale also began rehabilitation of Glorietta Well No. 3 in late-2016 and this well resumed full operation on August 27, 2017.

In Water Year 2010-11, Glendale rehabilitated an old, unused well on Foothill Boulevard and connected it to the City's water supply system in mid-2011. Additionally, a new well was constructed at the Rockhaven Sanitarium in mid-2011 to further increase its extraction capacity from the Verdugo Basin, but the well could not be used immediately because of the elevated concentrations of nitrate in that portion of the Basin. In 2014, Glendale and CVWD applied for and were awarded a grant through the Greater Los

Angeles County IRWM Group for a joint project to make use of groundwater from the Rockhaven Well. Groundwater extracted from the Rockhaven Well is now conveyed to CVWD's Glenwood Nitrate Water Treatment Plant for nitrate removal and disinfection, and then served to the La Crescenta-Montrose area. The volume of groundwater extracted from the Rockhaven Well is counted against the adjudicated water right of Glendale in the Verdugo Basin; these extractions are reported to the ULARA Watermaster on a monthly basis. Glendale Water and Power (GWP) entered into an agreement with CVWD for this arrangement. Design and construction of the Rockhaven Well project was completed in March 2016, at which time the well was placed into operation in accordance with the treatment agreement between Glendale and CVWD.

Glendale is planning on drilling a new well in the in the near future to replace Glorietta Well 6, and also plans to conduct an evaluation of the Verdugo Basin groundwater supply and the potential rehabilitation of Verdugo Wells A and B in the fiscal year 2018-19. As a result of the drought condition in the past several years, Glendale has not been able to pump to its full adjudicated right from the Verdugo Basin.

TABLE 3-1: ESTIMATED CAPACITY OF EXISTING WELLFIELDS

Party/Well Field	Number of Active Wells	Number of Standby Wells	Estimated Capacity (All Wells) (cfs)	(gpm)
SAN FERNANDO BASIN				
City of Los Angeles				
Aeration (NHOU)	7	---	2.2	987
Erwin	2	---	6.1	2,738
North Hollywood	14	3	53.1	23,833
Pollock	2	---	6.3	2,828
Rinaldi-Toluca	15	---	104.1	46,723
Tujunga	12	---	103.3	46,364
Verdugo	2	---	7.4	3,321
Whitnall	4	---	14.8	6,643
City of Burbank	8	3	24.5	11,000
City of Glendale	10	---	17.0	7,650
TOTAL	76	6	338.9	152,087
SYLMAR BASIN				
City of Los Angeles	2	---	5.0	2,244
City of San Fernando	3	1	8.1	3,630
TOTAL	5	1	13.1	5,874
VERDUGO BASIN				
CVWD	13	---	5.3	2,400
City of Glendale	6	---	5.0	2,240
TOTAL	19	---	10.3	4,640

Note:
- There are no municipal-supply water wells in the Eagle Rock Basin.

TABLE 3-1A: HISTORIC AND PROJECTED GROUNDWATER EXTRACTIONS 2017-18

(Acre-feet)

Party/Well Field	2017			2018									Total
	Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
						SAN FERNANDO BASIN							
City of Los Angeles													
Aeration (NHOU)	49	7	0	0	0	0	0	0	0	0	0	0	56
Erwin	0	0	0	0	0	0	0	0	0	0	0	0	-
North Hollywood	0	0	0	2	65	46	0	1,230	1,190	1,230	1,230	1,190	6,183
Pollock	181	174	176	188	155	182	143	0	0	148	148	143	1,638
Rinaldi-Toluca	12	9	10	840	1,127	1,069	1,250	1,599	2,381	2,460	2,460	2,381	15,600
Tujunga	0	0	11	268	1,219	1,283	2,262	3,383	3,452	3,567	3,567	3,452	22,464
Verdugo	0	0	0	0	0	0	0	0	0	0	0	0	-
Whitnall	0	0	0	0	0	0	0	0	0	0	0	0	-
SUBTOTAL City of Los Angeles:	242	190	198	1,298	2,567	2,580	3,655	6,212	7,023	7,405	7,405	7,166	45,941
City of Burbank[A]	906	908	797	901	844	462	895	924	920	1,181	1,181	1,181	11,099
City of Glendale[B]	644	673	705	566	426	643	726	804	723	723	723	723	8,080
TOTAL San Fernando Basin:	**1,791**	**1,771**	**1,699**	**2,765**	**3,837**	**3,685**	**5,276**	**7,939**	**8,667**	**9,310**	**9,310**	**9,071**	**65,120**
						SYLMAR BASIN							
City of Los Angeles	0	0	0	0	0	0	0	0	0	0	0	0	-
City of San Fernando	268	231	231	205	200	184	225	239	255	287	287	287	2,900
TOTAL Sylmar Basin:	**268**	**231**	**231**	**205**	**200**	**184**	**225**	**239**	**255**	**287**	**287**	**287**	**2,900**
						VERDUGO BASIN							
Crescenta Valley Water Dist.	128	111	128	134	101	107	115	121	121	121	121	121	1,430
City of Glendale	107	98	101	99	93	101	94	100	97	97	97	97	1,180
TOTAL Verdugo Basin:	**235**	**208**	**229**	**233**	**194**	**208**	**210**	**222**	**218**	**218**	**218**	**218**	**2,610**
ULARA TOTAL:	**2,295**	**2,210**	**2,159**	**3,203**	**4,231**	**4,077**	**5,710**	**8,400**	**9,140**	**9,815**	**9,815**	**9,576**	**70,630**

Notes:

A. Includes BOU and GAC.

B. Includes GOU, Forest Lawn and Grayson Power Plant.

C. Shaded cells denote projected values.

D. Includes production for CVWD's Rockhaven Well.

- There are no municipal-supply water wells in the Eagle Rock Basin.
- All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

TABLE 3-1B: HISTORIC AVERAGE AND PROJECTED GROUNDWATER EXTRACTIONS

(Acre-feet)

Party/Wellfield	Historic Average Pumping (AF)		Projected Groundwater Pumping (AF)				
SAN FERNANDO BASIN							
City of Los Angeles	1979-2017[A]	2012-2017[B]	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Aeration (NHOU)	1,150	709	56	1,086	1,089	1,086	1,167
Erwin	3,181	5	0	0	0	0	0
North Hollywood	23,686	11,842	6,183	13,587	14,533	16,686	17,935
Pollock	1,482	2,149	1,638	2,241	2,246	2,877	3,092
Rinaldi-Toluca	24,197	15,356	15,600	18,307	22,151	22,707	24,407
Tujunga	21,374	31,109	22,464	35,398	42,116	42,001	45,144
Verdugo	3,789	1,191	0	0	0	0	0
Whitnall	4,962	777	0	0	0	0	0
SUBTOTAL City of Los Angeles[C]	83,821	63,139	45,941	70,619	82,135	85,357	91,745
City of Burbank[D]	6,440	10,339	11,099	11,015	11,015	11,015	11,015
City of Glendale[E]	4,478	7,669	8,080	8,798	8,798	8,798	8,798
TOTAL San Fernando Basin:	**94,739**	**81,147**	**65,120**	**90,432**	**101,948**	**105,170**	**111,558**
SYLMAR BASIN							
City of Los Angeles	2,439	605	0	2,172	4,170	4,170	4,170
City of San Fernando	3,088	2,983	2,900	2,900	2,900	2,900	2,900
TOTAL Sylmar Basin:	**5,527**	**3,588**	**2,900**	**5,072**	**7,070**	**7,070**	**7,070**
VERDUGO BASIN							
Crescenta Valley Water District	2,746	2,043	1,430	1,520	1,550	1,645	1,720
City of Glendale[F]	2,139	1,333	1,180	1,180	1,180	1,180	1,180
TOTAL Verdugo Basin:	**4,885**	**3,376**	**2,610**	**2,700**	**2,730**	**2,825**	**2,900**
TOTAL ULARA:	105,151	88,111	70,630	98,204	111,748	115,065	121,528

Notes:

A. In prior reports, the long term-average included only muncipal wellfield pumping. Herein, the averages include physical solution pumping for Burbank, Glendale and CVWD (but not Los Angeles). Historic pumping averages include wells that are no longer in service.

B. 5-year average. Please note that in the historic report dated July 2011, this 5-year average did not include physical solution pumping.

C. Projections are not provided for the City of Los Angeles' Van Norman wells.
Production from this city's Van Norman wells are therefore not included in the long-term averages, the short-term averages, or the totals presented on this table.
As a result, values may differ between this table and corresponding values in the Annual ULARA Watermaster Report.

D. Includes BOU, City pumping, and Valhalla.
Valhalla converted to recycled water use in January 2016 and is now included only in the Historic Average Pumping values.

E. Includes Forest Lawn, GOU, and Grayson Power Plant pumping.

F. Includes production for CVWD's Rockhaven Well.

- There are no municipal-supply water wells in the Eagle Rock Basin.

IV. GROUNDWATER PUMPING AND TREATMENT FACILITIES

A. Wellfields

As shown on Table 3-1, there are ten municipal-supply wellfields located in the SFB, two in the Sylmar Basin, and two in the Verdugo Basin. There are no municipal-supply wells in the Eagle Rock Basin. Table 3-1, as mentioned previously, also lists the current number of active wells in each basin and the estimated pumping capacity of each wellfield (as reported by each Party). The general locations of wellfields within the SFB are shown on Plate 3.

Table 4-1 has been prepared to summarize the volumes (in AF) of groundwater that have reportedly been pumped and treated in the San Fernando, Sylmar and Verdugo basins by each of the various treatment facilities owned and/or historically operated by the five Parties in ULARA. The volumes of treated groundwater are listed for the Water Years 1985-86 through 2016-17. As seen on Table 4-1, a total of 615,409 AF of groundwater has been treated during that time period by the eight listed treatment facilities. Table 4-2 lists the volumes (in AF) of groundwater that are projected to be treated at these treatment facilities for the Water Years 2017-18 through 2021-22. As shown on Table 4-2, the Parties report that approximately 301,537 AF of water are projected to be treated at their existing treatment facilities between Water Years 2017-18 and 2021-22.

TABLE 4-1 HISTORIC AND CURRENT GROUNDWATER TREATMENT

(Acre-feet)

Water Year	Burbank GAC	Lockheed Aqua Detox	Burbank OU	Glendale North/South OU	CVWD Glenwood Nitrate Water Treatment Plant	Los Angeles North Hollywood OU	Los Angeles Pollock Wells Treatment Plant	Los Angeles Tujunga Wells Treatment Plant	Annual Total
1985-86		1							1
1986-87		1							1
1987-88		1							1
1988-89		924							924
1989-90		1,108				1,148			2,256
1990-91		747				1,438			2,185
1991-92		917			847	786			2,550
1992-93	1,205	692			337	1,279			3,513
1993-94	2,395	425	378		1,550	726			5,474
1994-95	2,590		462		1,626	1,626			6,304
1995-96	2,295		5,772		1,419	1,182			10,668
1996-97	1,620		9,280		1,562	1,448			13,910
1997-98	1,384		2,580		1,391	2,166			7,521
1998-99	1,555		9,184		1,281	1,515	1,513		15,048
1999-00	1,096		11,451	979	1,137	1,213	1,851		17,727
2000-01	995		9,133	6,345	989	1,092	1,256		19,810
2001-02	0		10,540	6,567	515	998	1,643		20,263
2002-03	0		9,170	7,508	216	1,838	1,720		20,452
2003-04	0		9,660	6,941	164	1,150	1,137		19,052
2004-05	0		6,399	7,541	782	1,042	1,752		17,517
2005-06	0		10,108	6,777	997	1,766	2,442		22,090
2006-07	0		9,780	7,562	644	1,307	2,231		21,524
2007-08	0		6,817	7,347	660	1,038	2,573		18,435
2008-09	148		9,818	7,148	459	662	1,698		19,932
2009-10	5		10,043	7,300	410	935	2,377	36,623	57,693
2010-11	4		10,394	7,473	592	1,150	3,127	12,200	34,940
2011-12	4		9,993	7,830	447	1,248	2,957	20,648	43,128
2012-13	0		11,387	6,518	488	343	1,629	5,718	26,084
2013-14	1		10,148	7,231	150	968	2,580	38,304	59,382
2014-15	2		10,006	7,025	186	1,132	3,037	10,442	31,830
2015-16	65		9,377	7,250	533	835	1,731	34,703	54,494
2016-17	0		9,501	7,740	246	525	2,278	20,411	40,700
Total AF	**15,364**	**4,815**	**201,382**	**123,082**	**19,628**	**32,556**	**39,533**	**179,049**	**615,409**

All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

TABLE 4-2 PROJECTED GROUNDWATER TREATMENT

(Acre-feet)

Water Year	Burbank GAC	Burbank OU	Glendale North/South OUs [1]	CVWD Glenwood Nitrate Water Treatment Plant	Los Angeles North Hollywood OU	Los Angeles Pollock Wells Treatment Plant	Los Angeles Tujunga Wells Treatment Plant [2]	Annual Total
2017-18	140	10,959	7,675	250	56	1,638	22,464	43,182
2018-19	0	11,015	8,388	300	1,086	2,241	35,398	58,428
2019-20	0	11,015	8,388	300	1,089	2,246	42,116	65,154
2020-21	0	11,015	8,388	300	1,086	2,877	42,001	65,667
2021-22	0	11,015	8,388	300	1,167	3,092	45,144	69,106
TOTAL	**140**	**55,019**	**41,227**	**1,450**	**4,484**	**12,094**	**187,123**	**301,537**

1. Groundwater treatment includes chromium removal via the WBA Chromium Removal facility and the RCF demonstration project.
2. Treatment plant utilizing GAC wellhead treatment only on Wells #6 and #7 of the twelve extraction wells at Tujunga Wellfield.

B. Active Groundwater Pumping and Treatment Facilities

Glendale OU (GOU) - City of Glendale

Construction of the GOU allowed for treated water to be available for delivery in Glendale in August 2000. The system includes four Glendale North OU (GNOU) extraction wells (with a total pumping capacity of 3,300 gpm) and four Glendale South OU (GSOU) extraction wells (with a total capacity of 1,700 gpm). The treatment process uses aeration and LPGAC to treat VOC-contaminated groundwater and then blends the treated water with imported MWD water at the Grandview Pump Station.

More information about the GOU can be found at USEPA's website:
https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0902252.

Burbank OU (BOU) - City of Burbank

The BOU is funded by Lockheed-Martin under a USEPA Consent Decree and is owned and operated by the City of Burbank at the expense of Lockheed Martin. Air stripping and LPGAC are used at the BOU to remove VOCs from groundwater (local groundwater also contains elevated concentrations of nitrate and chromium). Following these treatments, the treated water is the blended with imported water from MWD for delivery within the City of Burbank.

The City of Burbank is also concerned about Cr(VI) in the groundwater produced by BOU wells and has been blending the pumped groundwater with imported water to keep the concentration of total chromium at or below 7 μg/L; the BOU treatment facility was not designed to treat chromium.

More information about the BOU can be found via USEPA's website at:
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

GAC Treatment Plant - City of Burbank

The City of Burbank GAC system (Lake St wells) was shut down in March 2001 as a result of the elevated concentrations of Cr(VI) in the groundwater, and remained out of service through the 2007-08 Water Year. The plant saw limited use for non-potable purposes in Water Year 2008-09, and since then it has been used only when necessary to obtain water quality data from the wells. If the plant is returned to service, production may be considered as part of the average pumping goal of 9,000 gpm for the BOU.

North Hollywood OU (NHOU) - City of Los Angeles

The North Hollywood Operable Unit (NHOU) began operating in December 1989 in response to elevated concentrations of chlorinated VOCs including TCE and PCE. USEPA provides

100 percent of the funding for the operations and maintenance of this facility, which is operated and maintained by LADWP under the direction of the USEPA. The NHOU was designed to remove TCE and PCE from groundwater, with a treatment capacity of 2,000 gpm. This treatment facility operates by pumping water into an aeration tower where VOCs are removed from the water by an air stripper, with VPGAC vessels used on the aeration tower's air emissions to prevent introduction of VOCs to the atmosphere. Treated water is chlorinated and blended with other sources of clean water before distribution in the public water supply. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process. Current NHOU operations include the use of four of the seven extraction wells.

More recently, USEPA detected emerging contaminants including Cr(VI) and 1,4-dioxane in some of the wells within NHOU. Two of these wells have experienced elevated concentrations of 1,4-dioxane. The existing NHOU treatment system is incapable of removing Cr(VI) and 1,4-dioxane, but a sharp increase in the chromium concentrations has caused two of the eight NHOU extraction wells to be shut down and removed from the system; the untreated effluent from these two wells has been redirected for discharge into the municipal sewer. These wells serve an important plume containment function for the high levels of contamination, and these shutdowns demonstrated the need for a change in the original USEPA remedy.

In response to these shutdowns and continued migration of VOC-contaminated groundwater, USEPA conducted a Focused Feasibility Study (FFS) to evaluate alternatives for changing the groundwater remedy. USEPA summarized the results in its July 2009 Proposed Plan and selected the preferred remedy in its September 2009 Second Interim Record of Decision. The Second Interim Remedy is intended to upgrade and expand the existing NHOU groundwater supply production wellfields, and address treatment of emerging contaminants. The selected remedy included: installation of well-head treatment for Cr(VI) and 1,4-dioxane; expansion of the combined treatment system; construction of additional monitoring wells; construction and operation of three additional groundwater extraction wells; and continuing to provide the treated water to LADWP for a drinking water end use. USEPA amended the 2009 Second Interim Record of Decision in 2014 to allow for consideration of the treated effluent to be reinjected back into the local aquifer system (reinjection end use). In 2015, Lockheed Martin Corporation and Honeywell International Inc. prepared and submitted a groundwater Modeling Memorandum to USEPA for the design of the Second Interim Remedy for groundwater remediation at the NHOU.

For more information about the NHOU, please visit the following USEPA website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

Pollock Wells Treatment Plant (PWTP) - City of Los Angeles

San Fernando Valley (Area 4) USEPA Superfund site, which is an area of contaminated groundwater covering approximately 5,860 acres near the Pollock Wellfield in the City of Los Angeles. This area is part of the SFB, where groundwater is contaminated with various chlorinated VOCs including TCE and PCE.

USEPA completed an interim investigation of the Pollock Wellfield in April 1994 and concluded that selecting and implementing a Superfund remedy for the Pollock Area was not immediately necessary because LADWP planned to conduct a wellhead treatment project in the Pollock Wellfield. In March 1999, LADWP reactivated wells in the Pollock Wellfield to extract and treat the groundwater using LPGAC at the PWTP. Installation of the LPGAC vessels restored the use of Pollock Wells, which also reduces the potential of rising groundwater discharge from the SFB into the Los Angeles River. This treatment plant was designed to remove TCE and PCE from groundwater extracted by extraction wells at rates as high as 3,000 gpm. The treated water is delivered to LADWP's distribution system for a drinking water end use. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process. Emerging contaminants in the groundwater extracted from the Pollock Wellfield include 1,4-dioxane. LADWP plans to upgrade the existing PWTP to include treatment for 1,4-dioxane.

USEPA and the California Regional Water Quality Control Board entered into a Cooperative Agreement to perform an investigation of potential sources of contamination in the SFB. Currently, USEPA is conducting a search for Potentially Responsible Parties within the Pollock Site 4 Area, as well as a data gap analysis to identify where additional sampling and site characterization are needed. Following these activities, USEPA will conduct a Remedial Investigation and Feasibility Study to identify the extent of contamination and evaluate clean up alternatives.

For more information about Superfund Area 4 and the Pollock Wells Treatment Plant, please visit the following USEPA website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902253.

Temporary Tujunga Wells Treatment Study Project (TTW) - City of Los Angeles

The Tujunga Wellfield was constructed in the SFB in 1992 and has utilized 12 production wells to produce groundwater for municipal-supply use. Certain VOCs, including TCE and PCE, were detected in each of the wells. Over time, VOC concentrations increased sharply above their respective Federal and/or State MCLs, requiring the shutdown of multiple wells and, at times, the entire wellfield. In 2010, LADWP and MWD completed the Temporary Tujunga Wells

Treatment Study Project, a wellhead treatment project, including the installation of LPGAC adsorption vessels on two of the most severely impacted wells. Water quality test results from the treated effluent show that VOCs were effectively removed by the treatment process. The plant has a treatment capacity of 8,000 gpm and has restored more than 20,000 AFY of groundwater pumping capacity that had been unavailable due to water quality constraints. Other constituents of concern include 1,4 dioxane, carbon tetrachloride, and 1,1-dichloroethene (DCE). In this wellfield, Well No. 8 has been connected to the treatment system to run as a backup when Well Nos. 6 or 7 are shut down for either mechanical or maintenance needs. LADWP has requested a permit amendment from DDW to operate this connection.

Glenwood Nitrate Water Treatment Plant - Crescenta Valley Water District

Groundwater pumped from wells operated by CVWD in the Verdugo Basin often contains elevated to excessive concentrations of nitrate. A portion of the pumped groundwater is treated by ion exchange at the City's Glenwood Nitrate Water Treatment Plant and is then blended with untreated water from MWD and/or imported water to reduce nitrate concentrations to values that are below the State's Primary MCL for nitrate (as NO_3) of 45 mg/L. In the past few years, the ion-exchange plant has been in operation for the majority of each year to help maximize the use of local groundwater. The plant began to receive water from the Rockhaven Well in March 2016. The ion-exchange plant was in operation for eleven of the twelve months of Water Year 2016-17 and produced 246 AF of treated water, which helped CVWD to maximize its use of local groundwater.

C. Other Projects

1. Future Groundwater Pumping and/or Treatment Facilities

Groundwater System Improvement Study - City of Los Angeles

In early-2015, LADWP completed groundwater characterization in the SFB and constructed twenty-five new monitoring wells. In mid-2015, LADWP began the necessary planning for the groundwater basin remediation facilities, which may consist of centralized and localized treatment, to effectively cleanup and remove contaminants from the SFB and restore its groundwater to beneficial use. Contaminants of concern and proposed treatment will be determined through site-specific remedial investigations and feasibility studies. The four highest-priority basin remediation facilities are anticipated to be operational by 2021.

LADWP has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of various wellfields. These efforts include studies, activities, and other analyses required by USEPA's National Contingency Plan to evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that could produce water for potable use. Certain facts suggest this approach could be useful. These include the size and location of the plumes, the beneficial uses of the groundwater, reliability concerns of long-term availability of alternative water sources, and its high cost if such groundwater treatment did not occur.

The information LADWP will evaluate includes an analysis of pumping rates and treatment capacity that would be appropriate to capture contaminant mass, to reduce contaminant flow, and to help to restore the beneficial use of the aquifer systems for that wellfield, based on fate and transport modeling as well as other analyses. LADWP also plans to evaluate ways to minimize the volume of groundwater that requires treatment by prioritizing pumping from wells with higher levels of contamination to minimize the potential for contamination to spread to wells that currently do not contain contaminant concentrations that would require treatment. These analyses will also evaluate other alternatives.

LADWP will leverage its actions with current and planned response actions in the basin by LADWP and other parties, such as remedial actions undertaken by or overseen by state or federal regulatory agencies, as well as other feasible alternatives, including source control, in-situ treatment, or pumping from other areas.

As reported by LADWP, other agencies in Southern California are generally focusing on source control and other "hot spot" areas, whereas LADWP generally focuses more on restoring the beneficial uses of groundwater in the vicinity of production wells that has already migrated from the source areas.

To provide information about these potential response action alternatives, LADWP has completed a preliminary analysis of the scope and anticipated project costs. Preliminary analysis indicates that production from major SFB wellfields, either alone or in conjunction with other response actions, could attain a maximum well production capacity of over 300 cubic feet per second (cfs). LADWP anticipates that the treatment systems would have modularity for addressing additional treatment capacity that may be needed as a result of regulatory changes or plume migration over time. Design and construction costs for this set of alternatives are estimated to be on the order of $600 million, with remediation treatment costs of up to $50 million per year. These estimates assume that these facilities would be designed to utilize multiple best-available technologies to clean up contaminants including TCE, PCE, and 1,4-dioxane, eventually resulting in restoration of LADWP's highest producing wellfields in the eastern portion of the SFB.

North Hollywood West Advanced Oxidation Processes (AOP) Pilot Project

The North Hollywood West Advanced Oxidation Process Pilot Project (UV/AOP) was a pilot test for treatment of VOCs and 1,4-dioxane using the Ultraviolet Advanced Oxidation Process (UV AOP). The testing as part of this Pilot Project had two phases: Phase 1 incorporated bench scale testing with lab results, utilizing the oxidation from peroxide, chloride, and other background chemicals at flow rates ranging from 10 to 50 gpm; and Phase 2 testing evaluated low flow on-site pilot testing, increasing the flow rate up to 100 gpm and increasing the UV dose with the goal of better understanding reactor efficiency. In both phases, project feasibility was evaluated through monitoring of contaminant removal efficiency and through the identification of possible byproducts formed during the various treatment methods.

Mission Wellfield Improvement Project

The purpose of the Mission Wells Improvement Project is to rehabilitate and replace deteriorating City of Los Angeles groundwater facilities in Sylmar Basin, including construction of three replacement water wells and multiple groundwater monitoring wells, along with new piping, a new pump station, and electrical upgrades and controls. An application has been submitted to DDW to permit the operation of Well No. 10, one of the three new production wells in the Sylmar Basin. The other two wells, Nos. 8 and 9, will not be operated because of very low production capacity and because TCE concentrations in the pumped groundwater exceed the constituent's State MCL, respectively. The recently constructed onsite Chlorination Generation System has been permitted and is in operation, and Well No. 10 is expected to be able to be operational by July 2018.

Van Norman Complex Investigation

Two exploratory wells were drilled in 2015 to depths of approximately 1,500 feet below ground surface (bgs) on the LADWP Van Norman Complex property to investigate the existence and extent of potable groundwater within the Saugus Formation. Initial pumping tests from the two exploratory wells produced groundwater with concentrations of total dissolved solids (TDS) that were in excess of 1,000 mg/L. The water generated from the pumping tests was to be discharged to the high-speed channel that feeds directly to the Los Angeles Aqueduct Filtration Plant. Final well cleaning work was conducted in Summer 2017, and further testing is scheduled for Spring 2019.

Other Groundwater Remediation Projects

Many privately-owned, industrial-type properties in the ULARA groundwater basins have been found to have contaminated the soils and/or the groundwater beneath their facilities. Many of these facilities are under Cleanup and Abatement Orders from the RWQCB-LA; some sites are under the regulatory authority of the State Department of Toxic Substance Control (DTSC). Each known contaminated site typically has soil vapor borings and/or groundwater monitoring wells, and some have extraction wells, treatment facilities, and/or injection wells to help remove contaminant mass and to help mitigate the further spread of contamination. USEPA has been including Cr(VI) in the quarterly sampling from its monitoring wells in SFB as a step in the eventual containment and cleanup of this contaminant. The RWQCB-LA has also been evaluating properties and/or facilities in the eastern portion of the SFB for their possible onsite use, storage and/or release of Cr(VI) to the environment over time.

The reader can obtain current information and more details for various contamination and/or cleanup sites within ULARA, which are regulated by the RWQCB-LA, via that agency's GeoTracker website: http://geotracker.waterboards.ca.gov/. The DTSC website, http://www.envirostor.dtsc.ca.gov/public/, also contains information regarding groundwater quality investigations and/or cleanup sites within ULARA.

2. Dewatering Operations

Temporary Construction Dewatering

Temporary construction excavations, such as for deep subterranean parking structures or pipelines, sometimes require dewatering in areas that have a high (shallow) water table. Groundwater that is discharged from such temporary dewatering operations may, depending on volume, be required to be accounted for by the Watermaster. The annual groundwater withdrawals by these dewatering activities could be deducted from the local water right holder.

Permanent Dewatering Operations

A few facilities along the southern and western portions of the SFB have deep foundations and subterranean parking structures that have been excavated and constructed into areas of shallow (high) groundwater; these facilities require permanent dewatering. The amount of groundwater pumped at each of these facilities is reported to the Watermaster. These activities are subject to approval by the affected municipal-supply Party, and the dewaterer is required to pay for the replacement cost of the extracted groundwater. The pumped groundwater is subtracted from the affected Party's water right by the Watermaster.

3. Unauthorized Pumping in the County

There are numerous individuals, primarily within the unincorporated hill and mountain area of ULARA, who are or may be pumping groundwater without reporting the annual volume of production to the Watermaster. This groundwater was adjudicated and, in the opinion of prior Watermasters, is owned by the City of Los Angeles. The volume produced by each pumper is probably small. Working in cooperation with the Los Angeles County Department of Public Health and Los Angeles County Planning, the former Watermaster and LADWP initiated a process to help begin identification and monitoring of the water usage of these private pumpers through a water license agreement. LADWP and the Watermaster's office continue to work together to identify and track groundwater extractions associated with these private pumpers.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Agency-Owned Spreading Facilities

There are five active spreading facilities located in the SFB (see Plate 1). The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima spreading grounds, whereas the Tujunga spreading grounds are operated by LACDPW in cooperation with the City of Los Angeles. These spreading facilities are used for spreading native and imported water, when such types of water are available. Projects are underway to deepen and improve the capacity of these spreading basins and the LACDPW and the LADWP are also working to identify ways to maximize spreading, including possible changes to the operations at each spreading basin. The City of Burbank completed construction of MWD's new Foothill Feeder connection in 2010, which can deliver up to 50 cfs to the Pacoima spreading grounds; this enables Burbank to spread imported water when it is available. These facilities also allow Burbank to direct water to the Lopez spreading grounds. Burbank spread 11,791 AF of water in the Pacoima spreading grounds in the 2016-17 Water Year. Through December 2017 in this current Water Year, Burbank has spread 8,094 AF in the Pacoima spreading grounds.

B. Proposed Spreading Facilities

Rory M. Shaw Wetlands Park

The Rory M. Shaw Wetlands Park, Strathern Wetlands Park Project consists of stormwater capture and treatment facilities within a 46-acre site that was previously used as a gravel borrow pit. The project includes the construction of detention ponds and wetlands to store and treat stormwater runoff that will be pumped to Sun Valley Park for infiltration. This project has the potential to recharge an average of approximately 590 AF of runoff per year and is currently being designed; construction is estimated to start in 2018 and be completed by 2022.

C. Actual and Projected Spreading Operations

Table 5-1A shows the recent and projected volumes of native and imported water spread in SFB for the current 2017-18 Water Year. An estimated 11,623 AF of native runoff and imported water are projected to be spread in Water Year 2017-18. This represents a decrease of 17,355 AF when compared to the long-term (1968-2017) average of 28,978 AFY, and a decrease of 689 AF in comparison with the past five-year (2012-2017) average of 12,312 AFY.

TABLE 5-1A RECENT AND PROJECTED SPREADING OPERATIONS, Water Year 2017-18

(Acre-feet)

Month	Basin Operator					Total
	LACDPW				LACDPW and LADWP	
	Branford	Hansen	Lopez	Pacoima[A,B]	Tujunga[A]	
Actual						
Oct-17	4	8	0	3,190	0	3,202
Nov-17	4	14	445	1,980	0	2,443
Dec-17	4	26	847	1,970	0	2,847
Jan-18	108	102	1	284	0	495
Feb-18	9	41	0	0	0	50
Mar-18	175	255	0	1,010	0	1,440
Projected						
Apr-18	22	205	39	255	0	521
May-18	27	134	49	110	0	320
Jun-18	16	47	13	36	0	112
Jul-18	19	40	0	58	0	117
Aug-18	14	9	0	0	0	23
Sep-18	22	3	0	28	0	53
TOTAL	424	884	1,394	8,921	0	11,623
2012-2017 Average (AFY)	518	3,662	1,077	6,670	386	12,312
1968-2017 Average (AFY)	548	12,871	639	6,829	8,091	28,978

A) Includes native and imported water.

B) Includes water spread via the Foothill Feeder connection.

- Headworks Spreading Grounds out of service since 1981-82. The average spreading from 1968-69 to 1981-82 was 5,283 AF.
- All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

Precipitation on the valley fill area in the SFB is projected to be about 18.43 inches for Water Year 2017-18, higher than both the long-term average (1968-2017) of 17.15 inches per water year, and the five-year average for 2012-17 (10.35 inches per water year), as shown on Table 5-1B.

TABLE 5-1B HISTORICAL PRECIPITATION ON THE VALLEY FILL

(Inches per water year)

1968-17	2012-17	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18**
17.15	10.35	7.71	6.30	10.79	8.53	18.43	18.43

** Projected

The estimated capacities (in AFY) of the five spreading grounds in the northeastern portion of the SFB are shown on Table 5-2. Also listed for each spreading grounds are the site operator, the type of basin, the approximate total wetted area and the maximum experienced recharge. The total maximum experienced recharge of these five spreading grounds is approximately 107,828 AFY.

TABLE 5-2 ESTIMATED CAPACITIES OF EXISTING SPREADING GROUNDS

Name of Spreading Grounds	Basin Type	Total Wetted Area (ac)	Max Experienced Recharge (AFY)
Operated by LACDPW			
Branford	Deep basin	7	1,448
Hansen	Shallow basin	117	35,221
Lopez	Shallow basin	12	4,178
Pacoima	Shallow basin	107	24,164
Operated by LACDPW and LADWP			
Tujunga	Shallow basin	83	42,817
	TOTAL:	326	107,828

D. Stormwater Recharge Capacity Enhancements

Background Information

During the 1997-98 Water Year, area-weighted-average precipitation in the valley-fill and hill-and-mountain areas in ULARA was approximately 225% of normal. This amount of rainfall provided a well above-average volume of stormwater runoff that became available for capture in upstream reservoirs and diversion into existing spreading grounds. In April 1998, the original Watermaster received notice from the LACDPW that spreading at both the Hansen and Tujunga spreading grounds would be suspended temporarily. The reasons for curtailing spreading were that: the water table had risen to a level that threatened to inundate the base of the Bradley-East Landfill near the Hansen spreading grounds; and methane gas generated from the refuse was migrating from the Sheldon-Arleta Landfill and into the surrounding neighborhood due to the recharge operations at the nearby Tujunga spreading grounds. At that time, reservoirs in Los Angeles County were full, and thus thousands of acre-feet of surface water runoff had to otherwise be discharged and lost to the ocean. The spreading activities were suspended for at least one month at that time.

In response to this undesirable condition, in May 1998, that original Watermaster formed the Tujunga and Hansen Spreading Grounds Task Force which later became the San Fernando Basin Recharge Task Force. The task force included representatives from the LACDPW, LADWP, Los Angeles Bureau of Sanitation and the Watermaster. After a series of meetings, the task force developed preliminary mitigation measures to help improve the utilization of both spreading grounds, particularly during years of above-normal runoff and recharge.

The task force met as the Stormwater Recharge Committee for a period of time and has since become a collaborative effort between LACDPW and LADWP to focus on projects to enhance the recharge capacity of spreading basins in the eastern portion of the SFB. As a result, watershed management groups have been formed within both the LACDPW and LADWP to address the entire cycle of pumping and recharge as an interrelated discipline, and these groups are work in partnership to study and develop solutions to enhance the groundwater supply in the SFB.

LADWP and the Los Angeles County Flood Control District (LACFCD), in cooperation with the City of Los Angeles Bureau of Engineering, Bureau of Sanitation and Bureau of Street Services, continue to partner on, jointly fund, and collaborate on several projects that are projected to enhance the capacity for recharge of native water into the SFB via existing spreading grounds in the northeastern portion of this basin.

Below is a list of plans for modifying existing spreading facilities and construction of new facilities to provide expanded opportunities for enhancing the recharge capacity of the SFB and the Verdugo Basin.

Projects

- Hansen Spreading Grounds

Hansen spreading grounds is a 156-acre facility that is located adjacent to the channel of Tujunga Wash and downstream of Hansen Dam. The total wetted area of the spreading grounds is 117 acres and it has a maximum intake rate of 600 cfs. These spreading grounds are owned and operated by LACFCD. Improvements to deepen and combine the existing basins, as well as to retrofit and automate the intake structure, were completed in January 2013. No additional modifications to the spreading basin are currently proposed. LADWP and LACFCD shared the $8.4 million cost for construction of this project, and it is expected that the project will increase average stormwater recharge by 2,100 AFY.

- <u>Sheldon-Arleta Project - Cesar Chavez Recreational Complex Project (Phase I)</u>

Located adjacent to the Tujunga spreading grounds is the Sheldon-Arleta Landfill, which has caused environmental concern because of the methane gas that is produced and released into the subsurface as a byproduct of landfill operations.

During the spreading of surface water at the adjoining Tujunga spreading grounds, recharge water moving downward through the underlying earth materials displaces the air from voids within the unsaturated soil matrix. The resulting lateral migration of the air mass has the potential to displace methane gas out of the adjacent landfill. In recent years, the methane has occasionally migrated offsite, and elevated concentrations of this gas have even been reported at a nearby school. To avoid such occurrences, temporary limitations have been placed on the amount of stormwater that can be spread at the Tujunga spreading grounds.

To mitigate the displacement of methane gas, LADWP, the Los Angeles Bureau of Sanitation, and the Los Angeles Bureau of Engineering completed replacement of the existing methane gas collection system at the Sheldon-Arleta Landfill with a new gas collection system. This new system enhances containment of the methane gas within the landfill, restores the historic spreading flow capacity of 250 cfs at the Tujunga spreading grounds, and restores operations at some of the Tujunga spreading basins that lie closest to the landfill. Construction was completed in 2009 and the three agencies will eventually conduct an evaluation, hopefully during the next substantial storm season, to determine the maximum recharge capacity of the improved facility. It is expected that the project could increase average annual stormwater capture by 3,000 AF, to a total of 5,000 AF, at these spreading grounds.

- <u>Tujunga Spreading Grounds</u>

Tujunga spreading grounds occupy a 150-acre parcel located along the Tujunga Wash Channel at its confluence with the Pacoima Wash Channel. This spreading facility, which is owned by LADWP and operated by LACFCD, has a total wetted area of 83 acres, a maximum intake capacity of 250 cfs, and a storage capacity of 100 AF at this time.

The Tujunga Spreading Grounds Upgrade project entered the construction phase in August 2016 and is expected to be completed in 2019. As a result of this construction, the intake structure for these spreading grounds is out of commission and spreading is not feasible until completion of the work in late-2019. The scope of construction includes consolidating and deepening existing spreading basins, installing two high-flow rubber dams, and modifying the existing intake. This project is expected to increase regional average stormwater capture and recharge by 8,000 AFY. As a result of this construction, no spreading is projected to occur in these facilities throughout the current water year.

- Pacoima Spreading Grounds

The 169-acre Pacoima spreading grounds surround old Pacoima Wash Channel downstream of Pacoima Dam and Reservoir. This spreading facility is owned and operated by LACFCD and has a total wetted area of 107 acres, a maximum intake capacity of 600 cfs, and a storage capacity of 530 AF.

LADWP and LACFCD are currently working cooperatively to improve stormwater capture at this facility by upgrading and automating the intake structure and revitalizing the recharge basins as part of the Pacoima Spreading Grounds Upgrade project. This upgrade project is currently in design, with construction expected to begin in 2019 and be completed by 2021. The scope includes consolidating existing spreading basins, excavating sediment to improve infiltration rates, and installing a new automated intake structure. Once completed, this project is expected to increase regional annual average stormwater capture and recharge by 5,300 AFY.

- Lopez Spreading Grounds

Lopez spreading grounds, owned and operated by the LACFCD, are located downstream of Pacoima Dam. The facility has a total wetted area of 12 acres, a maximum intake rate of 25 cfs, and storage capacity of 24 AF.

LADWP and LACFCD are currently working cooperatively to improve stormwater capture by upgrading and automating the intake facility and revitalizing the recharge basins as part of the Lopez Spreading Grounds Upgrade project. This upgrade project is currently under design, with construction expected to begin in 2022 and be completed by 2024. The scope includes expanding and deepening existing spreading basins, excavating sediment to improve infiltration rates, and improving the intake structure. This project, once completed, is expected to increase regional annual average stormwater capture and recharge by approximately 480 AFY.

- Branford Spreading Grounds

Branford spreading grounds, owned and operated by LACFCD, are located immediately adjacent to Tujunga spreading grounds, along the Pacoima diversion channel. Most of the water that arrives at the Branford spreading grounds is urban runoff from Branford Street Channel. The total wetted area of the facility is 7 acres; it has with a maximum intake rate of 1,540 cfs and a storage capacity of 137 AF. Average annual recharge for the facility is approximately 550 AFY, based on the LACFCD historical record.

The Branford Spreading Basin Upgrade project is currently in design, with construction expected to begin and end in 2020. The scope includes installing a new pipe to divert water from the

Branford Basin into the Tujunga spreading grounds. Once completed, this project is expected to increase regional annual average stormwater capture and recharge by 597 AFY.

- Big Tujunga Dam Seismic Retrofit

Big Tujunga Dam was constructed by LACDPW in the 1930s primarily as a flood control facility. In the 1970s, a seismic analysis indicated the dam was susceptible to damage from a large earthquake. For many years thereafter, the dam has been operated at a reduced capacity for safety reasons.

LACDPW completed a major seismic retrofit of this dam in January 2012 and this effort has also restored its storage capacity for flood control and water conservation. Notably, the structural improvements to Big Tujunga Dam increased its storage capacity from 1,500 AF to 6,000 AF. This project, which was partially funded by the City of Los Angeles, greatly enhances LACDPW's ability to retain and manage stormwater for flood protection, water conservation, and environmental restoration.

- CVWD Stormwater Recharge Feasibility Study

CVWD's Verdugo Basin Groundwater Recharge, Storage, and Conjunctive Use Feasibility Study was completed in 2005 and recommended methods for stormwater recharge and storage within this basin. In Water Year 2012-13, CVWD received a Local Groundwater Assistance (LGA) grant from DWR to perform a feasibility study for stormwater recharge within the Verdugo Basin at Crescenta Valley County Park.
The study is a cooperative effort with the City of Glendale, the County of Los Angeles and other local stakeholders to determine if stormwater can be stored at Crescenta Valley County Park. The feasibility study started in August 2013 and was completed in October 2016. The results of this study showed that an estimated 500 AFY of stormwater could be infiltrated into the Verdugo Basin, which would help to increase groundwater levels in the basin, which, in turn, would help to increase well capacity on an annual basis.

CVWD is currently preparing a conceptual design plan for the stormwater capture within Crescenta Valley County Park. The conceptual plan will be circulated among stakeholders including the City of Glendale; LACDPW; Los Angeles County, Parks and Recreation; and the Crescenta Valley Town Council for comments and approval. In addition, CVWD will be pursuing State and Federal grant funding for implementation of the project.

