Appendix A
Scoping Report

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA
GROUNDWATER BASINS MASTER PLAN PROGRAM EIR

Scoping Report

Introduction and Master Plan Overview

The Water Replenishment District of Southern California (WRD) is the Lead Agency for the proposed Groundwater Basins Master Plan Program Environmental Impact Report (PEIR). The Groundwater Basins Master Plan (GBMP) identifies potential programs and management actions that would enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers under the respective Judgments for the Basins for the foreseeable future. The Master Plan also identifies potential programs and actions that would increase local groundwater supplies, improve water quality, and reduce dependence on imported water.

The GBMP includes results of groundwater modeling that evaluate both West Coast and Central Basins' physical storage capacities under numerous recharge and extraction scenarios involving different sets of projects to expand or modify recharge and extraction activities. The combinations of recharge and extraction scenarios envisioned in the groundwater model provide a menu of opportunities to meet future groundwater management priorities. The projects included in these scenarios would be implemented by WRD and/or other agencies and entities in coordination with WRD. The GBMP is a regional plan to more effectively manage and optimize the groundwater resources of southern Los Angeles County in concert with local stakeholders.

Master Plan Goals and Objectives:

- Provide adequate replenishment water supplies to meet the future needs of groundwater pumpers
- Improve the reliability of the replenishment supplies by reducing and eventually eliminating the current use of imported water for basin replenishment
- Improve groundwater quality
- Enhance the ability of both basins to sustainably store and deliver water supplies

Master Plan Concepts

The Master Plan identifies two programmatic levels of future groundwater replenishment and extraction as the basis for the master planning effort: meet the water rights and adjudicated pumping limits (Concept A), and provide for additional groundwater basin storage and recovery above current adjudicated levels (Concept B). The Draft GBMP uses a stepwise approach to developing additional water supply to meet each of these two target replenishment and extraction concepts through enhanced utilization of the Basins. The Draft GBMP develops and evaluates strategies that can be combined into alternatives that would satisfy the goals firstly of Concept A and subsequently of Concept B.

Notice of Preparation

Pursuant to Section 15082 of *CEQA Guidelines*, the lead agency is required to send a Notice of Preparation (NOP) stating that an EIR will be prepared to the State Office of Planning and Research (OPR), responsible and

trustee agencies, and federal agencies involved in funding or approving the project. The NOP must provide sufficient information in order for responsible agencies to make a meaningful response. At a minimum, the NOP must include a description of the project, location of the project, and probable environmental effects of the project (*CEQA Guidelines*, Section 15082(a)(1)). Within 30 days after receiving the NOP, responsible and trustee agencies and OPR shall provide the lead agency with specific detail about the scope and content of the environmental information related to that agency's area of statutory responsibility that must be included in the draft EIR (*CEQA Guidelines*, Section 15082(b)).

On September 14, 2012, a NOP for the proposed project was submitted to the Los Angeles County Clerk and OPR, and distributed to Responsible and Trustee Agencies and other interested parties for a 30-day review period that ended October 15, 2012 (see Attachment 1). A Notice of Completion (NOC) was also prepared by WRD and sent to the State Clearinghouse (see Attachment 2). The NOP was mailed to approximately 210 interested parties, including local, state, and federal agencies and groups or individuals who had expressed interest in the project. Copies of the NOP were made available for public review on the WRD website (http://www.wrd.org) and at the WRD offices located at 4040 Paramount Drive, Lakewood, CA 90712.

Scoping Meeting

Pursuant to *CEQA Guidelines* Section 15083, a lead agency may initiate public consultation regarding potential environmental impacts associated with the proposed project. If a project is determined to have statewide, regional, or areawide significance, the lead agency is required to conduct at least one scoping meeting to gauge the range of actions to be analyzed in the draft EIR pursuant to *CEQA Guidelines* Section 15206. The Southern California Association of Governments identified the proposed project as regionally significant per Sections 15206 and 15125 (see NOP comment letter in Attachment 6).

WRD held one public scoping meeting on September 27, 2012, during the 30-day NOP public review period, at their District Offices on 4040 Paramount Drive, Lakewood, CA 90712. WRD placed one public notice advertising the scoping meeting and announcing the availability of the NOP in the Los Angeles Times on September 20, 2012 (see Attachment 3). The NOP itself also included information about the scoping meeting. The Scoping Meeting Presentation (Attachment 4), Sign-In Sheets (Attachment 5), and summary of verbal comments made at the meeting (Attachment 7) are found in this report.

The next formal opportunity for the public to comment on the proposed project will occur when the Draft PEIR is distributed for a 45-day review period, which is currently anticipated to occur sometime in spring 2013.

NOP Comments

During the 30-day NOP public review period, WRD received six comment letters via mail and e-mail (see Attachment 6) and received verbal comments at the public scoping meeting (see Attachment 7). Table A-1 lists the comments that were received via mail and email.

TABLE A-1
NOP COMMENTS RECEIVED VIA MAIL AND EMAIL

	Agency/Affiliation	Name of Individual	Date of Comment Received
State Agencies			
1	California Department of Transportation District 7	Le Chen	October 11, 2012
Local Agencies			
2	Metropolitan Water District of Southern California	Deirde West	October 8, 2012
3	Cities of Cerritos, Downey, and Signal Hill (Aleshire & Wynder LLP)	Patricia J. Quilizapa	October 15, 2012
4	Los Angeles County Department of Public Works	Ruben Cruz	October 15, 2012
5	Los Angeles County Sanitation District	Mike Sullivan	October 15, 2012
6	Southern California Association of Governments	Jonathan Nadler	October 15, 2012

Areas of Controversy

Pursuant to Section 15123(b)(2) of the *CEQA Guidelines*, a lead agency is required to include areas of controversies raised by agencies and the public during the public scoping process in the EIR. Areas of controversy have been identified for the GBMP based on comments made during the 30-day public review period in response to information published in the NOP. Commenting parties have requested more detailed information on baseline conditions in West Coast and Central Basins, specifically related to pumper utilization, safe yield, and current storage space available. Commenting parties have expressed concern regarding transparency of the groundwater modeling system, specifically related to validity of groundwater replenishment levels and associated risks of rising levels on surrounding communities.

Commenting parties have requested more specific information on facilities proposed as part of the GBMP, such as location, size, and description of proposed wells, pipelines, pump stations, spreading basins, and treatment plant upgrades. Concerns also have been raised regarding the legitimacy of WRD as lead agency for the proposed project and the proposed project's effects on the California Department of Transportation (Caltrans) I-105 Freeway dewatering facility. Comments requested that the EIR address potential impacts from recharge activities on current groundwater levels and underground utilities located in the I-105 freeway area.

Attachments to this Report

This Scoping Report contains documents pertinent to the scoping process. The following items are included:

Attachment 1: Notice of Preparation
Attachment 2: Notice of Completion
Attachment 3: Proof of Publication of Public Notices
Attachment 4: Scoping Meeting Presentation
Attachment 5: Scoping Meeting Sign-In Sheet
Attachment 6: Comment Letters Received by WRD
Attachment 7: Scoping Meeting Comments

Attachment 1
Notice of Preparation

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Notice of Preparation

Date September 13, 2012

To: Responsible and Trustee Agencies and Interested Parties

Subject: Notice of Preparation of a Program Environmental Impact Report

Project: Groundwater Basins Master Plan (GBMP)

Lead Agency: Water Replenishment District of Southern California

Review Period: September 14, 2012 through October 15, 2012

This Notice of Preparation (NOP) has been prepared to notify agencies and interested parties that the Water Replenishment District of Southern California (WRD) is preparing a Program Environmental Impact Report (PEIR) pursuant to the California Environmental Quality Act (CEQA) for its proposed Groundwater Basins Master Plan (Master Plan or GBMP). WRD was formed in 1959 for the purpose of protecting the groundwater resources of the West Coast and Central groundwater basins. WRD manages groundwater for nearly four million residents within its 420-square-mile service area (see attached Figure 1), which includes 43 cities in southern Los Angeles County. WRD protects the basins and ensures that a reliable supply of high-quality groundwater is available to local water pumpers through groundwater replenishment, deterrence of sea water intrusion, and groundwater quality monitoring.

The Master Plan identifies potential programs and management actions that will enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers under the respective Judgments for the Basins for the foreseeable future. The Master Plan also identifies potential programs and actions that can increase local groundwater supplies, improve water quality, and reduce dependence on imported water.

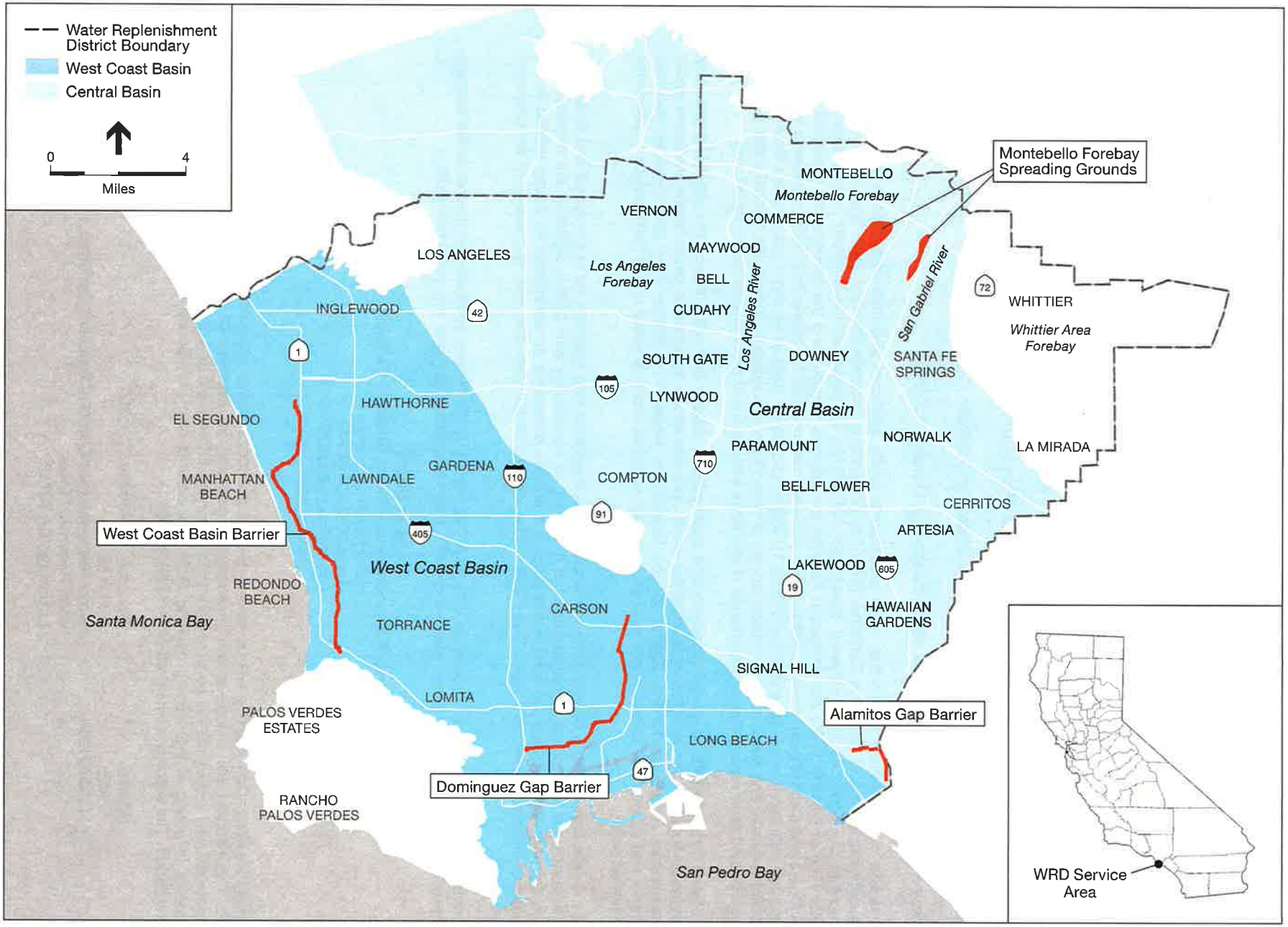
Public Comments: WRD is soliciting the views of interested persons and agencies as to the scope and content of the environmental information to be evaluated in the PEIR. In accordance with CEQA, agencies are requested to review the project description provided in this NOP and provide comments on environmental issues related to the statutory responsibilities of the agency. The PEIR will be used by WRD when considering approval of the proposed Master Plan.

We request that comments be received no later than October 15, 2012. Please send your comments to the address shown below. Please include a return address or email address and contact name with your comments.

Jason Weeks
Water Replenishment District of Southern California
4040 Paramount Drive
Lakewood, CA 90712
(562) 921-5521
jweeks@wrd.org

Scoping Meeting: One meeting will be held to receive public comments regarding the scope and content of the PEIR. The meeting will include a brief presentation providing an overview of the proposed project. After the presentation, oral comments will be accepted. Written comment forms will be supplied for those who wish to submit comments in writing at the scoping meeting. Written comments also may be submitted anytime during the NOP review period. The scoping meeting will be held as follows:

DATE: Thursday, September 27, 2012
TIME: 4:00 P.M.
LOCATION: Water Replenishment District of Southern California
4040 Paramount Drive
Lakewood, CA 90712



SOURCE: ESA, 2012.

WRD Groundwater Basins Master Plan NOP . 120192

Figure 1
WRD Service Area and Replenishment Facilities

1. Water Replenishment District Background

WRD is the Lead Agency, the agency with primary responsibility for carrying out and/or approving the Master Plan. WRD's service area encompasses 420-square miles in southern Los Angeles County, California and includes both the West Coast Groundwater Basin and Central Groundwater Basin. Figure 1 provides a map of the WRD service area, primary geographic features, and groundwater basins.

1.1 West Coast and Central Groundwater Basins

In the early 1960s, groundwater rights were adjudicated in both the West Coast and Central Basins. Annual pumping had exceeded the natural safe yield of the basins as determined by the State Department of Water Resources. The natural safe yield is the amount that can be withdrawn from the aquifer without adverse affect, after considering natural replenishment from runoff and precipitation. As a result of the excessive pumping, groundwater levels had declined, groundwater was lost from storage, and seawater had intruded into the coastal aquifers. To remedy this problem the courts issued Judgments that adjudicated the two basins to put a limit on pumping. The West Coast Basin adjudication of pumping rights set total maximum annual groundwater pumping at 64,468 acre-feet per year (AFY). The Central Basin adjudication of pumping rights was set at a total maximum of 267,900 AFY, although the Judgment set a lower allowable pumping allocation (APA) of 217,367 AFY to impose stricter control.

The adjudicated pumping amounts are greater than the natural replenishment of the groundwater basins, creating an annual deficit or annual overdraft. WRD is enabled under the California Water Code to purchase and recharge additional water to make up the overdraft, which is known as artificial replenishment or managed aquifer recharge. WRD has the authority to levy a replenishment assessment on all pumping within the District to raise the monies necessary to purchase the artificial replenishment water and to fund projects and programs necessary for replenishment and groundwater quality management activities.

Over the past ten years, average annual pumping in the West Coast Basin has been 42,000 AFY, which is approximately two-thirds of adjudicated rights, or about 22,500 AFY less than the adjudicated limit. Similarly, in the Central Basin, average annual pumping has been 195,000 AFY, which also is about 22,500 AFY less than the adjudicated limit. As costs of imported water increase in the future, pumpers will likely increase use of groundwater to meet local demands. WRD is responsible for ensuring that groundwater replenishment is sufficient to accommodate the additional 40,000 – 45,000 AFY of future extraction in the West Coast and Central Basins that is allowed under the existing adjudicated rights.

In 2009, motions were filed in court to amend both basin Judgments to allow additional water storage. The amendments include provisions that would allow implementation of water augmentation projects whereby recharge and extraction volumes could be matched within an established timeframe utilizing storage capacity that would allow pumping beyond adjudicated rights, essentially increasing the recharge and extraction capacities of the basins. Final decisions on the amendments are pending.

1.2 Existing Operations and Facilities

Groundwater replenishment in the Central Basin is achieved via surface spreading at the Whittier Narrows Dam and Montebello Forebay Spreading Grounds (MFSG), infiltration in the Lower San Gabriel River, and via direct injection at the Alamitos Barrier Project (ABP) (see Figure 1). The MFSG consists of two separate facilities located downstream of the Whittier Narrows Dam: the Rio Hondo Coastal Spreading Grounds (RHSG), adjacent to the Rio Hondo, and the San Gabriel Coastal Spreading Grounds (SGSG), adjacent to the San Gabriel River channel. The RHSG consists of off-channel facilities and the SGSG consists of both off-channel spreading grounds and unlined portions of the river. The MFSG is owned and operated by the Los Angeles County Flood Control District (LADFCD) for the purposes of storm water conservation and flood control. These spreading grounds have been used to recharge storm water since the late 1930s. Imported water was added in the 1950s, and recycled water in the 1960s, to maximize replenishment of the Central Basin during times when there are no storm events. The AGBP is a seawater intrusion barrier that injects imported (provided by the City of Long Beach) and advanced-treated recycled water (provided by the Water Replenishment District of Southern California) into 43 wells located along the coastal border between Los Angeles and Orange Counties. It has been in operation since 1964. The barrier system is owned, operated, and maintained by Los Angeles County Department of Public Works.

Groundwater replenishment in the West Coast Basin is performed exclusively through injection at two seawater intrusion barrier systems. In addition, some replenishment water travels from spreading grounds in the Central Basin to the West Coast Basin from groundwater movement across the Newport-Inglewood Fault Zone. The West Coast Basin Barrier Project (WCBBP) consists of over 150 injection wells located along the west coast of the Los Angeles County Coastal Plain south of Los Angeles International Airport. It has been in operation since 1953 and utilizes both imported and advanced-treated recycled water provided by the West Basin Municipal Water District. The Dominguez Gap Barrier Project (DGBP) consists of 94 injection wells spaced over four miles along the Dominguez Channel. It has been in operation since 1969 and also utilizes both potable and recycled water, provided by the City of Los Angeles. Both barrier systems are shown in Figure 1. The barrier systems are owned, operated, and maintained by Los Angeles County Department of Public Works.

1.3 Existing Water Pumpers

Existing pumpers in the West Coast and Central Basins are comprised of both private and public entities, representing investor-owned utilities, Los Angeles County, municipalities, mutual water companies, oil companies, private entities, school districts, special districts, and the State of California. Within Central Basin there are 128 pumpers with water rights and in West Coast Basin there are 56.

2. Groundwater Basins Master Plan

WRD has developed the Draft GBMP, in coordination with other basin stakeholders, to identify and evaluate a range of projects and opportunities for meeting replenishment requirements of the West Coast and Central Basins to ensure that sufficient groundwater is available in the future to overlying pumpers pursuant to the adjudicated water rights. The GBMP also evaluates opportunities to enhance water

supplies and reduce reliance on imported water in order to improve the long-term reliability and sustainability of the replenishment supplies.

The GBMP includes results of groundwater modeling that evaluate both Basins' physical storage capacities under numerous recharge and extraction scenarios involving different sets of projects to expand or modify recharge and extraction activities. The combinations of recharge and extraction scenarios envisioned in the groundwater model provide a menu of opportunities to meet future groundwater management priorities. The projects included in these scenarios would be implemented by WRD and/or other agencies and entities in coordination with WRD. The GBMP is a regional plan to more effectively manage and optimize the groundwater resources of southern Los Angeles County in concert with local stakeholders.

2.1 Goals and Objectives

The primary goals of the Draft GBMP are to provide adequate replenishment water supplies to meet the future needs of groundwater pumpers, improve the reliability of the replenishment supplies by reducing and eventually eliminating the current use of imported water for basin replenishment, improve groundwater quality, and enhance the ability of both basins to sustainably store and deliver water supplies. The Master Plan identifies several approaches to enhance utilization of both basins by strategically locating and managing groundwater pumping and extraction to increase and optimize the long-term, sustainable replenishment and extraction of groundwater.

2.2 Master Plan Concepts

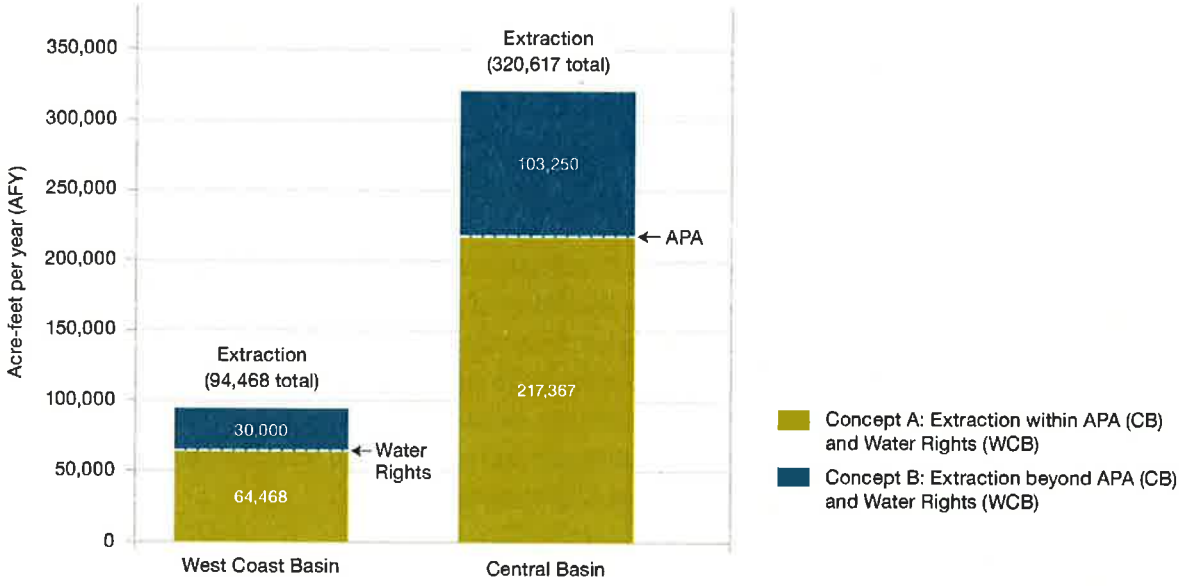
The Master Plan identifies two programmatic levels of future groundwater replenishment and extraction as the basis for the master planning effort: meet the water rights and adjudicated pumping limits (Concept A), and provide for additional groundwater basin storage and recovery above current adjudicated levels (Concept B). The Draft GBMP uses a stepwise approach to developing additional water supply to meet each of these two target replenishment and extraction concepts through enhanced utilization of the Basins. The Draft GBMP develops and evaluates strategies that can be combined into alternatives that would satisfy the goals firstly of Concept A and subsequently of Concept B.

Concept A: Maximize Water Rights

The adjudicated extraction limit for the West Coast Basin is 64,468 AFY and for the Central Basin is 217,367 AFY. It is WRD's responsibility to ensure these limits can be extracted by the water rights holders. Management actions and projects that allow for basin replenishment and extraction up to the current adjudicated limits are developed in Concept A. Natural replenishment is approximately 24,468 AFY in the West Coast Basin. WRD would need to replenish approximately 40,000 AFY on average in order to meet the requirements for extraction of 64,468 AFY in the West Coast Basin. In the Central Basin, natural replenishment is approximately 71,337 AFY. Approximately 146,000 AFY would need to be replenished in the Central Basin in order to meet the requirements for extraction of 217,367 AFY. In both basins, WRD would need to replenish an additional 22,500 AFY relative to existing conditions in order to allow for extractions up to the adjudicated limits. A summary of extraction and replenishment

opportunities to meet Concept A requirements in both basins are shown in Table 1. Target extractions are shown in Figure 2.

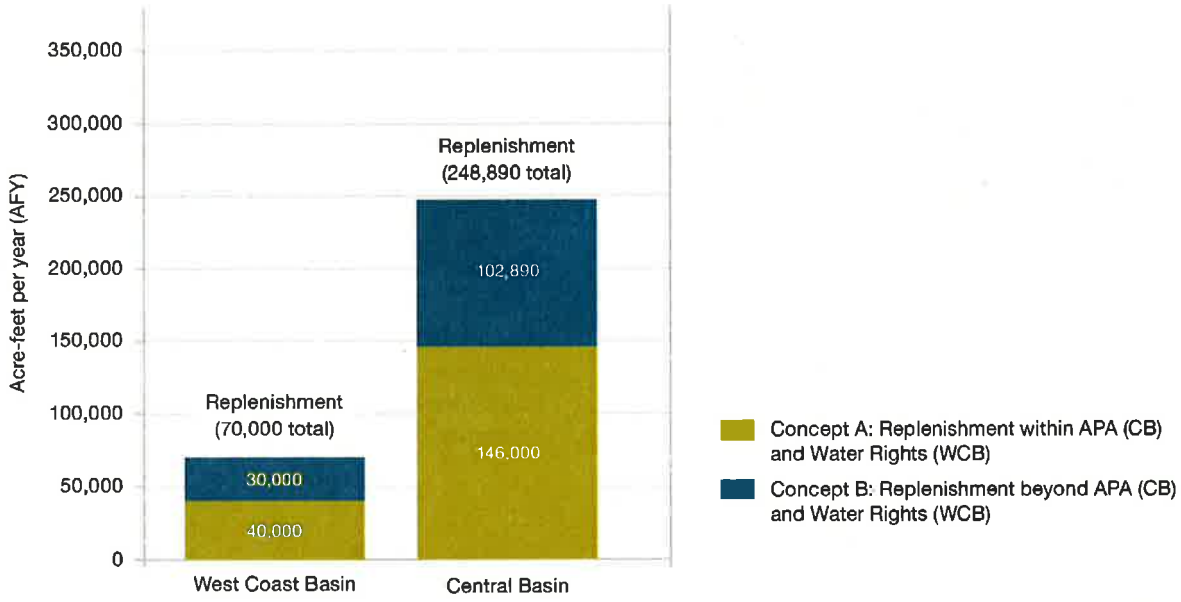
Figure 2
Concept A and Concept B Extraction Targets for the West Coast and Central Basins



Concept B: Basin Augmentation

Concept B would provide for placement of additional water in the ground, allowing for possible extraction of up to 30,000 AFY above the current West Coast Basin adjudication, or a total of 94,468 AFY. In the Central Basin, Concept B would ultimately minimize if not eliminate reliance on imported water use for the service area overlying the basin. The target extraction volume of approximately 320,617 AFY is about 103,250 AFY above the current APA. Target extractions are summarized in Figure 2; target replenishment amounts are shown in Figure 3.

Figure 3
Concept A and Concept B Replenishment Targets for the West Coast and Central Basins



Planning Scenarios and Projects

The Draft GBMP provides an analysis of planning scenarios that combine projects and management actions that would achieve target replenishment and extraction volumes for both basins under Concepts A and B. The analysis includes results of groundwater modeling efforts that evaluate potential physical impacts of each planning scenario. The Draft GBMP provides a screening analysis that ultimately identifies a menu of projects that could be implemented to achieve goals associated with Concepts A and B in each basin. These projects would involve construction of facilities such as wells, pipelines, pump stations, spreading basins, and treatment plant upgrades within the following general locations:

- the Montebello Forebay
- the Los Angeles Forebay
- the existing injection barriers along the coast including WCBBP, DGBP, and ABP
- inland areas of the West Coast Basin where the legacy salinity plume currently impedes groundwater production

Projects would be implemented by local water agencies in coordination with WRD. The locations of some existing and proposed facilities associated with the project alternatives are shown in Figure 1.

The Draft GBMP planning scenarios for the West Coast and Central Basins comprise three fundamental components: water supply sources, groundwater recharge mechanisms, and pumping patterns. These three components then lead to distinct infrastructure projects as shown below:

West Coast Basin

Management Strategies: The principal management strategies for the West Coast Basin include the following:

- Provide replenishment necessary to support pumping at water rights (64,468 AFY) for Concept A and increase injection to allow for extraction above water rights up to 94,468 AFY for Concept B.
- Increase replenishment at existing barriers using recycled water.
- Shift oil refineries from current groundwater pumping to recycled water so that municipal purveyors can increase groundwater pumping for potable use.
- Adjust pumping pattern to maximize containment and removal of saline plumes.
- Assess potential to stop injection into the Lower San Pedro aquifer and extract instead while maintaining adequate protection from saline intrusion.

Planning Scenario Components:

- **Water supplies:** Increase use of recycled water. Storm water is not a viable supply due to the lack of viable spreading locations.
- **Recharge mechanisms:** Increase use of injection wells. Existing injections systems may be expanded and new inland injection systems could be installed.
- **Pumping patterns:** Replace industrial extractions with recycled water and increase treatment for wells within the saline plume.

Shifting groundwater use from industrial uses to municipal uses and containing and ultimately removing the saline plume in the Silverado Aquifer are key management priorities. Additional recycled water could be provided by regional treatment plants, such as the City of Los Angeles' Hyperion Treatment Plant and Terminal Island Water Reclamation Plant; the West Basin Municipal Water District's Edward C. Little Water Reclamation Facility; and the Los Angeles County Sanitation Districts (LACSD) Joint Water Pollution Control Plant (JWPCP). Capacity expansion and treatment upgrade projects may be required at these plants to support increasing demand for recycled water. New pipelines and pump stations would be required to connect treatment plants to existing and proposed injection wells. Increased extraction would require expansion of existing production wells, development of new wells/well fields, installation of wellhead treatment facilities where necessary due to water quality, and development of new desalter wells to contain and remove the saline plume in the Silverado Aquifer. New conveyance pipelines would be required to connect new extraction wells to end users.

Central Basin

Management Strategies: The principal management strategies for the West Coast Basin include the following:

- Replenish Central Basin within the current APA of 217,367 AFY for Concept A and up to 320,617 AFY for Concept B
- Further develop local water sources, principally storm water and recycled water in order to offset imported water supplies
- Maximize use of supplies and spreading grounds in Montebello Forebay
- Provide for increased pumping to offset imported water demands consistent with increased replenishment
- Maintain an overall water balance in the basin
- Use groundwater basin storage space as required to meet objectives

Planning Scenario Components:

- **Water Supplies:** Increase use of recycled water for injection and storm water and recycled water for spreading.
- **Recharge Mechanisms:** Increase use of spreading basins and injection wells. New injection wells could be installed in the Los Angeles Forebay.
- **Pumping Patterns:** Increase pumping near recharge areas.

Recycled water would be produced at regional treatment plants, such as LACSD's San Jose Creek Water Reclamation Plant, Los Coyotes Water Reclamation Plant, and Long Beach Water Reclamation Plant, and/or a potential new satellite advanced water treatment plant. Capacity expansion and treatment upgrade projects may be required at these plants to support increasing demand for recycled water. New pipelines and pump stations would be required to connect treatment plants to existing spreading grounds and potential new spreading and injection facilities at the MFSG and within the Los Angeles Forebay. Storm water from the San Gabriel River and the Rio Hondo that currently bypasses the MFSG following large storm events would be captured and used for recharge. Storm flows from the Los Angeles River that

are wasted to the ocean also would be captured and used as a replenishment source in the Los Angeles Forebay.

Increased recharge in the Central Basin would occur by increased spreading of recycled water or storm water at the existing MFSG, injection of recycled water at new proposed wells in the Montebello Forebay, surface spreading and injection of storm water and/or recycled water in the Los Angeles Forebay at a proposed Aquifer Recharge and Recovery Facility (ARRF) along the Los Angeles River, and injection of recycled water at a new inland wellfield in the Los Angeles Forebay. The ARRF project would first treat storm water using a soil aquifer treatment system in the shallow aquifer and then recover (pump) the treated water for subsequent injection through a vadose zone infiltration conduit into the lower confined aquifer for replenishment.

To achieve the goals for Concept A in the Central Basin no new extraction facilities are required. To achieve goals for Concept B, new extraction wells may be developed in the vicinity of the MFSG, Los Angeles River ARRF, and/or the proposed inland wellfield. At the MFSG, extraction wells would allow additional pumping in the Montebello Forebay area to reduce groundwater levels and allow additional storm water to be captured and recharged. New conveyance pipelines would be required to connect new extraction wells to end users. At the proposed ARRF, extraction wells would allow groundwater to be pumped after soil aquifer treatment in the shallow aquifer for subsequent injection into the lower confined aquifer.

Implementation Considerations

Implementation of the GBMP would be influenced by future actions affecting groundwater management that involve multiple stakeholders and community interests. The following list provides a summary of issues affecting implementation of the GBMP:

- *New Recycled Water Regulations*. In particular, there are two significant regulatory activities currently under development that will affect recycled water projects in California: the California Department of Public Health Draft Recharge Regulations and the Water Recycling Act of 2012. These new regulations will affect planning, design, and implementation of potable reuse projects.
- *Groundwater Reliability Improvement Project*. WRD and the Los Angeles County Sanitation Districts are jointly developing an indirect potable reuse project in the Montebello Forebay and surrounding areas that could increase recycled water recharge by approximately 21,000 AFY.
- *Recycled Water Flow Availability*. The availability of recycled water from local treatment facilities will continue to be a guiding factor for placement and size of recycled water replenishment projects.
- *Storm Water Availability*. The availability of storm flows may change in the future and could affect storm flow management.
- *Montebello Forebay Spreading Grounds Capacity*. A limiting factor for recharge into the Central basin may be the capacity of the Montebello Forebay Spreading Grounds.
- *Salt and Nutrient Management Plan*. WRD is currently developing a Salt and Nutrient Management Plan in partnership with local stakeholders pursuant to the State's Recycled Water

Policy. Management actions identified in this plan will influence implementation of recharge and extraction projects.

- *West Coast Basin Flow and Transport Model.* West Basin Municipal Water District and WRD are in the process of improving the West Coast Basin model, which may affect locations of groundwater injection and extraction wells and management actions.
- *Public and Stakeholder Participation.* Review of the GBMP from local stakeholders may result in modifications to projects and planning scenarios.
- *Replenishment Assessment.* Costs of implementing projects will be evaluated by local stakeholders and WRD as details are developed. Implementation and operational costs are key factors in considering implementation of any project envisioned in the GBMP.
- *Potential Judgment Amendments.* The resolution of the Judgment Amendments will affect the ability for WRD to pursue Concept B.

Potential Environmental Impacts

WRD, as lead agency, is considering having the PEIR evaluate the following impacts.

The PEIR will focus on potential effects to the aquifers within both groundwater basins that could result from implementation of the projects and management actions identified in each planning scenario. The PEIR will also assess the physical changes to the environment that would likely result from implementation of the GBMP including the construction and operation of infrastructure projects, including direct, indirect and cumulative impacts. Potential impacts are summarized below. The PEIR will identify mitigation measures if necessary to minimize potentially significant impacts of the proposed project. In addition, the PEIR will include an Alternatives Analysis and explain the alternatives screening conducted as a part of development of the GBMP.

Groundwater

Implementation of the GBMP would likely result in increased replenishment and extraction. Such activities could affect groundwater levels and water quality. The PEIR will identify mitigation measures if necessary to ensure that potentially necessary significant impacts are reduced or avoided.

Aesthetics

Views in the WRD service area are as variable as land uses. Implementation of the GBMP would promote construction of aboveground facilities, such as spreading basins, injection wells, and pump stations. The PEIR will evaluate the potential for such facilities to affect aesthetic resources, including scenic vistas and views, local character, and light and glare.

Air Quality and Greenhouse Gas Emissions

Construction of the facilities needed to implement the GBMP would generate emissions from construction equipment exhaust, earth movement, construction workers' commute, and material hauling. Operation of new facilities would potentially generate emissions associated with energy use. The PEIR will evaluate the effects of construction and operational activities on air quality and greenhouse gas emissions and also will develop mitigation measures if necessary to reduce potential impacts.

Biological Resources

The GBMP could result in construction of facilities in open space or natural areas, as well as in urbanized areas. The PEIR will evaluate the potential for such facilities to impact biological resources and will also discuss local ordinances and state and federal regulations governing biological resources.

Cultural Resources

The GBMP would require construction of new facilities both above- and below-ground. As a result, previously unknown archaeological or paleontological resources could be encountered during ground disturbance and excavation. Furthermore, historic resources may exist near proposed infrastructure. The PEIR will assess the potential effects of the GBMP on cultural resources, including archaeological, paleontological, and Native American resources. Mitigation measures will be identified if necessary to reduce the level of impact where possible.

Geology, Soils and Seismicity

Southern Los Angeles County is a seismically active region. The GBMP would require construction of new facilities that could be subject to potential seismic and geologic hazards including ground shaking, liquefaction, expansive soils, and landslides. The PEIR will identify mitigation measures if necessary to reduce potential adverse effects to proposed facilities.

Hazards and Hazardous Materials

Excavation during construction of new facilities could uncover contaminated soils or hazardous substances that pose a substantial hazard to human health or the environment. The PEIR will assess the potential for encountering such hazards and identify mitigation measures, if necessary, to ensure that any hazards encountered during construction would be handled in accordance with applicable regulations.

Hydrology and Water Quality

Implementation of the GBMP may change local drainage patterns at construction sites, which could affect the volume and quality of surface runoff that in turn could affect local surface water resources. The PEIR will identify storm water quality protection measures required during construction and operation of proposed facilities. The PEIR also will evaluate potential impacts to flood control capacity and develop mitigation strategies if necessary to avoid significant impacts.

Land Use and Recreation

Implementation of the GBMP would include new, upgraded, and expanded water supply infrastructure throughout WRD's service area. The PEIR will evaluate the compatibility of the proposed facilities with existing and planned land uses within the service area.

Noise

Implementation of the GBMP would require construction of new facilities that would potentially generate noise and vibration. The PEIR will analyze potential noise sources and evaluate the proximity of sensitive receptors to project components. The PEIR will recommend mitigation strategies to ensure that projects implemented by local water agencies comply with local noise policies and ordinances.

Population and Housing / Growth Inducement

Implementation of the GBMP would enhance reliability of local water supplies for water users within WRD's service area. The PEIR will describe the relationship of water supply to population growth in the service area. The PEIR will identify current population and employment projections and identify local planning jurisdictions with the authority to approve growth and mitigate secondary effects of growth.

Public Services

Implementation of the GBMP is unlikely to affect demand for public services, or, by itself, to require new or expanded facilities for public service providers. The PEIR will, however, assess the potential for the GBMP to affect police and fire protection services, schools, parks and recreational facilities, such that new or expanded buildings or structures may be required that would, in turn, affect the environment.

Traffic and Transportation

Construction of new facilities associated with the GBMP could affect traffic on local roadways due to vehicle trips associated with hauling of material and equipment. The PEIR will evaluate the potential for additional construction vehicles, lane closures, or road closures to impact traffic and circulation. The PEIR will identify mitigation strategies to reduce any potential effects.

Utilities and Energy

Implementation of the GMBP would result in increased use of recycled water treatment facilities, wellhead treatment facilities, pump stations, injection wells and extraction wells, which would increase the amount of energy required locally to achieve regional water supply goals. However, the increased local energy use would offset energy requirements of importing water. The PEIR will evaluate energy consumption and compare the proposed energy use with existing imported water energy demands.

The GBMP proposes a shift in water supply sources that would reduce dependence on imported water supplies and increase local management responsibilities. The PEIR will evaluate the potential effects of this shift on local water and wastewater utilities.

Attachment 2
Notice of Completion

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # _____

Project Title: Groundwater Basins Master Plan

Lead Agency: Water Replenishment District of Southern California | Contact Person: Jason Weeks

Mailing Address: 4040 Paramount Drive | Phone: (562) 921-6101

City: Lakewood | Zip: 90712 | County: Los Angeles

Project Location: County: Los Angeles | City/Nearest Community: Greater Los Angeles Area

Cross Streets: _____ | Zip Code: _____

Lat. / Long.: ____ ° ____ ′ ____ ″ N/ ____ ° ____ ′ ____ ″ W | Total Acres: _____

Assessor's Parcel No.: _____ | Section: _____ | Twp.: _____ | Range: _____ | Base: _____

Within 2 Miles: State Hwy #: 1, 19, 42, 47, 72, 91 | Waterways: Los Angeles River, San Gabriel River

Airports: LAX | Railways: _____ | Schools: _____

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) _____ Other _____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other _____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational _____
☐ Recreational _____

☒ Water Facilities: Type groundwater MGD _____
☐ Transportation: Type _____
☐ Mining: Mineral _____
☐ Power: Type _____ MW _____
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☐ Other: _____

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☐ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☒ Geologic/Seismic
☐ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☐ Soil Erosion/Compaction/Grading
☐ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☐ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☐ Wetland/Riparian
☐ Wildlife
☐ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☒ Other Utilities/Energy

Present Land Use/Zoning/General Plan Designation:

Various

Project Description: *(please use a separate page if necessary)*

The Master Plan identifies potential programs and management actions that will enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers under the respective Judgments for the Basins for the foreseeable future. The Master Plan also identifies potential programs and actions that can increase local groundwater supplies, improve water quality, and reduce dependence on imported water.

Note: The state Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

_____	Air Resources Board	_____	Office of Emergency Services
_____	Boating & Waterways, Department of	x	Office of Historic Preservation
_____	California Highway Patrol	_____	Office of Public School Construction
_____	CalFire	_____	Parks & Recreation
x	Caltrans District # _____	_____	Pesticide Regulation, Department of
_____	Caltrans Division of Aeronautics	_____	Public Utilities Commission
_____	Caltrans Planning (Headquarters)	x	Regional WQCB # _____
_____	Central Valley Flood Protection Board	x	Resources Agency
_____	Coachella Valley Mountains Conservancy	_____	S.F. Bay Conservation & Development Commission
_____	Coastal Commission	_____	San Gabriel & Lower L.A. Rivers and Mtns Conservancy
_____	Colorado River Board	_____	San Joaquin River Conservancy
x	Conservation, Department of	_____	Santa Monica Mountains Conservancy
_____	Corrections, Department of	x	State Lands Commission
_____	Delta Protection Commission	_____	SWRCB: Clean Water Grants
_____	Education, Department of	x	SWRCB: Water Quality
_____	Energy Commission	x	SWRCB: Water Rights
x	Fish & Game Region # _____	_____	Tahoe Regional Planning Agency
_____	Food & Agriculture, Department of	x	Toxic Substances Control, Department of
_____	General Services, Department of	x	Water Resources, Department of
x	Health Services, Department of		
_____	Housing & Community Development	_____	Other _____
_____	Integrated Waste Management Board	_____	Other _____
x	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date September 14, 2012 Ending Date October 15, 2012

Lead Agency (Complete if applicable):

Consulting Firm: Environmental Science Associates
Address: 626 Wilshire Blvd.
City/State/Zip: Los Angeles/CA/90017
Contact: Jennifer Jacobus
Phone: (213) 599-4300

Applicant: _____
Address: _____
City/State/Zip: _____
Phone: _____

Signature of Lead Agency Representative: Jennifer Jacobus **Date:** 9/13/2012

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Attachment 3

Proof of Publication of Public Notices

RECORDING/FILING REQUESTED BY AND MAIL TO:
Environmental Science Assoc.
626 Wilshire Blvd
Ste 1100
Los Angeles, CA 90017

PROOF OF PUBLICATION
(California Code of Civil Procedure 2010, 2015.5)

STATE OF CALIFORNIA
County of Los Angeles

I am a citizen of the United States and a resident of the aforesaid County. I am over the age of eighteen years (18) years, and not a party to or interested in the above-entitled matter. I am the Principal Clerk of the printer of the **LOS ANGELES TIMES,** a newspaper of general circulation, printed and published DAILY in the City of Los Angeles, County of Los Angeles and which newspaper was adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, under the date of April 28, 1952, Case Number 598599. The notice, a true and correct copy of which is annexed, has been published in each regular and entire issue of said newspaper on the following dates, to wit:

THURSDAY; SEPTEMBER 20, 2012

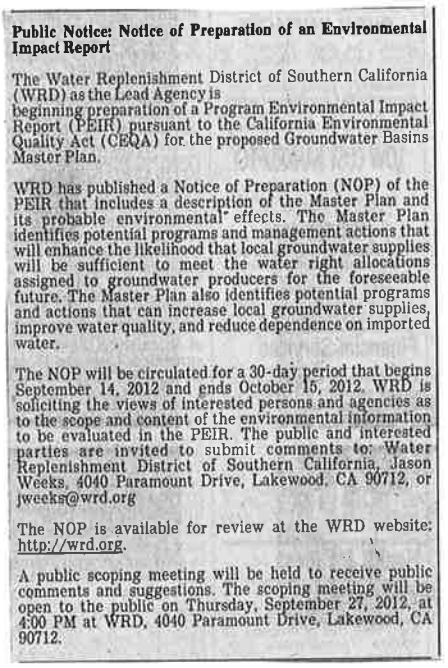
I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated at Los Angeles, California,

This 26th day of September, 2012

Signature

Veronica Chavez



Public Notice: Notice of Preparation of an Environmental Impact Report

The Water Replenishment District of Southern California (WRD) as the Lead Agency is beginning preparation of a Program Environmental Impact Report (PEIR) pursuant to the California Environmental Quality Act (CEQA) for the proposed Groundwater Basins Master Plan.

WRD has published a Notice of Preparation (NOP) of the PEIR that includes a description of the Master Plan and its probable environmental effects. The Master Plan identifies potential programs and management actions that will enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers for the foreseeable future. The Master Plan also identifies potential programs and actions that can increase local groundwater supplies, improve water quality, and reduce dependence on imported water.

The NOP will be circulated for a 30-day period that begins September 14, 2012 and ends October 15, 2012. WRD is soliciting the views of interested persons and agencies as to the scope and content of the environmental information to be evaluated in the PEIR. The public and interested parties are invited to submit comments to: Water Replenishment District of Southern California, Jason Weeks, 4040 Paramount Drive, Lakewood, CA 90712, or jweeks@wrd.org

The NOP is available for review at the WRD website: http://wrd.org.

A public scoping meeting will be held to receive public comments and suggestions. The scoping meeting will be open to the public on Thursday, September 27, 2012, at 4:00 PM at WRD, 4040 Paramount Drive, Lakewood, CA 90712.

Attachment 4
Scoping Meeting Presentation

Groundwater Basins Master Plan Program Environmental Impact Report Scoping Meeting

Water Replenishment District of Southern California

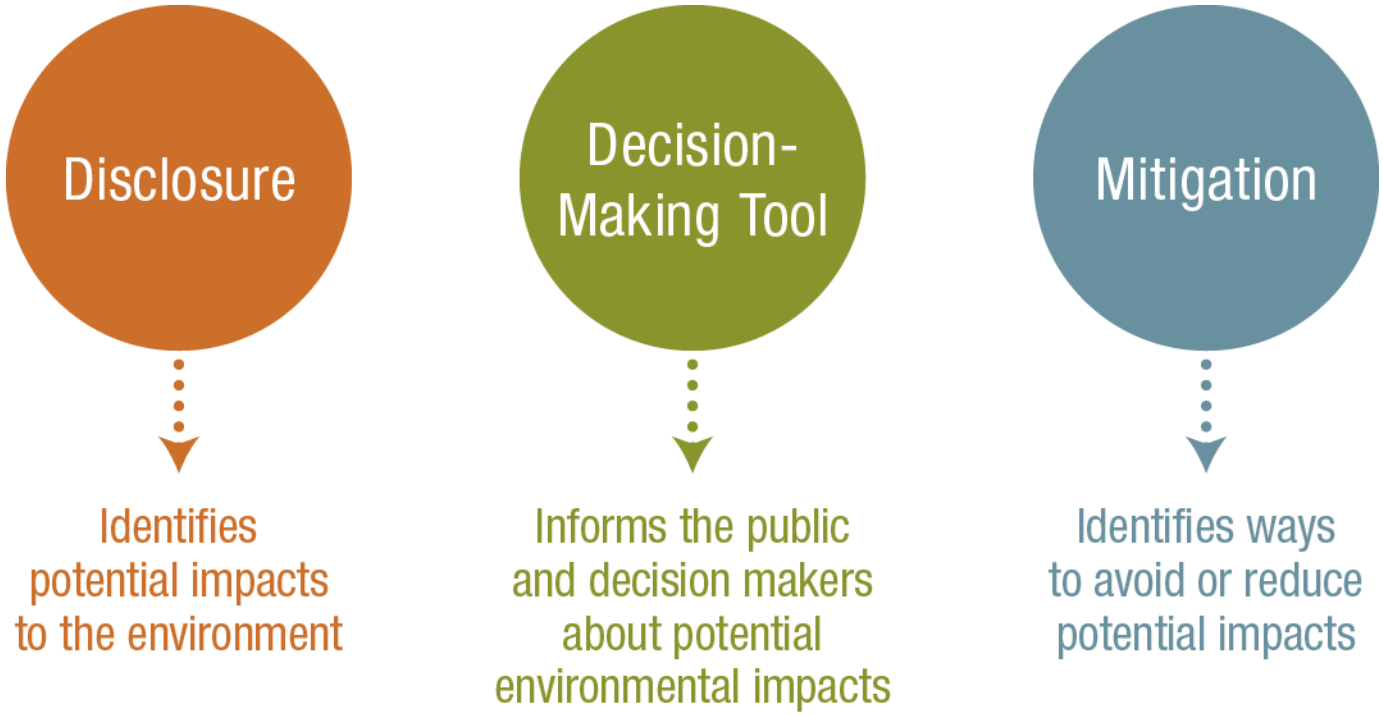
September 27, 2012

4pm

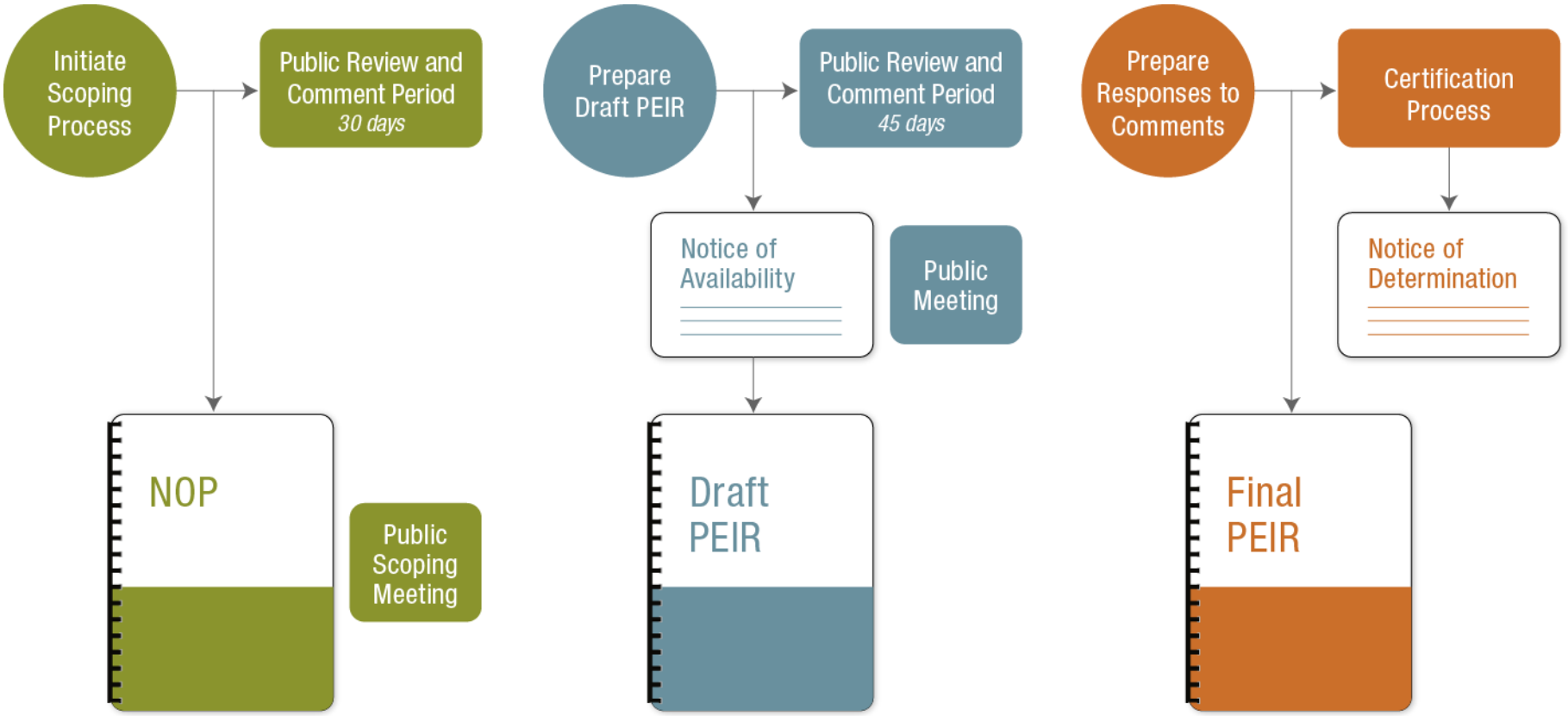
Agenda

- California Environmental Quality Act (CEQA) Overview and Process
- Water Replenishment District of Southern California (WRD) Overview
- Groundwater Basins Master Plan (GBMP)
  - Goals and Objectives
  - Description
- Issues to be Analyzed in the PEIR
- CEQA Schedule
- Comments

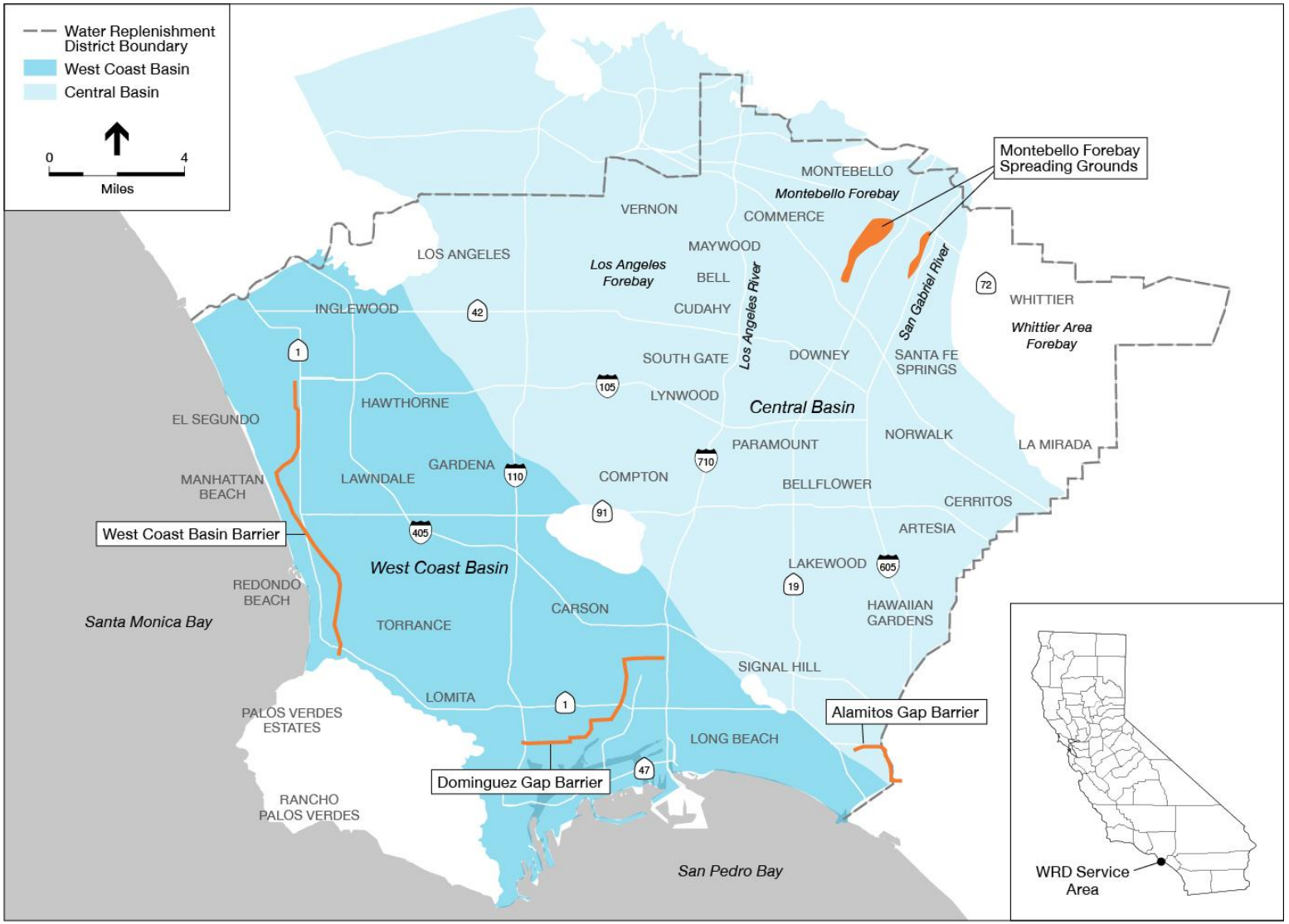
California Environmental Quality Act (CEQA)



CEQA Process for an EIR



WRD Overview



WRD Overview

- **Mission:** Protect the basins to ensure high-quality groundwater is available to local pumpers through:
  - Groundwater replenishment
  - Deterrence of sea water intrusion
  - Groundwater quality monitoring

- **Purpose**: Managed Aquifer Recharge
  - Replenishment water supplies include imported water, recycled water, and storm water

Groundwater Basins Master Plan (GBMP)

Goals and Objectives

- Provide adequate replenishment water supplies to meet future needs of groundwater pumpers
- Improve reliability of replenishment supplies by reducing and eventually eliminating the current use of imported water for replenishment
- Improve groundwater quality
- Enhance ability of both groundwater basins to sustainably store and deliver water supplies

GBMP Description

- Uses stepwise approach to developing additional water supply to meet future target replenishment and extraction concepts

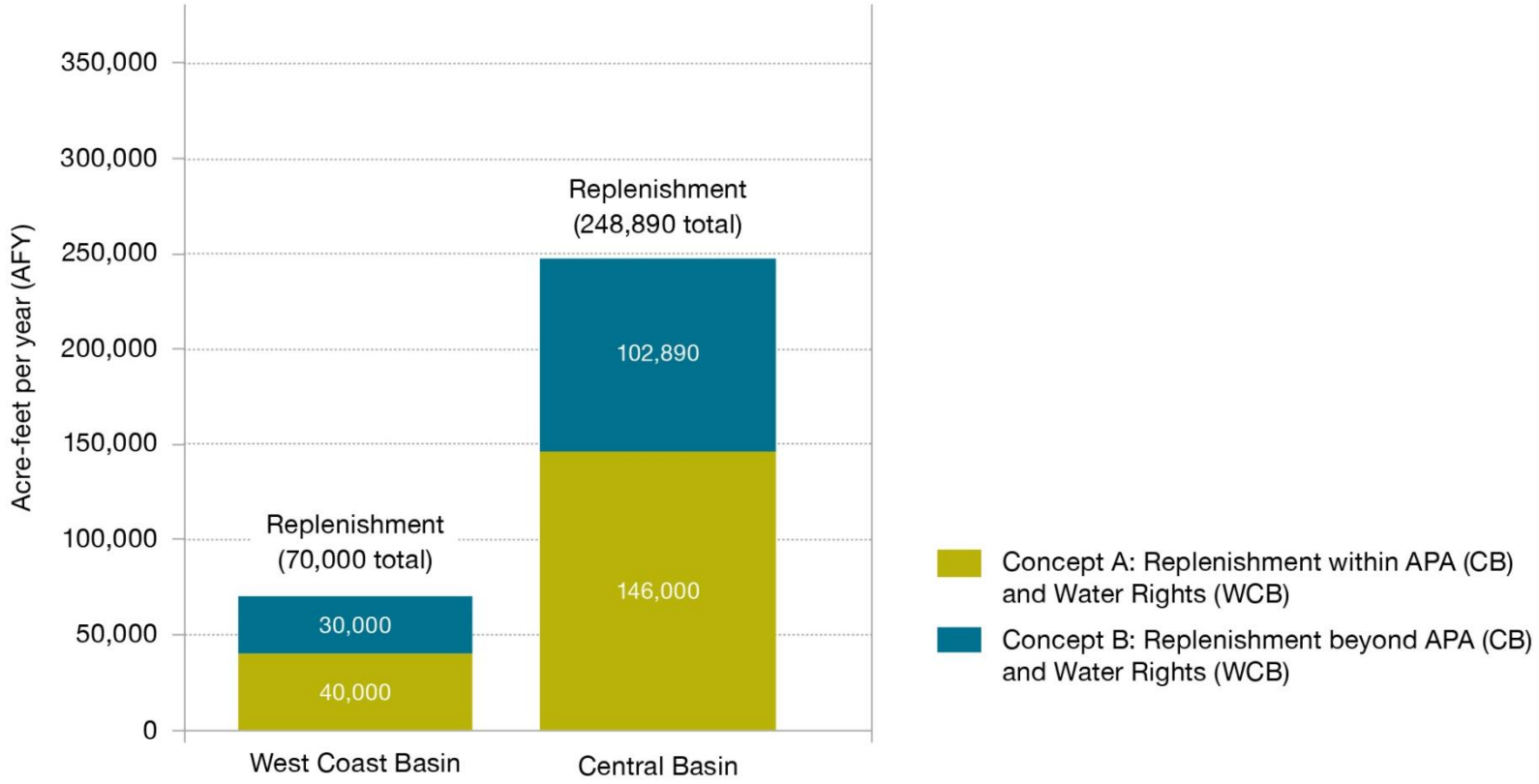
Concept A

- Meet existing water rights and adjudicated pumping limits

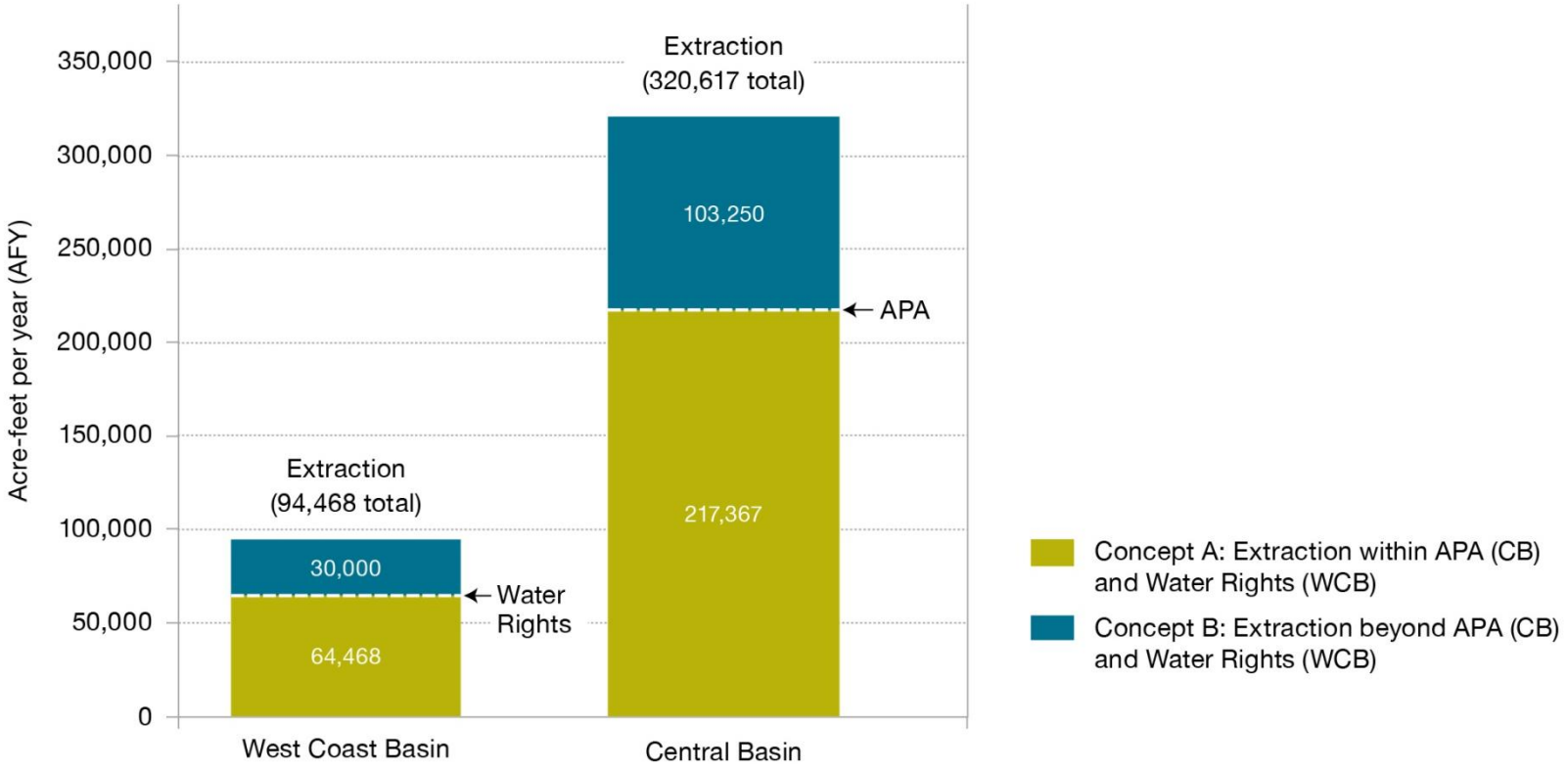
Concept B

- Provide additional replenishment beyond water rights and pumping limits

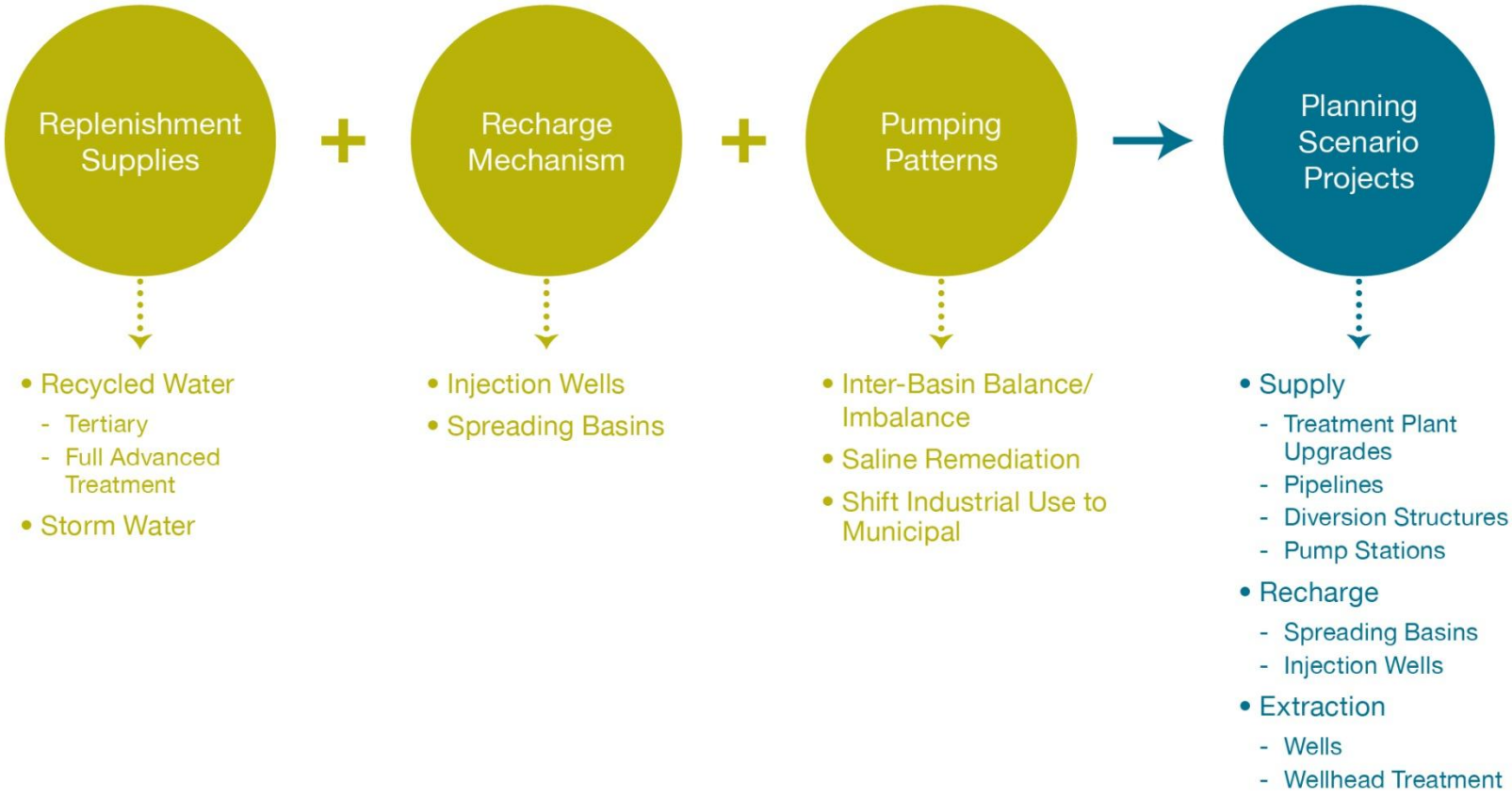
Concept A and Concept B Replenishment Targets for the West Coast and Central Basins



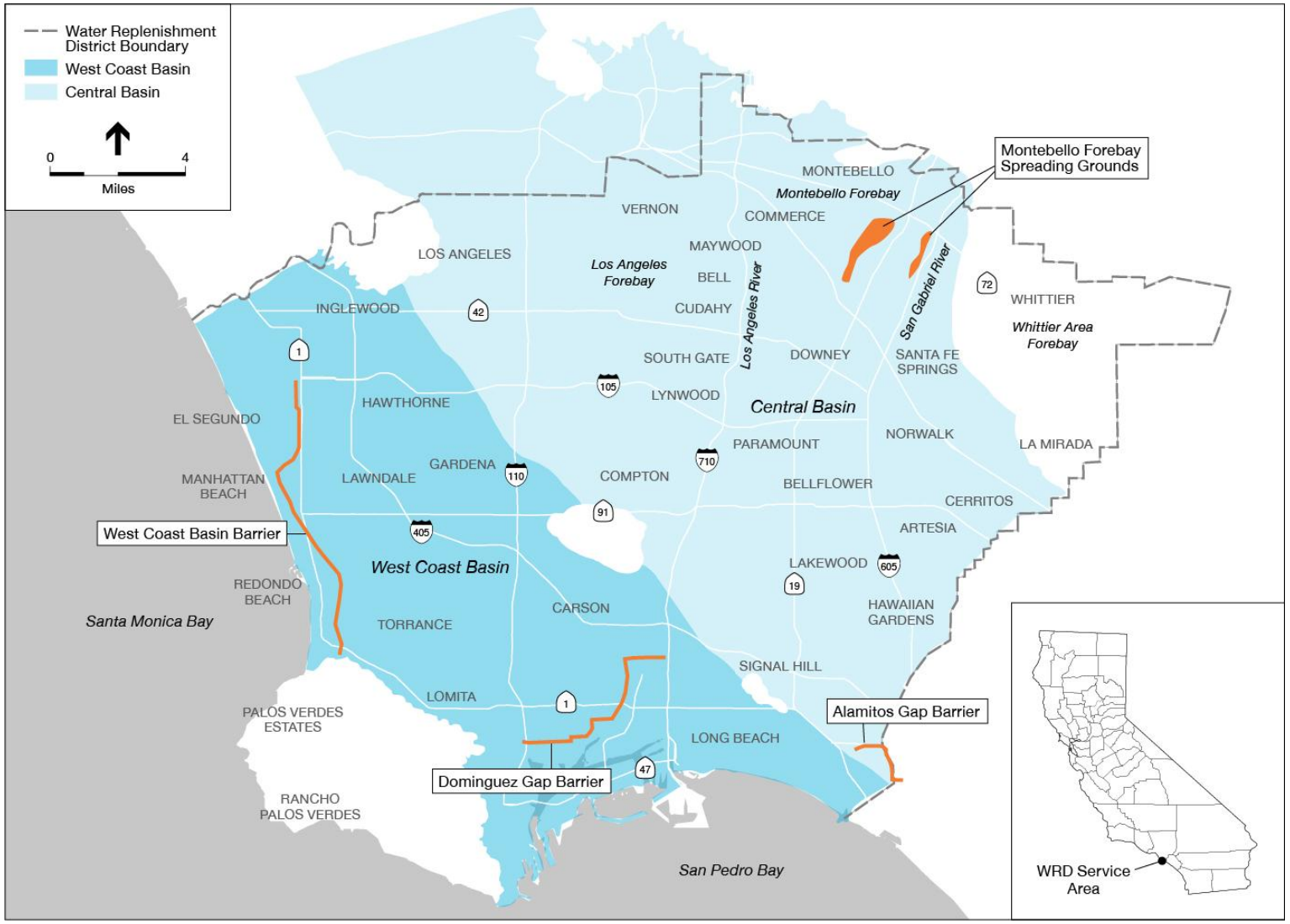
Concept A and Concept B Extraction Targets for the West Coast and Central Basins



GBMP Planning Scenarios



GBMP Planning Scenario Components



Issues to be Analyzed in the PEIR

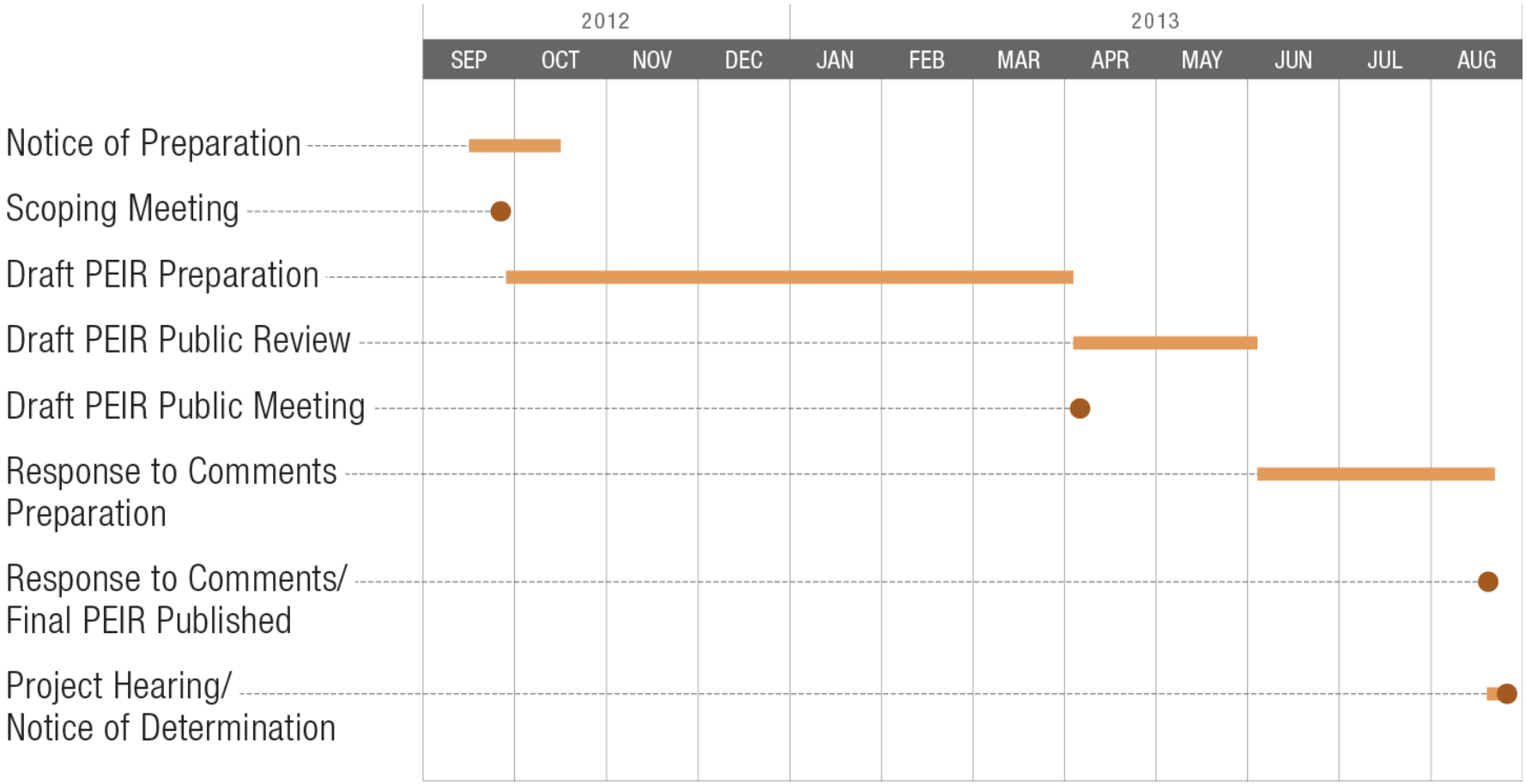
Programmatic Analysis of Impacts

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils & Seismicity
- Greenhouse Gas Emissions
- Hazards & Hazardous Materials
- Hydrology, Groundwater & Water Quality
- Land Use & Recreation
- Noise
- Population & Housing
- Public Services
- Traffic &vTransportation
- Utilities & Energy

Other CEQA Requirements

- Alternatives Analysis
  - No Project Alternative
- Cumulative Impact Analysis
- Growth Inducement Analysis

PEIR Schedule Estimate



NOP Comment Period

- Comment period ends October 15, 2012, 5:00 PM
- NOP Availability: **http://www.wrd.org/**
- Submit comments
  - Tonight: Verbal or Written Comments
  - Or mail or email comments by October 15th to:

Jason Weeks
Water Replenishment District of Southern California
4040 Paramount Drive
Lakewood, CA 90712
jweeks@wrd.org

Attachment 5

Scoping Meeting Sign-In Sheet

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

SIGN-IN SHEET

Groundwater Basins Master Plan
Program EIR: NOP Scoping Meeting

SEPTEMBER 27, 2012
4:00 P.M.

The signing, registering, or completion of this document is voluntary. All persons may attend this meeting regardless of whether they sign, register, or complete this document.

NAME	COMPANY/ AFFILIATION	ADDRESS	EMAIL	Mark an "x" if you do not want future notices sent to you regarding the project
Andrew Hall	LACSD	1955 Workman Mill Rd. Whittier CA 906-1	ahall@lacsd.org	
GARY LYNCH	PARK WATER CO.	PO. Box 7002/9750 WASHBURN DOWNEY CA 90241	gary@parkwater.com	
Kevin Hostert	Suburban Water Systems	1325 N. Grand Ave COVINA CA 91724	Khostert@SWWC.com	
LEON ROMERO	CALTRANS	100 S. MAIN ST., LOS ANGELES, CA 90012	LEON_ROMERO@DOT.CA.GOV	
Le Chen	Caltrans	100 S main st Los Angeles, CA 90012	le_chen@dot.ca.gov	
JAMES JETER	TESORO REF. & MKT	2101 E. PACIFIC COAST HWY WILMINGTON, CA. 90744	JAMES.R.JETER@TSOCORP.COM	
Rick Olson	City of Signal Hill	2175 Cherry Ave S.H. CA. 90755	rolson@cityofsignalhill.org	

SIGN-IN SHEET

Groundwater Basins Master Plan
Program EIR: NOP Scoping Meeting
SEPTEMBER 27, 2012
4:00 P.M.

The signing, registering, or completion of this document is voluntary. All persons may attend this meeting regardless of whether they sign, register, or complete this document.

NAME	COMPANY	ADDRESS	EMAIL	Mark an "x" if you do not want future notices sent to you regarding the project
SIGNED IN	City of Signal Hill			
Jim Powell	Tesoro	2101 E. Pacific Coast Hwy Wilmington CA 90744	jim.t.powell@tsocorp.com	

Attachment 6

Comment Letters Received by WRD

Sarah Spano

From: Jason Weeks [jweeks@wrd.org]
Sent: Thursday, October 11, 2012 5:48 PM
To: Jennifer Jacobus
Cc: Tom Barnes
Subject: FW: Groundwater Basins Master Plan NOP Comments
Attachments: Comment Matrix external.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

FYI

From: Le Chen [mailto:le_chen@dot.ca.gov]
Sent: Thursday, October 11, 2012 4:53 PM
To: Jason Weeks
Cc: Leon Romero
Subject: Groundwater Basins Master Plan NOP Comments

Hello Mr. Weeks,

Attached below is an electronic copy of the comments made by Caltrans on the Notice of Preparation for the Groundwater Basins Master Plan.

A hard copy of the comments will be sent to you tomorrow.

Le Chen
Caltrans, District 7
Associate Environmental Planner (Generalist)
(213) 897-4595

REVIEW COMMENTS: SUMMARY AND RESOLUTION						
Submittal: Notice of Preparation of a Program Environmental Impact Report | Groundwater Basins Master Plan | Consultant Prepared Submitted by: Jason Weeks | Water Replenishment District of Southern California				RESPONSE CODE	A = Accept Comment (correct, add, clarify) B = Will not incorporate.	
Comment No.	Section, Page No. or Study	Unit	Reviewer Comments	RESPONSE		
				Response Code	By Whom	Response Text
1		PPM	The impacts to the Route 105 freeway and Metro Green Line need to be addressed as both are major transportation arterials that are below grade level and located within the Central Basin. The safety of the traveling public and the integrity of the above systems are major concerns for the Department.			
2		PPM	An Agreement between Caltrans and WRD concerns a groundwater piping project which leads to the Seawater Barrier injection site. This proposed project needs to be addressed in the EIR.			
3		PPM	As the Metro Green Line is located in the center of the Route 105 freeway, Metro should be notified of this NOP/EIR.			
4		PPM	The EIR public meetings should be held after 6:00PM in order to accommodate more public awareness and input.			
5		PPM	Please address any anticipatory permits that will be required from the EIR proposal.			
6		PPM	Please address the treatment and filtration process that will be implemented for the additional extracted groundwater in the EIR.			
7		PPM	Please address the creation of two projects entitled Rio Hondo/San Gabriel River Spreading Grounds Interconnection Pipeline Project and the Whittier Narrows Conservation Pool Increase Project and their impact on the proposed project.			
8		PPM	For the Conservation Pool Increase Project noted above, WRD was seeking approval from the Army Corp (USACE) who was to conduct a feasibility study and safety analysis. Please provide a current status of the approval/analysis and address this condition and its potential impacts to the proposed project area.			
9		PPM	Please address the current pumping and treatment of extracted groundwater for Route 105 and the projected increase in pumping and treatment activity for Route 105 in result of the EIR proposal.			
10		PPM	Please describe the scope, purpose and need of the project as contemplated by the proposed EIR.			
11		PPM	Please identify the parameters of the Project as contemplated by the proposed EIR.			
12		PPM	Please identify the impact of any "federal waters" on the proposed project.			
13		GeoTech	How much water are the pumpers in the Central and West basin utilizing (existing and proposed)? Of this amount, how much is provided by WRD?			
14		GeoTech	In Figure 3, is it possible to infiltrate the additional water into the subsurface?			
15		GeoTech	In Figure 3, how much of this additional water will replenish beneficial aquifers?			

(1) Indicate document, page number or General Comment (2) Example: J. Doe, CT (3) If no comment, write "NO COMMENT" (4) To be filled in by SEP or designee
(5) To be determined at Project Team review meeting

REVIEW COMMENTS: SUMMARY AND RESOLUTION						
Submittal: Notice of Preparation of a Program Environmental Impact Report | Groundwater Basins Master Plan | Consultant Prepared				RESPONSE CODE	A = Accept Comment (correct, add, clarify) B = Will not incorporate	
Submitted by: Jason Weeks | Water Replenishment District of Southern California						
				RESPONSE		
Comment No.	Section, Page No. or Study	Unit	Reviewer Comments	Response Code	By Whom	Response Text
16		GeoTech	In Figure 3, please identify/describe replenishment as it relates to this EIR.			
17	Pg. 12	GeoTech	The PEIR should assess the potential for encountering contaminated soils, contaminated perched water, and hazardous substances, as the groundwater rises in the Central Basin and West Coast Basin due to the replenish of groundwater. And the potential migration of these contaminants. Not just the local construction sites.			
18	Pg. 13	GeoTech	The PEIR should assess the potential impacts on the underground structures of high-rise buildings, as a result of the groundwater rises in the Central Basin and West Coast Basin due to the replenish of groundwater.			
19	Pg. 13	GeoTech	The PEIR should assess the potential impacts on the highways, subways, and public transportation facilities, as a result of the groundwater rises in the Central Basin and West Coast Basin due to the replenishment of groundwater, and not limit the assessment of impacts to traffic.			
20		GeoTech	Please state what kind of groundwater model the project uses.			
21		GeoTech	Was the model developed with ascii files that can be used with USGS modflow software?			
22		GeoTech	Who developed the groundwater model? Is it available for review?			
23		GeoTech	Does the GBMP groundwater model, model all groundwater in the two basins or only beneficial use aquifers?			
24		GeoTech	Does the GBMP model include the shallow aquifers termed "semi-perched" by DWR Bulletin 104?			
25		GeoTech	How is successful replenishment measured? Is it simply an increase in groundwater elevation?			
26		GeoTech	Will groundwater increase across the basins uniformly? Or will some areas increase in elevation before others?			
27	Geology, Soils and Seismicity	GeoTech	If groundwater elevation is increased due to replenishment, will that pose a potential seismic hazard to existing facilities in the area, such as hospitals, bridges, and commuter rail lines?			
28	Geology, Soils and Seismicity	GeoTech	Will the increase in groundwater elevation pose as hazard to existing facilities with regard to bearing capacity?			
29	Hazards and Hazardous Materials	GeoTech	Do the new facilities refer to the proposed facilities in the GBMP?			
30	Hazards and Hazardous Materials	GeoTech	Is it possible for the increase in groundwater elevation to mobilize contaminants in soil? In other words, is it possible that properties which are listed by the regional water board as "soil only" impacted sites to become sources of groundwater contamination?			

(1) Indicate document, page number or General Comment (2) Example: J. Doe, CT (3) If no comment, write "NO COMMENT" (4) To be filled in by SEP or designee
(5) To be determined at Project Team review meeting

REVIEW COMMENTS: SUMMARY AND RESOLUTION						
Submittal: Notice of Preparation of a Program Environmental Impact Report | Groundwater Basins Master Plan | Consultant Prepared Submitted by: Jason Weeks | Water Replenishment District of Southern California				RESPONSE CODE	A = Accept Comment (correct, add, clarify) B = Will not incorporate.	
Comment No.	Section, Page No. or Study	Unit	Reviewer Comments	RESPONSE		
				Response Code	By Whom	Response Text
31	Hazards and Hazardous Materials	GeoTech	Is it possible that the increase in groundwater elevation could cause a significant increase in vapor intrusion to structures (houses, office buildings, etc) in the area?			
32		GeoTech	Please list specific procedures that are being considered for replenishment, such as in-lieu pumping.			
33		GeoTech	Will in-lieu pumping be considered as form of replenishment?			
34		GeoTech	Will the stake holders be able to make decisions about which pumpers will be engaged in this type of program?			
35	Section 2.2 of the NOP	GeoTech	Is Concept A an attempt to address the lack of ability for pumpers in the area to extract water up to their adjudicated/allocated rights? This would imply that pumpers in both basins are not collectively able to extract up to their allowed limit because of limited groundwater. Is the current state of extraction not at the legally allowed maximum for both basins?			
36	Section 2.2 of the NOP	GeoTech	The NOP states "WRD would need to replenish approximately 40,000 AFY on average in order to meet the requirements for extraction of 64,468 AFY". This implies water conservation, in some form, is directly correlated to potential extraction. Is every AFY of water conserved equivalent to an AFY of extraction? What is the time scale for water conserved to be considered available for extraction? Does all water that is conserved migrate so that it replenishes the basins for the purpose of extraction or does some amount of water migrate outside of the usable developed groundwater aquifers of the two basins? Were these assertions derived from groundwater modeling?			
37	Section 2.2 of the NOP	GeoTech	For Concept B, how was 30,000 AFY of extraction arrived at as an additional extraction for the West Coast Basin? Similarly how were 103,250 AFY arrived at for the Central Basin?			
38	Section 2.2 of the NOP	GeoTech	What was the process for determining these additional target extraction levels?			
39	Section 2.2 of the NOP	GeoTech	Are these target levels of extraction possible to achieve? Is the determination of these target levels based on groundwater modeling?			
40		Traffic	If project impacts traffic on Route 105, include a traffic plan and traffic handling(detours) during the construction phase.			
41		Traffic	If work is to be done on or near Route 105, try to minimize the hauling during the peak hours using Rte-105.			

(1) Indicate document, page number or General Comment (2) Example: J. Doe, CT (3) If no comment, write "NO COMMENT" (4) To be filled in by SEP or designee
(5) To be determined at Project Team review meeting

REVIEW COMMENTS: SUMMARY AND RESOLUTION						
Submittal: Notice of Preparation of a Program Environmental Impact Report | Groundwater Basins Master Plan | Consultant Prepared				RESPONSE CODE	A = Accept Comment (correct, add, clarify) B = Will not incorporate.	
Submitted by: Jason Weeks | Water Replenishment District of Southern California						
Comment No.	Section, Page No. or Study	Unit	Reviewer Comments	RESPONSE		
				Response Code	By Whom	Response Text
42		Hydraulics	Due to groundwater being present in the basin, a pumping and filtration system was implemented, especially in the area of Garfield Avenue. With the proposed increase of the replenishment and extraction of groundwater, Caltrans anticipates additional efforts in maintaining the freeway. Please list mitigation measures in the EIR.			
43		Hazardous Waste	The NOP does not state that it will address adverse environmental impacts to surrounding communities from the proposed project.			
44	Geology, Soils and Seismicity	Hazardous Waste	WRD states that the hazards to the proposed facilities will be addressed in the PEIR but no mention is made of the hazards in the areas impacted by the rise in groundwater table and increased liquefaction potential, expansive soils.			
45		Hazardous Waste	The cost to mitigate the problems caused by rise in groundwater elevation for the impacted properties needs to be addressed.			
46	Hazards and Hazardous Materials	Hazardous Waste	The NOP states that it will address and mitigate hazards encountered during construction. The hazards/impacts to the entire areas affected by the increase in groundwater elevations needs to be addressed in the PEIR.			
47		Utilities	Please address the potential impacts of the proposed project on the underground Utilities in the Route 105 area, which include a 4" Gas Line, Telephone underground Duct, Edison underground ducts(power Lines), 6" southern California water line, 12" wsp water line, 6" Gas Line in 10" CSG, in case of earth movement.			
48		Environmental Planning	What alternatives are currently proposed for this project?			

(1) Indicate document, page number or General Comment (2) Example: J. Doe, CT (3) If no comment, write "NO COMMENT" (4) To be filled in by SEP or designee
(5) To be determined at Project Team review meeting

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

October 8, 2012 **Via Federal Express**

Mr. Jason Weeks
Water Replenishment District of Southern California
4040 Paramount Drive
Lakewood, CA 90712

Dear Mr. Weeks:

Groundwater Basins Master Plan (GBMP) SCH 2012091035

The Metropolitan Water District of Southern California (Metropolitan) reviewed the Notice of Preparation of a Program Environmental Impact Report (PEIR) for the proposed Groundwater Basins Master Plan (Master Plan). The Master Plan identifies potential programs and management actions that will enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers under the respective Judgments for the Basins for the foreseeable future. The Master Plan also identifies potential programs and actions that can increase local groundwater supplies, improve water quality, and reduce dependence on imported water.

Metropolitan owns and operates conveyance and distribution facilities throughout southern California. There may be a potential for future excavation, construction, or other developments identified in the plan to affect Metropolitan facilities. Detailed prints of drawings of Metropolitan's pipelines and rights-of-way may be obtained by calling Metropolitan's Substructures Information Line at (213) 217-6564.

We appreciate the opportunity to provide input to support your planning process and we look forward to reviewing the draft PEIR and coordinating further on this Project. If you have any questions, please contact Mr. Sean Carlson at (213) 217-6276.

Very truly yours,

Deirdre West
Manager, Environmental Planning Team

SC/sc
(J:\Environmental Planning-Compliance\COMPLETED JOBS\October 2012\Job No. 2012100917)

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October 15, 2012

Mr. Jason Weeks
Water Replenishment District of Southern California
4040 Paramount Blvd.
Lakewood, California 90712

Re: Comments to WRD's Notice of Preparation of a Draft Environmental Impact Report for the Proposed Groundwater Basin Management Plan

Dear Mr. Weeks:

Our firm submits this letter on behalf of the Cities of Cerritos, Downey, and Signal Hill, owners of groundwater producing facilities overlying the Central Basin and adjudicated water rights in that Basin. As such, the Cities are at the very least interested parties, and potentially responsible agencies though it is difficult to ascertain from the Water Replenishment District of Southern California's ("WRD") vague description of the proposed Groundwater Basins Master Plan ("GBMP" or "Project") for the Central and West Coast Groundwater Basins located in the County of Los Angeles (collectively, the "Basins"). (Pub. Resources Code, § 21069; CEQA Guidelines, §§ 15096, 15381; *Citizens Association for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal.App.3d 151, 173-175.) Because there has been no consultation by WRD with the Cities, other than a scoping meeting you held on September 27, 2012 at which you stated you would not answer any questions, the Cities have been unable to adequately evaluate the GBMP. At this stage, the Cities require a more specific description of the Project than what WRD has included in its Notice of Preparation ("NOP") for a Draft Environmental Impact Report ("DEIR") on the GBMP, to be able to fully evaluate and comment on the Project.

It is highly unusual for an agency to propose to undertake a project that apparently involves adding 103,000 acre-feet per year (AFY) into groundwater basins, without conducting an initial study or any other preliminary analysis to identify facts, technical issues, or other substantial evidence to document the assumptions and conclusions in the NOP. It is also highly unusual for an agency to hold only a single scoping meeting before closing the review period for the NOP, as WRD has done. Given the limited opportunity for review, the Cities request that WRD:

- revise the NOP to include sufficient detail required for any interested party to provide meaningful comments;
- extend the review period for a revised NOP to be evaluated; and
- consult with all producers/pumpers – not only those likely to agree with WRD – to actually take into consideration and address their concerns.

Meanwhile, the Cities submit preliminary comments to the information you have made available in the NOP and will provide further comments particularly as to feasible alternatives once further information becomes known about the GBMP. While the Cities generally support development and implementation of groundwater storage plans in each of the Basins, they cannot support a proposal that contains various deficiencies under applicable environmental standards – namely, the California Environmental Quality Act of 1970, Public Resources Code sections 21000 *et seq.* ("CEQA") and related regulations – for reasons including those specifically stated herein.

The primary concerns of the Cities involve the following issues, discussed in more detail below.

A) Whether the "project" is sufficiently identified and described in terms of substance and scope to allow for meaningful evaluation and comment.

B) Whether sufficient descriptions are made as to the effects – significant or not – on the environment, as well as cumulative effects.

C) Whether WRD has the authority or jurisdiction to be the "lead agency" or to do what the NOP says would be done under the GBMP.

A. The NOP Fails to Identify a "Project" With Sufficient Specificity For an Interested Party to Provide Meaningful Comment

i. The NOP Must Adequately Describe the "Construction of Facilities," Before the Cities Are Able to Comment

The NOP must be written so as to provide the agencies with sufficient information to enable them to make meaningful responses. *At a minimum, the NOP must include the following: a description of the project; its location, either by street address or on a map; and a statement of the project's probable environmental effects.* (CEQA Guidelines, §15082, subd. (a)(1).) The NOP does not adequately describe the scope and potential environmental effects of the proposed Project. WRD describes the "Project" as only 2 potential scenarios: Concept A, which consists of replenishing the Basins to meet current allowed pumping in the Basins, and Concept B, which consists of replenishing the Basins to allow for an additional 103,617 AFY in annual pumping.[1] It is unclear from these general "Concepts" *how* WRD proposes to implement those concepts.

[1] NOP, Section 2.2 starting at Page 5

The only detail the Cities have identified in the NOP is the statement that the DEIR will cover a series of projects that "would involve construction of facilities such as wells, pipelines, pump stations, spreading basins, and treatment plant upgrades within ... the Montebello Forebay, the Los Angeles Forebay, the existing injunction barriers along the coast including West Coast Basin Barrier Project (WCBBP), the Dominguez Gap Barrier Project (DGBP), and the Alamitos Barrier Project (ABP), and the inland areas of the West Coast Basin.[2] *The NOP does not include, however, even the general area where each of the facilities would be constructed, the estimated number or size of each of the facilities, or a general description of the facility itself.* The NOP points to Figure 1, but that figure identifies only the existing barriers and spreading grounds.[3] It does not, for example, show the beginning and ending point of a potential pipeline, the location of additional wells or pump stations, or an inland location in the West Coast Basin at which any of these facilities would be constructed.

Additionally, the statement in the NOP that "[p]rojects would be implemented by local water agencies in coordination with WRD,"[4] is insufficient to identify the agency capable of implementing, or even likely to implement, the proposed projects. The Cities request further information regarding WRD's initial evaluations of the location and types of facilities that may form part of the Project, including any alternatives to building each or all of the facilities.

ii. The NOP Must Adequately Describe the Conditions and Availability of the Storage Space WRD Proposes to Use

With regards particularly to use of the dewatered space in the Basins for storage, the NOP states only that WRD intends to "[u]se groundwater basin storage space as required to meet objectives."[5] That statement is vague. An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published. (CEQA Guidelines, §15125, subd. (a).) The NOP fails to identify the space that is available for storage and how much of it WRD requires to "meet objectives," whether the increase will occur gradually, the areas of the Basin in which replenishment will increase the most, or where the additional extraction will be concentrated.

The NOP states that the "GBMP includes results of groundwater modeling that evaluate both Basins' physical storage capacities under numerous recharge and extraction scenarios" yet this "modeling" is not adequately identified nor are any of the components or inputs that go into the modeling.[6] Additionally, the NOP does not indicate that any further studies will be undertaken.

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[2] NOP, Page 7.
[3] NOP, Page 7, citing to Figure 1.
[4] NOP, Page 7, Section 2.2.
[5] NOP, Page 9.
[6] NOP, at Page 5, Section 2.0.

iii. The NOP Must Explain Whether the Project Overlaps With WRD's Current Storage Proposals Already Pending Before the Courts

It is unclear whether the Project is the same as (or dependent upon) the Regional Storage Projects or the WRD's Basin Operating Reserve proposed in WRD and others' Motions to Amend the Central Basin Judgment and the West Basin Judgment, filed in court in April 2009 (and still pending before the Courts).

If so, the NOP does not explain whether the proposed program is based on the evidence WRD filed in support of the Motions to Amend. If the proposed program and the 2009 Motions to Amend are the same, then WRD must confirm that fact. That would allow interested parties to review all relevant information and comment to the proper information.

Without a proper description of the Project, it is not possible for any interested party to provide any meaningful comments. The environmental assumptions and effects are vague due to the lack of specificity in the description of the project itself.

B. Greater Specificity Is Required To Evaluate Potential Environmental Impacts.

By only generically describing potential environmental impacts,[7] the NOP fails to sufficiently describe the Project" as required by Title 14 of the California Code of Regulations ("14 CCR") Section 15082(a)(1), including 14 CCR Sections 15355, 15358, and 13582 regarding cumulative impacts, effects, and significant effects on the environment. The NOP does not even touch on widely-known environmental concerns in the Central District, such as the water levels at or near the 105 Freeway. While WRD may reason that environmental concerns may not be identifiable until a project is more specifically developed, it should have at least considered and evaluated existing water level issues, such as at the area of the 105 Freeway.

Also missing from the environmental review is an evaluation of the following basic issues, which would be required to conduct even an initial study of the Project:

- The Project provides no reasonable "baseline" supported by any technical or other environmental study. "An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published." (CEQA Guidelines, §15125(a).) The NOP repeatedly refers to the "natural safe yield" but fails to identify or otherwise quantify the "natural safe yield," which is necessary for understanding how much replenishment water is necessary based on pumping *and* how much storage space is available, among other things.[8]

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[7] NOP, Page 11.
[8] NOP, starting at Page 3, Section 1.0.

- Indeed, it appears that a determination of the natural safe yield of the West Coast Basin and Central Basins is required to perform the groundwater modeling studies WRD reports it has undertaken. (*Id.* at pp. 4-5.) WRD reports that those studies "evaluate both Basins' physical storage capacities under numerous recharge and extraction activities." Recharge and extraction activities cannot be evaluated without an assumption of the natural safe yield of each of the basins (whether it be a final determination or an estimate). Thus, without information by WRD of the natural safe yield determinations or assumptions it made, the Cities cannot adequately evaluate or comment upon the proposed program.

- The NOP suggests that the estimated "natural replenishment" in the Basins will serve as the baseline. The NOP fails to identify, however, any study or other analysis showing that the "natural replenishment" levels WRD estimates and includes in the NOP are reasonable, or that they should be used as the baseline – and not the natural safe yield.

- It isn't clear whether the natural replenishment estimates take into account the annual entitlement to the Central Basin from the San Gabriel River resulting from the judgment in *Board of Water Commissioners of the City of Long Beach, et al., v. San Gabriel Valley Water Company, et al.* (Los Angeles County Superior Court, Case No. 722647).

- NOP, Section 2.2 at Page 9: For the Central Basin, the GBMP seeks to "[p]rovide for increased pumping to offset imported water demands consistent with increased replenishment." No statement is made this would be evaluated to determine how this "increased pumping" would affect, environmentally and otherwise, other producers in either of the Basins.

- NOP, at Pages 9 and 10: The NOP contains vague statements about "[n]ew pipelines and pump stations," "new spreading and injection facilities," "new extraction wells" and "[n]ew conveyance pipelines" but without any identification, discussion, or evaluation as to where and what potential effects, environmentally or otherwise, would be imposed by this "new" infrastructure, nor what would happen to existing pumps or other infrastructure.

- NOP, Section 2.2, at Page 10 ("Implementation Considerations"): The NOP notes that the "availability of recycled water" and the "availability of storm flows" are among the "issues" affecting "implementation of the GBMP," leaving unanswered and inadequately described by the NOP how the goals of the GBMP would be accomplished if either recycled water or captured storm water are at levels lower than contemplated to achieve the goals of the GBMP.

- NOP, at Page 11: Only a very vague and generic description is provided of the potential environmental impacts, including to groundwater, hydrology and water quality, without describing the "probable environmental effects of the project" as required by 14 CCR Section 15082(a)(1)(C).

    - The meaning of the statement that WRD plans to "increase pumping near recharge area" is unclear. (See NOP, at Page 9.) WRD does not have the authority to interfere with the pumpers' wells, or to prohibit any pumper from pumping in any particular area. (Water Code Section 60051.)

    - More broadly speaking, the NOP does not take into account additional storage by the parties to the Judgments, whether it is through WRD's 2009 Motion to Amend or through any other counter-proposal. Without an evaluation of all storage activities likely to take place in the Basins, the NOP does not adequately describe the Project for reasonable evaluation or comment.

Aside from the deficiencies of the NOP, it does not appear that WRD has considered broader environmental impacts that may result from any significant increase in the water levels, depending on the area increased. For example, WRD should have considered whether the Project may potentially:

1) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;

2) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service;

3) have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

4) disturb any human remains;

5) expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

    a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault, resulting in:

i. Strong seismic ground shaking;
ii. Seismic-related ground failure, including liquefaction; or
iii. Landslides;

b. construction of facilities on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

6) violate any water quality standards or waste discharge requirements;

7) substantially alter the existing drainage pattern of the site or area;

8) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

9) otherwise substantially degrade water quality;

10) induce substantial population growth in an area, either directly or indirectly;

11) result in the displacement of population in an area, either directly or indirectly;

12) require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or

13) require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

These are environmental issues that WRD must address in the context of its GBMP. It is especially crucial for WRD to address these potential environmental effects given the 420 square miles WRD has designated as the potential Project area.

C. WRD Lacks Governing Authority For The GBMP As Described In The NOP.

CEQA Guideline section 15040(b) "does not grant an agency new powers independent of the powers granted to the agency by other laws." (*See,* Public Resources Code section 21083; *see also, Pinewood Investors v. City of Oxnard* (1982) 133 Cal.App.3d 1030.) Thus, the Cities question WRD's role as the "lead agency" for a Project that appears, from what is discernible in the NOP, to primarily involve facilities owned and operated by the Los Angeles County Flood Control District (LADFCD) and the Los Angeles County Department of Public Works – not WRD.

1. *WRD Does Not Provide Support for Designating Itself as The "Lead Agency" For The GBMP.*

WRD must explain how it has deemed itself the lead agency for the GBMP program EIR, given the definition of "lead agency" in Section 21067 of Public Resources Code, and in Sections 15050-15053 of the CEQA Guidelines.

"So significant is the role of the lead agency that CEQA proscribes delegation." (*Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal. App. 4th 892, 907, *citing Kleist v. City of Glendale* (1976) 56 Cal. App. 3d 770, 779.) "[T]he public agency that shoulders primary responsibility for creating and implementing a project is the lead agency." (*See also, Planning & Conservation League v. Castaic Lake Water Agency* (2010) 180 Cal. App. 4th 210, 240.) "If more than one public agency is involved in a project but only one public agency carries out the project, then 'that agency shall be the lead agency even if the project would be located within the jurisdiction of another public agency.'" (*County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal. App. 4th 1544, 1633.)

WRD's NOP identifies projects that can only be carried out or implemented primarily by the LADFCD, the LA County Department of Public Works, and in conjunction with local water agencies, such as the Cities. Moreover, WRD does not have approval authority over "the constructions of facilities such as wells, pipelines, pump stations, spreading basins, and treatment plant upgrades," as proposed in the NOP. That WRD intends to attempt to collect funds from the actual interested parties to pay for the Project is not sufficient to designate it as the "lead agency."

Thus, WRD does not have the required authority to carry out or approve any of the projects it proposes, as is required for a "lead agency" (Pub. Resources Code, § 21067), nor can it use CEQA to vest itself with authority or power it does not already have. (*County of San Diego v. Grossmont-Cuyamaca Community College District* (2006)141 Cal. App. 4th 86, 102 ["CEQA does not grant an agency new powers independent of the powers granted to the agency by other laws."]; *Concerned Citizens of South Central Los Angeles v. Los Angeles Unified School District* (1994) 24 Cal. App. 4th 826, 842.)

2. *WRD'S Service Area Limits WRD's Governing Authority.*

The Basins' boundaries are larger than WRD's service area or jurisdictional boundaries,[9] yet the NOP seems to seek to implement the proposed groundwater plan throughout the entirety of the Basins. In the event mitigating measures are required in areas outside of WRD's service area, WRD would be without authority to implement such measures.

Based on the foregoing, and other relevant information as becomes known to the Cities, the GBMP presents a number of fundamental problems with respect to WRD being the "lead

[9] NOP, Figure 1 (WRD Service Area).

agency" as well as environmental issues that will need to be evaluated, and feasible alternatives considered, as part of the environmental review and planning process.

We look forward to the opportunity for meaningful discussions with WRD regarding the GBMP.

Very truly yours,

ALESHIRE & WYNDER, LLP

/s/

Patricia J. Quilizapa

Sarah Spano

From: Jason Weeks [jweeks@wrd.org]
Sent: Monday, October 15, 2012 4:16 PM
To: Jennifer Jacobus; Tom Barnes
Subject: FW: Groundwater Basins Master Plan - Water Replenishment District NOP

FYI

From: Cruz, Ruben [mailto:RCRUZ@dpw.lacounty.gov]
Sent: Monday, October 15, 2012 4:11 PM
To: Jason Weeks
Cc: Ibrahim, Amir; Yanez, Jarrett; Enriquez, Renee
Subject: Groundwater Basins Master Plan - Water Replenishment District NOP

Mr. Jason Weeks
Water Replenishment District of Southern California.

Thank you for the opportunity to review the NOP for the Groundwater Basins Master Plan. The Master Plan identifies potential programs and management actions that will enhance the likelihood that local groundwater supplies will be sufficient to meet the water right allocations assigned to groundwater producers under the respective judgments for the basins for the foreseeable future. The Master Plan also identifies potential programs and actions that can increase local groundwater supplies, improve water quality and reduce dependence on imported water.

We request to be included in the review of any documents or plans associated with this project in the future. The following are Public Works comments and are for your consideration and relate to the environmental document only:

The County of Los Angeles Department of Public Works (LACDPW) operates and maintains the Los Angeles County Flood Control District's (LACFCD's) dams, spreading grounds and seawater barrier facilities. It is in this role that LACDPW has the following comments on the Water Replenishment District's Groundwater Master Plan Notice of Preparation of a Program Environmental Impact Report.

1. Page 4, 7th sentence: AGBP should be changed to ABP (the acronym for the Alamitos Barrier Project). Also, the same paragraph should be changed to clarify that the ABP is jointly owned by LACFCD and Orange County Water District (OCWD).

2. Page 6, Table 1 is referenced but not included in the document. Please provide this table since it appears to provide very useful information pertaining to extraction and replenishment opportunities.

3. Pages 6 and 7, in Figures 2 and 3, the extraction above the APA (103,250 AFY) for the Central Basin is shown to be greater than the replenishment (102,890), respectively – please discuss the discrepancy in the Program Environmental Impact Report (PEIR).

4. Pages 6 and 7, Figures 2 and 3 currently show that extractions will exceed replenishment. However, on Page 9, the first comment under Central Basin Management Strategies mentions replenishing the Central Basin up to the current APA of 217,367 AFY for Concept A and 320,617 AFY for Concept B. The concept replenishment amount in Figures 3 and the

amounts stated in the strategy do not match; please clarify or correct the discrepancy in the PEIR.

5. Page 9, under the Central Basin Management Strategies heading: The text refers to the West Coast Basin rather than the Central Basin.

6. The document mentions new spreading grounds and injection wells. Who would own and operate the new facilities needs to be clarified.

7. The document mentions both increased spreading and injection at existing facilities. The spreading grounds in the Montebello Forebay are already heavily used, and are maximized during storm periods. Therefore, increasing the use of these facilities may be limited, especially since some downtime is needed to perform facility maintenance that serves to restore the storage capacities and percolation rates of the spreading basins. Therefore, any increased injection or spreading would need to be done in coordination with and approved by LACDPW.

8. Additional water conserved and injected would require additional on-going maintenance, which would result in additional emissions. This should be considered in the Air Quality and Greenhouse Gas Emissions section of the PEIR.

9. For purposes of cost analysis, a major issue to consider with regard to spreading facilities is the handling of sedimentation and the effect it has in reducing infiltration capacities and storage capacities.

10. For impacted LACFCD facilities, the Groundwater Basins Master Plan (GBMP) should mention the requirement of obtaining Flood Control Permits for any construction or modifications to the LACFCD facilities.

11. The GBMP should discuss the possibility of the need for maintenance and cost-sharing agreements as a result of the proposed improvements.

12. Where feasible, the PEIR should identify opportunities for projects to provide multiple benefits such as enhanced flood protection, capacity, surface water quality, recreational space, and habitat.

13. In order to see the “entire picture” in the PEIR, graphs should include the natural – or baseline – replenishment that occurs so that extractions equal replenishments.

For questions regarding this set of comments, the contact Greg Jaquez, Los Angeles County Department of Public Works, Watershed Management Division, at (626) 458-5923 or gjaquez@dpw.lacounty.gov

If you have any additional questions, please call or email me.

Ruben Cruz, P.E.
County of Los Angeles
Department of Public Works
Land Development Division
(626) 458-4910
rcruz@dpw.lacounty.gov

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GRACE ROBINSON CHAN
Chief Engineer and General Manager

October 15, 2012

Via Electronic Mail

Mr. Jason Weeks
Water Replenishment District of Southern California
4040 Paramount Drive
Lakewood, CA 90712

Dear Mr. Weeks:

Groundwater Basins Master Plan (GBMP)

The County Sanitation Districts of Los Angeles County (Sanitation Districts) received a Notice of Preparation of a Draft Environmental Impact Report for the subject project on September 17, 2012. Portions of the Groundwater Basins Master Plan Project are located within the jurisdictional boundaries of the Districts. We offer the following comments:

As a responsible agency, the Sanitation Districts appreciate the opportunity to review and comment throughout the environmental process in order to identify any potential impacts to the Sanitation Districts. As a general comment, the Water Replenishment District's potential use of recycled water would be subject to regulatory requirements and agreements with the Sanitation Districts. The Sanitation Districts have contracted much of the recycled water we produce. These existing commitments must be taken into account to determine the volumes available for any recycled water project. Consequently, the Sanitation Districts request to be included in the development of any assumptions regarding the quality and availability of recycled water produced at any of our treatment plants. Please forward project information to the attention of Mr. Mike Sullivan of the Sanitation Districts' Monitoring Section at the address shown above.

If you have any questions, please contact Andrew Hall at (562) 908-4288, extension 2837.

Very truly yours,
Grace Robinson Chan

Mike Sullivan
Section Head
Monitoring Section

MS:AJH:lmb

DOC #2383832

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October 15, 2012

Mr. Jason Weeks, P.E.
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RE: SCAG Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Groundwater Basins Master Plan [I20120209]

Dear Mr. Weeks:

Thank you for submitting the Notice of Preparation of a Draft Environmental Impact Report for the Groundwater Basins Master Plan to the Southern California Association of Governments (SCAG) for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review (IGR) of programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12372. Additionally, SCAG reviews the Environmental Impact Reports of projects of regional significance for consistency with regional plans pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.

SCAG is also the designated Regional Transportation Planning Agency under state law, and as such is responsible for preparation of the Regional Transportation Plan (RTP) including its Sustainable Communities Strategy (SCS) component pursuant to SB 375. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans.[1] Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of the regional goals and policies in the RTP/SCS.

SCAG staff has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Groundwater Basins Master Plan and determined that this proposed project is regionally significant per CEQA Guidelines, Sections 15125 and 15206. The proposed project is consists of a master plan that identifies potential programs that can increase local groundwater supplies, improve water quality, and reduce dependence on imported water in the Central and West Coast Basins located in Los Angeles and Orange counties.

When available, please send environmental documentation to SCAG's *main office in Los Angeles* providing, at a minimum, the *full comment period for review.*

If you have any questions regarding the attached comments, please contact Pamela Lee at (213) 236-1895 or leep@scag.ca.gov. Thank you.

Sincerely,

Jonathan Nadler
Manager, Compliance and Performance Assessment

[1] SB 375 amends CEQA to add Chapter 4.2 Implementation of the Sustainable Communities Strategy, which allows for certain CEQA streamlining for projects consistent with the RTP/SCS. Lead agencies (including local jurisdictions) maintain the discretion and will be solely responsible for determining "consistency" of any future project with the SCS. Any "consistency" finding by SCAG pursuant to the IGR process should not be construed as a finding of consistency under SB 375 for purposes of CEQA streamlining.

COMMENTS ON THE NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE GROUNDWATER BASINS MASTER PLAN [SCAG NO. I20120209]

CONSISTENCY WITH RTP/SCS

SCAG reviews environmental documents for regionally significant projects for their consistency with the adopted RTP/SCS.

Regional Growth Forecasts

The Notice of Preparation of an Environmental Impact Report for the Groundwater Basins Master Plan should reflect the most recently adopted SCAG forecasts (see http://scag.ca.gov/forecast/index.htm), which are the 2012-2035 RTP/SCS population, household and employment forecasts. The forecasts for the region and applicable jurisdictions are below. SCAG forecasts are provided at both the city and county level.

	Adopted SCAG Region Wide Forecasts		Adopted Los Angeles County Forecasts		Adopted Orange County Forecasts	
Forecast	**Year 2020**	**Year 2035**	**Year 2020**	**Year 2035**	**Year 2020**	**Year 2035**
Population	19,663,000	22,091,000	10,404,000	11,353,000	3,266,000	3,421,000
Households	6,458,000	7,325,000	3,513,000	3,852,000	1,049,000	1,125,000
Employment	8,414,000	9,441,000	4,558,000	4,827,000	1,626,000	1,779,000

RTP/SCS GOALS

The 2012-20135 RTP/SCS links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations (see http://rtpscs.scag.ca.gov). The goals included in the 2012 RTP/SCS may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project within the context of regional goals and policies. Among the relevant goals of the 2012-2035 RTP/SCS are the following:

SCAG 2012-2035 RTP/SCS GOALS	
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region*
RTP/SCS G4:	*Preserve and ensure a sustainable regional transportation system*
RTP/SCS G5:	*Maximize the productivity of our transportation system*
RTP/SCS G6:	*Protect the environment and health for our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking)*
RTP/SCS G7:	*Actively encourage and create incentives for energy efficiency, where possible*
RTP/SCS G8:	*Encourage land use and growth patterns that facilitate transit and non-motorized transportation*
RTP/SCS G9:	*Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies*

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the policy and supportive analysis in a table format. Suggested format is as follows:

SCAG 2012-2035 RTP/SCS Goals		
Goal		**Analysis**
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*.	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region.*	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region.*	*Consistent: Statement as to why* *Not-Consistent: Statement as to why* *or* *Not Applicable: Statement as to why* *DEIR page number reference*
etc.	etc.	etc.