VI. GROUNDWATER INVESTIGATION PROGRAMS

There are numerous ongoing groundwater quality investigations in ULARA, particularly in the eastern portion of the SFB. The reader can obtain current information and more details for the sites mentioned below, which are regulated by the RWCQCB-LA, via that agency's GeoTracker website, http://geotracker.waterboards.ca.gov/.

The DTSC website, http://www.envirostor.dtsc.ca.gov/public/, also contains information regarding other groundwater quality investigations and/or cleanup sites within ULARA.

Below are brief descriptions of some of the groundwater quality investigations for contaminated and/or potentially contaminated sites within ULARA. The discussion below does not provide an exhaustive list of these sites within ULARA. Possible omission of a site from the list below does not imply that the omitted site is not important or not of concern to the Watermaster or to the Parties to the ULARA adjudication.

Pacoima Area Groundwater Investigation

A major VOC contaminant plume exists in the groundwater near the intersection of San Fernando Road and the Simi Valley Freeway (118 Freeway), in the Pacoima area of the SFB. This area lies approximately 2.5 miles north of and upgradient from the LADWP Tujunga wellfield. Groundwater pumped at this wellfield has experienced increasing concentrations of VOCs over time.

To help characterize the extent and potential migration of contamination in the Pacoima area, LADWP constructed two groundwater monitoring wells in 1997, including: PA-01, approximately 0.5 miles downgradient; and PA-02, approximately 1.25 miles downgradient from the suspected source areas.

The suspected sources reportedly include the Chase chemical (formerly Holchem) and the Black & Decker (formerly Price-Pfister) sites, which are under the jurisdiction of DTSC and RWQCB-LA, respectively.

Chromium Investigations

The RWQCB-LA, funded in part with a grant from USEPA, reviewed a large number of sites for potential Cr(VI) contamination in the SFB and published its original findings in December 2002. Based on this RWQCB-LA review, 255 suspected Cr(VI) sites were identified and inspected. As a result of those inspections, the RWQCB-LA recommended closure (i.e., no further action) for 150 of those sites and further assessment of the remaining 105 sites. In addition, the RWQCB-LA issued Cleanup and Abatement Orders to several sites including, among others, B.F.

Goodrich (formerly Menasco Aerospace Division), PRC-Desoto (formerly Courtauld), Drilube, Honeywell (formerly Allied Signal), Lockheed (2), ITT, and Excello Plating. The RWQCB-LA may eventually issue additional orders to several other sites as well. These Cleanup and Abatement Orders require a responsible party to assess, clean up, and remediate the effects of contamination encountered in the soil and groundwater. Increasing concentrations of Cr(VI) in the groundwater have caused the shutdown or reduced pumping of several municipal-supply water wells associated with groundwater treatment plants because those plants were not designed to remove this contaminant (or any other newly-emerging contaminants). Shutdowns of those municipal-supply wells may allow the continued vertical and lateral migration of the VOCs and chromium to other production wells, and may also continue to complicate the ongoing and future extraction, management and delivery of potable water by the Parties within the SFB.

The Glendale Chromium Operable Unit (GCOU) was established in 2007 to help characterize the extent of chromium contamination in groundwater in the Glendale area, and to determine appropriate remedial action. USEPA is working with the DTSC and the RWQCB-LA to identify and clean up sources of chromium contamination. Remedial investigation of chromium contamination in groundwater in the GCOU began in 2011. To date, at least 29 groundwater monitoring wells have been constructed to help evaluate the location and extent of the chromium contamination in soils and groundwater beneath the area.

Information for the GCOU is available from USEPA's website at:
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902252

Tujunga Discovery Project

In 2008, the LADWP formed a task force in conjunction with USEPA and DTSC to conduct an inter-agency investigation into groundwater contamination at the Tujunga wellfield. The investigation began with LADWP's comprehensive sampling of eight existing groundwater monitoring wells in the vicinity of this wellfield. Two additional monitoring wells were sampled in December 2009. The lack of VOCs detected in groundwater samples collected from LADWP monitoring well TJ-MW-01 suggests that the Sheldon-Arleta Landfill, adjacent to the Tujunga wellfield, may not be the source of this contamination.

USEPA's contractor performed soil vapor sampling and limited soil sampling along several miles of transects upgradient of LADWP's Tujunga wellfield. The site-specific soil vapor results indicated low levels of PCE at most of the investigated sites. In early-2010, sediment sampling was conducted in the adjacent Branford spreading grounds to determine whether sediments in this basin might be a source of VOC contamination. Numerous borings were drilled, and many soil samples were analyzed for various analytes, including VOCs. TCE was not detected in any of these soil samples, but acetone and 2-butanone were detected in certain samples, although reportedly, these may be related to laboratory contamination.

The next stage of the investigation involved the construction of several new groundwater monitoring wells in the capture zone of the Tujunga wellfield. The locations of these new monitoring wells were prioritized based on data gaps in the existing wellfield. LADWP completed the construction of four new monitoring wells near the Tujunga wellfield between April 2012 and June 2013, and two other monitoring wells were to be constructed in late-2013. USEPA also constructed a monitoring well (TJ-MW-09) in 2013. Construction of these monitoring wells was completed in 2014.

VII. ULARA WATERMASTER MODELING ACTIVITIES

A. Introduction

LADWP continues to support the ULARA Watermaster by performing groundwater modeling of the SFB. The purpose of this groundwater modeling is to evaluate the combined effects of the proposed groundwater pumping and estimated groundwater recharge in the SFB projected over a five-year period. The projected pumping volumes used in the model were obtained from the "Water Year 2017-18 through 2021-22 Pumping and Spreading Plans" submitted by each Party pursuant to the provisions established in the revised February 1998 Policies and Procedures report. A copy of the current Pumping and Spreading Plan of each Party is included in the appendix of this report.

The groundwater flow model used is a comprehensive three-dimensional computer model that was developed originally for USEPA during the Remedial Investigation Study of the San Fernando Valley (December 1992). The model is a tool that has been used herein to estimate the future response to pumping and spreading in the SFB for the five-year period ending September 30, 2022.

The model code, "Modular Three-Dimensional Finite-Difference Groundwater Flow Model," commonly called MODFLOW, was originally developed by the U.S. Geological Survey (McDonald-Harbaugh); this model is currently used to develop the San Fernando Basin Groundwater Flow Model. This model consists of 64 rows, 86 columns, and up to four layers to reflect the varying geologic and hydrogeologic characteristics of the SFB in three dimensions. In the deepest portion of the SFB (i.e., in the eastern portion of the SFB), the model is subdivided into four layers, each layer characterizing a specific depth zone beneath ground surface. The model has a variable horizontal grid with cells that range from 1,000 by 1,000 feet in size in the southeastern portion of the SFB, to 3,000 by 3,000 feet in size in the northwestern portion of this basin or where less data are available. This model is regularly updated by LADWP.

B. Model Inputs

The input data for this model are illustrated in Table 7-1. Table 7-1A provides the various elements of recharge into the SFB; recharge occurs from precipitation, delivered water, hill and mountain runoff, spreading, and subsurface inflow. Table 7-1B provides the volumes of groundwater extracted from the SFB by each major Party, including the City of Los Angeles, the City of Burbank, the City of Glendale and other individual pumpers. Both tables show projected values for the five-year period, from Fall 2017 to Fall 2022, as well as any actual values that have been reported for the first half of the 2017-18 Water Year.

In Table 7-1A, the projected values for percolation and spreading activities were estimated using the long-term average rainfall and recharge amounts, and the resulting estimates were then used as inputs to the model. The projections for Water Years 2017-22 include the actual amounts reported for the first half of this current water year. The spreading estimates reflect temporary shutdowns during construction of the Tujunga spreading grounds. Construction to enhance the spreading capacity at the Tujunga spreading grounds is planned to occur within the next few years. The anticipated spreading of imported water at the Pacoima spreading grounds by the City of Burbank is also included in these projections. Subsurface inflows to the SFB occur from the Sylmar Basin (through the Sylmar Notch and Pacoima Notch) were estimated by the current ULARA Watermaster to be approximately 250 AFY. The amounts of subsurface inflows from the Verdugo Basin were those determined in the 1962 Report of Referee. These values were used as constants in the model throughout the current five-year study period.

The volumes for all groundwater extractions shown on Table 7-1B and used as model inputs were obtained from the "Groundwater Pumping and Spreading Plans" submitted by the five municipal-supply producers. The total extraction by each wellfield was initially allocated among the individual wells comprising each wellfield, and then a percentage of the pumping allocated to each well was assigned to each model layer based on the percentage of casing perforations considered to be contained within each layer.

The initial head values (groundwater elevations) were derived from the actual data from Water Year 2016-17, and these values set the initial conditions for model analysis for the next five-year period. These initial conditions reflect the increase in simulated groundwater elevations observed in most areas of the SFB resulting from decreased pumping in the wellfields operated by the City of Los Angeles.

At the close of every water year, the Watermaster staff at LADWP update the model input files with the actual basin recharge and extraction data; this activity is performed each year by LADWP and incorporates actual data from as early as 1981.

Table 7-1
MODEL INPUT
San Fernando Basin Recharge & Extractions
2017-2022

Table 7-1A
Projected San Fernando Basin Recharge 2017-22

	SAN FERNANDO BASIN RECHARGE (AF/Y)																		
	RAINFALL (IN/Y)		PERCOLATION			H&M (A)	SPREADING GROUNDS			PACOIMA					SUBSURFACE INFLOW				
WATER YEAR	VALLEY	HILL & MTN	VALLEY FILL	RETURN WATER	SUB TOTAL	HILL & MTN	BRANFORD	HANSEN (B) (NATIVE)	LOPEZ	PACOIMA (NATIVE)	PACOIMA (C) (MWD)	PACOIMA (TOTAL)	TUJUNGA (D)	SUB - TOTAL	PACOIMA NOTCH (E)	SYLMAR NOTCH (E)	VERDUGO BASIN	SUB - TOTAL	TOTAL RECHARGE
2017-18	18.43	23.87	12,803.38	38,312	51,115	4,076.84	424	884	1,394	8,921	8,094	17,015	0	19,717	117	133	70	320	75,229
2018-19	17.15	21.21	11,914.16	48,036	59,950	3,622.53	540	13,900	540	6,564	6,950	13,514	0	28,494	117	133	70	320	92,387
2019-20	17.15	21.21	11,914.16	48,036	59,950	3,622.53	540	13,900	540	6,564	6,950	13,514	0	28,494	117	133	70	320	92,387
2020-21	17.15	21.21	11,914.16	48,036	59,950	3,622.53	540	13,900	540	6,564	6,950	13,514	5,100	33,594	117	133	70	320	97,487
2021-22	17.15	21.21	11,914.16	48,036	59,950	3,622.53	540	13,900	540	6,564	6,950	13,514	5,100	33,594	117	133	70	320	97,487

Table 7-1B
Projected San Fernando Basin Extraction 2017-22

	SAN FERNANDO BASIN EXTRACTIONS (AF/Y)																			
	LADWP										BURBANK			GLENDALE			OTHERS			
WATER YEAR	AE	ER	HW	NH (WEST)	NH (EAST)	PL	RT	TJ	VO	WH	TOTAL LADWP (F)	BURBANK PSD	LOCKHEED	NON-BURBANK (VMP)	CITY OF GLENDALE	GU-NORTH	GU-SOUTH	TOTAL NON-LADWP	TOTAL NON-GLENDALE (F. LAWN)	TOTAL EXTRACTION
2017-18	-56	0	0	-6,183	0	-1,638	-15,600	-22,464	0	0	-45,941	0	-10,959	0	-5	-4,989	-2,686	-772	-400	-65,752
2018-19	-1,086	0	0	-13,587	0	-2,241	-18,307	-35,398	0	0	-70,619	0	-11,015	0	-10	-5,452	-2,936	-772	-400	-91,204
2019-20	-1,089	0	0	-14,533	0	-2,246	-22,151	-42,116	0	0	-82,135	0	-11,015	0	-10	-5,452	-2,936	-772	-400	-102,720
2020-21	-1,086	0	0	-16,686	0	-2,877	-22,707	-42,001	0	0	-85,357	0	-11,015	0	-10	-5,452	-2,936	-772	-400	-105,942
2021-22	-1,167	0	0	-17,935	0	-3,092	-24,407	-45,144	0	0	-91,745	0	-11,015	0	-10	-5,452	-2,936	-772	-400	-112,330

NOTES:

(A) Hill & Mountain runoff

(B) Hansen Spreading Grounds activated in the water year of 2009-10 after completing the modification work

(C) Burbank projected to spread a total of 6,950 AF of imported water (MWD) at Pacoima Spreading Grounds on a yearly basis.

(D) Tujunga Spreading Grounds will be out of service during the water years of 2016-18 for modifications to increase storage capacity

(E) The values were estimated on the updated Safe Yield for the Sylmar Basin by Mr. Richard Slade, the Watermaster of Upper Los Angeles River Area.

(F) The values shown for Los Angeles on this extraction plan are estimates only. The estimated groundwtaer pumping amounts for the above-mentioned wellfields may be increased as treatment faculities are installed or as the blending with external source of water will continue to be allowable.

C. Simulated Groundwater Elevations and Flow Directions

After running the model for five separate but successive stress periods (Water Years 2017-2022), each lasting 365 days, MODFLOW generated various numerical data, including the heads (groundwater elevations), the drawdown (change in groundwater elevations) and the cell-by-cell flow (vector or flow direction data). These numerical data were used to create the following figures and plates:

- The simulated groundwater (water table) contour results for Model Layer 1 for Fall 2022 are shown on Plate 1; the simulated contours for Model Layer 2 are shown on Plate 2 for the same period.

- The changes in the simulated groundwater elevation contours were generated from the drawdown data from the Fall 2017 to Fall 2022 stress period and the results are shown on Plate 3 for Layer 1 and on Plate 4 for Layer 2.

- The simulated horizontal groundwater flow directions for Fall 2022 are shown on Plate 5 for Model Layer 1 and on Plate 6 for Layer 2 for the same period.

- Plates 7 through 10 depict the most recently generated contaminant plumes for TCE, PCE, NO_3, and total dissolved chromium (as adapted from 2017-dated work published by USEPA), superimposed onto the Layer 1 simulated horizontal groundwater flow direction for the year 2022.

D. Evaluation of Model Results

Plate 1: Simulated Groundwater Contour Model Layer 1 – Fall 2022

The most noticeable feature of the simulated groundwater contours shown on Plate 1 for the SFB is the cone of depression (pumping cone) that has developed around the BOU. Extractions by wells at this facility occur primarily from Layer 1, although Layer 2 does provide some recharge to Layer 1. The City of Burbank has projected pumping of about 11,015 AFY from its BOU for the period from Fall 2017 to Fall 2022. The radius of pumping influence extends as far as 3,865 feet in the downgradient (southeasterly) direction from the BOU wells. The upgradient radius of influence is usually larger than the downgradient radius of influence. Plate 1 illustrates the more subtle pumping influence on groundwater elevations of the GOU wells and the Pollock Treatment Plant Wells.

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2022

The most significant features of the simulated groundwater contours shown on Plate 2 are the simulated cones of depression near the Tujunga wellfield, the Rinaldi-Toluca wellfield, the North Hollywood wellfield and the BOU. Approximately 75 percent of the groundwater pumped from the Tujunga, Rinaldi-Toluca and North Hollywood wellfields is considered to be extracted from model Layers 2, 3 and 4.

Plate 3: Change in Groundwater Elevation Model Layer 1 – Fall 2017 to Fall 2022

The model simulation showed an increase in simulated groundwater elevations in most areas of the basin, particularly in areas near the wellfields. This increase in simulated water levels would result mostly from the difference between the amount of pumping and the amount of recharge that were simulated during the five-year period of model simulation.

The estimated total groundwater recharge during the five years of simulation exceeded the total extraction volume by about 22,970 AF, cumulatively. The items below provide a more detailed review of Plate 3:

- The area in the vicinity of the Tujunga spreading grounds shows a decrease in simulated groundwater elevations of about 35 feet.
- The area in the vicinity of Hansen spreading grounds shows an increase in simulated groundwater elevations of about 30 feet.
- The increase in simulated groundwater elevations from 2017 to 2022 in the vicinity of the Pacoima spreading grounds results from proposed spreading of imported water by Burbank (6,950 AFY), in addition to the normal recharge of native surface water by the LACDPW.
- The simulated groundwater elevations for the Rinaldi-Toluca wellfield were shown by the model to increase by about 35 feet.
- Simulated groundwater elevations near the Erwin, Whitnall and Verdugo wellfields were simulated to decrease by 15 to 5 feet.
- The simulated groundwater elevation near the BOU showed an expected decrease by about 10 feet.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 2017 to Fall 2022

- Similar to Model Layer 1 (shown on Plate 3), Plate 4 illustrates much of the same increase in simulated groundwater elevations in Model Layer 2 which would also result from the increased recharge during the five years of the model scenario.

- The model simulated a decrease in the groundwater elevations by 40 to 35 feet in the area near the Rinaldi-Toluca wellfield. Simulated groundwater elevations in the area near the Erwin, Whitnall and Verdugo wellfields were projected by the model to decrease by 25 to 10 feet.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2022

- Plate 5 consists of groundwater flow direction arrows superimposed on the simulated groundwater elevation contours to illustrate the general (or regional) direction of groundwater flow within Layer 1 of the model.

- Groundwater pumped at the Rinaldi-Toluca, Tujunga, North Hollywood, GOU, and BOU wellfields and water spread at the Hansen, Pacoima and Tujunga spreading grounds caused the most pronounced effect on the direction of groundwater flow in the SFB. In particular, pumping by the BOU may create such a significant cone of pumping depression that groundwater appears to flow inward toward the wellfield from all directions (radial flow).

- A groundwater divide apparently develops south of the BOU wells. This appears to be primarily due to the "pumping trough" formed by groundwater extractions at the BOU.

Plate 6: Simulated Groundwater Flow Direction Model Layer 2 – Fall 2022

- Plate 6 consists of groundwater flow direction arrows superimposed on the simulated groundwater elevation contours to illustrate the general, or regional, direction of groundwater flow within Layer 2 of the model for the SFB.

Plates 7 – 10: Simulated Groundwater Flow Direction and TCE, PCE, NO_3, and Chromium (Cr) Contamination in Model Layer 1 – Fall 2022

- Plates 7 through 10 depict the most recent TCE (2017), PCE (2017), NO_3 (2010) and Total Cr (2014) contaminant plumes available from the work of USEPA, and these plumes are superimposed onto the horizontal direction of groundwater movement in Layer 1 for Fall 2022. The BOU appears to a large portion of the 0-5, 5-50, 100-500, and 500-1,000 μg/L regions of the TCE and PCE plumes. The uncaptured portions of these plumes are likely to continue migrating in a southeasterly direction toward the GOU and toward the Los Angeles River Narrows area.

- Pumping by the BOU (11,015 AFY) tends to flatten (reduce) the horizontal gradient in a southeasterly direction, slowing the natural movement of groundwater southeasterly of the plume in the area of the BOU.

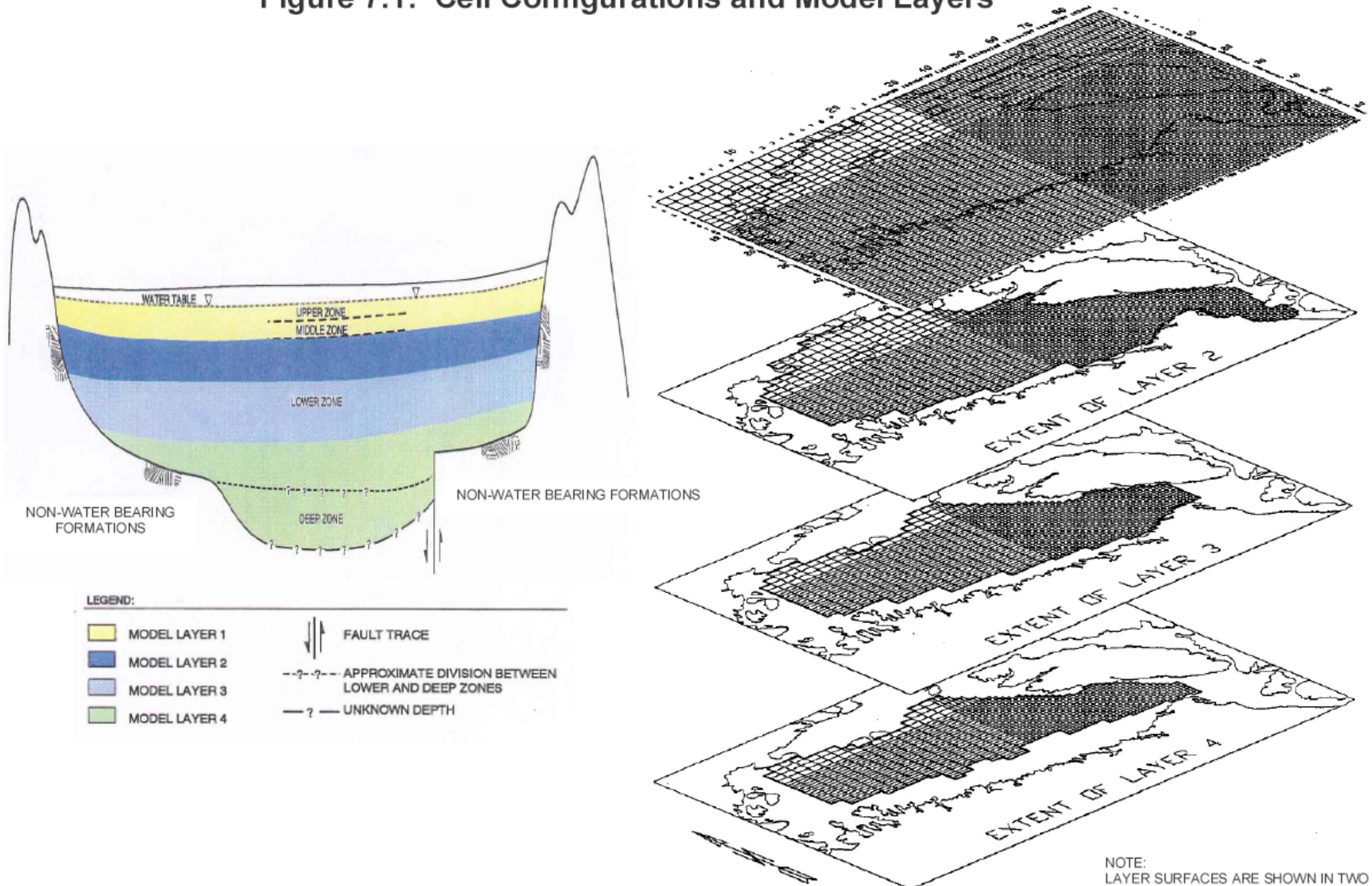
- Wells in the Glendale NOU and SOU capture a portion of the plume(s) that is (are) not captured by the BOU wells. GOU wells also appear to capture the plume located upgradient but within the radius of influence of these wells.

- Pumping by the Pollock wells appears to have little effect on Layer 1 because approximately 75 percent of the pumping by this facility extracts groundwater from the zones within Layer 2.

- Plate 9 (NO_3 Contamination) indicates that Layer 1 extractions by the NHOU, BOU and GOU wells may be impacted by NO_3.

- Plate 10 (Total Dissolved Chromium) indicates that Layer 1 extractions by wells in the NHOU, BOU, the north and south GOUs and the Pollock Wells may be impacted by the Cr plume(s).

Figure 7.1: Cell Configurations and Model Layers



NOTE:
LAYER SURFACES ARE SHOWN IN TWO DIAMENSIONS FOR THE PURPOSE OF THIS ILLUSTRATION ONLY. ACTUAL MODEL LAYER THICKNESS VARIES BY NODE.

Source: Remedial Investigation Report of Groundwater Contamination in the San Fernando Valley, December 1992

VIII. WATERMASTER EVALUATION AND RECOMMENDATIONS

The Parties to the Judgment continue to evaluate ways to help increase groundwater recharge in the ULARA groundwater basins. In an effort to increase stormwater recharge in SFB, the City and County of Los Angeles initiated and continue to fund an ambitious and very important program to increase the recharge capacity in several of the local spreading grounds; the City of Los Angeles also continues to investigate additional alternatives to increase water conservation. This Watermaster commends the City and County of Los Angeles for these vital efforts. The City of Burbank has continued spreading imported water in certain spreading basins when possible to increase basin recharge; CVWD continues to work independently and with the City of Glendale to possibly try to implement stormwater capture programs to increase recharge in the Verdugo Basin. Further, Burbank, Glendale and Los Angeles continue to expand their recycled water programs to offset groundwater and imported water use.

VOC contamination in conjunction with newly-discovered contaminants (such as 1,4-dioxane) in some areas continue to be the most serious challenges to water quality and to the ability of the Parties to pump their water rights (without treatment) from the SFB. The various contaminant plumes are large and continue to migrate, despite years of groundwater remediation and treatment. For example, the VOC plumes in North Hollywood have not been fully contained by the extraction wells in the NHOU, due in large part to declining groundwater levels which have resulted in the reduced pumping capacity of those extraction wells. It is encouraging to see USEPA's proposed Second Interim Remedy for the NHOU which entails facility improvements to increase its peak pumping capacity to as much as 4,000 gpm (3,050 gpm on average). Although the planned implementation of these improvements is several years away, this Remedy should eventually help remove additional contaminant mass and control contaminant migration in the nearby plumes. The BOU has undergone several capital improvements and the facility now operates with much greater reliability for pumping and treatment of VOC-contaminated groundwater at near its 9,000 gpm design capacity on a consistent basis.

This Watermaster continues to be aware of and concerned about the detections of Cr(VI) in several production wells in the eastern portion of the SFB. As Watermaster, I continue to support an aggressive approach by regulatory agencies, including USEPA, RWQCB-LA and DTSC, in identifying the various sources of this contaminant and in requiring effective, efficient and timely cleanup by the responsible parties. The Watermaster appreciates Glendale's lead in the development of chromium treatment technology in the area and in the construction of its Chromium (VI) Removal Demonstration Facilities.

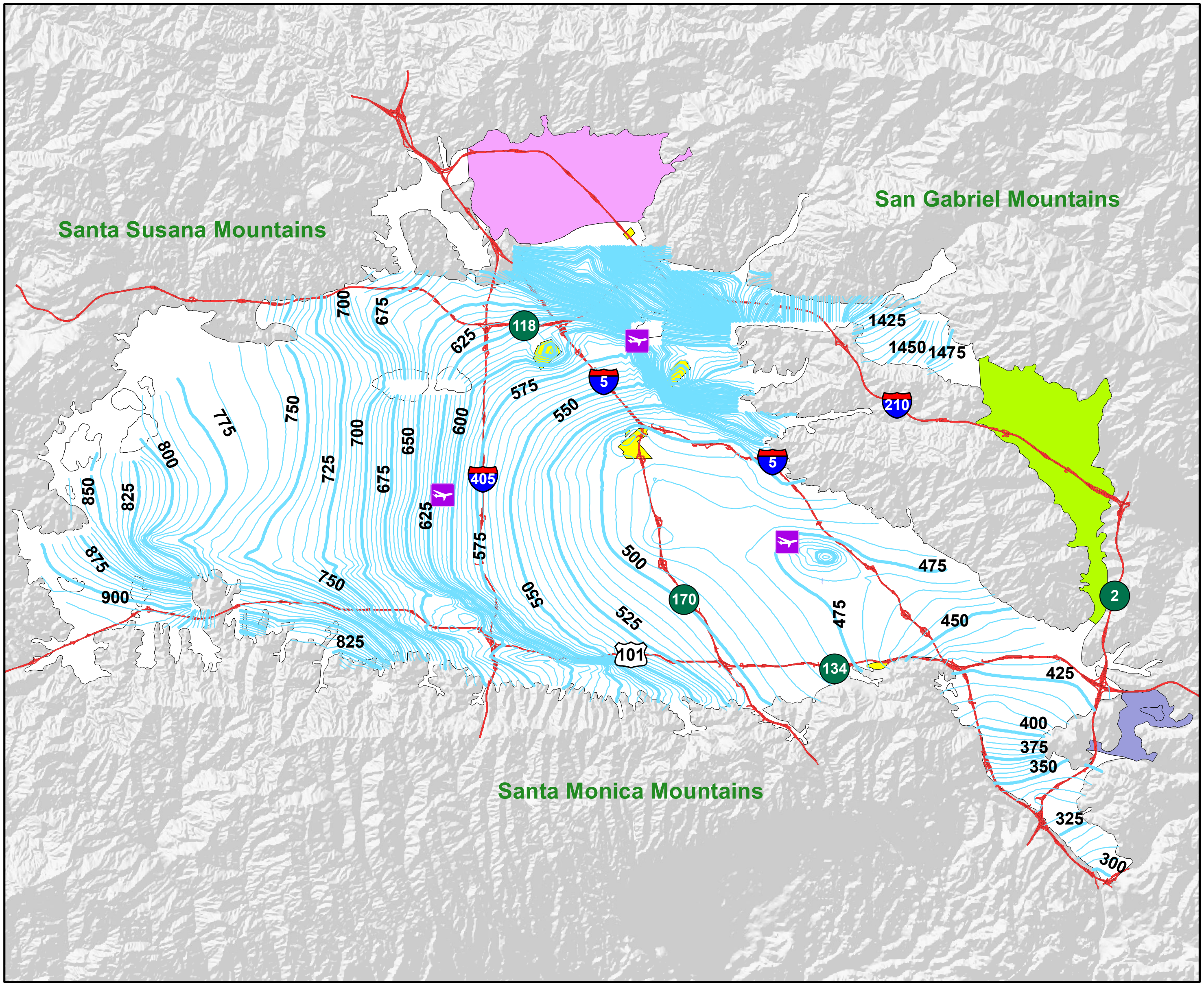
As a result of the geologic conditions in Verdugo Basin and the presence of local bedrock constrictions, groundwater tends to rise to ground surface near the Verdugo Wash Narrows and eventually leaves this basin as surface outflow. Glendale is currently unable to pump its full right from the Verdugo Basin, but by rehabilitating one of its previously-abandoned wells and constructing a new municipal-supply well, Glendale has taken steps to increase its use of groundwater from this basin and help reduce the continued groundwater outflow from this basin. The Watermaster commends the ongoing efforts of Glendale to increase its pumping capacity. The Watermaster also notes the efforts of CVWD on its ongoing evaluation of potential stormwater recharge projects in Verdugo Basin.

The Parties should continue to expect significant challenges to both the availability and quality of groundwater in the ULARA groundwater basins during the next five water years. It is the opinion of this Watermaster that, over the forthcoming years, it will be essential for the continuing safe yield operation of the ULARA groundwater basins to continue to: provide more recharge at existing spreading basins; define and implement new locations and/or other methods (such as the use of injection wells) for recharging these groundwater basins; and actively pursue the possible spreading of recycled water in existing spreading basins in the northeastern portion of the SFB in order to augment groundwater recharge that occurs naturally during the rainy season in those existing spreading basins.

PLATES

PLATE 1

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

- Groundwater Contour
- Spreading Grounds
- Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

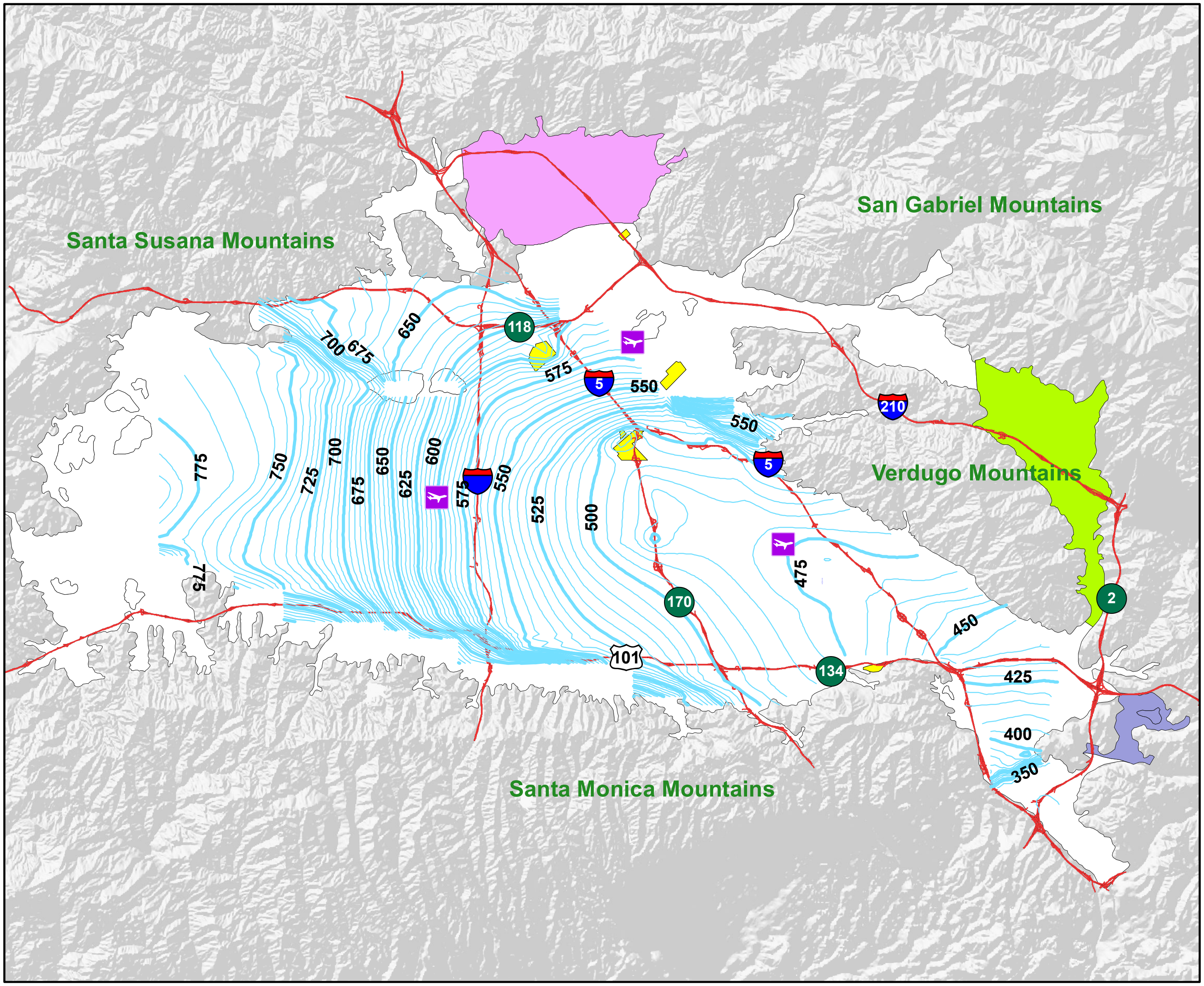
N

2 0 2
Miles

Simulated Groundwater Contour - Model Layer 1
Fall 2022

PLATE 2

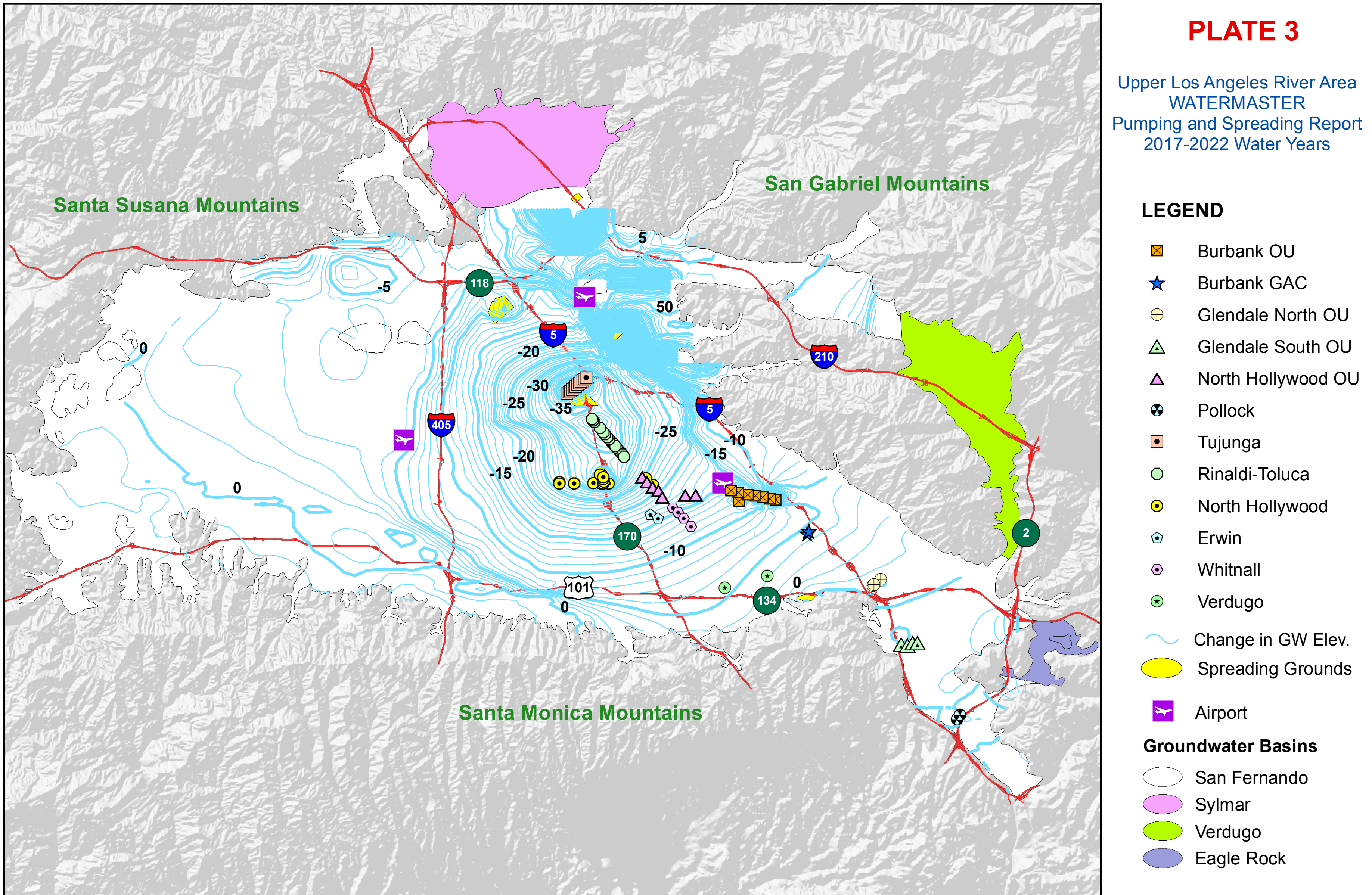
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



Simulated Groundwater Contour - Model Layer 2
Fall 2022

PLATE 3

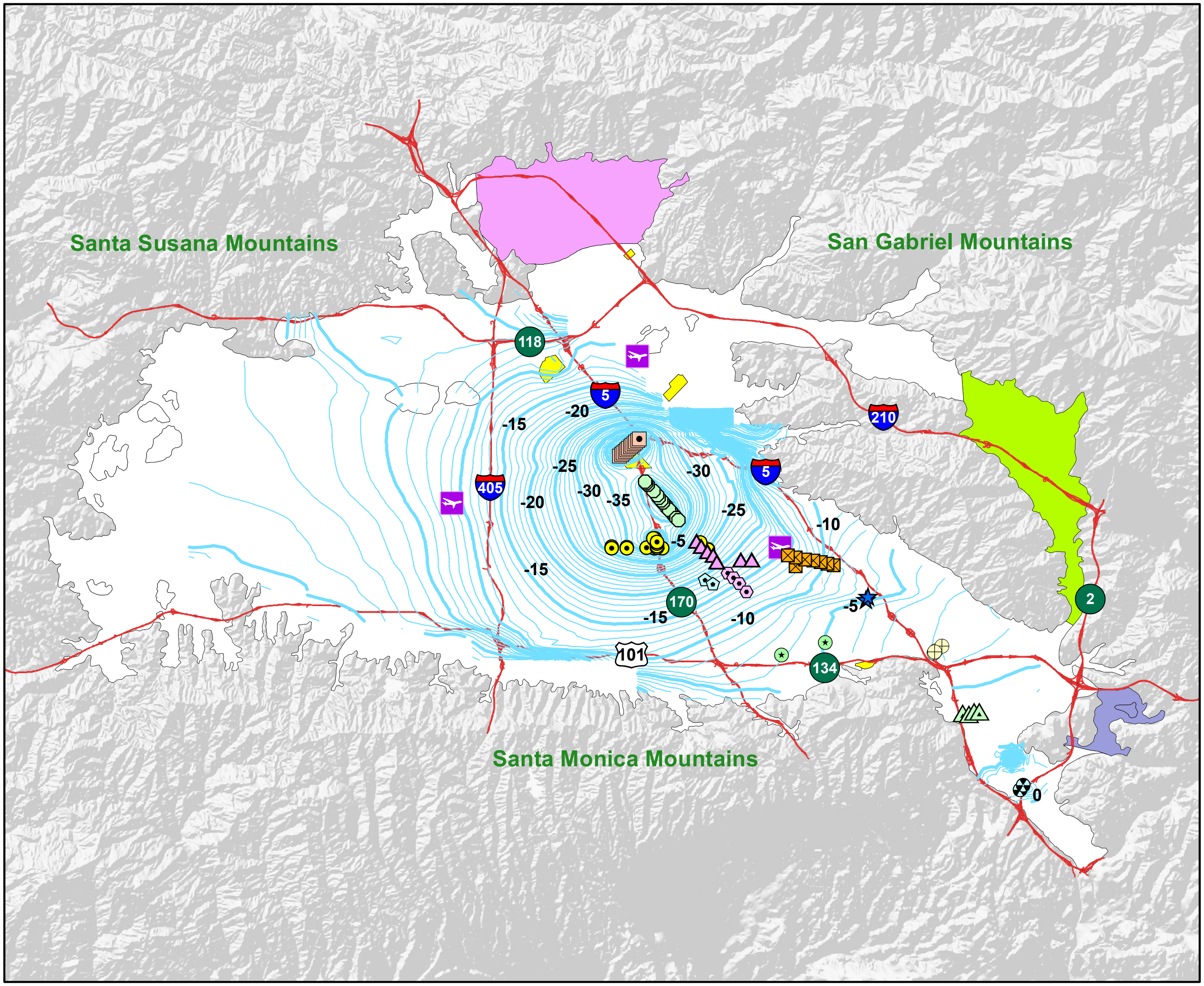
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