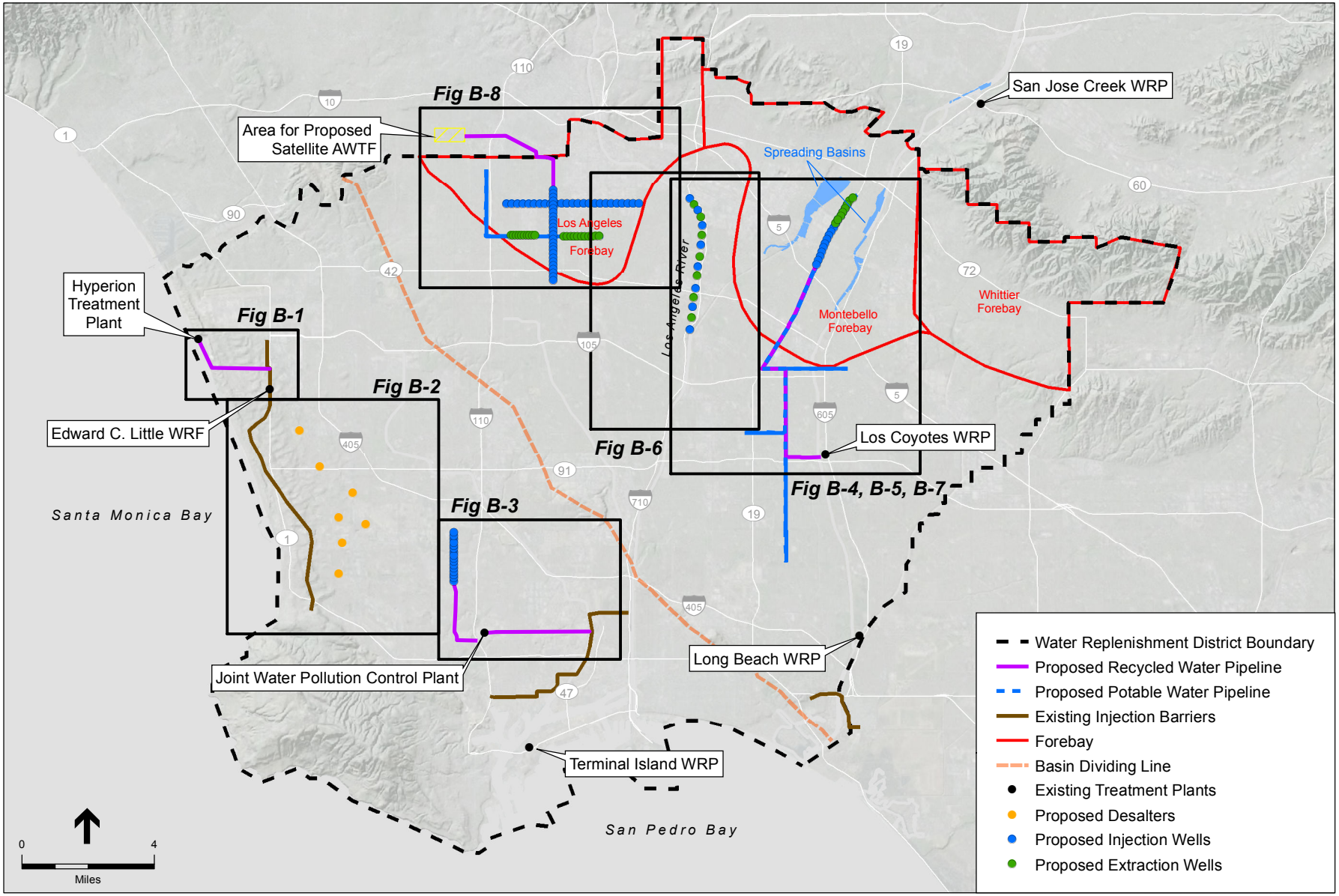
Attachment 7
Scoping Meeting Comments

Water Replenishment District of Southern California
Groundwater Basins Master Plan Program EIR
NOP Scoping Meeting
September 27, 2012, 4pm

Oral Public Comments

- Will the Program EIR cover both Concepts A & B or come back to Concept B later?
- Both Basins are underutilized. A plan to develop utilization for existing rights should be first (a plan to utilize what is not being utilized now).
    - What is the point of Concept B if Concept A can't be used?
    - Concept A should have a plan to utilize full rights.
- California Department of Transportation will provide scoping comments
- How will the Caltrans I-105 dewatering facility and other facilities be affected and mitigated for Concepts A & B? Will Concepts A & B be differentiated?
    - If recharge is increased, will water be lost at I-105 Freeway where Caltrans mitigation dewatering is located?
- How will Concept B affect natural underflow between Central Basin and West Coast Basin? Would underflow be expected to increase?
- What is the cost of the Program EIR and how is it being funded?
- Will the Program EIR list other specific projects?
- Will the Program EIR conduct a cost/acre-foot analysis? What will the cost per acre foot be after the Groundwater Basins Master Plan in implemented?
- Will the project separate out projects by Basins, i.e. West Coast Basin versus Central Basin?
    - Will there be a basin specific project list?
- Why is Concept B needed, and what are the driving factors for this concept?
- Is there a water demand report/growth report that shows what future water demand is expected to be?

Appendix B
Map Atlas

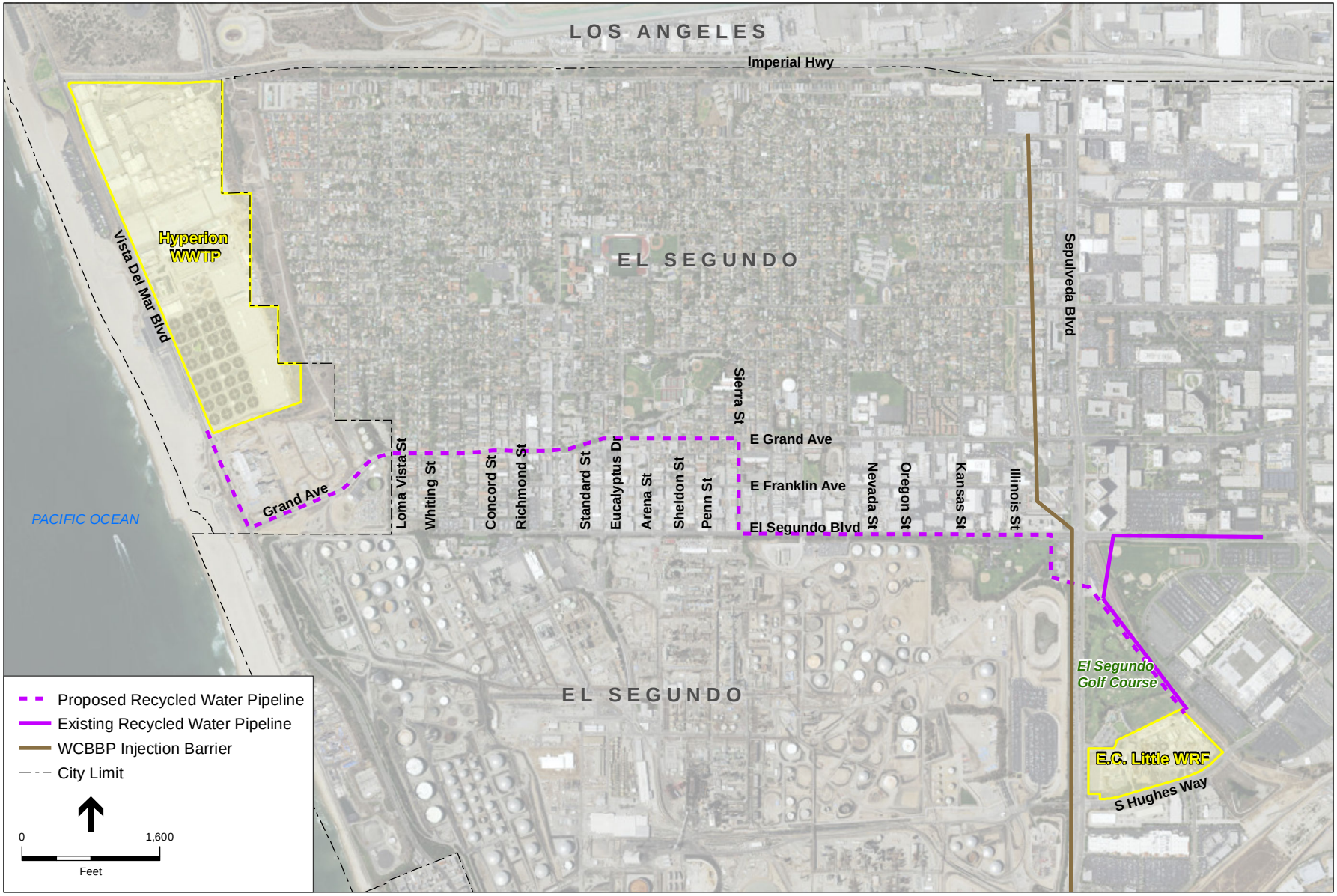


SOURCE: ESA, 2012.

Appendix B

Map Atlas Key

Proposed Geographic Locations of GBMP Projects

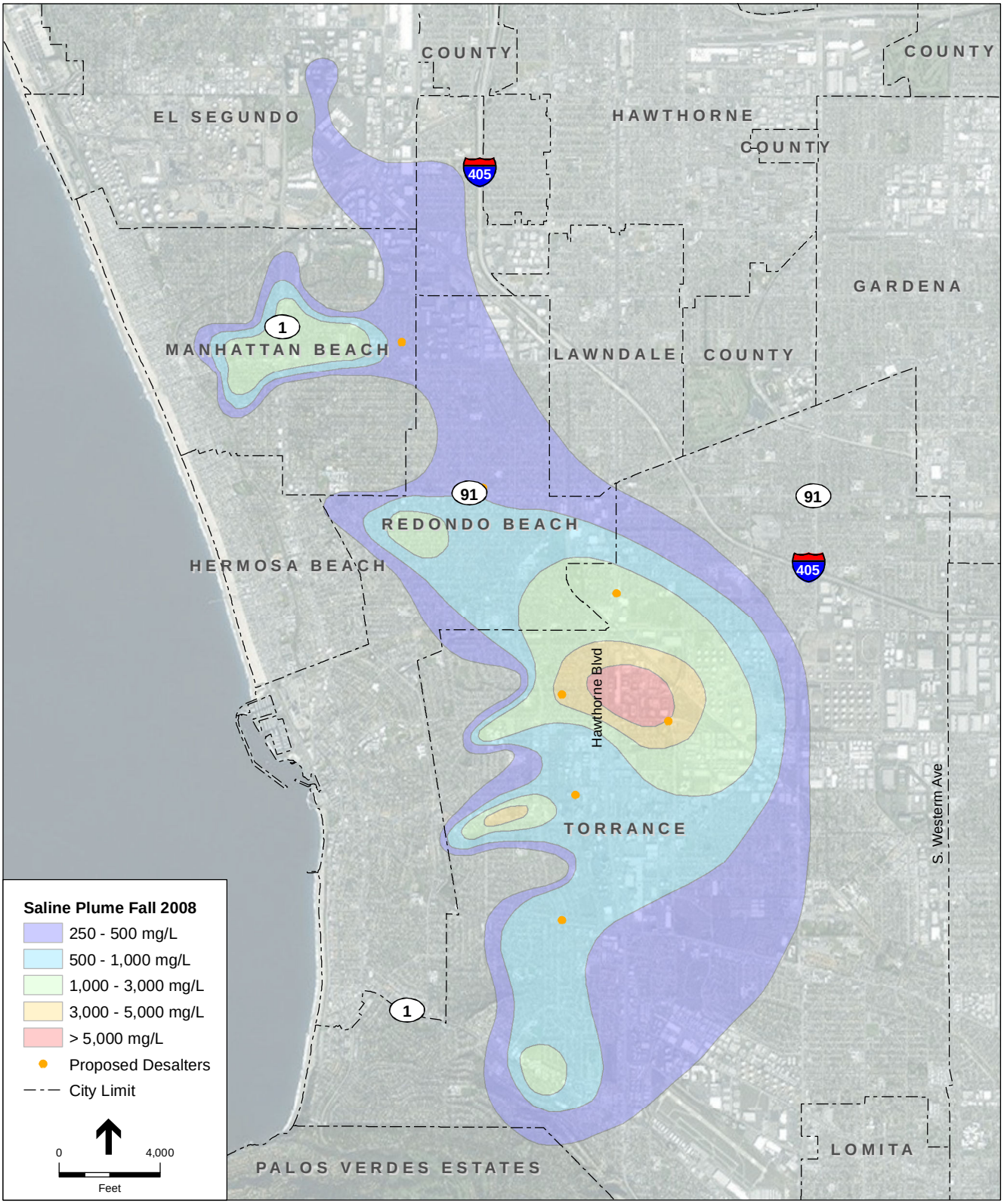


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-1

Projects W1 and W3: Increase Injection at West Coast Basin Barrier

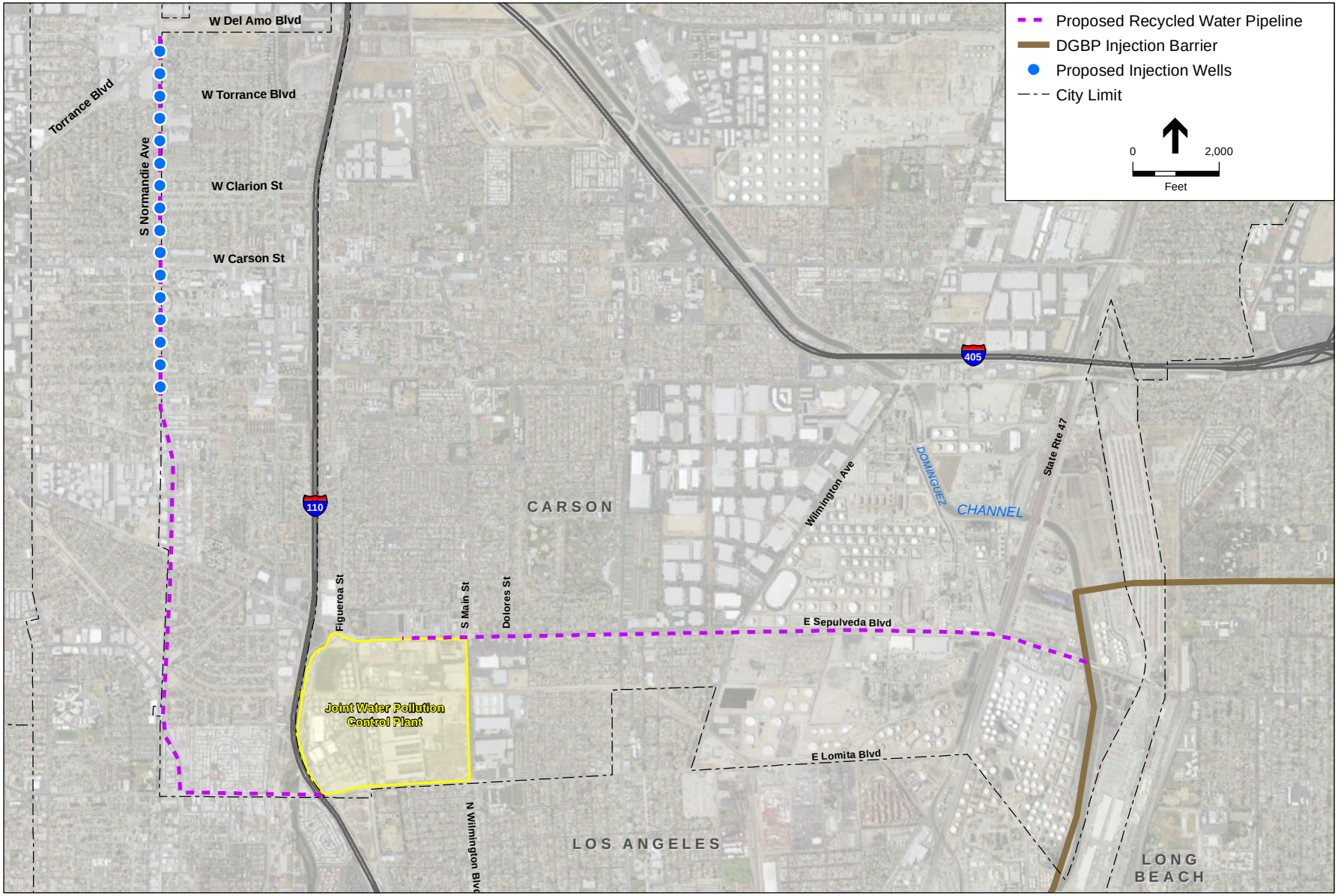


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-2

Project W2: Saline Plume Remediation



SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

Figure B-3

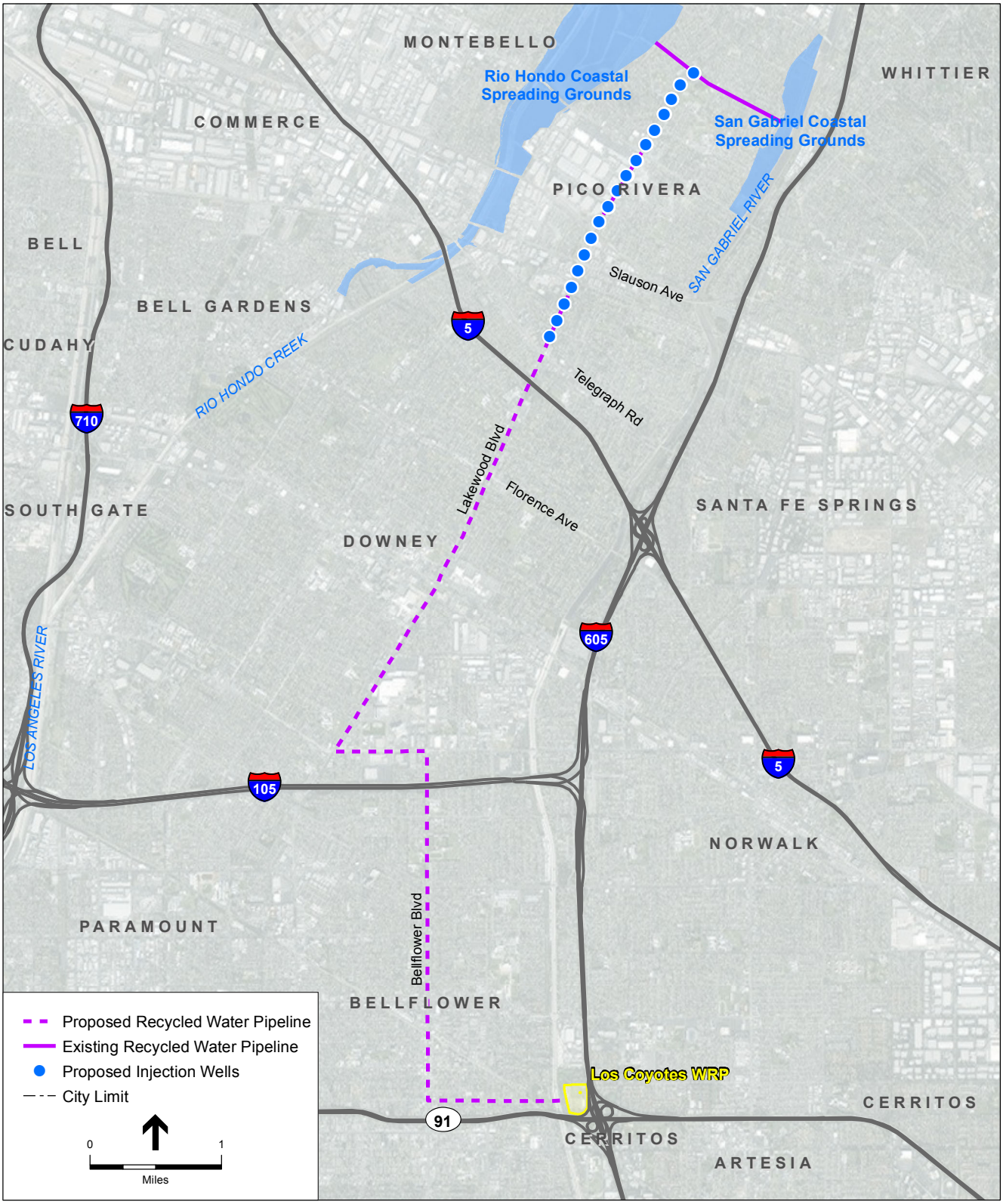
Project W4: Increase Injection at Dominguez Gap Barrier and Proposed Inland Injection Well System

SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-4

Project C3: Increase Replenishment at MFSG (Spreading)



SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-5

Projects C4, C8 and C9: Increase Replenishment at MFSG (Injection)

SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-6

Project C5: Los Angeles Forebay Storm Water Aquifer Recharge and Recovery Facility (ARRF)

SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-7

Project C6: Groundwater Basin Optimization Pipeline

SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure B-8

Project C10: Injection of Recycled Water in Los Angeles Forebay

Appendix C
GRIP Analysis of Potential Groundwater Impacts

ESA

Groundwater Reliability Improvement Program (GRIP) Analysis of Potential Groundwater Impacts

PREPARED FOR: Esther Rojas/Water Replenishment District of Southern California

PREPARED BY: Richard Sturn/CH2M HILL SCO
Judi Miller/CH2M HILL LAC

DATE: March 26, 2015

PROJECT NUMBER: 393041.T4.P3.01

This technical memorandum has been prepared for the Water Replenishment District of Southern California (WRD) and presents an analysis of potential groundwater impacts associated with the Groundwater Reliability Improvement Program (GRIP). This memorandum is organized as follows:

Section 1 – Groundwater Reliability Improvement Program Overview
Section 2 – Hydrogeology and Groundwater Quality of the Montebello Forebay Area
Section 3 – Summary of Existing and Proposed Recharge Operations
Section 4 – Analysis of Potential Groundwater Impacts
Section 5 – Mitigation Requirements
Section 6 – References

1. Groundwater Reliability Improvement Program Overview

The Montebello Forebay Spreading Grounds (MFSG) is the principle groundwater recharge area for the Central Groundwater Basin (Central Basin) of Southern California. Groundwater replenishment in the Central Basin involves multiple water sources, including imported water, that are spread at the MFSG. GRIP would allow WRD to offset the current use of imported water with a combination of tertiary treated and advanced water treatment (AWT) recycled water. GRIP would replace imported water supplies with 21,000 acre-feet per year (AFY) of recycled water consisting of an additional 11,000 AFY of tertiary treated recycled water purchased from Los Angeles County Sanitation Districts (LACSD) and approximately 10,000 AFY of AWT water produced at a new AWT plant.

The tertiary treated recycled water would be supplied from the San Jose Creek Water Reclamation Plant (SJCWRP) (east or west plants), and would be conveyed in the existing outfall pipeline to the MFSG. WRD would construct an AWT plant that would discharge AWT water from the AWT plant to a connection point with the existing outfall pipeline; this AWT water would be blended with the tertiary treated recycled water prior to spreading at the San Gabriel Coastal Basin Spreading Grounds (SGCBSG) and the Rio Hondo Coastal Basin Spreading Grounds (RHCBSG).

2. Hydrogeology and Groundwater Quality of the Montebello Forebay Area

The MFSG is located within the Montebello Forebay area of the Central Basin, adjacent to the Rio Hondo and San Gabriel Rivers, south of the Whittier Narrows (Figure 1). Surface water from upper watersheds of the Rio Hondo and San Gabriel Rivers discharge through the narrows onto the Los Angeles Coastal Plain. Likewise, groundwater from the San Gabriel Groundwater Basin flows through the narrows into the Central Basin.

The water-bearing units in the Central Basin consist of unconsolidated to partly consolidated nonmarine and marine deposits from the Holocene through Pleistocene age (Reichard et al., 2003). These water-bearing deposits have been subdivided into four aquifer systems: Recent, Lakewood, Upper San Pedro, and Lower San Pedro (Reichard et al., 2003).

Base map from U.S. Geological Survey digital maps 1:24,000

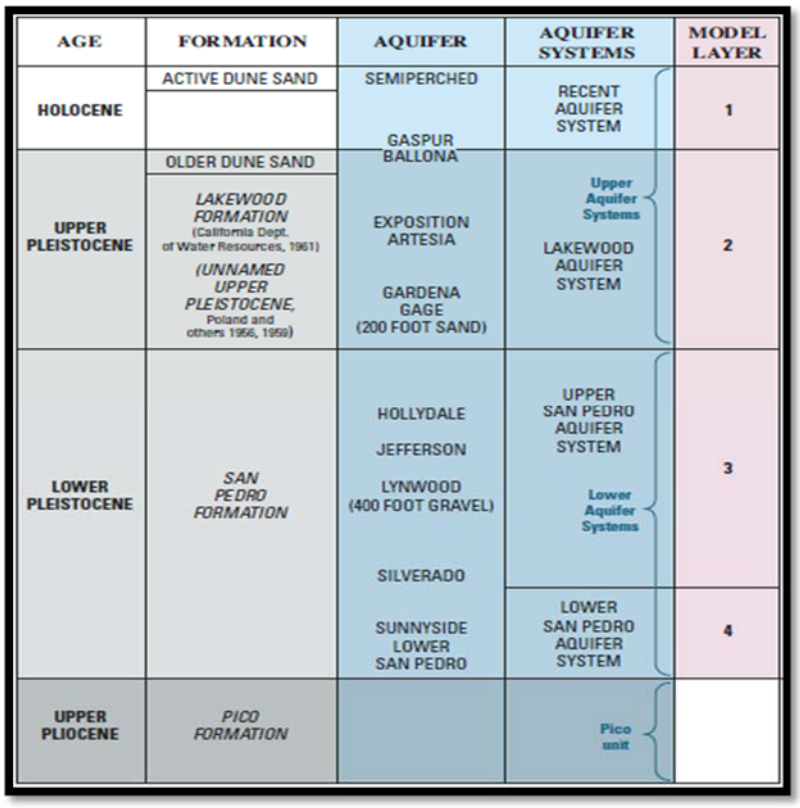
Geology redrawn from Reichard and others, 2003

FIGURE 1
Project Location Map
Groundwater Reliability Improvement Program

Source: Anders and Schroder, 2003 (Figure 1)

CH2MHILL

The individual aquifer systems contain designated aquifer units composed predominantly of sand and gravel (for example, the Silverado aquifer), which are separated by intervening finer-grained units. Figure 2 summarizes the age, formations, and aquifer designations of the water-bearing units in the Central Basin. Figure 2 also shows corresponding model layering implemented in the U.S Geological Survey (USGS) groundwater flow model for the Los Angeles Coastal Plain groundwater basins (Reichard et al., 2003). An updated version of this model was used to evaluate potential impacts to groundwater flow conditions associated with GRIP. See Section 4.1 for a discussion of modeling activities.

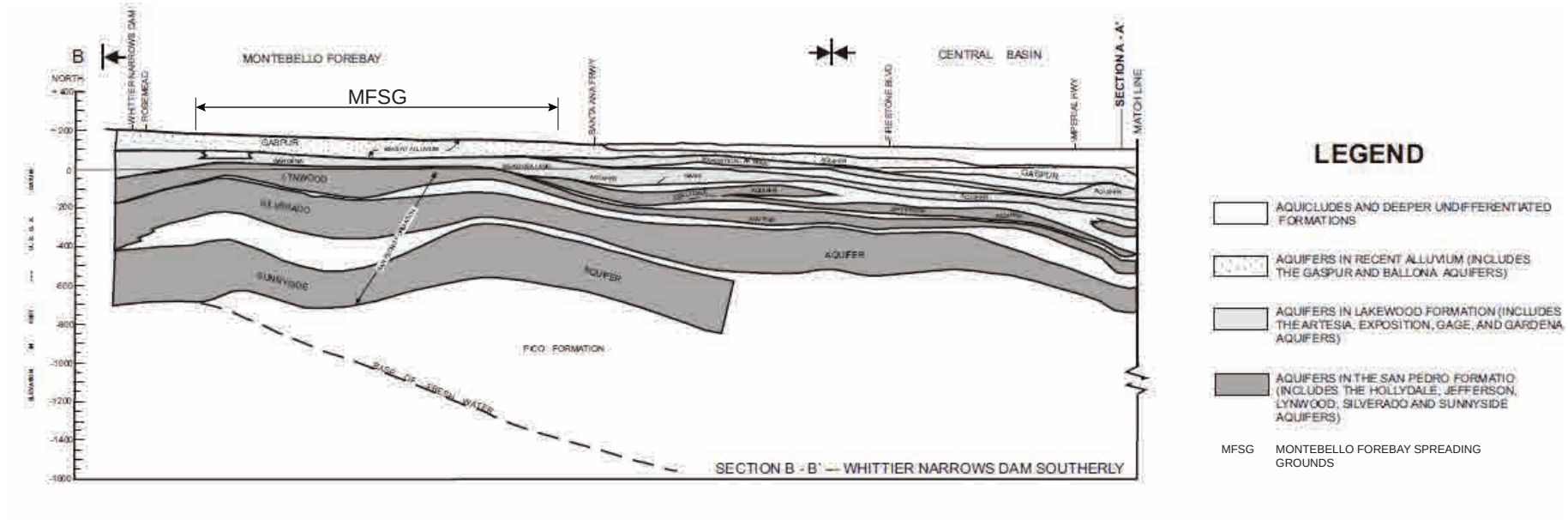


Source: Reichard et al., 2003 (Figure 3)

FIGURE 2
Aquifer Units – Central Basin
Groundwater Reliability Improvement Program

The fine-grained units separating the aquifer units are thin or absent in the Montebello Forebay. There is a high degree of mergence among the aquifer units relative to conditions in the Central Basin Pressure Area (Figure 3). This configuration facilitates vertical groundwater migration from the Recent Aquifer System (Gasper aquifer) into the underlying Lakewood and Upper San Pedro Aquifer Systems, which recharges the deeper units.

Aquifer units in the Montebello Forebay are highly transmissive. Model-calibrated hydraulic conductivities range from 51 to 800 feet per day (ft/day) for the Recent Aquifer System and 11 to 150 ft/day for the Lakewood, Upper San Pedro, and Lower San Pedro Aquifer Systems (Kennedy/Jenks/Todd LLC and LLNL [KJT/LLNL], 2008).



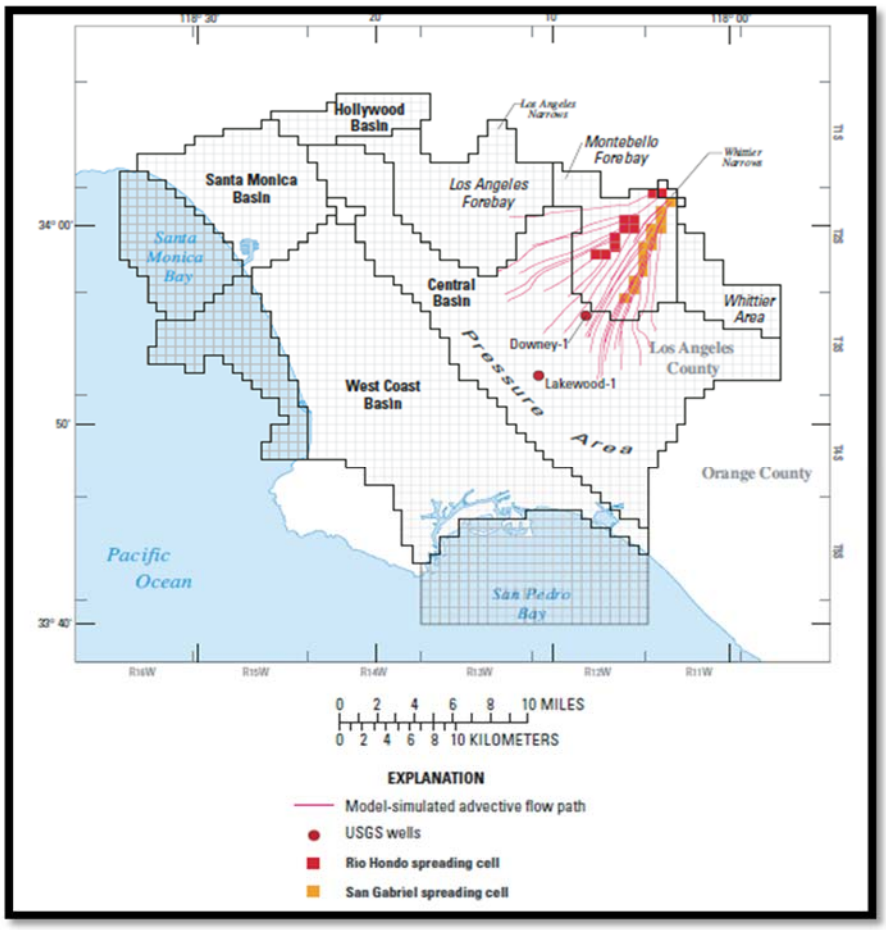
Not to scale

FIGURE 3
Hydrogeologic Cross Section
Groundwater Reliability Improvement Program

Source: WRD, 2013 (Figure 1.4)

2.1 Groundwater Flow Conditions

Groundwater flows from the San Gabriel Groundwater Basin through the Whittier Narrows, mixes with groundwater recharged at the MFSG, and diverges radially into the Central Basin. Figure 4 shows model-simulated advective flow paths from the MFSG into the Central Basin Pressure Area, illustrating this radial flow pattern.



Source: Reichard et al., 2003 (Figure 38)

FIGURE 4
Advective Flow Paths – MFSG to Central Basin Pressure Area
Groundwater Reliability Improvement Program

2.1.1 Vertical Gradients

Vertical hydraulic gradients are generally downward in the Montebello Forebay area. Figure 5 shows groundwater level hydrographs for WRD's Pico #2 and Rio Hondo #1 nested monitoring wells. The wells are located near the southern ends of the SGCBSG and RHCBSG, respectively. At Pico #2, the vertical gradient is downward across all aquifer units, with approximately 30 feet of head difference between the Gardena aquifer (shallow) and Lower Sunnyside aquifer (deep) well screens. At Rio Hondo #1, the vertical gradient is downward from the Gage through Silverado aquifers, with approximately 10 feet of head difference across these units. Hydraulic heads are higher, however, in the underlying Sunnyside aquifer and there is an upward hydraulic gradient from the Sunnyside to the Silverado; occasionally, heads in the Sunnyside have been higher than those in the Gage and Lynwood aquifers. The upward hydraulic gradient from the Sunnyside at this location is likely caused by pumping from the Silverado aquifer. In contrast, little groundwater production occurs from the Sunnyside aquifer in the Montebello Forebay (Reichard et al., 2003).

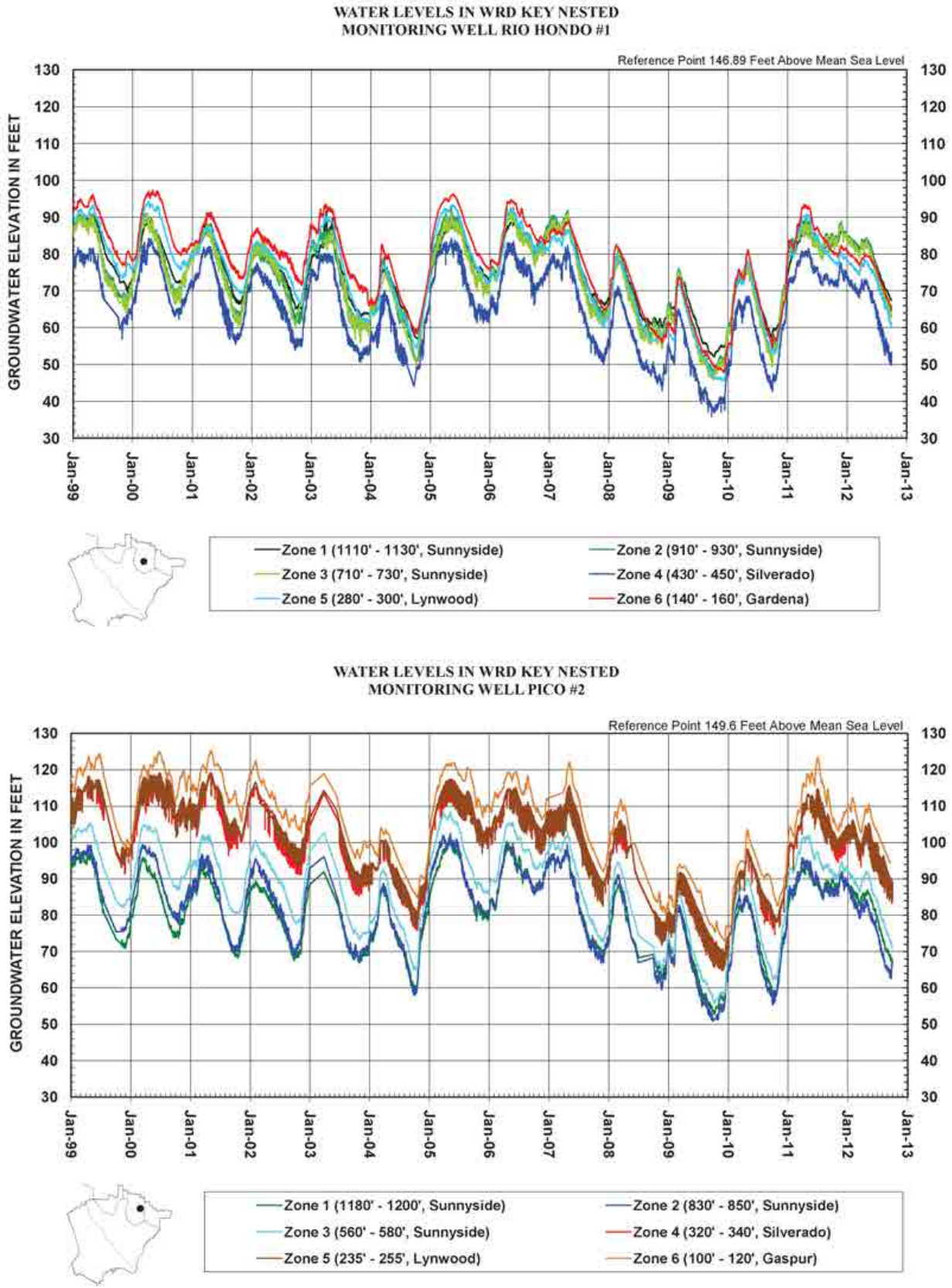


FIGURE 5
Key Well Hydrographs
Groundwater Reliability Improvement Program

Source: WRD, 2013 (Figures 2.3 and 2.4)

2.1.2 Groundwater Budget

Spreading operations at the MFSG are the most significant source of groundwater recharge in the Central Basin. On average, approximately 132,000 AFY of water was spread between 1971 and 2000, which exceeds the estimated areal and mountain front recharge for the entire Los Angeles Coastal Plain (67,500 AFY) (Reichard et al., 2003).

Figure 6 illustrates the simulated average groundwater flows between model layers, basins, and subareas in the USGS groundwater flow model for years 1996 through 2000 (Reichard et al., 2003). A key feature of this figure is the vertical flow component within the Montebello Forebay. Approximately 110,600 AFY of groundwater flows from Model Layer 1 (Recent Aquifer System) to Layer 2 (Lakewood Aquifer System), and approximately 107,700 AFY flows from Layer 2 to Layer 3 (Upper San Pedro Aquifer System). Significant lateral flow occurs within Layer 3 from the Montebello Forebay to the Central Basin Pressure Area (61,500 AFY). Lateral flow in the Upper San Pedro Aquifer System (for example, Silverado aquifer) from the Montebello Forebay is the largest source of groundwater inflow to the Central Basin Pressure Area (Figure 6).

Figure 6 also illustrates significant lateral flow (21,000 AFY) in Layer 1 from the Montebello Forebay to the Central Basin Pressure Area.

2.2 Groundwater Quality

Groundwater quality standards for the Montebello Forebay (and Central Basin) are incorporated into the Water Quality Control Plan for the Los Angeles Region (Basin Plan) (LARWQCB, 1994). The beneficial uses of groundwater include municipal supply; therefore, the water quality objectives for regulated substances are equivalent to drinking water standards. In addition, the Basin Plan specifies area-specific water quality objectives (Basin Plan Objectives) for total dissolved solids (TDS), chloride, sulfate, nitrogen compounds, and boron. The Basin Plan Objectives for the Montebello Forebay and Central Basin Pressure Area include:

- TDS – 700 milligrams per liter (mg/L)
- Chloride – 150 mg/L
- Sulfate – 250 mg/L
- Nitrogen compounds – 10 mg/L nitrate or nitrate plus nitrite (as N), 1 mg/L nitrite (as N)
- Boron – 1.0 mg/L

Groundwater quality in the Montebello Forebay has been extensively monitored as part of WRD's regional groundwater monitoring program, monitoring for the MFSG, and required monitoring for drinking water supply wells. In general, existing groundwater quality meets drinking water standards and applicable Basin Plan Objectives, although concentrations of select compounds may locally exceed some of these limits. TDS concentrations locally exceed the recommended secondary maximum contaminant level (MCL) of 500 mg/L. Concentrations of select metals (for example, iron and manganese) locally exceed MCLs due to site-specific aquifer conditions. Local groundwater impacts also occur at environmental release sites. In addition, several large volatile organic compound (VOC) plumes under U.S. Environmental Protection Agency (EPA) oversight occur in the area. An overview of groundwater quality for salts, nutrients, metals, other constituents, and existing VOC plumes is presented in the following sections.

2.2.1 Salts and Nutrients

An evaluation of salt and nutrient inputs to the Central and West Coast Basin, including GRIP, is presented in the *Draft Salt and Nutrient Management Plan, Central Basin and West Coast Basin, Southern Los Angeles County, California* (SNMP) (Todd Engineers, 2014). The SNMP assessed potential water quality parameters to identify those most representative of salts and nutrients in the Central Basin. TDS, chloride, and nitrate were selected as the representative indicator parameters.

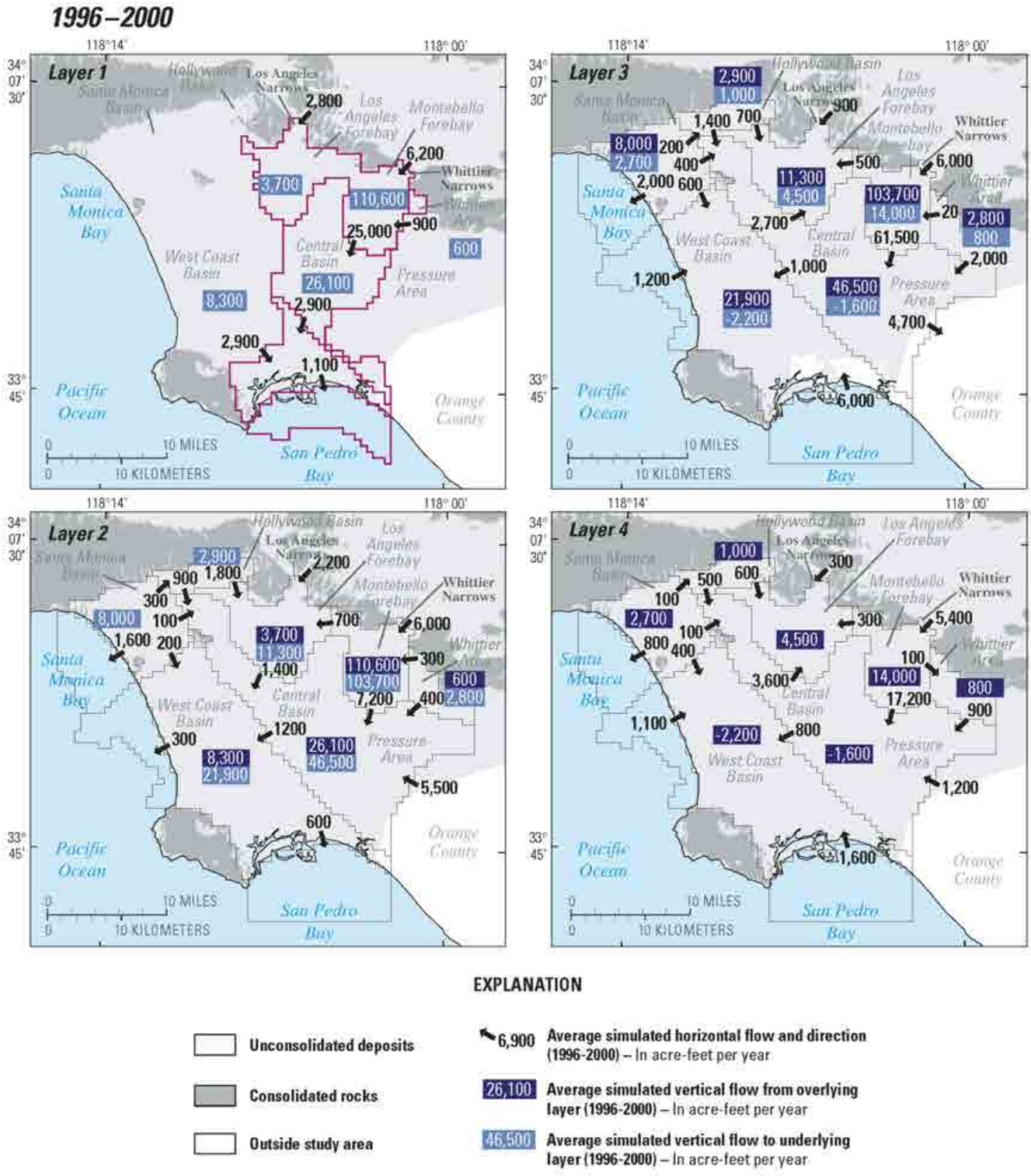


FIGURE 6
Simulated Inter-Zone Flows
Groundwater Reliability Improvement Program

Source: Reichard and others, 2003 (Figure 34B)

The distributions of the TDS, chloride, and nitrate concentrations reported in groundwater production wells in the Montebello Forebay (2012 to 2009) are illustrated in Figure 7. Chloride concentrations are less than the recommended secondary MCL (250 mg/L); nitrate concentrations are less than the primary MCL (10 mg/L). TDS concentrations locally exceed the recommended secondary MCL but are less than the upper limit secondary MCL (1,000 mg/L).

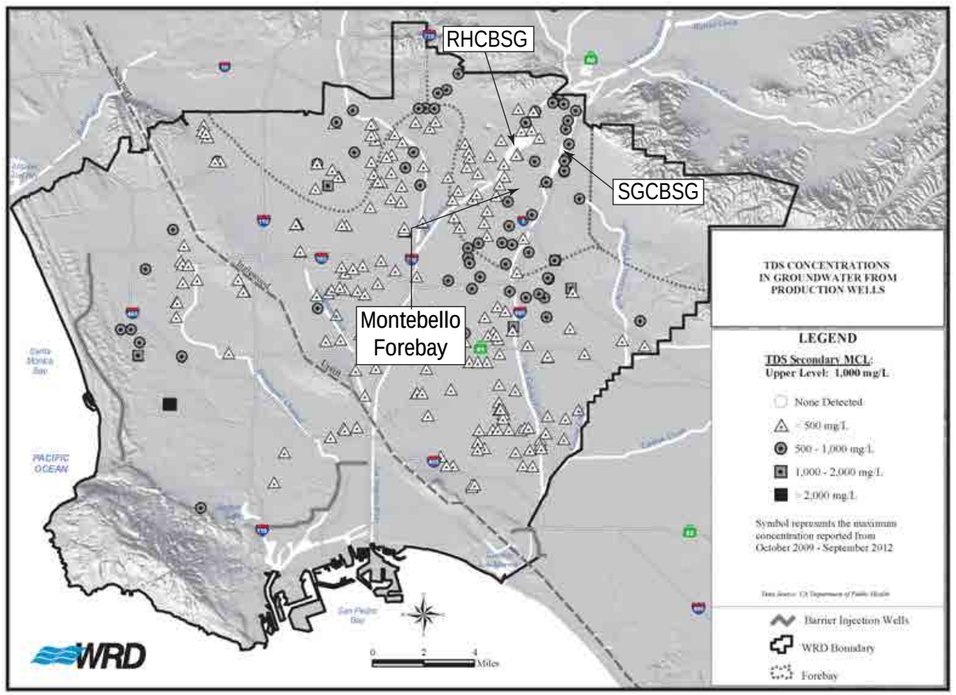
In general, TDS and chloride concentrations in the Montebello Forebay have been below Basin Plan Objectives and relatively stable. Figure 8 shows groundwater TDS and chloride concentration trends for WRD's Pico #2 and Rio Hondo #1 nested monitoring wells for 1998 through 2012. The wells are located near the southern end of the SGCBSG and RHCBSG, respectively. At Rio Hondo #1, chloride and TDS concentrations have been less than the Basin Plan Objectives (150 and 700 mg/L, respectively) for all screen depths. At Pico #2, chloride and TDS concentrations have been less than the Basin Plan Objectives for all screen depths except the screen completed in the middle Sunnyside aquifer (830 to 850 feet below ground surface). TDS exceeded the Basin Plan Objective in that well screen during one sampling event in 2008.

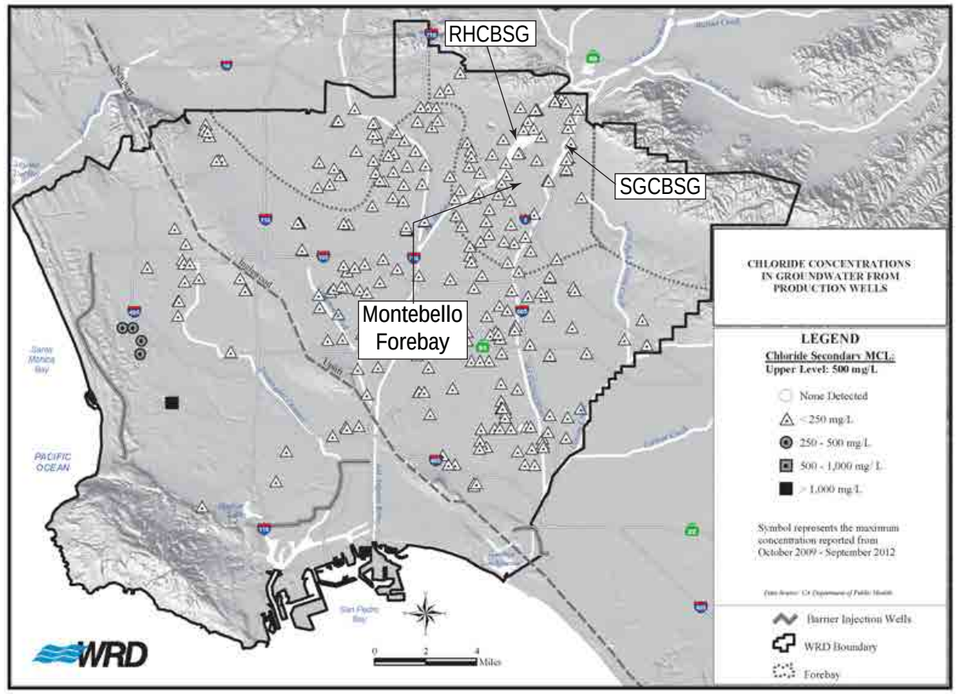
2.2.2 Metals and Other Groundwater Constituents

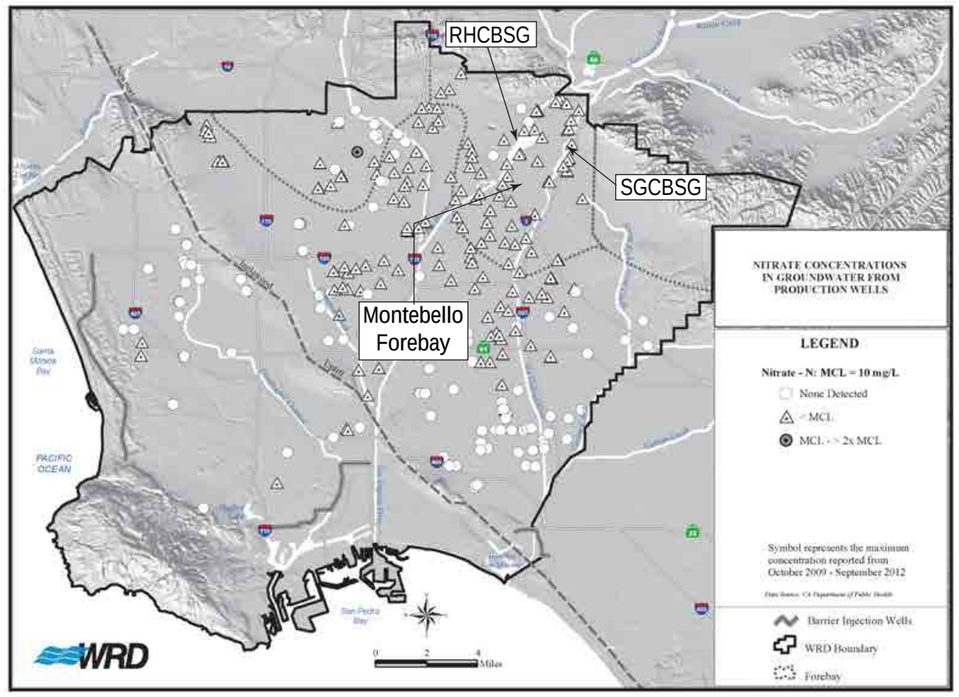
WRD tracks and assesses basinwide water quality for other parameters in addition to salt and nutrient indicators. WRD's regional groundwater monitoring reports include results for iron, manganese, arsenic, hexavalent chromium, trichloroethylene (TCE), tetrachloroethylene (PCE), 1,4-dioxane, 1,2,3-trichloropropane (1,2,3-TCP), and perchlorate. A general summary of these constituents for the Montebello Forebay is presented below for water year 2011-2012 (WRD, 2013).

- **Iron, magnesium, arsenic, and hexavalent chromium**: The concentrations of these metals reported for WRD monitoring wells and production wells are generally below the respective MCLs. Localized exceedances of iron and manganese MCLs, however, are likely caused by local aquifer conditions.
- **TCE and PCE**: These VOCs have been detected at low concentrations (less than MCLs) at select WRD monitoring wells in the Montebello Forebay (including Pico #2), and at concentrations exceeding MCLs at a few production wells. The PCE and TCE concentrations detected in these monitoring wells are likely associated with local environmental release sites.
- **1,4-Dioxane**: An MCL for 1,4-dioxane has not yet been promulgated, but the drinking water notification level (NL) is 1 microgram per liter (μg/L). 1,4-Dioxane has been detected at concentrations exceeding the NL in WRD monitoring wells and production wells in the Montebello Forebay. 1,4-Dioxane has been used as a solvent stabilizer for 1,1-trichloroethane (1,1-TCA) formulations and is commonly associated with environmental release of 1,1-TCA. It also occurs at low levels (1 to 2 μg/L) in tertiary treated effluent from the Pomona, Whittier Narrows, and San Jose Creek wastewater treatment plants (Todd Engineers, 2014). It is rarely detected in shallow MFSG monitoring wells; consequently, the 1,4-dioxane detections in the Montebello Forebay are thought to be associated with environmental release sites and not managed aquifer recharge at the MFSG (Todd Engineers, 2014).
- **1,2,3-TCP**: Like 1,4-dioxane, an MCL has not been established for 1,2,3-TCP. The NL, however, is very low (0.005 μg/L). 1,2,3-TCP was not detected in WRD monitoring well samples in water year 2011-2012, which were analyzed using low-detection-limit methods, nor was it detected in production wells, although higher-detection-limit methods were used for analysis.
- **Perchlorate**: The perchlorate MCL is 6 μg/L. Perchlorate has been detected in select WRD monitoring wells at concentrations less than the MCL, but it is rarely detected in production wells.

In general, existing monitoring results suggest there are no widespread groundwater quality issues in the Montebello Forebay associated with these parameters. Where concentrations exceed regulatory limits, the exceedances are likely associated with site-specific aquifer conditions or environmental releases.



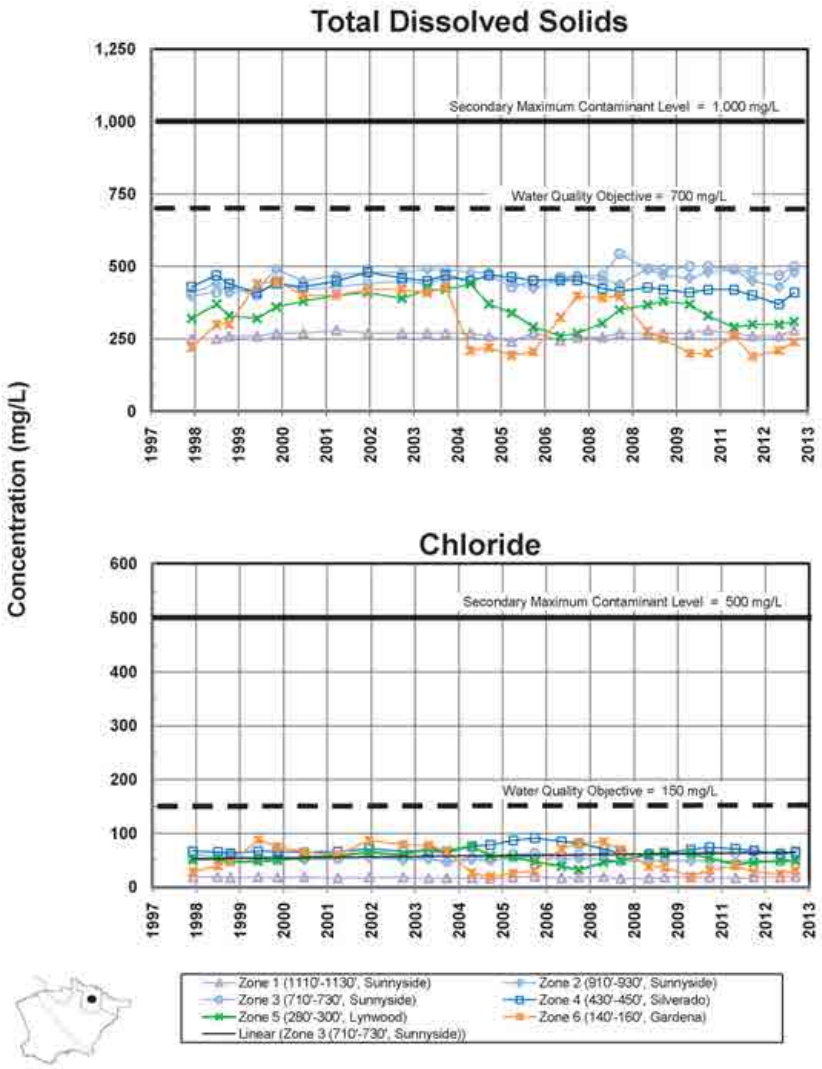




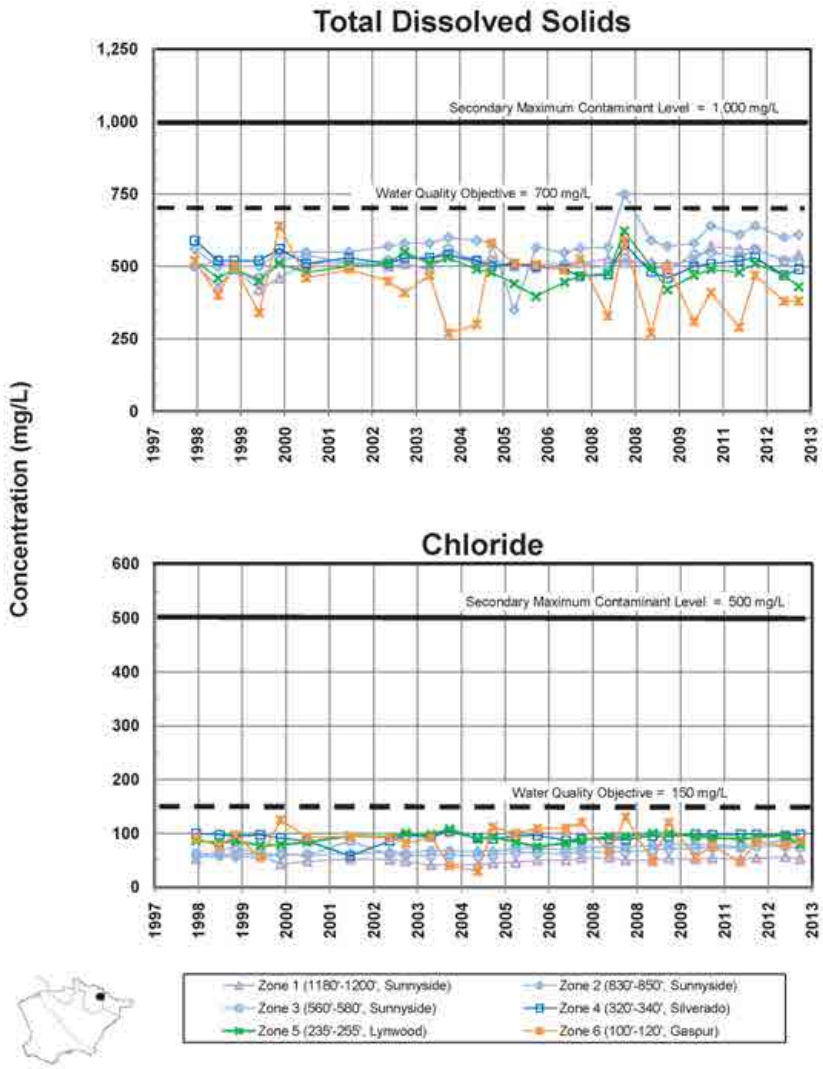
RHCBSG - Rio Hondo Coastal Basin Spreading Grounds
SGCBSG - San Gabriel Coastal Basin Spreading Grounds

Source: WRD, 2013 (Figures 3.2, 3.8, 3.10)

FIGURE 7
Distribution Nitrate, Chloride, and TDS Concentrations in Production Wells
Groundwater Reliability Improvement Program



WATER QUALITY CONCENTRATIONS IN
WRD KEY MONITORING WELL RIO HONDO #1



WATER QUALITY CONCENTRATIONS IN
WRD KEY MONITORING WELL PICO #2

FIGURE 8
TDS and Chloride Concentration Trends in Key Wells
Groundwater Reliability Improvement Program

Source: WRD, 2013 (Figure 4-2 and 4-3)

2.2.3 Volatile Organic Compound (VOC) Plumes

Two large, composite VOC plumes associated with EPA Superfund sites occur in the Montebello Forebay area. Figure 9 shows the generalized distribution of the Whittier Narrows Operable Unit (WNOU) and Omega Chemical Operable Unit 2 (Omega OU2) VOC plumes.

The WNOU is located north (upgradient) of the MFSG (Figure 9) and encompasses approximately 4 square miles in the southern portion of the San Gabriel Basin. It represents the primary discharge point for groundwater and surface water flow exiting the San Gabriel Basin into the Central Basin. PCE and TCE are the primary groundwater contaminants found upgradient and within the WNOU. EPA signed an Interim Record of Decision (IROD) on March 31, 1993, and an IROD Amendment on November 10, 1999, requiring implementation of hydraulic containment north of the Whittier Narrows Flood Control Dam (WND). The remedy is ongoing and is intended to contain groundwater impacts and protect groundwater resources in Whittier Narrows and the Montebello Forebay.

Omega OU2 is located southeast (cross-gradient) of the MFSG (Figure 9). PCE, TCE, and Freons are the primary groundwater contaminants in Omega OU2. The feasibility study for OU2 is complete; an IROD was approved in 2011. The IROD remedy requires hydraulic containment of the high-concentration portions of the OU2 VOC plume. EPA is currently negotiating a Unilateral Administrative Order with the respondents to implement the interim remedy.

3. Summary of Existing and Proposed Recharge Operations

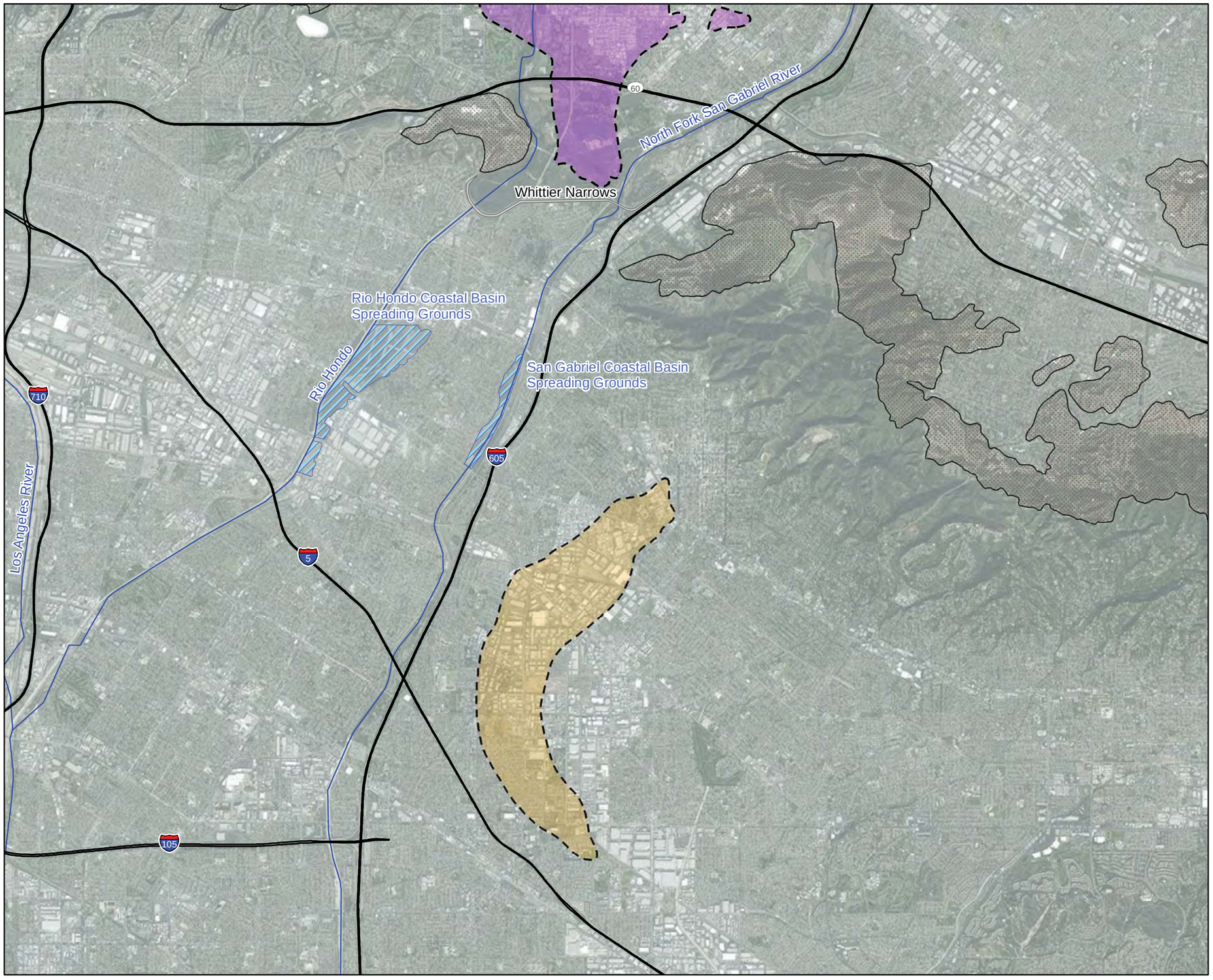
The MFSG is located downstream of the WND. The WND discharges to two different watersheds: the Rio Hondo on the west (Los Angeles River Watershed), and the San Gabriel River on the east (San Gabriel River Watershed). Both facilities are located approximately 2 miles downstream of the WND. The RHCBSG is located on both sides of the Rio Hondo. The SGCBSG is located along the west side of the San Gabriel River. Figure 10 shows the locations of the MFSG, WND, and other important features.

3.1 Existing Recharge Operations

One of the main objectives of the MFSG is to recharge local water flow released from the WND. The system also has the capacity to take tertiary treated recycled water flows from the Whittier Narrows Wastewater Reclamation Plant (WNWRP), the SJCWRP, and the Pomona Wastewater Treatment Plant, as well as imported water from upstream Metropolitan Water District of Southern California (MWD) connections. The MFSG can accept recycled water flows from upstream wastewater treatment plants that discharge to lined streambeds that flow to the San Gabriel River. When stormwater flows exceed the infiltration capacity of the MFSG, stormwater can be temporarily stored behind the WND in a conservation pool and released when infiltration capacity is available.

The Rio Hondo is lined below the WND. Stormwater and recycled water flow from upstream sources are diverted into the basins via diversion gates along the Rio Hondo. The San Gabriel River below the WND is unlined north of Firestone Boulevard. The SGCBSG incorporates seven in-channel basins separated by inflatable dams, as well as three off-channel basins fed by diversion gates. In addition, tertiary treated recycled water can be diverted from the SJCWRP outfall pipeline into the basins.

Figure 11 shows the annual volumes of water sources applied (spread) at the MFSG for water years 2001 through 2010. Table 1 summarizes important water quality parameters for these water sources. Figure 11 and Table 1 exclude non-applied inflow components (groundwater underflow and infiltration of precipitation) to the MFSG because this discussion focuses on the quality of applied water. Refer to Section 3.3.4 for a discussion of the non-applied inflow components and the recycled water contribution (RWC) limit for the MFSG.



LEGEND

- Major Road
- River/Stream
- Whittier Narrows Dam
- Spreading Basin
- Bedrock
- Whittier Narrows OU Composite Shallow and Intermediate Zone PCE Plume
- Omega Chemical Superfund Site OU2 Boundary

Notes:
Whittier Narrows OU Composite Shallow and Intermediate Zone PCE Plume based on the maximum extent of PCE above the California MCL in the Shallow and Intermediate Zones through November 2012.
Omega Chemical Superfund Site OU2 Boundary based on the maximum extent of VOC plumes through the first quarter of 2011.
MCL = maximum contaminant level
OU = operable unit
PCE = tetrachloroethene
VOC = volatile organic compound

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Projection: UTM Zone 11N
Datum: NAD 1983

0 3,000 6,000
Approximate scale in feet

1 inch = 6,000 feet

N

FIGURE 9
Major Groundwater VOC Plumes
Groundwater Reliability Improvement Program

CH2MHILL

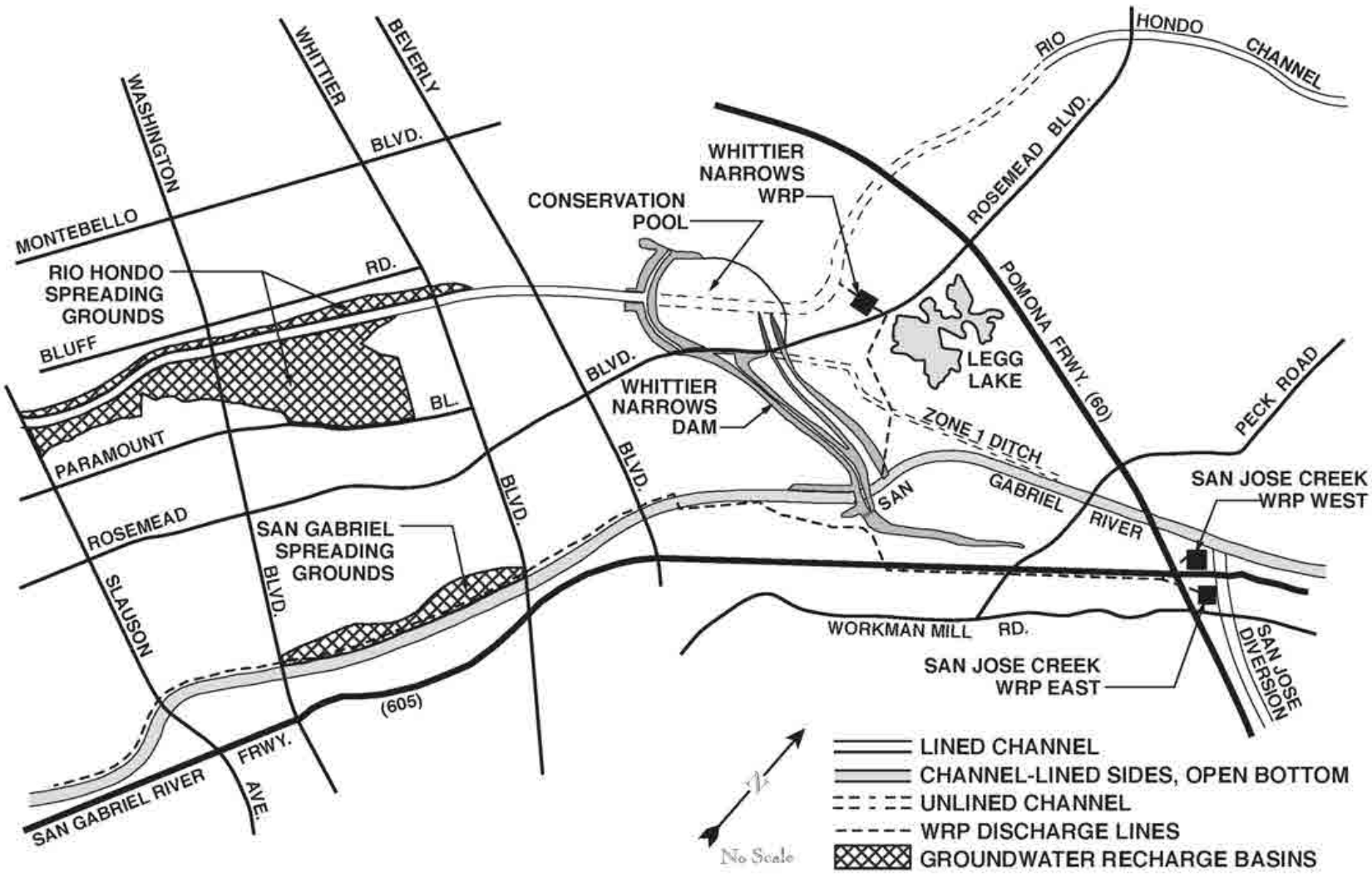


FIGURE 10
Montebello Forebay Groundwater Recharge Facilities
Groundwater Reliability Improvement Program

Source: LACSD, 2014 (Figure 2.1)

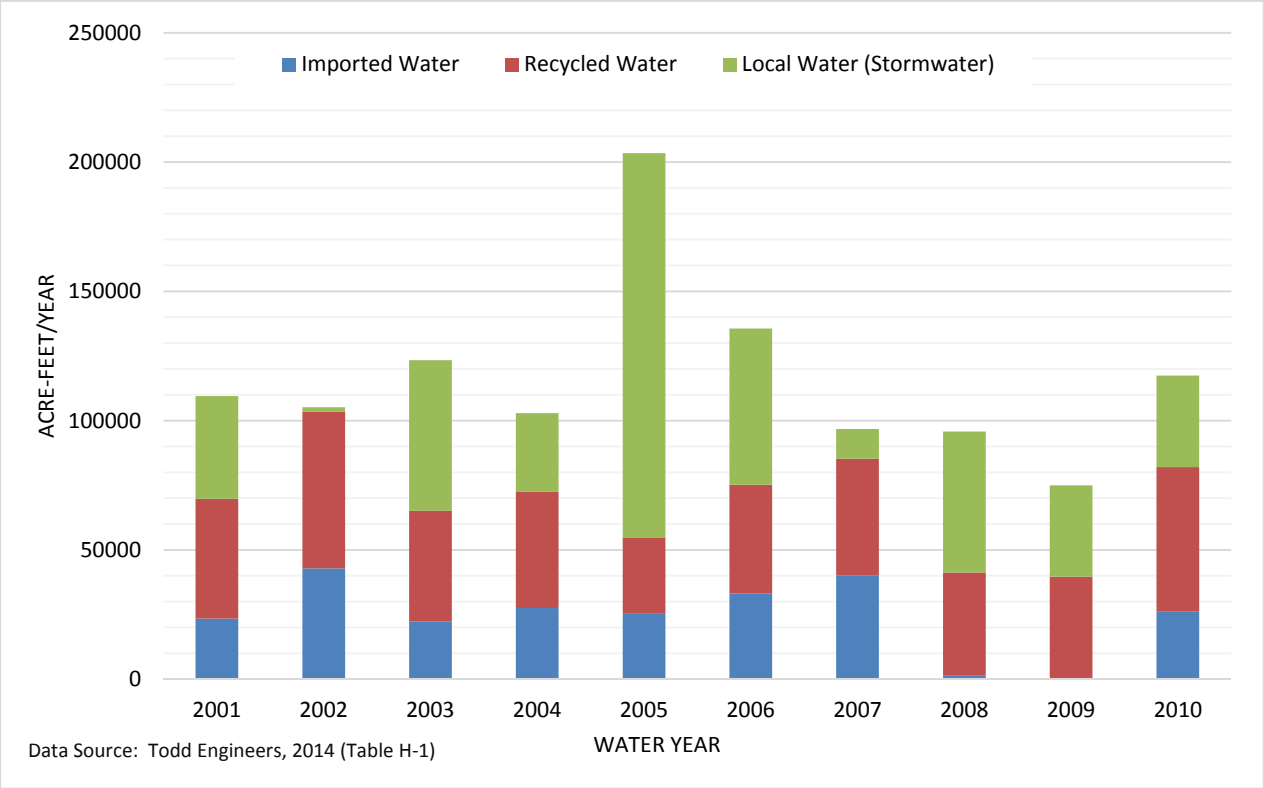


FIGURE 11
Sources of Applied Water MFSG – Water Years 2001-2010
Groundwater Reliability Improvement Program

TABLE 1
Quality of Applied Water MFSG – Water Years 2001-2010
Groundwater Reliability Improvement Program

Water Source	TDS (mg/L)	CL (mg/L)	NO_3 - (N) (mg/L)	Average Annual Volume Applied (AFY)[a]
Local Water	259	40	1.58	49,120
Imported Water				
Colorado River	624	88	0.21	7,233
State Water Project	251	68	0.67	16,347
Recycled Water				
San Jose Creek West	533	109	5.63	34,493
San Jose Creek East	626	149	3.41	
Whittier Narrows	550	105	6.31	6,987
Pomona	545	126	4.41	3,154
Volume Average Baseline (2001-2010)	419	86	2.36	

[a] Average annual volume for water years 2001-2010

CL – chloride

NO_3 - (N) – nitrate as nitrogen

Data source: Todd Engineers, 2014 (Tables 10, H-1, 1-9,1-4 and 1-5)

3.2 Proposed Operations—GRIP

The annual volume of imported water used for groundwater replenishment at the MFSG has varied over time (Figure 11) based on availability and cost. GRIP would replace this uncertain and variable source of supply for replenishment with a relatively constant supply of recycled water. The project would increase the quantity of recycled water available for recharge in the MFSG from approximately 50,000 AFY to 71,000 AFY. The additional 21,000 AFY of recycled water applied to the basins would be a combination of tertiary recycled water obtained from the SJCWRP (11,000 AFY) and AWT obtained from a newly constructed treatment plant (10,000 AFY).

Figure 12 illustrates projected annual volumes of applied water sources that would be spread at the MFSG over a 10-year period under GRIP assuming the baseline applied-water components for water years 2001 through 2010, with the exception that imported water supplies have been replaced with 21,000 AFY of GRIP recycled water. Table 2 summarizes projected water quality parameters for these applied water sources. The average quality of applied water under GRIP (Table 2) is similar to baseline conditions (Table 1) because the quality of the AWT/tertiary treated blend is similar to that of the imported water.

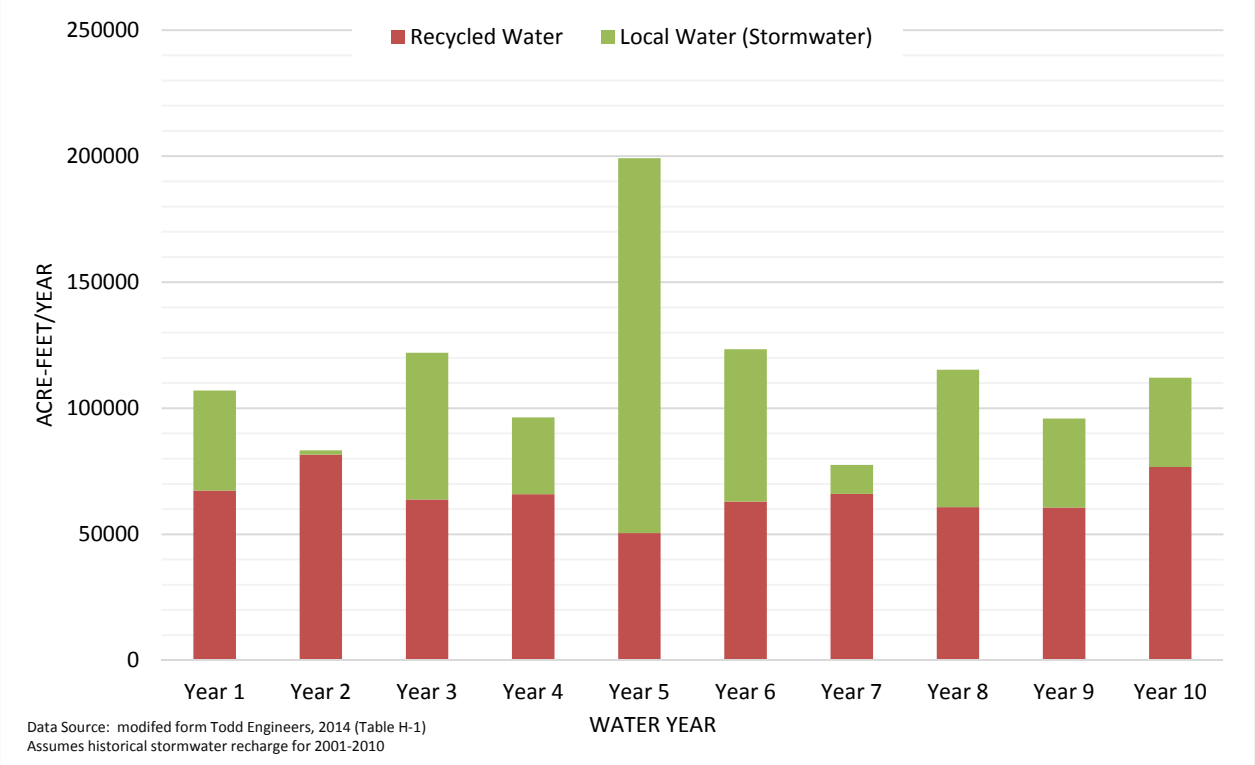


FIGURE 12
Projected Sources of Applied Water – GRIP
Groundwater Reliability Improvement Program

TABLE 2
Projected Quality of Applied Water MFSG – GRIP
Groundwater Reliability Improvement Program

Water Source	TDS (mg/L)	CL (mg/L)	NO_3 - (N) (mg/L)	Average Annual Volume Applied (AFY)[a]
Local Water	259	40	1.58	49,120
Tertiary Recycled Water				
San Jose Creek West	533	109	5.63	45,493
San Jose Creek East	626	149	3.41	
Whittier Narrows	550	105	6.31	6,987
Pomona	545	126	4.41	3,154
AWT Recycled Water	98	37	0.79	10,000
Volume Average, GRIP	422	89	2.60	

[a] Assumes projected average annual volume for water years 2001-2010, an additional 11,000 AFY of tertiary recycled water, and an additional 10,000 AFY of AWT recycled water

Data source: Todd Engineers, 2014 (Tables 10, H-1, I-9, 1-4 and 1-5)

3.3 Potential Operational Constraints

Potential constraints associated with the GRIP project include:

- Availability of recycled water for application at the MFSG
- Competing use for recharge capacity of stormwater flows
- Maintaining a mix of tertiary treated and AWT recycled water for effective soil aquifer treatment (SAT)
- Compliance with the RWC criterion

3.3.1 Availability of Recycled Water

The availability of recycled water for GRIP was evaluated previously (CH2M HILL, 2013). A "worst case" scenario was examined to evaluate the adequacy of the SJCWRP's recycled water supply versus projected demands. The analysis conservatively assumed summer period recycled water supply, when SJCWRP recycled water production and the additional recycled water available from minor diversions would be at their lowest levels. The analysis included existing WRD recycled water demands, new demands from GRIP, and non-WRD demands.

The findings confirm that supply of recycled water at the SJCWRP is adequate for the additional 21,000 AFY of recycled water demand for GRIP. Table 3 summarizes the findings of this analysis.

TABLE 3
Summer Month Recycled Water Availability – SJCWRP
Groundwater Reliability Improvement Program

Category	Recycled Water (AFM)
Supply	
Available Recycled Water	6,519
Supplies from Minor Diversions	1,447
Total Available Supply	7,966
Demand	
Non-WRD Demand	1,775
Baseline WRD Demand	4,150
GRIP Demand	1,750
Total Demand	7,675
Available Recycled Water	+ 291

AFM – acre-feet per month

Data source: CH2M HILL, 2013 (Table 4-4)

3.3.2 Recharge Capacity Limitations

The MFSG currently recharges a combination of stormwater, imported water, and recycled water. GRIP replaces variable imported water supplies with a relatively constant supply of tertiary treated and AWT recycled water (approximately 6,000 AFM), but the project does not impact the overall recharge capacity of the basins. Stormwater flows, however, are highly variable, unpredictable, and can compete with recycled water sources for available recharge capacity. Figure 13 illustrates historical monthly variability in recycled water and stormwater sources applied at the MFSG.

The average sustainable recharge capacity of the MFSG is estimated at 15,000 AFM (CH2M HILL, 2013). Historical recharge records for water years 2000 to 2010 suggest that during a typical year, capacity would be available for the additional recycled water recharge under GRIP. For 1 to 2 months per year, however, stormwater recharge has exceeded the average recharge capacity (Figure 13), indicating recharge capacity may not be available to accept all stormwater and recycled water supplies during those months. During exceptionally wet weather, stormwater recharge has exceeded the average recharge capacity for extended periods (3 to 4 months).

Historically, the MFSG has been managed to preferentially apply stormwater for spreading when available. In the case of GRIP, however, a relatively constant supply of ATW would be available year-round for spreading. The ATW would be produced solely to supply high-quality water for groundwater replenishment. Given this fact, operators may choose to preferentially apply AWT (approximately 800 AFM) water, even when stormwater is available for recharge. It may be possible to temporarily impound stormwater flows in the conservation pool behind the WND until recharge capacity is available for both water sources.

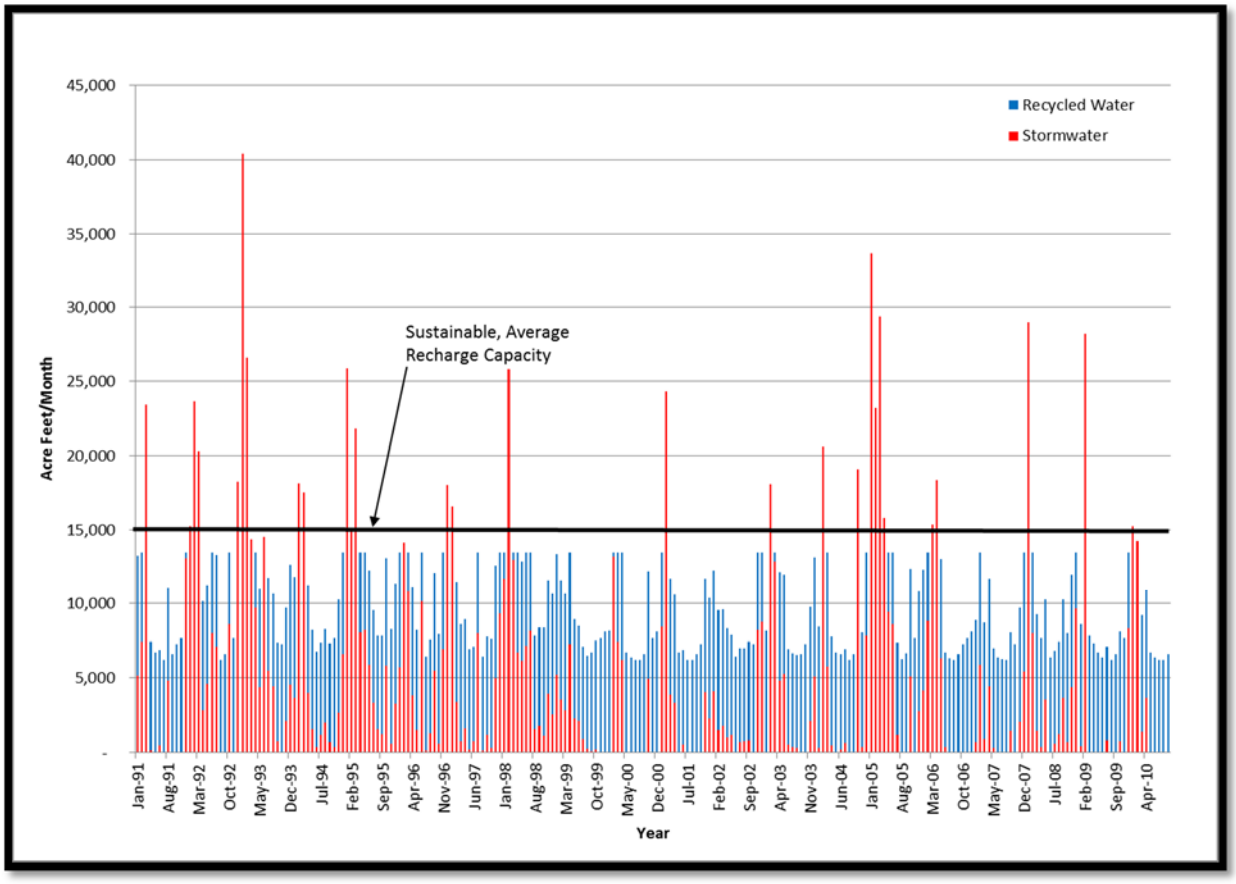


FIGURE 13
Monthly Recycled and Stormwater Recharge, 1991-2010
Groundwater Reliability Improvement Program

3.3.3 Blending of AWT and Tertiary Treated Water

Surface application of tertiary treated recycled water at the MFSG relies on SAT within the recharge basin and shallow vadose zone to remove residual pathogens, nitrogen, organic carbon, and contaminants of emerging concern (CECs) prior to recharge. SAT is biologically mediated and requires a continuous delivery of dissolved organic carbon and nutrients to maintain this natural attenuation process. AWT typically results in high-quality effluent with no detectable pathogens, low concentrations of nitrogen species, and less than 0.5 mg/L of total organic carbon (TOC). Such low levels of TOC will not support abundant microbial growth, and sequential spreading of tertiary treated recycled water and AWT recycled water may impact SAT performance (CH2M HILL, 2013).

GRIP would apply a blend of AWT and tertiary treated recycled water recharge in the MFSG. Previous studies have demonstrated that recycled water blends up to 75 percent AWT water and 25 percent tertiary treated water would not adversely impact SAT performance (CH2M HILL, 2013). Although not evaluated in that study, blending of AWT recycled water with stormwater flows is also expected to sustain SAT processes, because stormwater flows to the MFSG contain higher concentrations of degradable TOC than tertiary treated recycled water (Ly and Johnson, 2011).

Future operations would manage recycled water blends so the AWT component does not exceed this threshold. Based on expected total recycled water application rates (71,000 AFY), the annual average recycled water blend under GRIP would be approximately 14 percent AWT water (10,000 AFY) and 86 percent tertiary treated water (61,000 AFY).

3.3.4 Recycled Water Contribution (RWC)

The permitted maximum RWC for the MFSG is 45 percent (Los Angeles Regional Water Quality Control Board [LARWQCB] Order R4-2009-0048-A-01). In accordance with Order R4-2009-0048-A-01, the following inflow components to the MFSG are used to compute the RWC: recycled water, imported water, stormwater (local water), groundwater underflow, and infiltration of precipitation that occurs at the spreading basins. GRIP would replace imported water supplies with recycled water.

The existing permit requires the RWC to be calculated by computing the amount of recycled water applied over a 10-year period, divided by the total inflow from all sources over the same 10-year period. Table 4 summarizes the inflow components at MFSG for water years 2001 through 2010 and the corresponding RWC. The total volume of inflows to the MFSG during this period was approximately 1,497,000 acre-feet. The corresponding RWC was 30 percent.

TABLE 4
MFSG Inflow Components, Water Years 2001-2010
Groundwater Reliability Improvement Program

Water Year	Imported (acre-feet)	Recycled (acre-feet)	Local (acre-feet)	Rainfall (acre-feet)	Underflow (acre-feet)	Total (acre-feet)
2000/01	23,451	46,343	39,725	7,102	27,900	144,520
2001/02	42,875	60,596	17,000	1,195	27,400	149,065
2002/03	22,365	42,796	58,202	7,100	24,000	154,463
2003/04	27,520	44,925	30,467	3,665	24,200	130,777
2004/05	25,296	29,503	148,523	7,100	21,600	232,022
2005/06	33,229	42,022	60,377	5,386	24,300	165,314
2006/07	40,214	45,039	11,495	924	26,400	124,072
2007/08	1,510	39,767	54,518	7,100	30,300	133,195
2008/09	0	39,611	35,348	4,499	31,300	110,758
2009/10	26,286	55,731	35,398	6,220	29,400	153,035
Totals	**242,745**	**446,332**	**491,053**	**50,290**	**266,800**	**1,497,221**
		Recycled Water Contribution 30 percent [a]				

[a] Computed as the total volume of recycled water for previous 10 years divided by the total of all inflows for the same period.

Assuming the 2001 through 2010 baseline inflows for stormwater, groundwater underflow, and infiltration of precipitation; omitting imported water; and increasing recycled water inflows beyond 2001 through 2010 baseline values by an additional 21,000 AFY; the 10-year total volume of inflows under GRIP would be approximately 1,464,000 acre-feet (Table 5). The RWC would be 45 percent (Table 5), which is in compliance with the current permit limit. Ultimately, the recycled water application rates would be managed based on availability of nonrecycled water (diluent water) inflows to comply with the permitted RWC criterion.

TABLE 5
Projected MFSG Inflow Components -GRIP
Groundwater Reliability Improvement Program

Water Year	Imported (acre-feet)	Recycled (acre-feet)	Local (acre-feet)	Rainfall (acre-feet)	Underflow (acre-feet)	Total [a] (acre-feet)
Year 1	0	67,343	39,725	7,102	27,900	142,069
Year 2	0	81,596	17,000	1,195	27,400	127,190
Year 3	0	63,796	58,202	7,100	24,000	153,098
Year 4	0	65,925	30,467	3,665	24,200	124,257
Year 5	0	50,503	148,523	7,100	21,600	227,726
Year 6	0	63,022	60,377	5,386	24,300	153,085
Year 7	0	66,039	11,495	924	26,400	104,858
Year 8	0	60,767	54,518	7,100	30,300	152,685
Year 9	0	60,611	35,348	4,499	31,300	131,758
Year 10	0	76,731	35,398	6,220	29,400	147,749
Totals	**0**	**656,332**	**491,053**	**50,290**	**266,800**	**1,464,475**
		Recycled Water Contribution 45 percent [b]				

[a] Assumes recycled water, local (storm) water, rainfall, and underflow from 2001-2010 baseline period, an additional 11,000 AFY of tertiary recycled water, and an additional 10,000 AFY of AWT recycled water.

[b] Computed as the total volume of recycled water for previous 10 years divided by the total of all inflows for the same period.

3.3.5 Summary

Recycled water supplies are adequate for the additional 21,000 AFY of recycled water demand for GRIP. In addition, historical records indicate that during a typical water year, recharge capacity would be available for the additional applied recycled water. The actual recycled water application rates, however, would need to be managed to comply with the permitted 45 percent RWC criterion, based on availability of nonrecycled water inflows, and maintain recycled water blends that do not exceed 75 percent AWT to preserve the effectiveness of SAT.

4. Analysis of Potential Groundwater Impacts

The future availability and cost of imported water supplies for groundwater replenishment are uncertain. GRIP would offset the current use of imported water for replenishment with a combination of tertiary treated and AWT recycled water. The overarching goal of the project is to enhance reliability of supply for groundwater replenishment in the Central Basin. The following sections discuss an evaluation of potential impacts to groundwater levels, flow conditions, and quality associated with the project.

4.1 Groundwater Levels and Flow Conditions

Groundwater flow simulation of the proposed GRIP project was performed to evaluate potential changes in groundwater levels, flow directions, and velocities associated with proposed recharge operations under GRIP. The WRD/USGS three-dimensional groundwater flow model, as updated and revised by CH2M HILL for the Groundwater Basin Master Plan (CH2M HILL, 2012), was used to perform the simulations. To simulate potential changes in the groundwater conditions under GRIP, a transient baseline simulation was performed for water years 1991 through 2010 that included the actual imported, recycled, and stormwater components of recharge at the MFSG. A second simulation was performed that excluded the variable component of imported water recharge spread at the MFSG, and replaced it with a constant source of

recycled water equivalent to the average imported water component for the simulation period. The results of the two simulations were compared to evaluate potential impacts of GRIP on groundwater levels, flow directions, and velocities.

4.1.1 Groundwater Flow Model Setup for Simulating Recycled Water Recharge

Water years 1991 through 2010 were selected for the period of analysis. This period represents 20 years of operations, with wet and dry periods, so it provides good representation of hydrological variations, and thus variations in groundwater levels. Imported water volumes used for replenishment are highly variable during this period (Table 6). For a conservative assessment of potential impacts, CH2M HILL assumed that all of the imported water recharge was replaced by recycled water recharge. The average annual spreading rate is 24,233 AFY, which exceeds the additional recycled water recharge proposed for GRIP (21,000 AFY).

TABLE 6
Historical Spreading of Imported Water and Model Input Changes to Simulated Spreading
Groundwater Reliability Improvement Program

Water Year Historical	Water Year Projected	Historical Imported Water Spread (acre-feet)	Simulated Recycled Water Spread (acre-feet)	Annual Difference (acre-feet)
1991	2031	56,286	24,233	32,053
1992	2032	43,103	24,233	18,870
1993	2033	16,561	24,233	(7,672)
1994	2034	20,411	24,233	(3,822)
1995	2035	21,837	24,233	(2,396)
1996	2036	17,959	24,233	(6,274)
1997	2037	19,990	24,233	(4,243)
1998	2038	889	24,233	(23,344)
1999	2039	0	24,233	(24,233)
2000	2040	45,037	24,233	20,804
2001	2041	23,451	24,233	(782)
2002	2042	42,875	24,233	18,642
2003	2043	22,365	24,233	(1,868)
2004	2044	27,520	24,233	3,287
2005	2045	25,145	24,233	912
2006	2046	33,229	24,233	8,996
2007	2047	40,214	24,233	15,981
2008	2048	1,510	24,233	(22,723)
2009	2049	0	24,233	(24,233)
2010	2050	26,286	24,233	2,053

( ) = negative values

Recycled water recharge was allocated among the spreading grounds using historical distribution of recharged imported water: 58 percent Rio Hondo Spreading Grounds, 32 percent San Gabriel Spreading Grounds, and 10 percent WND.

4.1.2 Change in Simulated Groundwater Levels

The potential change in groundwater levels associated with GRIP was evaluated at locations near the MFSG, where impacts are expected to be largest. Simulated groundwater levels were evaluated at eight well locations for both baseline (historical) conditions and recharge operations under GRIP. Figure 14 shows the well locations where groundwater levels were evaluated. Figures 15 and 16 show simulated groundwater level hydrographs for both simulation scenarios. To provide a frame of reference for long-term groundwater level responses, the hydrographs show baseline responses for a 40-year simulation period (model years 2010 to 2050, corresponding to water years 1970 to 2010). Relevant findings are as follows.

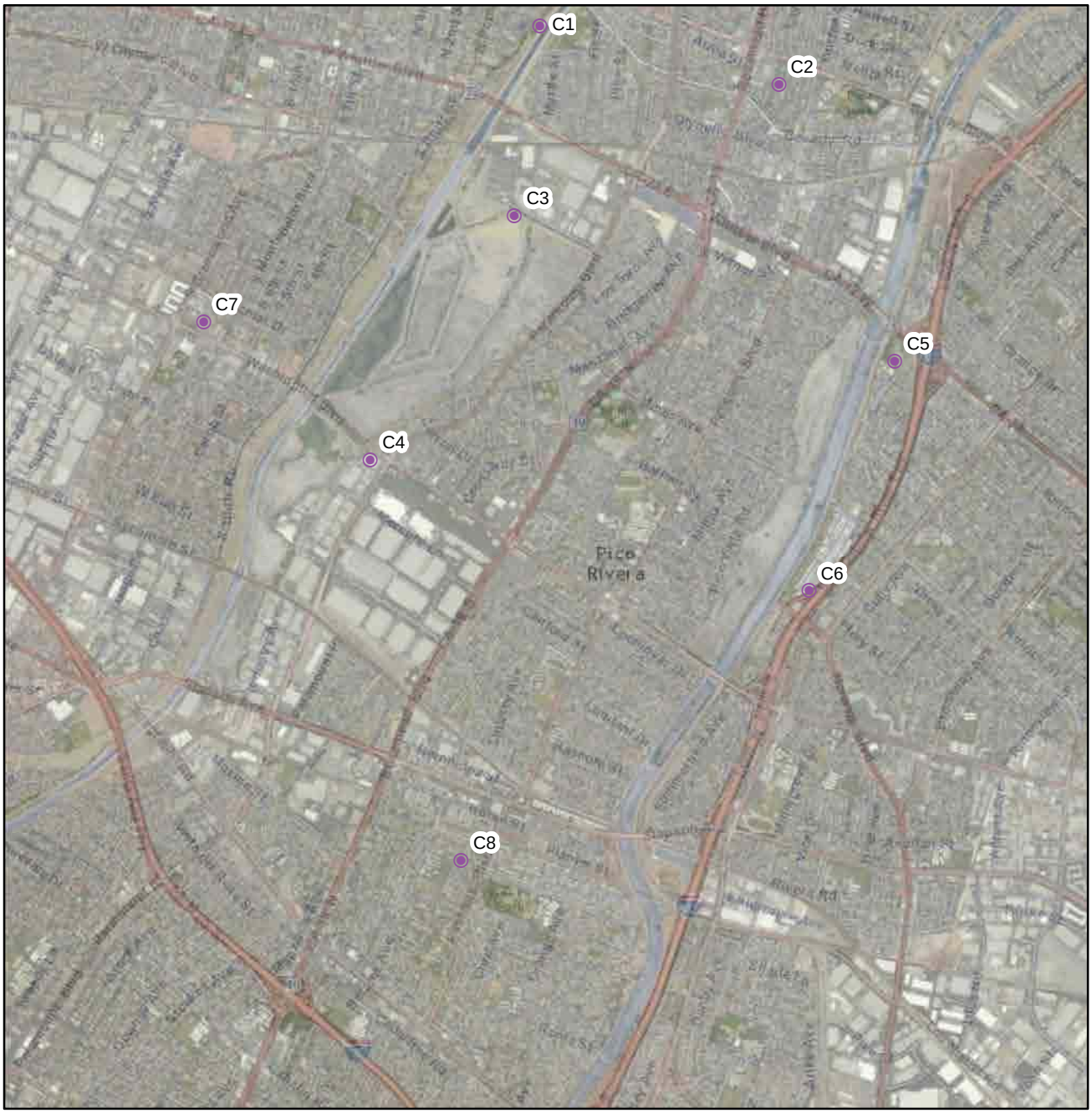
- The simulated groundwater levels for the baseline and GRIP conditions are similar. Differences between the two are nearly imperceptible.
- The simulated groundwater level fluctuations for GRIP are slightly dampened relative to baseline conditions. This reflects the substitution of variable imported water recharge with a constant source of recycled water recharge.
- The simulated groundwater levels are within the range of historical high and low groundwater levels for the simulation period, suggesting that spreading under GRIP will not result in excessive groundwater mounding or adversely lower groundwater levels.

4.1.3 Flow Rate and Direction

Potential changes in groundwater flow directions and velocities associated with GRIP spreading were evaluated by comparing model output of simulated flow vectors. Similar to groundwater level responses, potential changes in groundwater flow were evaluated for the area near the MFSG, where changes would be greatest. Figure 17 shows the output for projected water year 2040 (baseline simulation 2000). The direction of the arrows represents the direction of groundwater flow; the length of the arrows is proportional to groundwater velocity. Vectors were plotted at 5-year intervals. This water year is at the end of a 3-year period with the greatest fluctuations in historical imported water, when the difference between historical and GRIP spreading rates are largest (Table 6). Outputs for other simulation years also were produced and evaluated. Relevant findings are as follows.

- For 2040, the flow velocity is similar for both simulations, but there is a minor (3 degree) difference in flow direction between the scenarios.
- For 2040, the change in flow direction is well within the historical variation of flow direction.
- There is no perceptible difference in groundwater flow conditions or velocities between the two simulations for other time periods evaluated (water years 1995, 2005, and 2010).

Based on this analysis, spreading operations under GRIP would not significantly impact groundwater flow conditions in the vicinity of the MFSG. Potential impacts would be greatest near the MFSG; therefore, these findings also suggest that GRIP would not impact groundwater flow conditions in the wider Montebello Forebay and Central Basin, including the Omega OU2 and WNOU Superfund sites.



LEGEND

- Well with hydrograph

0 1,000 2,000 4,000 6,000 Feet

FIGURE 14
Hydrograph Locations
Groundwater Reliability Improvement Program

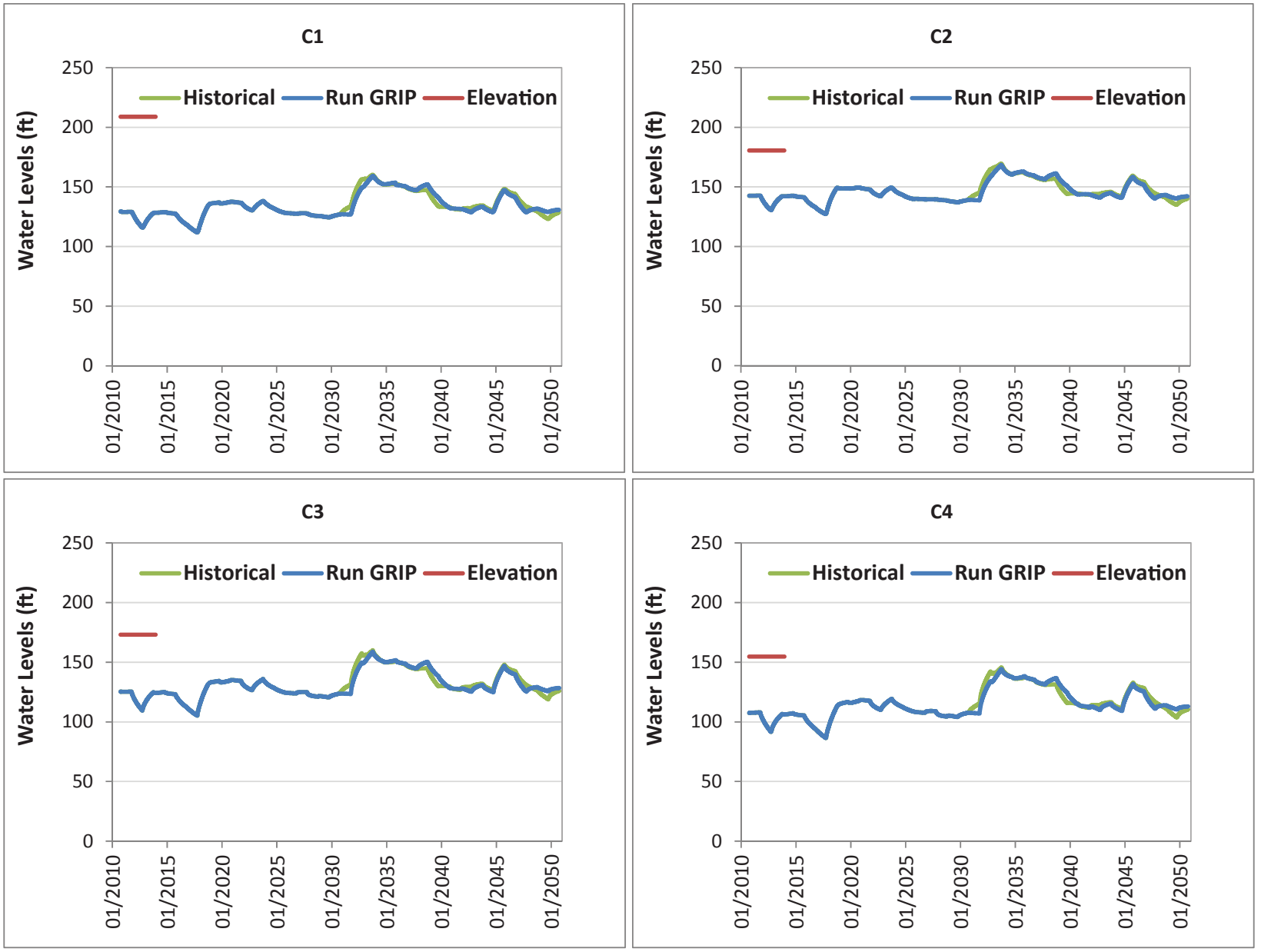


FIGURE 15
Hydrographs, C1 - C4
Groundwater Reliability Improvement Program

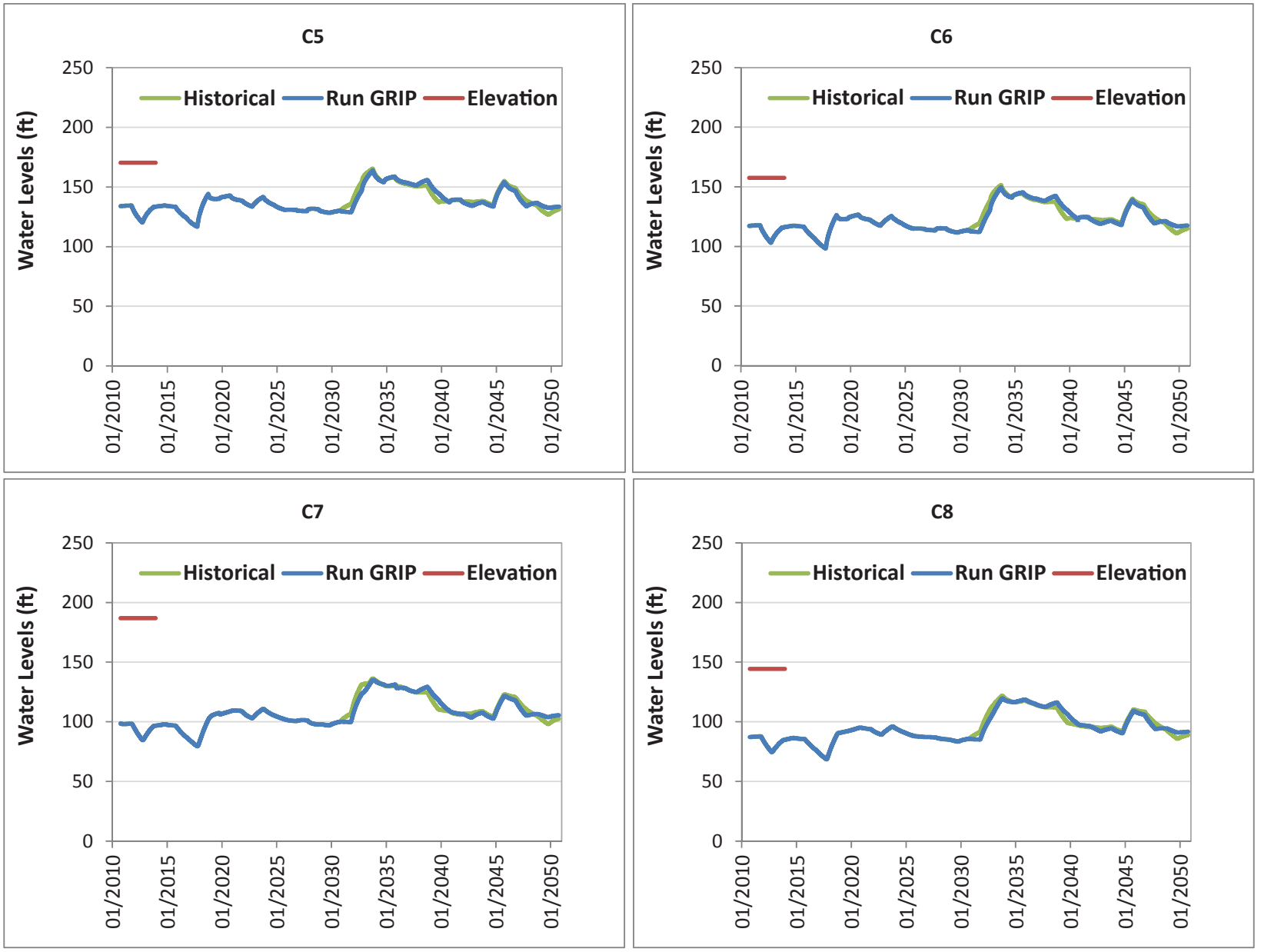
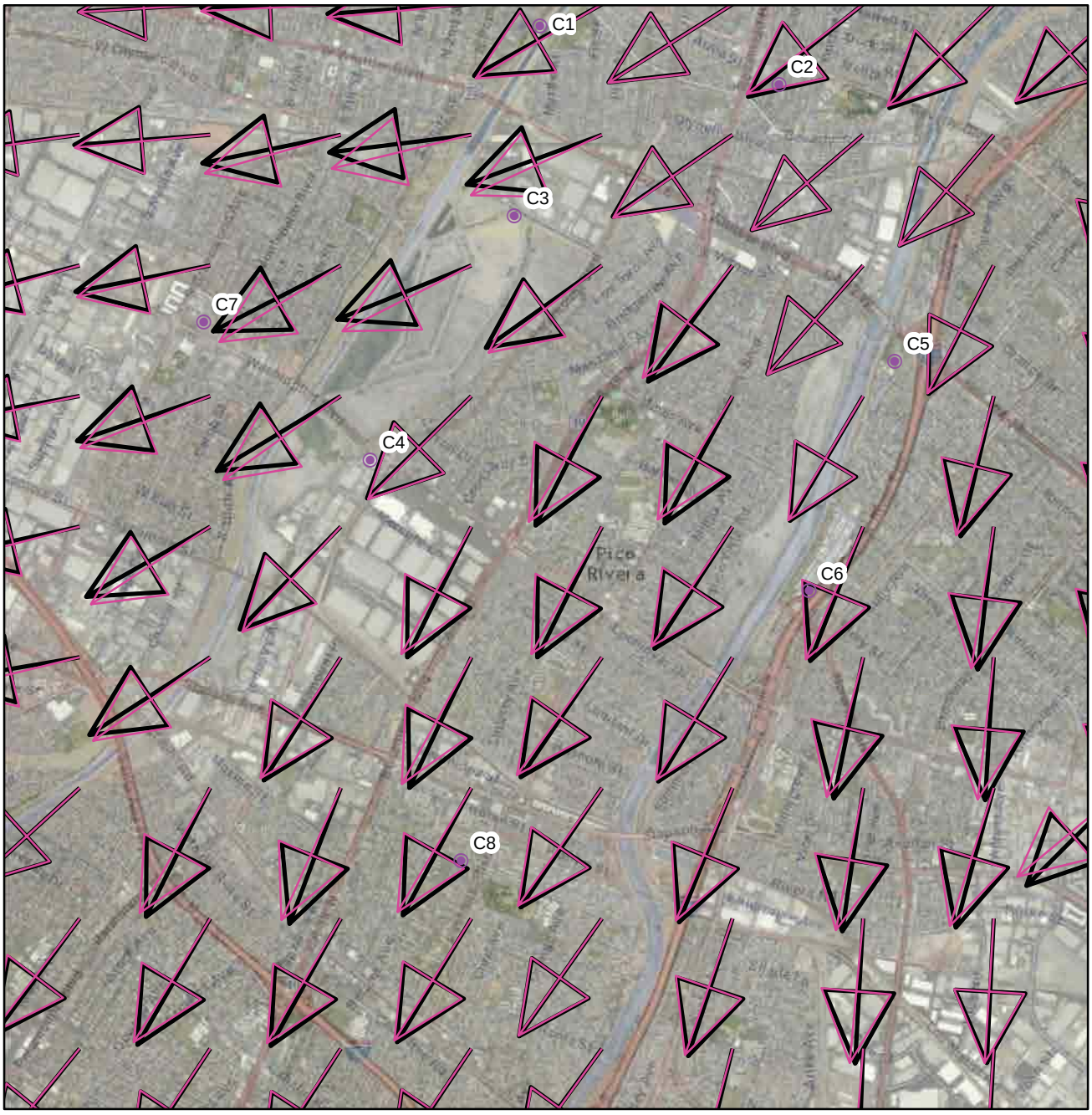


FIGURE 16
Hydrographs, C5 - C8
Groundwater Reliability Improvement Program



LEGEND

- Well with hydrograph
- GRIP
- Historical

0 1,000 2,000 4,000 6,000 Feet

FIGURE 17
Flow Vectors
Layer 1, 2040
Groundwater Reliability Improvement Program

4.1.4 Summary

Changes in simulated groundwater levels, flow rates, and flow directions in response to MFSG operations under GRIP are minor relative to baseline historical conditions. The changes to groundwater levels and flow are small because the total volume of recharge that would be applied under GRIP is the same (on average) as the historical values for the MFSG. The project simply exchanges the variable imported recharge component with a relatively constant source of recycled water recharge. In addition, the absolute differences between the annual imported (historical) and recycled (GRIP) sources (Table 6) are small compared to other recharge components for the Central Basin.