Simulated Change in Groundwater Elevation Model Layer 1
Fall 2017 - Fall 2022

PLATE 4

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

- Burbank OU
- Burbank GAC
- Glendale North OU
- Glendale South OU
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi-Toluca
- North Hollywood
- Erwin
- Whitnall
- Verdugo
- Change in GW Elev.
- Spreading Grounds
- Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

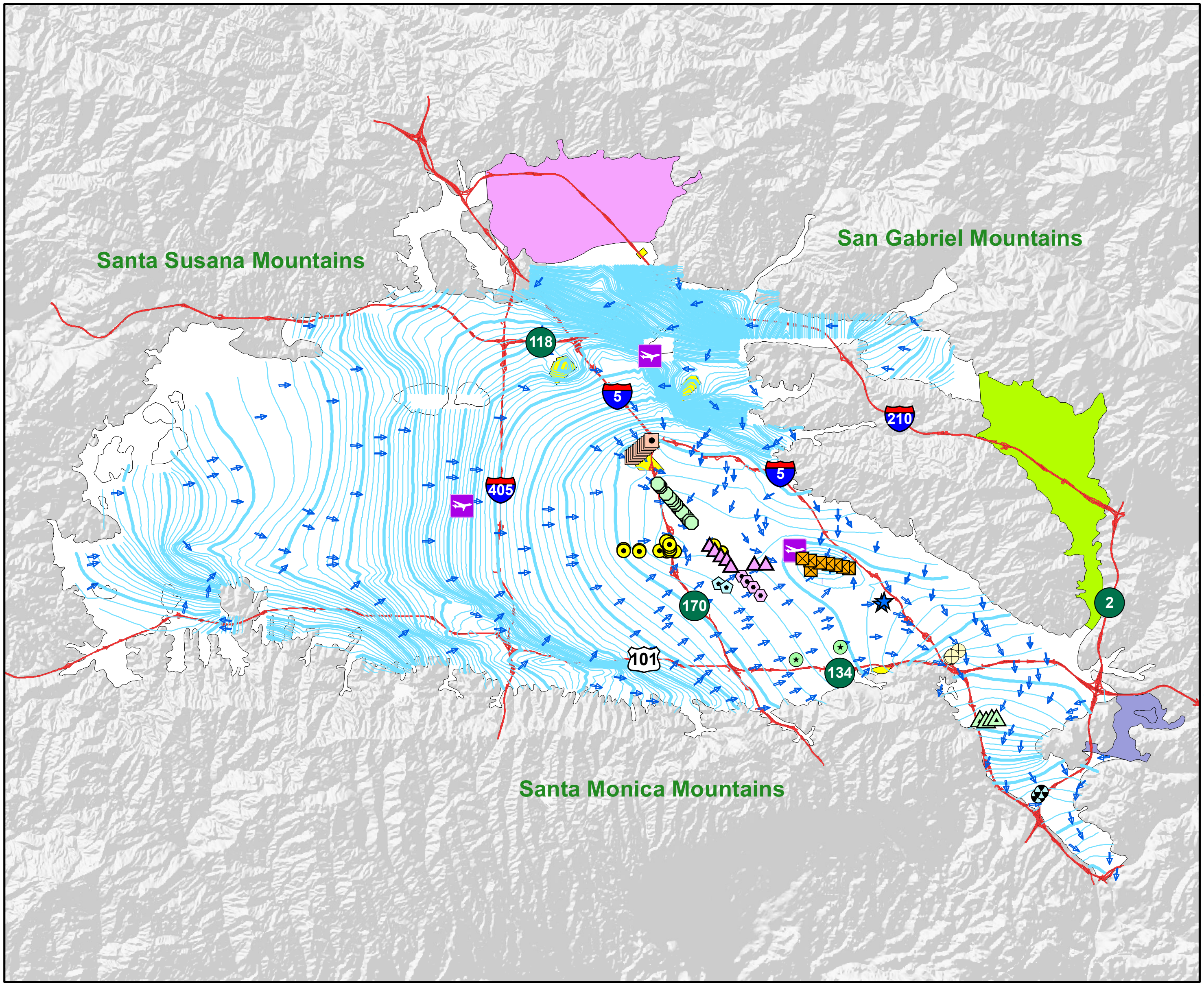
N

2 0 2 Miles

Simulated Change in Groundwater Elevation Model Layer 2
Fall 2017 - Fall 2022

PLATE 5

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

- Burbank OU
- Burbank GAC
- Glendale North OU
- Glendale South OU
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi-Toluca
- North Hollywood
- Erwin
- Whitnall
- Verdugo
- Groundwater Flow Direction
- Groundwater Contour
- Spreading Grounds
- Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

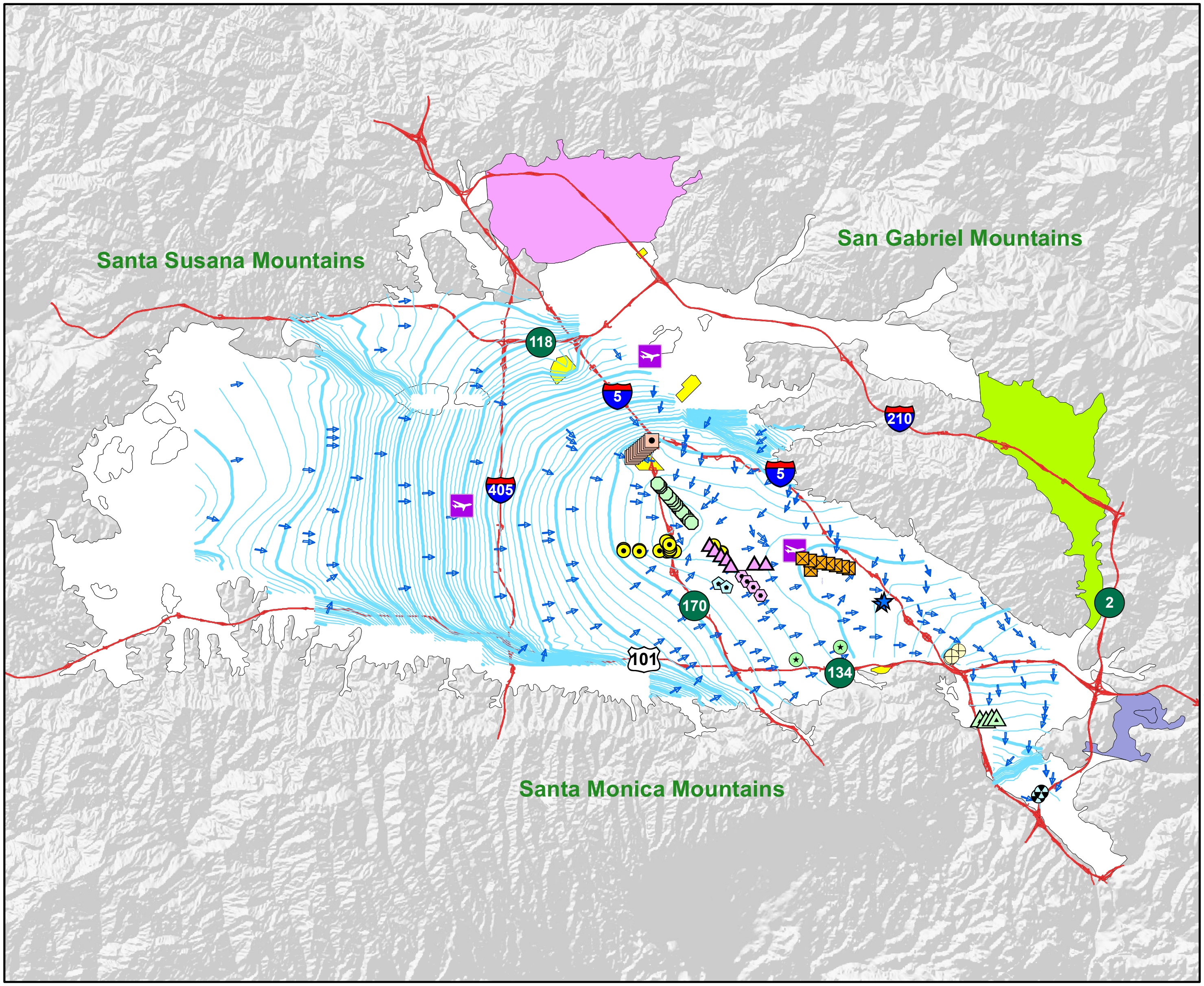
2 0 2

Miles

Simulated Groundwater Flow Direction - Model Layer 1
Fall 2022

PLATE 6

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

- Burbank OU
- Burbank GAC
- Glendale North OU
- Glendale South OU
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi-Toluca
- North Hollywood
- Erwin
- Whitnall
- Verdugo
- Groundwater Flow Direction
- Groundwater Contour
- Spreading Grounds
- Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

2 0 2

Miles

Simulated Groundwater Flow Direction - Model Layer 2
Fall 2022

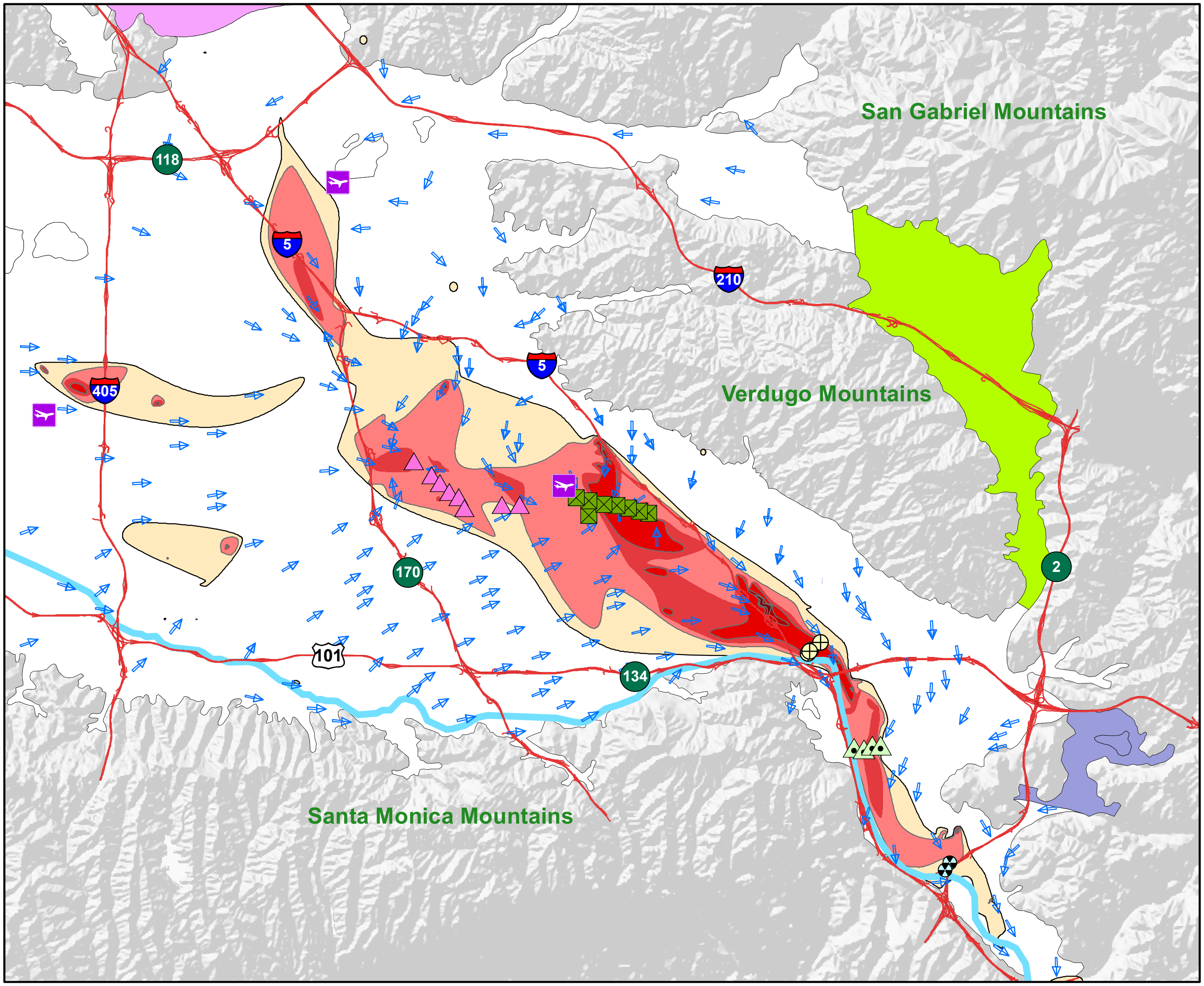


PLATE 7

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years

LEGEND

- Burbank OU
- Glendale North OU
- Glendale South OU
- North Hollywood OU
- Pollock Wells

TCE PLUME (Source: USEPA)

- > DL - 5 ug/L
- 5.01 - 50 ug/L
- 50.01 - 100 ug/L
- 100.01 - 500 ug/L
- 500.01 - 1000 ug/L
- > 1000 ug/L

- Groundwater Flow Direction
- Airport
- Los Angeles River

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

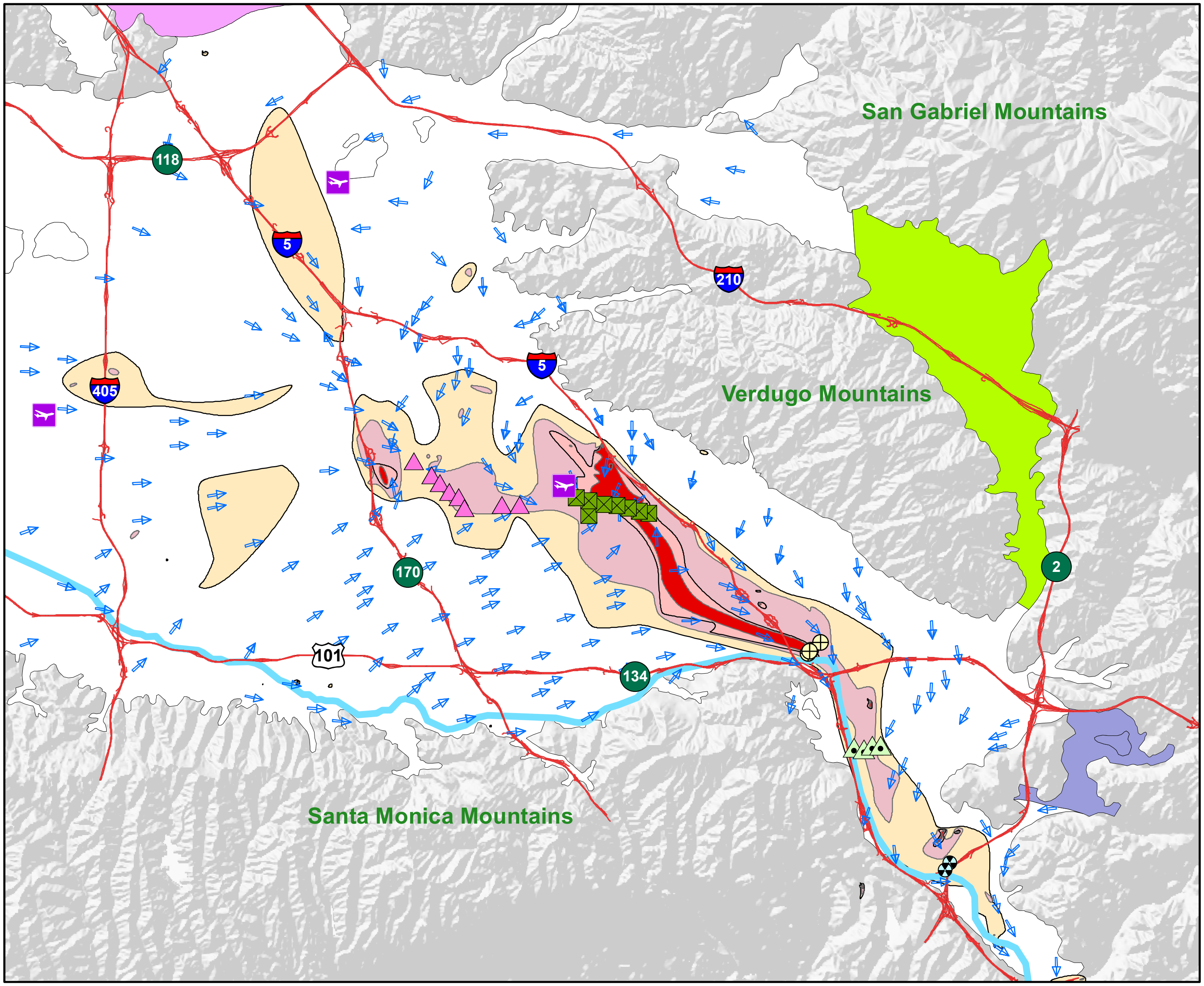
1 0 1 2

Miles

2017 TCE Contamination and 2022 Simulated Groundwater Flow Direction
Model Layer 1

PLATE 8

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

Burbank OU
Glendale North OU
Glendale South OU
North Hollywood OU
Pollock Wells

PCE Plume (Source: USEPA)

> DL - 5 ug/L
5.01 - 50 ug/L
50.01 - 100 ug/L
100.01 - 500 ug/L
500.01 - 1000 ug/L
> 1000 ug/L

Groundwater Flow Direction

Airport
Los Angeles River

Groundwater Basins

San Fernando
Sylmar
Verdugo
Eagle Rock

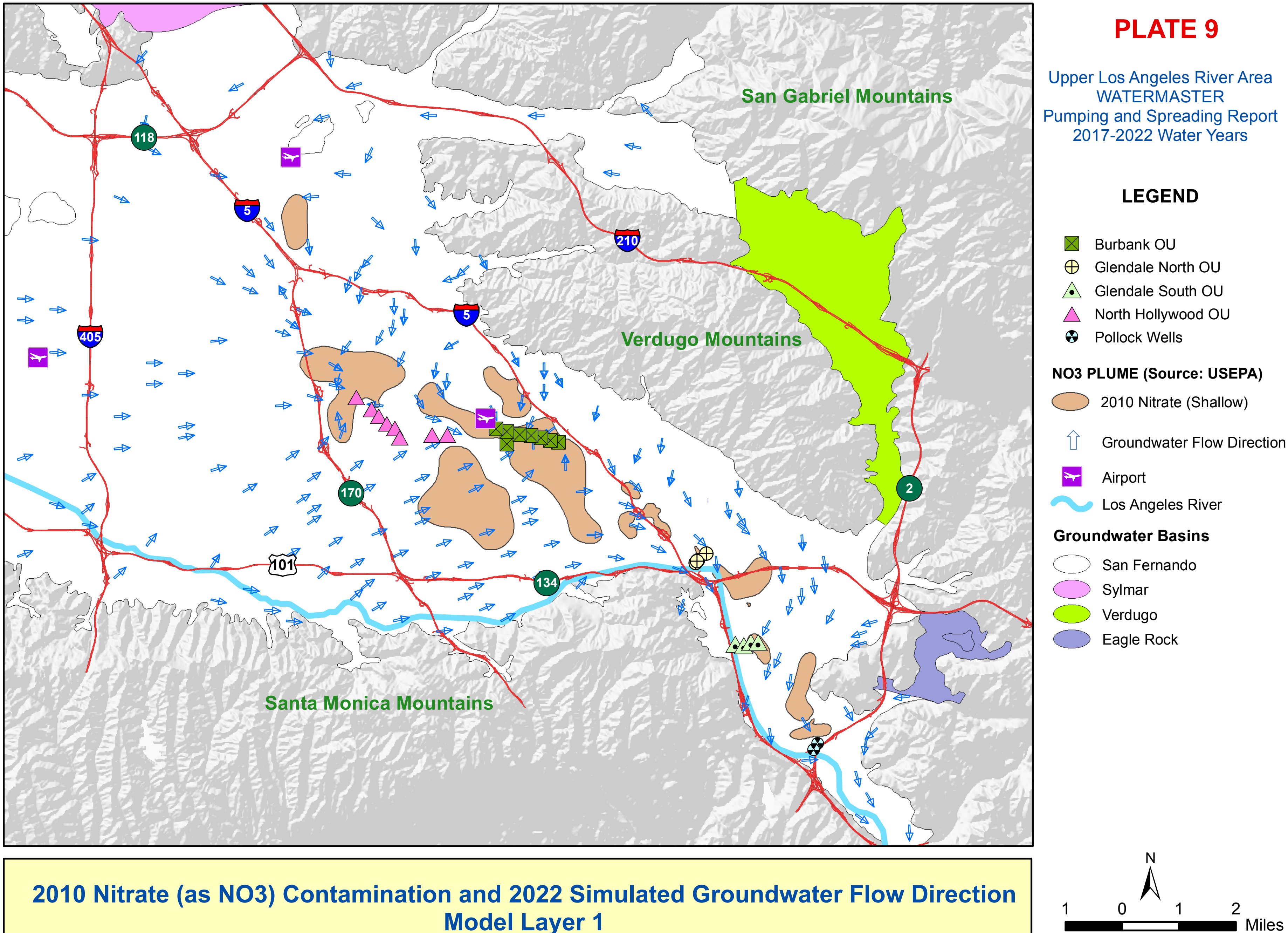
N

1 0 1 2
Miles

2017 PCE Contamination and 2022 Simulated Groundwater Flow Direction
Model Layer 1

PLATE 9

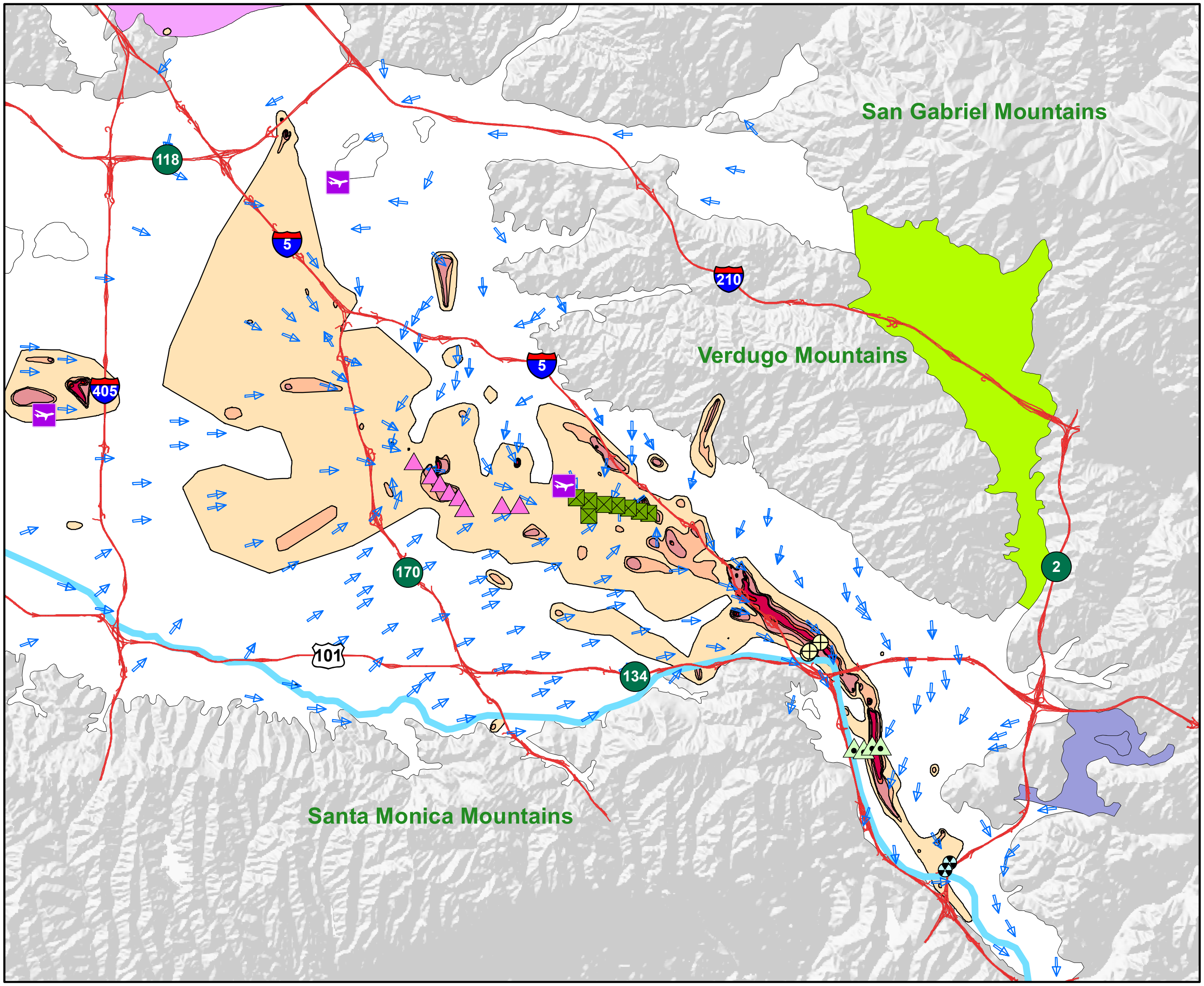
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



2010 Nitrate (as NO3) Contamination and 2022 Simulated Groundwater Flow Direction
Model Layer 1

PLATE 10

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2017-2022 Water Years



LEGEND

- Burbank OU
- Glendale North OU
- Glendale South OU
- North Hollywood OU
- Pollock Wells

Total Chromium Plume (Source: USEPA)

- > DL - 5 ug/L
- 5.01 - 10 ug/L
- 10.01 - 50 ug/L
- 50.01 - 100 ug/L
- 100.01 - 1,000 ug/L
- > 1,000 ug/L

- Groundwater Flow Direction
- Airport
- Los Angeles River

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

1 0 1 2 Miles

2014 Total Dissolved Chromium Contamination and 2022 Simulated Groundwater Flow Direction
Model Layer 1

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2017-18 through 2021-22 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR WATER YEARS 2017-2022

May 2018

Prepared by:
Water Rights & Groundwater Management Group
Water Resources Division
Los Angeles Department of Water and Power

TABLE OF CONTENTS

Introduction

The water rights in the Upper Los Angeles River Area (ULARA) were set forth in a Final Judgment, entered on January 26, 1979, ending litigation that lasted over 20 years. The ULARA Watermaster's Policies and Procedures give a summary of the decreed extraction rights within ULARA, together with a detailed statement describing the ULARA Administrative Committee operations, reports to and by the Watermaster and necessary measuring tests and inspection programs. The ULARA Policies and Procedures have been revised several times since the original issuance, to reflect current groundwater management thinking.

In Section 5.4 of the ULARA Policies and Procedures as amended in February 1998, it is stated that:

> *"...all parties or non-parties who pump groundwater are required to submit annual reports by May 1 to the Watermaster that include the following:*
>
> - *A 5-year projection of annual groundwater pumping rates and volumes.*
> - *A 5-year projection of annual spreading rates and volumes.*
> - *The most recent water quality data for each well."*

This 2018 report presents the five-year Groundwater Pumping and Spreading Plan for the Water Years 2017–2022 for the City of Los Angeles.

Section 1: Facilities Description

Groundwater conditions in ULARA are influenced by facilities owned or operated by the Los Angeles Department of Water and Power (LADWP).

a. *Spreading Grounds*

There are five spreading ground facilities that can be used for groundwater recharge of native water in ULARA. The Los Angeles County Flood Control District (LACFCD) owns, operates, and maintains the Branford spreading basin, Hansen, Lopez, and Pacoima spreading grounds. LADWP owns and maintains the Tujunga spreading grounds which are operated by LACFCD. Estimated capacities for the spreading grounds are shown in Table 1-1 and their locations are shown in Figure 1-1.

TABLE 1-1
ESTIMATED CAPACITIES OF SPREADING GROUNDS

Spreading Ground	Basin Type	Wetted area (acre)	Max Experienced Recharge (acre-feet/year)
Branford	Deep	7	1,448
Hansen	Shallow	117	35,221
Lopez	Shallow	12	4,178
Pacoima	Shallow	107	24,164
Tujunga	Shallow	83	42,817
		TOTAL:	108,000

b. Extraction Wells

LADWP has eight active wellfields in the San Fernando Basin, and one in the Sylmar Basin. The rated capacities of the nine wellfields are shown in Table 1-2. The rated capacities are approximate, as operating capacities vary depending on the water levels. Actual groundwater pumping will vary due to maintenance schedules and water quality for each well.

TABLE 1-2
RATED CAPACITIES OF LADWP WELLFIELDS IN ULARA

Wellfield	Number of Wells			Rated Capacity	
San Fernando Basin	Active	Inactive	Total	cfs	gpm
Aeration	7	0	7	2.2	987
Erwin	2	6	8	6.1	2,738
North Hollywood	14	24	38	53.1	23,833
Pollock	2	2	4	6.3	2,828
Rinaldi-Toluca	15	0	15	104.1	46,723
Tujunga	12	0	12	103.3	46,364
Verdugo	2	7	9	7.4	3,321
Whitnall	4	6	10	14.8	6,643
Sylmar Basin					
Mission	2	1	3	5	2,244
TOTAL	60	46	106	302	135,681

c. Groundwater Remediation Facilities

LADWP operates three groundwater remediation facilities. Treated effluent produced by these facilities is conveyed to the water distribution system and delivered to LADWP customers for potable supply as a beneficial end use.

North Hollywood Groundwater Treatment Facility

The North Hollywood Operable Unit (NHOU) was placed into service December 1989 and is being operated and maintained by LADWP under the direction of the United States Environmental Protection Agency (USEPA) in accordance with the Cooperative Agreement between these two agencies. USEPA provides 100 percent of the funding for the operations and maintenance of the North Hollywood Groundwater Treatment Facility.

The NHOU was designed to achieve a groundwater treatment capacity of up to 2,000 gallons per minute (gpm) utilizing eight shallow extraction wells and an aeration tower to remove volatile organic compounds (VOC) from the extracted groundwater. Vapor-phase granular activated carbon (GAC) vessels are then utilized to remove VOCs from the aeration tower air emissions.

Pollock Wells Treatment Plant

The Pollock Wells Treatment Plant was placed into service March 1999 to remove VOCs from the groundwater at a rate of up to 3,000 gpm. This facility was designed to remove trichloroethylene (TCE) and perchloroethylene (PCE) from groundwater produced by two extraction wells. Liquid-phase GAC vessels restored the use of Pollock Wells, which also reduces the potential of rising groundwater discharge from the San Fernando Basin into the Los Angeles River.

Temporary Tujunga Wells Treatment Study Project

The Temporary Tujunga Wells Treatment Study Project was placed into service May 2010 to remove VOCs from the groundwater with a remediation capacity of approximately 8,000 gpm. Liquid-phase GAC vessels designed to remove VOCs from groundwater were installed at two wells at the Tujunga Wellfield, and have restored more than 20,000 acre feet per year (AFY) of pumping capacity that was unavailable due to water quality constraints.

Section 2: Annual Pumping and Spreading Projections

a. Pumping Projections for Water Years 2017-2022

The City of Los Angeles has the following six sources of water supply:

1) Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin areas,
2) Local groundwater supply from the San Fernando, Sylmar, Central, and West Coast Basins
3) Metropolitan Water District of Southern California (MWD) supply imported from the San Francisco Bay Delta via the State Water Project (SWP) and the Colorado River Aqueduct,
4) Recycled water,
5) Stormwater, and
6) Conservation.

LADWP's use of groundwater from the San Fernando Basin fluctuates from year to year depending on the availability of the imported water sources, which can vary as a result of hydrologic conditions and operational constraints. Use of the San Fernando Basin groundwater supply is largely constrained by the impacts of groundwater contamination, including most significantly PCE, TCE, 1,4-Dioxane, potentially hexavalent chromium (Cr-VI) and perchlorate, and other emerging chemicals. VOCs that have escaped the containment area of the NHOU have affected nearby groundwater supply wells. To a lesser degree, VOCs have impaired LADWPs use of groundwater in Sylmar Basin and Central Basin.

The San Fernando, Sylmar, Central, and West Coast Basins provide the City's local groundwater supply. The City of Los Angeles has the following average annual water rights, in acre feet (AF), which comprise approximately 21% of the City's supply:

San Fernando Basin:	87,000 AF
Sylmar Basin:	3,570 AF
Central Basin:	17,236 AF
West Coast Basin:	1,503 AF

Table 2-1 shows the amount of groundwater extractions that are expected, during the 2017-2018 Water Year, from the San Fernando and Sylmar Basins. Projected 2018 to 2022 groundwater extractions are provided in Table 2-2. These projections are based upon water demand forecasts and availability of Los Angeles Aqueduct flows, and are subject to yearly adjustments.

TABLE 2-1
ACTUAL AND PROJECTED PUMPING
BY THE CITY OF LOS ANGELES FOR WY 2017-2018
(acre-feet)

San Fernando Basin		Actual Extraction						Projected Extraction					
	Total	**Oct-17**	**Nov-17**	**Dec-17**	**Jan-18**	**Feb-18**	**Mar-18**	**Apr-18**	**May-18**	**Jun-18**	**Jul-18**	**Aug-18**	**Sep-18**
Aeration	**56**	49	7	0	0	0	0	0	0	0	0	0	0
Erwin	**0**	0	0	0	0	0	0	0	0	0	0	0	0
North Hollywood	**6,183**	0	0	0	2	65	46	0	1,230	1,190	1,230	1,230	1,190
Pollock	**1,638**	181	174	176	188	155	182	143	0	0	148	148	143
Rinaldi-Toluca	**15,600**	12	9	10	840	1,127	1,069	1,250	1,599	2,381	2,460	2,460	2,381
Tujunga	**22,464**	0	0	11	268	1,219	1,283	2,262	3,383	3,452	3,567	3,567	3,452
Verdugo	**0**	0	0	0	0	0	0	0	0	0	0	0	0
Whitnall	**0**	0	0	0	0	0	0	0	0	0	0	0	0
San Fernando Basin Total	**45,941**	**242**	**190**	**198**	**1,298**	**2,567**	**2,580**	**3,655**	**6,212**	**7,023**	**7,405**	**7,405**	**7,166**
Sylmar Basin													
Mission	**0**	0	0	0	0	0	0	0	0	0	0	0	0
ULARA Total	**45,941**	**242**	**190**	**198**	**1,298**	**2,567**	**2,580**	**3,655**	**6,212**	**7,023**	**7,405**	**7,405**	**7,166**

TABLE 2-2
PROJECTED PUMPING IN THE SAN FERNANDO AND SYLMAR BASINS
BY THE CITY OF LOS ANGELES FOR 2017-2022
(acre-feet)

WELL FIELD	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
AERATION	56	1,086	1,089	1,086	1,167
ERWIN	0	0	0	0	0
NO HOLLYWOOD	6,183	13,587	14,533	16,686	17,935
POLLOCK	1,638	2,241	2,246	2,877	3,092
RINALDI-TOLUCA	15,600	18,307	22,151	22,707	24,407
TUJUNGA	22,464	35,398	42,116	42,001	45,144
VERDUGO	0	0	0	0	0
WHITNAL	0	0	0	0	0
TOTAL (SFB) ACRE-FEET	**45,941**	**70,619**	**82,135**	**85,357**	**91,745**
MISSION WELLFIELD (Sylmar)	0	2,172	4,170	4,170	4,170

b. Spreading Projections for the 2017-2018 Water Year

Native groundwater recharge from captured storm runoff occurs primarily as a result of runoff diversion from adjacent storm channels into engineered spreading grounds. Spreading grounds are operated by Los Angeles County Flood Control District (LACFCD). Table 2-3 represents the anticipated spreading volumes for Water Year 2017-2018.

TABLE 2-3
ACTUAL AND PROJECTED CENTRALIZED SPREADING
IN ULARA SPREADING GROUNDS FOR WY 2017-2018
(acre-feet)

	Operated by:					
Month	**LACDPW**				**LACDPW and LADWP**	**Monthly Total**
	Branford	**Hansen**	**Lopez**	**Pacoima**	**Tujunga**	
	Actual					
Oct-17	4	8	0	3,190	0	3,202
Nov-17	4	14	445	1,980	0	2,443
Dec-17	4	26	847	1,970	0	2,847
Jan-18	108	102	1	284	0	495
Feb-18	9	41	0	0	0	50
Mar-18	175	255	0	1,010	0	1,440
	Projected					
Apr-18	22	205	39	255	0	521
May-18	27	134	49	110	0	320
Jun-18	16	47	13	36	0	112
Jul-18	19	40	0	58	0	117
Aug-18	14	9	0	0	0	23
Sep-18	22	3	0	28	0	53
Total	**424**	**884**	**1,394**	**8,921**	**0**	**11,623**

LADWP and the LACFCD are cooperatively working to enhance the 150 acre Tujunga Spreading Grounds. Enhancements include expanding and combining the spreading basins and installing new intake structures, which will increase the facility's storage and intake capacity and allow more stormwater to be captured. The project will result in an increase in groundwater recharge of the San Fernando Groundwater Basin. Due to construction which started in August 2016, the intake structure is out of commission and spreading is not feasible until completion in late 2019. As seen in Table 2-3, Tujunga has no spreading throughout the 2017-18 water year.

Section 3: Water Quality Monitoring Program Description

All of LADWP's 60 active wells in ULARA are monitored in conformance with the requirements set forth in Title 22, California Code of Regulations (CCR). For all active wells, monitoring is required whether the well is in production or not. State regulations require the following types of monitoring regimens:

1. Inorganic compounds
2. Organic compounds
3. General Minerals
4. Radiological compounds
5. Secondary Standards: VOC, SOC

Each well, whether on active or standby status, is monitored every three years for many types of inorganic and organic compounds. Monitoring is performed at various frequencies commensurate with regulatory standards. A complete list of the parameters that must be tested for is contained in Title 22 of the CCR.

Appendix A provides the concentrations of various compounds detected in LADWP's groundwater wells in the San Fernando and Sylmar Basins during the period of April 2016 through March 2017. This report includes concentrations detected for a number of contaminants including TCE, PCE, Perchlorate, Cr-VI, and 1-4 Dioxane.

Section 4: Groundwater Treatment Facilities Operations Summary

a. North Hollywood Operable Unit (NHOU)

Table 4-1 provides the volume of groundwater extracted by each North Hollywood extraction well and treated through the aeration tower for VOC removal. This table also provides the concentrations of TCE and PCE detected in the raw groundwater from each wellhead before treatment. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process. Current operations include the use of four of the seven extraction wells.

Emerging contaminants have also impacted operational reliability of the NHOU. North Hollywood Extraction Well Nos. 2 and 3 (NHE-2, NHE-3) have been disconnected from the distribution system since February 2007 and March 2013, respectively, due to elevated concentrations of Cr-VI, which the NHOU was not designed to remove. To contain the plumes, the responsible party, Honeywell International, Inc., began operating NHE-2 in 2008, and NHE-3 in 2015 and has been discharging the untreated effluent into the sanitary sewer.

TABLE 4-1
GROUNDWATER TREATMENT FROM THE NORTH HOLLYWOOD OPERABLE UNIT (AERATION) WELLS

	Groundwater Treatment from Aeration Wells (AF)								PCE (µg/L)		TCE (µg/L)	
Mon-Yr	No. 2 [A]	No. 3 [B]	No. 4	No. 5	No. 6	No. 7	No. 8	Total	Influent	Effluent	Influent	Effluent
Apr-17	--	--	1	0	3	3	6	**13**	ns	ns	ns	ns
May-17	--	--	1	0	2	1	3	**6**	ns	ns	ns	ns
Jun-17	--	--	6	0	18	16	34	**74**	8.85	ND	39.9	ND
Jul-17	--	--	6	0	16	15	2	**39**	10.00	ND	20.9	ND
Aug-17	--	--	7	0	34	8	0	**48**	8.93	ND	19.9	ND
Sep-17	--	--	5	0	29	14	0	**48**	8.02	ND	18.3	ND
Oct-17	--	--	6	0	29	14	0	**49**	8.21	ND	18.5	ND
Nov-17	--	--	1	0	4	2	0	**7**	6.81	ND	20.8	ND
Dec-17	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Jan-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Feb-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Mar-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Total								**285**				

Note:
[A] Wells No. 2 and 3 are currently operated by Honeywell for plume control. Effluent is being diverted to the sanitary sewer and does not enter the NHOU.
[B] Well no. 3 shutdown in 2013.
ND: Not Detected
ns: Not Sampled

b. Pollock Wells Treatment Plant (PWTP)

Table 4-2 provides the volume of groundwater extracted by each well and treated through the liquid-phase GAC vessels for VOC removal. This table also provides the concentrations of TCE and PCE detected in the raw groundwater from the influent line before treatment. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process.

TABLE 4-2
GROUNDWATER TREATMENT FROM POLLOCK WELLS

	Treatment (AF)			PCE (µg/L)		TCE (µg/L)	
Mon-Yr	**No. 4**	**No. 6**	**Total**	**Influent**	**Effluent**	**Influent**	**Effluent**
Apr-17	172.55	0.13	172.68	2.25	ND	2.71	ND
May-17	174.48	0.11	174.59	2.67	ND	3.08	ND
Jun-17	175.76	0.15	175.91	2.69	ND	3.06	ND
Jul-17	179.71	0.11	179.82	2.99	ND	3.21	ND
Aug-17	183.22	0.10	183.32	3.21	ND	3.56	ND
Sep-17	176.34	0.07	176.41	3.00	ND	3.31	ND
Oct-17	181.05	0.12	181.17	3.23	ND	3.59	ND
Nov-17	173.86	0.07	173.93	3.26	ND	3.48	ND
Dec-17	175.85	0.10	175.95	3.27	ND	3.46	ND
Jan-18	187.70	0.11	187.81	3.81	ND	3.76	0.57
Feb-18	155.02	0.26	155.28	3.83	ND	3.77	0.95
Mar-18	182.21	0.12	182.33	3.94	ND	3.87	1.53
Total			2119.20				

Note:
ND: Not Detected
ns: Not Sampled

c. Temporary Tujunga Wells Treatment Study Project

Table 4-3 provides the volume of groundwater extracted by each well and treated through the liquid-phase GAC vessels for VOC removal. This table also provides the concentrations of TCE and PCE detected in the raw groundwater from each wellhead before treatment. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process.

Well No. 8 has been connected to the treatment system to run as a backup when Well Nos. 6 or 7 are shutdown either for mechanical or maintenance needs. LADWP has requested a permit amendment from the Division of Drinking Water to operate this connection.

TABLE 4-3
GROUNDWATER TREATMENT FROM TUJUNGA WELLS

Mon-Yr	Tujunga Well No. 6					Tujunga Well No. 7					Treatment Totals
	Treatment (AF)	PCE (µg/L)		TCE (µg/L)		Treatment (AF)	PCE (µg/L)		TCE (µg/L)		
		Influent	Effluent	Influent	Effluent		Influent	Effluent	Influent	Effluent	
Apr-17	436	7.4	ND	5.3	ND	424	34.0	ND	21.8	ND	**859**
May-17	464	7.7	ND	5.2	ND	450	36.2	ND	22.7	ND	**914**
Jun-17	498	7.3	ND	5.11	ND	482	32.2	ND	22.2	ND	**981**
Jul-17	175	not rep.	ND	5.59	ND	170	38.3	ND	24.8	ND	**346**
Aug-17	0	ns	ns	ns	ns	0	ns	ns	ns	ns	**0**
Sep-17	0	ns	ns	ns	ns	0	ns	ns	ns	ns	**0**
Oct-17	0	ns	ns	ns	ns	0	ns	ns	ns	ns	**0**
Nov-17	0	ns	ns	ns	ns	0	ns	ns	ns	ns	**0**
Dec-17	3	ns	ns	ns	ns	2	ns	ns	ns	ns	**6**
Jan-18	82	10.7	ND	8.9	ND	75	67.3	ND	43.4	ND	**157**
Feb-18	369	15.6	ND	9.05	ND	413	61.4	ND	35.3	ND	**782**
Mar-18	378	8.5	ND	6.02	ND	424	50.0	ND	31.9	ND	**801**
Total											**4,846**

Note: Wellfield was offline between August and December for control system replacement.
ND: Not Detected
ns: Not Sampled
* : sample was "non representative"

Section 5: Proposed Facility Modifications

LADWP and LACFCD, in cooperation with the City of Los Angeles Bureau of Engineering, Bureau of Sanitation, and Bureau of Street Services continue to partner on, jointly fund, and collaborate on several projects that will enhance the capacity for recharge of stormwater and recycled water into the groundwater basin via existing spreading grounds in the eastern portion of the San Fernando Basin. This section describes plans for modifying existing spreading facilities and construction of new facilities to provide expanded opportunities for enhancing the groundwater recharge potential.

a. Spreading Grounds

<u>Tujunga Spreading Grounds Upgrade</u>
The project is currently under construction and is expected to be completed in late 2019. The scope includes consolidating and deepening existing spreading basins, installing two high-flow intakes with rubber dams, and modifying the existing intake. This project is expected to increase regional annual average stormwater capture and recharge by about 8,000 AFY.

<u>Lopez Spreading Grounds Upgrade</u>
This upgrade project is currently in design, with construction expected to begin in 2022 and be completed by 2024. The scope includes expanding and deepening existing spreading basins, excavating sediment to improve infiltration rates, and improving the intake structure. This project is expected to increase regional annual average stormwater capture and recharge by approximately 480 AFY.

<u>Branford Spreading Basin Upgrade</u>
This upgrade project is currently in design, with construction expected to begin and end in 2020. The scope includes installing a new pipe to divert water from the Branford Basin into the Tujunga Spreading Grounds. This project is expected to increase regional annual average stormwater capture and recharge by 597 AFY.

<u>Pacoima Spreading Grounds Upgrade</u>
This upgrade project is currently in design, with construction expected to begin in 2019 and be completed by 2021. The scope includes consolidating existing spreading basins, excavating sediment to improve infiltration rates, and installing a new automated intake structure. This project is expected to increase regional annual average stormwater capture and recharge by approximately 5,300 AFY.

b. Groundwater Production Facilities

Mission Wellfield Improvement Project

The purpose of the Mission Wells Improvement Project is to rehabilitate and replace deteriorating groundwater facilities in Sylmar Basin, including installation of three replacement production wells, monitoring wells, new piping, new pump station, electrical upgrades, and controls. An application has been submitted to California Division of Drinking Water to permit the operation of Well No. 10, one of the three new production wells. The other two wells, Nos. 8 and 9 will not be operated due to very low production capacity and TCE concentrations exceeding the State Maximum Contamination Level, respectively. The recently constructed on-site Chlorination Generation System has been permitted and is in operation and Well No. 10 is expected to be able to be operational by July 2018.

Van Norman Complex Investigation

Two exploratory wells were drilled on the LADWP Van Norman Complex property to investigate the existence and extent of potable groundwater at depth (~1500' bgs) within the Saugus geologic formation. As of late 2015, the wells have been completed and showed promise of producing uncontaminated potable water. Final well cleaning was conducted in summer 2017, and further testing is scheduled for Spring 2019. The goal of the investigation is to determine the sustainability of the groundwater formation, with the potential of establishing a productive wellfield.

c. Groundwater Remediation Facilities

North Hollywood Operable Unit (NHOU)

The NHOU, which has been in operation since December 1989, was designed to remove TCE and PCE contaminants from groundwater via aeration. The treated effluent is disinfected and conveyed into the municipal water distribution system. More recently, EPA has detected emerging contaminants, including Cr-VI and 1,4-dioxane, in excess of the state MCL and notification level (NL) for 1,4-dioxane at two of the NHOU extraction wells. The existing NHOU treatment system is incapable of removing these contaminants. This sharp increase in the chromium concentrations has caused two of the eight extraction wells to be shut down and removed from the system while the untreated effluent from these two wells have been redirected for discharge into the municipal sewer. These wells serve an important plume containment function for the high levels of contamination, and these shut downs demonstrated the need for a change in the remedy.

In response to the above shut downs and continued migration of VOC-contaminated groundwater, USEPA conducted a Focused Feasibility Study (FFS) to evaluate alternatives for changing the groundwater remedy. USEPA summarized the results in its July 2009 Proposed Plan, and selected the preferred remedy in its September 2009 Second Interim Record of Decision. The selected remedy is to install well-head treatment for hexavalent chromium and 1,4 dioxane, expand the combined treatment system, install additional monitoring wells, install and operate three additional groundwater extraction wells, and to continue to provide the treated water to LADWP for a drinking water end use. USEPA amended the 2009 Second Interim Record of Decision in 2014 to allow for consideration of the treated effluent to be reinjected back into the aquifer (reinjection end use).

San Fernando Groundwater Basin Remediation Efforts

LADWP has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of various well fields. These efforts include studies, activities, and other analysis required by the EPA's National Contingency Plan to evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that produce water for potable use. Some facts suggest this approach could be ideal. These include the size and location of the plumes, the beneficial uses of the groundwater, and reliability concerns of long-term availability of alternative water sources and its high cost if such groundwater treatment did not occur.

The information LADWP will evaluate includes an analysis of pump rates and treatment capacity that would be appropriate to capture contaminant mass and help to restore the beneficial use of the aquifer for that wellfield, based on fate and transport modeling and other analysis. LADWP also plans to evaluate ways to minimize the volume of water that requires treatment by prioritizing pumping from wells with higher levels of contamination to minimize the potential for contamination to spread to wells that currently do not contain levels of contamination that would require treatment. This analysis will also evaluate other alternatives.

LADWP will leverage its actions with current and planned response actions in the basin by LADWP and other parties, such as remedial actions undertaken by or overseen by the state or federal regulatory agencies, as well as other feasible alternatives, such as source control, in-situ treatment or pumping from other areas. Generally, other agencies are focusing on source control and other hot spot areas, while LADWP generally focuses more on restoring the beneficial uses of water in the vicinity of production wells that has already migrated from the source areas.

To provide information about these potential response action alternatives, LADWP has completed a rough preliminary analysis of the scope and anticipated project costs. Preliminary analysis indicates that production of major SFB wellfields, either alone or in conjunction with other response actions, could reach a maximum of over 300 cfs well production capacity. LADWP would anticipate that the treatment systems would have modularity for addressing additional treatment capacity that may be needed due to regulatory changes or plume migration. Design and construction costs for this set of alternatives are estimated to be approximately $600 million, with remediation treatment costs of up to $50 million per year. This estimate assumes that the facilities would be designed to utilize multiple best-available technologies to clean up the contaminants including TCE, PCE, and 1,4-dioxane, restoring LADWP's highest producing wellfields in the northern SFB.

North Hollywood West Advanced Oxidation Processes (AOP) Pilot Project

The UV/AOP testing was completed in two phases. Phase 1 incorporated bench scale testing with lab results. Phase 2 evaluated low flow on-site pilot testing. In both phases, project feasibility was evaluated through measurement of contaminant removal efficiency and through the identification of possible byproducts formed during the various treatment methods.

d. *Recycled Water Projects*

Los Angeles Groundwater Replenishment (GWR) Project

The GWR Project will provide up to 30,000 AFY of recycled water to replenish the SFB to increase the City's local water supplies and reduce the need for purchased imported water. The water utilized for GWR will consist of recycled water from the Donald C. Tillman Water Reclamation Plant (Tillman) that meets or exceeds the State's Title 22 groundwater recharge regulations before being used for replenishment.

The GWR Project's Environmental Impact Report was certified by the Board of Water and Power Commissioners on December 6, 2016. The GWR Project has since been divided into phases, necessitated by a reduction in wastewater flows and subsequently the supply of recycled water. The Initial Phase of the GWR Project will spread up to 3,500 AFY of recycled water at Hansen Spreading Grounds; simultaneously, ozone treatment will be undertaken at Tillman to demonstrate its ability to enhance the quality of recycled water for future phases.

Future phases will be implemented as additional recycled water supply becomes available. The City is evaluating ways to increase wastewater flows, including construction of a new East-West Valley Interceptor Sewer, and recirculation of recycled water that flows through lakes in the Sepulveda Basin Recreation Area.

APPENDIX A:
Water Quality Sampling Results
April 2017 through March 2018

Aeration

COLLECTION DATE	LOCATION	ANALYTE	RESULT	UNIT
4/25/2017 10:15:00 AM	AT002	Tetrachloroethylene (PCE)	7.20	µg/L
4/25/2017 10:15:00 AM	AT002	Trichloroethene (TCE)	98.8	µg/L
4/25/2017 10:15:00 AM	AT002	1,4-Dioxane	2.89	ug/L
4/25/2017 10:15:00 AM	AT002	Perchlorate	ND	µg/L
4/25/2017 10:15:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	64.4	µg/L
4/25/2017 11:21:00 AM	AT003	Tetrachloroethylene (PCE)	6.56	µg/L
4/25/2017 11:21:00 AM	AT003	Trichloroethene (TCE)	39.0	µg/L
4/25/2017 11:21:00 AM	AT003	1,4-Dioxane	1.35	ug/L
4/25/2017 11:21:00 AM	AT003	Perchlorate	ND	µg/L
4/25/2017 11:21:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	37.2	µg/L
5/23/2017 9:54:00 AM	AT004	Tetrachloroethylene (PCE)	5.76	µg/L
5/23/2017 9:54:00 AM	AT004	Trichloroethene (TCE)	29.4	µg/L
5/23/2017 9:54:00 AM	AT004	Perchlorate	ND	µg/L
5/23/2017 9:54:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	8.81	µg/L
5/30/2017 11:45:00 AM	AT003	Tetrachloroethylene (PCE)	8.06	µg/L
5/30/2017 11:45:00 AM	AT003	Trichloroethene (TCE)	42.8	µg/L
5/30/2017 11:45:00 AM	AT003	1,4-Dioxane	1.33	ug/L
5/30/2017 11:45:00 AM	AT003	Perchlorate	ND	µg/L
5/30/2017 11:45:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	37.1	µg/L
6/13/2017 10:32:00 AM	AT006	Tetrachloroethylene (PCE)	12.7	µg/L
6/13/2017 10:32:00 AM	AT006	Trichloroethene (TCE)	32.1	µg/L
6/13/2017 10:32:00 AM	AT006	1,4-Dioxane	1.07	ug/L
6/13/2017 10:32:00 AM	AT006	Perchlorate	ND	µg/L
6/13/2017 10:32:00 AM	AT006	Hexavalent Chromium (Cr+6), IC	4.71	µg/L
6/13/2017 9:20:00 AM	AT007	Tetrachloroethylene (PCE)	7.60	µg/L
6/13/2017 9:20:00 AM	AT007	Trichloroethene (TCE)	2.61	µg/L
6/13/2017 9:20:00 AM	AT007	1,4-Dioxane	0.829	ug/L
6/13/2017 9:20:00 AM	AT007	Perchlorate	ND	µg/L
6/13/2017 9:20:00 AM	AT007	Hexavalent Chromium (Cr+6), IC	1.68	µg/L
6/13/2017 8:25:00 AM	AT008	Tetrachloroethylene (PCE)	9.45	µg/L
6/13/2017 8:25:00 AM	AT008	Trichloroethene (TCE)	86.3	µg/L
6/13/2017 8:25:00 AM	AT008	1,4-Dioxane	1.39	ug/L
6/13/2017 8:25:00 AM	AT008	Perchlorate	ND	µg/L
6/13/2017 8:25:00 AM	AT008	Hexavalent Chromium (Cr+6), IC	1.56	µg/L

6/19/2017 12:05:00 PM	AT004	Tetrachloroethylene (PCE)	5.12	µg/L
6/19/2017 12:05:00 PM	AT004	Trichloroethene (TCE)	39.2	µg/L
6/19/2017 12:05:00 PM	AT004	1,4-Dioxane	1.10	ug/L
6/19/2017 12:05:00 PM	AT004	Perchlorate	ND	µg/L
6/19/2017 12:05:00 PM	AT004	Hexavalent Chromium (Cr+6), IC	6.42	µg/L
6/22/2017 9:45:00 AM	AT002	Tetrachloroethylene (PCE)	7.24	µg/L
6/22/2017 9:45:00 AM	AT002	Trichloroethene (TCE)	85.1	µg/L
6/22/2017 9:45:00 AM	AT002	1,4-Dioxane	2.71	ug/L
6/22/2017 9:45:00 AM	AT002	Perchlorate	ND	µg/L
6/22/2017 9:45:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	45.6	µg/L
7/18/2017 10:17:00 AM	AT004	Tetrachloroethylene (PCE)	5.66	µg/L
7/18/2017 10:17:00 AM	AT004	Trichloroethene (TCE)	31.3	µg/L
7/18/2017 10:17:00 AM	AT004	1,4-Dioxane	1.04	ug/L
7/18/2017 10:17:00 AM	AT004	Perchlorate	ND	µg/L
7/18/2017 10:17:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	8.84	µg/L
7/18/2017 11:07:00 AM	AT006	Tetrachloroethylene (PCE)	11.0	µg/L
7/18/2017 11:07:00 AM	AT006	Trichloroethene (TCE)	27.3	µg/L
7/18/2017 11:07:00 AM	AT006	1,4-Dioxane	1.03	ug/L
7/18/2017 11:07:00 AM	AT006	Perchlorate	ND	µg/L
7/18/2017 11:07:00 AM	AT006	Hexavalent Chromium (Cr+6), IC	4.49	µg/L
7/18/2017 12:00:00 PM	AT007	Tetrachloroethylene (PCE)	7.40	µg/L
7/18/2017 12:00:00 PM	AT007	Trichloroethene (TCE)	2.44	µg/L
7/18/2017 12:00:00 PM	AT007	1,4-Dioxane	0.883	ug/L
7/18/2017 12:00:00 PM	AT007	Perchlorate	ND	µg/L
7/18/2017 12:00:00 PM	AT007	Hexavalent Chromium (Cr+6), IC	1.87	µg/L
8/3/2017 10:23:00 AM	AT002	Tetrachloroethylene (PCE)	6.55	µg/L
8/3/2017 10:23:00 AM	AT002	Trichloroethene (TCE)	93.6	µg/L
8/3/2017 10:23:00 AM	AT002	1,4-Dioxane	2.80	ug/L
8/3/2017 10:23:00 AM	AT002	Perchlorate	ND	µg/L
8/3/2017 10:23:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	43.9	µg/L
8/4/2017 10:20:00 AM	AT004	Tetrachloroethylene (PCE)	Non Representa	µg/L
8/4/2017 10:20:00 AM	AT004	Trichloroethene (TCE)	Non Representa	µg/L
8/4/2017 10:20:00 AM	AT004	1,4-Dioxane	1.70	ug/L
8/4/2017 10:20:00 AM	AT004	Perchlorate	ND	µg/L
8/4/2017 10:20:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	8.29	µg/L

8/7/2017 12:38:00 PM	AT004	Tetrachloroethylene (PCE)	Non Representa	µg/L
8/7/2017 12:38:00 PM	AT004	Trichloroethene (TCE)	Non Representa	µg/L
8/11/2017 9:40:00 AM	AT004	Tetrachloroethylene (PCE)	8.19	µg/L
8/11/2017 9:40:00 AM	AT004	Trichloroethene (TCE)	31.6	µg/L
8/30/2017 12:24:00 PM	AT006	1,4-Dioxane	0.912	ug/L
8/30/2017 12:24:00 PM	AT006	Perchlorate	ND	µg/L
8/30/2017 12:24:00 PM	AT006	Hexavalent Chromium (Cr+6), IC	4.52	µg/L
9/7/2017 11:20:00 AM	AT003	Tetrachloroethylene (PCE)	8.46	µg/L
9/7/2017 11:20:00 AM	AT003	Trichloroethene (TCE)	49.4	µg/L
9/7/2017 11:20:00 AM	AT003	1,4-Dioxane	1.38	ug/L
9/7/2017 11:20:00 AM	AT003	Perchlorate	ND	µg/L
9/7/2017 11:20:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	40.7	µg/L
9/26/2017 11:06:00 AM	AT006	Tetrachloroethylene (PCE)	9.15	µg/L
9/26/2017 11:06:00 AM	AT006	Trichloroethene (TCE)	24.3	µg/L
9/26/2017 11:06:00 AM	AT006	1,4-Dioxane	0.783	ug/L
9/26/2017 11:06:00 AM	AT006	Perchlorate	ND	µg/L
9/26/2017 11:06:00 AM	AT006	Hexavalent Chromium (Cr+6), IC	4.90	µg/L
9/26/2017 10:35:00 AM	AT007	Tetrachloroethylene (PCE)	6.74	µg/L
9/26/2017 10:35:00 AM	AT007	Trichloroethene (TCE)	2.42	µg/L
9/26/2017 10:35:00 AM	AT007	1,4-Dioxane	0.748	ug/L
9/26/2017 10:35:00 AM	AT007	Perchlorate	ND	µg/L
9/26/2017 10:35:00 AM	AT007	Hexavalent Chromium (Cr+6), IC	Preserv Error	µg/L
9/27/2017 11:30:00 AM	AT004	Tetrachloroethylene (PCE)	8.06	µg/L
9/27/2017 11:30:00 AM	AT004	Trichloroethene (TCE)	26.0	µg/L
9/27/2017 11:30:00 AM	AT004	1,4-Dioxane	1.81	ug/L
9/27/2017 11:30:00 AM	AT004	Perchlorate	ND	µg/L
9/27/2017 11:30:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	9.27	µg/L
9/29/2017 8:37:00 AM	AT007	Hexavalent Chromium (Cr+6), IC	1.44	µg/L
9/29/2017 8:10:00 AM	AT002	Tetrachloroethylene (PCE)	8.89	µg/L
9/29/2017 8:10:00 AM	AT002	Trichloroethene (TCE)	94.7	µg/L
9/29/2017 8:10:00 AM	AT002	1,4-Dioxane	3.23	ug/L
9/29/2017 8:10:00 AM	AT002	Perchlorate	ND	µg/L
9/29/2017 8:10:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	38.8	µg/L
10/16/2017 9:57:00 AM	AT004	Tetrachloroethylene (PCE)	8.68	µg/L
10/16/2017 9:57:00 AM	AT004	Trichloroethene (TCE)	29.0	µg/L

10/16/2017 9:57:00 AM	AT004	1,4-Dioxane	1.60	ug/L
10/16/2017 9:57:00 AM	AT004	Perchlorate	ND	µg/L
10/16/2017 9:57:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	4.85	µg/L
10/16/2017 10:46:00 AM	AT006	Tetrachloroethylene (PCE)	8.07	µg/L
10/16/2017 10:46:00 AM	AT006	Trichloroethene (TCE)	22.5	µg/L
10/16/2017 10:46:00 AM	AT006	1,4-Dioxane	0.812	ug/L
10/16/2017 10:46:00 AM	AT006	Perchlorate	ND	µg/L
10/16/2017 10:46:00 AM	AT006	Hexavalent Chromium (Cr+6), IC	8.93	µg/L
10/20/2017 10:45:00 AM	AT007	Tetrachloroethylene (PCE)	6.77	µg/L
10/20/2017 10:45:00 AM	AT007	Trichloroethene (TCE)	2.32	µg/L
10/20/2017 10:45:00 AM	AT007	1,4-Dioxane	0.701	ug/L
10/20/2017 10:45:00 AM	AT007	Perchlorate	ND	µg/L
10/20/2017 10:45:00 AM	AT007	Hexavalent Chromium (Cr+6), IC	1.53	µg/L
10/23/2017 9:23:00 AM	AT002	Tetrachloroethylene (PCE)	11.2	µg/L
10/23/2017 9:23:00 AM	AT002	Trichloroethene (TCE)	107	µg/L
10/23/2017 9:23:00 AM	AT002	1,4-Dioxane	3.30	ug/L
10/23/2017 9:23:00 AM	AT002	Perchlorate	ND	µg/L
10/23/2017 9:23:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	42.6	µg/L
10/23/2017 10:01:00 AM	AT003	Tetrachloroethylene (PCE)	8.53	µg/L
10/23/2017 10:01:00 AM	AT003	Trichloroethene (TCE)	50.7	µg/L
10/23/2017 10:01:00 AM	AT003	1,4-Dioxane	1.14	ug/L
10/23/2017 10:01:00 AM	AT003	Perchlorate	ND	µg/L
10/23/2017 10:01:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	42.4	µg/L
11/1/2017 10:50:00 AM	AT002	Tetrachloroethylene (PCE)	9.00	µg/L
11/1/2017 10:50:00 AM	AT002	Trichloroethene (TCE)	103	µg/L
11/1/2017 10:50:00 AM	AT002	1,4-Dioxane	3.71	ug/L
11/1/2017 10:50:00 AM	AT002	Perchlorate	ND	µg/L
11/1/2017 10:50:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	40.7	µg/L
11/3/2017 9:59:00 AM	AT004	Tetrachloroethylene (PCE)	8.02	µg/L
11/3/2017 9:59:00 AM	AT004	Trichloroethene (TCE)	40.1	µg/L
11/3/2017 9:59:00 AM	AT004	1,4-Dioxane	1.39	ug/L
11/3/2017 9:59:00 AM	AT004	Perchlorate	ND	µg/L
11/3/2017 9:59:00 AM	AT004	Hexavalent Chromium (Cr+6), IC	10.2	µg/L
11/3/2017 11:45:00 AM	AT006	Tetrachloroethylene (PCE)	7.69	µg/L
11/3/2017 11:45:00 AM	AT006	Trichloroethene (TCE)	25.8	µg/L
11/3/2017 11:45:00 AM	AT006	1,4-Dioxane	0.797	ug/L

11/3/2017 11:45:00 AM	AT006	Perchlorate	ND	µg/L
11/3/2017 11:45:00 AM	AT006	Hexavalent Chromium (Cr+6), IC	4.88	µg/L
11/3/2017 12:50:00 PM	AT007	Tetrachloroethylene (PCE)	6.60	µg/L
11/3/2017 12:50:00 PM	AT007	Trichloroethene (TCE)	2.42	µg/L
11/3/2017 12:50:00 PM	AT007	1,4-Dioxane	0.663	ug/L
11/3/2017 12:50:00 PM	AT007	Perchlorate	ND	µg/L
11/3/2017 12:50:00 PM	AT007	Hexavalent Chromium (Cr+6), IC	1.35	µg/L
11/29/2017 11:45:00 AM	AT003	Tetrachloroethylene (PCE)	7.93	µg/L
11/29/2017 11:45:00 AM	AT003	Trichloroethene (TCE)	45.5	µg/L
11/29/2017 11:45:00 AM	AT003	1,4-Dioxane	1.33	ug/L
11/29/2017 11:45:00 AM	AT003	Perchlorate	ND	µg/L
11/29/2017 11:45:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	43.2	µg/L
12/18/2017 10:00:00 AM	AT002	Tetrachloroethylene (PCE)	9.65	µg/L
12/18/2017 10:00:00 AM	AT002	Trichloroethene (TCE)	87.4	µg/L
12/18/2017 10:00:00 AM	AT002	1,4-Dioxane	3.37	ug/L
12/18/2017 10:00:00 AM	AT002	Perchlorate	ND	µg/L
12/18/2017 10:00:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	43.8	µg/L
12/18/2017 9:32:00 AM	AT003	Tetrachloroethylene (PCE)	8.66	µg/L
12/18/2017 9:32:00 AM	AT003	Trichloroethene (TCE)	48.1	µg/L
12/18/2017 9:32:00 AM	AT003	1,4-Dioxane	1.12	ug/L
12/18/2017 9:32:00 AM	AT003	Perchlorate	ND	µg/L
12/18/2017 9:32:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	44.8	µg/L
1/12/2018 8:40:00 AM	AT002	Tetrachloroethylene (PCE)	10.5	µg/L
1/12/2018 8:40:00 AM	AT002	Trichloroethene (TCE)	104	µg/L
1/12/2018 8:40:00 AM	AT002	1,4-Dioxane	4.09	ug/L
1/12/2018 8:40:00 AM	AT002	Perchlorate	ND	µg/L
1/12/2018 8:40:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	42.8	µg/L
1/12/2018 9:30:00 AM	AT003	Tetrachloroethylene (PCE)	8.52	µg/L
1/12/2018 9:30:00 AM	AT003	Trichloroethene (TCE)	45.9	µg/L
1/12/2018 9:30:00 AM	AT003	1,4-Dioxane	1.46	ug/L
1/12/2018 9:30:00 AM	AT003	Perchlorate	ND	µg/L
1/12/2018 9:30:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	44.5	µg/L
2/5/2018 9:43:00 AM	AT002	Tetrachloroethylene (PCE)	10.0	µg/L
2/5/2018 9:43:00 AM	AT002	Trichloroethene (TCE)	97.4	µg/L
2/5/2018 9:43:00 AM	AT002	1,4-Dioxane	3.87	ug/L
2/5/2018 9:43:00 AM	AT002	Perchlorate	ND	µg/L

2/5/2018 9:43:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	35.8	µg/L
2/5/2018 10:20:00 AM	AT003	Tetrachloroethylene (PCE)	8.69	µg/L
2/5/2018 10:20:00 AM	AT003	Trichloroethene (TCE)	44.6	µg/L
2/5/2018 10:20:00 AM	AT003	1,4-Dioxane	1.30	ug/L
2/5/2018 10:20:00 AM	AT003	Perchlorate	ND	µg/L
2/5/2018 10:20:00 AM	AT003	Hexavalent Chromium (Cr+6), IC	35.6	µg/L
3/5/2018 9:28:00 AM	AT002	Tetrachloroethylene (PCE)	9.28	µg/L
3/5/2018 9:28:00 AM	AT002	Trichloroethene (TCE)	97.4	µg/L
3/5/2018 9:28:00 AM	AT002	1,4-Dioxane	4.12	ug/L
3/5/2018 9:28:00 AM	AT002	Perchlorate	ND	µg/L
3/5/2018 9:28:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	41.2	µg/L

North Hollywood

COLLECTION DATE	LOCATION	ANALYTE	RESULT	UNIT
4/4/2017 8:30:00 AM	NH034	Tetrachloroethylene (PCE)	0.863	µg/L
4/4/2017 8:30:00 AM	NH034	Trichloroethene (TCE)	2.24	µg/L
4/4/2017 8:30:00 AM	NH034	1,4-Dioxane	ND	ug/L
4/4/2017 9:20:00 AM	NH044	Perchlorate	ND	µg/L
4/4/2017 9:20:00 AM	NH044	Tetrachloroethylene (PCE)	ND	µg/L
4/4/2017 9:20:00 AM	NH044	Trichloroethene (TCE)	1.39	µg/L
4/4/2017 9:20:00 AM	NH044	1,4-Dioxane	ND	ug/L
4/4/2017 11:34:00 AM	NH004	Tetrachloroethylene (PCE)	ND	µg/L
4/4/2017 11:34:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
4/4/2017 11:34:00 AM	NH004	1,4-Dioxane	ND	ug/L
4/6/2017 11:00:00 AM	NH034	Tetrachloroethylene (PCE)	0.897	µg/L
4/6/2017 11:00:00 AM	NH034	Trichloroethene (TCE)	2.30	µg/L
4/6/2017 11:00:00 AM	NH034	1,4-Dioxane	ND	ug/L
4/6/2017 11:30:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
4/6/2017 11:30:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
4/6/2017 11:30:00 AM	NH022	1,4-Dioxane	ND	ug/L
4/6/2017 12:15:00 PM	NH007	Tetrachloroethylene (PCE)	0.513	µg/L
4/6/2017 12:15:00 PM	NH007	Trichloroethene (TCE)	ND	µg/L
4/6/2017 12:15:00 PM	NH007	1,4-Dioxane	ND	ug/L
4/6/2017 12:45:00 PM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
4/6/2017 12:45:00 PM	NH032	Trichloroethene (TCE)	ND	µg/L
4/6/2017 12:45:00 PM	NH032	1,4-Dioxane	ND	ug/L

5/25/2017 9:40:00 AM	NH037	Tetrachloroethylene (PCE)	ND	µg/L
5/25/2017 9:40:00 AM	NH037	Trichloroethene (TCE)	ND	µg/L
5/25/2017 9:40:00 AM	NH037	1,4-Dioxane	ND	ug/L
5/25/2017 10:05:00 AM	NH034	Tetrachloroethylene (PCE)	ND	µg/L
5/25/2017 10:05:00 AM	NH034	Trichloroethene (TCE)	ND	µg/L
5/25/2017 10:05:00 AM	NH034	1,4-Dioxane	ND	ug/L
5/25/2017 10:30:00 AM	NH044	Tetrachloroethylene (PCE)	ND	µg/L
5/25/2017 10:30:00 AM	NH044	Trichloroethene (TCE)	ND	µg/L
5/25/2017 10:30:00 AM	NH044	Perchlorate	ND	µg/L
5/25/2017 10:30:00 AM	NH044	1,4-Dioxane	ND	ug/L
5/25/2017 11:00:00 AM	NH026	Tetrachloroethylene (PCE)	ND	µg/L
5/25/2017 11:00:00 AM	NH026	Trichloroethene (TCE)	ND	µg/L
5/25/2017 11:00:00 AM	NH026	Perchlorate	ND	µg/L
5/25/2017 11:00:00 AM	NH026	1,4-Dioxane	ND	ug/L
5/25/2017 11:40:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
5/25/2017 11:40:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
5/25/2017 11:40:00 AM	NH022	1,4-Dioxane	ND	ug/L
5/26/2017 8:35:00 AM	NH023	Tetrachloroethylene (PCE)	ND	µg/L
5/26/2017 8:35:00 AM	NH023	Trichloroethene (TCE)	1.09	µg/L
5/26/2017 8:35:00 AM	NH023	1,4-Dioxane	ND	ug/L
5/26/2017 9:00:00 AM	NH004	Tetrachloroethylene (PCE)	0.623	µg/L
5/26/2017 9:00:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
5/26/2017 9:00:00 AM	NH004	1,4-Dioxane	ND	ug/L
5/26/2017 9:20:00 AM	NH033	Tetrachloroethylene (PCE)	ND	µg/L
5/26/2017 9:20:00 AM	NH033	Trichloroethene (TCE)	ND	µg/L
5/26/2017 9:20:00 AM	NH033	1,4-Dioxane	ND	ug/L
5/26/2017 9:55:00 AM	NH007	Tetrachloroethylene (PCE)	1.03	µg/L
5/26/2017 9:55:00 AM	NH007	Trichloroethene (TCE)	ND	µg/L
5/26/2017 9:55:00 AM	NH007	1,4-Dioxane	ND	ug/L
5/26/2017 10:30:00 AM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
5/26/2017 10:30:00 AM	NH032	Trichloroethene (TCE)	ND	µg/L
5/26/2017 10:30:00 AM	NH032	1,4-Dioxane	ND	ug/L
6/20/2017 9:30:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
6/20/2017 9:30:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
6/20/2017 9:30:00 AM	NH022	Hexavalent Chromium (Cr+6), IC	0.408	µg/L
6/29/2017 9:20:00 AM	NH023	Tetrachloroethylene (PCE)	ND	µg/L
6/29/2017 9:20:00 AM	NH023	Trichloroethene (TCE)	1.26	µg/L
6/29/2017 9:20:00 AM	NH023	1,4-Dioxane	ND	ug/L
6/29/2017 9:43:00 AM	NH044	Tetrachloroethylene (PCE)	ND	µg/L
6/29/2017 9:43:00 AM	NH044	Trichloroethene (TCE)	ND	µg/L
6/29/2017 9:43:00 AM	NH044	1,4-Dioxane	ND	ug/L

6/29/2017 10:15:00 AM	NH034	Tetrachloroethylene (PCE)	ND	µg/L
6/29/2017 10:15:00 AM	NH034	Trichloroethene (TCE)	ND	µg/L
6/29/2017 10:15:00 AM	NH034	1,4-Dioxane	ND	ug/L
6/29/2017 10:47:00 AM	NH037	Tetrachloroethylene (PCE)	ND	µg/L
6/29/2017 10:47:00 AM	NH037	Trichloroethene (TCE)	ND	µg/L
6/29/2017 10:47:00 AM	NH037	1,4-Dioxane	ND	ug/L
6/30/2017 9:15:00 AM	NH004	Tetrachloroethylene (PCE)	0.602	µg/L
6/30/2017 9:15:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
6/30/2017 9:34:00 AM	NH033	Tetrachloroethylene (PCE)	ND	µg/L
6/30/2017 9:34:00 AM	NH033	Trichloroethene (TCE)	ND	µg/L
6/30/2017 9:34:00 AM	NH033	1,4-Dioxane	ND	ug/L
6/30/2017 10:30:00 AM	NH007	Tetrachloroethylene (PCE)	1.13	µg/L
6/30/2017 10:30:00 AM	NH007	Trichloroethene (TCE)	ND	µg/L
6/30/2017 10:30:00 AM	NH007	1,4-Dioxane	ND	ug/L
6/30/2017 10:46:00 AM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
6/30/2017 10:46:00 AM	NH032	Trichloroethene (TCE)	ND	µg/L
6/30/2017 10:46:00 AM	NH032	1,4-Dioxane	ND	ug/L
7/25/2017 8:50:00 AM	NH023	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 8:50:00 AM	NH023	Trichloroethene (TCE)	1.32	µg/L
7/25/2017 8:50:00 AM	NH023	Perchlorate	ND	µg/L
7/25/2017 8:50:00 AM	NH023	1,4-Dioxane	ND	ug/L
7/25/2017 9:20:00 AM	NH037	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 9:20:00 AM	NH037	Trichloroethene (TCE)	ND	µg/L
7/25/2017 9:20:00 AM	NH037	1,4-Dioxane	ND	ug/L
7/25/2017 9:54:00 AM	NH034	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 9:54:00 AM	NH034	Trichloroethene (TCE)	ND	µg/L
7/25/2017 9:54:00 AM	NH034	1,4-Dioxane	ND	ug/L
7/25/2017 10:15:00 AM	NH044	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 10:15:00 AM	NH044	Trichloroethene (TCE)	ND	µg/L
7/25/2017 10:15:00 AM	NH044	1,4-Dioxane	ND	ug/L
7/25/2017 10:32:00 AM	NH026	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 10:32:00 AM	NH026	Trichloroethene (TCE)	ND	µg/L
7/25/2017 10:32:00 AM	NH026	1,4-Dioxane	ND	ug/L
7/25/2017 11:10:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
7/25/2017 11:10:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
7/25/2017 11:10:00 AM	NH022	1,4-Dioxane	ND	ug/L
7/27/2017 10:08:00 AM	NH004	Tetrachloroethylene (PCE)	0.608	µg/L
7/27/2017 10:08:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
7/27/2017 10:08:00 AM	NH004	1,4-Dioxane	ND	ug/L
7/27/2017 10:20:00 AM	NH033	Tetrachloroethylene (PCE)	ND	µg/L
7/27/2017 10:20:00 AM	NH033	Trichloroethene (TCE)	ND	µg/L

7/27/2017 10:20:00 AM	NH033	1,4-Dioxane	ND	ug/L
7/27/2017 11:15:00 AM	NH007	Tetrachloroethylene (PCE)	1.27	µg/L
7/27/2017 11:15:00 AM	NH007	Trichloroethene (TCE)	ND	µg/L
7/27/2017 11:15:00 AM	NH007	1,4-Dioxane	ND	ug/L
7/27/2017 11:30:00 AM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
7/27/2017 11:30:00 AM	NH032	Trichloroethene (TCE)	ND	µg/L
7/27/2017 11:30:00 AM	NH032	1,4-Dioxane	ND	ug/L
1/30/2018 9:25:00 AM	NH023	Tetrachloroethylene (PCE)	ND	µg/L
1/30/2018 9:25:00 AM	NH023	Trichloroethene (TCE)	1.59	µg/L
1/30/2018 9:25:00 AM	NH023	1,4-Dioxane	ND	ug/L
1/30/2018 10:40:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
1/30/2018 10:40:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
1/30/2018 10:40:00 AM	NH022	Perchlorate	ND	µg/L
1/30/2018 10:40:00 AM	NH022	1,4-Dioxane	ND	ug/L
1/30/2018 11:20:00 AM	NH026	Tetrachloroethylene (PCE)	0.705	µg/L
1/30/2018 11:20:00 AM	NH026	Trichloroethene (TCE)	1.38	µg/L
1/30/2018 11:20:00 AM	NH026	1,4-Dioxane	ND	ug/L
2/15/2018 9:26:00 AM	NH023	Tetrachloroethylene (PCE)	ND	µg/L
2/15/2018 9:26:00 AM	NH023	Trichloroethene (TCE)	1.65	µg/L
2/15/2018 9:26:00 AM	NH023	1,4-Dioxane	ND	ug/L
2/15/2018 10:05:00 AM	NH026	Tetrachloroethylene (PCE)	1.03	µg/L
2/15/2018 10:05:00 AM	NH026	Trichloroethene (TCE)	2.04	µg/L
2/15/2018 10:05:00 AM	NH026	1,4-Dioxane	ND	ug/L
2/15/2018 10:20:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
2/15/2018 10:20:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
2/15/2018 10:20:00 AM	NH022	1,4-Dioxane	ND	ug/L
2/15/2018 10:50:00 AM	NH004	Tetrachloroethylene (PCE)	0.685	µg/L
2/15/2018 10:50:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
2/15/2018 10:50:00 AM	NH004	Perchlorate	ND	µg/L
2/15/2018 10:50:00 AM	NH004	1,4-Dioxane	ND	ug/L
2/21/2018 9:37:00 AM	NH007	Tetrachloroethylene (PCE)	0.830	µg/L
2/21/2018 9:37:00 AM	NH007	Trichloroethene (TCE)	ND	µg/L
2/21/2018 9:37:00 AM	NH007	1,4-Dioxane	ND	ug/L
2/21/2018 10:25:00 AM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
2/21/2018 10:25:00 AM	NH032	Trichloroethene (TCE)	ND	µg/L
2/21/2018 10:25:00 AM	NH032	Perchlorate	ND	µg/L
2/21/2018 10:25:00 AM	NH032	1,4-Dioxane	ND	ug/L
2/21/2018 10:50:00 AM	NH033	Tetrachloroethylene (PCE)	ND	µg/L
2/21/2018 10:50:00 AM	NH033	Trichloroethene (TCE)	ND	µg/L
2/21/2018 10:50:00 AM	NH033	Perchlorate	ND	µg/L
2/21/2018 10:50:00 AM	NH033	1,4-Dioxane	ND	ug/L

2/28/2018 11:24:00 AM	NH025	1,4-Dioxane	ND	ug/L
2/28/2018 11:24:00 AM	NH025	Tetrachloroethylene (PCE)	ND	µg/L
2/28/2018 11:24:00 AM	NH025	Trichloroethene (TCE)	ND	µg/L
2/28/2018 11:24:00 AM	NH025	Hexavalent Chromium (Cr+6), IC	0.487	µg/L
3/20/2018 9:31:00 AM	NH004	Tetrachloroethylene (PCE)	0.753	µg/L
3/20/2018 9:31:00 AM	NH004	Trichloroethene (TCE)	ND	µg/L
3/20/2018 9:40:00 AM	NH007	Tetrachloroethylene (PCE)	0.944	µg/L
3/20/2018 9:40:00 AM	NH007	Trichloroethene (TCE)	ND	µg/L
3/20/2018 9:40:00 AM	NH007	Perchlorate	ND	µg/L
3/20/2018 9:40:00 AM	NH007	1,4-Dioxane	ND	ug/L
3/20/2018 9:58:00 AM	NH032	Hexavalent Chromium (Cr+6), IC	ND	µg/L
3/20/2018 9:58:00 AM	NH032	Tetrachloroethylene (PCE)	ND	µg/L
3/20/2018 9:58:00 AM	NH032	Trichloroethene (TCE)	ND	µg/L
3/20/2018 9:58:00 AM	NH032	1,4-Dioxane	ND	ug/L
3/20/2018 10:13:00 AM	NH033	Tetrachloroethylene (PCE)	ND	µg/L
3/20/2018 10:13:00 AM	NH033	Trichloroethene (TCE)	ND	µg/L
3/21/2018 9:48:00 AM	NH022	Tetrachloroethylene (PCE)	ND	µg/L
3/21/2018 9:48:00 AM	NH022	Trichloroethene (TCE)	ND	µg/L
3/21/2018 10:25:00 AM	NH023	Tetrachloroethylene (PCE)	0.636	µg/L
3/21/2018 10:25:00 AM	NH023	Trichloroethene (TCE)	2.97	µg/L
3/21/2018 10:25:00 AM	NH023	1,4-Dioxane	ND	ug/L
3/21/2018 10:03:00 AM	NH026	Tetrachloroethylene (PCE)	1.05	µg/L
3/21/2018 10:03:00 AM	NH026	Trichloroethene (TCE)	2.42	µg/L
3/21/2018 10:03:00 AM	NH026	1,4-Dioxane	ND	ug/L