Groundwater production wells in the area have been operated successfully over the range of groundwater levels observed between 1971 and 2010. The simulation results show that predicted water levels under GRIP will remain within this historical range. The findings indicate the project will not adversely impact groundwater production wells (by lowering water levels) in the vicinity of the MFSG.

In addition, the simulation findings indicate GRIP would not significantly modify groundwater flow conditions in the vicinity of the MFSG or the wider Montebello Forebay and Central Basin. The project, therefore, would not adversely impact contaminant plume migration in these areas.

4.2 Groundwater Quality

Approximately 50,000 AFY of recycled water is currently applied at the MFSG. GRIP will increase the volume of recycled water recharge to approximately 71,000 AFY by spreading a combination of AWT recycled water (10,000 AFY) and additional tertiary treated recycled water (11,000 AFY). There is a long history of monitoring and other studies at the MFSG that demonstrate compliance with applicable water quality objectives at the current annual recycled water application rates. This discussion focuses on potential groundwater quality impacts associated with the increased annual recycled water application rate under GRIP. Potential impacts were assessed by evaluating compliance with the following regulatory water quality requirements and policies.

- 2013 State Water Resources Control Board (SWRCB) Recycled Water Policy (RWP)
- 2014 Groundwater Replenishment Regulations (GRRs)
- Basin Plan

4.2.1 2013 Recycled Water Policy (RWP)

The RWP was adopted by the SWRCB on February 3, 2009, and subsequently amended in 2013 to include monitoring for CECs. The RWP includes provisions for managing salts and nutrients on a basinwide, rather than project, basis by developing Salt and Nutrient Plans. The RWP requires Salt and Nutrient Plans to evaluate (1) sources and sinks of salts and nutrients, (2) measures to manage their loading, and (3) compliance with state anti-degradation requirements. The RWP specifies anti-degradation thresholds for groundwater recycling projects based on use of assimilative capacity for a water quality constituent. The RWP also includes requirements for monitoring CECs at projects that apply recycled water for groundwater recharge.

Potential Salt and Nutrient Impacts. WRD submitted the SNMP to LARWQCB in August 2014 (Todd Engineers, 2014). The SNMP evaluated a range of water quality parameters and identified three indicator parameters representative of salts and nutrients in the basins: TDS, chloride, and nitrate. The SNMP evaluated baseline conditions for the MFSG and potential water quality impacts associated with GRIP. Table 7 summarizes the average annual TDS, chloride, and nitrate concentrations for groundwater recharged under baseline conditions (2000-2010) and projected future operations under GRIP (2011-2025). Both are less than the Basin Plan water quality objectives.

TABLE 7
Average Annual TDS, Chloride, and Nitrate Concentrations in Applied Water at MFSG – Baseline and GRIP
Groundwater Reliability Improvement Program

Category	TDS (mg/L)	CL (mg/L)	NO_3 - (N) (mg/L)
Basin Plan Water Quality Objectives [a]	700	150	10
Average Baseline (2000-2010) [b]	419	86	2.36
GRIP (2011-2025) [a]	422	89	2.60

[a] Data source: LARWQCB, 1994

[b] Data source: Todd Engineering, 2014 (Table 10)

mg/L – volume-weighted average concentration of all sources in milligrams per liter

Projected salt and nutrient concentrations of water recharged at the MFSG under GRIP are similar to baseline conditions because the water quality of the AWT/tertiary treated blend that would be applied is similar to that of the imported water it replaces. Consequently, projected salt and nutrient impacts in the Central Basin associated with GRIP are negligible. The project is expected to decrease average TDS concentrations slightly (0.5 mg/L) and increase average chloride and nitrate concentrations by only 0.4 and 0.03 mg/L, respectively, by the end of the 2025 (Todd Engineers, 2014). Based on the findings of the SNMP, GRIP would not cause groundwater concentrations of TDS, chloride, or nitrate to exceed Basin Plan Objectives or utilize significant (greater than 10 percent) assimilative capacity in the Central Basin (Todd Engineers, 2014).

CEC Monitoring and Compliance. The RWP also specifies monitoring requirements for CECs and concentration levels for CECs that trigger response actions. The RWP requires monitoring of eight CECs and surrogate parameters (for example, TOC) for surface application projects like GRIP, in both recycled water and groundwater. LACSD has performed significant monitoring of CECs in effluent from their plants either as a permit requirement or for voluntary effluent characterization.

The current discharge permit for the MFSG does not include monitoring requirements for all of the CECs required by the RWP, but extensive monitoring for one of these compounds, n-nitrosodimethylamine (NDMA), has been performed. NDMA is formed at low levels during wastewater treatment and occurs in tertiary recycled water applied at the MFSG. Previous studies have concluded that a combination of photolytic degradation in surface water and biodegradation in the vadose zone and groundwater significantly reduce NDMA concentrations in recharged water at the MFSG (KJT/LLNL, 2008). In addition, NDMA rarely has been detected at concentrations above the NL (10 nanograms per liter) in shallow monitoring wells in the vicinity of the MFSG (KJT/LLNL, 2008). Reported removal rates of NDMA concentrations between the headworks for recycled water and shallow groundwater have ranged from 74 to 98 percent (KJT/LLNL, 2008). The increase in recycled water recharge proposed under GRIP (from 50,000 to 71,000 AFY) would not impact these attenuation processes. Furthermore, NDMA is not expected to occur at detectable concentrations in the applied AWT recycled water, which may reduce NDMA concentrations in the recycled water blends through dilution.

Laboratory studies have been performed to assess the SAT performance for CECs in tertiary treated/AWT blends in applied recycled water (CH2M HILL, 2013). The findings of these studies suggest that biodegradable CECs would continue to be effectively removed by SAT processes during the increase in the annual recharge volume proposed under GRIP (CH2M HILL, 2013). Concentrations of CECs that are more recalcitrant may increase slightly in groundwater, but that increase may be offset by dilution from the AWT recycled water component of recharge (CH2M HILL, 2013).

Monitoring to assess the effectiveness of CEC removal at the project scale, consistent with RWP requirements, is expected to be incorporated into future discharge permit modifications for the MFSG.

4.2.2 Groundwater Replenishment Regulations (GRRs)

The GRRs were adopted on June 18, 2014. The GRRs specify compliance requirements for groundwater replenishment projects. Requirements for important groundwater quality parameters are summarized briefly in Table 8.

TABLE 8
Groundwater Replenishment Regulations – Water Quality Parameters
Groundwater Reliability Improvement Program

Water Quality Parameter	Requirement
Pathogen Control	10-log Giardia reduction, 10-log Cryptosporidium reduction, and 12-Log Virus reduction, demonstrated through treatment studies and retention time underground, is required.
Nitrogen Compounds	Concentration of total nitrogen in recycled water before or after recharge must be less than 10 mg/L.
Regulated Chemicals and Physical Characteristics	Concentrations of regulated chemicals in recycled water must be less than drinking water MCLs or action levels.
Total Organic Carbon (TOC)	TOC concentration in recycled water after recharge cannot exceed 0.5 mg/L divided by the permitted RWC.
Chemicals of Emerging Concern (CECs)	Demonstrate at least 90 percent removal of CEC indicator compound selected based on an occurrence study of treated recycled water.
Response Retention Time	Minimum retention time underground to respond to treatment failure is 2 days.

The following discussion focuses on the potential impacts to the water quality parameters and requirements presented in Table 8. Compliance requirements for the GRR RWC criterion are discussed in Section 3.2.4.

Pathogen Control. Approximately 50,000 AFY of tertiary treated recycled water is currently applied to the MFSG for groundwater recharge. A minimum of three treatment processes is required, with only 6-log-cycle reduction allowed for each process, to achieve the required reduction in pathogens (Table 8). Current operations comply with the required pathogen reduction through treatment (tertiary treated recycled water) and a minimum retention time underground of 6 months, as determined by tracer testing (using an added tracer). GRIP would increase the annual volume of tertiary recycled water that would be applied, but the average annual volume of water recharged under GRIP (all sources) would be similar to current levels; analysis of future flow conditions suggests little or no change in groundwater flow directions and gradients. Furthermore, the pathogen reduction due to in-plant treatment processes under GRIP would be equivalent (or better for the AWT component) than current levels. Thus, GRIP would not modify existing pathogen-reduction processes (treatment or retention time underground) and is expected to comply with this GRR requirement.

Nitrogen Compounds. GRRs require the total nitrogen concentrations in recycled water before or after recharge to be less than 10 mg/L. Frequent monitoring of tertiary treated recycled water at the wastewater treatment plants that supply recycled water to the MFSG (weekly) and at the headworks for the SGCBSG and RHCBSG (quarterly) have demonstrated compliance with this requirement (LACSD, 2014). The increased volume of tertiary recycled water applied under GRIP would also comply with this requirement; in addition, the AWT component of recharge would have lower total nitrogen concentrations. Blending of these two components may result in lower total nitrogen concentrations in the applied recycled water.

Regulated Compounds and Physical Characteristics. Similar to nitrogen compounds, existing monitoring of tertiary treated recycled water applied at the MFSG demonstrates compliance with drinking water standards for regulated compounds and physical characteristics. The increased volume of tertiary recycled water applied under GRIP would also comply with drinking water standards. The AWT component of recharge is expected to have lower concentrations of these parameters.

Total Organic Carbon. TOC is treated as a surrogate for unregulated organic compounds in recycled water applied for groundwater recharge. The maximum allowable TOC concentration in recycled water after recharge is equal to 0.5 mg/L divided by the permitted RWC. The current RWC for the MFSG is 45 percent, so the maximum TOC concentration currently allowed in recharged recycled water is 1.11 mg/L. TOC compliance is evaluated based on a 20-week running average and the average of the last 4 weekly measurements.

Previous monitoring at the MFSG to assess SAT efficiency has demonstrated significant TOC reductions in the recycled water (and stormwater) during recharge (Ly and Johnson, 2011). The average TOC concentration in recycled water during this testing was approximately 5.61 mg/L; the average concentration of TOC in groundwater was 0.91 mg/L, which demonstrates that approximately 84 percent of TOC in tertiary recycled water applied at the MFSG is removed by SAT processes.

Application of the additional tertiary and AWT recycled water under GRIP is not expected to impact the existing SAT performance, provided the recycled water blend does not exceed 75 percent AWT recycled water. Blends with 25 percent or more of tertiary treated recycled water would provide sufficient TOC and nutrients to maintain SAT (CH2M HILL, 2013).

CEC Indicator Reduction. The GRRs require the project sponsor to identity three indicator CECs based on an occurrence study in the recycled water applied for recharge, and demonstrate greater than 90 percent reduction though SAT processes. Similar to TOC, the increase in annual volume of recycled water is not expected to impact the existing efficiency of SAT removal of degradable CEC indicator compounds. Laboratory studies to assess SAT performance for CECs in tertiary treated/AWT blends in applied recycled water suggest degradable CECs would continue to be effectively removed by SAT processes during the increase in the annual recharge volume proposed under GRIP (CH2M HILL, 2013).

Response Retention Time. Previous tracer testing (using an added tracer) has demonstrated minimum retention times underground for recycled water recharged at the MFSG that exceed the minimum response retention time (2 months) for existing water supply wells in the vicinity of the MFSG. The average annual volume of water recharged under GRIP (all sources) would be similar to current levels, and little or no change in groundwater flow conditions relative to existing conditions is predicted to occur under GRIP. Consequently, the additional recycled water recharge proposed under GRIP would not impact existing response retention time estimates.

4.2.3 Basin Plan Objectives

The Basin Plan designates beneficial uses and water quality objectives for groundwater basins in the Los Angeles Region (LARWQCB, 2003). For the Central Basin, the beneficial uses include municipal drinking water supply; consequently, the Basin Plan incorporates primary and secondary MCLs as groundwater water quality objectives. In addition, the Basin Plan incorporates Central Basin-specific water quality objectives for TDS (700 mg/L), chloride (150 mg/L), sulfate (250 mg/L), and boron (1.0 mg/L), as well as regional requirements for nitrogen compounds (for example, 10 mg/L as N). Long-term water quality monitoring of tertiary treated recycled water applied at the MFSG has demonstrated compliance with these requirements. The additional tertiary recycled water that would be applied under GRIP would also comply with the Basin Plan Objectives. Furthermore, the blends of AWT and tertiary recycled water that would be spread may actually decrease the concentration of these constituents because of the superior water quality of the AWT component.

4.2.4 Summary

Based on the above evaluation, GRIP would comply with the water quality requirements of the GRR, RWP, and Basin Plan. Consistent with the history of groundwater quality compliance at current recycled water application rates, the increased annual recycled water application rate proposed under GRIP would not adversely impact groundwater quality within the Montebello Forebay.

5. Mitigation Requirements

As described above, GRIP would not adversely impact groundwater flow conditions or groundwater quality in the Montebello Forebay area. The project does not require mitigation for these issues. The LARWQCB may require modification to the existing MFSG discharge permit to reflect the planned application of AWT water. Future permit revisions are expected to incorporate the new monitoring requirements of the GRRs and RWP. Monitoring would be performed in accordance with the revised permit conditions.

6. References

Anders, Robert and Roy A. Schroeder. 2003. *Use of Water-Quality Indicators and Environmental Tracers to Determine the Fate and Transport of Recycled Water in Los Angeles County, California.* U.S. Geological Survey Water-Resources Investigations Report 03-4279.

CH2M HILL. 2012. *Draft Report Groundwater Basins Master Plan*. July.

CH2M HILL. 2013. *Preliminary Engineering Report, Groundwater Reliability Improvement Program.* February.

Kennedy Jenks Todd, LCC, and LLNL (KJT/LLNL). 2008. *Final Project Report for Montebello Forebay Attenuation and Dilution Studies Los Angeles County, California*. March.

Los Angeles Regional Water Quality Control Board (LARWQCB). 1994. *Water Quality Control Plan, Los Angeles Region*. June 13.

Ly, Phuong and Ted Johnson. 2011. *75 Consecutive Weeks of Groundwater Sampling For Total Organic Carbon at the Montebello Forebay Spreading Grounds, Los Angeles County, California*.

Reichard, Eric G., Michael Land, Steven M. Crawford, Tyler Johnson, Rhett R. Everett, Trayle V. Kulshan, Daniel J. Ponti, Keith J. Halford, Theodore A. Johnson, Katherine S. Paybins, and Tracy Nishikawa. 2003. *Geohydrology, Geochemistry, and Ground-water Simulation-optimization of the Central and West Coast Basins, Los Angeles County, California.* U.S. Geological Survey Water-Resources Investigations Report 03-4065.

Todd Engineering. 2014. *Draft Salt and Nutrient Management Plan, Central Basin and West Coast Basin, Southern Los Angeles County, California*. August.

Water Replenishment District of Southern California (WRD). 2011. *Water Replenishment District of Southern California, Engineering Survey and Report.* May 6.

Water Replenishment District of Southern California (WRD). 2013. *Regional Groundwater Monitoring Report, Central Basin and West Coast Basin Los Angeles County, California. Water Year 2011-2012*. March.

Appendix D
Biological Resources Data

ESA

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad is (Inglewood (3311883) or Anaheim (3311778) or Baldwin Park (3411718) or El Monte (3411811) or Hollywood (3411813) or La Habra (3311788) or Los Alamitos (3311871) or Los Angeles (3411812) or Long Beach (3311872) or Redondo Beach (3311874) or San Pedro (3311863) or South Gate (3311882) or Torrance (3311873) or Venice (3311884) or Whittier (3311881))

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAABF02020	***Spea hammondii*** western spadefoot	None	None	G3	S3	SSC
ABNFC01021	***Pelecanus occidentalis californicus*** California brown pelican	Delisted	Delisted	G4T3	S1S2	FP
ABNKC12040	***Accipiter cooperii*** Cooper's hawk	None	None	G5	S3	WL
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S3	
ABNKC19120	***Buteo regalis*** ferruginous hawk	None	None	G4	S3S4	WL
ABNME03041	***Laterallus jamaicensis coturniculus*** California black rail	None	Threatened	G4T1	S1	FP
ABNNB03031	***Charadrius alexandrinus nivosus*** western snowy plover	Threatened	None	G3T3	S2	SSC
ABNNM08103	***Sternula antillarum browni*** California least tern	Endangered	Endangered	G4T2T3Q	S2S3	FP
ABNRB02022	***Coccyzus americanus occidentalis*** western yellow-billed cuckoo	Proposed Threatened	Endangered	G5T3Q	S1	
ABNSB10010	***Athene cunicularia*** burrowing owl	None	None	G4	S3	SSC
ABPAE33043	***Empidonax traillii extimus*** southwestern willow flycatcher	Endangered	Endangered	G5T1T2	S1	
ABPAU08010	***Riparia riparia*** bank swallow	None	Threatened	G5	S2S3	
ABPBG02095	***Campylorhynchus brunneicapillus sandiegensis*** coastal cactus wren	None	None	G5T3Q	S3	SSC
ABPBJ08081	***Polioptila californica californica*** coastal California gnatcatcher	Threatened	None	G3T2	S2	SSC
ABPBW01114	***Vireo bellii pusillus*** least Bell's vireo	Endangered	Endangered	G5T2	S2	
ABPBX24010	***Icteria virens*** yellow-breasted chat	None	None	G5	S3	SSC
ABPBX99015	***Passerculus sandwichensis beldingi*** Belding's savannah sparrow	None	Endangered	G5T3	S3	
ABPBXB0020	***Agelaius tricolor*** tricolored blackbird	None	None	G2G3	S1S2	SSC
AFCJB1303H	***Siphateles bicolor mohavensis*** Mohave tui chub	Endangered	Endangered	G4T1	S1	FP

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AMABA01104	***Sorex ornatus salicornicus*** southern California saltmarsh shrew	None	None	G5T1?	S1	SSC
AMACC02010	***Lasionycteris noctivagans*** silver-haired bat	None	None	G5	S3S4	
AMACC05030	***Lasiurus cinereus*** hoary bat	None	None	G5	S4?	
AMACC05070	***Lasiurus xanthinus*** western yellow bat	None	None	G5	S3	SSC
AMACC10010	***Antrozous pallidus*** pallid bat	None	None	G5	S3	SSC
AMACD02011	***Eumops perotis californicus*** western mastiff bat	None	None	G5T4	S3?	SSC
AMACD04010	***Nyctinomops femorosaccus*** pocketed free-tailed bat	None	None	G4	S2S3	SSC
AMACD04020	***Nyctinomops macrotis*** big free-tailed bat	None	None	G5	S2	SSC
AMAEB03051	***Lepus californicus bennettii*** San Diego black-tailed jackrabbit	None	None	G5T3?	S3?	SSC
AMAFD01042	***Perognathus longimembris pacificus*** Pacific pocket mouse	Endangered	None	G5T1	S1	SSC
AMAFF08041	***Neotoma lepida intermedia*** San Diego desert woodrat	None	None	G5T3?	S3?	SSC
AMAFF11035	***Microtus californicus stephensi*** south coast marsh vole	None	None	G5T1T2	S1S2	SSC
AMAJF04010	***Taxidea taxus*** American badger	None	None	G5	S4	SSC
ARAAA02010	***Chelonia mydas*** green turtle	Threatened	None	G3	S1	
ARAAD02030	***Emys marmorata*** western pond turtle	None	None	G3G4	S3	SSC
ARACC01012	***Anniella pulchra pulchra*** silvery legless lizard	None	None	G3G4T3T4Q	S3	SSC
ARACF12100	***Phrynosoma blainvillii*** coast horned lizard	None	None	G3G4	S3S4	SSC
ARACJ02143	***Aspidoscelis tigris stejnegeri*** coastal whiptail	None	None	G5T3T4	S2S3	
CTT21330CA	***Southern Dune Scrub*** Southern Dune Scrub	None	None	G1	S1.1	
CTT31200CA	***Southern Coastal Bluff Scrub*** Southern Coastal Bluff Scrub	None	None	G1	S1.1	
CTT32720CA	***Riversidian Alluvial Fan Sage Scrub*** Riversidian Alluvial Fan Sage Scrub	None	None	G1	S1.1	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
CTT52120CA	***Southern Coastal Salt Marsh*** Southern Coastal Salt Marsh	None	None	G2	S2.1	
CTT62400CA	***Southern Sycamore Alder Riparian Woodland*** Southern Sycamore Alder Riparian Woodland	None	None	G4	S4	
CTT71210CA	***California Walnut Woodland*** California Walnut Woodland	None	None	G2	S2.1	
CTT81600CA	***Walnut Forest*** Walnut Forest	None	None	G1	S1.1	
ICBRA07010	***Streptocephalus woottoni*** Riverside fairy shrimp	Endangered	None	G1	S1	
IICOL02080	***Cicindela gabbii*** western tidal-flat tiger beetle	None	None	G2G4	S1	
IICOL02101	***Cicindela hirticollis gravida*** sandy beach tiger beetle	None	None	G5T2	S1	
IICOL02113	***Cicindela latesignata latesignata*** western beach tiger beetle	None	None	G2G4T1T2	S1	
IICOL02121	***Cicindela senilis frosti*** senile tiger beetle	None	None	G2G3T1T3	S1	
IICOL4A010	***Coelus globosus*** globose dune beetle	None	None	G1G2	S1S2	
IICOL4W010	***Onychobaris langei*** Lange's El Segundo Dune weevil	None	None	G1	S1	
IICOL51021	***Trigonoscuta dorothea dorothea*** Dorothy's El Segundo Dune weevil	None	None	G1T1	S1	
IIDIP05022	***Rhaphiomidas terminatus terminatus*** El Segundo flower-loving fly	None	None	G1T1	S1	
IIDIP17010	***Brennania belkini*** Belkin's dune tabanid fly	None	None	G1G2	S1S2	
IILEM0R390	***Eucosma hennei*** Henne's eucosman moth	None	None	G1	S1	
IILEM2X090	***Carolella busckana*** Busck's gallmoth	None	None	G1G3	SH	
IILEP84030	***Panoquina errans*** wandering (=saltmarsh) skipper	None	None	G4G5	S1	
IILEPG201B	***Euphilotes battoides allyni*** El Segundo blue butterfly	Endangered	None	G5T1	S1	
IILEPG402A	***Glaucopsyche lygdamus palosverdesensis*** Palos Verdes blue butterfly	Endangered	None	G5T1	S1	
IILEPP2010	***Danaus plexippus*** monarch butterfly	None	None	G5	S3	
IMGASJ7040	***Tryonia imitator*** mimic tryonia (=California brackishwater snail)	None	None	G2G3	S2S3	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDAST20095	***Chaenactis glabriuscula var. orcuttiana*** Orcutt's pincushion	None	None	G5T1	S1	1B.1
PDAST440C0	***Pseudognaphalium leucocephalum*** white rabbit-tobacco	None	None	G4	S2S3.2	2B.2
PDAST4N102	***Helianthus nuttallii ssp. parishii*** Los Angeles sunflower	None	None	G5TH	SH	1A
PDAST4R0P4	***Centromadia parryi ssp. australis*** southern tarplant	None	None	G3T2	S2	1B.1
PDAST5L0A1	***Lasthenia glabrata ssp. coulteri*** Coulter's goldfields	None	None	G4T2	S2	1B.1
PDAST6X060	***Pentachaeta lyonii*** Lyon's pentachaeta	Endangered	Endangered	G2	S2	1B.1
PDASTE80C0	***Symphyotrichum defoliatum*** San Bernardino aster	None	None	G2	S2	1B.2
PDASTE80U0	***Symphyotrichum greatae*** Greata's aster	None	None	G2	S2.3	1B.3
PDBER060A0	***Berberis nevinii*** Nevin's barberry	Endangered	Endangered	G1	S1	1B.1
PDBRA10020	***Dithyrea maritima*** beach spectaclepod	None	Threatened	G2	S2.1	1B.1
PDBRA1M114	***Lepidium virginicum var. robinsonii*** Robinson's pepper-grass	None	None	G5T3	S3	4.3
PDBRA270V0	***Nasturtium gambelii*** Gambel's water cress	Endangered	Threatened	G1	S1	1B.1
PDCAR040L0	***Arenaria paludicola*** marsh sandwort	Endangered	Endangered	G1	S1	1B.1
PDCHE02010	***Aphanisma blitoides*** aphanisma	None	None	G3G4	S3	1B.2
PDCHE040E0	***Atriplex coulteri*** Coulter's saltbush	None	None	G2	S2	1B.2
PDCHE041C0	***Atriplex pacifica*** south coast saltscale	None	None	G3G4	S2	1B.2
PDCHE041D0	***Atriplex parishii*** Parish's brittlescale	None	None	G1G2	S1	1B.1
PDCHE041T1	***Atriplex serenana var. davidsonii*** Davidson's saltscale	None	None	G5T1	S1	1B.2
PDCHE091Z0	***Chenopodium littoreum*** coastal goosefoot	None	None	G2	S2	1B.2
PDCHE0P0D0	***Suaeda esteroa*** estuary seablite	None	None	G3	S2	1B.2
PDCON040E6	***Calystegia sepium ssp. binghamiae*** Santa Barbara morning-glory	None	None	G5T1	S1	1B.1

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDCRA040H0	***Dudleya multicaulis*** many-stemmed dudleya	None	None	G2	S2	1B.2
PDCRA040S2	***Dudleya virens ssp. insularis*** island green dudleya	None	None	G3?T3	S3	1B.2
PDCRO02020	***Crossosoma californicum*** Catalina crossosoma	None	None	G2	S2	1B.2
PDCUS01111	***Cuscuta obtusiflora var. glandulosa*** Peruvian dodder	None	None	G5T4T5	SH	2B.2
PDFAB0F1G0	***Astragalus brauntonii*** Braunton's milk-vetch	Endangered	None	G2	S2	1B.1
PDFAB0F7B1	***Astragalus pycnostachyus var. lanosissimus*** Ventura Marsh milk-vetch	Endangered	Endangered	G2T1	S1	1B.1
PDFAB0F8R2	***Astragalus tener var. titi*** coastal dunes milk-vetch	Endangered	Endangered	G2T1	S1	1B.1
PDGER01070	***California macrophylla*** round-leaved filaree	None	None	G2	S2	1B.1
PDGRO020F3	***Ribes divaricatum var. parishii*** Parish's gooseberry	None	None	G4TH	SH	1A
PDHYD0A0H0	***Nama stenocarpum*** mud nama	None	None	G4G5	S1S2	2B.2
PDHYD0C510	***Phacelia stellaris*** Brand's star phacelia	None	None	G1	S1	1B.1
PDLAM1U0A1	***Scutellaria bolanderi ssp. austromontana*** southern mountains skullcap	None	None	G4T2	S2	1B.2
PDMAL110J0	***Sidalcea neomexicana*** Salt Spring checkerbloom	None	None	G4?	S2S3	2B.2
PDNYC010P1	***Abronia villosa var. aurita*** chaparral sand-verbena	None	None	G5T3T4	S2	1B.1
PDPGN040J1	***Chorizanthe parryi var. fernandina*** San Fernando Valley spineflower	Candidate	Endangered	G2T1	S1	1B.1
PDPGN0G011	***Nemacaulis denudata var. denudata*** coast woolly-heads	None	None	G3G4T2	S2	1B.2
PDPLM0C080	***Navarretia fossalis*** spreading navarretia	Threatened	None	G1	S1	1B.1
PDPLM0C0Q0	***Navarretia prostrata*** prostrate vernal pool navarretia	None	None	G2	S2	1B.1
PDROS0W045	***Horkelia cuneata var. puberula*** mesa horkelia	None	None	G4T1	S1	1B.1
PDROS1B120	***Potentilla multijuga*** Ballona cinquefoil	None	None	GX	SX	1A
PDSCR0J0C2	***Chloropyron maritimum ssp. maritimum*** salt marsh bird's-beak	Endangered	Endangered	G4?T1	S1	1B.2

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDSOL0G0N0	***Lycium brevipes var. hassei*** Santa Catalina Island desert-thorn	None	None	G1Q	S1	1B.1
PMLIL0D150	***Calochortus plummerae*** Plummer's mariposa-lily	None	None	G4	S4	4.2
PMLIL0D1J1	***Calochortus weedii var. intermedius*** intermediate mariposa-lily	None	None	G3G4T2	S2	1B.2
PMPOA4G010	***Orcuttia californica*** California Orcutt grass	Endangered	Endangered	G1	S1	1B.1

Record Count: 107

Appendix E

Status of Recycled Water Regulations Technical Report

ESA

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FINAL DRAFT TECHNICAL MEMORANDUM

October 31, 2014

To: Jennifer Jacobus and Tom Barnes, ESA

From: Margaret H. Nellor, P.E., Nellor Environmental Associates, Inc.[1]

Subject: **Programmatic Environmental Impact Report for the Central and West Coast Groundwater Basins Master Plan (Project Number D120192) - Task 7 Status of Recycled Water Regulations Technical Report**

Executive Summary

The Draft Groundwater Basins Master Plan (GBMP) establishes a framework to enhance groundwater replenishment in the Central Basin and West Coast Basin (CBWCB), increase the reliability of groundwater water supplies, improve and protect groundwater quality, and accommodate growing potable water demands. Specific projects and strategies in the Draft GBMP include the use of recycled water for groundwater replenishment (GWR). A Programmatic Environmental Impact Report (PEIR) is being prepared for the GBMP that will provide an area-wide assessment of the potential significant environmental effects of implementing the program objectives and associated groundwater management strategies in the Plan. As part of the scope of work for the PEIR, this technical study was conducted to evaluate (1) the status and future of recycled water regulations pertaining to GWR and (2) studies that have assessed the effects of using recycled water for GWR on groundwater quality and public health.

The key findings of the technical study are:

- There are numerous state laws, regulations, and policies in place to protect groundwater quality and the health of individuals who drink groundwater that is replenished using recycled water, including:
  - Final Groundwater Replenishment Regulations for recycled water;
  - State polices related to anti-degradation and the use of recycled water; and
  - Locally-based Water Quality Control Plans (Basin Plans) implemented by the Regional Water Quality Control Boards (RWQCBs).
- Effective July 1, 2014, the regulatory structure for water, recycled water, and wastewater was consolidated into one agency, the State Water Resources Control Board

[1] TEXAS P.E. NO. 95405 / CALIFORNIA P.E. NO. 31997.

(SWRCB), to protect public health and promote comprehensive protection of drinking water and other beneficial uses of the state's water.

- A Draft Salt Nutrient Management Plan (SNMP) has been prepared for CBWCB, which concluded that:
  - For the planning period of 2010 – 2025, recycled water projects either improve water quality or use only a very small amount of the available water quality capacity;
  - Existing and planned implementation measures, including GWR projects, are robust and will continue to manage salts and nutrients on a sustainable basis;
  - Extensive monitoring programs are in place to rapidly detect changes in groundwater quality; and
  - Recycled water is a safe, valuable, sustainable, and beneficial water supply.
- The region has an extensive recycled water monitoring program for constituents of emerging concern (CECs), such as pharmaceuticals and personal care products. Low concentrations of CECs have been found in recycled water and drinking water. However, the ability to detect these chemicals at very low levels has outpaced the ability to completely remove them from the environment. Simply detecting a compound does not mean that its presence is of health significance. In general, for CECs whose presence in recycled water or drinking water has been evaluated, the CECs were present at concentrations many times lower than the acceptable safe concentrations.
- There different types of studies and tools that can be used evaluate the effects of recycled water used for GWR on human health, including epidemiological studies, risk assessments, and bio-analytical screening tests. These types of studies and tools show that the use of recycled water for GWR is a safe sustainable practice. For example, the Montebello Forebay Groundwater Replenishment Project, which has been using recycled water as a source of replenishment to Central Basin since 1962, has been the subject of three epidemiological studies and a risk assessment.
  - The epidemiological studies have shown there is no association between the use of recycled water for groundwater replenishment and infectious disease, cancer, or adverse birth outcomes.
  - The risk assessment showed that recycled water used for replenishment did not contribute to human health risk.
  - These results illustrate that properly designed and operated projects that use recycled water for groundwater replenishment provide protection from microbiological and chemical contaminants comparable to or better than what the public experiences in many drinking water supplies today.

1. Introduction

The Draft Groundwater Basins Master Plan (GBMP) establishes a framework to enhance groundwater replenishment in the Central Basin and West Coast Basin (CBWCB), increase the reliability of groundwater water supplies, improve and protect groundwater quality, and accommodate growing potable water demands. The GBMP identifies and evaluates specific projects and management strategies that would increase replenishment and beneficial use of

recycled water and captured storm water. The increased replenishment would require increased utilization of existing spreading grounds, injection wells, and recovery facilities, expanding or upgrading recycled water treatment facilities, and the installation of new water infrastructure.

A Programmatic Environmental Impact Report (PEIR) is being prepared for the GBMP that will provide an area-wide assessment of the potential significant environmental effects of implementing the program objectives and associated groundwater management strategies in the Plan. One of the key strategies is the use of recycled water to replenish the groundwater basins via surface application (e.g., spreading) and/or subsurface application (e.g., injection), including saltwater intrusion barriers. This practice, known as groundwater replenishment (GWR) is a type of indirect potable reuse that is typically defined as the introduction of recycled water to a water supply source, such as groundwater, where the water supply source serves to dilute the recycled water and may provide additional treatment through natural processes. Thus, the recycled water receives additional treatment before entering a drinking water distribution system. For some groundwater systems, additional treatment such as disinfection is applied before the water is provided to customers for drinking.

An understanding of the potential public health implications for the increased use of recycled water as a principal replenishment source in the future is a fundamental and essential component of the PEIR. Thus, as part of the scope of work for the PEIR, a technical study was included to evaluate (1) the status and future of recycled water regulations pertaining to GWR and (2) studies that have assessed the effects of using recycled water for GWR on groundwater quality and public health. The results of the PEIR technical study are presented in this technical memorandum (TM).

The remainder of the TM is organized into the following sections:

- Overview of Statutory Requirements for Groundwater Replenishment
- California Groundwater Replenishment Regulations
- State Water Resources Control Board Policies
- Los Angeles Regional Water Quality Control Board Requirements
- Permitting Groundwater Replenishment Projects
- Studies and Tools to Assess the Safe Use of Recycled Water for Groundwater Replenishment
- Acronyms

2. Overview of Statutory Requirements for Groundwater Replenishment

The use of recycled water for planned GWR projects in California is regulated under the Clean Water Act when applicable (when a project involves discharges to a Water of the United States (U.S.)), the Safe Drinking Water Act, and several State laws, regulations, and policies, with different responsibilities assigned to the State Water Resources Control Board (SWRCB), the

nine Regional Water Quality Control Boards (RWQCBs), and the SWRCB Division of Drinking Water (DDW), formerly the California Department of Public Health (CDPH).[2]

The California Water Code (CWC) and Health and Safety Code (H&SC) contain California's statutes that regulate the use of water and recycled water, the protection of water quality and public health, and thus are applicable to all GWR projects. The key statutes that ensure protection of water quality and public health are presented in **Table 3-1**.

Table 3-1. Key California Statutes for Protection of Water Quality and Public Health

Code	Purpose
Water Rights	
CWC section 1210-1212	Requires that prior to making any change in the point of discharge, place of use, or purpose of treated wastewater, approval must be obtained from the SWRCB. New SWRCB guidance has clarified that a wastewater petition for change only needs to be filed with the SWRCB Division of Water Rights if the owner of the wastewater treatment plant decreases the amount of water in a stream or other waterway.[3]
Recycled Water Definitions	
CWC sections 13050, 13512, 13576, 13577, 13350, and 13552-13554	Recycled water is defined in the CWC as water, which as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and therefore considered a valuable resource.
CWC sections 13561	Defines direct potable reuse, and indirect potable reuse for GWR.
Water Quality	
CWC section 13170	Authorizes the SWRCB to adopt State policies for water quality control.
CWC sections 13240-42	Authorizes RWQCB to adopt Water Quality Control Plans (Basin Plans) that assign beneficial uses for surface waters and groundwaters, and contain numeric and narrative water quality objectives that must provide reasonable protection of the beneficial uses of the groundwater. One of the factors that must be considered when establishing water quality objectives is the need to develop and use recycled water. Basin Plans must include a program of implementation for achieving the water quality objectives.
H&SC sections 116270 et seq.	This is the California Safe Drinking Water Act that authorizes primary and secondary maximum contaminant levels (MCLs) as included in the California Code of Regulations, Title 17 – Public Health, Chapter 5, Subchapter 1, Group 4 – Drinking Water Supplies, sections 7583 through 7630.[4]
H&SC section 116455	Requires public water systems to take certain actions if drinking water exceeds Notification Levels (NLs). NLs are health-based advisory levels

[2] Effective July 1, 2014, the DDW Drinking Water Program (including recycled water responsibilities) was transferred to the SWRCB, and named the Division of Drinking Water.

[3] See http://www.waterboards.ca.gov/rwqcb8/water_issues/programs/basin_plan/index.shtml, http://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/wastewaterchange/index.shtml.

[4] See http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/dwregulations-2014-07-01.pdf.

Code	Purpose
	established by the DDW for chemicals in drinking water that lack MCLs. When chemicals are found at concentrations greater than their NLs, certain requirements and recommendations apply.[5]
Recycled Water Permits	
CWC sections 13260, 13263, 13269, 13523.1	Dischargers proposing to discharge waste that could affect the quality of waters of the state must file a report of waste discharge (ROWD) to the RWQCB. After receiving this report, the RWQCB can issue specific or general Waste Discharge Requirements (WDRs) and/or Water Recycling Requirements (WRRs) that reasonably protects all beneficial uses and that implement any relevant water quality control plans and policies. The RWQCB can also issue a Master Reclamation Permit, which is a WDR that covers multiple non-potable reuse applications and requires periodic site inspections and adoption of rules and regulations for recycled water use. A RWQCB may require a discharger to provide monitoring program reports or conduct studies.
CWC section 13552.5	Authorizes the SWRCB to adopt General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water to streamline tertiary disinfected recycled water use. The General Permit was adopted in 2009; in 2014 the SWRCB adopted a new General Permit that supersedes this permit and covers all non-potable reuse applications.[6]
H&SC section 116271	Effective July 1, 2014 transfers the DDW Drinking Water Program to the SWRCB, including water reclamation and direct and indirect potable reuse; creates the Deputy Director of the new SWRCB DDW.
CWC section 13528.5	Effective July 1, 2014, the SWRCB may carry out the duties and authority granted to a RWQCB pursuant to Chapter 7 of the CWC (Water Reclamation sections 13500 – 13557, which include issuing potable reuse permits).
Recycled Water Regulations	
CWC sections 13500-13529.4; H&SC 116800 et seq.	Requires DDW to establish uniform statewide recycling criteria. DDW has developed these criteria for non-potable reuse and GWR and they are codified in Title 22 of the California Code of Regulations; regulations for cross connections are codified in Title 17.
CWC section 13540	Prohibits the use of any waste well that extends into a water-bearing stratum that is, or could be, used as a water supply for domestic purposes; injection wells or vadose zone wells used for replenishment are part of this category (injection wells or vadose zone wells are considered waste wells under the CWC). An exception can be provided if (1) the RWQCB finds that water quality considerations do not preclude controlled replenishment by direct injection, and (2) DDW finds, following a public hearing, that the proposed replenishment will not degrade groundwater quality as a source of domestic water supply. This section of the CWC also allows DDW to make and enforce regulations pertaining replenishment of recycled water using injection wells.

[5] See http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.shtml.
[6] See http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2014/wqo2014_0090_dwq_revised.pdf.

Code	Purpose
CWC sections 13522.5 and 13523	Requires any person who proposes to recycle or to use recycled water to file an Engineering Report with the RWQCB on the proposed use. After receiving the report, and consulting with and receiving recommendations from DDW, and any necessary evidentiary hearing, the RWQCB must issue a permit (WDRs and/or WRRs) for the use.
CWC sections 13562-13563	Requires DDW to adopt uniform water recycling criteria for GWR by June 30, 2014 as emergency regulations, and for surface water augmentation by December 31, 2016; and requires DDW to investigate the feasibility of developing criteria for direct potable reuse and to provide a final report on that investigation to the Legislature by December 31, 2016. By February 14, 2015, DDW must convene an expert panel to advise DDW on water recycling criteria for surface water augmentation and the feasibility of direct potable reuse.

3. California Groundwater Replenishment Regulations

Prior to June 18, 2014, the Water Recycling Criteria (California Code of Regulations Title 22) included narrative requirements for planned GWR projects. The regulations required that recycled water must be at all times of a quality that fully protects public health and that DDW recommendations would be made on an individual case basis and taking into consideration all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal.

Since 1976, DDW issued numerous draft versions of more detailed GWR regulations that served as guidance for the requirements applied to the six permitted GWR projects in California, four of which are located in the CBWCB, as well as for potable reuse planning.[7]

The four permitted GWR projects in CBWCB are:

- Montebello Forebay GWR Project. This project is the joint responsibility of the Water Replenishment District of Southern California (WRD), the Sanitation Districts of Los Angeles County (LACSD), and the Los Angeles County Department of Public Works (LACDPW). Tertiary recycled water, untreated Colorado River Water and State Project water (imported water) supplied by the Metropolitan Water District of Southern California, local stormwater, direct rainfall, and subsurface groundwater flow are sources of groundwater replenishment. WRD manages the groundwater basin and purchases recycled water and imported water; LACSD produces the recycled water; and LACDPW operates and maintains the spreading facilities. The project first began using

[7] The other two projects are (1) the Chino Basin GWR Project that uses tertiary recycled water (21,000 AFY) and stormwater for groundwater replenishment via surface spreading in the Chino Groundwater Basin. This project first began using recycled water in 2005; and (2) the Groundwater Replenishment System (GWRS) that uses 100% advanced treated recycled water (78,000 AFY) for injection as a sea water barrier / replenishment and for surface spreading for replenishment in the Orange County Groundwater Basin. This project first started its full-scale GWR in 2008. Construction is underway to expand the advanced treatment plant such that 112,000 AFY of AWT recycled water will be available for injection and spreading in 2015.

recycled water in 1962. On average it uses 50,000 acre-feet per year (AFY) of recycled water for groundwater replenishment. The project is allowed to use recycled water up to 45% of the volume of all replenishment sources to the Forebay (as determined over a 10-year period). Plans are underway for the Groundwater Reliability Improvement Project that would replace the 21,000 AFY of imported water used for replenishment with recycled water (potentially 11,000 AFY of tertiary recycled water and 10,000 AFY of advanced treated recycled water) by 2017/18.

- Alamitos Gap Seawater Intrusion Barrier Project (AGB). The AGB is jointly owned by LACDPW and Orange County Water District and is operated/maintained by LACDPW. The AGB was established to prevent seawater intrusion and replenish groundwater resources in the Central Basin and Orange County Basin. It currently is authorized to use a 50:50 blend of advanced treated recycled water and treated imported water. The Leo J. Vander Lans Advanced Water Treatment Facility, which is owned by WRD and operated by the Long Beach Water Department, performs advanced water treatment (AWT) of tertiary recycled water supplied by LACSD. The project first began using AWT recycled water in 2005 (2,000 AFY). The Vander Lans Advanced Water Treatment Facility is undergoing expansion, which is expected to be completed in 2014. The permit for the project has been amended to allow injection of 100% recycled water (8,400 AFY), replacing the imported water.
- West Coast Basin Seawater Intrusion Barrier (WCBB). The WCBB, owned and operated by LACDPW, was established to prevent seawater intrusion and replenish groundwater resources in the West Coast Basin. The Edward C. Little Water Recycling Facility, which is owned by West Basin Municipal Water District, produces the AWT recycled water. The project first began using AWT recycled water in 1994 and started out with a 50:50 blend of recycled water and imported water and then was increased to a 75:25 blend. In 2014 when the Edward C. Little Water Recycling Facility's expansion is completed, all of the injected water (17,000 AFY) will be advanced treated recycled water.
- Dominquez Gap Seawater Intrusion Barrier (DGB). The DGB, owned and operated by the City of Los Angeles, was established to prevent seawater intrusion and replenish groundwater resources in the West Coast Basin. The project first began using recycled water in 2003. The project is allowed to use up to a 50:50 blend of AWT recycled water (5,400 AFY) produced by the City of Los Angeles Terminal Island Water Reclamation Plant/Advanced Water Treatment Facilities and treated imported water. Plans are underway for expansion of the Los Angeles Terminal Island Water Reclamation Plant/Advanced Water Treatment Facilities and to use 100% AWT recycled water (7,500 AFY) by 2018/19.

3.1. June 2014 Groundwater Replenishment Regulations

Final GWR regulations were adopted and went into effect June 18, 2014. The overarching principles taken into consideration by DDW in developing the GWR Regulations were:

- GWR projects are replenishing groundwater basins that are used as sources of drinking water.
- Control of pathogenic microorganisms should be based on a low tolerable risk which was defined as an annual risk of infection in drinking water of one in 10,000;

- Compliance with drinking water standards for regulated chemicals; and
- Controls for unregulated chemicals.
- No degradation of an existing groundwater basin used as a drinking water source.
- Use of multiple barriers to protect water quality and human health.
- Projects should be designed to identify and respond to a treatment failure. A component of this design acknowledges that GWR projects inherently will include storage in a groundwater aquifer and include some natural treatment.

The GWR Regulations are organized by type of project: (1) surface application (surface spreading) and (2) subsurface application (injection or vadose zone wells). The key provisions are summarized in **Table 4-1**.

Table 4-1. June DDW2014 Groundwater Replenishment Regulations

Control Mechanism	Requirements
Source Control	Entities that supply recycled water to a GWR project must administer a comprehensive source control program as a critical first barrier to prevent undesirable chemicals from entering wastewater. The source control program must include: (1) an assessment of the fate of DDW and RWQCB-specified contaminants through the wastewater and recycled water treatment systems; (2) provisions for contaminant source investigations and contaminant monitoring that focus on DDW and RWQCB-specified contaminants; (3) an outreach program to industrial, commercial, and residential communities; and (4) an up-to-date inventory of contaminants.
Pathogen Control	To meet the low tolerable risk level (a basic principle of the regulations), pathogen reduction requirements have been established for treatment of recycled water similar to the approach used for drinking regulations by establishing log reductions for the treatment process. The regulations required that the water reclamation process (from conventional wastewater treatment through residence time underground) achieve a 12-log enteric virus reduction, a 10-log *Giardia* cyst reduction, and a 10-log *Cryptosporidium* oocyst reduction using at least 3 treatment barriers. To ensure that a barrier is significant, each barrier must achieve at least 1.0-log reduction and cannot be credited with more than 6-log reduction. The log reductions must be verified using a procedure approved by DDW. Failure to meet the specified pathogen requires notification to DDW and RWQB, investigation, and/or discontinuation of recycled water use until a problem is corrected. A National Water Research Institute (NWRI) independent expert panel has reviewed these requirements and concluded that a large margin of safety was incorporated into the regulations and the recycled water could be safely used for GWR (NWRI, 2013).
Nitrogen Control	To ensure protection of groundwater, the concentration of total nitrogen in recycled water must meet 10 milligrams per liter (mg/L) before or after recharge. Failure to meet this value requires follow-up sampling, notification to DDW and RWQCB, and/or discontinuation of recycled water use until a problem is corrected as specified in the GWR Regulations.

Control Mechanism	Requirements
Regulated Chemicals Control	The recycled water must meet drinking water MCLs as specified by the regulations. Failure to meet MCLs requires follow-up sampling, notification to DDW and RWQCB, and/or discontinuation of recycled water use until a problem is corrected as specified in the GWR Regulations.
Unregulated Chemicals Control	Monitoring the concentrations and toxicities of thousands of potential organic compounds in a recycled water would be an infeasible task. Control of unregulated chemicals for all GWR projects is accomplished through the application of an allowable Recycled Water Contribution (RWC) and recycled water limits for Total Organic Carbon (TOC). For surface application GWR projects, additional Soil Aquifer Treatment Process (SAT) performance requirements apply (for removal of TOC and constituents of emerging concern [CECs[8]]).[9] For subsurface application projects, the recycled water must receive advanced treatment using reverse osmosis (RO) and advanced oxidation (AOP) and the regulations includes specific performance criteria for RO and AOP. TOC is used as a surrogate for unregulated and unknown organic chemicals. Failure to meet the requirements established for a GWR project results in taking corrective actions, consultation with regulators, and in some cases cessation of the use of recycled water. For surface spreading projects, the recycled water TOC must be less than 0.5 mg/L divided by the RWC, which is the ratio of recycled water applied for replenishment divided by the sum of recycled water and any applied credited dilution water that meets specific water quality requirements. This approach allows a GWR project to balance treatment and dilution as necessary to comply with requirements. **Surface spreading projects** can use disinfected tertiary recycled water, but require dilution water to go above RWCs typically > 50% based on TOC. If advanced treatment is used, surface spreading projects may not require dilution water. For **subsurface application projects**, the TOC must be less than 0.5 mg/L and projects have the ability to begin using 100% recycled water.
Response Retention Time (RRT)	The intent of the RRT is to retain recycled water underground to provide time to identify any treatment failure so that inadequately treated recycled water does not enter a potable water system. Sufficient time must elapse to allow for a response that will protect the public from exposure to inadequately treated water and provide an alternative source of water or remedial treatment at drinking water if necessary as a result of a GWR project. The RRT is the aggregate period of time between treatment verification samples or measurements; time to make the measurement or analyze the sample; time to evaluate the results; time to make a decision; time to activate the response; and time for the response work. The minimum RRT is 2 months, but the GWR project sponsor must justify the RRT derived.
Emergency Response Plan	Before a GWR project begins, a project sponsor must develop and be

[8] CECs include pharmaceuticals, personal care products, and endocrine disrupting chemicals.

[9] A number of soil column studies and field tests have been conduced on SAT performance for TOC and CECs for the Montebello Forebay GWR Project and Chino Basin GWR project that demonstrate that SAT effectively removes TOC and CECs.

Control Mechanism	Requirements
	willing to implement a DDW-approved plan for an alternative source of potable water supply or treatment at a drinking water well if a GWR project causes the well to no longer be safe for drinking purposes.
Monitoring Program	Project sponsors must develop and implement a comprehensive monitoring program for recycled water, dilution water, and groundwater for regulated and unregulated constituents.
Operation and Optimization Plan	Before a GWR project begins, a project sponsor must develop plan to assure that the treatment, distribution, and replenishment facilities are operated to achieve compliance with the GWR Regulations r, to achieve optimal reduction of contaminants, and to identify how the project will be operated and monitored.
Boundaries Restricting Production Wells	Project proponents must establish a "zone of restricted well construction," which represents the greatest of the horizontal and vertical distances reflecting the underground retention times required for pathogen control or for RRT. Production wells cannot be located in this zone. Project proponents must also create a "secondary boundary" representing a zone of potential restricted well construction that may be beyond the zone of restricted well development thereby requiring additional study before a production well is drilled.
Adequate Managerial and Technical Capability	A project sponsor must demonstrate that it possess adequate managerial and technical capability to comply with the regulations.
Engineering Report	The project sponsor must submit an Engineering Report to DDW and RWQCB that indicates how a GWR project will comply with all regulations and includes a contingency plan to insure that no untreated or inadequately treated water will be used.
Reporting	Annual reports must be submitted to DDW and RWQCB, and the Engineering Report must be updated every 5 years.
Alternatives	Alternatives to any of the provisions are allowed if the project sponsor demonstrates that the alternative provides the same level of public health protection; the alternative has been approved by DDW; and an expert panel must review the alternative unless otherwise specified by DDW.
Public Hearings	The project sponsor must hold a public hearing for a GWR project after DDW approves the Engineering Report. A second public hearing is held for consideration and adoption of the GWR permit.

3.2. Overview of Drinking Water Standards and Advisory Levels

The Safe Drinking Water Act allows the U.S. Environmental Protection Agency (USEPA) to promulgate national primary drinking water standards specifying MCLs for each contaminant present in a public water system with an adverse effect on human health, taking into consideration cost and technical feasibility. MCLs have been established for approximately 90 contaminants in drinking water.[10] In cases where the MCLs cannot be feasibly ascertained, the USEPA may elect to identify and establish a schedule of "treatment techniques" preventing adverse effects on human health to the extent feasible. DDW has established its own set of

[10] For a current list of maximum contaminant levels, see http://www.epa.gov/safewater/contaminants/index.html.

MCLs either based on the Federal MCLs or as part of its own rulemaking effort. For example, California has an MCL for perchlorate while there is no Federal MCL.[11]

Drinking water MCLs are established in two steps. For the Federal process, the USEPA establishes MCL goals (MCLGs) and DDW uses establishes Public Health Goals (PHGs) established by the Office of Environmental Health Hazard Assessment, which are the maximum levels of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allow an adequate margin of safety. The MCLGs have been historically set at zero for microbial and carcinogenic contaminants; chemical PHGs for carcinogens are set at the 10^{-6} level. Once the MCLG or PHG is established, the USEPA or DDW determines the feasible MCL or treatment technology level that may be achieved with the use of the best available technology and treatment techniques, and taking cost into consideration.

There are also a variety of chemicals of health concern whose occurrence is too infrequent in conventional drinking water sources to justify the establishment of national standards but are addressed using advisory levels. The USEPA establishes health advisories to address many of these latter chemicals. DDW has established its own health advisories for chemicals in drinking water without MCLs: NLs and Response Levels.[12] If a chemical concentration is greater than its NL in drinking water, the utility must inform its customers and consumers about the presence of the chemical, and about health concerns associated with exposure to it. If a chemical is present in drinking water that is provided to consumers at concentrations greater than the Notification Level (10 to 100 times greater depending on the toxicological endpoint), the DDW recommends that the source be taken out of service (Response Level). The GWR Regulations include requirements for monitoring recycled water for NLs and response actions if concentrations exceed NLs.

4. State Water Resources Control Board Policies

There are two policies of particular importance with respect to GWR projects for protection of water quality and human health: (1) anti-degradation policies, and (2) the Recycled Water Policy.

4.1. Anti-degradation Policies

California's anti-degradation policies are found in Resolution 68-16, Policy with Respect to Maintaining Higher Quality Waters in California, and Resolution 88-63, Sources of Drinking Water Policy.[13] These resolutions are binding on all State agencies. They apply to both surface waters and groundwaters (and thus GWR projects), protect both existing and potential uses, and are incorporated into RWQCB Basin Plans.

4.1.1. Resolution 68-16 (Anti-degradation Policy)

The Anti-degradation Policy requires that existing high water quality be maintained to the maximum extent possible, but allows lowering of water quality if the change is "consistent with

[11] For a comparison see: http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/dwdocuments/MCLsEPAvsDWP-2014-07-01.pdf.
[12] See http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.shtml.
[13] See http://www.swrcb.ca.gov/plans_policies/.

maximum benefit to the people of the state, will not unreasonably effect present and anticipated use of such water (including drinking), and will not result in water quality less than prescribed in policies." The Anti-degradation Policy also stipulates that any discharge to existing high quality waters will be required to "meet waste discharge requirements which will result in the best practicable treatment or control of the discharge to ensure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

4.1.2. Resolution 88-63 (Sources of Drinking Water Policy)

The Sources of Drinking Water Policy designates the municipal and domestic supply (MUN) beneficial use for all surface waters and groundwater except for those: (1) with total dissolved solids (TDS) exceeding 3,000 mg/L, (2) with contamination that cannot reasonably be treated for domestic use, (3) where there is insufficient water supply, (4) in systems designed for wastewater collection or conveying or holding agricultural drainage, or (5) regulated as a geothermal energy producing source. Resolution 88-63 addresses only designation of water as drinking water source; it does not establish objectives for constituents that threaten source waters designated as MUN.

4.2. Recycled Water Policy

The Recycled Water Policy was adopted by the SWRCB on February 3, 2009 and became effective on May 14, 2009. It was subsequently amended on January 22, 2013 with regard to CEC monitoring with an effective date of April 25, 2013. The Recycled Water Policy was a critical step in creating uniformity in how RWQCBs were individually interpreting and implementing Resolution 68-16 for water recycling projects, including GWR projects. The critical provisions in the Policy related to GWR projects are discussed in the following subsections.