Pollock

COLLECTION DATE	LOCATION	ANALYTE	RESULT	UNIT
4/11/2017 11:25:00 AM	PL004	Tetrachloroethylene (PCE)	2.35	µg/L
4/11/2017 11:25:00 AM	PL004	Trichloroethene (TCE)	2.79	µg/L
4/11/2017 11:25:00 AM	PL004	1,4-Dioxane	0.785	ug/L
4/11/2017 11:25:00 AM	PL004	Perchlorate	2.32	µg/L
4/11/2017 10:15:00 AM	PL006	Tetrachloroethylene (PCE)	4.08	µg/L
4/11/2017 10:15:00 AM	PL006	Trichloroethene (TCE)	4.00	µg/L
4/11/2017 10:15:00 AM	PL006	1,4-Dioxane	ND	ug/L
4/11/2017 10:15:00 AM	PL006	Perchlorate	3.21	µg/L
5/9/2017 9:55:00 AM	PL006	Tetrachloroethylene (PCE)	4.54	µg/L
5/9/2017 9:55:00 AM	PL006	Trichloroethene (TCE)	4.09	µg/L
5/9/2017 9:55:00 AM	PL006	1,4-Dioxane	ND	ug/L
5/9/2017 9:55:00 AM	PL006	Perchlorate	2.80	µg/L

5/9/2017 9:55:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	2.04	µg/L
5/23/2017 11:50:00 AM	PL004	Tetrachloroethylene (PCE)	2.63	µg/L
5/23/2017 11:50:00 AM	PL004	Trichloroethene (TCE)	3.03	µg/L
5/23/2017 11:50:00 AM	PL004	Perchlorate	2.39	µg/L
5/23/2017 11:50:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.76	µg/L
6/14/2017 8:20:00 AM	PL004	Tetrachloroethylene (PCE)	3.12	µg/L
6/14/2017 8:20:00 AM	PL004	Trichloroethene (TCE)	3.33	µg/L
6/14/2017 8:20:00 AM	PL004	1,4-Dioxane	0.776	ug/L
6/14/2017 8:20:00 AM	PL004	Perchlorate	2.11	µg/L
6/14/2017 8:20:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.65	µg/L
6/14/2017 11:12:00 AM	PL006	Tetrachloroethylene (PCE)	5.17	µg/L
6/14/2017 11:12:00 AM	PL006	Trichloroethene (TCE)	4.67	µg/L
6/14/2017 11:12:00 AM	PL006	1,4-Dioxane	ND	ug/L
6/14/2017 11:12:00 AM	PL006	Perchlorate	3.05	µg/L
6/14/2017 11:12:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.95	µg/L
7/26/2017 11:58:00 AM	PL006	Tetrachloroethylene (PCE)	5.24	µg/L
7/26/2017 11:58:00 AM	PL006	Trichloroethene (TCE)	4.53	µg/L
7/26/2017 11:58:00 AM	PL006	1,4-Dioxane	ND	ug/L
7/26/2017 11:58:00 AM	PL006	Perchlorate	2.67	µg/L
7/26/2017 11:58:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.71	µg/L
7/26/2017 12:48:00 PM	PL004	Tetrachloroethylene (PCE)	3.47	µg/L
7/26/2017 12:48:00 PM	PL004	Trichloroethene (TCE)	3.49	µg/L
7/26/2017 12:48:00 PM	PL004	1,4-Dioxane	0.889	ug/L
7/26/2017 12:48:00 PM	PL004	Perchlorate	2.28	µg/L
7/26/2017 12:48:00 PM	PL004	Hexavalent Chromium (Cr+6), IC	1.59	µg/L
8/22/2017 9:35:00 AM	PL006	Tetrachloroethylene (PCE)	5.26	µg/L
8/22/2017 9:35:00 AM	PL006	Trichloroethene (TCE)	4.70	µg/L
8/22/2017 9:35:00 AM	PL006	1,4-Dioxane	ND	ug/L
8/22/2017 9:35:00 AM	PL006	Perchlorate	2.81	µg/L
8/22/2017 9:35:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	2.09	µg/L
8/30/2017 11:00:00 AM	PL004	Tetrachloroethylene (PCE)	3.19	µg/L
8/30/2017 11:00:00 AM	PL004	Trichloroethene (TCE)	3.42	µg/L
8/30/2017 11:00:00 AM	PL004	1,4-Dioxane	0.821	ug/L
8/30/2017 11:00:00 AM	PL004	Perchlorate	2.59	µg/L
8/30/2017 11:00:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.76	µg/L
9/26/2017 8:56:00 AM	PL006	Tetrachloroethylene (PCE)	4.45	µg/L

9/26/2017 8:56:00 AM	PL006	Trichloroethene (TCE)	3.86	µg/L
9/26/2017 8:56:00 AM	PL006	1,4-Dioxane	ND	ug/L
9/26/2017 8:56:00 AM	PL006	Perchlorate	2.70	µg/L
9/26/2017 8:56:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.94	µg/L
9/26/2017 9:45:00 AM	PL004	Tetrachloroethylene (PCE)	3.01	µg/L
9/26/2017 9:45:00 AM	PL004	Trichloroethene (TCE)	3.29	µg/L
9/26/2017 9:45:00 AM	PL004	1,4-Dioxane	0.791	ug/L
9/26/2017 9:45:00 AM	PL004	Perchlorate	2.28	µg/L
9/26/2017 9:45:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.83	µg/L
10/24/2017 9:20:00 AM	PL006	Tetrachloroethylene (PCE)	4.91	µg/L
10/24/2017 9:20:00 AM	PL006	Trichloroethene (TCE)	4.25	µg/L
10/24/2017 9:20:00 AM	PL006	1,4-Dioxane	ND	ug/L
10/24/2017 9:20:00 AM	PL006	Perchlorate	3.02	µg/L
10/24/2017 9:20:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.93	µg/L
10/24/2017 10:40:00 AM	PL004	Tetrachloroethylene (PCE)	3.08	µg/L
10/24/2017 10:40:00 AM	PL004	Trichloroethene (TCE)	3.40	µg/L
10/24/2017 10:40:00 AM	PL004	1,4-Dioxane	0.862	ug/L
10/24/2017 10:40:00 AM	PL004	Perchlorate	2.41	µg/L
10/24/2017 10:40:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.76	µg/L
11/21/2017 7:22:00 AM	PL004	Tetrachloroethylene (PCE)	3.34	µg/L
11/21/2017 7:22:00 AM	PL004	Trichloroethene (TCE)	3.49	µg/L
11/21/2017 7:22:00 AM	PL004	1,4-Dioxane	0.915	ug/L
11/21/2017 7:22:00 AM	PL004	Perchlorate	2.47	µg/L
11/21/2017 7:22:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.84	µg/L
11/21/2017 8:57:00 AM	PL006	Tetrachloroethylene (PCE)	5.24	µg/L
11/21/2017 8:57:00 AM	PL006	Trichloroethene (TCE)	4.21	µg/L
11/21/2017 8:57:00 AM	PL006	1,4-Dioxane	ND	ug/L
11/21/2017 8:57:00 AM	PL006	Perchlorate	2.89	µg/L
11/21/2017 8:57:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.91	µg/L
12/6/2017 9:13:00 AM	PL004	Tetrachloroethylene (PCE)	3.68	µg/L
12/6/2017 9:13:00 AM	PL004	Trichloroethene (TCE)	3.50	µg/L
12/6/2017 9:13:00 AM	PL004	1,4-Dioxane	0.861	ug/L
12/6/2017 9:13:00 AM	PL004	Perchlorate	2.13	µg/L
12/6/2017 9:13:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.45	µg/L
12/6/2017 11:00:00 AM	PL006	Tetrachloroethylene (PCE)	5.29	µg/L
12/6/2017 11:00:00 AM	PL006	Trichloroethene (TCE)	4.30	µg/L
12/6/2017 11:00:00 AM	PL006	1,4-Dioxane	ND	ug/L

12/6/2017 11:00:00 AM	PL006	Perchlorate	2.95	µg/L
12/6/2017 11:00:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	2.04	µg/L
1/9/2018 10:00:00 AM	PL004	Tetrachloroethylene (PCE)	3.92	µg/L
1/9/2018 10:00:00 AM	PL004	Trichloroethene (TCE)	3.91	µg/L
1/9/2018 10:00:00 AM	PL004	1,4-Dioxane	0.958	ug/L
1/9/2018 10:00:00 AM	PL004	Perchlorate	2.44	µg/L
1/9/2018 10:00:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.87	µg/L
1/9/2018 9:00:00 AM	PL006	Tetrachloroethylene (PCE)	6.39	µg/L
1/9/2018 9:00:00 AM	PL006	Trichloroethene (TCE)	4.54	µg/L
1/9/2018 9:00:00 AM	PL006	1,4-Dioxane	ND	ug/L
1/9/2018 9:00:00 AM	PL006	Perchlorate	3.02	µg/L
1/9/2018 9:00:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.89	µg/L
2/8/2018 10:25:00 AM	PL004	Tetrachloroethylene (PCE)	Preserv Error	µg/L
2/8/2018 10:25:00 AM	PL004	Trichloroethene (TCE)	Preserv Error	µg/L
2/8/2018 10:25:00 AM	PL004	1,4-Dioxane	0.915	ug/L
2/8/2018 10:25:00 AM	PL004	Perchlorate	2.30	µg/L
2/8/2018 10:25:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.67	µg/L
2/8/2018 1:45:00 PM	PL006	Tetrachloroethylene (PCE)	Preserv Error	µg/L
2/8/2018 1:45:00 PM	PL006	Trichloroethene (TCE)	Preserv Error	µg/L
2/8/2018 1:45:00 PM	PL006	1,4-Dioxane	ND	ug/L
2/8/2018 1:45:00 PM	PL006	Perchlorate	2.71	µg/L
2/8/2018 1:45:00 PM	PL006	Hexavalent Chromium (Cr+6), IC	1.79	µg/L
2/27/2018 9:45:00 AM	PL006	Tetrachloroethylene (PCE)	6.33	µg/L
2/27/2018 9:45:00 AM	PL006	Trichloroethene (TCE)	4.70	µg/L
2/27/2018 10:55:00 AM	PL004	Tetrachloroethylene (PCE)	3.46	µg/L
2/27/2018 10:55:00 AM	PL004	Trichloroethene (TCE)	3.67	µg/L
3/6/2018 7:39:00 AM	PL004	Tetrachloroethylene (PCE)	3.71	µg/L
3/6/2018 7:39:00 AM	PL004	Trichloroethene (TCE)	3.93	µg/L
3/6/2018 7:39:00 AM	PL004	1,4-Dioxane	0.930	ug/L
3/6/2018 7:39:00 AM	PL004	Perchlorate	2.24	µg/L
3/6/2018 7:39:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.71	µg/L
3/6/2018 8:47:00 AM	PL006	Tetrachloroethylene (PCE)	6.11	µg/L
3/6/2018 8:47:00 AM	PL006	Trichloroethene (TCE)	4.52	µg/L
3/6/2018 8:47:00 AM	PL006	1,4-Dioxane	ND	ug/L
3/6/2018 8:47:00 AM	PL006	Perchlorate	2.68	µg/L

3/6/2018 8:47:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.81	µg/L

Rinaldi-Toluca

COLLECTION DATE	LOCATION	ANALYTE	RESULT	UNIT
5/18/2017 10:50:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
5/18/2017 10:50:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
5/18/2017 10:50:00 AM	RT007	Perchlorate	ND	µg/L
5/18/2017 10:50:00 AM	RT007	1,4-Dioxane	ND	ug/L
5/18/2017 11:25:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
5/18/2017 11:25:00 AM	RT002	Trichloroethene (TCE)	1.05	µg/L
5/18/2017 11:25:00 AM	RT002	Perchlorate	ND	µg/L
5/18/2017 11:25:00 AM	RT002	1,4-Dioxane	ND	ug/L
6/19/2017 10:00:00 AM	RT001	Tetrachloroethylene (PCE)	1.09	µg/L
6/19/2017 10:00:00 AM	RT001	Trichloroethene (TCE)	10.7	µg/L
6/19/2017 10:00:00 AM	RT001	1,4-Dioxane	ND	ug/L
6/19/2017 10:00:00 AM	RT001	Perchlorate	ND	µg/L
6/19/2017 11:15:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
6/19/2017 11:15:00 AM	RT002	Trichloroethene (TCE)	0.903	µg/L
6/20/2017 11:15:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
6/20/2017 11:15:00 AM	RT004	Trichloroethene (TCE)	0.581	µg/L
6/20/2017 11:15:00 AM	RT004	Perchlorate	2.70	µg/L
6/20/2017 11:15:00 AM	RT004	Hexavalent Chromium (Cr+6), IC	2.48	µg/L
6/20/2017 11:15:00 AM	RT004	1,4-Dioxane	ND	ug/L
6/23/2017 8:40:00 AM	RT011	Tetrachloroethylene (PCE)	0.994	µg/L
6/23/2017 8:40:00 AM	RT011	Trichloroethene (TCE)	6.28	µg/L
6/23/2017 8:40:00 AM	RT011	Perchlorate	ND	µg/L
6/23/2017 8:40:00 AM	RT011	1,4-Dioxane	ND	ug/L
6/23/2017 9:05:00 AM	RT014	Tetrachloroethylene (PCE)	1.11	µg/L
6/23/2017 9:05:00 AM	RT014	Trichloroethene (TCE)	14.1	µg/L
6/23/2017 9:05:00 AM	RT014	1,4-Dioxane	ND	ug/L
6/23/2017 9:37:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
6/23/2017 9:37:00 AM	RT015	Trichloroethene (TCE)	4.95	µg/L
6/23/2017 9:37:00 AM	RT015	1,4-Dioxane	ND	ug/L
6/23/2017 10:15:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
6/23/2017 10:15:00 AM	RT012	Trichloroethene (TCE)	1.72	µg/L
6/23/2017 10:15:00 AM	RT012	Perchlorate	ND	µg/L
6/23/2017 10:15:00 AM	RT012	1,4-Dioxane	ND	ug/L
6/23/2017 10:50:00 AM	RT013	Tetrachloroethylene (PCE)	0.674	µg/L

6/23/2017 10:50:00 AM	RT013	Trichloroethene (TCE)	4.27	µg/L
6/23/2017 10:50:00 AM	RT013	1,4-Dioxane	ND	ug/L
6/27/2017 9:13:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
6/27/2017 9:13:00 AM	RT008	Trichloroethene (TCE)	1.09	µg/L
6/27/2017 9:13:00 AM	RT008	Perchlorate	2.26	µg/L
6/27/2017 9:13:00 AM	RT008	1,4-Dioxane	ND	ug/L
6/27/2017 9:28:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
6/27/2017 9:28:00 AM	RT009	Trichloroethene (TCE)	0.648	µg/L
6/27/2017 9:28:00 AM	RT009	Perchlorate	ND	µg/L
6/27/2017 9:28:00 AM	RT009	1,4-Dioxane	ND	ug/L
6/27/2017 10:18:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
6/27/2017 10:18:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
6/27/2017 10:18:00 AM	RT007	Perchlorate	ND	µg/L
6/27/2017 10:55:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
6/27/2017 10:55:00 AM	RT003	Trichloroethene (TCE)	ND	µg/L
6/27/2017 10:55:00 AM	RT003	Perchlorate	ND	µg/L
6/27/2017 10:55:00 AM	RT003	1,4-Dioxane	ND	ug/L
7/17/2017 9:55:00 AM	RT011	Tetrachloroethylene (PCE)	1.00	µg/L
7/17/2017 9:55:00 AM	RT011	Trichloroethene (TCE)	6.31	µg/L
7/17/2017 10:45:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
7/17/2017 10:45:00 AM	RT012	Trichloroethene (TCE)	1.43	µg/L
7/17/2017 10:45:00 AM	RT012	Perchlorate	ND	µg/L
7/19/2017 10:00:00 AM	RT001	Tetrachloroethylene (PCE)	1.17	µg/L
7/19/2017 10:00:00 AM	RT001	Trichloroethene (TCE)	11.1	µg/L
7/19/2017 10:00:00 AM	RT001	1,4-Dioxane	ND	ug/L
7/19/2017 10:40:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
7/19/2017 10:40:00 AM	RT002	Trichloroethene (TCE)	0.747	µg/L
7/19/2017 10:40:00 AM	RT002	Perchlorate	ND	µg/L
7/19/2017 10:40:00 AM	RT002	1,4-Dioxane	ND	ug/L
7/19/2017 11:10:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
7/19/2017 11:10:00 AM	RT015	Trichloroethene (TCE)	4.78	µg/L
7/19/2017 11:35:00 AM	RT014	Tetrachloroethylene (PCE)	1.13	µg/L
7/19/2017 11:35:00 AM	RT014	Trichloroethene (TCE)	13.7	µg/L
7/21/2017 8:37:00 AM	RT013	Tetrachloroethylene (PCE)	0.629	µg/L
7/21/2017 8:37:00 AM	RT013	Trichloroethene (TCE)	3.89	µg/L
7/21/2017 9:10:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
7/21/2017 9:10:00 AM	RT003	Trichloroethene (TCE)	ND	µg/L
7/21/2017 9:10:00 AM	RT003	Perchlorate	2.36	µg/L
7/21/2017 9:10:00 AM	RT003	1,4-Dioxane	ND	ug/L
7/21/2017 9:36:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
7/21/2017 9:36:00 AM	RT004	Trichloroethene (TCE)	0.575	µg/L

7/21/2017 9:36:00 AM	RT004	Perchlorate	2.82	µg/L
7/21/2017 9:36:00 AM	RT004	1,4-Dioxane	ND	ug/L
7/21/2017 10:00:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
7/21/2017 10:00:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
7/21/2017 10:00:00 AM	RT007	Perchlorate	ND	µg/L
7/21/2017 10:25:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
7/21/2017 10:25:00 AM	RT008	Trichloroethene (TCE)	1.17	µg/L
7/21/2017 10:25:00 AM	RT008	Perchlorate	2.47	µg/L
7/21/2017 11:00:00 AM	RT009	Perchlorate	ND	µg/L
7/21/2017 11:00:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
7/21/2017 11:00:00 AM	RT009	Trichloroethene (TCE)	0.550	µg/L
8/23/2017 9:35:00 AM	RT001	Tetrachloroethylene (PCE)	1.11	µg/L
8/23/2017 9:35:00 AM	RT001	Trichloroethene (TCE)	10.4	µg/L
8/23/2017 1:10:00 PM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
8/23/2017 1:10:00 PM	RT002	Trichloroethene (TCE)	0.699	µg/L
8/23/2017 9:10:00 AM	RT011	Tetrachloroethylene (PCE)	0.968	µg/L
8/23/2017 9:10:00 AM	RT011	Trichloroethene (TCE)	6.24	µg/L
8/23/2017 11:18:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
8/23/2017 11:18:00 AM	RT012	Trichloroethene (TCE)	1.51	µg/L
8/23/2017 11:38:00 AM	RT013	Tetrachloroethylene (PCE)	0.580	µg/L
8/23/2017 11:38:00 AM	RT013	Trichloroethene (TCE)	3.47	µg/L
8/23/2017 11:38:00 AM	RT013	Perchlorate	ND	µg/L
8/23/2017 10:12:00 AM	RT014	Tetrachloroethylene (PCE)	1.08	µg/L
8/23/2017 10:12:00 AM	RT014	Trichloroethene (TCE)	13.2	µg/L
8/23/2017 10:12:00 AM	RT014	Perchlorate	ND	µg/L
8/23/2017 10:38:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
8/23/2017 10:38:00 AM	RT015	Trichloroethene (TCE)	3.87	µg/L
8/23/2017 10:38:00 AM	RT015	Perchlorate	ND	µg/L
8/23/2017 12:39:00 PM	RT010	Tetrachloroethylene (PCE)	ND	µg/L
8/23/2017 12:39:00 PM	RT010	Trichloroethene (TCE)	5.26	µg/L
8/23/2017 12:39:00 PM	RT010	Perchlorate	ND	µg/L
8/23/2017 12:39:00 PM	RT010	1,4-Dioxane	ND	ug/L
8/24/2017 9:47:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
8/24/2017 9:47:00 AM	RT003	Trichloroethene (TCE)	ND	µg/L
8/24/2017 9:47:00 AM	RT003	Perchlorate	2.09	µg/L
8/24/2017 10:35:00 AM	RT004	Perchlorate	3.50	µg/L
8/24/2017 10:35:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
8/24/2017 10:35:00 AM	RT004	Trichloroethene (TCE)	0.509	µg/L
8/24/2017 8:38:00 AM	RT007	Perchlorate	2.12	µg/L
8/24/2017 8:38:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
8/24/2017 8:38:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L

8/24/2017 8:38:00 AM	RT007	1,4-Dioxane	ND	ug/L
8/24/2017 8:52:00 AM	RT008	Perchlorate	3.02	µg/L
8/24/2017 9:30:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
8/24/2017 9:30:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
8/24/2017 9:30:00 AM	RT009	1,4-Dioxane	ND	ug/L
8/24/2017 8:52:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
8/24/2017 8:52:00 AM	RT008	Trichloroethene (TCE)	1.24	µg/L
8/24/2017 8:52:00 AM	RT008	1,4-Dioxane	ND	ug/L
9/6/2017 9:27:00 AM	RT011	Tetrachloroethylene (PCE)	0.860	µg/L
9/6/2017 9:27:00 AM	RT011	Trichloroethene (TCE)	6.24	µg/L
9/6/2017 9:27:00 AM	RT011	1,4-Dioxane	ND	ug/L
9/6/2017 9:57:00 AM	RT001	Tetrachloroethylene (PCE)	1.08	µg/L
9/6/2017 9:57:00 AM	RT001	Trichloroethene (TCE)	10.4	µg/L
9/6/2017 10:40:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
9/6/2017 10:40:00 AM	RT015	Trichloroethene (TCE)	3.82	µg/L
9/6/2017 10:40:00 AM	RT015	1,4-Dioxane	ND	ug/L
9/6/2017 11:10:00 AM	RT014	Tetrachloroethylene (PCE)	1.12	µg/L
9/6/2017 11:10:00 AM	RT014	Trichloroethene (TCE)	12.6	µg/L
9/6/2017 11:10:00 AM	RT014	1,4-Dioxane	ND	ug/L
9/11/2017 9:10:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
9/11/2017 9:10:00 AM	RT012	Trichloroethene (TCE)	1.37	µg/L
9/11/2017 9:10:00 AM	RT012	1,4-Dioxane	ND	ug/L
9/11/2017 9:35:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
9/11/2017 9:35:00 AM	RT013	Trichloroethene (TCE)	3.04	µg/L
9/11/2017 9:35:00 AM	RT013	1,4-Dioxane	ND	ug/L
9/11/2017 10:02:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
9/11/2017 10:02:00 AM	RT002	Trichloroethene (TCE)	0.644	µg/L
9/11/2017 10:58:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
9/11/2017 10:58:00 AM	RT003	Trichloroethene (TCE)	0.522	µg/L
9/11/2017 10:58:00 AM	RT003	Perchlorate	2.39	µg/L
9/15/2017 10:05:00 AM	RT010	Tetrachloroethylene (PCE)	ND	µg/L
9/15/2017 10:05:00 AM	RT010	Trichloroethene (TCE)	5.17	µg/L
9/15/2017 10:05:00 AM	RT010	Perchlorate	ND	µg/L
9/15/2017 10:05:00 AM	RT010	1,4-Dioxane	ND	ug/L
9/15/2017 11:15:00 AM	RT004	Perchlorate	3.14	µg/L
9/15/2017 11:15:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
9/15/2017 11:15:00 AM	RT004	Trichloroethene (TCE)	0.604	µg/L
9/15/2017 11:56:00 AM	RT008	Perchlorate	2.98	µg/L
9/15/2017 11:56:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
9/15/2017 11:56:00 AM	RT008	Trichloroethene (TCE)	1.31	µg/L
9/15/2017 12:30:00 PM	RT007	Perchlorate	2.19	µg/L

9/15/2017 12:30:00 PM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
9/15/2017 12:30:00 PM	RT007	Trichloroethene (TCE)	ND	µg/L
9/15/2017 12:45:00 PM	RT009	Perchlorate	ND	µg/L
9/15/2017 12:45:00 PM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
9/15/2017 12:45:00 PM	RT009	Trichloroethene (TCE)	ND	µg/L
10/10/2017 11:00:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
10/10/2017 11:00:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
10/10/2017 12:15:00 PM	RT011	Tetrachloroethylene (PCE)	0.783	µg/L
10/10/2017 12:15:00 PM	RT011	Trichloroethene (TCE)	5.50	µg/L
10/11/2017 10:10:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
10/11/2017 10:10:00 AM	RT012	Trichloroethene (TCE)	1.18	µg/L
10/11/2017 10:10:00 AM	RT012	Perchlorate	ND	µg/L
10/11/2017 10:10:00 AM	RT012	Hexavalent Chromium (Cr+6), IC	2.19	µg/L
10/11/2017 9:50:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
10/11/2017 9:50:00 AM	RT013	Trichloroethene (TCE)	2.60	µg/L
10/11/2017 9:50:00 AM	RT013	Perchlorate	ND	µg/L
10/11/2017 9:50:00 AM	RT013	Hexavalent Chromium (Cr+6), IC	1.98	µg/L
10/11/2017 11:40:00 AM	RT014	Tetrachloroethylene (PCE)	0.844	µg/L
10/11/2017 11:40:00 AM	RT014	Trichloroethene (TCE)	10.6	µg/L
10/11/2017 11:40:00 AM	RT014	Perchlorate	ND	µg/L
10/11/2017 11:40:00 AM	RT014	Hexavalent Chromium (Cr+6), IC	1.50	µg/L
10/11/2017 10:51:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
10/11/2017 10:51:00 AM	RT015	Trichloroethene (TCE)	2.57	µg/L
10/11/2017 10:51:00 AM	RT015	Hexavalent Chromium (Cr+6), IC	1.70	µg/L
10/11/2017 11:20:00 AM	RT014	1,4-Dioxane	ND	ug/L
10/23/2017 10:05:00 AM	RT001	Tetrachloroethylene (PCE)	0.939	µg/L
10/23/2017 10:05:00 AM	RT001	Trichloroethene (TCE)	8.55	µg/L
10/23/2017 10:05:00 AM	RT001	1,4-Dioxane	ND	ug/L
10/23/2017 10:36:00 AM	RT010	Perchlorate	ND	µg/L
10/23/2017 11:05:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
10/23/2017 11:05:00 AM	RT002	Trichloroethene (TCE)	0.569	µg/L
10/23/2017 11:05:00 AM	RT002	Perchlorate	ND	µg/L
10/23/2017 11:05:00 AM	RT002	1,4-Dioxane	ND	ug/L
10/25/2017 11:00:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
10/25/2017 11:00:00 AM	RT003	Trichloroethene (TCE)	ND	µg/L
10/25/2017 11:00:00 AM	RT003	Perchlorate	2.11	µg/L
10/25/2017 11:00:00 AM	RT003	1,4-Dioxane	ND	ug/L
10/25/2017 11:35:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
10/25/2017 11:35:00 AM	RT004	Trichloroethene (TCE)	0.598	µg/L

10/25/2017 11:35:00 AM	RT004	Perchlorate	3.19	µg/L
10/25/2017 11:35:00 AM	RT004	1,4-Dioxane	ND	ug/L
10/25/2017 11:49:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
10/25/2017 11:49:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
10/25/2017 11:49:00 AM	RT007	Perchlorate	2.33	µg/L
10/25/2017 12:15:00 PM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
10/25/2017 12:15:00 PM	RT008	Trichloroethene (TCE)	1.37	µg/L
10/25/2017 12:15:00 PM	RT008	Perchlorate	3.06	µg/L
10/25/2017 12:50:00 PM	RT010	Tetrachloroethylene (PCE)	0.502	µg/L
10/25/2017 12:50:00 PM	RT010	Trichloroethene (TCE)	5.45	µg/L
11/27/2017 10:44:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
11/27/2017 10:44:00 AM	RT003	Trichloroethene (TCE)	0.514	µg/L
11/27/2017 10:44:00 AM	RT003	Perchlorate	2.22	µg/L
11/27/2017 9:31:00 AM	RT007	Perchlorate	2.46	µg/L
11/27/2017 9:31:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
11/27/2017 9:31:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
11/27/2017 9:31:00 AM	RT007	1,4-Dioxane	ND	ug/L
11/27/2017 9:44:00 AM	RT008	1,4-Dioxane	ND	ug/L
11/27/2017 10:10:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
11/27/2017 10:10:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
11/27/2017 10:10:00 AM	RT009	1,4-Dioxane	ND	ug/L
11/27/2017 9:44:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
11/27/2017 9:44:00 AM	RT008	Trichloroethene (TCE)	1.43	µg/L
11/27/2017 9:44:00 AM	RT008	Perchlorate	3.16	µg/L
11/27/2017 11:05:00 AM	RT004	Perchlorate	3.22	µg/L
11/27/2017 11:05:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
11/27/2017 11:05:00 AM	RT004	Trichloroethene (TCE)	0.572	µg/L
11/28/2017 9:45:00 AM	RT011	Tetrachloroethylene (PCE)	0.781	µg/L
11/28/2017 9:45:00 AM	RT011	Trichloroethene (TCE)	5.10	µg/L
11/28/2017 10:10:00 AM	RT001	Tetrachloroethylene (PCE)	0.949	µg/L
11/28/2017 10:10:00 AM	RT001	Trichloroethene (TCE)	9.01	µg/L
11/28/2017 10:46:00 AM	RT014	Tetrachloroethylene (PCE)	0.942	µg/L
11/28/2017 10:46:00 AM	RT014	Trichloroethene (TCE)	11.6	µg/L
11/28/2017 11:10:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
11/28/2017 11:10:00 AM	RT015	Trichloroethene (TCE)	2.58	µg/L
11/29/2017 9:28:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
11/29/2017 9:28:00 AM	RT012	Trichloroethene (TCE)	1.15	µg/L
11/29/2017 9:28:00 AM	RT012	Perchlorate	ND	µg/L
11/29/2017 9:50:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
11/29/2017 9:50:00 AM	RT013	Trichloroethene (TCE)	2.12	µg/L
11/29/2017 10:22:00 AM	RT010	Tetrachloroethylene (PCE)	0.698	µg/L

11/29/2017 10:22:00 AM	RT010	Trichloroethene (TCE)	5.33	µg/L
11/29/2017 10:22:00 AM	RT010	Perchlorate	ND	µg/L
11/29/2017 10:22:00 AM	RT010	1,4-Dioxane	ND	ug/L
11/29/2017 11:00:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
11/29/2017 11:00:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
12/11/2017 9:35:00 AM	RT001	Tetrachloroethylene (PCE)	0.824	µg/L
12/11/2017 9:35:00 AM	RT001	Trichloroethene (TCE)	7.82	µg/L
12/11/2017 10:25:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
12/11/2017 10:25:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
12/11/2017 8:55:00 AM	RT011	Tetrachloroethylene (PCE)	0.780	µg/L
12/11/2017 8:55:00 AM	RT011	Trichloroethene (TCE)	5.63	µg/L
12/11/2017 9:50:00 AM	RT012	Tetrachloroethylene (PCE)	ND	µg/L
12/11/2017 9:50:00 AM	RT012	Trichloroethene (TCE)	1.19	µg/L
12/11/2017 8:55:00 AM	RT011	1,4-Dioxane	ND	ug/L
12/11/2017 9:50:00 AM	RT012	1,4-Dioxane	ND	ug/L
12/12/2017 9:40:00 AM	RT010	Tetrachloroethylene (PCE)	0.684	µg/L
12/12/2017 9:40:00 AM	RT010	Trichloroethene (TCE)	6.13	µg/L
12/12/2017 10:05:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2017 10:05:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
12/12/2017 10:45:00 AM	RT008	Perchlorate	3.13	µg/L
12/12/2017 10:45:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2017 10:45:00 AM	RT008	Trichloroethene (TCE)	1.41	µg/L
12/12/2017 11:08:00 AM	RT007	Perchlorate	2.38	µg/L
12/12/2017 11:08:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2017 11:08:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
12/12/2017 11:55:00 AM	RT004	Perchlorate	3.37	µg/L
12/12/2017 11:55:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2017 11:55:00 AM	RT004	Trichloroethene (TCE)	0.623	µg/L
12/14/2017 9:30:00 AM	RT014	Tetrachloroethylene (PCE)	0.922	µg/L
12/14/2017 9:30:00 AM	RT014	Trichloroethene (TCE)	11.9	µg/L
12/14/2017 9:30:00 AM	RT014	1,4-Dioxane	ND	ug/L
12/14/2017 10:30:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
12/14/2017 10:30:00 AM	RT015	Trichloroethene (TCE)	2.75	µg/L
12/14/2017 10:30:00 AM	RT015	1,4-Dioxane	ND	ug/L
12/14/2017 11:20:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
12/14/2017 11:20:00 AM	RT013	Trichloroethene (TCE)	1.80	µg/L
12/14/2017 11:20:00 AM	RT013	1,4-Dioxane	ND	ug/L
12/14/2017 12:20:00 PM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
12/14/2017 12:20:00 PM	RT003	Trichloroethene (TCE)	0.588	µg/L
12/14/2017 12:20:00 PM	RT003	Perchlorate	2.34	µg/L
1/16/2018 9:22:00 AM	RT014	Tetrachloroethylene (PCE)	1.06	µg/L

1/16/2018 9:22:00 AM	RT014	Trichloroethene (TCE)	12.9	µg/L
1/16/2018 10:00:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
1/16/2018 10:00:00 AM	RT015	Trichloroethene (TCE)	2.64	µg/L
1/16/2018 11:05:00 AM	RT001	Tetrachloroethylene (PCE)	1.05	µg/L
1/16/2018 11:05:00 AM	RT001	Trichloroethene (TCE)	9.07	µg/L
1/16/2018 11:05:00 AM	RT001	1,4-Dioxane	ND	ug/L
1/16/2018 11:35:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
1/16/2018 11:35:00 AM	RT002	Trichloroethene (TCE)	0.745	µg/L
1/16/2018 11:35:00 AM	RT002	Perchlorate	ND	µg/L
1/16/2018 11:35:00 AM	RT002	1,4-Dioxane	ND	ug/L
1/17/2018 9:20:00 AM	RT011	Tetrachloroethylene (PCE)	0.782	µg/L
1/17/2018 9:20:00 AM	RT011	Trichloroethene (TCE)	5.28	µg/L
1/17/2018 10:15:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
1/17/2018 10:15:00 AM	RT013	Trichloroethene (TCE)	2.05	µg/L
1/17/2018 9:40:00 AM	RT012	Tetrachloroethylene (PCE)	0.523	µg/L
1/17/2018 9:40:00 AM	RT012	Trichloroethene (TCE)	4.12	µg/L
1/17/2018 9:40:00 AM	RT012	Perchlorate	ND	µg/L
1/17/2018 10:40:00 AM	RT010	Tetrachloroethylene (PCE)	1.65	µg/L
1/17/2018 10:40:00 AM	RT010	Trichloroethene (TCE)	8.94	µg/L
1/17/2018 10:40:00 AM	RT010	Perchlorate	ND	µg/L
1/18/2018 9:15:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2018 9:15:00 AM	RT003	Trichloroethene (TCE)	1.03	µg/L
1/18/2018 9:15:00 AM	RT003	Perchlorate	2.40	µg/L
1/18/2018 9:15:00 AM	RT003	1,4-Dioxane	ND	ug/L
1/18/2018 9:50:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2018 9:50:00 AM	RT004	Trichloroethene (TCE)	0.657	µg/L
1/18/2018 9:50:00 AM	RT004	Perchlorate	3.94	µg/L
1/18/2018 9:50:00 AM	RT004	1,4-Dioxane	ND	ug/L
1/18/2018 9:05:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2018 9:05:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
1/18/2018 9:05:00 AM	RT007	Perchlorate	2.08	µg/L
1/18/2018 9:20:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2018 9:20:00 AM	RT008	Trichloroethene (TCE)	0.739	µg/L
1/18/2018 9:20:00 AM	RT008	Perchlorate	2.25	µg/L
2/12/2018 9:20:00 AM	RT001	Tetrachloroethylene (PCE)	1.07	µg/L
2/12/2018 9:20:00 AM	RT001	Trichloroethene (TCE)	9.92	µg/L
2/12/2018 9:03:00 AM	RT011	Tetrachloroethylene (PCE)	0.768	µg/L
2/12/2018 9:03:00 AM	RT011	Trichloroethene (TCE)	5.21	µg/L
2/12/2018 11:18:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
2/12/2018 11:18:00 AM	RT013	Trichloroethene (TCE)	2.95	µg/L
2/12/2018 10:18:00 AM	RT014	Tetrachloroethylene (PCE)	0.827	µg/L

2/12/2018 10:18:00 AM	RT014	Trichloroethene (TCE)	11.0	µg/L
2/12/2018 10:35:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
2/12/2018 10:35:00 AM	RT015	Trichloroethene (TCE)	1.31	µg/L
2/13/2018 11:25:00 AM	RT008	Perchlorate	ND	µg/L
2/13/2018 11:25:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
2/13/2018 11:25:00 AM	RT008	Trichloroethene (TCE)	0.727	µg/L
2/13/2018 10:00:00 AM	RT003	Tetrachloroethylene (PCE)	0.602	µg/L
2/13/2018 10:00:00 AM	RT003	Trichloroethene (TCE)	1.61	µg/L
2/13/2018 10:00:00 AM	RT003	Perchlorate	2.32	µg/L
2/13/2018 10:00:00 AM	RT003	Hexavalent Chromium (Cr+6), IC	2.13	µg/L
2/13/2018 10:00:00 AM	RT003	1,4-Dioxane	ND	ug/L
2/13/2018 11:10:00 AM	RT007	Perchlorate	ND	µg/L
2/13/2018 11:10:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
2/13/2018 11:10:00 AM	RT007	Trichloroethene (TCE)	0.508	µg/L
2/14/2018 9:33:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2018 9:33:00 AM	RT002	Trichloroethene (TCE)	1.36	µg/L
2/14/2018 10:25:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2018 10:25:00 AM	RT004	Trichloroethene (TCE)	0.801	µg/L
2/14/2018 10:25:00 AM	RT004	Perchlorate	3.96	µg/L
2/14/2018 10:25:00 AM	RT004	1,4-Dioxane	ND	ug/L
2/14/2018 9:04:00 AM	RT010	Tetrachloroethylene (PCE)	2.31	µg/L
2/14/2018 9:04:00 AM	RT010	Trichloroethene (TCE)	13.3	µg/L
2/14/2018 8:40:00 AM	RT012	Tetrachloroethylene (PCE)	1.18	µg/L
2/14/2018 8:40:00 AM	RT012	Trichloroethene (TCE)	10.6	µg/L
3/13/2018 8:51:00 AM	RT001	Tetrachloroethylene (PCE)	0.884	µg/L
3/13/2018 8:51:00 AM	RT001	Trichloroethene (TCE)	10.3	µg/L
3/13/2018 9:46:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
3/13/2018 9:46:00 AM	RT002	Trichloroethene (TCE)	1.01	µg/L
3/13/2018 9:29:00 AM	RT010	Tetrachloroethylene (PCE)	2.18	µg/L
3/13/2018 9:29:00 AM	RT010	Trichloroethene (TCE)	14.7	µg/L
3/13/2018 9:29:00 AM	RT010	1,4-Dioxane	ND	ug/L
3/13/2018 8:38:00 AM	RT011	Tetrachloroethylene (PCE)	0.792	µg/L
3/13/2018 8:38:00 AM	RT011	Trichloroethene (TCE)	5.84	µg/L
3/13/2018 8:38:00 AM	RT011	1,4-Dioxane	ND	ug/L
3/14/2018 12:25:00 PM	RT012	Tetrachloroethylene (PCE)	1.50	µg/L
3/14/2018 12:25:00 PM	RT012	Trichloroethene (TCE)	13.1	µg/L
3/14/2018 12:25:00 PM	RT012	1,4-Dioxane	ND	ug/L
3/14/2018 12:10:00 PM	RT013	Tetrachloroethylene (PCE)	0.713	µg/L
3/14/2018 12:10:00 PM	RT013	Trichloroethene (TCE)	4.97	µg/L
3/14/2018 12:10:00 PM	RT013	1,4-Dioxane	ND	ug/L
3/14/2018 10:30:00 AM	RT014	Tetrachloroethylene (PCE)	0.776	µg/L

3/14/2018 10:30:00 AM	RT014	Trichloroethene (TCE)	9.69	µg/L
3/14/2018 10:30:00 AM	RT014	1,4-Dioxane	ND	ug/L
3/14/2018 11:15:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
3/14/2018 11:15:00 AM	RT015	Trichloroethene (TCE)	1.56	µg/L
3/14/2018 11:15:00 AM	RT015	1,4-Dioxane	ND	ug/L
3/15/2018 9:15:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
3/15/2018 9:15:00 AM	RT003	Trichloroethene (TCE)	1.01	µg/L
3/15/2018 9:15:00 AM	RT003	Perchlorate	2.30	µg/L
3/15/2018 9:40:00 AM	RT004	Perchlorate	4.04	µg/L
3/15/2018 9:40:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
3/15/2018 9:40:00 AM	RT004	Trichloroethene (TCE)	0.749	µg/L
3/15/2018 11:40:00 AM	RT007	Perchlorate	ND	µg/L
3/15/2018 11:40:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
3/15/2018 11:40:00 AM	RT007	Trichloroethene (TCE)	0.700	µg/L
3/15/2018 11:40:00 AM	RT007	1,4-Dioxane	ND	ug/L
3/15/2018 11:20:00 AM	RT008	Perchlorate	ND	µg/L
3/15/2018 11:20:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
3/15/2018 11:20:00 AM	RT008	Trichloroethene (TCE)	0.780	µg/L
3/15/2018 11:20:00 AM	RT008	1,4-Dioxane	ND	ug/L
3/15/2018 10:55:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
3/15/2018 10:55:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
3/15/2018 10:55:00 AM	RT009	1,4-Dioxane	ND	ug/L

Tujunga

COLLECTION DATE	LOCATION	ANALYTE	RESULT	UNIT
4/5/2017 11:00:00 AM	TJ006	Tetrachloroethylene (PCE)	7.40	µg/L
4/5/2017 11:00:00 AM	TJ006	Trichloroethene (TCE)	5.30	µg/L
4/5/2017 11:00:00 AM	TJ006	1,4-Dioxane	ND	ug/L
4/5/2017 11:00:00 AM	TJ006	Perchlorate	ND	µg/L
4/5/2017 11:50:00 AM	TJ007	Tetrachloroethylene (PCE)	34.0	µg/L
4/5/2017 11:50:00 AM	TJ007	Trichloroethene (TCE)	21.8	µg/L
4/5/2017 11:50:00 AM	TJ007	1,4-Dioxane	1.71	ug/L
4/5/2017 11:50:00 AM	TJ007	Perchlorate	ND	µg/L
4/20/2017 8:50:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
4/20/2017 8:50:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
4/20/2017 8:50:00 AM	TJ002	1,4-Dioxane	ND	ug/L
4/20/2017 8:50:00 AM	TJ002	Perchlorate	2.13	µg/L
5/3/2017 10:00:00 AM	TJ006	Tetrachloroethylene (PCE)	7.74	µg/L
5/3/2017 10:00:00 AM	TJ006	Trichloroethene (TCE)	5.20	µg/L
5/3/2017 10:00:00 AM	TJ006	Perchlorate	ND	µg/L

5/3/2017 10:26:00 AM	TJ007	Tetrachloroethylene (PCE)	36.2	µg/L
5/3/2017 10:26:00 AM	TJ007	Trichloroethene (TCE)	22.7	µg/L
5/3/2017 10:26:00 AM	TJ007	Perchlorate	2.03	µg/L
5/4/2017 11:35:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
5/4/2017 11:35:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
5/4/2017 11:35:00 AM	TJ002	Perchlorate	ND	µg/L
5/9/2017 11:10:00 AM	TJ008	Tetrachloroethylene (PCE)	27.4	µg/L
5/9/2017 11:10:00 AM	TJ008	Trichloroethene (TCE)	29.5	µg/L
5/9/2017 11:10:00 AM	TJ008	Perchlorate	2.50	µg/L
5/30/2017 10:05:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
5/30/2017 10:05:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
5/30/2017 10:05:00 AM	TJ003	1,4-Dioxane	ND	ug/L
5/30/2017 10:05:00 AM	TJ003	Perchlorate	2.26	µg/L
5/30/2017 10:35:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
5/30/2017 10:35:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
5/30/2017 10:35:00 AM	TJ001	1,4-Dioxane	ND	ug/L
5/30/2017 10:35:00 AM	TJ001	Perchlorate	2.33	µg/L
6/7/2017 8:42:00 AM	TJ006	Tetrachloroethylene (PCE)	7.34	µg/L
6/7/2017 8:42:00 AM	TJ006	Trichloroethene (TCE)	5.11	µg/L
6/7/2017 8:42:00 AM	TJ006	Perchlorate	ND	µg/L
6/7/2017 9:03:00 AM	TJ007	Tetrachloroethylene (PCE)	32.2	µg/L
6/7/2017 9:03:00 AM	TJ007	Trichloroethene (TCE)	22.2	µg/L
6/7/2017 9:03:00 AM	TJ007	Perchlorate	2.33	µg/L
6/8/2017 10:15:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
6/8/2017 10:15:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
6/8/2017 10:15:00 AM	TJ005	1,4-Dioxane	ND	ug/L
6/8/2017 10:15:00 AM	TJ005	Perchlorate	ND	µg/L
6/8/2017 11:24:00 AM	TJ008	Tetrachloroethylene (PCE)	27.1	µg/L
6/8/2017 11:24:00 AM	TJ008	Trichloroethene (TCE)	30.6	µg/L
6/8/2017 11:24:00 AM	TJ008	1,4-Dioxane	1.37	ug/L
6/8/2017 11:24:00 AM	TJ008	Perchlorate	ND	µg/L
6/9/2017 9:00:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
6/9/2017 9:00:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
6/9/2017 9:00:00 AM	TJ002	1,4-Dioxane	ND	ug/L
6/9/2017 9:00:00 AM	TJ002	Perchlorate	ND	µg/L
6/9/2017 9:25:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
6/9/2017 9:25:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
6/9/2017 9:25:00 AM	TJ001	1,4-Dioxane	ND	ug/L
6/9/2017 9:25:00 AM	TJ001	Perchlorate	2.33	µg/L
6/9/2017 10:10:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
6/9/2017 10:10:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L

6/9/2017 10:10:00 AM	TJ003	1,4-Dioxane	ND	ug/L
6/9/2017 10:10:00 AM	TJ003	Perchlorate	ND	µg/L
6/9/2017 10:40:00 AM	TJ009	Tetrachloroethylene (PCE)	11.6	µg/L
6/9/2017 10:40:00 AM	TJ009	Trichloroethene (TCE)	22.0	µg/L
6/9/2017 10:40:00 AM	TJ009	1,4-Dioxane	0.756	ug/L
6/9/2017 10:40:00 AM	TJ009	Perchlorate	2.20	µg/L
6/30/2017 8:10:00 AM	TJ012	Tetrachloroethylene (PCE)	0.726	µg/L
6/30/2017 8:10:00 AM	TJ012	Trichloroethene (TCE)	6.26	µg/L
6/30/2017 8:10:00 AM	TJ012	1,4-Dioxane	0.567	ug/L
6/30/2017 8:10:00 AM	TJ012	Perchlorate	ND	µg/L
7/5/2017 10:15:00 AM	TJ006	Tetrachloroethylene (PCE)	Non Representa	µg/L
7/5/2017 10:15:00 AM	TJ006	Trichloroethene (TCE)	Non Representa	µg/L
7/5/2017 10:15:00 AM	TJ006	1,4-Dioxane	ND	ug/L
7/5/2017 10:15:00 AM	TJ006	Perchlorate	ND	µg/L
7/6/2017 9:30:00 AM	TJ007	Tetrachloroethylene (PCE)	38.3	µg/L
7/6/2017 9:30:00 AM	TJ007	Trichloroethene (TCE)	24.8	µg/L
7/6/2017 9:30:00 AM	TJ007	1,4-Dioxane	1.63	ug/L
7/6/2017 9:30:00 AM	TJ007	Perchlorate	ND	µg/L
7/7/2017 9:10:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
7/7/2017 9:10:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
7/7/2017 9:10:00 AM	TJ005	1,4-Dioxane	ND	ug/L
7/7/2017 9:10:00 AM	TJ005	Perchlorate	ND	µg/L
7/7/2017 10:25:00 AM	TJ008	Tetrachloroethylene (PCE)	25.9	µg/L
7/7/2017 10:25:00 AM	TJ008	Trichloroethene (TCE)	30.1	µg/L
7/7/2017 10:25:00 AM	TJ008	1,4-Dioxane	1.45	ug/L
7/7/2017 10:25:00 AM	TJ008	Perchlorate	ND	µg/L
7/7/2017 10:45:00 AM	TJ006	Tetrachloroethylene (PCE)	8.54	µg/L
7/7/2017 10:45:00 AM	TJ006	Trichloroethene (TCE)	5.59	µg/L
7/12/2017 10:50:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
7/12/2017 10:50:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
7/12/2017 10:50:00 AM	TJ002	1,4-Dioxane	ND	ug/L
7/12/2017 10:50:00 AM	TJ002	Perchlorate	ND	µg/L
7/12/2017 10:50:00 AM	TJ002	Hexavalent Chromium (Cr+6), IC	3.13	µg/L
7/13/2017 10:05:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
7/13/2017 10:05:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
7/13/2017 10:05:00 AM	TJ003	1,4-Dioxane	ND	ug/L
7/13/2017 10:05:00 AM	TJ003	Perchlorate	ND	µg/L
7/13/2017 10:05:00 AM	TJ003	Hexavalent Chromium (Cr+6),	2.04	µg/L

		IC		
7/13/2017 8:08:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
7/13/2017 8:08:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
7/13/2017 8:08:00 AM	TJ001	1,4-Dioxane	ND	ug/L
7/13/2017 8:08:00 AM	TJ001	Perchlorate	2.42	µg/L
7/13/2017 11:10:00 AM	TJ009	Tetrachloroethylene (PCE)	9.93	µg/L
7/13/2017 11:10:00 AM	TJ009	Trichloroethene (TCE)	19.3	µg/L
7/13/2017 11:10:00 AM	TJ009	1,4-Dioxane	0.736	ug/L
7/13/2017 11:10:00 AM	TJ009	Perchlorate	2.04	µg/L
7/14/2017 9:06:00 AM	TJ012	Tetrachloroethylene (PCE)	0.708	µg/L
7/14/2017 9:06:00 AM	TJ012	Trichloroethene (TCE)	5.86	µg/L
7/14/2017 9:06:00 AM	TJ012	1,4-Dioxane	0.548	ug/L
7/14/2017 9:06:00 AM	TJ012	Perchlorate	ND	µg/L
1/24/2018 2:00:00 PM	TJ005	Tetrachloroethylene (PCE)	0.509	µg/L
1/24/2018 2:00:00 PM	TJ005	Trichloroethene (TCE)	ND	µg/L
1/24/2018 2:00:00 PM	TJ005	1,4-Dioxane	ND	ug/L
1/24/2018 2:00:00 PM	TJ005	Perchlorate	ND	µg/L
1/24/2018 2:00:00 PM	TJ005	Hexavalent Chromium (Cr+6), IC	1.51	µg/L
1/24/2018 11:55:00 AM	TJ006	Tetrachloroethylene (PCE)	10.7	µg/L
1/24/2018 11:55:00 AM	TJ006	Trichloroethene (TCE)	8.85	µg/L
1/24/2018 11:55:00 AM	TJ006	1,4-Dioxane	ND	ug/L
1/24/2018 11:55:00 AM	TJ006	Perchlorate	ND	µg/L
1/24/2018 11:55:00 AM	TJ006	Hexavalent Chromium (Cr+6), IC	1.21	µg/L
1/24/2018 12:45:00 PM	TJ007	Tetrachloroethylene (PCE)	67.3	µg/L
1/24/2018 12:45:00 PM	TJ007	Trichloroethene (TCE)	43.4	µg/L
1/24/2018 12:45:00 PM	TJ007	1,4-Dioxane	2.72	ug/L
1/24/2018 12:45:00 PM	TJ007	Perchlorate	ND	µg/L
1/25/2018 10:17:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
1/25/2018 10:17:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
1/25/2018 10:17:00 AM	TJ001	1,4-Dioxane	ND	ug/L
1/25/2018 10:17:00 AM	TJ001	Perchlorate	2.47	µg/L
1/25/2018 10:36:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
1/25/2018 10:36:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
1/25/2018 10:36:00 AM	TJ002	1,4-Dioxane	ND	ug/L
1/25/2018 10:36:00 AM	TJ002	Perchlorate	ND	µg/L
1/25/2018 11:05:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
1/25/2018 11:05:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
1/25/2018 11:05:00 AM	TJ003	1,4-Dioxane	ND	ug/L
1/25/2018 11:05:00 AM	TJ003	Perchlorate	ND	µg/L
1/25/2018 11:17:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L

1/25/2018 11:17:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
1/25/2018 11:17:00 AM	TJ004	1,4-Dioxane	ND	ug/L
1/25/2018 11:17:00 AM	TJ004	Perchlorate	ND	µg/L
1/26/2018 11:30:00 AM	TJ009	Tetrachloroethylene (PCE)	24.6	µg/L
1/26/2018 11:30:00 AM	TJ009	Trichloroethene (TCE)	29.2	µg/L
1/26/2018 11:30:00 AM	TJ009	1,4-Dioxane	1.17	ug/L
1/26/2018 11:30:00 AM	TJ009	Perchlorate	ND	µg/L
1/26/2018 12:00:00 PM	TJ012	Tetrachloroethylene (PCE)	1.19	µg/L
1/26/2018 12:00:00 PM	TJ012	Trichloroethene (TCE)	8.70	µg/L
1/26/2018 12:00:00 PM	TJ012	1,4-Dioxane	0.771	ug/L
1/26/2018 12:00:00 PM	TJ012	Perchlorate	2.64	µg/L
1/31/2018 2:25:00 PM	TJ007	1,4-Dioxane	2.59	ug/L
2/7/2018 11:02:00 AM	TJ006	Tetrachloroethylene (PCE)	15.6	µg/L
2/7/2018 11:02:00 AM	TJ006	Trichloroethene (TCE)	9.05	µg/L
2/7/2018 11:02:00 AM	TJ006	1,4-Dioxane	ND	ug/L
2/7/2018 11:02:00 AM	TJ006	Perchlorate	ND	µg/L
2/7/2018 12:46:00 PM	TJ007	Tetrachloroethylene (PCE)	61.4	µg/L
2/7/2018 12:46:00 PM	TJ007	Trichloroethene (TCE)	35.3	µg/L
2/7/2018 12:46:00 PM	TJ007	1,4-Dioxane	2.07	ug/L
2/7/2018 12:46:00 PM	TJ007	Perchlorate	2.02	µg/L
2/9/2018 9:05:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
2/9/2018 9:05:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
2/9/2018 9:05:00 AM	TJ005	1,4-Dioxane	ND	ug/L
2/9/2018 9:05:00 AM	TJ005	Perchlorate	ND	µg/L
2/9/2018 10:00:00 AM	TJ008	Tetrachloroethylene (PCE)	32.6	µg/L
2/9/2018 10:00:00 AM	TJ008	Trichloroethene (TCE)	29.0	µg/L
2/9/2018 10:00:00 AM	TJ008	1,4-Dioxane	2.24	ug/L
2/9/2018 10:00:00 AM	TJ008	Perchlorate	ND	µg/L
2/15/2018 10:32:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
2/15/2018 10:32:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
2/15/2018 10:32:00 AM	TJ001	1,4-Dioxane	ND	ug/L
2/15/2018 10:32:00 AM	TJ001	Perchlorate	2.41	µg/L
2/22/2018 9:30:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
2/22/2018 9:30:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
2/22/2018 9:30:00 AM	TJ002	1,4-Dioxane	ND	ug/L
2/22/2018 9:30:00 AM	TJ002	Perchlorate	ND	µg/L
2/22/2018 9:52:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
2/22/2018 9:52:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
2/22/2018 9:52:00 AM	TJ003	1,4-Dioxane	ND	ug/L
2/22/2018 9:52:00 AM	TJ003	Perchlorate	ND	µg/L
2/22/2018 10:11:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L

2/22/2018 10:11:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
2/22/2018 10:11:00 AM	TJ004	1,4-Dioxane	ND	ug/L
2/22/2018 10:11:00 AM	TJ004	Perchlorate	ND	µg/L
2/22/2018 11:04:00 AM	TJ009	Tetrachloroethylene (PCE)	13.3	µg/L
2/22/2018 11:04:00 AM	TJ009	Trichloroethene (TCE)	18.0	µg/L
2/22/2018 11:04:00 AM	TJ009	1,4-Dioxane	0.877	ug/L
2/22/2018 11:04:00 AM	TJ009	Perchlorate	ND	µg/L
2/22/2018 11:31:00 AM	TJ011	Tetrachloroethylene (PCE)	3.13	µg/L
2/22/2018 11:31:00 AM	TJ011	Trichloroethene (TCE)	14.4	µg/L
2/22/2018 11:31:00 AM	TJ011	1,4-Dioxane	1.02	ug/L
2/22/2018 11:31:00 AM	TJ011	Perchlorate	2.97	µg/L
2/22/2018 12:03:00 PM	TJ012	Tetrachloroethylene (PCE)	1.14	µg/L
2/22/2018 12:03:00 PM	TJ012	Trichloroethene (TCE)	8.48	µg/L
2/22/2018 12:03:00 PM	TJ012	1,4-Dioxane	0.738	ug/L
2/22/2018 12:03:00 PM	TJ012	Perchlorate	2.50	µg/L
3/7/2018 9:53:00 AM	TJ006	Tetrachloroethylene (PCE)	8.49	µg/L
3/7/2018 9:53:00 AM	TJ006	Trichloroethene (TCE)	6.02	µg/L
3/7/2018 9:53:00 AM	TJ006	1,4-Dioxane	ND	ug/L
3/7/2018 9:53:00 AM	TJ006	Perchlorate	ND	µg/L
3/7/2018 9:37:00 AM	TJ007	Tetrachloroethylene (PCE)	50.0	µg/L
3/7/2018 9:37:00 AM	TJ007	Trichloroethene (TCE)	31.9	µg/L
3/7/2018 9:37:00 AM	TJ007	1,4-Dioxane	2.02	ug/L
3/7/2018 9:37:00 AM	TJ007	Perchlorate	ND	µg/L
3/9/2018 8:48:00 AM	TJ009	Tetrachloroethylene (PCE)	13.1	µg/L
3/9/2018 8:48:00 AM	TJ009	Trichloroethene (TCE)	20.7	µg/L
3/9/2018 8:48:00 AM	TJ009	1,4-Dioxane	0.839	ug/L
3/9/2018 8:48:00 AM	TJ009	Perchlorate	ND	µg/L
3/9/2018 9:18:00 AM	TJ011	Tetrachloroethylene (PCE)	3.46	µg/L
3/9/2018 9:18:00 AM	TJ011	Trichloroethene (TCE)	16.2	µg/L
3/9/2018 9:18:00 AM	TJ011	1,4-Dioxane	1.08	ug/L
3/9/2018 9:18:00 AM	TJ011	Perchlorate	3.28	µg/L
3/9/2018 9:47:00 AM	TJ012	Tetrachloroethylene (PCE)	1.37	µg/L
3/9/2018 9:47:00 AM	TJ012	Trichloroethene (TCE)	10.4	µg/L
3/9/2018 9:47:00 AM	TJ012	1,4-Dioxane	0.742	ug/L
3/9/2018 9:47:00 AM	TJ012	Perchlorate	2.71	µg/L
3/28/2018 11:37:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
3/28/2018 11:37:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
3/28/2018 11:37:00 AM	TJ005	1,4-Dioxane	ND	ug/L
3/28/2018 11:37:00 AM	TJ005	Perchlorate	ND	µg/L
3/28/2018 11:57:00 AM	TJ008	Tetrachloroethylene (PCE)	52.1	µg/L
3/28/2018 11:57:00 AM	TJ008	Trichloroethene (TCE)	46.7	µg/L

3/28/2018 11:57:00 AM	TJ008	1,4-Dioxane	2.58	ug/L
3/28/2018 11:57:00 AM	TJ008	Perchlorate	ND	µg/L
3/29/2018 9:10:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
3/29/2018 9:10:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
3/29/2018 9:10:00 AM	TJ001	1,4-Dioxane	ND	ug/L
3/29/2018 9:10:00 AM	TJ001	Perchlorate	2.35	µg/L
3/29/2018 9:30:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
3/29/2018 9:30:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
3/29/2018 9:30:00 AM	TJ002	1,4-Dioxane	ND	ug/L
3/29/2018 9:30:00 AM	TJ002	Perchlorate	ND	µg/L
3/29/2018 10:20:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
3/29/2018 10:20:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
3/29/2018 10:20:00 AM	TJ003	1,4-Dioxane	ND	ug/L
3/29/2018 10:20:00 AM	TJ003	Perchlorate	ND	µg/L
3/29/2018 10:20:00 AM	TJ003	Hexavalent Chromium (Cr+6), IC	1.64	µg/L
3/29/2018 11:15:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
3/29/2018 11:15:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
3/29/2018 11:15:00 AM	TJ004	1,4-Dioxane	ND	ug/L
3/29/2018 11:15:00 AM	TJ004	Perchlorate	ND	µg/L
3/29/2018 11:15:00 AM	TJ004	Hexavalent Chromium (Cr+6), IC	1.62	µg/L

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2017-18 through 2021-22 Water Years

GROUNDWATER PUMPING

AND

SPREADING PLAN

FIVE WATER YEARS

OCTOBER 1, 2017 TO SEPTEMBER 30, 2022

BURBANK

Water and Power

Since 1913

WATER DIVISION

164 W. MAGNOLIA BOULEVARD

JULY 2018

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SECTION 1: INTRODUCTION

The groundwater rights of the City of Burbank are defined by the Judgment in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgment (Judgment) was signed on January 26, 1979.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition was made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup of the ground water and limit the spread of contamination in the San Fernando basin. The 1998 revision of the Policies and Procedures now includes Section 5.0, Watermaster Management of Groundwater Quality. This report is in response to Section 5.4, Groundwater Pumping and Spreading Plan for the Upper Los Angeles River Area.

The annual Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30, and it includes projections for five years beginning with the current water year. This Plan for Burbank will be submitted to the Watermaster in July 2018. The Watermaster will evaluate the impact of pumping and spreading by all the parties, and the ULARA Pumping and Spreading Plan will be published by the Watermaster.

Burbank’s Plan was prepared by the Water Engineering and Planning Section of City of Burbank Water and Power. Questions may be addressed to Bob Doxsee, Civil Engineering Associate, at (818) 238-3500 or by e-mail to bdoxsee@burbankca.gov.

SECTION 2: WATER DEMAND

The annual total water demand for the last ten years and the projected annual water demand for the next five years are shown in Table 2.

Since 2007, with increasing public awareness of water supply issues, and with new State legislation, and especially since the recent drought, Burbank has achieved significant reductions in its water demands. For this plan, per-capita water use is predicted to remain lower than in 2013 because watering restrictions have been made permanent. Treated groundwater and recycled water will be used as much as possible in order to reduce the demand on treated imported water from the Metropolitan Water District of Southern California (MWD). (Ultimately, all of Burbank's water supply depends on MWD.) The projected water demand may vary significantly due to weather and/or economic conditions in the Burbank area; a variance of ±5% may be expected. A major expansion of the recycled system was completed in 2013, and demand on the potable water system has been offset by recycled water as site conversions are completed.

SECTION 3: WATER SUPPLY

The water supply for the City of Burbank is composed of purchased water from MWD, locally produced and treated groundwater, and recycled water from the Burbank Water Reclamation Plant. A discussion about each of the sources of supply is included below, and historic and projected use of each water source is shown in Table 3.

3.1 MWD

Burbank continues to directly rely on MWD for about 40% of its treated, potable water supply, purchasing water from MWD for direct delivery into its distribution system. Burbank also purchases untreated water from MWD for groundwater basin replenishment. Indirectly, it depends on MWD for all of its water. The City must purchase and spread water within the basin or purchase Physical Solution credits from the Los Angeles Department of Water and Power (LADWP) to operate its local groundwater wells. The economics determine which of these two options or what percentage of each Burbank will exercise in a given water year.

3.2 GAC Treatment Plant

The GAC Treatment Plant treats the groundwater produced from Well No. 7 (Figure 3.1). The well and treatment plant can deliver 1,100 gallons per minute (gpm). In the current Water Year (WY) 2017/18, the well and treatment plant are being operated to replace recycled water in the cooling towers for the power plant because the recycled water supply has been temporarily reduced due to a major sewer force main being shut down. The amount of water that will be produced and delivered to the Magnolia Power Project cooling towers for industrial cooling is estimated to be 140 acre-feet. Current plans are to keep the plant shut down, except for emergencies, water quality testing, or onsite non-potable use.

3.3 EPA Consent Decree Project

The EPA Consent Decree Project (also known as Burbank Operable Unit or BOU) became operational January 3, 1996. Wells VO-1 through VO-8 (Figure 3.1) are the source of groundwater for treatment, and the treatment plant has a capacity of 9,000 gpm. The Second Consent Decree was entered on June 22, 1998. An agreement has been negotiated with LADWP to treat and deliver groundwater from Burbank to Los Angeles during periods of low demand on the Burbank system, when the BOU would otherwise operate below capacity. There may be 500 AFY of such deliveries beginning in WY 2018/19. The increased groundwater extractions and MWD purchased water for blending associated with the deliveries to Los Angeles are not included in this Plan, because they will be reported as Los Angeles demands.

3.4 Recycled Water

An updated master plan for expansion of the recycled water system was completed in 2010. The plan detailed an expansion of the distribution system to deliver an additional 1,000 acre-feet per year (AFY) of recycled water, 625 AFY of this total directly offsetting potable water deliveries, and the remaining 375 AFY offsetting groundwater pumped from the well at Valhalla Memorial Park (Valhalla). The distribution main construction is complete, and many site conversions have been completed. Plans are also in place to deliver some recycled water to the City of Los Angeles in exchange for groundwater pumping credits.

3.5 Production Wells

Burbank has eight wells that are part of the BOU collector system, plus another three wells which are mechanically and electrically operable, and two others which have had equipment removed. The eight BOU wells are on “Active” status, while all the others are on "Inactive" status with the California State Water Resources Control Board, Division of Drinking Water (DDW). (See Table 1.) Except for water quality testing at Well 7, Burbank does not plan to operate the inactive wells unless an emergency develops. Wells 7 may be operated for non-potable power plant use if there is an interruption or shortfall in the recycled water supply from the wastewater plant. That is the case as this is being written in July 2018. Well No. 7 produces 1,050 gpm to supply the GAC treatment plant.

TABLE 1

BWP’S WELL STATUS

Active Wells	Inactive Wells	Inactive-Pulled
VO-1	No. 6A	No. 11A
VO-2	No. 7	No. 12
VO-3	No. 13A	
VO-4		
VO-5		
VO-6		
VO-7		
VO-8		

SECTION 4: GROUNDWATER CREDITS

The Judgment includes a number of procedures related to groundwater pumping that Burbank and the other defendants must follow. In order to pump groundwater, rights to groundwater must be established, and in the San Fernando Basin those rights are accounted for as groundwater credits. Rights and procedures related to establishing, counting and maintaining groundwater credits are discussed in the following paragraphs. Historic and projected future groundwater credits are shown in Table 4.

4.1 Import Return Water

Under the Judgment, Burbank is entitled to extract 20 percent of the volume of water it delivered (potable and recycled) in the prior water year. This is known as import return water. The import return water credited for WY 2017/18 (based on water delivered in WY 2016/17) is 3,657 AF.

Estimated import return water credit for the next water year, based on 19,937 AF of delivered water, will be 3,987 AF.

4.2 Physical Solution

Burbank has a Physical Solution right to 4,200 AFY in addition to its import return water extraction rights. This is a right to purchase up to 4,200 AFY of groundwater credits from the City of Los Angeles. The price paid to the City of Los Angeles for this groundwater is set by formula in the Judgment.

Depending on the price of MWD untreated imported water and Physical Solution water from the City of Los Angeles, a decision will be made each year regarding which to purchase. MWD untreated water is currently less expensive than Physical Solution water. Therefore, Burbank will not purchase Physical Solution water from the City of Los Angeles in WY 2017/18. The current plan reflects the spreading of imported water instead of the purchase of Physical Solution credits.

In the Judgment, Valhalla and Lockheed Martin have the right under the Physical Solution to pump up to 300 AFY and 25 AFY, respectively. Burbank will charge the Physical Solution right holders for groundwater they extracted and claim the extractions against Burbank's rights. Valhalla has shut down its well and is now using recycled water.

4.3 Stored Water Credit

Burbank has a stored water credit of 19,824 AF as of October 1, 2017. This includes 4,824 AF spread under the MWD Cyclic Storage Program, for which payment will be made to MWD as the water is pumped and used. Burbank’s objective is to maintain a reserve of 10,000 AF of stored water credits. (See Appendix B.) Therefore, some combination of Physical Solution and/or spreading of imported water is necessary to avoid depleting the stored water credits.

4.4 Spreading Operations and Transfers of Credits

In 2010 Burbank completed a new service connection to MWD at the end of the Foothill Feeder. (See Figure 4.1.) Connection B-06 is capable of delivering 50 cubic feet per second (cfs) of untreated imported water to the Pacoima Wash, where the water is conveyed down to the Pacoima Spreading Grounds operated by the L.A. County Public Works Department. Additionally, this service connection allows Burbank to direct water to the Lopez Spreading Grounds via the Lopez Ditch. These facilities allow Burbank to spread the 6,000 to 8,000 AFY of untreated water at the Pacoima Spreading Grounds that is needed to avoid depleting its stored groundwater credits.

Burbank received the first water delivery through the new connection on April 26, 2010. By agreement with MWD, Burbank will spread a minimum of 150 AF twice a year to maintain water quality at the end of the Foothill Feeder.

Because of the severe drought, instead of spreading imported water in WY 2014/15 and WY 2015/16, Burbank and Los Angeles agreed, as they had done several times before, to exchange purchased imported water delivered to LADWP through MWD connection LA-35 at the LADWP treatment plant for groundwater credits to Burbank.

In WY 2016/17, 11,791 AF were spread at Pacoima. In October, November, and December 2016, 8,094 AF were spread for WY 2017/18. These spreading amounts included Cyclic Storage deliveries. For the remaining four water years covered by this plan, Burbank plans to purchase about 6,950 AF per year of Physical Solution credits, untreated imported water, or a combination of the two. (See Table 4.) We will take additional deliveries under Cyclic Storage if available.

SECTION 5: CAPITAL IMPROVEMENTS

5.1 Wells

Burbank plans to continue the use of Well No. 7 for the GAC Treatment Plant when it is operated. This well and the Lake GAC serve as a backup water supply for the Magnolia Power Plant. Well No. 15 was removed from service and properly destroyed in WY 2017/18. Wells V-01 through V-08 will continue to be operated to supply water to the BOU. No capital improvements are planned for any wells.

5.2 Groundwater Treatment Facilities

EPA Project: The EPA Consent Decree Project became fully operational on January 3, 1996. Burbank assumed responsibility for operation and maintenance of the BOU on March 12, 2001.

The City of Burbank currently contracts with TerranearPMC for the day-to-day operation and maintenance of the BOU.

GAC Treatment Plant: The plant will remain on an active status, but will not be operated except for well water quality tests and for emergencies. (It is being operated for non-potable use as of this writing, in July 2018.) No capital improvement projects are planned for the GAC Treatment Plant.

TABLE 2

ACTUAL AND PROJECTED WATER DEMAND

Water Year	Acre-Feet
2007/08	24,653
2008/09	22,532
2009/10	20,852
2010/11	19,735
2011/12	20,938
2012/13	20,937
2013/14	21,874
2014/15	18,234
2015/16	17,494
2016/17	18,300
2017/18*	19,962
2018/19*	18,816
2019/20*	18,926
2020/21*	18,936
2021/22*	18,936

* Projected

NOTES:

1) Water demand equals the total of MWD, extractions (GAC, Valley/BOU, Valhalla, and cleanup pumpers), and recycled.
2) The five-year average water demand was 19,368 AFY for WY 2012/13 through 2016/17.

TABLE 3

GROUNDWATER EXTRACTIONS, MWD TREATED WATER, AND RECYCLED WATER

Water Year	MWD	GAC	BOU	Recycled	Valhalla	Total
2007/08	15,299	0	6,817	2,192	337	24,645
2008/09	10,202	148	9,818	2,011	346	22,525
2009/10	8,401	5	10,043	2,080	317	20,846
2010/11	7,376	4	10,394	1,568	387	19,729
2011/12	8,602	4	9,993	2,000	338	20,937
2012/13	7,507	0	11,387	1,608	435	20,937
2013/14	8,901	1	10,148	2,407	417	21,874
2014/15	5,619	2	10,006	2,307	300	18,234
2015/16	5,092	65	9,377	2,903	57	17,494
2016/17	5,718	0	9,501	3,081	0	18,300
2017/18*	5,637	140	10,959	3,086	0	19,822
2018/19*	4,859	0	11,015	2,942	0	18,816
2019/20*	4,859	0	11,015	3,052	0	18,926
2020/21*	4,859	0	11,015	3,062	0	18,936
2021/22*	4,859	0	11,015	3,062	0	18,936

*Projected

Notes:

1. Use of BOU will be maximized, with MWD used for required blending and to meet total demand.
2. MWD amounts are treated water. (Untreated MWD purchases are in Table 4.)
3. GAC was used only for non-potable use in the Magnolia Power Plant.
4. BOU includes small amounts of non-municipal use which is not included in the import return calculation.
5. Groundwater extractions need to be balanced over time by groundwater credits (Table 4.)
6. Valhalla converted to recycled water in January 2016.
7. Groundwater extractions by small cleanup pumpers are not included in this table. They were about 6 to 8 AFY from 2004/05 through 2010/11, but have dropped to zero since then.

TABLE 4

GROUNDWATER CREDITS

Water Year	Physical Solution	Import Return	Spreading Operations	Other	Total
2007/08	4,200	4,855	0	0	9,055
2008/09	4,200	4,432	0	2,000 (1)	10,632
2009/10	0	4,103	34	0	4,137
2010/11	0	3,864	11,187	0	15,051
2011/12	0	4,117	1,371	0	5,488
2012/13	0	4,096	6,703	0	10,799
2013/14	0	4,288	7,000	0	11,288
2014/15	0	3,583	150	7,200 (2)	10,933
2015/16	0	3,484	306	7,200 (3)	10,990
2016/17	0	3,657	11,791	0	10,624
2017/18*	0	3,959	8,094	0	11,159
2018/19*	0	3,758	6,950	65 (4)	10,773
2019/20*	0	3,780	6,950	125 (4)	10,855
2020/21*	0	3,782	6,950	190 (4)	10,922
2021/22*	0	3,782	6,950	280 (4)	11,012

*Projected

Notes:

1. A 2,000 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP for WY 2008/09.
2. A 7,200 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP in December 2014 for WY 2014/15.
3. A 7,200 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP in October 2015 for WY 2015/16.
4. Spread water includes MWD Cyclic Storage Program deliveries, 4,824 AF in 2016/17 and 894 AF in 2017/18.
5. Beginning WY 2018/19, groundwater credits are expected from LADWP in exchange for recycled water delivered from Burbank to LADWP.

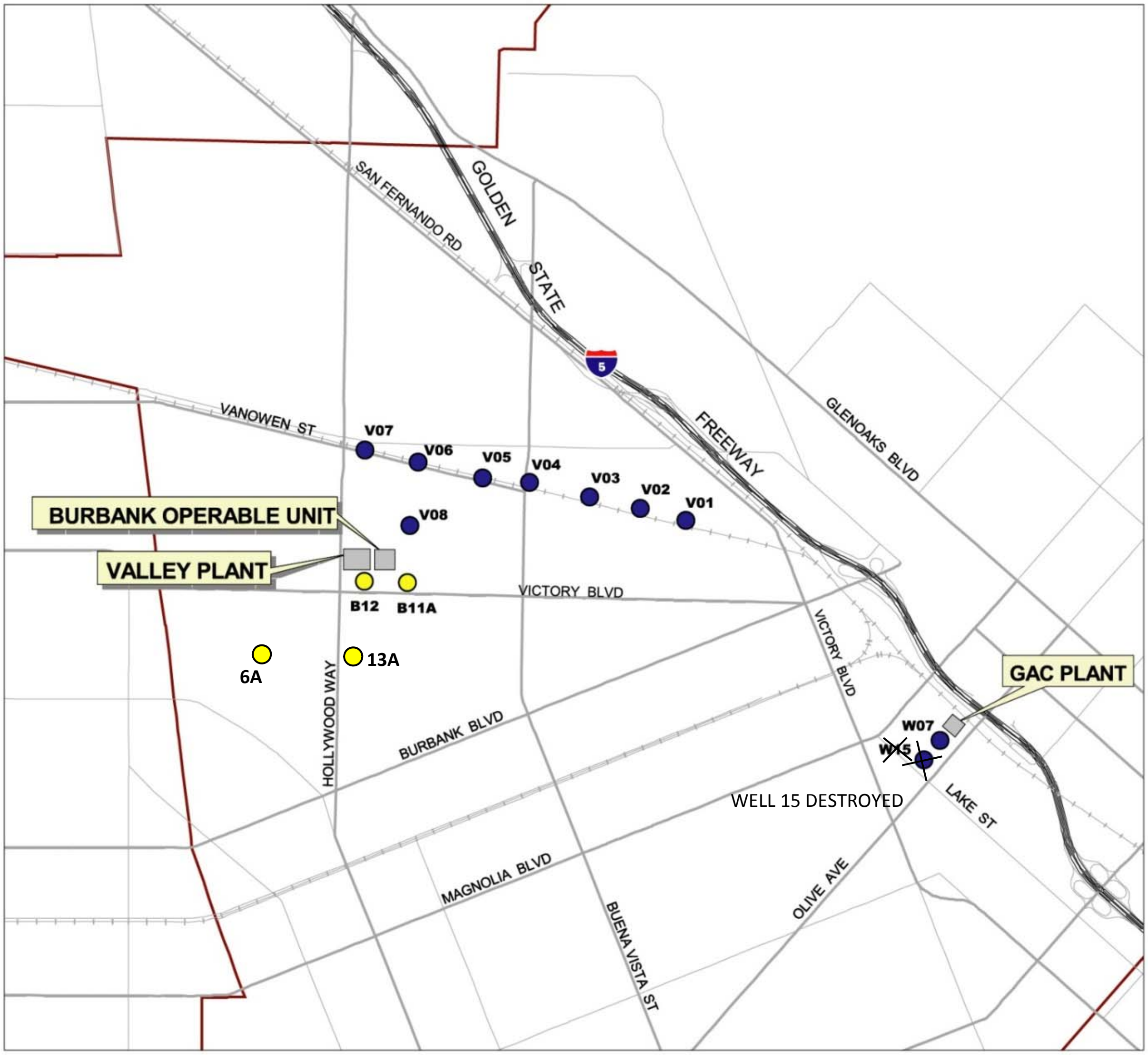


FIGURE 3.1

WELLS AND GROUNDWATER TREATMENT PLANTS

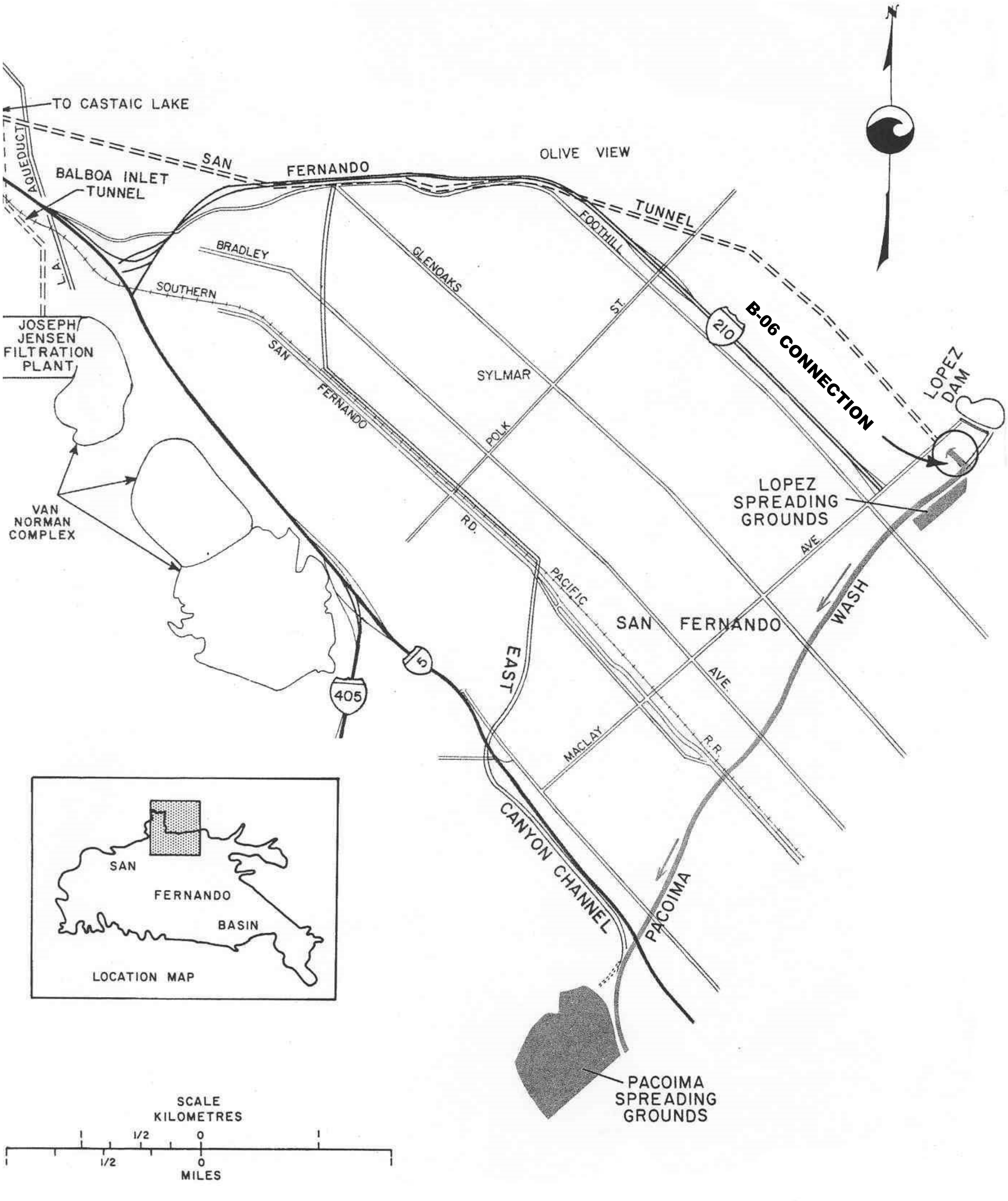


FIGURE 4.1

LOCATION OF MWD UNTREATED WATER CONNECTION

Appendix A

Water Treatment Facilities

LAKE STREET GAC TREATMENT PLANT

320 North Lake Street
Burbank CA   91502

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division
Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/16 through 9/30/17):

No deliveries for non-potable power plant use

WATER QUALITY:

Contaminant VOC'S: TCE, PCE, 1,2-DCE, 1,2-DCA

DISPOSITION:

Magnolia Power Project
Non-potable Water

EPA CONSENT DECREE PROJECT – BURBANK OPERABLE UNIT

2030 North Hollywood Way
Burbank CA 91505

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division
Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/16 through 9/30/17):

9,501 AF

WATER QUALITY:

Contaminants: VOCs, Nitrate, Chromium, 1,2,3-TCP

DISPOSITION:

1) Test Water- Waste
2) Operation Water (backwash, etc.) - Waste
3) Burbank Water System-(Potable water after blending)