4.2.1. Salt Nutrient Management Plans

In recognition that some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed Basin Plan groundwater objectives, and that some Basin Plans do not have adequate implementation measures to achieve compliance, the Recycled Water Policy included provisions for managing salts and nutrients on a regional or watershed basis through development of Salt Nutrient Management Plans (SNMPs) rather than imposing requirements on individual recycled water projects (which had been the practice prior to adoption of the Recycled Water Policy). Unfavorable groundwater salt and nutrient conditions can by caused by natural soils, discharges of waste, irrigation using surface water, groundwater, or recycled water, and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

SNMPs are to be developed for every groundwater basin/sub-basin by May 2014 (May 2016 with a RWQCB-approved extension). The SNMP must identify salt and nutrient sources; identify basin/sub-basin assimilative capacity and loading estimates; and evaluate the fate and transport of salts and nutrients. The SNMP must include implementation measures to manage salt and nutrient loadings in the basin on a sustainable basis and an anti-degradation analysis demonstrating that all recycling projects identified in the plan will collectively satisfy the requirements of Resolution No. 68-16. The SNMP must also include an appropriate cost effective network of monitoring locations to determine if salts, nutrients and other constituents of concern (as identified in the SNMPs) are consistent with applicable water quality objectives.

A draft SNMP has been prepared for the CBWCB and was submitted to the Los Angeles RWQCB in August 2014. It will be adopted as an amendment to the Los Angeles Basin Plan by the RWQCB in 2015. The SNMP evaluated a broad range of contaminants and concluded that only salts/nutrients (S/N) required further assessment. The SNMP is using three indicators to be representative of S/N: TDS, chloride, and nitrate. The SNMP has characterized the average CBWCB TDS, chloride, and nitrate groundwater quality, water quality trends, and future predicted water quality taking into consideration existing and future S/N loadings, including the impacts of GWR projects and water recycling irrigation projects, wastewater discharges, stormwater capture, and other salt/nutrient sources. The overall SNMP results and conclusions show that for the SNMP planning period of 2010 – 2025:

- Recycled water projects either improve S/N water quality or use only a very small amount of the available assimilative capacity.
- Based on existing and future water quality, existing and planned implementation measures, including GWR projects, are robust and will continue to manage S/N on a sustainable basis.
- Project impacts, including GWR Projects, are minor and well below the 10% and 20% capacity thresholds in the Recycled Water Policy (see TM Section 5.2.3).
- For the Central Basin planning period, the Basin Plan groundwater quality objectives will be not be exceeded.
- For the West Coast Basin planning period, water quality is improving and Basin Plan groundwater quality objectives will be achieved in the future. There are areas of the basin that have been impacted by legacy salt water intrusion plumes, but with implementation measures in place these will be remediated over time.
- Long standing, comprehensive, and well-established water quality monitoring programs exist for all source waters.
- Assessment of S/N in groundwater in the CBWCB will be conducted by WRD and reported annually.
- Salts and nutrients in the CBWCB are being well managed.
- Current Basin Plan groundwater quality objectives are sufficient and no modifications are being sought.
- Extensive monitoring programs are in place to rapidly detect changes in water quality.
- There is significant existing CEC monitoring through existing programs and permits.
- Recycled water used for irrigation can have concentrations at the upper secondary MCLs or primary MCL with insignificant impact on groundwater quality.
- Recycled water is a safe, valuable, sustainable, and beneficial water supply.

4.2.2. Regional Water Quality Control Board Groundwater Requirements

The Recycled Water Policy does not limit the authority of a RWQCB to include more stringent requirements for GWR projects to protect designated beneficial uses of groundwater, *provided* that any proposed limitations for the protection of public health may only be imposed following

regular consultation with DDW. The Recycled Water Policy also does not limit the authority of a RWQCB to impose additional requirements for a proposed GWR project that has a substantial adverse effect on the fate and transport of a contaminant plume (for example those caused by industrial contamination or gas stations), or changes the geochemistry of an aquifer thereby causing the dissolution of naturally occurring constituents, such as arsenic, from the geologic formation into groundwater. This provision requires additional assessment of the impacts of a GWR project on areas of contamination in a basin and/or if the quality of the water used for replenishment causes constituents, such as naturally occurring arsenic, to become mobile and impact groundwater.

4.2.3. Anti-degradation and Assimilative Capacity

Assimilative capacity is the ability for groundwater to cleanse itself (i.e., the capacity to receive toxic materials without detrimental effects to human health that may consume the water). It is typically derived by comparing background ambient chemical concentrations in groundwater and comparing the concentrations to applicable Basin Plan groundwater quality objectives. The difference between the ambient concentration and groundwater quality objective is the available assimilative capacity.

In accordance with the Recycled Water Policy, two assimilative capacity thresholds were established. A GWR project that utilizes less than 10% of the available assimilative capacity in a groundwater basin/sub-basin (or multiple projects utilizing less than 20% of the available assimilative capacity in a groundwater basin/sub-basin) must conduct an anti-degradation analysis verifying the use of the assimilative capacity. In the event a project or multiple projects utilize more than the fraction of the assimilative capacity (e.g., 10% or 20%), then the project proponent must conduct a RWQCB-deemed acceptable (and more elaborate) anti-degradation analysis. A RWQCB has the discretionary authority to allocate assimilative capacity to GWR projects. There is a presumed assumption that allocations greater than the Recycled Water Policy thresholds would not be granted without concomitant mitigation or an amendment to the Basin Plan groundwater quality objective to create more assimilative capacity for allocation.

As discussed in Section 5.2.1, the CBWCB SNMP has shown that all current and future projects, including GWR projects, through the 2025 planning period fall below both the 10% and 20% assimilative capacity thresholds. GWR projects included in the Draft GBMP, but not addressed in the SNMP, would be evaluated in terms of groundwater impacts and assimilative capacity as part of their approval and permitting process, or as part of a future updated SNMP and Basin Plan amendment (if undertaken).

4.2.4. Constituents of Emerging Concern

Background

Among the perceived risks of using recycled water for GWR is concern about the presence of trace concentrations of pharmaceuticals, personal care products (such as insecticides and flame retardants), and chemicals that can affect the human endocrine system in terms of growth, reproduction, and sexual behavior (e.g., endocrine disrupting chemicals). These chemicals are often grouped together and called CECs. Low concentrations of CECs have been found in wastewater, recycled water, surface water, drinking water, and groundwater. The ability to detect these chemicals at very low levels has outpaced the ability to completely remove them from the environment.

CECs are effectively removed by many recycled water treatment processes, including secondary/tertiary treatment, SAT, and AWT, but can still be detected in the recycled water. For example, a widely used prescription antibiotic, Ciprofloxacin, has been found in recycled water at a concentration of 9 nanograms per liter (ηg/L). A ηg/L is one part per trillion, or the equivalent of one cent in ten billion dollars**.** However, simply detecting a compound does not mean that its presence is of health significance. Because many CECs do not have established drinking water standards or advisory levels, researchers have developed a method to describe an estimate of the amount of a substance in drinking water, expressed on a body-weight basis (usually in milligrams of the substance per kilograms of body weight per day), that can be ingested daily over a lifetime without appreciable risk. The procedure to derive this estimated "safe" amount involves collecting all relevant toxicity data, ascertaining the completeness of the data, determining the most sensitive toxicity outcome (taking into account sensitive population groups such as infants, children, pregnant women, and those with compromised health), and applying appropriate safety factors. Health outcomes include therapeutic dose of medications, the no observed adverse affect level (NOAEL), the lowest observed no adverse effect level (LOAEL), and carcinogenicity. Depending on the researcher conducting the study, these estimated safe amounts are called different names: Tolerable Daily Intakes (TDIs), Acceptable Daily Intakes (ADIs), or Predicted No Effect Concentrations (PNEC) (Schwab et al., 2005, Environment Protection and Heritage Council et al., 2008, Environment Protection and Heritage Council et al, 2008, Anderson et al., 2010, Bruce et al 2010a,b).

Selection of CECs for evaluation typically start off considering the approximately 3,000 chemicals that might be present in recycled or drinking water, including prescription drugs, drugs of abuse, over-the-counter drugs, veterinary pharmaceuticals, personal care products, components of household products, and chemicals that can disrupt the human endocrine system. The selection process considers:

- The likelihood of occurrence in recycled water on the basis of evidence of detection in wastewater treatment plant effluents, effluent-dominated surface waters, and/or drinking water; the rate of pharmaceutical use; or physical/chemical properties predictive of resistance to water treatment and the potential to migrate in groundwater.
- The likelihood to cause adverse health effects in humans at very low, chronic exposure levels, particularly given any evidence of carcinogenicity, impairment of fertility, or developmental toxicity in animal or human studies.
- Public, scientific, and regulatory interest.
- The ability to be representative of different chemical or drug groups to represent different mechanisms of action or use patterns.

In order to compare the estimated safe amounts to concentrations of chemicals in recycled water or drinking water, researchers calculate a Drinking Water Equivalent Level (DWEL). The DWEL represents the concentration of a chemical in drinking water that would be equivalent to the TDI/ADI/PNEC, assuming a 150-pound person (70 kilograms or kg) consumes 2 liters (L) of water (about 8½ cups) per day using the following equation.

$$\text{DWEL } (\mu g/L) = \frac{\text{TDI } (\mu g/kg/day) \times 70 \text{ kg}}{2 \text{ L/day}}$$

Where µg/L is micrograms per liter and µg/kg/day is micrograms per kilogram per day.

Anderson et al. (2010) presents a compendium of TDIs, ADIs, PNECs, and DWELs for over 400 CECs.

To put the DWELs into understandable terms to support risk communication, they can be compared to the highest (worst case) concentrations that have been detected in wastewater, recycled water, or drinking water sources. It is then possible to calculate the number of 8-ounce glasses of water containing the detected concentrations that a person would have to drink to reach the acceptable levels (the DWEL).

$$\text{Required water consumption (L/day)} = \frac{\text{DWEL } (\mu g/L) \times 2 \text{L/day}}{\text{Detected water concentration } (\mu g/L)}$$

Some examples of DWELs and water consumption to reach the DWEL are presented in **Table 5-1**.

Table 5-1. Daily Water Consumption to Equal the Drinking Water Equivalent Level

Compound	Type of Compound	DWEL µg/L	Consumption Rate Required to Equal DWEL (8-ounce Glasses/Day)
Alprazolam	Anti-anxiety medication	14	39
Ciprofloxacin	Antibiotic	17	4,800
Clonidine	Blood pressure medication	0.028	>99
DEET[1]	Insecticide	81	3,500
Ibuprofen	Analgesic	34	290
Morphine	Analgesic	1.0	42
Primidone	Anticonvulsant	0.85	55
Salicylic acid	Skin care product ingredient	54	420
TCEP	Flame retardant	4.4	84
Di-*n*-butyl phthalate	Plasticizer	14	200

Source: Bruce et al., 2010a.

1. DEET - N,N-diethyl-meta-toluamide).
2. TCEP - Tris(2-chloroethyl)phosphate.

In general, for those CECs whose presence in recycled water, drinking water or other water sources has been evaluated, CECs were many times lower than the acceptable concentrations based on the DWELs. Thus, for those CECs with data available in the literature, there was a wide range of water consumption needed to reach the acceptable health level. If a person typically drinks five 8 ounce glasses per day, a person would have to drink 8 to 30,000 times more water per day than normal to exceed the acceptable levels.

Monitoring

As part of the SWRCB Recycled Water Policy, a Science Advisory Panel was formed to identify a list of CECs for monitoring in recycled water used for GWR and landscape irrigation. The Panel completed its report in June 2010 and recommended monitoring a specific list of selected health-based and treatment performance indicator CECs and surrogates for GWR projects (Anderson et al., 2010). The Panel concluded that CEC monitoring was unnecessary for landscape irrigation. The GWR monitoring recommendations were directed at (1) surface spreading using tertiary recycled water, specifically monitoring recycled water and groundwater; and (2) injection projects using RO and AOP, specifically monitoring recycled water.

The Panel compiled available California CEC data for secondary and tertiary recycled water and identified Monitoring Trigger Levels (MTLs) to pinpoint the chemicals that should be prioritized for CEC monitoring for GWR projects. MTLs are equivalent to DWELs discussed in the CEC Background Section of this TM. The Panel selected the lowest available DWEL to use in the selection process and acknowledged that overall the assumptions used to identify CECs for monitoring included 6 to 11 orders of magnitude of conservatism. Some of the CECs were selected for monitoring based on their potential to pose a human health risk if present in drinking water, while others were selected to evaluated recycled water treatment performance, or both.

The SWRCB amended the Recycled Water Policy on January 22, 2013 to include the Panel's recommended monitoring program. The Office of Administrative Law approved the amendment on April 25, 2013. The Recycled Water Policy Amendment provides the final list of specific CECs and monitoring frequencies for GWR Projects (see **Table 5-2**), and procedures to evaluate the data and for responding to the monitoring results (see **Table 5-3**). For health-based CECs, the responses in Table 5-2 are based on comparing measured concentrations in recycled water after treatment (tertiary treatment plus SAT for surface spreading project; RO or RO with AOP for subsurface application projects) to the MTLs. The monitoring and response requirements will be incorporated into the permits for existing GWR projects, and will be included as requirements for all future projects. As part of the June 2014 GWR Regulations, DDW has it's own CEC requirements and monitoring locations that must be met (and established on a project-by-project basis) in addition to the Recycled Water Policy requirements. The next update of CEC monitoring by a SWRCB expert panel will occur in 2015.

Table 5-2. State Water Resources Control Board Recycled Water Policy – Constituents of Emerging Concern to be Monitored for Groundwater Replenishment Projects

Constituent	Constituent Group	Relevance / Indicator Type	Method Reporting Limit (µg/L)[1,2]	MTL (µg/L)	Example of Treatment % Removal[3]
Groundwater Replenishment Reuse – Surface Application					
17β-estradiol	Steroid hormones	Health	0.001	0.0009	---[4]
Caffeine	Stimulant	Health & Performance	0.05	0.35	>90
NDMA[5]	Disinfection byproduct	Health	0.002	0.01	---
Triclosan	Antimicrobial	Health	0.05	0.35	---
Gemfibrozil	Pharmaceutical	Performance	0.01	---	>90
Iopromide	Pharmaceutical	Performance	0.05	---	>90

Constituent	Constituent Group	Relevance / Indicator Type	Method Reporting Limit (µg/L)[1,2]	MTL (µg/L)	Example of Treatment % Removal[3]
N,N-Diethyl-meta-toluamide (DEET)	Personal care product	Performance	0.05	---	>90
Sucralose	Food additive	Performance	0.1	---	<25[6]
Groundwater Replenishment and Reuse – Subsurface Application					
17β-estradiol	Steroid hormones	Health	0.001	0.0009	---
Caffeine	Stimulant	Health & Performance	0.05	0.35	>90
NDMA	Disinfection byproduct	Health & Performance	0.002	0.01	25-50, >80[7]
Triclosan	Antimicrobial	Health	0.05	0.35	---
DEET	Personal care product	Performance	0.05	---	>90
Sucralose	Food additive	Performance	0.1	---	>90

1. The Method Reporting Level is the smallest measured concentration of a substance that can reliably be measured using a given analytical method.
2. Monitoring frequency is quarterly for the initial assessment phase; semi-annually for the baseline phase; and semi-annually to annually for the standard operation phase; CECs can be removed or monitoring can increase based on the results.
3. These percentages are one example from one study that evaluated treatment performance; specific removal percentages are to be established for each GWR project
4. Not applicable.
5. NDMA – N-nitrosodimethylamine
6. Sucralose is used more as a tracer for SAT than performance
7. For RO, the range is 25-50%; for RO with AOP, the removal is greater than 80%

Table 5-3. State Water Resources Control Board Recycled Water Policy Thresholds and Response Actions for Health-based Indicators

MEC/MTL Threshold[1]	Response Action
If greater than 75% of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring:	A) After completion of the baseline-monitoring phase, consider requesting removal of the CEC from the monitoring program.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1:	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10:	C) Check the data. Continue to monitor.
If MEC/MLT ratio is greater than 10 and less than or equal to 100:	D) Resample immediately and analyze to confirm CEC result. Continue to monitor.
If MEC/MLT ratio is greater than 100:	E) Resample immediately and analyze to confirm result. Continue to monitor. Contact the RWQCB and DDW to discuss additional actions. (Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation,

MEC/MTL Threshold[1]	Response Action
	implementation of a source identification program, and monitoring at additional locations.)

1. MEC – Measured Environmental Concentration in treated recycled water (including SAT for surface application)

5. Los Angeles Regional Water Quality Control Board Requirements

The Los Angeles RWQCB is responsible for regulating recycled water discharges to groundwater, which are subject to state water quality regulations established pursuant to the CWC (see TM Section 3) for surface and subsurface applications.

5.1. Basin Plan

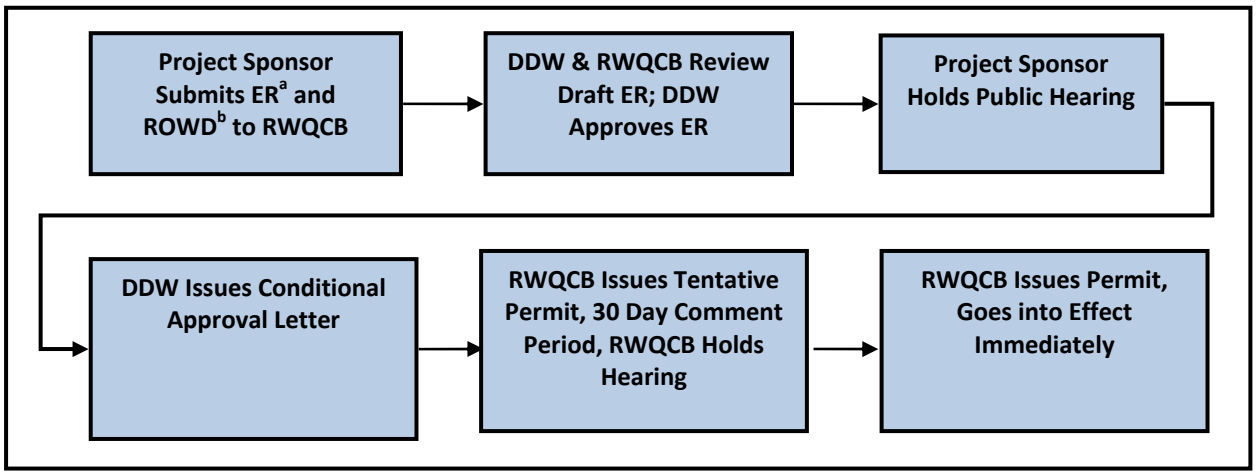
WDRs issued by the Los Angeles RWQCB are required to implement applicable State water quality control policies and plans, including water quality objectives and implementation policies established in the Basin Plan.[14] The Basin Plan designates beneficial uses and groundwater quality objectives on a watershed-by-watershed basis. The Basin Plan incorporates primary and secondary MCLs as groundwater quality objectives that apply to the CBWCB. The Basin Plan also establishes basin specific groundwater objectives for the Central Basin and West Coast Basin for minerals (TDS, sulfate, chloride, boron) and region-wide objectives for nitrogen and taste and odor. Requirements placed on GWR projects by the RWQCB are intended to protect groundwater beneficial uses.

6. Permitting Groundwater Replenishment Projects

The current (potentially interim) process for project approval and permitting of GWR projects is depicted in **Figure 7-1**. The permit based on the GWR Regulations and requirements consistent with Basin Plans, SNMPs, and State policies. Effective July 1, 2014, the DDW as part of the SWRCB has the authority to issue WDRs and WRRs. As the DDW transition proceeds during fiscal year 2014/15, more information will be available on how permitting responsibilities will be handled by DDW and RWQCBs.

[14] See http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/basin_plan/electronics_documents/bp3_water_quality_objectives.pdf.

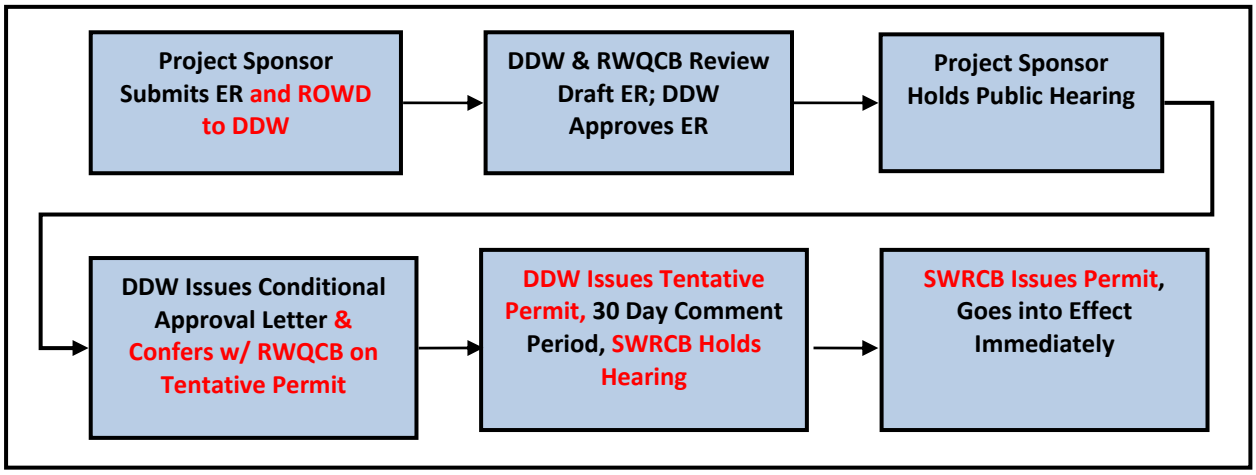
Figure 7-1. Current Regulatory Process for Groundwater Replenishment Projects Using Recycled Water



a. ER – Engineering Report.
b. ROWD – Report of Waste Discharge.

If DDW becomes the permitting authority for GWR projects, the possible approval and permitting process may follow the steps presented in Figure 7-2 (changes shown in red).

Figure 7-2. Potential Regulatory Process for Groundwater Replenishment Projects Using Recycled Water



6.1. Federal Requirements for Groundwater Replenishment Projects

At this time there are no Federal permitting requirements for surface GWR projects; however, the USEPA's underground injection control (UIC) program does apply, but has no permitting consequences. The UIC program has categorized injection wells into five classes, only one of which (Class V) applies to GWR projects. Under the existing Federal regulations, Class V injection wells are "authorized by rule" which means they do not require a Federal permit if they do not endanger underground sources of drinking water and comply with other UIC program requirements. For California, U.S EPA Region 9 is the permitting administrator for Class V wells. Any injection project planned in California must meet the State Sources of Drinking

Water Policy, which ensures protection of groundwater quality for drinking water supplies, and therefore a Federal permit would not be necessary. All Class V injection well owners in California are required to submit information to USEPA Region 9 on the well for USEPA's inventory.[15]

7. Studies and Tools to Assess the Safety of the Use of Recycled Water for Groundwater Replenishment

This section presents information on studies and tools designed to evalute the effects of recycled water used for GWR on human health. These types of studies and tools show that the use of recycled water for GWR is a safe sustainable practice.

- Epidemiological studies.
- Risk assessments.
- Bio-analytical screening tools.

7.1. Epidemiological Studies

Epidemiological studies evaluate the relation between an environmental pollutant and human health using data to characterize exposures to the pollutant, including concentrations in the environment, the probability and characteristics of human exposure, and the distributions of internal doses, as well as trends or differences in the health status of exposed people. Over the past 30 years, a limited number of epidemiology studies have specifically been conducted to evaluate the public health implications of using recycled water for GWR and for direct potable reuse.[16]

The epidemiology studies conducted rely on exposure and outcome data for groups rather than individuals. The diseased persons in the study may not be the most exposed individuals, but this cannot be determined. Nor is information on important risk factors (such as smoking, alcohol consumption, and occupational/environmental exposure that might affect disease incidence) typically available or controllable in the analysis. Other confounding factors can include population migration in and out of the study areas and the use of bottled water. Although epidemiology is invaluable as part of an evaluative suite of analytical tools assessing risk, epidemiology may be most useful at bounding the extent of risk, rather than actually determining the presence of risk at any level (NRC, 2012).

A summary of the relevant projects and related studies is presented in **Table 8-1**. The Montebello Forebay GWR Project has been the subject of three studies that have shown that there was no association between use of recycled water and mortality or morbidity.

[15] http://www.epa.gov/region9/water/groundwater/uic-classv.html, and http://www.epa.gov/region9/water/groundwater/injection-wells-register.html.

[16] Direct potable reuse is typically defined as the introduction of recycled water either directly into the potable water system downstream of a water treatment plant or into the raw water supply immediately upstream of a water treatment plant.

Table 8-1. Summary of Potable Reuse Epidemiology Studies

Project	Description	Studies/Results
GWR		
Montebello Forebay Groundwater Recharge Study, Los Angeles County, California (Nellor, *et al.*, 1984; Sloss *et al.*, 1996; Sloss *et al.* 1999)	Recycled water has been used as a source of replenishment since 1962; other replenishment sources are imported river water (Colorado River and State Project water) and local storm runoff. Water is percolated into the groundwater using two sets of spreading grounds. From 1962 to 1977, the water used for replenishment was disinfected secondary effluent. Filtration (dual-media or mono-media) was added later to enhance virus inactivation during final disinfection. During this time period, the amount of recycled spread annually averaged 27,000 acre-feet (AF), which was 16% of the inflow to the groundwater basin. At that time an arbitrary cap of 32,700 AFY of recycled water had been established. In 1987, the project was allowed in increase the amount of recycled water to 50,000 AFY. The current permit allows for a maximum recycled water contribution of 35% based on a 10-year average. The recycled water meets drinking water standards for chemical constituents, total coliforms < 2.2/100 milliliters (mL), and turbidity < 2 Nephelometric Turbidity Units (NTU).	The studies have looked at health outcomes for 900,000 people that received some recycled water in their household water supplies in comparison to 700,000 people in a control population. Three sets of studies have been conducted: 1) the Health Effects Study, which evaluated mortality, morbidity, cancer incidence, and birth outcomes for the period 1962-1980; 2) the Rand Study, which evaluated mortality, morbidity, and cancer incidence for the period 1987-1991; and 3) the second Rand Study, which evaluated adverse birth outcomes for the period 1982-1993. Health Effects Study (1962-1980): the epidemiological studies focused on a broad spectrum of health concerns that could potentially be attributed to constituents in drinking water. Health parameters evaluated included: mortality (death from all causes, heart disease, stroke, all cancers and cancers of the colon, stomach, bladder and rectum); cancer incidence (all cancers, and cancers of the colon, stomach, bladder, and rectum); infant and neonatal mortality; low birth weight; congenital malformations; and selected infectious diseases (including *Hepatitis A* and *Shigella*). Another part of the study consisted of a telephone interview of adult females living in recycled water and control areas. Information was collected on spontaneous abortions and other adverse reproductive outcomes, bed-days, disability-days, and perception of well-being. The survey was able to control for the confounding factors of bottled water usage and mobility. Rand (1987–1991): the study evaluated cancer incidence (all cancers, and cancer of the bladder, colon, esophagus, kidney, liver, pancreas, rectum, stomach); mortality (death from all causes, cancer, cancer of the bladder, colon, esophagus, kidney, liver, pancreas, rectum, stomach, heart disease, cerebrovascular disease); and

Project	Description	Studies/Results
		infectious diseases (including *Giardia*, *Hepatitis A*, *Salmonella*, *Shigella*). Rand (1982–1993): the evaluation focused on two types of adverse birth outcomes: (a) prenatal development and infant mortality (including: low birth weight (full term only), low birth weight (all births), very low birth weight, preterm birth, infant mortality); and (b) birth defects (all defects, neural tube defects, other nervous system defects, ears, eyes, face, neck defects; major cardiac defects, patent ductus arteriosus, other cardiac defects, and respiratory system defects; cleft defects, pyloric stenosis, intestinal artesias, other digestive system defects; limb, other musculoskeletal, integument and all other defects; chromosomal syndromes and syndromes other than chromosomal). The results from these studies found that after almost 30 years of groundwater replenishment, there was no association between recycled water and higher rates of cancer, mortality, infectious disease, or adverse birth outcomes.
Direct Potable Reuse		
Windhoek, Namibia (Isaacson and Sayed, 1988)	This is an ongoing direct reuse project that began in 1968. At the time the study was conducted, the recycled water was treated using sand filtration and granular activated carbon, and the recycled water was added to drinking water supply system. The treatment system for this project has been upgraded since this work was conducted. The highly treated recycled water is blended with treated dam water and/or groundwater. The maximum portion of recycled water fed into the potable water distribution system is 50% in times of low water demand (winter season) (Lahnsteiner and Lempert, 2007). The drinking water system that serves 250,000 people. Water quality guarantee values have been established for the	The study, which was conducted for the period 1976–1983, looked at cases of diarrheal diseases. For the Caucasian population of similar socio-economic status studied, disease incidence was marginally lower in persons supplied with recycled water than those with water from conventional sources. Incidence rates were significantly higher in black populations, all of whom received conventional water only. Age-specific incidence rates in children of the various ethnic groups also showed differences characteristically associated with socio-economic stratification. It was concluded that the consumption of recycled water did not increase the risk of diarrheal diseases caused by waterborne infectious agents.

Project	Description	Studies/Results
	project based on the World Health Organization Guidelines, the Rand Water Guidelines (South Africa), and the Namibian Guidelines for Group A Water.	
Chanute, Kansas (Metzler *et al.*, 1958)	Emergency use of recycled water during a drought for 150 days during 1956-57. The Neosho River was dammed below the outfall of the sewage treatment plant and the treated effluent backed up to the water intake. The impounding acted as waste stabilization and water was chlorinated prior to service. The use ended when heavy rains washed out the temporary dam. The river water source already contained wastewater prior to this event.	An epidemiology study showed fewer cases of stomach and intestinal illness during the period when recycled water was used than the following winter when Chanute returned to using river water.

7.2. Risk Assessment

Risk assessment can be defined as the determination of a quantitative or qualitative value of risk related to a specific situation and a recognized threat (or hazard). Typically, the goal of an environmental risk assessment is to estimate the severity and likelihood of harm to human health or the environment occurring from exposure to a (chemical or microbiological) risk agent (Cohrssen and Covello, 1989). Information obtained from risk assessments can be used to make risk management and policy decisions.

In 1983, in response to a request by the U.S. Congress, the National Academy of Sciences National Research Council (NRC), developed a risk assessment framework that primarily addressed human health effects associated with exposure to chemical contaminants (NRC, 1983). The framework has also served as a template for the development of numerous subsequent risk assessments and risk assessment frameworks. Those steps in that framework include:

- Hazard identification: Evaluate data and identify detected chemicals that can be used to represent the potential carcinogenic risk and noncarcinogenic hazard posed by the test waters.
- Dose response assessment: Evaluate the potential carcinogenicity and noncarcinogenic effects of the chemicals of concern.
- Exposure assessment: Estimate the potential doses based on observed concentrations and assumed intake levels or rates.
- Risk Characterization: Compute the potential health risks associated with the test waters.

Risk assessment following a modified form of this framework can also be conducted for microorganisms.

The 1983 risk assessment framework was enhanced in 2009 by expanding on problem formulation and risk-based decision-making, and by including provisions for internal and external stakeholder involvement in all stages of risk assessment (NRC, 2009).

The USEPA Office of Drinking Water uses a "regulatory window" of 10^{-6} to 10^{-4} for evaluation of risk where 10^{-4} is the baseline risk for all regulations and 10^{-6} is the *de minimis* risk level, where *de minimis* risk levels infer that the activity is essentially "risk free." Acceptable risk differs from *de minimis* risk in that it incorporates factors beyond health-based criteria alone, such as the technological feasibility or economic impacts of achieving a given level of risk. Under ideal conditions, the acceptable risk would meet the *de minimis* criteria while being technically and economically practical. However, a compromise between the lower levels of risk and the availability of technology and/or economic limitations is sometimes justified.

Several representative quantitative risk assessment studies have been conducted evaluating the risks to human health associated with the use of recycled water for indirect potable reuse. Quantitative "relative" risk assessments (QRRAs) differ from conventional risk assessments in that they calculate doses on the basis of observed concentrations in water and an *assumed* standard water intake in lieu of deriving a site-specific water intake rate because determinations of absolute exposure in terms of the amount of water consumed in a study population cannot be reliably or easily derived. For example, absolute exposure is impacted by

use of bottle water, consuming different water at home rather than at work, population mobility, etc. Thus, a QRRA does not assess the absolute risk from ingestion of water at the tap but rather compares the relative risk of the scenario being evaluated assuming everyone is drinking the same amount of water at the same concentration. This is likely a more conservative approach than using absolute exposure information.

A QRRA was conducted for the Montebello Forebay GWR Project and the Chino Basin GWR Project. The recycled water used for these projects meets the DDW standard for disinfected filtered recycled water (e.g., total coliform less than 2.2 / 100 mL and turbidity less than 2 NTU) and federal and state drinking water MCLs in recycled water before or after surface application. Both GWR projects apply recycled water using spreading basins. Dilution waters are also used for replenishment (stormwater, potable water, or other sources of non-wastewater origin) such that the RWC ranges from 35% to 45%. The QRRA was based on chemicals that are currently regulated or under consideration for regulation (Soller and Nellor, 2011, a,b). Relative human health risks were used to evaluate the potential human health rather than using a more traditional approach of making comparisons to drinking water standards because MCLs are based on varying levels of risk. The study evaluated eight years of historical data including approximately 200 chemicals, and identified constituents that were detected in groundwater and had associated health-based criteria such as noncarcinogenic toxicity information and/or cancer slope factors that could be used to quantify the estimated relative potential risk presented by ingestion of water from the groundwater. The wells studied included those with and without recycled water.

The hazard index method was used to assess the overall potential for non-carcinogenic effects. This approach calculated the ratio between the concentration of a detected chemical in groundwater and its toxicity (either the NOAEL or LOAEL). The ratios were added together for all detected chemicals. If the cumulative sum of the added ratios was equal to or greater than unity (“1”), there was a potential risk. If the cumulative sum was less than 1, there was no risk. The QRRAs found that for non-carcinogenic risk, the hazard index for all of the wells was below 1.

The QRRA also assessed carcinogenic risks. Carcinogenic risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. Probabilistic simulations were conducted to estimate the carcinogenic risk associated with a hypothetical drinking water exposure for the wells under investigation using cancer slope factors. Twenty-five thousand (25,000) individual simulations were carried out for each well. The results of the carcinogenic risk assessment showed no significant difference in risk for groundwater wells with and without recycled water; the carcingenic risks were in the range of 1 in 100,000. For the Montebello Forebay Project, the chemicals that contributed most to carcinogenic risk were arsenic, bromoform, chloroform, di-ethyl-hexyl-phthalate, dibromochloromethane, lead, and NDMA.

The results showed that for both GWR projects, it was unlikely that recycled water used for GWR contributed substantially to the human health risk. Naturally occurring arsenic (not impacted by recycled water GWR) was the highest contributor to risk in groundwater.

Similarly, the Orange County Water District (OCWD) in Southern California conducted a QRRA (Soller et al., 2000) using available chemical and microbial data to compare alternative water sources used to replenish the potable Orange County Groundwater Basin. The alternatives

considered were Santa Ana River water (which includes a substantial contribution of wastewater from upstream dischargers); Colorado River water (which also includes a substantial contribution of wastewater from upstream dischargers); California State Water Project water; and AWT recycled water from OCWD's GWRS treatment facility. The GWRS source water was secondary wastewater that underwent further treatment via microfiltration, reverse osmosis, and advanced oxidation. The QRRA found that for non-carcinogenic risk, the hazard index for each water matrix was below one, which is considered the threshold for potential health effects, with the AWT recycled water index lower than the Santa Ana River water and the imported waters. For carcinogenic risks, the risk levels were lower for the AWT recycled water and imported waters in comparison to the Santa Ana River water. Although the levels of arsenic were below the then existing drinking water MCL of 50 µg/L and the then proposed MCL of 10 µg /L, arsenic represented the majority of risk. Arsenic concentrations in the AWT recycled water were 60 times lower than the Santa Ana River water and 35 times lower than the imported water levels. The results also showed that the AWT recycled water was projected to present much less risk that the other waters from bacteria, parasites, and viruses provided that all unit processes in the treatment facility were fully operational and operating properly.

As part of NRC's evaluation of potable reuse, the NRC conducted an analysis that was termed as a "risk exemplar," which compared the estimated risks of a common drinking water source generally perceived as safe (but which was comprised of a 5% wastewater component, e.g., *de facto* potable reuse) against the estimated risks of two other potable reuse scenarios: a deep well in a groundwater aquifer fed by recycled water via SAT and a deep well drawing from a groundwater aquifer fed by injection of recycled water from an AWT plant (NRC, 2012). The analysis examined the presence of selected pathogens and trace organic chemicals in final product waters from *de facto* potable reuse and the two potable reuse scenarios to assess whether there are likely to be significantly greater human health concerns from exposure via ingestion to contaminants in these hypothetical reuse scenarios, compared with a common *de facto* reuse scenario. For the chemicals in each of the scenarios, a risk-based action level was used, such as USEPA's MCLs, Australian drinking water guidelines, or World Health Organization drinking water guideline values. Also, a margin of safety was reported, defined as the ratio between a risk-based action level (such as an MCL) and the actual concentration of a chemical in reclaimed water. For microorganisms, the dose-response relationships were used to compute risk from a single day of exposure. The NRC focused on four pathogens commonly of concern in reuse applications and selected 24 chemicals representing different classes of contaminants. The results showed that following proper diligence and employing appropriately designed treatment trains, potable reuse systems can provide protection from trace organic contaminants comparable to what the public experiences in many drinking water supplies today. For microbial agents, if one illness or infection per 10,000 persons per year is used as a benchmark, the risks from bacterial and protozoan exposure are below this benchmark for the two potable reuse scenarios but not for the *de facto* reuse example.

7.3. Bio-analytical Screening Tools

A number of studies have sought to analyze and compare the toxicological properties of recycled water to those of drinking water; some of these studies attempted to use the combination of toxicology assays and chemical methods to isolate and identify constituents of potential health significance in recycled water used for planned indirect potable reuse. A

summary of these projects and related studies is presented in **Table 8-2**. In general these studies show that bio-analytical methods can be used to evaluate treatment effectiveness, but are not yet ready to evaluate health significance.

Table 8-2. Summary of Bio-analytical Screening Studies

Project	Types of Water Studied	Health-effects data
Montebello Forebay GWR Project (Nellor, *et al.*, 1984)	Disinfected tertiary effluent, storm water, and imported river water used for GWR; also recovered groundwater.	This study used the Ames *Salmonella* test and mammalian cell transformation assay using organic concentrates of the different waters (concentrated 10,000 to 20,000 times), and subsequent chemical identification was attempted using the Ames assays. Samples were collected from the late 1970s to the early 1980s. The level of mutagenic activity (in decreasing order) was storm runoff > dry weather runoff > recycled water > groundwater > imported water. No relation was observed between the percentage of recycled water in wells and observed mutagenicity of residues isolated from wells. The residues did not yield significant cytotoxicity in the mammalian cell assays. To facilitate the isolation and identification of the components in sample concentrates, the residues were first fractionated by high performance liquid chromatography followed by testing of the fractions for mutagens and analysis of the mutagenic fractions by gas chromatography-electron ionization mass spectrometry. Results indicated that mutagenicity generally occurred in the least polar (most hydrophobic) fractions of each sample. In most cases, the sum of the mutagenicity in sample fractions was similar in magnitude to that observed in the whole sample. There was no evidence of synergistic effects in these assays. The chemical analysis of mutagenic fractions from 34 samples yielded only four known Ames mutagens in six samples (fluoranthene, benzo(a)pyrene, N-nitrosomorpholine, and N-nitrosopiperidine). However, these compounds were considered to contribute little to the observed overall mutagenicity of the samples. Several unknown compounds detected in the mutagenic fractions could not have caused the mutagenicity in all of the samples, because their frequency of occurrence, distribution in the fractions, and concentrations were not consistent with the bioassay results. Selected sample residues were then evaluated qualitatively by chemical derivatization techniques to determine which classes of compounds might be contributing to the mutagenic activity. Since mutagens are considered to be electrophilic, two nucleophilic reagents were used to selectively remove epoxide and organohalide mutagens from the residues. Analysis of mutagenic residues of groundwater and

Project	Types of Water Studied	Health-effects data
		replenishment water by negative ion chemical ionization gas chromatography-mass spectrometry and Ames assay before and after derivatization supported (but did not unequivocally prove) the role of at least these two classes of electrophiles in the observed mutagenicity. Several samples had more than 100 reactive components, containing chlorine, bromine, iodine, or epoxides, with concentrations at the part-per-trillion level. However, the structures of these compounds could not be determined, nor were the sources of the compounds identified. Because positive chemical identifications of specific mutagens could not be made and because the estimated concentrations of the components were so low, the biological significance of these materials remained in doubt. Follow-up toxicity testing of recycled water residues in the mid-1990s (not published) showed no Ames test response, while preserved residues from the earlier testing still showed a response indicating that the character of the recycled water has changed over time, perhaps as a result of increased source-control activities.
Denver Potable Water Reuse Demonstration Project (Lauer *et al*., 1996; NRC, 1988)	AWT effluent (with ultrafiltration or reverse osmosis) and finished drinking water (current supply). The purpose of the project was to evaluate the feasibility of direct potable reuse by producing high quality recycled water; the proposed project was not implemented.	This study used 150 to 500 times organic residue concentrates in 2-year *in vivo* chronic/carcinogenicity study in rats and mice and a reproductive/teratology study in rats. No treatment-related effects were observed.
Tampa Water Resource Recovery Project (CH2M Hill, 1993, Pereira *et al*., undated; NRC, 1988)	AWT effluent (using granular activated carbon and ozone disinfection) and Hillsborough River water using ozone disinfection (the current drinking water supply). The proposed project involved augmentation of the Hillsborough River raw water supply; it was not implemented.	This study used Ames *Salmonella*, micronucleus, and sister chromatid exchange tests for three dose levels with organic concentrates (up to 1,000 times). No mutagenic activity was observed in any of the samples. *In vivo* testing included mouse skin initiation, strain A mouse lung adenoma, a 90-day subchronic assay on mice and rats, and a reproductive study on mice. All tests were negative, except for some fetal toxicity exhibited in rats, but not mice, for the AWT sample.
Total Resource Recovery Project, City of San Diego (Western Consortium for Public Health, 1996; NRC, 1988; Erickson, 2004)	AWT effluent (reverse osmosis and granular activated carbon) and raw reservoir water (after treatment this is the current drinking water supply). This is a proposed surface water augmentation project that would utilize AWT recycled water to supplement the raw reservoir water. The project	This study used organic concentrates (150–600 times) in the Ames *Salmonella* test, mouse micronucleus, 6-thoguanine resistance, and mammalian cell transformation assays. The Ames test showed some weak mutagenic activity, but recycled water was less active than the drinking water. The micronucleus test showed positive results only at the high (600 times) doses for both types of water. The 6-thoguanine assay run on whole

Project	Types of Water Studied	Health-effects data
	and treatment system are currently being re-evaluated.	samples and fractions of each type of water showed no mutagenic effect. The mammalian cell transformation assay, showed a strong response for the reservoir sample, but the single test may not have been significant. *In vivo* fish bio-monitoring using fathead minnows (28-day bioaccumulation and swimming tests) showed no positive results. There was greater evidence of bioaccumulation of pesticides in fish exposed to raw water than recycled water.
Potomac Estuary Experimental Wastewater Treatment Plant (James M. Montgomery, Inc., 1983; NRC, 1988)	Study of the wastewater-contaminated Potomac River Estuary; 1:1 blend of estuary water and nitrified secondary effluent, AWT effluent (filtration and granular activated carbon), and finished drinking waters from three water treatment plants.	This study used 150 times organic concentrates in the Ames *Salmonella* and mammalian cell transformation tests. Results showed low levels of mutagenic activity in the Ames test, with AWT water exhibiting less activity than finished drinking water. The cell-transformation test showed a small number of positive samples with no difference between AWT water and finished drinking water.
Essex & Suffolk Water Langford Recycling Scheme, UK (Walker, 2000)	Secondary treatment, coagulant and polymer addition, sedimentation, nitrification/denitrification in biologically aerated filter, ultraviolet radiation disinfection.	Toxicological tests using fish indicated no significant estrogenic effects
Singapore Water Reclamation Study (Kahn and Roser, 2007)	AWT effluent (microfiltration, RO, ultraviolet radiation) and untreated reservoir water. The largest amount of Singapore's NeWater is currently used for industrial (semi-conductor manufacturing) and commercial use. At the time the study was conducted, a smaller amount was blended with raw water in reservoirs, which is then treated for domestic use.	Japanese medaka fish (Oryzias latipes) testing over a 12-month period with two generations of fish showed no evidence of carcinogenic or estrogenic effects in AWT effluent; however, the study was repeated owing to design deficiencies. The repeated fish study was completed in 2003 and confirmed the findings of no estrogenic or carcinogenic effects. Groups of mouse strain (B6C3F1) fed 150 times and 500 times concentrates of AWT effluent and untreated reservoir water over 2 years. The results presented to an expert panel indicated that exposure to concentrated AWT effluent did not cause any tissue abnormalities or health effects.
Santa Ana River Water Quality Monitoring Study (Deng, 2008)	Shallow groundwater adjacent to the Santa Ana River and control water. This is an unplanned indirect potable reuse project where the OCWD diverts Santa Ana River water for recharge into the Orange County Groundwater Basin. The Santa Ana River base flow is comprised primarily of tertiary-treated effluent.	Three rounds of testing were conducted in 2004 and 2005. In the first two rounds, Japanese Medaka fish were analyzed for tissue pathology, vitellogenin induction, reproduction, and gross morphology. In the third round, fish were analyzed for vitellogenin induction, reproduction, limited tissue pathology, and gross morphology. In the first two rounds, no statistically significant differences in gross morphological endpoints, gender ratios, tissue pathology, or reproduction were observed between the test water (shallow groundwater adjacent to the Santa Ana River) and the control

Project	Types of Water Studied	Health-effects data
		water. In the third round, no statistically significant differences were observed in reproduction, tissue pathology (limited to evaluation of gonads and ovaries), or vitellogenin induction between the test water and the control water.
Soil Aquifer Treatment Study (Fox et al., 2006)	Wastewater (various facilities), soil aquifer treatment water, storm water.	The study used a variety of analytical methods to characterize and measure chemical estrogenicity: *in vitro* methods (estrogen binding assay, glucocorticoid receptor competitive binding assay, yeast-based reporter gene assay ,and MCF-7 cell proliferation assay); *in vivo* fish vitellogenin synthesis assay; enzyme-linked immunosorbent assays; and gas chromatography–mass spectrometry. Procedures were developed to extract estrogenic compounds from solids, liquid/liquid methods for direct extraction from aqueous suspensions such as primary and secondary effluents, and concentration of estrogenic (and other) organics on hydrophobic resins followed by organic fractionation during elution in a solvent (alcohol/water) gradient. Field applications of these techniques were designed to measure estrogenic activity derived from conventional wastewater treatment and from SAT. The stability of estrogenic contaminants that are removed on soils SAT was investigated by extracting and measuring nonylphenol from infiltration basin soils as well as by measuring total estrogenic activity in soil extracts. The researchers attempted to separate and measure estrogenic and anti-estrogenic activities in wastewater effluent and conducted a multi-laboratory experiment in which a variety of wastewater effluents and effluents spiked with known concentrations of specific estrogenic chemicals were tested for estrogenic activity. Significant variability in recycled water estrogenicity was observed in bioassay results. Facilities with the longest hydraulic retention times tended to have the lowest observed levels of estrogenicity. Estrogenicity was efficiently removed during SAT. The study also presented information on the advantages and disadvantages of the bioassay test procedures evaluated.
Toxicological Relevance of EDCs and Pharmaceuticals in Drinking Water – Water Research Foundation #3085 (Snyder, 2007; Bruce et al., 2010)	Drinking water (20 facilities), wastewater (4 facilities - raw and recycled), and food products.	The researchers used an *in vitro* cellular bioassay (E-screen) with a method reporting limit of 0.16 ηg/L; results were also converted to estradiol equivalents. The results showed that the vast majority of drinking waters were less than the method reporting limit. The level of estrogenicity (in decreasing order) was food and beverage products (particularly soy based products) > raw wastewater > recycled water > finished drinking water.

8. References

Anderson, P., Denslow, N., Drewes, J.E., Olivieri, A., Schlenk, D., Snyder, S. (2010) *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water: Final Report*, Sacramento, CA. Available at: http://www.sccwrp.org/ResearchAreas/Contaminants/ContaminantsOfEmergingConcern/RecycledWaterAdvisoryPanel.aspx.

Bruce, G. M., Pleus, R. C. Peterson, M. K., Nellor, M. H., Soller, J. A. (2010a) *Development and Application of Tools to Assess and Understand the Relative Risks of Drugs and Other Chemicals in Indirect Potable Reuse;* Tools to Assess and Understand the Relative Risks of Indirect Potable Reuse and Aquifer Storage and Recovery Projects, Vol. 2; WaterReuse Foundation: Alexandria, VA.

Bruce, G. M., Pleus, R. C., Snyder, S. A. (2010b) Toxicological relevance of pharmaceuticals in drinking water. *Environ. Sci. Technol*., *44,* 5619–5626.

CH2M Hill (1993) *Tampa Water Resource Recovery Project Summary Report;* CH2M Hill: Denver, Colorado.

Cohrssen, J. J., and Covello, V. T. (1989) *Risk Analysis: A Guide to Principles and Methods for Analyzing Health and Environmental Risks*. Council on Environmental Quality, Washington, D.C.

Deng, X., Carney, M., Hinton, D. E., Lyon, S., Woodside, G., Duong, C. N., Kim, S. D., Schlenk, D. (2008) Biomonitoring recycled water in the Santa Ana River Basin in Southern California. J*. Tox. Env. Health* Part A. 71: pp 109-18.

Environment Protection and Heritage Council, the National Health and Medical Research Council and the Natural Resource Management Ministerial Council (2008). *Australian Guidelines for Water Recycling Augmentation of Drinking Water Supplies*, March.

Erickson, M.C. (2004) *Recycled Water: Merits and Constraints as an Alternative Water*, White Paper, University of Georgia, Center for Food Safety, Griffin, GA.

Fox, P., Houston, S., Westerhoff, P., Nellor, M., Yanko, W., Baird, R., Rincon, M., Gully, J., Carr, S., Arnold, R., Lansey, K., Quanrud, D., Ela, W., Amy, G., Reinhard, M., and Drewes, J., (2006) Advances in Soil–aquifer Treatment for Sustainable Reuse. Water Research Foundation, Denver, CO.

Isaacson, M., Sayed, A. R. (1988) Health aspects of the use of recycled water in Windhoek, SWA/Namibia, 1974–1983. *S. African Med. J.*, 73, 596–599.

James M. Montgomery, Inc. (1983) *Operation, Maintenance, and Performance Evaluation of the Potomac Estuary Wastewater Treatment Plant*; James M. Montgomery, Inc.: Alexandria, Virginia.

Khan, S.; Roser, D. (2007) *Risk Assessment and Health Effects Studies of Indirect Potable Reuse Schemes: Final Report*; CWWT Report 2007/01; School of Civil and Environmental Engineering, University of New South Wales: Kensington, New South Wales, Australia; prepared for Local Government Association of Queensland Centre for Water and Waste Technology.

Lahnsteiner, J., and Lempert, G. (2007) Water management in Windhoek/Namibia. *Water Science and Technology*, Volume 55, No. 1-2, 442-448. Available at:

http://www.wabag.com/wp-content/uploads/2012/04/Water-management-in-Windhoek-2007.pdf.

Lauer, W. C., and Rogers, S. E. (1996) The demonstration of direct potable water reuse: Denver's pioneer project. *Proceedings of the AWWA/WEF 1996 Water Reuse Conference*; San Diego, California, February 25 – 28, 1996; American Water Works Association: Denver, Colorado; 269.

Metzler, D. F., Culp, R. L., Stoltenberg, H. A., Woodward, R. L., Walton, G., Chang, S. L., Clarke, N. A., Palmer, C. M., Middleton, F. M. (1958) Emergency use of recycled water from potable supply at Chanute, Kansas. *J AWWA* 1958; 50:1021-60.

Nellor, M. H., Baird, R. B., Smyth, J. (1984) *Health Effects Study Final Report*; County Sanitation Districts of Los Angeles County: Whittier, California.

NRC. (1983) *Risk Assessment in the Federal Government: Managing the Process;* National Academy Press: Washington, DC, 1983.

NRC. (1998) *Issues in Potable Reuse—The Viability of Augmenting Drinking Water Supplies with Recycled Water*. National Academy Press, Washington, D.C.

NRC. (2009) *Science and Decisions: Advancing Risk Assessment*. National Academies Press, Washington, D.C.

NRC. (2012) Water Reuse: *Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater*. National Academy Press, Washington, D.C.

Pereira, M. A., Castro, B. C., Tabor, M. W., Khoury, M. D. (undated) Toxicological Studies of the Tampa Water Resources Project. Report supplied to the 1998 Committee to Evaluate the Viability of Augmenting Potable Water Supplies with Reclaimed Water, National Research Council by M. Perreira, Medical College of Ohio, Toledo, Ohio.

Schwab, B. W., Hayes, E. P., Fiori, J. M., Mastrocco, F. J., Roden, N. M., Cragin, D., Meyerhoff, R. D.; D'Aco, V. J., Anderson, P. D. (2005) Human pharmaceuticals in U.S. surface waters: a human health risk assessment. *Regul. Toxicol. Pharmacol.,* 42, 296.

Sloss, E. M., Geschwind, S. A., McCaffrey, D. F., Ritz, B. R. (1996) *Groundwater Recharge with Recycled Water: An Epidemiologic Assessment in Los Angeles, County, 1987-1991*; RAND: Santa Monica, California. Report prepared for the Water Replenishment District of Southern California.

Sloss E. M., McCaffrey, D. F., Fricker, R. D., Geschwind, S. A., Ritz, B. R. (1999) *Groundwater Recharge With Recycled Water: Birth Outcomes in Los Angeles County 1982-1993*. Report prepared for the Water Replenishment District of Southern California, by RAND, Santa Monica, California.

Snyder, S. (2007) Endocrine disruptors & pharmaceuticals: implications for the water industry. Presentation at the California State Water Resources Control Board, Sacramento, California; May.

Soller, J., Eisenberg, D., Olivieri, A., and Galitsky, C. (2000) *Groundwater Replenishment System Water Quality Evaluation*. Prepared by EOA Inc. for the Orange County Water District and Orange County Sanitation District, Fountain Valley, CA.

Soller, J.A., Nellor, M.H. (2011a) *Development and Application of Tools to Assess and Understand the Relative Risks of Regulated Chemicals in Indirect Potable Reuse Projects Task 1 - the Montebello Forebay Groundwater Recharge Project*. WaterReuse Research Foundation, Alexandria, VA.

Soller, J.A., Nellor, M.H. (2011b) *Development and Application of Tools to Assess and Understand the Relative Risks of Regulated Chemicals in Indirect Potable Reuse Projects Task 1 - the Chino Basin Groundwater Recharge Project*. WaterReuse Research Foundation, Alexandria, VA.

Walker, D. (2000) Oestrogenicity and wastewater recycling: experience from Essex and Suffolk Water." *J. CIWEM*, 14:427-431.

Western Consortium for Public Health (1996) *Total Resource Recovery Project Final Report*. City of San Diego, CA. Western Consortium for Public Health in association with EOA, Inc. Oakland, CA.

9. Acronyms

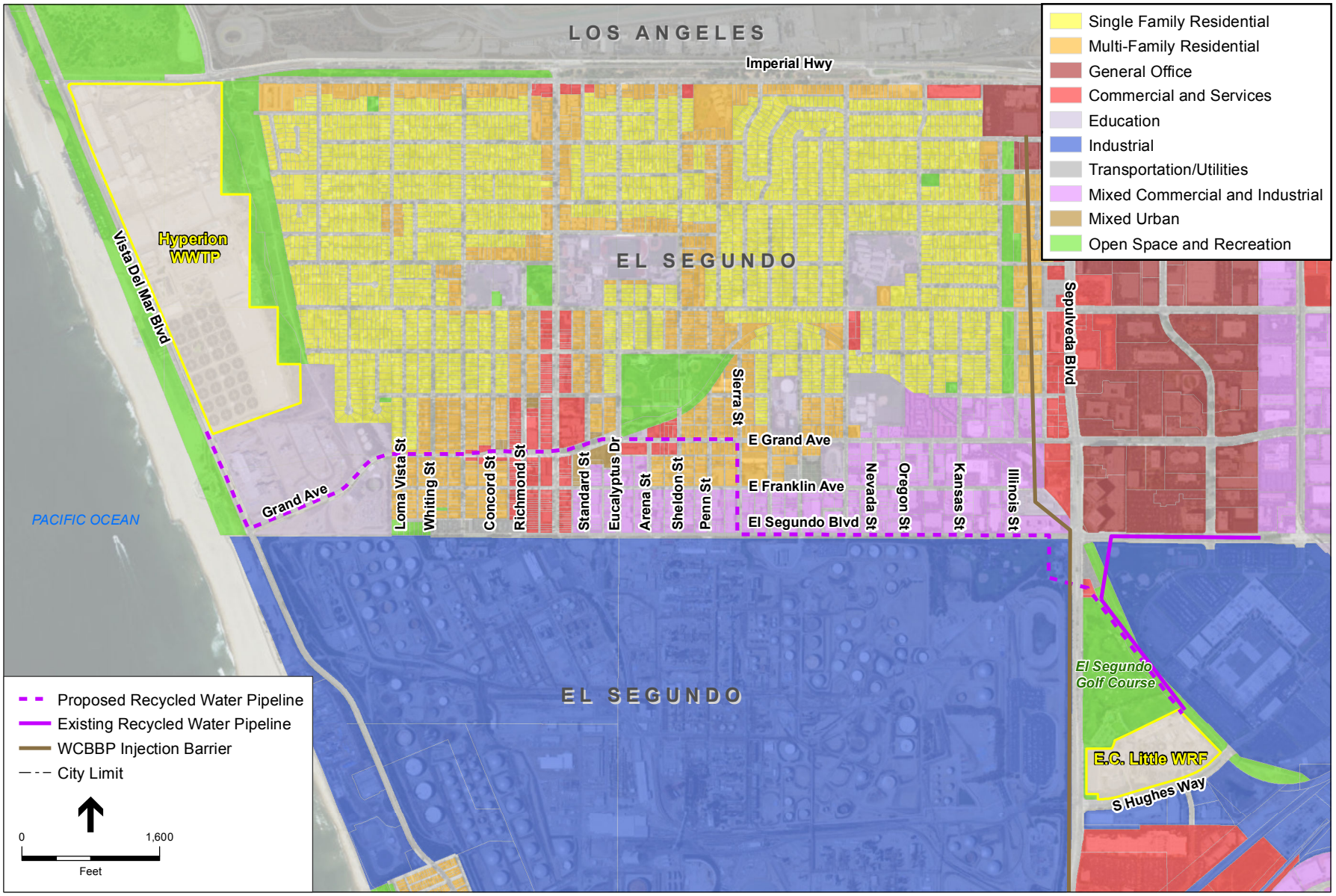
ADI	Acceptable Daily Intakes
AF	Acre-feet
AFY	Acre-feet per year
AGB	Alamitos Gap Barrier
AOP	Advanced oxidation
AWT	Advanced water treatment
CBWCB	Central Basin and West Coast Basin
CDPH	California Department of Public Health
CECs	Constituents of Emerging Concern
CWC	California Water Code
DDW	Division of Drinking Water
DEET	N,N-diethyl-meta-toluamide
DGB	Dominguez Gap Barrier
DWEL	Drinking Water Equivalent Level
ER	Engineering Report
GBMP	Groundwater Basins Master Plan
GWR	Groundwater replenishment
GWRS	Groundwater Replenishment System
H&SC	Health and Safety Code
kg	kilogram
L	Liter

L/d	Liter per day
LACDPW	Los Angeles County Department of Public Works
LACSD	Sanitation Districts of Los Angeles County
LOAEL	Lowest Observed No Adverse Effect Level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MEC	Measured Environmental Concentration
mg/L	Milligrams per liter
mL	Milliliters
MTL	Monitoring Trigger Level
MUN	Municipal and Domestic Supply
NDMA	N-nitrosodimethylamine
ηg/L	Nanograms per liter
NLs	Notification Levels
NOAEL	No Observed Adverse Affect Level
NRC	National Academy of Sciences National Research Council
NTU	Nephelometric Turbidity Units
NWRI	National Water Research Institute
OCWD	Orange County Water District
PEIR	Programmatic Environmental Impact Report
PHG	Public Health Goal
PNEC	Predicted No Effect Concentrations
QRRA	Quantitative Relative Risk Assessment
RO	Reverse osmosis
ROWD	Report of Waste Discharge
RRT	Response Retention Time
RWC	Recycled Water Contribution
RWQCB	Regional Water Quality Control Board
SAT	Soil aquifer treatment
S/N	Salts and nutrients
SNMP	Salt Nutrient Management Plan
SWRCB	State Water Resources Control Board
TCEP	Tris(2-chloroethyl)phosphate

TDI	Tolerable Daily Intakes
TDS	Total Dissolved Solids
TM	Technical Memorandum
TOC	Total Organic Carbon
µg/L	Micrograms per liter
µg/kg-d	Micrograms per kilogram per day
UIC	Underground Injection Control
U.S.	United States
USEPA	U.S. Environmental Protection Agency
WCBB	West Coast Basin Barrier
WDRs	Waste Discharge Requirements
WRD	Water Replenishment District of Southern California
WRRs	Water Recycling Requirements

Appendix F
General Plan Land Use

ESA

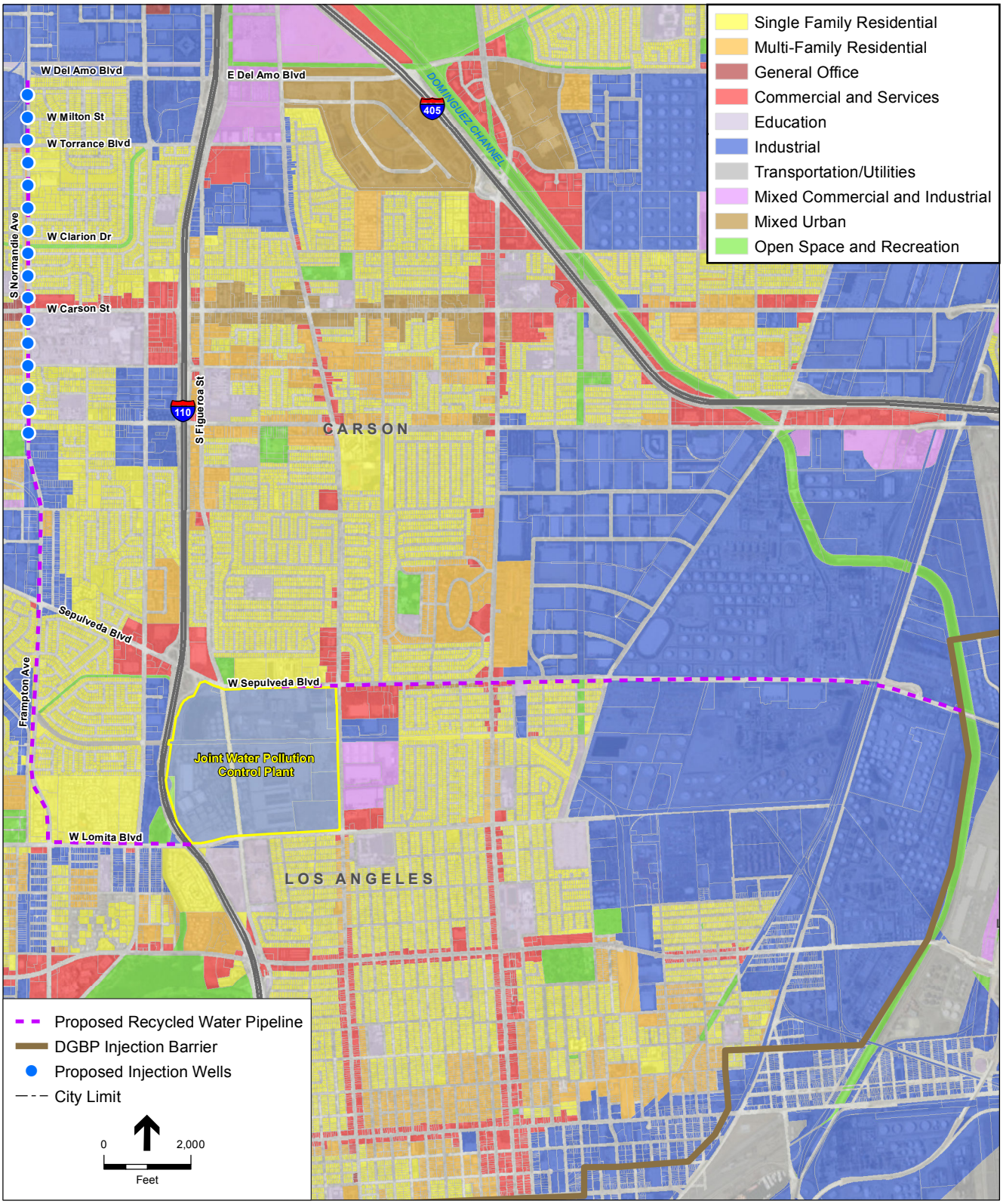


SOURCE: ESRI; Los Angeles County GIS; SCAG

WRD - Groundwater Basins Master Plan . 120192

Figure F-1

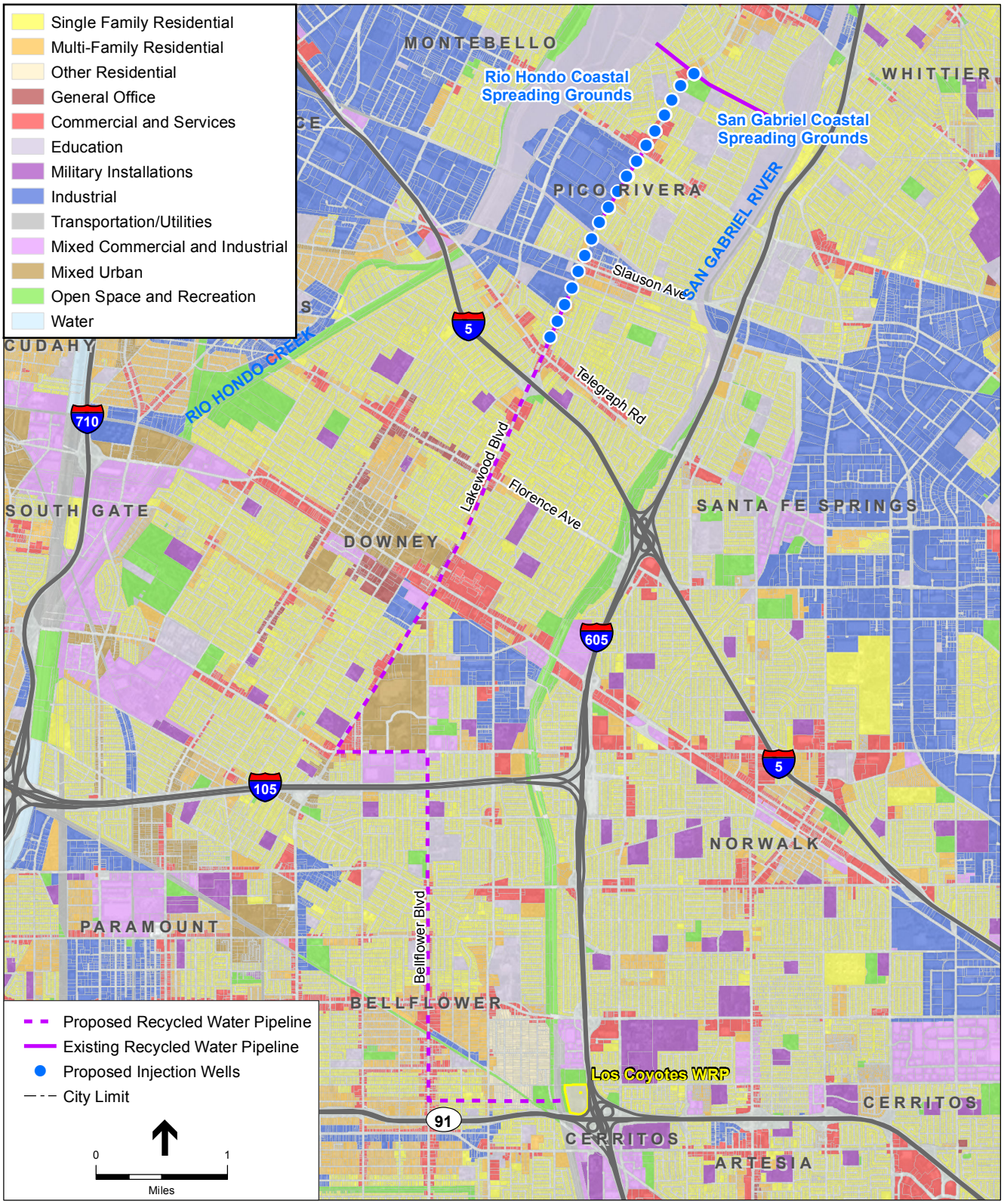
Projects W1 and W3: Increase Injection at West Coast Basin Barrier
General Plan Land Use 2008



SOURCE: ESRI; Los Angeles County GIS; SCAG

Figure F-2

Project W4: Increase Injection a Dominguez Gap Barrier and Proposed Inland Injection Well System
General Plan Land Use 2008

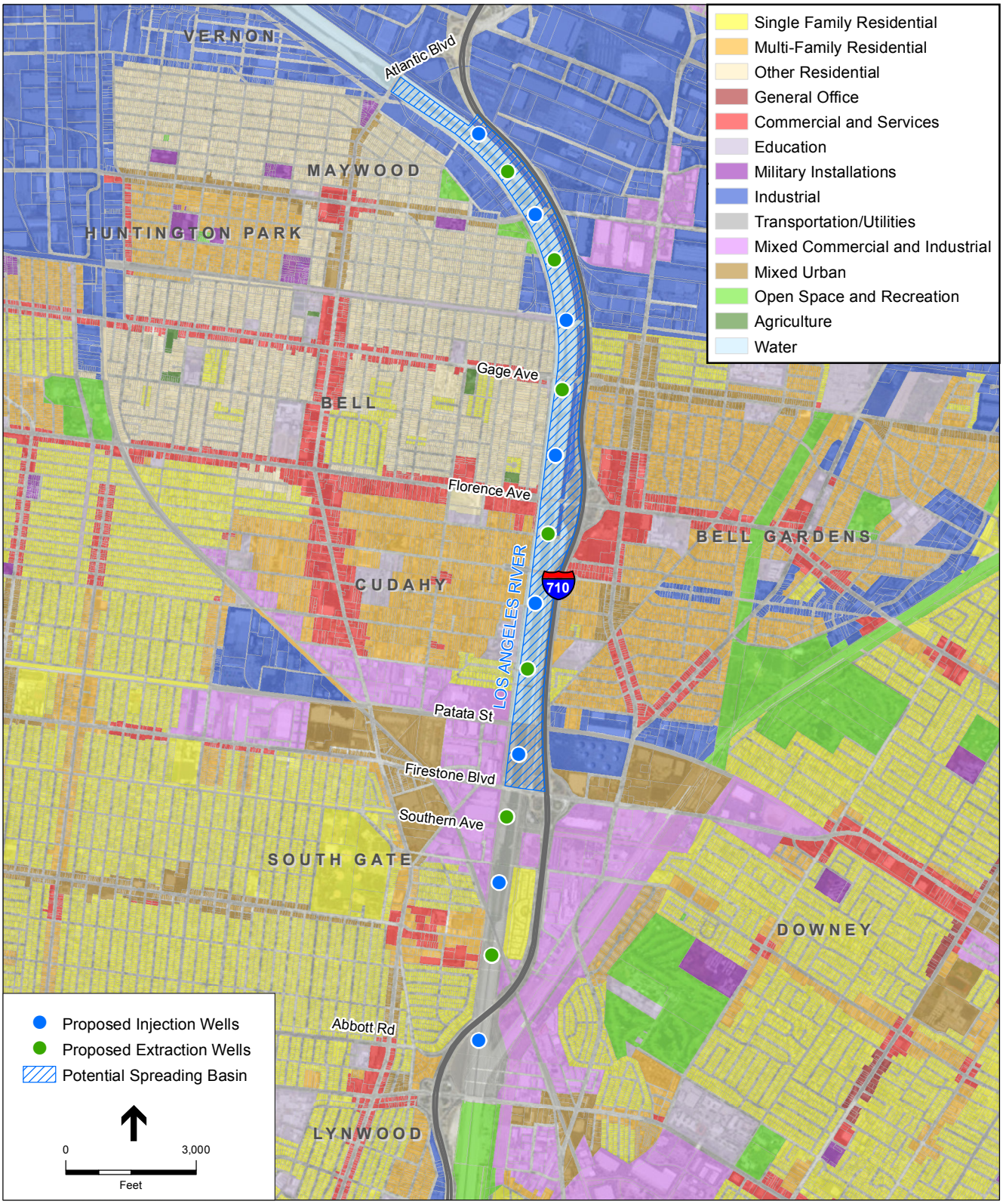


SOURCE: ESRI; Los Angeles County GIS; SCAG

WRD - Groundwater Basins Master Plan . 120192

Figure F-3

Projects C3, C4, C8 and C9: Increase Replenishment at MFSG
General Plan Land Use 2008

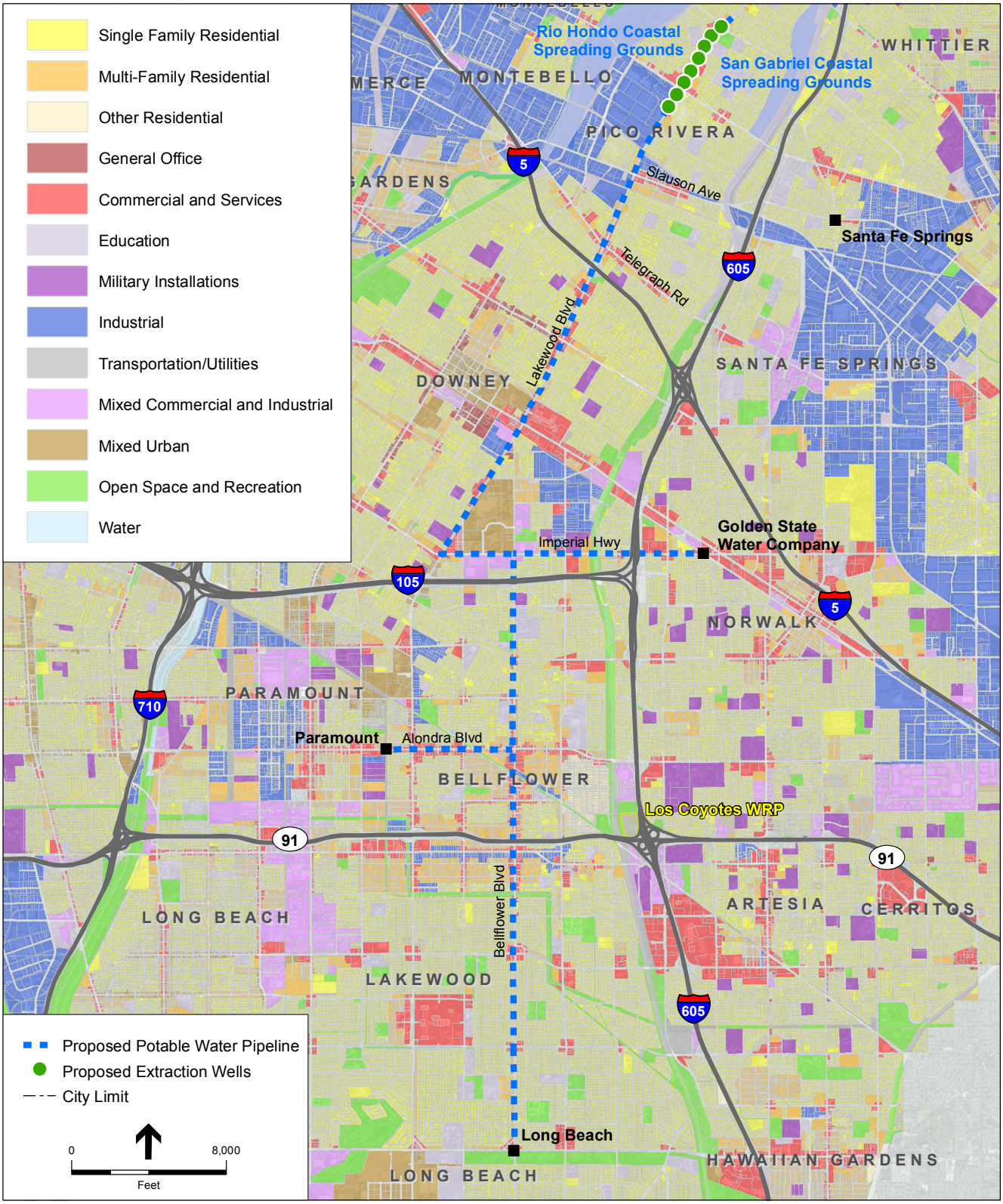


SOURCE: ESRI; Los Angeles County GIS; SCAG

WRD - Groundwater Basins Master Plan . 120192

Figure F-4

Project C5: Los Angeles Forebay Storm Water Aquifer Recharge and Recovery Facility (ARRF)
General Plan Land Use 2008

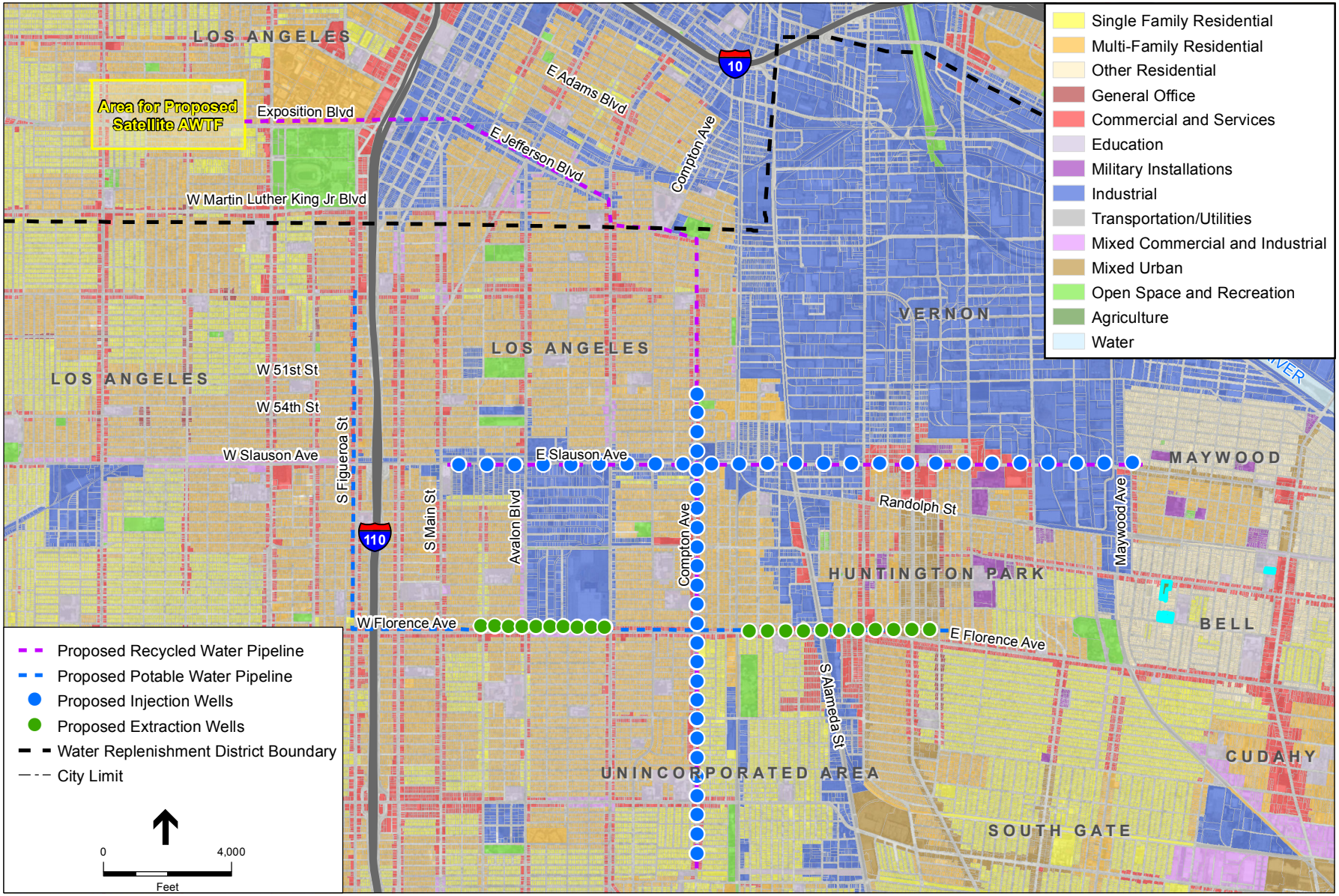


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure F-5

Project C6: Groundwater Basin Optimization Pipeline
General Plan Land Use 2008



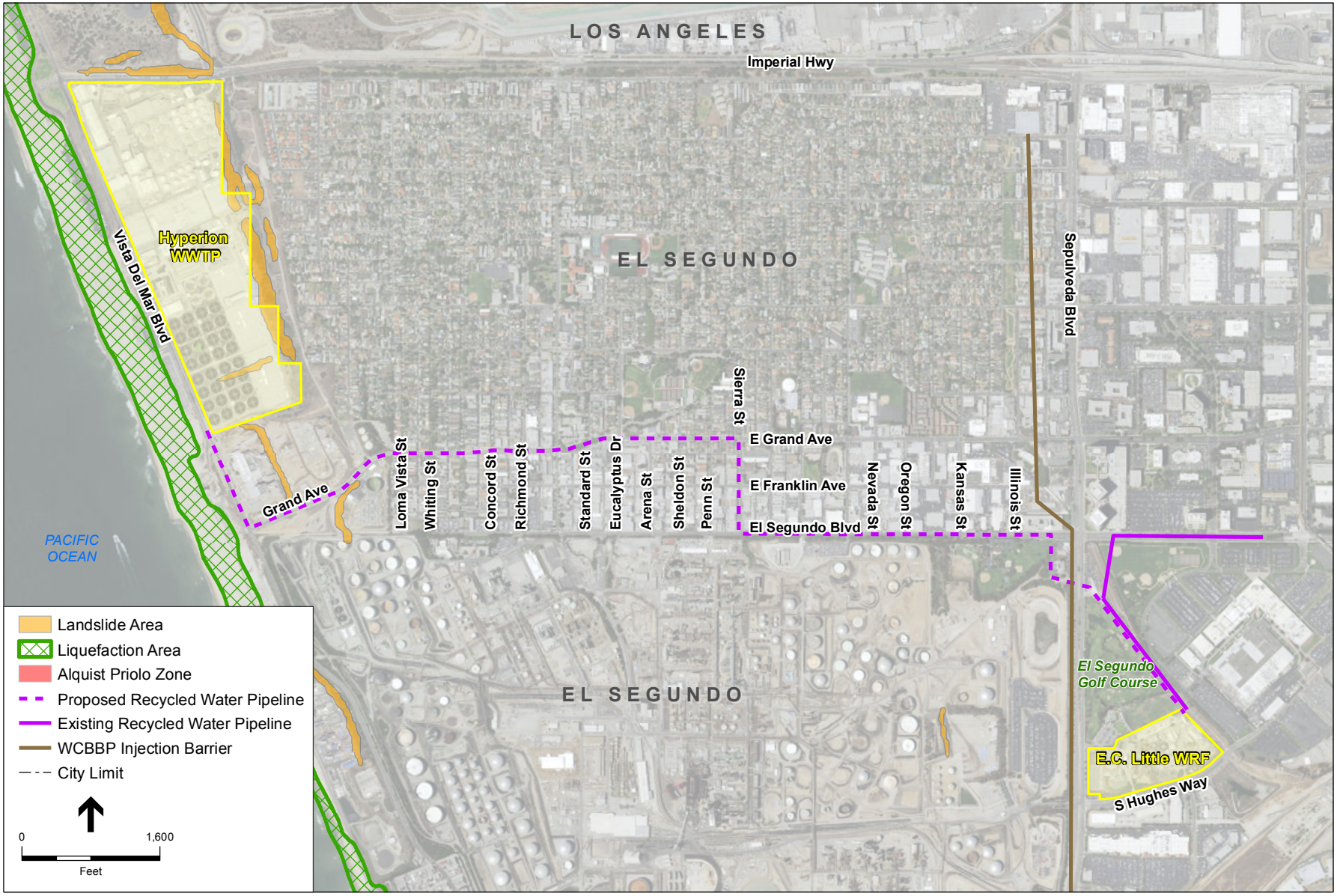
SOURCE: ESRI; Los Angeles County GIS; SCAG

WRD - Groundwater Basins Master Plan . 120192

Figure F-6

Project C10: Injection of Recycled Water in Los Angeles Forebay
General Plan Land Use 2008

Appendix G
Geological Features

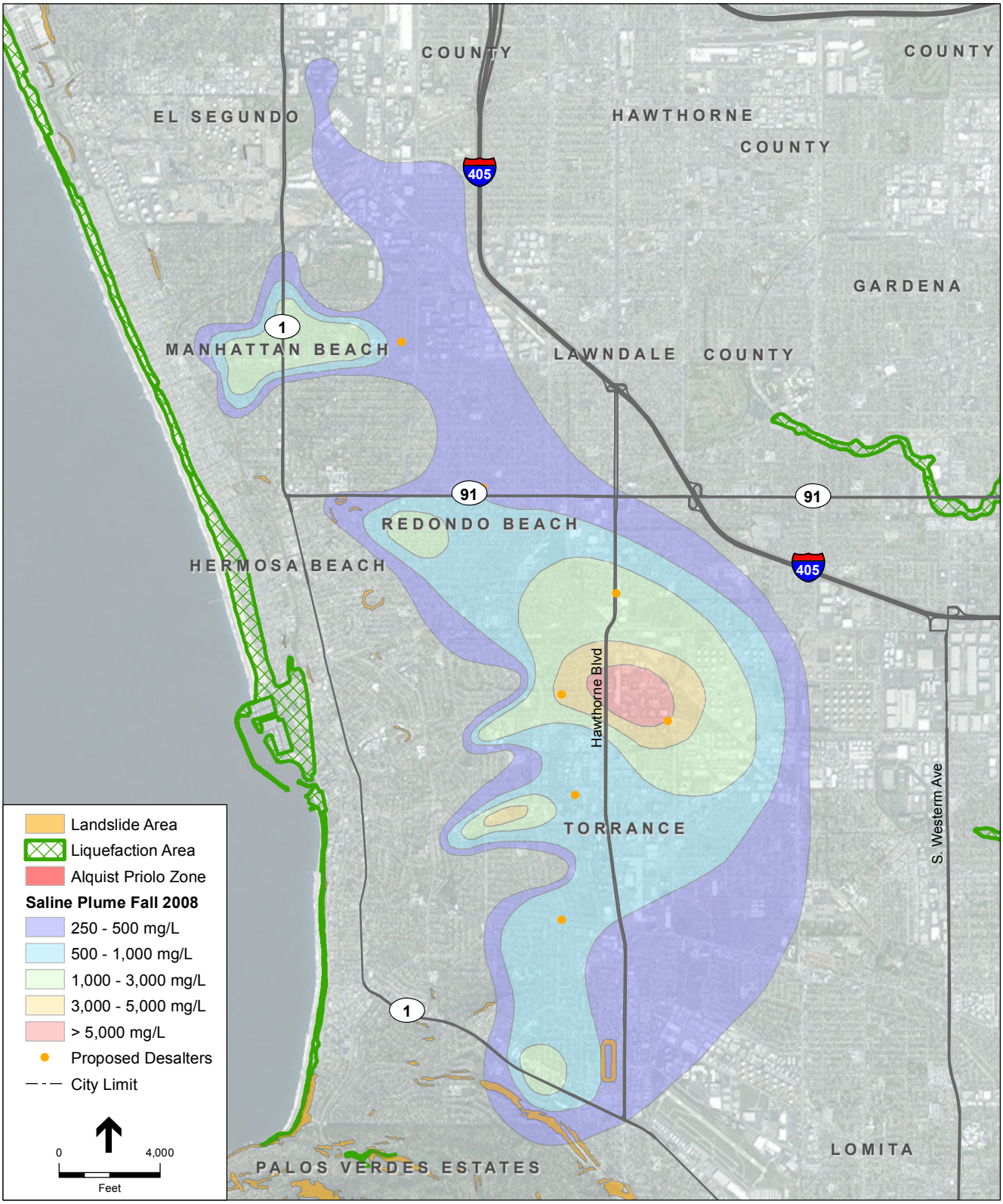


SOURCE: ESRI; Los Angeles County GIS

WRD - Groundwater Basins Master Plan . 120192

Figure G-1

Projects W1 and W3: Increase Injection at West Coast Basin Barrier
Geological Features

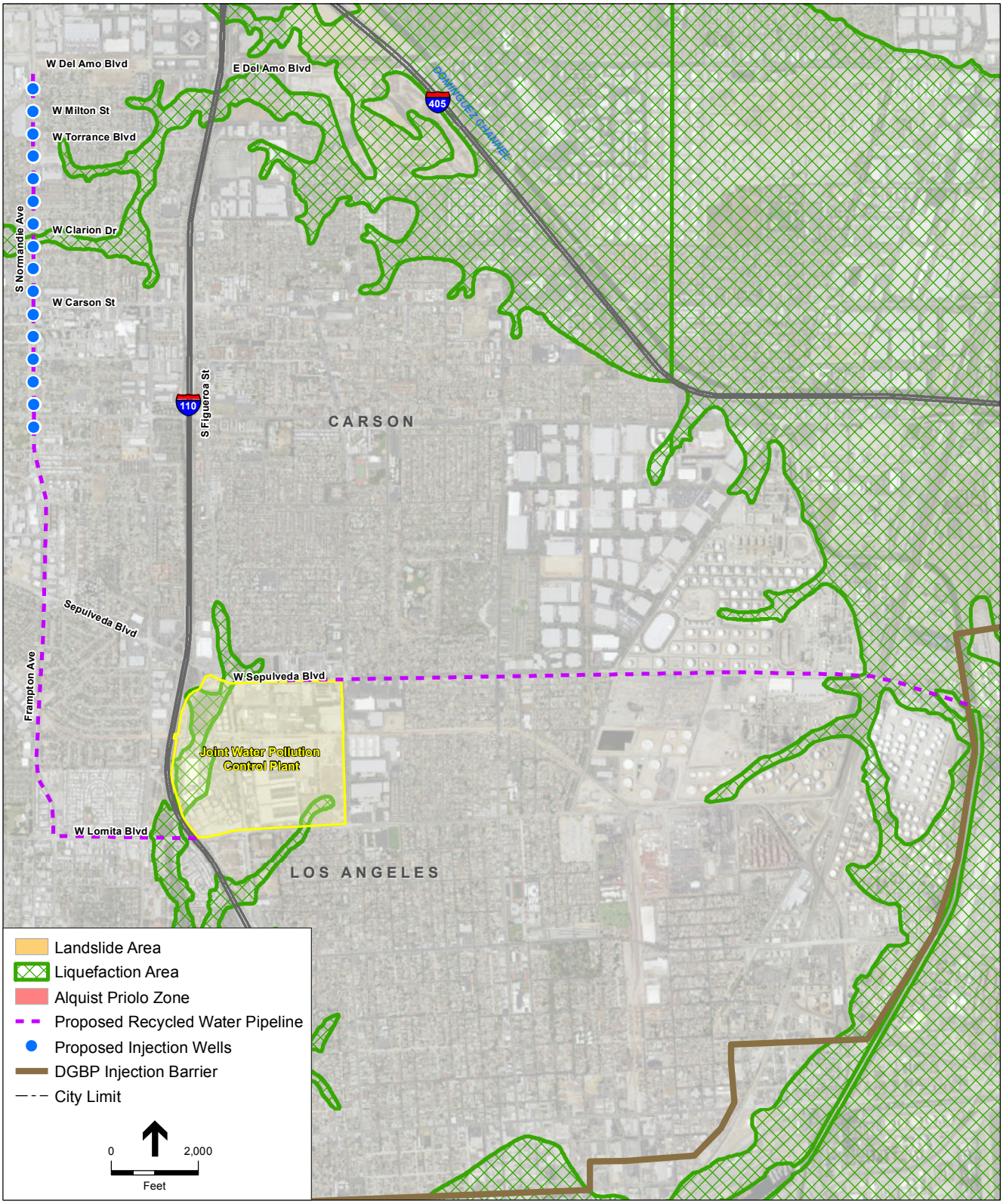


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure G-2

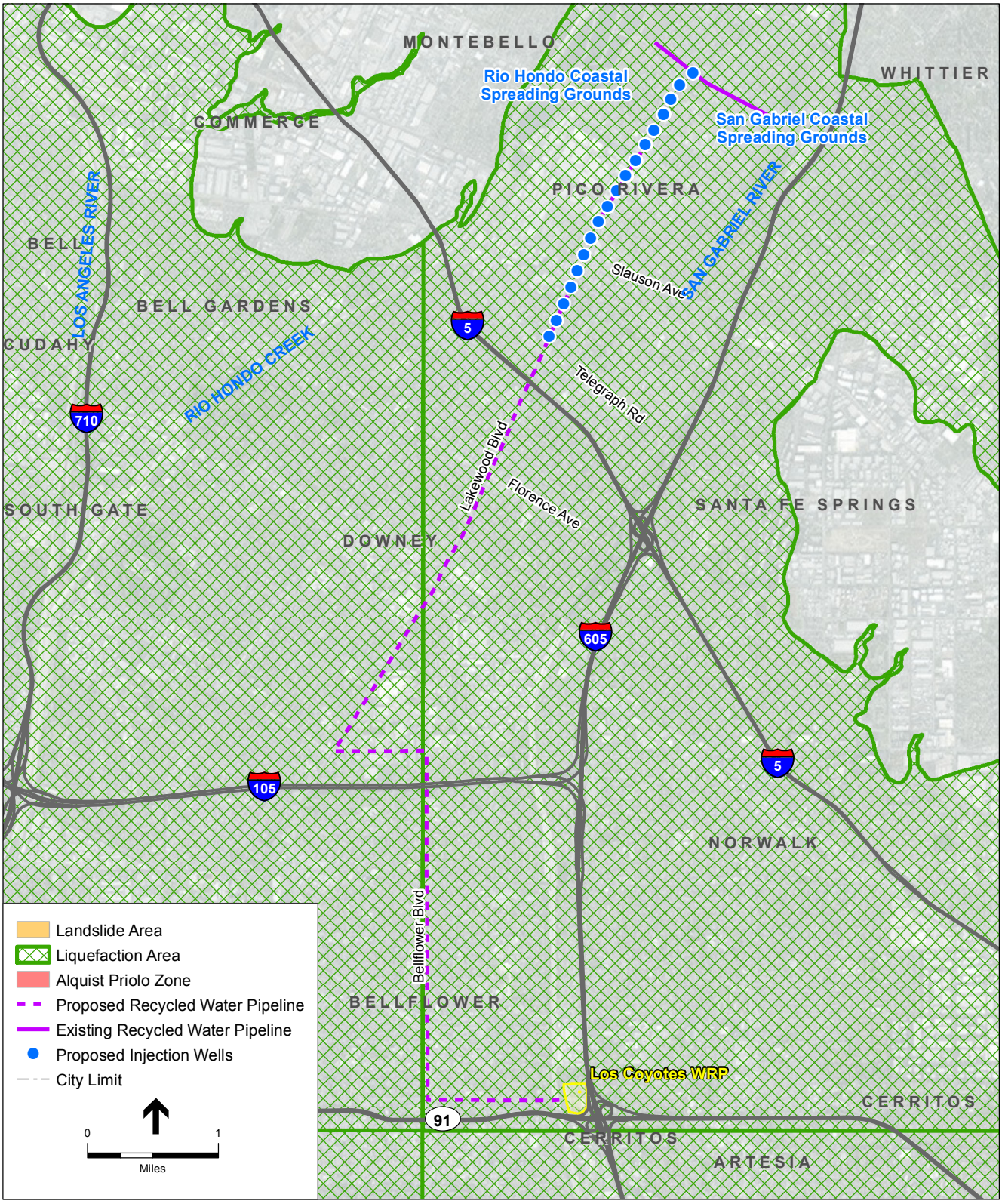
Project W2: Saline Plume Remediation
Geological Features



SOURCE: ESRI; Los Angeles County GIS

Figure G-3

Project W4: Increase Injection at Dominguez Gap Barrier and Proposed Inland Injection Well System Geological Features



SOURCE: ESRI; Los Angeles County GIS

WRD - Groundwater Basins Master Plan . 120192

Figure G-4

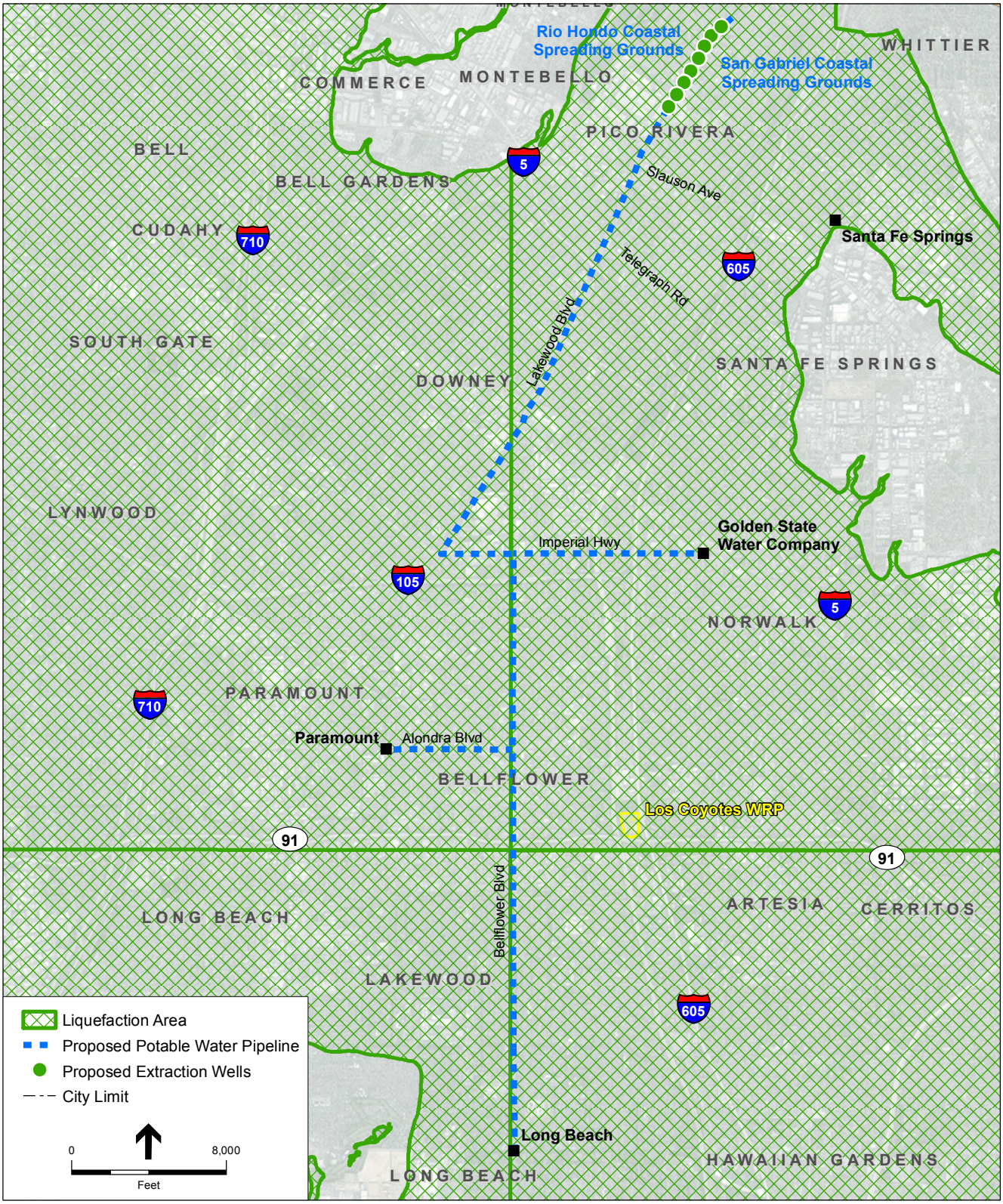
Projects C3, C4 and C9: Increase Replenishment at MFSG
Geological Features

SOURCE: ESRI; Los Angeles County GIS

WRD - Groundwater Basins Master Plan . 120192

Figure G-5

Project C5: Los Angeles Forebay Storm Water Aquifer Recharge and Recovery Facility (ARRF) Geological Features

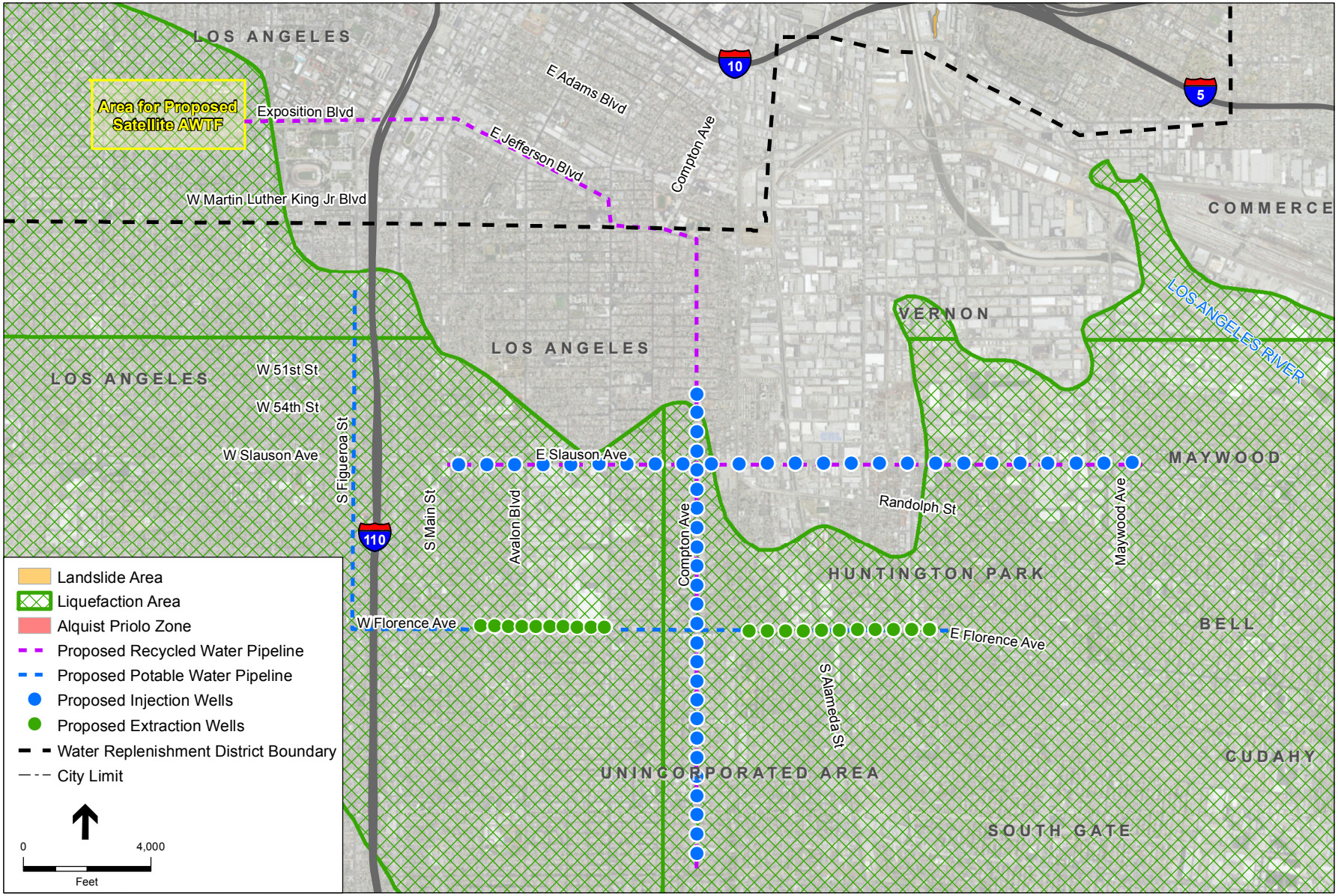


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure G-6

Project C6: Groundwater Basin Optimization Pipeline
Geological Features



SOURCE: ESRI; Los Angeles County GIS

WRD - Groundwater Basins Master Plan . 120192

Figure G-7

Project C10: Injection of Recycled Water in Los Angeles Forebay
Geological Features

Appendix H

Demographic and Income Data for Affected Cities and Census Tracts

ESA

APPENDIX H

DEMOGRAPHIC DISTRIBUTION BY CITY AND CENSUS TRACT

City/Census Tract	Hispanic	White	Black	Other	Project
Avocado Heights CDP[a]	**82%**	**8%**	**1%**	**9%**	
4083.02	86%	7%	0%	7%	C0-B, C1, C2
4083.03	83%	8%	0%	9%	C0-B, C1, C2
Average	**84%**	**7%**	**0%**	**8%**	
Bell	**93%**	**5%**	**1%**	**1%**	
5338.06*	98%	2%	0%	0%	C5
5323.04	87%	5%	7%	1%	C5
Average	**92%**	**4%**	**4%**	**1%**	
Bellflower	**54%**	**19%**	**14%**	**13%**	
5531.00	49%	23%	14%	14%	C3, C4
5532.00	64%	17%	6%	12%	C3, C4
5540.01	61%	20%	3%	16%	C3, C4
5540.02	60%	17%	9%	15%	C3, C4
5541.01	77%	12%	1%	10%	C3, C4
5541.03	59%	17%	9%	15%	C3, C4
5541.05	48%	14%	31%	7%	C3, C4
5542.01	53%	24%	12%	12%	C6
5542.03	49%	26%	12%	13%	C3, C4
5542.04	58%	14%	11%	17%	C3, C4
5544.04	47%	15%	19%	19%	C3, C4
5544.05	36%	20%	26%	19%	C3, C4
5544.06	32%	40%	12%	16%	C3, C4
Average	**53%**	**20%**	**13%**	**14%**	
Carson	**40%**	**7%**	**20%**	**33%**	
2920.00	56%	11%	12%	21%	W4
2932.01	60%	9%	7%	24%	W4
5436.04	48%	11%	2%	39%	W4
Average	**55%**	**10%**	**7%**	**28%**	
Cerritos	**12%**	**16%**	**7%**	**65%**	
5545.21	15%	24%	10%	50%	C3, C4
Cudahy	**97%**	**1%**	**0%**	**1%**	
5338.06*	98%	2%	0%	0%	C5
Downey	**72%**	**17%**	**4%**	**8%**	
5505.00	70%	19%	4%	7%	C3, C4
5506.01	73%	18%	4%	5%	C3, C4

5506.02	68%	21%	0%	11%	C3, C4
5509.01	71%	14%	6%	10%	C3, C4
5509.02	74%	14%	3%	9%	C3, C4
5510.00	65%	24%	0%	11%	C3, C4
5511.01	79%	5%	7%	9%	C3, C4
5511.02	81%	8%	8%	2%	C3, C4
5512.02	74%	13%	7%	6%	C3, C4
5513.01	73%	15%	6%	7%	C3, C4
5517.00	80%	11%	4%	5%	C3, C4
5518.00	67%	14%	5%	14%	C3, C4
Average	**73%**	**15%**	**5%**	**8%**	
El Segundo	**18%**	**68%**	**1%**	**13%**	
6200.02	20%	69%	2%	10%	W1, W3
6201.02	12%	70%	1%	13%	W1, W3
9800.13	-	-	-	3%	W1, W3
9800.28	-	-	-	0%	W1, W3
9800.30	-	-	-	-	W1, W3
Average	**16%**	**69%**	**1%**	**6%**	
Florence-Graham CDP[a]	**90%**	**1%**	**8%**	**1%**	
5330.01	97%	1%	2%	1%	C10
5350.02	88%	3%	9%	0%	C10
5351.01	80%	1%	18%	1%	C10
5351.02	74%	1%	24%	1%	C10
5352.00	84%	1%	14%	1%	C10
Average	**84%**	**1%**	**13%**	**1%**	
Huntington Park	**98%**	**1%**	**0%**	**1%**	
5325.00	92%	1%	2%	6%	C10
5326.03	100%	0%	0%	0%	C10
5326.04	98%	1%	0%	1%	C10
5326.05	95%	0%	1%	5%	C10
5327.00	97%	2%	2%	0%	C10
5328.00	94%	0%	5%	1%	C10
5329.00	94%	1%	6%	0%	C10
5330.02	99%	1%	0%	0%	C10
5331.03	98%	1%	0%	1%	C10
5331.04	98%	2%	0%	0%	C10
Average	**96%**	**1%**	**1%**	**1%**	

Industry	**58%**	**29%**	**5%**	**8%**	
4084.02	49%	16%	2%	33%	C0-B, C1, C2
Lakewood	**33%**	**38%**	**7%**	**22%**	
5700.02	43%	35%	5%	17%	C6

5708.00	32%	47%	3%	18%	C6
Average	**37%**	**41%**	**4%**	**18%**	
Long Beach	**42%**	**28%**	**13%**	**17.600%**	
5712.00	25%	54%	6%	15%	C6
Los Angeles (City)	**49%**	**29%**	**9%**	**14%**	
2220.02	68%	2%	25%	6%	C10
2225.00	70%	1%	22%	7%	C10
2226.00	54%	8%	23%	16%	C10
2227.00	10%	47%	3%	40%	C10
2246.00	92%	2%	3%	3%	C10
2267.00	94%	0%	5%	1%	C10
2281.00	91%	0%	9%	0%	C10
2282.10	86%	0%	12%	1%	C10
2282.20	84%	1%	14%	1%	C10
2283.10	92%	0%	5%	3%	C10
2288.00	89%	0%	10%	1%	C10
2289.00	85%	0%	7%	7%	C10
2311.00	66%	6%	25%	3%	C10
2312.10	75%	0%	23%	2%	C10
2312.20	75%	6%	14%	5%	C10
2313.00	71%	1%	28%	1%	C10
2314.00	80%	0%	18%	2%	C10
2317.20	87%	2%	8%	4%	C10
2321.20	77%	1%	22%	1%	C10
2327.00	80%	1%	18%	2%	C10
2371.02	73%	0%	26%	1%	C10
2376.00	76%	1%	23%	1%	C10
2392.01	84%	0%	15%	1%	C10
2392.02	79%	0%	18%	2%	C10
2393.10	84%	2%	13%	1%	C10
2393.20	80%	0%	18%	1%	C10
2393.30	85%	0%	16%	0%	C10
2932.02	61%	6%	9%	24%	W4
2944.10	43%	17%	15%	25%	W4
Average	**76%**	**4%**	**15%**	**6%**	
Los Angeles	**49%**	**29%**	**9%**	**14%**	
2220.02	68%	2%	24%	6%	C10-AWTF
2225.00	70%	1%	22%	7%	C10-AWTF
2226.00	54%	8%	23%	16%	C10-AWTF
2312.10	75%	0%	23%	2%	C10-AWTF
2312.20	75%	6%	14%	5%	C10-AWTF
2313.00	71%	1%	28%	1%	C10-AWTF
2314.00	80%	0%	18%	2%	C10-AWTF
Average	**70.4%**	**2.4%**	**21.7%**	**15.7%**	

Maywood	**97%**	**2%**	**1%**	**0%**	
5333.00	97%	2%	0%	0%	C10
5337.03	98%	2%	0%	1%	C5
Average	**98%**	**2%**	**0%**	**0%**	
Norwalk	**70%**	**12%**	**4%**	**14%**	
5502.02	74%	12%	5%	9%	C6
5503.00	76%	13%	0%	12%	C6
Average	**75%**	**12%**	**3%**	**10%**	
Pico Rivera	**91%**	**5%**	**1%**	**4%**	
5003.00	58%	21%	1%	21%	
5004.03	88%	5%	2%	5%	C0-B, C1, C2
5007.00	92%	5%	0%	3%	C3, C4
5008.00	89%	6%	3%	2%	C3, C4
5009.00	88%	5%	1%	6%	C3, C4
5023.01	94%	5%	0%	1%	C6
5023.02	91%	5%	1%	4%	C6
5024.01	93%	6%	1%	1%	C3, C4
5025.00	88%	7%	1%	3%	C3, C4
5026.01	93%	5%	0%	2%	C3, C4
5026.02	92%	5%	0%	4%	C3, C4
5027.00	86%	8%	1%	5%	C6
Average	**90%**	**6%**	**1%**	**3%**	
South Gate	**96%**	**3%**	**1%**	**1%**	
5361.02	82%	13%	2%	3%	C5

Vernon	**81%**	**15%**	**0%**	**3%**	
5324.00	81%	15%	0%	2%	C10
West Carson CDP[a]	**31%**	**21%**	**12%**	**37%**	
5435.02	46%	22%	4%	29%	W4
5435.03	24%	19%	12%	46%	W4
5436.02	36%	15%	9%	40%	W4
5436.03	17%	34%	25%	25%	W4
Average	**31%**	**22%**	**12%**	**35%**	
West Whittier-Los Nietos CDP[a]	**88%**	**9%**	**1%**	**2%**	
5022.00	85%	11%	0%	4%	C6

[a] Census-designated place

*Tract listed twice as it falls under two city jursidictions

SOURCE: U.S. Census Bureau. Tract data obtained from 2010 U.S. Census files; city data obtained from 2010-2014 ACS data.