Appendix B

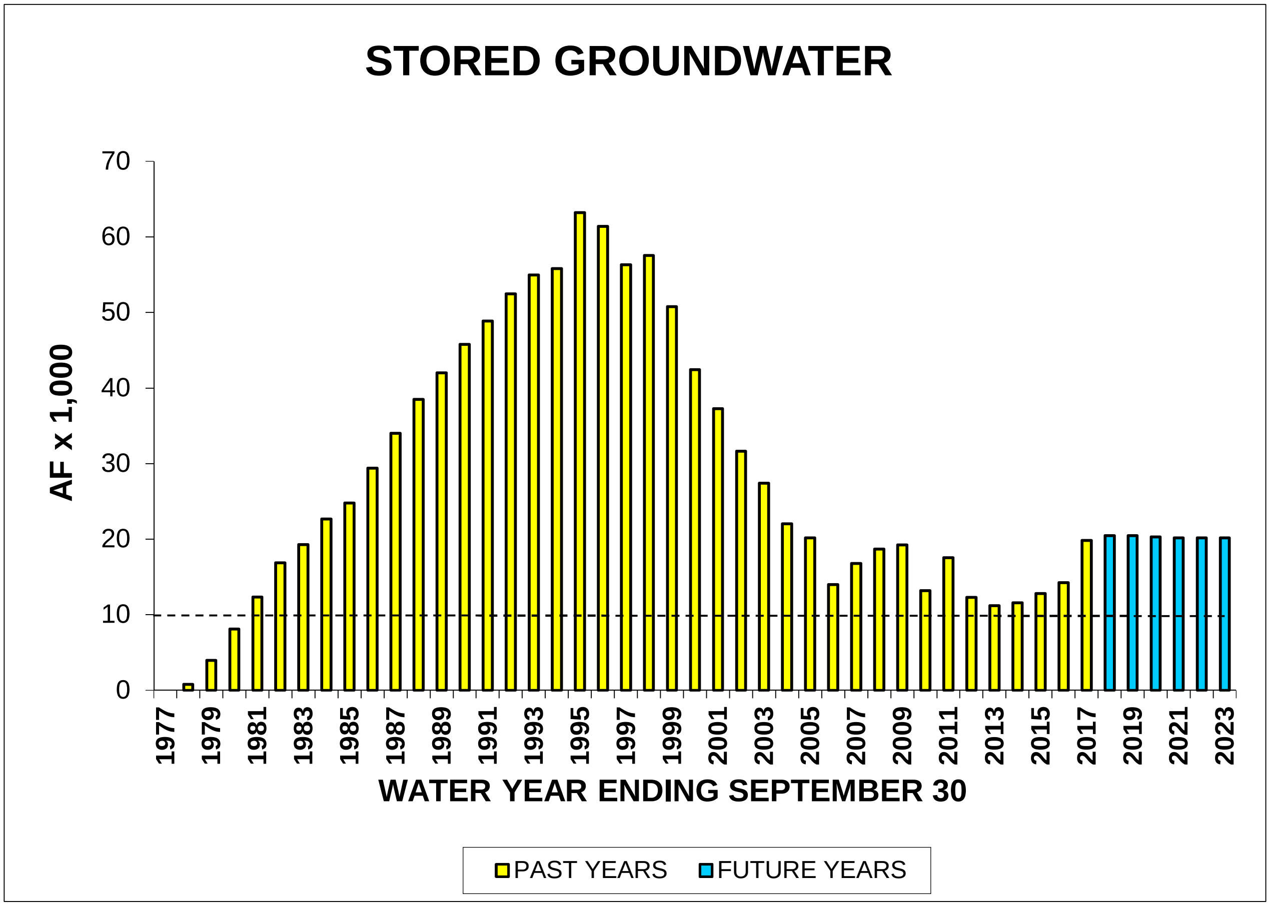
Stored Groundwater

CITY OF BURBANK WATER AND POWER
WATER DIVISION
BURBANK'S STORED GROUNDWATER

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	OTHER CREDITS AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976/77	22,743	4,549				
1977/78	22,513	4,503			3,767	(1) 782
1978/79	24,234	4,847			1,358	(2) 3,947
1979/80	24,184	4,837			677	8,117
1980/81	25,202	5,040			595	12,359
1981/82	22,120	4,424			523	16,876
1982/83	22,118	4,424			2,002	19,298
1983/84	24,927	4,985			1,063	22,659
1984/85	23,641	4,728			2,863	24,781
1985/86	23,180	4,636			123	29,386
1986/87	23,649	4,730			0	34,022
1987/88	23,712	4,742			253	38,498
1988/89	23,863	4,773			1,213	42,027
1989/90	23,053	4,611	378		1,401	45,777
1990/91	20,270	4,054	504		2,032	48,860
1991/92	20,930	4,186	503		938	52,479
1992/93	21,839	4,368	500		(3) 2,184	54,981
1993/94	24,566	4,913	0		(3) 3,539	55,810
1994/95	22,541	4,508	0	5,380	2,888	63,215
1995/96	23,124	4,625	0	2,000	8,308	61,415
1996/97	24,888	4,977	0	1,500	11,243	56,297
1997/98	22,447	4,489	0	0	3,731	57,543
1998/99	22,671	4,534	0	2,000	13,262	50,770
1999/2000	26,312	5,262	0	0	12,862	42,442
2000/01	25,619	5,124	0	0	10,440	37,264
2001/02	24,937	4,987	0	0	10,764	31,624
2002/03	23,108	4,622	0	300	9,483	27,428
2003/04	24,235	4,847	0	44	10,057	22,037
2004/05	21,749	4,350	0	0	6,694	20,190
2005/06	24,084	4,817	0	0	10,543	13,999
2006/07	25,288	5,058	0	8,200	10,220	16,796
2007/08	24,277	4,855	0	4,200	7,161	18,704
2008/09	22,160	4,432	0	6,200	10,319	19,246
2009/10	20,513	4,103	34	0	10,371	13,208
2010/11	19,322	3,864	11,187	0	10,791	17,530
2011/12	20,584	4,117	1,371	0	10,336	12,305
2012/13	20,480	4,096	6,703	0	11,822	11,190
2013/14	21,442	4,288	7,000	0	10,567	11,602
2014/15	17,917	3,583	150	7,200	10,308	12,803
2015/16	17,422	3,484	306	7,200	9,499	14,249
2016/17	18,282	3,656	11,791	0	9,501	19,824
2017/18	19,937	3,987	8,094	0	11,099	20,475
2018/19	18,791	3,758	6,950	65	11,015	20,462
2019/20	18,901	3,780	6,950	125	11,015	20,281
2020/21	18,911	3,782	6,950	190	11,015	20,186
2021/22	18,911	3,782	6,950	280	11,015	20,183
2022/23	18,911	3,782	6,950	280	11,015	20,180

(1) STORED WATER AS OF OCTOBER 1, 1978 (2) STORED WATER AS OF OCTOBER 1, 1979
(3) EXCLUDES 150 AF OF PUMPING FOR TESTING.
SPREAD WATER INCLUDES CYCLIC STORAGE PROGRAM
OTHER CREDITS INCLUDE PHYSICAL SOLUTION PURCHASES, IN-LIEU STORAGE,
AND OTHER TRANSFERS OF GROUNDWATER CREDITS
COLUMNS (1) THROUGH (6) - FROM ULARA WATERMASTER REPORTS
COLUMN (2) = 20% OF COL. (1)
PUMPED GROUNDWATER INCLUDES CITY, VALHALLA, LOCKHEED, DISNEY, MENASCO, HOME DEPOT
FOR WY 2007-08 THROUGH 2016-17, 1% WAS DEDUCTED FROM THE STORED WATER AT THE END OF EACH YEAR.
SHADED AREAS OF TABLE ARE PROJECTED VALUES .

BURBANK WATER AND POWER
WATER DIVISION
WY 2016/17



NOTES:

- 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD.
- STORED WATER IS REDUCED WHEN PRODUCTION EXCEEDS THE RETURN FLOW CREDIT (~4,200 AF) PLUS SPREAD WATER OR PHYSICAL SOLUTION CREDITS.
- SPREADING WATER OR GROUNDWATER CREDIT PURCHASES TO BE CONTINUED TO MAINTAIN BASIN BALANCE.

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

2017-18 through 2021-22 Water Years

glendale california

Glendale Water & Power
Water Engineering

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June 28, 2018

Mr. Richard Slade
ULARA Watermaster
14051 Burbank Blvd, Suite 300
Sherman Oaks, CA 91401

Subject: **Annual Pumping & Spreading Plan for Water Years 2018-2022 for City of Glendale**

Dear Mr. Slade:

Enclosed please find the annual Pumping and Spreading Plan for the City of Glendale for the Water Years 2018-2022. Glendale, as you know, does not have any spreading facilities.

If you have any question or need further information, please do not hesitate to contact my staff, Mr. Leo Chan at (818) 548-3905 or via email at LChan@Glendaleca.gov.

Respectfully yours,

Raja Takidin
Senior Civil Engineer

RT/lc

Enclosed

cc: Anthony Hicke, Assistant Watermaster
Michael De Ghetto, Chief Assistant General Manager – Water
Richard Ruyle, Water Services Administrator

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS 2018-2022

Prepared By

GLENDALE *WATER & POWER*

June 2018

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Introduction

This report discusses water supplies to the City of Glendale for Water Year 2017-18 and projections in local water resources available to meet future water demands and to reduce Glendale dependency on imported water. This information is used by the ULARA Watermaster and a wide group of individuals and organizations including Glendale's City Manager and Council Members, regulatory agencies and others interested in the future conditions of Glendale's water resources.

Executive Summary

Glendale receives its groundwater supply from San Fernando Groundwater Basin and Verdugo Groundwater Basin. Table 1 illustrates the actual (in bold letters) and projected pumping activities in the two basins between 2017-18 and 2021-22. Glendale currently does not have any spreading facility.

TABLE 1
ACTUAL & PROJECTED PUMPING ACTIVITIES IN WATER YEAR 2017-18 – 2021-22
(Acre Feet per Year)

Source	2017-18*	2018-19	2019-20	2020-21	2021-22
San Fernando (SF) Basin					
Glendale OU	***7,675***	*8,388*	*8,388*	*8,388*	*8,388*
Forest Lawn Memorial Park	***400***	*400*	*400*	*400*	*400*
Grayson Power Plant	***5***	*10*	*10*	*10*	*10*
SF Basin Total	**8,080**	8,798	8,798	8,798	8,798
Verdugo Basin	**1,180**	1,158	1,158	1,158	1,158

** The first seven months of the year were based on actual production data.*

Existing Water Sources and Supplies

The City of Glendale ("City") currently has four sources of water available to meet demands: groundwater from the San Fernando Basin and Verdugo Basin, imported water from the Metropolitan Water District of Southern California ("Metropolitan") and recycled water from the Los Angeles/Glendale Water Reclamation Plant ("LAGWRP"). Each of these sources is described below. The entry points into the City water system for the various supplies are shown in Figure 1.

1. San Fernando Basin

The City's water right to San Fernando Basin supplies is defined by the judgment entitled "The City of Los Angeles vs. the City of San Fernando, et al." (1979) hereinafter referred to as the "Judgment"). The Judgment consists of a return flow credit, which is a type of water right based on the assumption that a percentage of water used in the City is returned to the groundwater basin. The City has a right to accumulate its return flow credits annually if its water rights are not used. In the water year of 2016-17, the City estimated a storage credit of 33,334 acre feet ("AF") within the basin. In addition, the Judgment contains rights for physical solution water. This is a right to produce water in excess of return flow credit and the accumulated credits, subject to a payment obligation to the City of Los Angeles based primarily on the cost of Metropolitan alternative supplies. This option to produce physical solution water in excess of the return flow credit and the accumulated credits is a significant factor in relation to the water production at the Glendale Water Treatment Plant ("GWTP"). The GWTP is part of a U.S. Environmental Protection Agency ("EPA") Superfund clean-up project in Glendale. The project consists of a 5,250[*] gallon per minute ("gpm") facility and nine (9)[†] wells that supply the plant. Further discussion regarding the GWTP can be found in the Section: *Past Water Use and Trend* on page 8 in this report. The various San Fernando Basin supplies are:

Return Flow Credit – Glendale is entitled to a return flow credit of twenty (20.0) percent of all City-delivered water, including recycled water, in the San Fernando Basin and its tributary hill and mountain area. A location map is shown in Figure 2 *(Source: 2014-15 Water Year ULARA Watermaster Report)*. This credit ranges from about 4,500 acre feet per year (AFY) to 5,400 AFY depending on actual water use. This is the City's primary water right in the San Fernando Basin.

Physical Solution Water – The City has an agreement to extract water over and above the return flow credit and accumulated credits, and it is chargeable against the rights of the City of Los Angeles upon payment of specified charges generally tied to Metropolitan's water rates. The City's physical solution right is 5,500 AFY.

Pumping for Groundwater Cleanup – Section 2.5 of the Upper Los Angeles River Area's ("ULARA") Policies and Procedures, dated July, 1993, provides for the extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right became a significant factor with the completion of the GWTP in 2000.

Carry-over extractions – In addition to current extractions of return flow water and stored water, Glendale may, in any one year, extract from the San Fernando Basin an amount not to exceed 10 percent of its last annual credit for import return water, subject to an obligation to replace such over-extraction by reduced extraction during the next water year. This provides important year-to-year flexibility in meeting water demands.

** State Water Resources Control Board – Division of Drinking Water (DDW) approved to increase the overall treatment plant capacity from the original 5,000 gpm to 5,250 gpm in October 2008.*

† The ninth extraction well (GS-5) began operation in November 2016.

San Fernando Basin production has been limited in the past and was eventually eliminated for a time because of volatile organic compounds ("VOC") contamination of the groundwater. The entire San Fernando Valley is part of a U. S. Environmental Protection Agency ("EPA") Superfund cleanup program. Since the early 1990s, many water treatment plants had been constructed in the San Fernando Valley to remove VOC from the groundwater. EPA had focused on the construction of cleanup facilities in the City. The GWTP and eight extraction wells have been constructed to pump, treat and deliver water to the City via its Grandview Pumping Plant. Significant production from the basin and delivery to the City started in January 2002.

The cleanup facilities consist of eight shallow extraction wells and one deep well; the 5,250 gpm GWTP to remove the VOC; piping to convey the untreated groundwater from the wells to the water treatment plant; a system to convey treated water from the treatment plant to the City's potable distribution system; the Grandview facility to blend the treated groundwater with water from Metropolitan, and a disinfection facility. A general layout of these facilities is shown in Figure 3.

In 2000, major agreements were signed between City of Glendale and Glendale Respondents Group (GRG), which represents forty-plus industries identified by the EPA as potentially responsible for the groundwater contamination, and the EPA. GRG retained CDM Consulting Engineers, Inc. to design, construct and operate the water treatment facilities required by the agreements. The State Water Resources Control Board – Division of Drinking Water ("DDW") (formally known as the California Department of Public Health) issued a permit for the City to operate the facilities in July 2000. The City started taking small quantities of water from this facility on July 23, 2001. The delivery of the water was initially limited because of the City's concern with taking water with higher hexavalent chromium ("Cr(VI)") levels than in the current water supply, even though such water met all water quality standards. In January 2002, the Glendale City Council authorized the City to start delivering 5,000 gpm from the treatment facility into the City's potable water system with a target to minimize the concentration of Cr(VI) in the water.

The San Fernando Basin is expected to provide about 7,300 AFY to the City, which will meet about twenty-six percent (26%) of projected near-term water demands. The Forest Lawn Memorial Park also has a physical solution right of 400 acre-feet per year from the Basin. In addition, the Glendale Grayson Power Plant uses about 20 AFY on the cooling tower and steam and gas combustion turbines. The total groundwater extraction from the San Fernando Basin by the City of Glendale and its physical solution pumping parties is approximately 7,720 AFY. As of October 1, 2017, the City estimated an accumulated pumping credit of 29,012 AF in the San Fernando Basin.

2. Verdugo Basin

Historically, groundwater supplies from the Verdugo Basin contributed a small portion to the City's water supplies via five wells and an underground water infiltration system. The Judgment granted Glendale the right to extract 3,856 AFY from the Verdugo Basin. Crescenta Valley Water District (CVWD) also has water rights of 3,294 AFY and is the only other entity allowed to extract water from the Verdugo Basin.

Use of the Verdugo Basin supplies has been limited in the past due to water quality problems, groundwater levels, and limited extraction capacity. In order to increase the use of these supplies, the City completed construction of the Verdugo Park Water Treatment Plant ("VPWTP") in 1995. VPWTP treats water pumped from two low capacity wells, referred to as Verdugo Wells A & B, and from the water supplies in the Verdugo Pickup System, a subsurface horizontal infiltration system. The water is then pumped into the City's distribution system. The plant was originally designed to treat 1,150 gpm, however, at VPWTP startup in July of 1995 the flow was 550 gpm and over the years, the production of VPWTP has slowly declined. Due to the low production, the Verdugo Wells and the VPWTP were temporarily taken offline on September 17, 2013.

In 2011, the City completed the rehabilitation of the Foothill Well and the drilling of the Rockhaven Well in the Montrose area to increase its extraction capacity from the Verdugo Basin.

In 2014, the City and CVWD worked together as a joint project to construct and develop the Rockhaven Well. The new Rockhaven Well began operation in March 2016.

The City rehabilitated Glorietta Well 6 between July and October 2016 and began rehabilitation of Glorietta Well 3 in November 2016. Glorietta Well 3 resumed full delivery on August 27, 2017.

Due to the drought condition in the past several years and in spite of the multiple well rehabilitations, the City has not been able to pump to its full adjudicated right from the Verdugo Basin.

3. Metropolitan Water District of Southern California

The City relies on Metropolitan water supply to meet a majority of its current water supply requirements. For the past five water years ending September 30, 2017, water deliveries from Metropolitan averaged 14.9 million gallons per day (approximately 16,658 AFY), which constituted an average of 67% of the City's total potable water supply. The City expects to continue reliance on Metropolitan sales of water to meet a majority of its future water supply requirements.

The following information regarding Metropolitan has been obtained from Metropolitan and sources that the City believes to be reliable, but the City takes no responsibility for the accuracy or completeness hereof. Additional information about Metropolitan can be obtained on Metropolitan's website at *www.mwdh2o.com*.

3.1. History and Background

The Metropolitan Water District of Southern California is a public agency organized in 1928 by a vote of the electorates of eleven (11) southern California cities which included the City of Glendale, under authority of the Metropolitan Water District Act (California Statutes 1927, Chapter 429, as reenacted in 1969 as Chapter 209, as amended, herein referred to as the "Metropolitan Act"). The Metropolitan Act authorizes Metropolitan to levy property taxes within its service area; establish water rates; impose charges for water standby and service availability; incur general obligation bonded indebtedness and issue revenue bonds, notes and short-term revenue certificates; execute contracts; and exercise the power of eminent domain for the purpose of acquiring property. In addition, Metropolitan's Board of Directors ("Metropolitan's Board") is authorized to establish terms and conditions under which additional areas may be annexed to Metropolitan's service area.

Metropolitan's primary purpose is to provide a supplemental supply of water for domestic and municipal uses at wholesale rates to its member public agencies. City of Glendale is one of the 26 Metropolitan member public agencies. If additional water is available, such water may be sold for other beneficial uses. Metropolitan serves its member agencies as a water wholesaler and has no retail customers.

To supply Southern California with reliable and safe water, Metropolitan owns and operates an extensive range of capital facilities including the Colorado River Aqueduct, 16 hydroelectric power recovery plants, approximately 850 miles of pipeline, nine reservoirs and five water treatment plants. Two of these treatment plants supply treated water to the City – Joseph Jensen Water Treatment Plant and the F.E. Weymouth Water Treatment Plant. The Joseph Jensen Water Treatment Plant receives water from the State Water Project only and the F.E. Weymouth Water Treatment Plant treats a blend of the Colorado River Water and State Project Water. The locations of the California Aqueduct and Colorado River Aqueduct are shown in Figure 4.

3.2. State Water Project (SWP)

One of Metropolitan's two major sources of water is the State Water Project, which is owned by the State and operated by the State Department of Water Resources ("DWR"). The SWP transports water from San Francisco Bay/Sacramento-San Joaquin River Delta ("Bay-Delta") south via the California Aqueduct to Metropolitan. The total length of the California Aqueduct is approximately 444 miles. The State Water Contract, under a 100 percent allocation, provides Metropolitan 1,911,500 AF of water per year.

In 2016-2017, northern California had experienced its wettest water year on record. The record precipitation led to a SWP allocation of 85 percent, or approximately 1.62 million acre-fet (MAF) for Metropolitan. Metropolitan was also able to secure 124,000 AF of surplus Article 21 supplies. *(Source: MWDSC Annual Report 2017)*

3.3. Colorado River Aqueduct (CRA)

Metropolitan has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior. Water from the Colorado River or its tributaries is also available to other users in California, as well as users in the states of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, resulting in both competition and the need for cooperation among these holders of Colorado River entitlements. The Colorado River Aqueduct, which is owned and operated by Metropolitan, transports water from the Colorado River approximately 242 miles to its terminus at Lake Mathews in Riverside County.

To effectively manage and take full advantage of the extraordinarily high amounts of SWP supplies, Metropolitan reduced the delivery of Colorado River water into the service area to under 300,000 AF by cutting back CRA pumping in March through June 2017 and maximizing the storage in Lake Mead. *(Source: MWDSC Annual Report 2015)7*

3.4. Metropolitan's Services to Glendale

Glendale receives Metropolitan water through three (3) service connections as shown on Figure 1. The service connection number and capacity are summarized in Table 2 below. In total, Metropolitan has a total delivery capacity of seventy-eight (78) cubic feet-per-second (cfs). During hot summer days, Glendale has the capability to utilize the full capacity of the facilities.

TABLE 2
METROPOLITAN CONNECTIONS AND CAPACITY

Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	20

Over the years, Metropolitan has provided a high level of reliability in meeting Glendale's supplemental water supply needs. It is believed that the reliability of water supplied to the City will continue in the future as a result of the many water resource programs under way and the proposed future programs now being considered based on Metropolitan's Integrated Water Resources Plan (IRP) and the Water Shortage and Drought Management Plan (WSDM). This source will always be a major factor in meeting the water needs of the City. The City closely follows the planning activities at Metropolitan to assure that it has adequate supplies to meet the needs of its member agencies.

4. Recycled Water

The City has been delivering recycled water from the LAGWRP since the late 1970's. This is a twenty (20) million gallon-per-day (MGD) facility owned by the Cities of Los Angeles and Glendale. Based on a 1970 contract between the Cities of Los Angeles and Glendale, Glendale is entitled to fifty percent (50%) of any effluent produced at the plant, which is more than sufficient to for all recycled water use within City of Glendale. Treated wastewater that is not used in either the Glendale or Los Angeles system is discharged to the Los Angeles River and eventually reaches the ocean.

In the 1990's Glendale Water & Power (GWP) began to require all new high-rise buildings (4-story or higher) to install dual-plumbing systems within the Glendale Downtown area. Recycled water customers are solely responsible for funding and installing the connectors from the recycled water pipeline in the public streets to the customer's property, and for all on-site facilities to distribute recycled water to the ultimate use. The main recycled water distribution pipelines and existing recycled water facilities are shown in more detail in Figure 5.

As of October 2017, Glendale has a total of forty nine (49) recycled water users and seventy six (76) recycled water accounts. These include a landfill, the Grayson Power Plant, two golf courses, two cemeteries, six schools, seven recreation parks, and other irrigation areas. Other users include three (3) high-rise buildings, the Glendale Police Headquarters, the Disney Complex on Flower Street, and the facilities at the Glendale Community College that are dual-plumbed to use recycled water for sanitary flushing purposes. (Figure 6).

5. Summary of Local Supplies

The current use of local groundwater resources available to the City is substantially less than its rights because of water quality and extraction problems. A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 3.

TABLE 3
LOCAL WATER PROJECTS AND USE (AFY)

Potential Source	Credit/Right	Current Use	Future Use
San Fernando Basin*	4,500 - 5,400	8,080	8,798
Verdugo Basin	3,856	1,180	1,158
Recycled Water	10,000	1,740	3,500

** Glendale has an agreement with City of Los Angeles to extract groundwater above the return flow credit from the San Fernando Basin.*

Past Water Use and Trends

Historically, the City used groundwater to meet a varying portion of its water demand. In the 1940s and 1950s essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from Metropolitan. In the 1960's, production from the San Fernando Basin reached a peak of about 17,000 AFY. The Grandview well water collection system in the San Fernando Basin and the Grandview Pumping Plant originally pumped a peak capacity of about 24,000 gpm (34.6 MGD) from the San Fernando Basin directly into Glendale's potable water system.

In the mid-1970s, Glendale limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a Water Rights lawsuit by the City of Los Angeles. In 1975, the California Supreme Court issued the Judgment in City of Los Angeles vs. City of San Fernando which further limited Glendale's production right. The current right is about 5,500 AFY based on a Return Flow Credit right from water use in Glendale, with certain additional rights as described above. Other limitations to groundwater use occurred in the late 1970s, when production from the Verdugo pick-up system in the Verdugo Basin was discontinued because of water quality problems.

In late 1979, Assembly Bill 1803 required that all water agencies using groundwater must conduct tests for the presence of certain industrial solvents. The tests indicated that VOC such as trichlorethylene and perchloroethylene were present in the San Fernando Basin groundwater supplies in concentrations exceeding State Department of Health Services' maximum contaminant levels. Both chemicals were used extensively in the past as degreasers in manufacturing industries.

At that time, the presence and hazards to the water supplies were identified. As a result, Glendale had to further limit its use of San Fernando Basin supplies. From 1980 to 1992, Glendale reduced production; and from 1992 to 2000, Glendale totally suspended production from the basin because of the presence of VOC. During the twenty year period of reduced production, Glendale was allowed to accumulate the groundwater storage credits that could be used in the future. Glendale's storage account balance was 29,012 AF as of October 1, 2017.

The water quality problems in the San Fernando Basin and groundwater levels in the Verdugo Basin have impacted the ability of Glendale to produce water from these Basins. Now Glendale is able to better utilize its rights to the San Fernando Basin water supplies, which accumulated for many years started in 2000. The EPA has designated several locations in the San Fernando Basin as Superfund sites and required construction of cleanup treatment facilities by the industry group responsible for the contamination. The Glendale cleanup project – Glendale Operable Unit (GOU) is the last in a series of EPA-required cleanup facilities for VOC and is now complete.

The GOU is comprised of a treatment plant (the GWTP), nine (9) groundwater extraction wells, a pumping plant, a disinfection facility, and associated piping. The facility was designed to treat groundwater contaminated by TCE and PCE at a combined rate of 5,000 gpm using aeration and granulated activated carbon (GAC). The treated water is then blended with imported supplies to control nitrate concentrations. In December 2000, the City started operating the GOU. But due to the Cr(VI) issue, only a small quantity was initially pumped and delivered. Full operation started on January 6, 2002.

The wells were being pumped and blended in a manner to limit Cr(VI) concentrations to achieve the City's target of 5 µg/L. In 2003, the City began a major research effort on identifying viable treatment technologies for the removal of Cr(VI) from its pumped groundwater. In 2010, the City constructed the Weak Base Anion (WBA) Chromium Removal facility to remove Cr(VI) from groundwater produced by GSOU Well GS-3. The City also constructed a 100-gpm demonstration-scale facility using reduction, coagulation and filtration (RCF) technology to remove Cr(VI). These facilities effectively removed Cr(VI) in the groundwater to concentration below 5 µg/L. The Cr(VI) Removal Research Project was completed in 2015. Based on the findings of the Research Project, the City, in partnership with the GRG, constructed a full-scale WBA Cr(VI) Removal Facility adjacent to the existing GWTP to remove Cr(VI) from the groundwater from GNOU Well GN-3. The GN-3/WBA facility began operation in December 2016.

In the Verdugo Basin, Glendale currently has six (6) active production wells and a pick-up system (infiltration galleries), along with the VPWTP. The four active wells referred to as Glorietta Wells 3, 4 & 6 and Foothill Well produce about 935.7 AFY in Water Year 2016-17 and account for about five percent (5%) of Glendale's total potable water supply. The declined water levels have significantly reduced supplies for this source, and accordingly, the City has reduced its projections of supply from this source as well. Due to the low production from the Verdugo Wells A & B, the two wells and the VPWTP were temporarily shut down since September 17, 2013 pending well performance evaluation and rehabilitation. The location of the VPWTP and existing wells are shown on Figure 1.

The City is committed to aggressively advocating the use of recycled water for irrigation & toilet flushing, which will help with increased conservation of potable water and reduced the dependency on imported supplies. GWP continues to work with the City of Pasadena to facilitate the delivery of 3,100 AFY of recycled water from the Glendale system to Pasadena via the existing Glenoaks 1666 Tank. Also, the City has completed the construction of a pipeline to extend the use of Recycled Water to three Glendale Unified School District facilities (55 AFY) in fiscal year 2017-2018.

Glendale's Ability To Meet Demands

Over the past four years, there has been a sizeable increase in the development of multi-family mix-use buildings in the City. Reliability of water supplies is a key goal in the operation of Glendale's water distribution system to serve the current and forthcoming water demand. In Water Year 2016-17 Glendale imported approximately 63 percent of its potable water supply from Metropolitan. Consequently, the reliability of Metropolitan water supplies to meet Glendale water needs becomes exceptionally crucial. Glendale continues to maximize local groundwater production and work closely with Metropolitan on imported water delivery to meet the needs of our citizens.

Future Goals

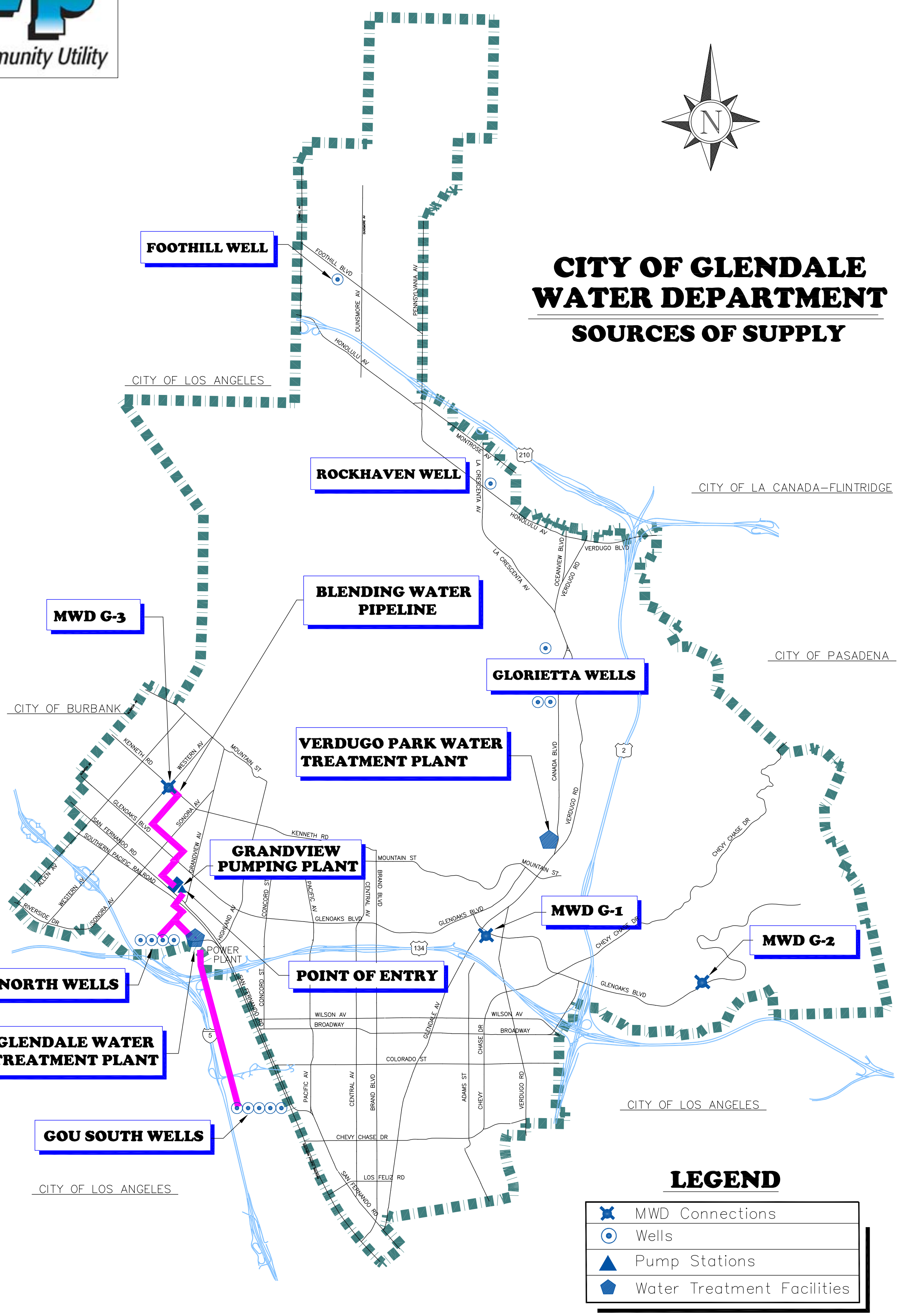
Glendale's goal is to increase its extraction capacity from the Verdugo Basin, GWP is planning on drilling a new well near the existing Glorietta Well 6 and to conduct an evaluation of the Verdugo Basin groundwater supply and the potential rehabilitation of Verdugo Wells A & B in the fiscal year 2018-19.

In the next several years, GWP is planning for at least three major capital improvement projects to extend the recycled water supply to (1) Camino San Rafael & Chevy Oaks (120 AFY), (2) the Chevy Chase Golf Course (100 AFY), and (3) the Glendale T Project (50 AFY). The total estimated recycled water usage from these improvements is 329 AFY. The City continues to aggressively advocate the use of recycled water for irrigation & toilet flushing, which will help increase the conservation of potable water and reduce the dependency on imported supplies.

In water year 2016-2017, the City imported 63 percent of the total potable water used from the Metropolitan. It is the goal of the City's Water Department to maximize local groundwater production from the two Basins and to maintain the City's water purchase from Metropolitan to less than sixty five percent (65%) of the total potable water use in water years 2017-18 through 2021-22.

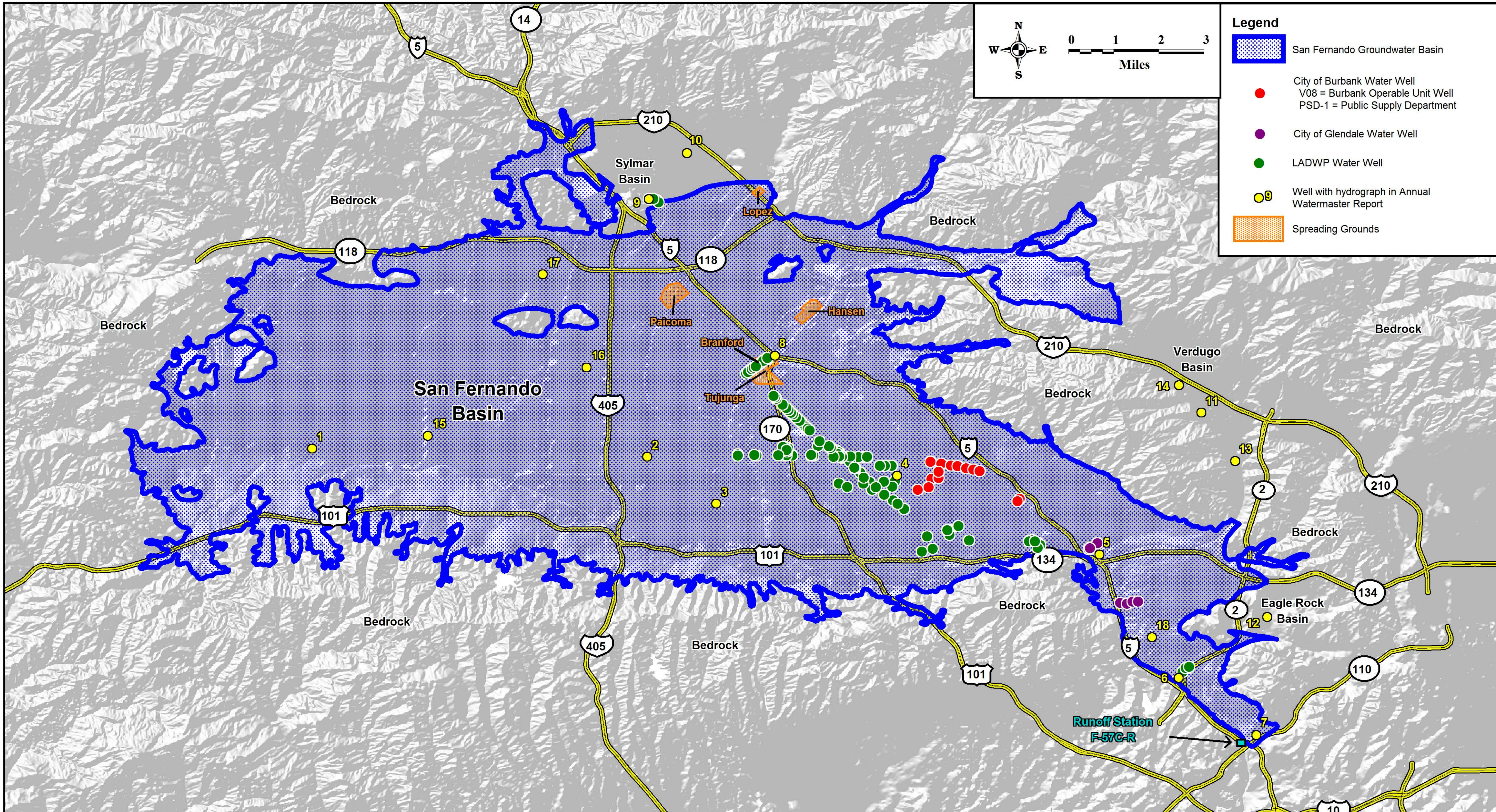
FIGURES

FIGURE 1



CITY OF GLENDALE
WATER DEPARTMENT
SOURCES OF SUPPLY
FOOTHILL WELL
ROCKHAVEN WELL
BLENDING WATER PIPELINE
MWD G-3
GLORIETTA WELLS
VERDUGO PARK WATER TREATMENT PLANT
GRANDVIEW PUMPING PLANT
MWD G-1
MWD G-2
POINT OF ENTRY
GOU NORTH WELLS
GLENDALE WATER TREATMENT PLANT
GOU SOUTH WELLS
POWER PLANT
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
CITY OF LOS ANGELES
CITY OF LOS ANGELES
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities

FIGURE 2



2014-2015 Water Year
ULARA Watermaster Report

Upper Los Angeles River Area:
San Fernando Groundwater Basin Map

PLATE 1A

FIGURE 3

GLENDALE WATER TREATMENT PLANT SYSTEM LAYOUT

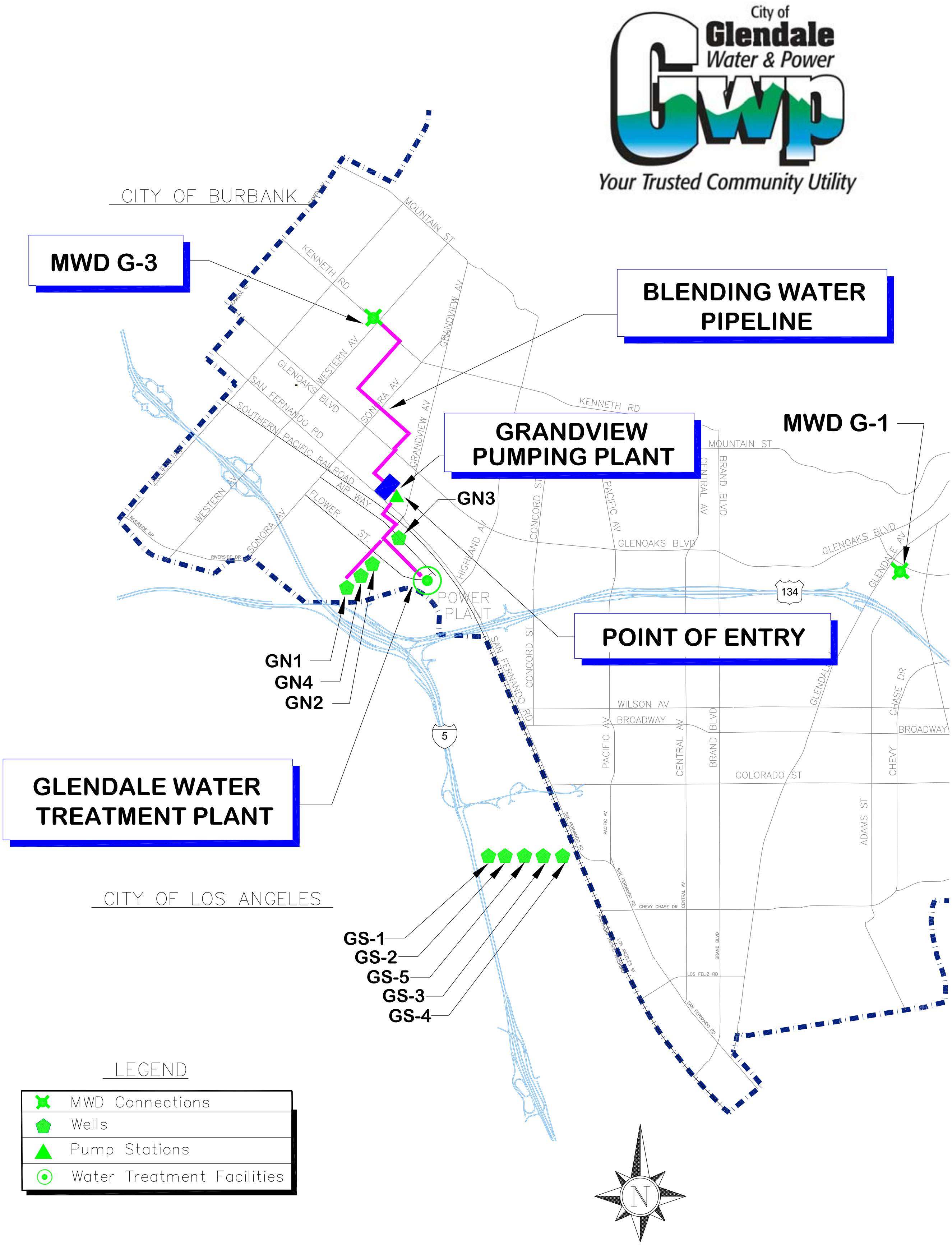
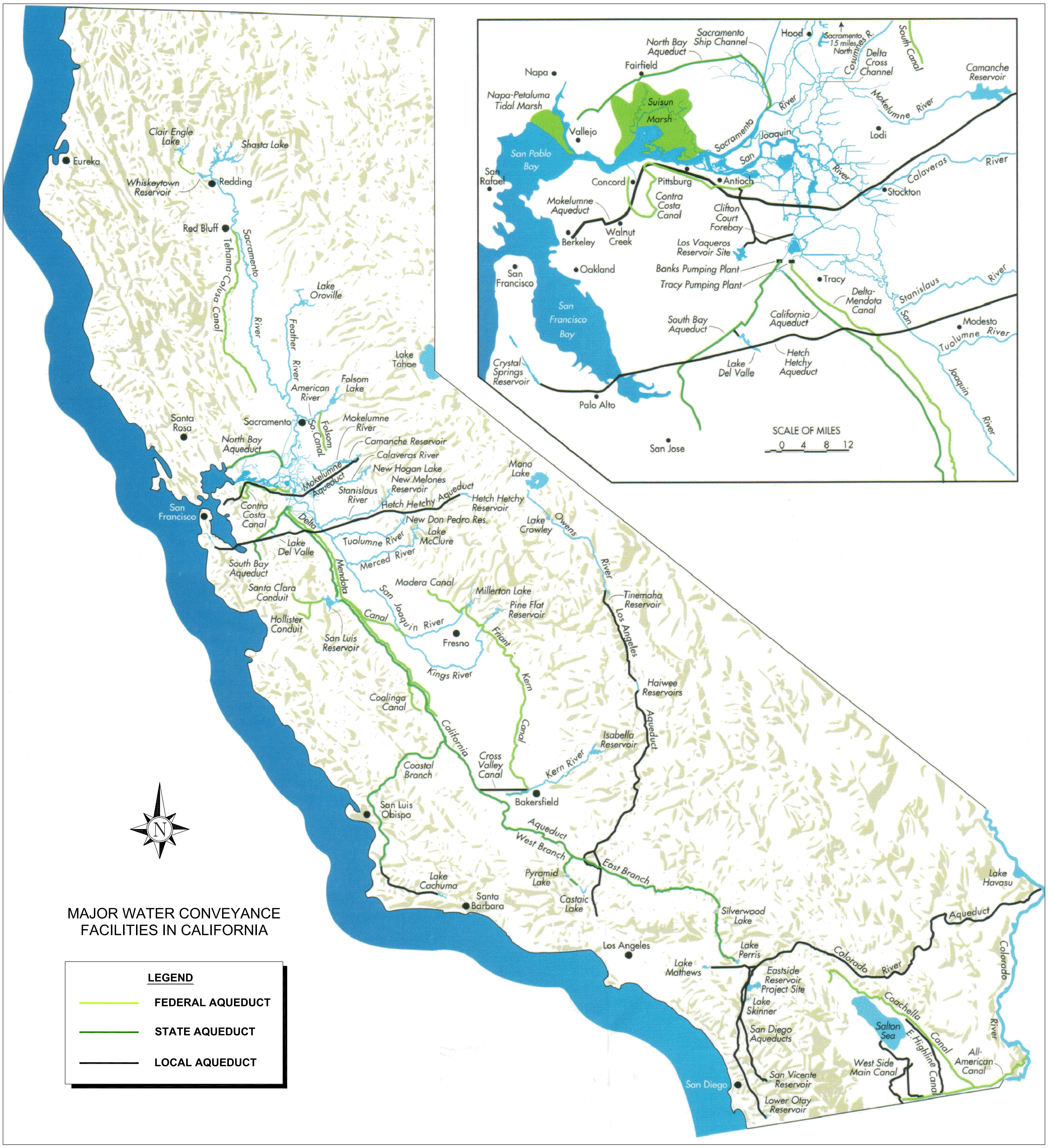
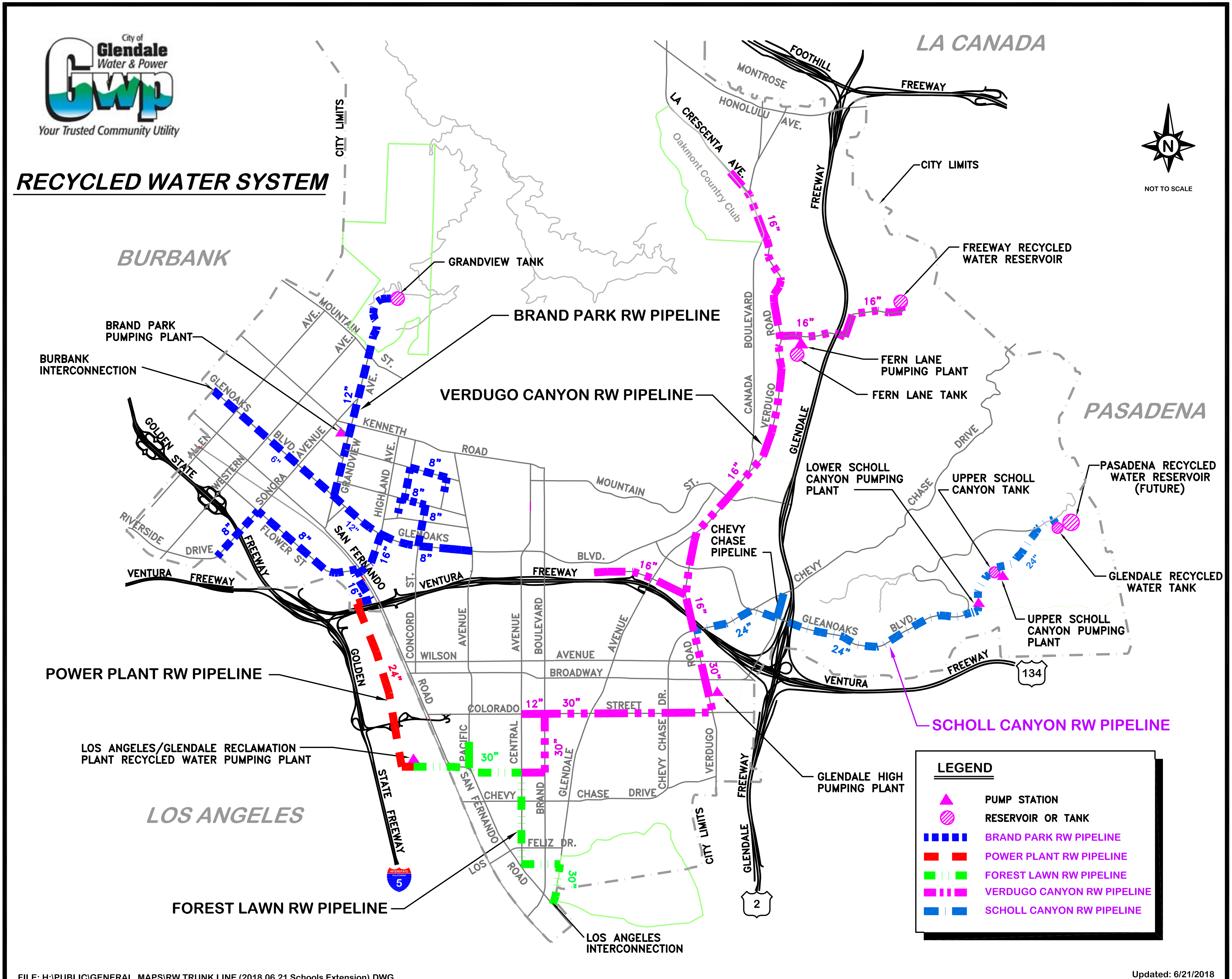


FIGURE 4



MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA

FIGURE 5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BURBANK
PASADENA
LOS ANGELES
CITY LIMITS
GRANDVIEW TANK
BRAND PARK RW PIPELINE
BRAND PARK PUMPING PLANT
BURBANK INTERCONNECTION
VERDUGO CANYON RW PIPELINE
FREEWAY RECYCLED WATER RESERVOIR
FERN LANE PUMPING PLANT
FERN LANE TANK
LOWER SCHOLL CANYON PUMPING PLANT
UPPER SCHOLL CANYON TANK
PASADENA RECYCLED WATER RESERVOIR (FUTURE)
GLENDALE RECYCLED WATER TANK
UPPER SCHOLL CANYON PUMPING PLANT
CHEVY CHASE PIPELINE
POWER PLANT RW PIPELINE
LOS ANGELES/GLENDALE RECLAMATION PLANT RECYCLED WATER PUMPING PLANT
GLENDALE HIGH PUMPING PLANT
SCHOLL CANYON RW PIPELINE
FOREST LAWN RW PIPELINE
LOS ANGELES INTERCONNECTION
LEGEND
PUMP STATION
RESERVOIR OR TANK
BRAND PARK RW PIPELINE
POWER PLANT RW PIPELINE
FOREST LAWN RW PIPELINE
VERDUGO CANYON RW PIPELINE
SCHOLL CANYON RW PIPELINE
FILE: H:\PUBLIC\GENERAL_MAPS\RW TRUNK LINE (2018.06.21 Schools Extension).DWG
Updated: 6/21/2018

FIGURE 6

CITY OF GLENDALE

Recycled Water Account Information

NO.	PROJECT NAME	ADDRESS	NO. OF METER	DELIVERY DATE	TYPE OF USE
		FOREST LAWN PROJECT (A - 1)			
1	City of Glendale	1600 S Brand Boulevard	1	1995	Irrigation
2	Forest Lawn Memorial Park	1712 S Glendale Avenue	1	1992	Irrigation
3	Forest Lawn Memorial Park	3690 San Fernando Road	1	1992	Irrigation
4	Silver Crest Homes	316 W Windsor Road	1	2000	Irrigation
5	Cerritos Elementary School	120 E Cerritos Avenue	1	2006	Irrigation
6	Cerritos Elementary School	1715 S Glendale Avenue	1	2006	Irrigation
7	Cerritos School Park	3690 San Fernando Road	1	2007	Irrigation
8	Edison Elementary & Pacific Park	501 Riverdale Drive	1	Mar 2007	Irrigation
		POWER PLANT PROJECT (A - 2)			
9	CalTrans	943 W Doran Street	1	1978	Irrigation
10	Grayson Power Plant - GWP	800 Air Way	1	1978	Cooling Towers
11	Glendale Water & Power - UOC	800 Air Way	1	2010	Irrigation
12	Public Works - Parkway Irrigation	(No AMI Meter)	0	-	Irrigation
		BRAND PARK PROJECT (A - 3)			
13	Glenoaks Median (9 meters)	2008 W Glenoaks Boulevard	1	1996	Irrigation
14	Glenoaks Median (9 meters)	1818 W Glenoaks Boulevard	1	1996	Irrigation
15	Glenoaks Median (9 meters)	1108 W Glenoaks Boulevard	1	1996	Irrigation
16	Glenoaks Median (9 meters)	978 W Glenoaks Boulevard	1	1996	Irrigation
17	Glenoaks Median (9 meters)	720 W Glenoaks Boulevard	1	1996	Irrigation
18	Glenoaks Median (9 meters)	618 W Glenoaks Boulevard	1	1996	Irrigation
19	Glenoaks Median (9 meters)	532 W Glenoaks Boulevard	1	1996	Irrigation
20	Glenoaks Median (9 meters)	1628 W Glenoaks Boulevard	1	1996	Irrigation
21	Glenoaks Median (9 meters)	1400 W Glenoaks Boulevard	1	1996	Irrigation
22	Brand Park	1700 W Mountain Street	1	1997	Irrigation
23	Pelanconi Park	905 Cleveland Road	2	1996	Irrigation
24	Grandview Memorial Park	1341 Glenwood Road	2	2001	Irrigation
25	Grandview Memorial (Heritage Cemetery Management I)	1341 Glenwood Road	1	2009	Irrigation
26	Disney Complex (Dual Plumbed-Future)	1049 Flower Street	1	Jun-17	Irrigation
27	Disney Complex (Dual Plumbed-Future)	1101 Flower Street	1	2007	Irrigation
28	Walt Disney Co.	900 Grand Central Ave	1	Sep 2012	Irrigation
29	Walt Disney Co.	1200 Grand Central Ave	2	Aug 2012	Irrigation
30	San Fernando Landscape Project	5775 San Fernando Road	1	Jan 2009	Irrigation
31	Public Works - Glendale Narrow Riverwalk	900 Flower St.	1	Feb 2013	Irrigation
32	Public Works - Fairmont Street Extension Project	907 Flower Street	2	Mar 2010	Irrigation
33	Grayson Power Plant - GWP	630 Kellogg Ave	1	May 2007	Irrigation
		VERDUGO SCHOLL PROJECT (B)			
34	Colorado Blvd - Parkway Irrigation	815 E Colorado Street	1	1997	Irrigation
35	Colorado Blvd - Parkway Irrigation	1311 E Colorado Street	1	1997	Irrigation
36	Colorado Blvd - Parkway Irrigation	1401 E Colorado Street	1	1997	Irrigation
37	CalTrans	1970 E Glenoaks Blvd (E/S,W/S I2)	2	1995	Irrigation
38	Caltrans	406 N Verdugo Rd (at Chevy Chase Dr)	1	1995	Irrigation
39	Caltrans	709 Howard Street (at Monterey Road)	1	1995	Irrigation
40	741 S. Brand Median	741 S Brand Boulevard (Median)	1	1995	Irrigation
41	Caltrans	2000 E Chevy Chase Drive (at Harvey)	1	1995	Irrigation
42	Montecito Park	2978 N Verdugo Road (at Sparr)	1	1995	Irrigation

FIGURE 6

CITY OF GLENDALE

Recycled Water Account Information

NO.	PROJECT NAME	ADDRESS	NO. OF METER	DELIVERY DATE	TYPE OF USE
43	N. Verdugo Rd Median/La Cresenta Ave	3220 N Verdugo Road/Median/ La Crescenta Avenue *OPP	1	1996	Irrigation
44	Verdugo Rd/Canada (North Median)	3021 N Verdugo/Canada Median	1	1996	Irrigation
45	Verdugo Rd/Canada South Overpass	1388 N Verdugo/Canada (South) Overpass	1	1995	Irrigation
46	Parque Vaquero	1285 N Verdugo Road	1	1998	Irrigation
47	701 N. Glendale Ave - Median @ Monterey Rd	701 N Glendale Avenue (Median)	1	1995	Irrigation
48	Civic Auditorium	1401 N Verdugo Road	1	1996	Irrigation
49	Sports Complex	2200 Fern Lane	1	1998	Irrigation
50	Adult Recreation Center	201 E Colorado Street	1	1995	Irrigation
51	Glenoaks Park	2531 E Glenoaks Boulevard	1	1995	Irrigation
52	Scholl Canyon Park	2849 E Glenoaks Boulevard	1	1996	Irrigation
53	Scholl Canyon Ballfield	3200 E Glenoaks Boulevard	1	1997	Irrigation
54	Glendale High School	1440 E Broadway	1	1995	Irrigation
55	Wilson Junior High School	1220 Monterey Road	1	1995	Irrigation
56	Glendale Adventist Hospital	1520 E Chevy Chase Drive	1	1997	Irrigation / Cooling Towers
57	Glenoaks Elementary School	2015 E Glenoaks Boulevard	1	1998	Irrigation
58	Glendale Community College	1500 N Verdugo Road	2	1996 & 2004	Irrigation / Toilet Flushing
59	Oakmont Country Club	3100 Country Club Drive	1	1996	Irrigation
60	Central Library	222 E Harvard Street	2	1995	Irrigation
61	Armory	220 E Colorado Street	1	1996	Irrigation
62	Scholl Canyon Golf Course	3800 E Glenoaks Boulevard	1	1998	Irrigation
63	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	2	1996	Irrigation/ Soil Compaction/ Dust Control
64	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	1	1996	Irrigation/ Soil Compaction/ Dust Control
65	Scholl Canyon Landfill (LACSD)	2847 E Glenoaks Boulevard	1	1997	Irrigation/ Soil Compaction/ Dust Control
66	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	1	1996	Irrigation
67	Fern Lane (Freeway Tank + Median)	1926 Fern Lane	1	1997	Irrigation
68	Glendale Retirement Home	1551 E Chevy Chase Drive	1	Jul-09	Irrigation
69	Americana at Brand LLC	233 S Brand Boulevard	1	Apr-09	Irrigation
70	Monterey Community Garden	870 Monterey Road	1	Aug-09	Irrigation
71	City of Glendale - CCBG	827 Monterery Road	1	Jan-11	Irrigation
72	PUBLIC WORKS PARKING SECTION	101 E HARVARD ST	1	Apr-15	Irrigation
73	GWP - WATER DIVISION	210 S VERDUGO RD	1	Jun-07	Irrigation
74	Caltrans	Chevy Chase / 134 Fwy	1	Jul-16	Irrigation
75	City of Glendale / Public Works	825 MONTEREY RD	1	May-17	Irrigation
76	CITY OF LA CANADA FLINTRIDGE	3200 LA CRESCENTA AVE	1	Sep-17	Irrigation

APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2017-18 through 2021-22 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2017 TO SEPTEMBER 30, 2022

2017-2018 Water Year

Prepared by:

Public Works Department

Water Division

117 Macneil Street

San Fernando, California 91340

July 2018

TABLE OF CONTENTS

I. INTRODUCTION

The ground water rights of the City of San Fernando were defined by the JUDGMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants." The Final Judgment was signed on January 26, 1979.

On August 26, 1983, the Watermaster reported to the court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in condition of overdraft. On October 1, 1984, San Fernando and Los Angeles were assigned equal rights to pump the safe yield of the Basin (6,210 acre-feet) thus, San Fernando and Los Angeles were each allowed to pump approximately 3,105 acre-feet per year. Thereafter, on October 1, 1996, the safe yield of the Basin was determined to be 6,510 acre-feet per year. A stipulation approved by the Court, on December 13, 2006, allows for a temporary increase in the safe yield of the Basin to 6,810 AF/Y beginning October 1, 2006. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,405 acre-feet per year.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 2.9.4, Groundwater Pumping and Spreading Plan.

The Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30. The Draft Plan for San Fernando will be submitted in May to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last five years and the projected annual water demand for the next five years are shown on Table 2.1.

Water demand during the early 1990's was affected by drought conditions in the Southern California region. However, the City of San Fernando has imposed voluntary conservation since 1977.

Projected water demands for the next five years is expected to slightly decrease or remain the same due to conservation efforts.
The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the San Fernando area. A variance of ± 10 percent can be expected.

III. WATER SUPPLY

The water supply for the City of San Fernando is composed of locally produced and treated groundwater. Supplemental water is purchased from the Metropolitan Water District of Southern California (MWD). In case of emergency, there is an existing 6-inch water connection to the City of Los Angeles (DWP) water system at 12900 Dronfield Avenue, in Sylmar.

A. <u>MWD:</u> Treated water is purchased from the MWD to supplement ground water supplies. Historic and projected use of MWD water is shown in Table 2.1.

B. <u>Production Wells:</u> The City of San Fernando owns and operates three (3) wells that are on "active status" with the Department of Health Services as indicated below:

1. ***Well 2A***
   Location: 14060 Sayre Street, Sylmar
   Capacity: 2100 GPM

2. ***Well 4A***
   Location: 12900 Dronfield Avenue, Sylmar
   Capacity: 330 GPM

3. ***Well 3***
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1200 GPM
   This well shown is on "stand-by status" with the Department of Public Health Services and quarterly samples are collected by waste pumping.

4. ***Well 7A***
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 900 GPM
   This well was placed on "inactive status" with the State Water Resources Control Board Division of Drinking Water and has been physically disconnected from the water system. Plans are to activate this well by the end of 2018 and start-up a new Envirogen ion-exchange nitrate removal unit to be located at 12900 Dronfield Avenue, Sylmar CA.

C. <u>Quantity (Acre-Feet) of Water Pumped From Each Well (2016-2017)</u>

1.	Well 2A	2,467.79
2.	Well 3	.29
3.	Well 4A	309.09
4.	Well 7A	0
	Total	2,777.17

D. <u>Wells Groundwater Level Data</u>

1.	Well 2A	1078.5 Taken 4/13 (Transducer out of service)
2.	Well 3	1102.2 Taken 12/17
3.	Well 4A	1057.1 Taken 12/17
4.	Well 7A	1097.3 Taken 12/17

E. Well Locations

Well 2A - 14060 Sayre Street, Sylmar

Well 3 - 13003 Borden Street, Sylmar

Well 4A - 12900 Dronfield Avenue, Sylmar

Well 7A 13180 Dronfield Avenue, Sylmar

IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The safe yield of the Sylmar Basin was 6,810 acre-feet and the cities of San Fernando and Los Angeles have equal rights to pump from this basin. After subtracting the overlaying pumping rights of two private parties, San Fernando and Los Angeles were each allowed to pump approximately 3,405 acre-feet per year.

A stipulation approved by the Court May 01, 2013 allows for a temporary increase in the safe yield of the Basin to 7,140 AF/Y beginning October 1, 2012. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,570 acre-feet per year, for the next five years (2012-13 through 2017-18)

B. Stored Water Credit

San Fernando and Los Angeles each have the right to store water in the Sylmar Basin and the right to extract equivalent amounts.

As of 2012-13 through 2017-18 water years the City of San Fernando has a “frozen” water credit of 404 acre feet.

TABLE 2.1
FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND
PUMPED AND IMPORTED WATER
CITY OF SAN FERNANDO

(Acre – Feet)

FY	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
DEMAND										
WELLS	3,279	3,352	2,736	2,766	2,777	2,900	2,900	2,900	2,900	2,900
MWD	82	9	100	0	0	0	0	0	0	0
TOTAL	3,361	3,361	2,836	2,766	2,777	2,900	2,900	2,900	2,900	2,900
ACTUAL						**PROJECTED**				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 2017

CITY OF SAN FERNANDO

- WELL NO. 3
- WELL NO. 4A
- WELL NO. 2A
- WELL NO. 7A

APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

February 1998

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

2017-18 through 2021-22 Water Years

CRESCENTA VALLEY WATER DISTRICT

GROUNDWATER PUMPING & SPREADING PLAN

FOR

WATER YEARS

OCTOBER 1, 2017 TO SEPTEMBER 30, 2022

Prepared by:
David S. Gould, P.E.
District Engineer

Prepared for:
ULARA Watermaster's Office

July 2018

I. INTRODUCTION

The ground water rights of the Crescenta Valley Water District (CVWD) were defined by the JUDGEMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgment was signed on January 26, 1979.

This report as prepared by CVWD is in response to Section 5.4, Groundwater Pumping and Spreading Plan. This report refers to groundwater pumping only since there is no groundwater spreading performed by CVWD.

The Groundwater Pumping Plan is based on the water years October 1, 2017 to September 30, 2022.

II. WATER DEMAND

The annual total water demand for the last five (5) years and the projected annual water demand for the next five (5) years are shown in Table 2.1.

Water demands between WY 2012/13 and WY 2016/17 were affected by a number of factors including less than average annual rainfall, a five-year statewide drought, and water conservation efforts within the Crescenta Valley.

Demands in the CVWD's service area vary due to seasonal conditions, which is part of the residential character of the District and the large percentage of water consumption used for outdoor residential landscaping.

CVWD anticipated an increase in water demand of approximately 3% to 4% in WY 17/18 and an estimated 4% annual increase in demand from WY 18/19 – WY 21/22 as water conservation restrictions are reduced, increased in residential development as the economy improves and as the State slowly comes out of drought conditions.

In WY 2016/17, CVWD saw an increase of 4.8% in water demand as compared to WY 2015/16, which is related to the State ending drought restrictions.

Statewide Drought and Water Conservation:

From October 2016 to September 2017, CVWD reduced its water conservation efforts as the State and Metropolitan Water District of Southern California (MWD) conservation mandates were deferred. The State Assembly is proposing new water conservation measures that could affect further water demands. When these new water conservation measures are approved, CVWD will prepare to implement them over the next 5-years.

III. WATER SUPPLY

A. Existing Water Supply Overview:

The water supply for CVWD is composed of locally produced and treated groundwater, and imported water from MWD purchased on a wholesale basis from Foothill Municipal Water District (FMWD). In WY 2016/17, CVWD had an overall ratio of 44% local groundwater and 56% imported water from FMWD.

In WY 2016/17, CVWD saw decease in groundwater production of 21.6% as compared to WY 2015/16. CVWD's wells produced 1,341 ac-ft, which is 1,953 ac-ft under adjudicated right of 3,294 AFY. CVWD did produce an additional 347 ac-ft from the Rockhaven Well, which will be included in Glendale's annual groundwater production.

In general, the well levels in the Verdugo Basin decreased over WY 2016/17, while the total rainfall for the water year was 24.96", which was 10% above average rainfall. It was observed that static well levels rose slightly (about 5 – 8 feet) after the rainfall season, however the rise in water levels was for a short period and water levels returned to last year's levels. CVWD believes that this primarily due to less than average rainfall from WY 2011/12 to WY 2014/15. CVWD has seen an overall decrease in water levels within the Verdugo Basin of about 20 feet over the last 5 years.

CVWD continued its well rehabilitation program that includes replacing the existing pumps with lower capacity pumps as the amount of water available has decreased. In WY 2016/17, CVWD performed well rehabilitation on Well 5, 8 & 10 and is planning to perform well rehabilitation on Well 7, 11 & 14 in WY 17/18 to obtain better well efficiency and to potentially increase groundwater production.

B. PRODUCTION WELLS

Currently CVWD has thirteen (13) active wells in operation. Historic and projected production from these wells is shown in Table 3.1.

Well pumping capacity for WY 2016/17 varied from a high of 1.9 MGD to a low of 1.3 MGD and the average was 1.6 MGD, which is 60% less than the well design capacity of 4.2 MGD.

This is largely due to declining water levels and Wells 5, 8, 10, & 12 being out of service at various times throughout the year for rehabilitation and bacteriological issues.

B.1 Nitrate (NO_3) in Production Wells

CVWD's groundwater wells produce water which typically contains nitrate (as NO_3) levels above the 45 mg/L maximum contaminant level (MCL) as set by the EPA and the State Water Resources Control Board, Division of Drinking Water (DDW).

B.1.1 Glenwood

The Glenwood Nitrate Removal Treatment Plant is an ion-exchange process used to treat and remove nitrates from CVWD's well water. Untreated water and water treated at the Glenwood Plant are blended to produce water with a nitrate level less than the MCL.

In WY 2016/17, the ion-exchange plant was in operation for eleven (11) of the twelve (12) months and produced 246 ac-ft of treated water, which allows CVWD to maximize the use of local groundwater.

B.1.2 Mills

Water production at CVWD's Mills Plant is blended with FMWD water to decrease the nitrate levels below the MCL.

B.2 Methyl tertiary-butyl ether (MTBE) in Wells

In 2004, CVWD detected low levels of MTBE in Well 5 during routine sampling. In 2006, Well 7 was taken out of service because of MTBE above the 13 ug/L MCL. In 2008, Well 5 was taken out of service when the MTBE level reached 14 ppb, which is above the MCL of 13 ppb. MTBE levels have decreased below the MCL and since 2010, Wells 5 & 7 have been back in service.

B.2.1 MTBE Levels

In WY 2016/17, the MTBE levels in CVWD's wells were between Non-Detect (ND) and 0.18 ppb.

B.2.2 Verdugo Basin MTBE Task Force

In 2006, CVWD made a request to the Watermaster's office to create the Verdugo Basin MTBE Task Force. CVWD has been working with RWQCB, DDW, stakeholders, and RP's on remediation and clean-up of the MTBE. The task force met from 2006 to 2010. In WY 2016/17, the Task Force did not meet. The Task Force will reconvene at any time MTBE levels are higher than 1.0 ug/L.

B.2.3 Groundwater Recharge - Rainfall

CVWD has observed less than average rainfall amounts in the Verdugo Basin over the past five (5) years as shown in the table below. In WY 2016/17, the rainfall was 24.96 inches, which was 10% above the annual average of 22.7 inches.

CVWD Annual Rainfall Total	
Water Year	**Total Rainfall (In)**
16-17	**24.96**
15-16	**13.49**
14-15	**14.28**
13-14	**9.11**
12-13	**12.25**

The forecast for WY 2017/18 is a normal year for rainfall and CVWD is planning to decrease its water conservation efforts next year.

C. WELL REPLACEMENT PROGRAM

The age of the District’s active wells range from 7 to 86 years old and are mostly beyond their useful life.

CVWD has included in its 10-year Capital Improvement program, a project to install a new water production well within the next 5 – 7 years.

C.1 Rockhaven Well Project

CVWD worked with Glendale Water and Power (GWP) to activate the Rockhaven Well (CVWD Well 16) located at 2740 Hermosa Ave. The Rockhaven Well project was a joint project between CVWD and GWP to activate a groundwater well within the Verdugo Basin.

CVWD and GWP received a 2014 Drought Grant as part of Proposition 84 for funding for the design and construction of the Rockhaven Well project. The grant funding was approved November 2015. The design and construction of the Rockhaven Well project was completed in March 2016.

The project is estimated to produce about 480 ac-ft per year of additional local water. The historic and projected Rockhaven Water production is shown in Table 3.5 and per agreement between CVWD and GWP, the groundwater produced will be added to GWP’s Verdugo Basin groundwater production.

C.2 Reactivation of Well 2 with a New Nitrate Treatment Removal Facility

CVWD received a 2015 Integrated Regional Water Management (IRWM) Grant as part of Proposition 84 in March 2016 to reactivate Well 2 and install a new nitrate removal treatment facility at CVWD's Ordunio Reservoir site. Well 2 was drilled in 1927 and taken out of service in 1977 due to nitrate levels above the MCL and lack of a nitrate removal treatment facility.

The project is estimated to produce 150 gpm or 240 ac-ft/yr, which will add to CVWD's groundwater production. Project construction is planned to begin in November 2017 and completed by June 2018.

CVWD is working with the State Water Resources Control Board, Division of Drinking Water (DDW) for a permit amendment for the new nitrate removal treatment facility, which is anticipated to be completed by October 2018.

D. WELL REHABILITATION PROGRAM

CVWD, as part of its annual Capital Improvement program will continue rehabilitation of its existing wells to maintain well capacity and extend the life of the wells. In WY 2016/17, CVWD performed well rehabilitation on Wells 5, 8, & 10 and is planning rehabilitating of Wells 7, 11 & 14 in WY 2017/18.

E. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion-exchange nitrate removal treatment plant was placed into operation in 1990. CVWD replaced the ion-exchange resin in WY 2010/11 during its annual maintenance shut-down.

During WY 2016/17, the plant was in operation eleven (11) months of the year to maximize the use of groundwater production and this trend will continue in WY 2017/18, unless there are maintenance issues requiring the plant to discontinue operation. The historic and projected production from the Glenwood Plant is shown in Table 3.2.

F. PICKENS GRAVITY TUNNEL PRODUCTION

A small portion of the total demand for CVWD is supplied by the Pickens Gravity Tunnel. Historic and projected production from Pickens Tunnel is shown in Table 3.3.

G. FMWD/MWD – IMPORTED WATER

In WY 2016/17, the amount of imported water purchased from MWD via FMWD increased from previous years because of the overall decrease in groundwater production. Proportionally, the ratio of groundwater to import water in WY 2016/17 was 56/44, which shows a decrease in ground water production from previous years.

In WY 2017/18, CVWD anticipates a 4% increase in the amount of imported water received from FMWD as groundwater production continues to decrease and water demands slightly increase. CVWD also anticipates that imported water purchases will continue to increase over the next 5-years as groundwater production remains at current production.

Historic and projected of FMWD/MWD water production are shown in Table 3.4.

H. CITY OF GLENDALE INTERCONNECTION

In 2004, CVWD completed the installation of a new water supply interconnection with the City of Glendale. This connection allowed CVWD to increase its water supply capacity by 5.0 cfs or 3.2 mgd.

An agreement between the City of Glendale, FMWD, and CVWD was signed in 2004, where CVWD will pay FMWD for the water and the City of Glendale for the maintenance and operation of bringing the water to CVWD.

In WY 2016/17, CVWD used 2.80 MG (8.6 ac-ft) of water from the Glendale/CVWD interconnection (GCI) in November & December 2016. This was used for emergency water supply due to a FMWD/MWD water shutdown for repairs.

I. CITY OF LOS ANGELES INTERCONNECTION

In 2006, CVWD received a Proposition 50, Water Security Grant from CDPH to install an emergency water supply connection with the City of Los Angeles. The new connection will provide 2.2 cfs or 1.44 mgd. In addition, the new interconnection and associated facilities will allow CVWD to provide water during an emergency to FMWD and its sub-agencies in case of a local disaster or when MWD's Weymouth plant is out of service.

Project under construction and the facilities should be completed in WY 2016/17. CVWD will be working with DDW and FMWD on amending the DDW permit and performing operational testing of the system.

J. STORMWATER RECHARGE FEASILIBLITY STUDY

A Verdugo Basin Groundwater Recharge, Storage, and Conjunctive Use Feasibility Study was completed in 2005 by CVWD and its recommendations included conceptual plans for stormwater recharge and storage within the basin. In WY 2012/13, CVWD received a Local Groundwater Assistance (LGA) grant from the Department of Water Resources (DWR) to perform a feasibility study to look at stormwater recharge at Crescenta Valley County Park.

The study is a cooperative effort with the City of Glendale, the County of Los Angeles, and other local stakeholders to determine if stormwater can be stored at Crescenta Valley County Park. The feasibility study started in August 2013 and was completed October 2016. The results of the study showed that an estimated 500 ac-ft/year of stormwater water could be put into the Verdugo Basin, which would reduce the wide fluctuation of water levels and increase well capacity on annual basis.

CVWD is currently working on preparing a conceptual design plan for the stormwater capture within Crescenta Valley County Park. The conceptual plan would be circulated among stakeholders, such as the City of Glendale, Los Angeles County, Department of Public Works, Los Angeles County, Parks and Recreation and the Crescenta Valley Town Council for comments and approval. In additional, CVWD will be pursuing State and Federal grant funding for implementation of the project.

IV. JUDGEMENT CONSIDERATIONS

The adjudicated rights of CVWD from the Verdugo Basin are 3,294 acre-feet per year:

- WY 1978/79 to WY 1991/92 - CVWD pumped 1,700 to 2,900 ac-ft/yr.
- WY 1993/94 to WY 2000/01 - CVWD pumped over its adjudicated right, up to 500 ac-ft/yr, which was allowed by the Watermaster's office.
- WY 2001/02 to WY 2003/04 - CVWD pumped below its adjudication by due to declining basin production.
- WY 2004/05 - CVWD increased its water production because of higher than normal rainfall and was able to pump over the adjudication by 16 ac-ft.

IV. JUDGEMENT CONSIDERATIONS (Cont.)

- WY 2005/06 - CVWD pumped over the adjudication by 59 ac-ft. CVWD and the City of Glendale agreed upon compensation for the amount of water pumped over the adjudication for WY 2004/05 & WY 2005/06.
- WY 2006/07 - CVWD planned to maintain well production within the adjudication, however due to operator error, CVWD pumped over the adjudication by 11 ac-ft. CVWD and Glendale agreed upon compensation for the amount of water pumped based on the WY 2005/06 agreement.
- WY 2007/08 - CVWD adjusted its pumping schedule to maintain well production within the adjudication, and was 15 ac-ft below, since Well 7 was out of service for high MTBE levels.
- WY 2008/09 – CVWD pumped below its adjudication by 330 ac-ft, due to Well 5 being out of service for high MTBE levels and Well 9 being out of service due to bacteriological problems.
- WY 2009/10 - CVWD pumped below its adjudication by 640 ac-ft, which was due to Well 5 being out of service for high MTBE levels, Well 9 being out of service due to bacteriological problems, and Well 11 being out of service due to pump failure.
- WY 2010/11 - CVWD pumped below its adjudication by 368 ac-ft, which was due to Well 5 being out of service for high MTBE levels for three (3) months and decrease in water demand.
- WY 2011/12 - CVWD pumped below its adjudication by 195 ac-ft, this increase in production over previous years was due mainly to an increase in well efficiency from rehabilitation.
- WY 2012/13 - CVWD pumped below its adjudication by 368 ac-ft due to Well 1 and 12 being out of service for rehabilitation, declining well levels, and declining water demands.
- WY 2013/14 - CVWD pumped below its adjudication by 1,038 ac-ft due to Well 5, 8, 9, 11 and 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2014/15 - CVWD pumped below its adjudication by 1,265 ac-ft due to Well 10, 11 and 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2015/16 - CVWD pumped below its adjudication by 1,583 ac-ft due to Wells 9, 10, 12 & 16 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2016/17 - CVWD pumped below its adjudication by 1,953 ac-ft due to Wells 5, 8, 10, 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels

TABLE 2.1

HISTORIC AND PROJECTED WATER DEMAND (Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
4,607	4,603	3,744	3,867	3,863	3,990	4,250	4,420	4,610	4,800
ACTUAL					PROJECTED				

TABLE 3.1

HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION (Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
2,926	2,256	2,029	1,711	1,341	1,430	1,520	1,550	1,645	1,720
ACTUAL					PROJECTED				

TABLE 3.2

HISTORIC AND PROJECTED GLENWOOD NITRATE REMOVAL PLANT PRODUCTION BEFORE BLENDING (Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
488	150	186	533	246	250	300	300	300	300
ACTUAL					PROJECTED				

NOTES:

(1) The Glenwood Treatment Plant has a capacity of 2.1 MGD of blended water.

(2) The Glenwood Treatment Plant began operation January 1990.

TABLE 3.3

HISTORIC AND PROJECTED
PICKENS TUNNEL WATER PRODUCTION
(Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
61	59	58	57	53	55	55	55	55	55
ACTUAL					PROJECTED				

TABLE 3.4

HISTORIC AND PROJECTED
FMWD/MWD TREATED WATER PRODUCTION
(Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1,682	2,348	1,715	1,717	2,175	2,250	2,405	2,515	2,560	2,660
ACTUAL					PROJECTED				

TABLE 3.5

HISTORIC AND PROJECTED
GWP (Rockhaven) WELL WATER PRODUCTION
(Acre-Feet)

2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
0	0	0	259	347	313	330	360	405	420
ACTUAL					PROJECTED				

NOTES:

(1) Rockhaven Well (Well 16) was put into service in March 2016.

(2) Rockhaven Well Production to be included in GWP’s adjudicated right.

APPENDIX F

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA

1979-2017

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA
1979-80 through 2016-17
(acre-feet)

Water	San Fernando Basin*				Sylmar Basin			Verdugo Basin			ULARA
Year	Burbank	Glendale	Los Angeles	TOTAL	Los Angeles	San Fernando	TOTAL	CVWD	Glendale	TOTAL	TOTAL
2016-17	9,501	7,752	36,834	54,087	0	2,777	2,777	1,331	1,283	2,614	59,478
2015-16	9,442	7,270	73,898	90,610	683	2,766	3,448	1,704	1,172	2,876	96,935
2014-15	10,008	7,054	72,633	89,696	0	2,736	2,737	2,019	1,145	3,164	95,597
2013-14	10,150	7,241	79,768	97,158	668	3,352	4,021	2,246	1,393	3,639	104,817
2012-13	11,387	7,176	52,751	71,314	1,673	3,284	4,957	2,917	1,670	4,587	80,858
2011-12	9,997	7,876	49,273	67,145	1,093	3,202	4,295	3,090	1,982	5,073	76,513
2010-11	10,398	7,476	43,951	61,825	964	3,082	4,046	2,917	1,827	4,744	70,615
2009-10	10,048	7,935	59,958	77,941	2,544	3,143	5,687	2,645	2,135	4,780	88,408
2008-09	9,966	7,151	52,896	70,013	868	3,473	4,341	2,957	2,087	5,043	79,397
2007-08	6,816	7,411	50,009	64,236	2,997	3,670	6,667	3,270	2,687	5,957	76,860
2006-07	9,780	7,622	76,251	93,653	3,919	2,894	6,813	3,294	2,568	5,862	106,329
2005-06	10,108	7,374	38,042	55,523	2,175	2,857	5,032	3,343	2,390	5,733	66,287
2004-05	6,399	7,792	49,085	63,276	1,110	3,143	4,253	3,302	2,357	5,659	73,188
2003-04	9,660	7,282	68,626	85,568	3,033	3,454	6,487	2,568	2,117	4,685	96,740
2002-03	9,170	8,507	73,376	91,053	3,549	3,357	6,906	2,836	1,613	4,449	102,408
2001-02	10,540	6,838	66,823	84,200	1,240	3,766	5,005	3,266	2,129	5,396	94,601
2000-01	10,128	6,886	65,409	82,423	2,606	3,696	6,301	3,422	2,227	5,649	94,374
1999-00	12,547	1,023	98,016	111,586	2,634	3,807	6,441	3,699	2,727	6,426	124,453
1998-99	10,729	31	123,207	133,966	4,536	3,528	8,064	3,797	2,627	6,424	148,455
1997-98	3,964	28	85,292	89,284	3,642	3,308	6,950	3,747	2,820	6,567	102,802
1996-97	11,171	20	89,935	101,126	2,482	3,259	5,741	3,672	2,674	6,346	113,213
1995-96	8,067	26	72,286	80,379	2,766	2,985	5,752	3,705	2,133	5,838	91,969
1994-95	3,052	53	55,478	58,583	2,311	3,421	5,732	3,708	1,633	5,341	69,656
1993-94	2,773	115	60,480	63,368	2,052	3,398	5,451	3,634	1,402	5,037	73,855
1992-93	1,354	91	34,973	36,419	1,369	2,145	3,514	2,557	990	3,547	43,480
1991-92	39	489	75,684	76,213	3,292	2,826	6,118	2,631	633	3,264	85,596
1990-91	1,278	2,755	67,032	71,065	3,281	2,266	5,546	2,615	1,230	3,845	80,456
1989-90	16	1,500	79,949	81,465	2,626	2,763	5,389	2,903	1,329	4,232	91,086
1988-89	29	1,315	126,630	127,974	3,259	2,199	5,459	2,285	2,064	4,349	137,781
1987-88	30	1,020	104,419	105,470	3,133	777	3,911	2,268	2,096	4,364	113,745
1986-87	29	5,758	85,845	91,632	3,113	3,026	6,139	2,255	2,619	4,874	102,645
1985-86	123	5,819	80,963	86,904	3,075	3,166	6,241	2,075	3,418	5,493	98,639
1984-85	2,863	3,086	95,641	101,591	3,130	3,102	6,232	1,997	3,837	5,834	113,657
1983-84	1,063	1,708	112,840	115,611	3,106	3,907	7,013	2,009	3,551	5,560	128,184
1982-83	2,187	1,028	65,178	68,394	3,048	3,133	6,181	1,759	3,427	5,187	79,761
1981-82	523	952	83,207	84,682	3,486	3,290	6,775	1,876	3,732	5,607	97,065
1980-81	595	1,129	91,067	92,791	4,117	3,380	7,497	2,140	2,122	4,262	104,550
1979-80	677	934	57,304	58,915	3,111	2,991	6,102	1,873	1,434	3,307	68,325
Average	5,963	4,093	72,500	82,556	2,439	3,088	5,527	2,746	2,139	4,885	92,968

*Includes municipal pumping only.