APPENDIX H

MEDIAN HOUSEHOLD INCOME AND POVERTY STATUS BY CITY AND CENSUS TRACT

Census Tract	Median Household Income	Percent Below Poverty Level (Individuals)	Project
Avocado Heights CDP[a]	**$ 73,030**	**13.0%**	
4083.02	$ 72,500	8.0%	C0-B, C1, C2
4083.03	$ 88,152	7.2%	C0-B, C1, C2
Average	**$ 80,326**	**7.6%**	
City of Bell	**$ 37,121**	**25.4%**	
5338.06*	$ 32,835	**33.4%**	C5
5323.04	$ 44,375	31.0%	C5
Average	**$ 38,605**	**32.2%**	
City of Bellflower	**$ 50,765**	**18.1%**	
5531.00	$ 64,536	13.5%	C3, C4
5532.00	$ 69,250	10.0%	C3, C4
5540.01	$ 59,423	12.7%	C3, C4
5540.02	$ 47,115	18.6%	C3, C4
5541.01	$ 44,263	28.7%	C3, C4
5541.03	$ 103,674	2.7%	C3, C4
5541.05	$ 37,071	30.8%	C3, C4
5542.01	$ 73,696	16.9%	C6
5542.03	$ 54,679	17.2%	C3, C4
5542.04	$ 33,786	28.0%	C3, C4
5544.04	$ 42,917	20.0%	C3, C4
5544.05	$ 44,323	16.1%	C6
5544.06	$ 69,676	9.1%	C6
Average	**$ 57,262**	**17.3%**	
City of Carson	**$ 76,722**	**11.5%**	
2920.00	$ 43,107	26.3%	W4
2932.01	$ 58,194	10.8%	W4
5436.04	**$ 81,250**	14.3%	W4
Average	**$ 60,850**	**17.1%**	
City of Cerritos	**$ 87,788**	**4.2%**	
5545.21	$ 81,875	5.6%	C3, C4
Cudahy	**$ 39,263**	**32.8%**	
5338.06*	$ 32,835	**39.7%**	C5
Downey	**$ 60,132**	**12.0%**	
5505.00	$ 74,271	7.5%	C3, C4

5506.01	$	63,125	13.6%	C3, C4
5506.02	$	72,500	0.8%	C3, C4
5509.01	$	46,722	13.2%	C3, C4
5509.02	$	51,759	10.3%	C3, C4
5510.00	$	39,789	8.8%	C3, C4
5511.01	$	39,789	30.0%	C3, C4
5511.02	$	37,350	26.2%	C3, C4
5512.02	$	60,511	13.5%	C3, C4
5513.01	$	46,230	19.4%	C3, C4
5517.00	$	61,080	11.0%	C3, C4
5518.00	$	58,461	12.7%	C3, C4
Average	**$**	**54,299**	**13.9%**	
El Segundo	**$**	**86,364**	**8.3%**	
6200.02	$	71,151	7.0%	W1, W3
6201.02	$	80,921	4.1%	W1, W3
9800.13	-		-	W1, W3
9800.28	-		-	W1, W3
9800.30	-		-	W1, W3
Average	**$**	**76,036**	**5.6%**	
Florence-Graham CDP[a]	**$**	**36,841**	**33.4%**	
5330.01	$	32,547	30.4%	C10
5350.02	$	35,879	38.5%	C10
5351.01	$	35,949	28.8%	C10
5351.02	$	34,773	37.7%	C10
5352.00	$	33,006	30.8%	C10
Average	**$**	**34,431**	**33.2%**	
Huntington Park	**$**	**36,620**	**30.3%**	
5325.00	$	42,585	29.3%	C10
5326.03	$	37,500	31.1%	C10
5326.04	$	35,833	26.7%	C10
5326.05	$	24,809	33.5%	C10
5327.00	$	35,221	25.7%	C10
5328.00	$	33,211	40.6%	C10
5329.00	$	32,541	43.4%	C10
5330.02	$	37,398	21.7%	C10
5331.03	$	21,797	41.6%	C10
5331.04	$	20,683	47.1%	C10
Average	**$**	**32,158**	**34.1%**	

Industry	**$**	**49,419**	**1.6%**	
4084.02	$	84,355	7.7%	C0-B, C1, C2

Lakewood	**$**	**78,876**	**8.3%**	
5700.02	$	84,375	7.7%	C6
5708.00	$	80,517	5.1%	C6
Average	**$**	**82,446**	**6.4%**	
Long Beach	**$**	**52,900**	**20.7%**	
5712.00	$	78,481	4.4%	C6
City of Los Angeles	**$**	**49,745**	**22.4%**	
2227.00	$	10,515	81.6%	C10
2246.00	$	26,645	47.4%	C10
2267.00	$	30,186	44.4%	C10
2281.00	$	37,200	43.5%	C10
2282.10	$	26,538	48.9%	C10
2282.20	$	29,029	44.6%	C10
2283.10	$	31,629	41.2%	C10
2288.00	$	24,727	43.4%	C10
2289.00	$	18,622	57.0%	C10
2311.00	$	21,827	60.2%	C10
2313.00	$	21,913	45.7%	C10
2314.00	$	34,797	26.0%	C10
2317.20	$	32,115	35.3%	C10
2321.20	$	42,019	43.3%	C10
2327.00	$	42,813	28.4%	C10
2371.02	$	29,183	39.5%	C10
2376.00	$	48,371	28.0%	C10
2392.01	$	28,601	42.3%	C10
2392.02	$	35,978	33.7%	C10
2393.10	$	32,301	28.3%	C10
2393.20	$	33,477	32.0%	C10
2393.30	$	38,661	29.6%	C10
2932.02	$	34,441	37.3%	W4
2944.10	$	46,415	25.9%	W4
Average	**$**	**31,583**	**41.1%**	

City of Los Angeles	**$**	**49,745**	**22.4%**	
2220.02	$	38,125	14.5%	C10-AWTF
2225.00	$	30,184	36.1%	C10-AWTF
2226.00	$	29,528	39.2%	C10-AWTF
2312.10	$	25,485	31.1%	C10-AWTF
2312.20	$	23,323	44.9%	C10-AWTF
2313.00	$	21,913	45.7%	C10-AWTF
2314.00	$	34,797	26.0%	C10-AWTF
Average	**$**	**29,051**	**33.9%**	

Maywood	**$**	**38,155**	**25.6%**	
5333.00	$	31,083	31.4%	C10
5337.03	$	38,073	30.2%	C5
Average	**$**	**34,578**	**30.8%**	
Norwalk	**$**	**60,485**	**14.5%**	
5502.02	$	65,976	10.7%	C6
5503.00	$	62,411	9.3%	C6
Average	**$**	**64,194**	**10.0%**	
Pico Rivera	**$**	**57,044**	**14.5%**	
5003.00	$	94,953	10.0%	C0-B, C1, C2
5004.03	$	58,721	13.1%	C0-B, C1, C2
5007.00	$	68,068	9.1%	C3, C4
5008.00	$	55,395	14.6%	C3, C4
5009.00	$	53,160	21.8%	C3, C4
5023.01	$	63,355	11.8%	C6
5023.02	$	36,654	27.8%	C6
5024.01	$	60,862	8.9%	C3, C4
5025.00	$	40,278	19.8%	C3, C4
5026.01	$	70,722	6.0%	C3, C4
5026.02	$	51,290	9.5%	C3, C4
5027.00	$	51,862	8.5%	C3, C4
Average	**$**	**55,488**	**13.7%**	
South Gate	**$**	**41,851**	**21.0%**	
5361.02	$	46,587	17.1%	C5
Vernon	**$**	**32,188**	**5.1%**	
5324.00	$	38,500	5.1%	C10

West Carson CDP[a]	**$**	**62,100**	**9.4%**	
5435.02	$	70,162	9.4%	W4
5435.03	$	61,056	5.9%	W4
5436.02	$	108,640	14.1%	W4
5436.03	$	59,160	4.7%	W4
Average	**$**	**74,755**	**8.5%**	
West Whittier-Los Nietos CDP[a]	**$**	**60,525**	**10.9%**	
5022.00	$	63,324	9.0%	C6

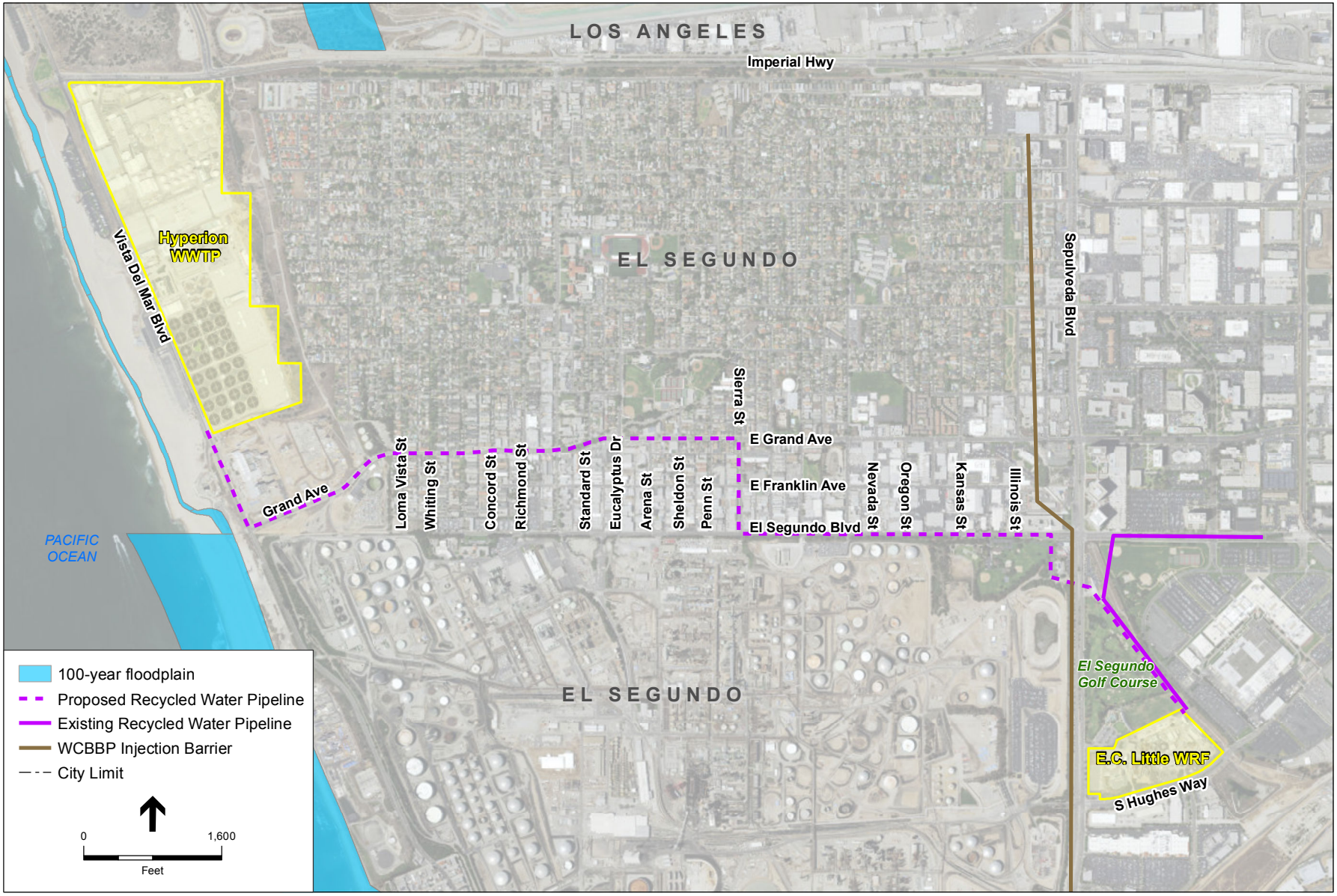
[a] Census-designated place

*Tract listed twice as it falls under two city jursidictions

SOURCE: U.S. Census Bureau. City and tract data both obtained from 2010-2014 ACS five-year estimates data.

Appendix I
Flood Zone Maps

ESA

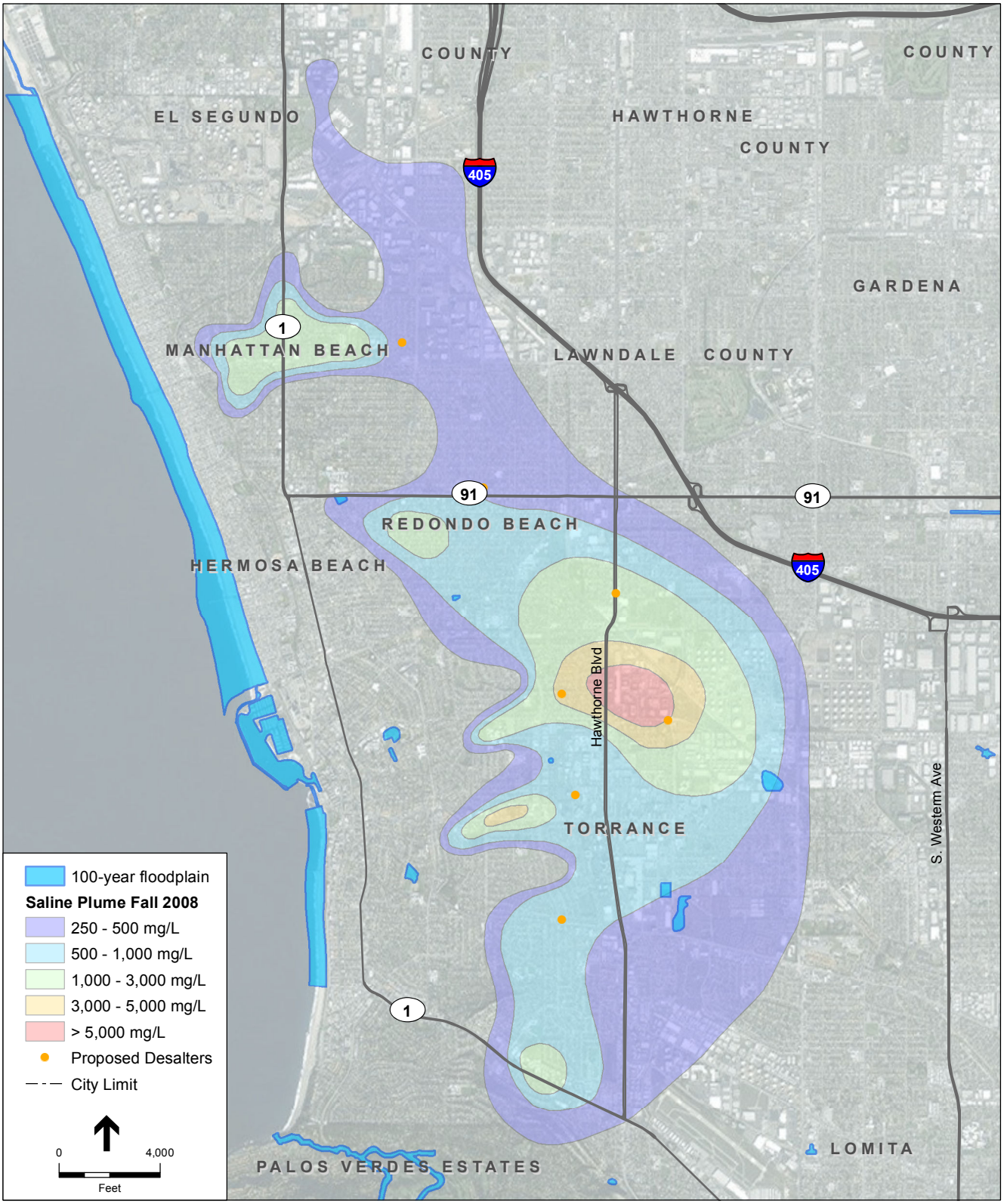


SOURCE: ESRI; Los Angeles County GIS; FEMA

WRD - Groundwater Basins Master Plan . 120192

Figure I-1

Projects W1 and W3: Increase Injection at West Coast Basin Barrier
FEMA Flood Zones

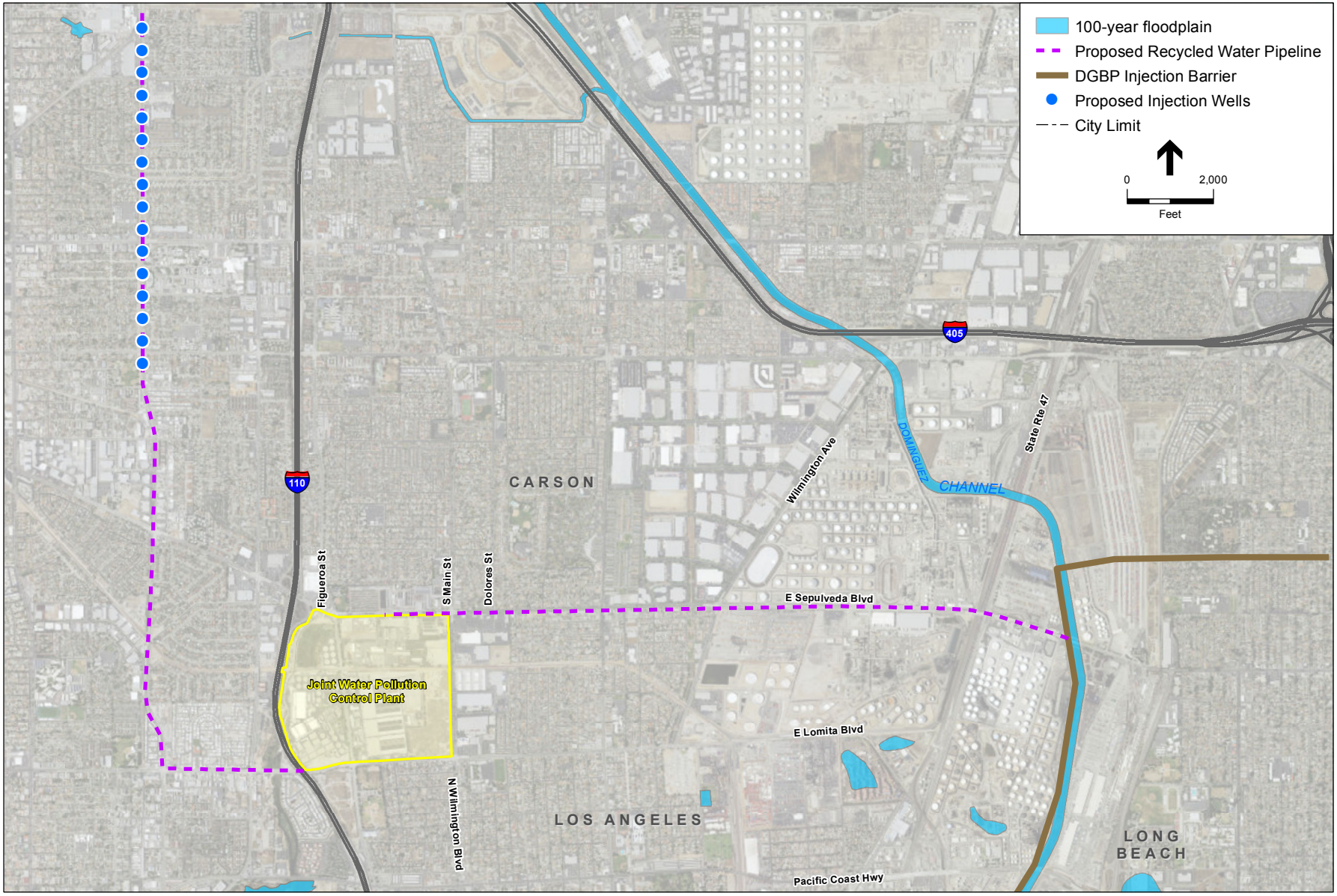


SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure I-2

Project W2: Saline Plume Remediation
FEMA Flood Zones

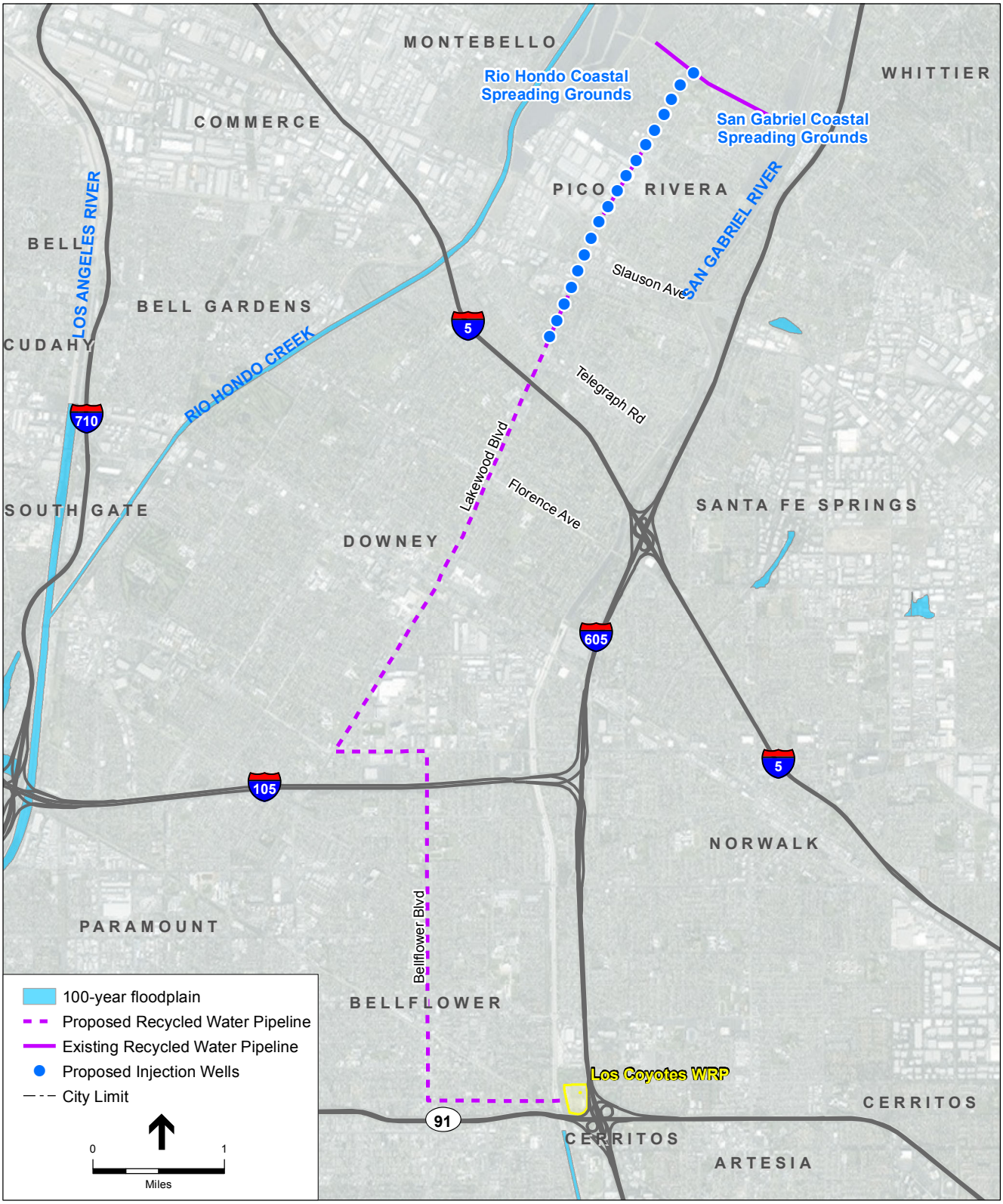


SOURCE: ESRI; Los Angeles County GIS; FEMA

WRD - Groundwater Basins Master Plan . 120192

Figure I-3

Project W4: Increase Injection at Dominguez Gap Barrier and Proposed Injection Well System
FEMA Flood Zones



SOURCE: ESRI; Los Angeles County GIS; FEMA

Figure I-4

Projects C3, C4, C8 and C9: Increase Replenishment at MFSG
FEMA Flood Zones

SOURCE: ESRI; Los Angeles County GIS; FEMA

WRD - Groundwater Basins Master Plan . 120192

Figure I-5

Project C5: Los Angeles Forebay Storm Water Aquifer Recharge and Recovery Facility (ARRF) FEMA Flood Zones

SOURCE: ESRI; Los Angeles County GIS; ESA, 2012.

WRD - Groundwater Basins Master Plan . 120192

Figure I-6

Project C6: Groundwater Basin Optimization Pipeline
FEMA Flood Zones

SOURCE: ESRI; Los Angeles County GIS; FEMA

Figure I-7

Project C10: Injection of Recycled Water in Los Angeles Forebay
FEMA Flood Zones

Appendix J
Hazardous Materials Records Searches

ESA

Department of Toxic Substances Control
EnviroStor Database Glossary

Acres: The approximate size of the facility/site in acres. One acre of land equals 43,560 square feet (4,840 square yards) or about 1 football field.

Activity: A document related to a significant event or part of an evaluation, investigation, cleanup, permitting action, closure or post-closure.

Area Name and Description: Facilities or sites tracked in EnviroStor may be divided into smaller portions called "Areas" or further into "sub-areas" to address smaller sections of a site. An area is a discrete portion of a site with its own activities that may address geographical portions of a site, specific site problems, or phases of a site. Area Name refers to the name of an area or sub-area, and the Description provides a general description of an area or sub-area.

Assembly District: The State of California Assembly District where the facility/site is located. Some facilities/sites may be located in multiple assembly districts. For information on your legislative district, use the following link: http://www.assembly.ca.gov/defaulttext.asp.

Assessor's Parcel Number (APN): APNs are assigned by county recorders' offices; an APN is a series of numbers and letters, the sequence of which is determined by each county. External sources provide APNs to the Department of Toxic Substances Control (DTSC), and cannot make any assurance regarding their accuracy. APNs may change over time and DTSC is not notified when an APN changes; therefore, APN information is only reflective of the point of entry.

Authorization: A permit, modification to a permit, or a variance from permitting requirements. In limited cases, can be a legal agreement, e.g., consent order, consent agreement, settlement agreement.

Branch: The branch within DTSC that is responsible for overseeing the facility/site.

Brownfields: Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance or waste, pollutant, or contaminant. In the EnviroStor database, brownfields are designated as a facility or site, or portion thereof, of industrial or commercial property that is abandoned or underused, and often environmentally contaminated – especially one considered as a potential site for redevelopment or other reuse.

California Environmental Quality Act (CEQA): The California Environmental Quality Act (CEQA) was enacted in 1970; it requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

Certified Unified Program Agency (CUPA): An agency certified by DTSC to conduct the Unified Program, which consists of hazardous waste generator and onsite treatment programs, aboveground and underground storage tank programs, Hazardous Materials Management and Business Plans and Inventory Statements, and the Risk Management and Prevention Program. (The CUPA is generally a part of the county or city Fire Department or Environmental Health Department.)

Class 1 Modification: Minor modification(s) to an existing hazardous waste facility permit, generally administrative changes. Requires prior notification to DTSC. Some specified Class I modifications also require DTSC prior approval (Class I * modification).

Class 2 Modification: Modification(s) to an existing hazardous waste facility permit, generally applicable to changes necessary to respond to common variations in types and quantities of wastes or technological advances/changes to comply with new regulations.

Class 3 Modification: Major modification(s) to an existing hazardous waste facility permit to substantially alter the facility or its operations.

Cleanup Oversight Agencies: A list of the primary regulatory agencies responsible for the remediation activities at a facility/site. This list includes the "lead" regulatory agency (the agency with primary oversight responsibility) and any other primary supporting local, state, or federal regulatory agencies.

Cleanup Status: Identifies DTSC's current involvement at a facility/site undergoing investigation and/or cleanup. This listing may also indicate that a facility/site has been referred to another regulatory agency and is no longer under the oversight of DTSC.

- Active: Identifies that an investigation and/or remediation is currently in progress and that DTSC is actively involved, either in a lead or support capacity.

- Backlog: Identifies non-active sites which DTSC is not currently investigating or remediating. These sites generally become active when staff and/or financial resources are available. Priorities for placing a site on backlog status versus active are based on the degree of long-term threat posed by the property. Before placing a property on backlog status, DTSC considers whether interim actions are necessary to protect the public and the environment from any immediate hazard posed by the property. Often there are no parties available to fund the full cleanup of these properties.

- Border Zone/Haz Waste Property (BZP/HWP): Identifies properties that went through the Border Zone Property or Hazardous Waste Property process of evaluation. Potential Border Zone properties are located within 2,000 feet of a significant disposal of hazardous waste; Hazardous Waste Property facilities/sites have a significant disposal of hazardous waste.

- Certified: Identifies completed sites with previously confirmed release that are subsequently certified by DTSC as having been remediated satisfactorily under DTSC oversight.

- Certified O&M: Identifies sites that have certified cleanups in place but require ongoing Operation and Maintenance (O&M) activities. The Certified O&M status designation means that all planned activities necessary to address the contamination problems have been implemented. However, some of these remedial activities (such as pumping and treating contaminated groundwater) must be continued for many years before complete cleanup will be achieved. Prior to the Certified O&M designation, all institutional controls (e.g., land use restrictions) that are necessary to protect public health must be in place.

- Hazardous Waste Disposal Land Use (NOT BZP/HWP): Identifies facilities/sites that went through the Hazardous Waste or Border Zone Property process and entered into voluntary deed restrictions, but were not formally designated as either a "Border Zone" or "Hazardous Waste Property."

- Inactive – Action Required: Identifies non-active sites where, through a Preliminary Endangerment Assessment (PEA) or other evaluation, DTSC has determined that a removal or remedial action or further extensive investigation is required.

- Inactive – Needs Evaluation: Identifies non-active sites where DTSC has determined a PEA or other evaluation is required.

- No Action Required: Identifies sites where a Phase I Environmental Assessment was completed and resulted in a no action required determination.

- No Further Action: Identifies completed sites where DTSC determined after investigation, generally a PEA (an initial assessment), that the property does not pose a problem to public health or the environment.

- Non-Operating: A Treatment, Storage, Disposal or Transfer Facility (TSDTF) with no operating hazardous waste management unit(s).

- Non-Operating Permit: A facility that has received a hazardous waste facility permit but, has no hazardous waste management operating unit(s). This could be a post-closure permit.

- Operating: A Treatment, Storage, Disposal or Transfer (TSDTF) Facility with an operating hazardous waste management unit(s).

- Referred: 1248 Local Agency: Identifies sites that were referred to a local agency (through the SB 1248 determination process) to supervise the cleanup of

a simple waste release. For more information, go to: http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/sb-1248.pdf

- Referred: EPA: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by the United States Environmental Protection Agency (U.S. EPA).

- Referred: IWMB: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by the California Integrated Waste Management Board (IWMB).

- Referred: Other Agency: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by another state or local environmental regulatory agency.

- Referred: RCRA: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by DTSC's Hazardous Waste Management Program and are identified as Resource Conservation and Recovery Act (RCRA).

- Referred: RWQCB: Identifies sites that, based on limited information available to DTSC, appear to be more appropriately addressed by the California Regional Water Quality Control Boards (RWQCBs).

Closure: The act of closing a hazardous waste management facility or hazardous waste management unit pursuant to the requirements of chapters 14 and 15 of California Code of Regulations, Title 22, Division 4.5. In California, all hazardous waste Treatment, Storage, Disposal or Transfer Facilities (TSDTFs) are required to prepare and submit closure plans.

Comments: Statements or information about a completed activity.

Community Involvement: Provides opportunities for the public to get involved with a facility/site's cleanup process. This section includes draft documents available for review, public notice documents and fact sheets.

Completed Activities: Completed documents or facility/site activities.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries. It provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous wastes at these sites; and established a trust fund to provide for cleanup

when no responsible party could be identified. CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986.

Corrective Action: Investigation and cleanup activities at hazardous waste facilities (either Resource Conservation and Recovery Act (RCRA) or State-only) that either were eligible for a permit or received a permit, are called "corrective action." These facilities treated, stored, disposed and/or transferred hazardous waste.

Corrective Measures Implementation (CMI): The CMI is the last phase of the corrective action process; the remedy is designed and implemented. This phase follows the selection of remedy and approval of permit modification or order amendment. The modified permit or amended order should include conditions that specify how the corrective measures are to be implemented.

Corrective Measures Study (CMS): The general objective of the CMS is to develop and evaluate corrective measure alternative(s) that may be utilized at the facility to address releases of hazardous wastes or constituents from Solid Waste Management Units, Areas of Concern, and other source areas at the facility. The CMS is analogous to the Feasibility Study conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or State Superfund laws.

Cortese List: The Hazardous Waste and Substances (Cortese) List is a planning document used by the state, local agencies and developers to comply with the California Environmental Quality Act (CEQA) requirements in providing information about the location of hazardous materials release facilities/sites. Government Code section 65962.5 requires the California Environmental Protection Agency (Cal/EPA) to develop at least annually an updated Cortese List. DTSC is responsible for a portion of the information contained in the Cortese List. Other state and local government agencies are required to provide additional hazardous material release information for the Cortese List.

Date Completed: The calendar date when an activity is completed. This date is usually the final approval/concurrence letter or signature date, and is not necessarily associated with the date the work is completed.

Document Type: A DTSC standardized name used to identify documents developed during the evaluation, investigation, permitting, closure, post-closure and remediation of facilities/sites. These documents may also include environmental analysis documents developed in support of DTSC's statutory responsibilities under the California Environmental Quality Act (CEQA). For example: agreements, orders, decisions, permits, closure plans, cleanup plans and reports, public outreach, and land use restriction documents may be included.

Due Date: The calendar year that staff expect to complete the particular activity.

Emergency Permit: A permit issued in accordance with section 66270.61 California Code of Regulations, Title 22, Division 4.5. Emergency permits are temporarily issued when DTSC determines that a situation represents an imminent and substantial endangerment to human health or the environment. They may be issued to a non-permitted or permitted facility to allow treatment, storage, disposal or transfer of hazardous waste. The duration of the emergency permit cannot exceed 90 days.

Entire Facility: All contiguous land and structures, other appurtenances, and improvements on the land used for the treatment, transfer, storage, resource recovery, disposal, or recycling of hazardous waste.

Environmental Protection Agency (EPA) Identification Number (EPA ID #): The Resource Conservation and Recovery Act (RCRA) requires individuals who generate or transport hazardous waste, or who operate a facility/site for recycling, treating, storing, or disposing (TSD) of hazardous waste, to notify U.S. EPA or their authorized state waste management agency of their regulated waste activities and obtain a U.S. EPA Identification (ID) Number (also known as a RCRA ID Number). **Note:** Most hazardous waste falls into two types in California: waste regulated under the federal Resource Conservation and Recovery Act is known as "RCRA waste;" waste regulated by California law alone is known as "non-RCRA" or "California-only" waste. All hazardous waste (RCRA and non-RCRA) in California is regulated under state statutes and regulations. DTSC issues *California ID Numbers* for generators, transporters, and treatment, storage, disposal and transfer facilities that handle hazardous wastes not regulated under RCRA.

Export to Excel: The EnviroStor database provides the option to export all search results, when viewed on a list, to an MS Excel® spreadsheet.

Facility: Regulated site or business entity. May be a hazardous waste cleanup site, generator, transporter, a Treatment, Storage, Disposal or Transfer Facility (TSDTF) or a post-closure facility.

Facility/Site Name: The name of the facility/site. When using the search screen, any part of the facility/site name may be used to search the database. For example, to look for the facilities/sites at Mare Island, entering “Mare” will result in a listing of all facilities/sites with a site name containing the word “Mare.”

Facility/Site Type: Identifies the type of facility/site based on the certain characteristics.

- Cal-Mortgage: Under a Memorandum of Understanding with the Cal-Mortgage Loan Insurance Division (Cal-Mortgage) of the Office of Statewide Health Planning and Development, DTSC reviews environmental documents for sites applying for their guaranteed loan insurance program for the construction, improvement and expansion of health care facilities. The loan applicants are either public entities or non-profit groups. The environmental review is done as

part of the real estate due diligence process and the properties are not expected to have had hazardous substances releases.

- Closed Base: Identifies closed military facilities with confirmed or unconfirmed releases and where DTSC is involved in investigation and/or remediation, either in a lead or support capacity. Facilities/sites with confirmed releases are generally considered high-priority and high potential risk. Closed Base facilities/sites are further defined as State Response, Federal Superfund, or Military Evaluation.

- Corrective Action: Investigation or cleanup activities at Resource Conservation and Recovery Act (RCRA) or state-only hazardous waste facilities (that were required to obtain a permit or have received a hazardous waste facility permit from DTSC or U.S. EPA) are called "corrective action."

- Evaluation: Identifies suspected, but unconfirmed, contaminated sites that need or have gone through a limited investigation and assessment process. If a site is found to have confirmed contamination, it will change from Evaluation to either a State Response or Voluntary Cleanup site type. Sites found to have no contamination at the completion of the limited investigation and/or assessment process result in a No Action Required (for Phase I assessments) or No Further Action (for PEAs or Phase II assessments) determination.

- Expedited Remedial Action Program (ERAP): Identifies sites in the Expedited Remedial Action Program. These are confirmed release facilities/sites worked on by Responsible Parties with oversight of the cleanup by DTSC. This is a pilot program limited to 30 facilities/sites. These confirmed facilities/sites are generally high-priority and high potential risk.

- Federal Superfund (NPL): Identifies sites where the U.S. EPA proposed, listed, or delisted a site on the National Priorities List (NPL). The list of sites is developed and maintained by U.S. EPA, which typically has primary regulatory oversight for the sites listed on the NPL. For more information, please refer to U.S. EPA's web site at: http://www.epa.gov/superfund/sites/npl/npl_hrs.htm.

- FUDS: Identifies military facilities that were Formerly Used Defense Sites (FUDS) with confirmed or unconfirmed releases and where DTSC is involved in investigation and/or remediation, either in a lead or support capacity. Facilities/sites with confirmed releases are generally considered high-priority and high potential risk. FUDS are further defined as State Response, Federal Superfund, or Military Evaluation sites.

- Hazardous Waste Property or Border Zone Property Evaluation: Identifies facilities/sites that went through the Hazardous Waste Property or Border Zone Property evaluation process. (Chapter 6.5, Health and Safety Code section 25221.)

- Historical: Identifies sites from an older database where no site type was identified. Most of these sites have a status of Referred or No Further Action. DTSC is working to clean-up this data by identifying an appropriate site type for each "Historic" site.

- Open Base: Identifies open military facilities with confirmed or unconfirmed releases and where DTSC is involved in investigation and/or remediation, either in a lead or support capacity. Facilities/sites with confirmed releases are generally considered high-priority and high potential risk. Open Base facilities/sites are further defined as State Response, Federal Superfund, or Military Evaluation.

- Permitted: Facilities/sites that were required to obtain a permit or have received a hazardous waste facility permit from DTSC or U.S. EPA in accordance with section 25200 of the Health and Safety Code or the Resource Conservation and Recovery Act (RCRA).

- School: Identifies proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. School sites are further defined as "Cleanup" (remedial actions occurred) or "Evaluation" (no remedial action occurred) based on completed activities. All proposed school sites that will receive State funding for acquisition or construction are required to go through a rigorous environmental review and cleanup process under DTSC's oversight. For more information, go to: http://www.dtsc.ca.gov/Schools/index.cfm.

- State Response: Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

- Voluntary Cleanup: Identifies sites with either confirmed or unconfirmed releases, and the project proponents have requested that DTSC oversee evaluation, investigation, and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Facility/Site History: General information regarding the facility/site including a description of the historical/current manufacturing processes or operations that may have contributed to the hazardous substances or wastes released at the facility/site, boundaries, vicinity descriptions, and any other unique facility/site specific information.

Funding: Identifies the source of funding for evaluation, investigation or remediation of a site.

- BRAC (Base Realignment and Closure): Department of Defense (DOD) funds used to implement the base closure process.

- Cal-Mortgage: Properties where DTSC performs environmental assessments for the Office of Statewide Planning and Development, Cal-Mortgage Loan Insurance Division, a sister agency as a part of the real estate due diligence process under a Memorandum of Understanding (MOU) for the guaranteed loan insurance program for the construction, improvement, and expansion of various health care facilities.

- DERA (Defense Environmental Restoration Account): DOD funds used for hazardous substances responses consistent with the Defense Environmental Restoration Program.

- EPA grant: Funds that the United States Environmental Protection Agency (U.S. EPA) provides to DTSC.

- Federal DOE-funded: Funds the U.S. Department of Energy (DOE) provides under a grant for oversight work.

- Orphan funds: A property where the Responsible Party has either not been identified, is insolvent, cannot be located, or recalcitrant and enforcement actions have not resulted in the Responsible Party performing the site activities. Orphan funds include State only as well as joint State/Federal funds.

- Responsible Party: A private party or parties fund a site.

- School District funded: A particular school district provides funds.

Future Activities: A list of activities scheduled to be completed at the site. This list is updated at least annually, or more frequently, as activities progress. It reflects those activities DTSC, the responsible parties, facility owners/operators and any other regulatory agencies involved with the site anticipate.

Hazardous Waste Management Unit (HWMU): A contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, a waste transfer area, an incinerator, a tank and its associated piping and underlying containment system and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

Hazardous Waste Permitting (HWP): Hazardous Waste Permitting is a database that includes permitting, modifications, corrective action, closure and post-closure activities for hazardous waste facilities. It is the source database for facility information in the EnviroStor database and is in the process of conversion completely to the EnviroStor database.

Inactive Facility: A facility which may require a corrective action work.

Interim Status: Period during which treatment, storage and disposal facilities subject to the Resource Conservation and Recovery Act (RCRA) in 1980 were temporarily permitted to operate while awaiting a permanent permit. Permits issued under these circumstances are usually called "Part A" or "Part B" permits. State-only hazardous waste facilities subject to California Health and Safety Code Chapter 6.5 were also granted interim status.

Interim Status Document (ISD): The authorization document granted by DTSC or U.S. EPA which allows a facility to continue to operate pending review and decision of the facility's permit application.

Interim/Stabilization Measures: Measures taken to achieve high-priority, short-term remediation needs at a hazardous waste facility. Analogous to “removal actions” or “interim remedial measures” conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or State Superfund laws.

Latitude and Longitude: Coordinates used to establish the site location. The EnviroStor database uses the North American Datum of 1983 (NAD83) standard.

Lead Agency: The agency that has accepted direct oversight responsibility for the evaluation, investigation, permitting, closure, remediation or post-closure of a facility/site.

Map: A link that identifies a facility/site’s physical location on a map. A missing map link means that DTSC does not have location coordinates for the facility/site.

National Priorities List: Indicates whether the site is listed on the federal “Superfund” National Priorities List (NPL). The list of sites is developed and maintained by U.S. EPA, which typically has primary regulatory oversight for the sites listed on the NPL. Designations under this listing include: not listed; proposed to be listed; listed; or delisted. U.S. EPA delists a site from the NPL when all cleanup activities are certified as complete.

Ongoing Corrective Action or Active Facility: A facility that is undergoing investigation and/or cleanup and has not been designated as No Further Action (NFA).

Past Use(s) That Caused The Contamination: A description of the business(es), past or present uses, and/or waste handling activities suspected of causing the environmental contamination. This list includes a general listing of manufacturing, agricultural, educational, and waste handling activity and business uses.

Permitted: A facility that was required to obtain a permit or has received a hazardous waste facility permit from DTSC or U.S. EPA**.**

Permitting Activity: An activity involving: Permitting, Closure, Corrective Action or Post-Closure.

Permit Maintenance Lead: The designated DTSC project manager responsible for maintaining and reviewing information received after a permit is issued.

Permit Renewal Lead: The designated DTSC project manager responsible for issuing and renewing an existing permit.

Post-Closure: Monitoring, engineering controls or other requirements of a closed hazardous waste management unit or entire facility.

Potential Contaminants of Concern: Potential contaminants include hazardous substances that may be present at the site. These potential contaminants may be located in various environmental media, such as groundwater, surface water, soil or sediments. "Confirmed" contaminants are noted.

Potential Media Affected: The environmental media suspected of being contaminated by chemicals and/or hazardous substances. Environmental media includes air, groundwater, surface water, soil or sediments.

Preliminary Assessment (PA): An assessment of information about a site and its surrounding area. A Preliminary Assessment is designed to determine whether a site poses little or no threat to human health and the environment or if it does pose a threat, whether the threat requires further investigation. Generally includes historical review of documents and may include limited sampling of a site.

Project Manager: The DTSC project manager assigned to a cleanup site.

Resource Conservation and Recovery Act (RCRA): The Resource Conservation and Recovery Act, as amended, contains the federal hazardous and solid waste laws: 42 USC 6901 (United States Code). RCRA was initially enacted on October 21, 1976 by amendments to the Solid Waste Disposal Act of 1965. RCRA was amended and strengthened in November 1984 by the Federal Hazardous and Solid Waste Amendments (HSWA) which required phasing out land disposal of hazardous waste. The federal hazardous waste regulations are found in Title 40 of the Code of Federal Regulations (40 CFR). DTSC is authorized by U.S. EPA to implement the hazardous waste/RCRA program in California.

RCRA Facility Assessment (RFA): This is the initial phase of corrective action. It includes determinations of actual or potential releases for all environmental media (i.e., soil, ground water, subsurface gas, air, or surface water). The RFA generally includes historical records research and may include limited sampling. Currently, the RFA is generally conducted by DTSC, a designated agency or a contractor.

RCRA Facility Investigation (RFI): The primary objective of the Resource Conservation and Recovery Act (RCRA) Facility Investigation is to thoroughly evaluate the nature and extent of releases of hazardous waste and constituents from solid waste management units, areas of concern and other source areas at the facility. The RFI is analogous to the Remedial Investigation conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or State Superfund laws.

School District: The California school district in which a new or expanding school site is proposed. **Note:** This information is provided for School sites ONLY.

Senate District: The State of California Senate District in which the facility/site is located. Some facilities/sites may be located in multiple senate districts. For information on your legislative district, use the following link: http://www.sen.ca.gov/

Site Management Requirements: Describes the requirements placed on the site or location to ensure that the final remedy(ies) and monitoring systems are operating, maintained and protected. Site management requirements may include posted signs, notification of property sale/lease, fencing, engineering controls, operation and maintenance activities or post-closure activities, and restrictions on digging or activities which may disturb the soil or site.

Special Program: Describes any special program related to the site.

- CLRRA Liability Immunity (AB 389): The California Land Reuse and Revitalization Act of 2004 (AB 389, Montanez), effective January 1, 2005. Provides liability protections to Brownfield developers, innocent landowners and contiguous property owners. Intended to promote the cleanup and redevelopment of blighted contaminated properties.

- Designation of Single Agency: The Responsible Party requested that a single administering agency be designated to oversee site investigation and remedial action needed at a contaminated site. This process is outlined in Health and Safety Code sections 25260 et seq. The Responsible Party requesting an administering agency must agree to carry out the site investigation and remedial action. The administering agency will be the lead agency in liaison with the Responsible Party and coordinate between other state and local agencies with oversight responsibility for the site.

- EPA-Multi Site Cooperative Agreement: DTSC site oversight is funded through a federal grant from U.S. EPA. These are usually U.S. EPA lead sites where U.S. EPA is funding the investigation rather than responsible parties.

- EPA-Naturally Occurring Asbestos (NOA): U.S. EPA provides limited funds to assess potential naturally occurring asbestos sites. NOA is classified by U.S. EPA as a known human carcinogen. NOA is a naturally occurring mineral that

has been found in rocks with serpentine minerals, in some soapstone (talc), and in association with faults. Additionally, trace levels have been found with some thermally altered rocks that contain amphibole minerals. The primary pathway for asbestos is the inhalation of dust containing asbestos fibers.

- EPA-PASI (Preliminary Assessment/Site Investigation): U.S. EPA provides grant funding to DTSC to prepare various preliminary assessment activities on specific sites or general areas of concern under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The evaluations include Discoveries, Site Screenings, and Preliminary Assessments.

- EPA-Targeted Site Investigation (TSI): U.S EPA provides funds to DTSC or State/Regional Water Quality Control Boards to perform environmental site investigations at no cost to the applicant. The TSI funds are intended to provide state and local governments, school districts, redevelopment agencies, or non-profit organizations an opportunity to gain more information about a site's condition, which can directly affect decisions on property acquisition or cleanup strategy.

- Mello Roos - Community Facilities District: Created the first long-term financing options for hazardous substances cleanup by empowering Community Facilities Districts to levy special taxes and issue bonds to provide funds for site cleanups.

- Polanco Redevelopment MOA: Designed to assist redevelopment agencies in responding to Brownfield properties in their redevelopment areas. It prescribes processes for redevelopment agencies to follow when cleaning up a hazardous substance release in a redevelopment site area. It also provides immunity from liability for redevelopment agencies and subsequent property purchasers for sites cleaned up under a cleanup plan approved by DTSC or a Regional Water Quality Control Board.

- Prospective Purchaser Program: A program developed by DTSC to address some of the major Brownfields issues and removes or lessens the liability that prospective purchasers face. A Prospective Purchaser Agreement between DTSC and a person who will be a Responsible Party upon the purchase of a site releases the purchaser from specified environmental liability when the site is cleaned-up according to DTSC's direction.

- Voluntary Cleanup Program: A DTSC program that allows motivated parties who are able to fund the evaluation, investigation, cleanup, and DTSC's oversight to move ahead at their own pace to investigate and remediate their sites.

Sub-Area: A discrete portion or an area that may address geographical portions of a facility/site, specific problems, or phases.

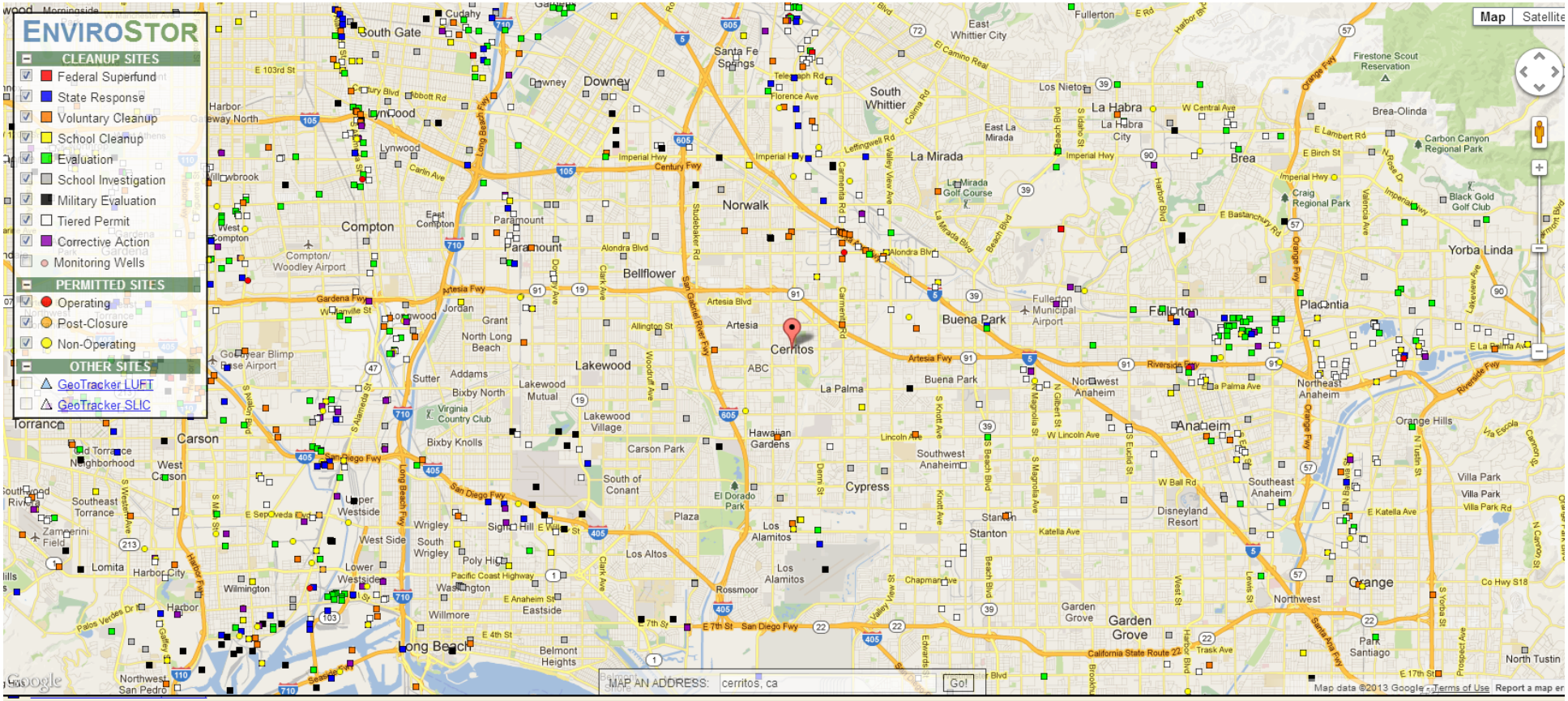
Summary of Violation/Notice to Comply (SOV/NTC): Notice issued at the end of a hazardous waste facility inspection when a violation is detected. Triggers the start of the enforcement process.

Supervisor: The DTSC supervisor assigned to the facility/site and/or the name of the project manager's supervisor.

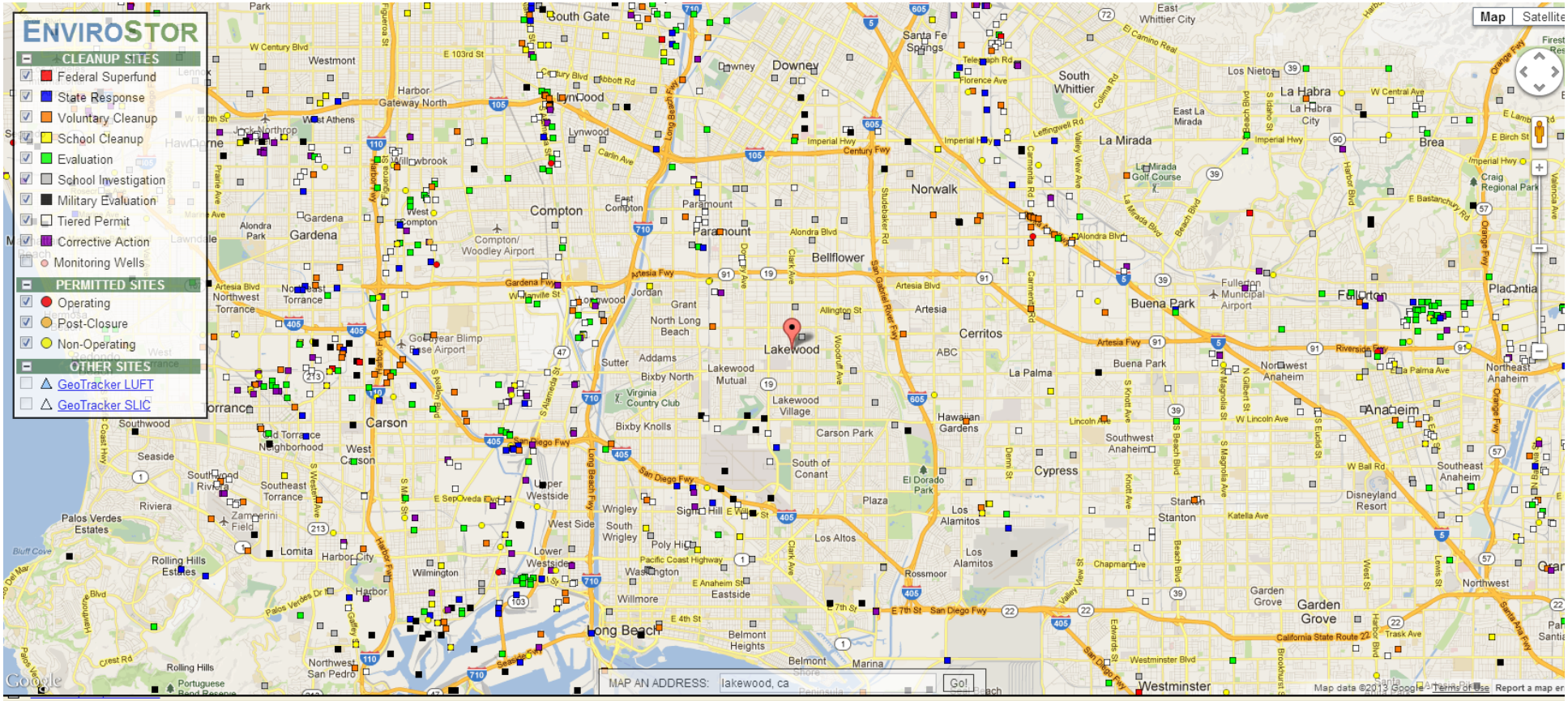
Treatment, Storage, Disposal and Transfer Facility (TSDTF): Hazardous Waste Facilities that treat, store, dispose and/or transfer hazardous waste.

Unilateral Order: A complete and signed "Administrative Enforcement Order" sent to the respondent without prior discussion or negotiation (Unilateral Orders are not final until the hearing period has passed). Issued pursuant to State hazardous waste law, the California Hazardous Waste Control Act (Chapter 6.5 of the Health and Safety Code).

Violation Area Code: A code representing the type of violation that can occur within each violation area, such as, a Treatment, Storage, Disposal or Transfer Facility (TSDTF) can have a Landfill (code DLF) violation, which is in the "Class 1" violation area.



GOLDEN EAGLE REFINING COMPANY INC	PROTECTIVE FILER	NON-OPERATING	21000 SOUTH FIGUEROA STREET	CARSON
LA PORT O EMB STATION HOSP	INACTIVE - NEEDS EVALUATION	MILITARY EVALUATION		CARSON
METRO BIOLOGICAL LABORATORIES	NO FURTHER ACTION	VOLUNTARY CLEANUP	14905 CARMENITA ROAD	CERRITOS
FREDRICK RAMOND, INC.	ACTIVE	VOLUNTARY CLEANUP	16121 CARMENITA ROAD	CERRITOS
J&R CERRITOS PROPERTIES, LLC	ACTIVE	VOLUNTARY CLEANUP	12981 166TH STREET	CERRITOS
GNB TECHNOLOGIES	CLOSED	NON-OPERATING	12981 EAST 166TH ST	CERRITOS
GNB TECHNOLOGIES	ACTIVE	CORRECTIVE ACTION	12981 EAST 166TH ST	CERRITOS
LANDMARK SQUARE CERRITOS	ACTIVE	VOLUNTARY CLEANUP	11300 - 11338 SOUTH STREET	CERRITOS
MANUEL DOMINGUEZ HS/NEW RANCHO DOMINGUEZ	INACTIVE - NEEDS EVALUATION	SCHOOL INVESTIGATION	15301 SAN JOSE AVE/6500 COMPTON BLVD	COMPTON
BETZ DEARBORN INC	ACTIVE	CORRECTIVE ACTION	3154 E HARCOURT ST	COMPTON
BETZ DEARBORN INC	CLOSED	NON-OPERATING	3154 E HARCOURT ST	COMPTON



HAYES-LEMMERZ INTERNATIONAL, INC.	ACTIVE	TIERED PERMIT	14500 FIRESTONE BOULEVARD	LA MIRADA
ALCAN RUBBER & CHEMICAL CO. INC.	REFER: 1248 LOCAL AGENCY	EVALUATION	15100 VALLEY VIEW AV.	LA MIRADA
JOHN F. KENNEDY HIGH SCHOOL	CERTIFIED	SCHOOL CLEANUP	8301 WALKER STREET	LA PALMA
JAMES MONROE ELEMENTARY SCHOOL	NO ACTION REQUIRED	SCHOOL INVESTIGATION	4400 LADOGA AVENUE	LAKEWOOD
ESTER LINDSTROM ELEMENTARY SCHOOL	INACTIVE - NEEDS EVALUATION	SCHOOL INVESTIGATION	5900 CANEHILL AVENUE	LAKEWOOD
MAYFAIR HIGH SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	6000 NORTH WOODRUFF AVENUE	LAKEWOOD
STEPHEN FOSTER ELEMENTARY SCHOOL	INACTIVE - NEEDS EVALUATION	SCHOOL INVESTIGATION	5223 EAST BIGELOW STREET	LAKEWOOD
CRAIG WILLIAMS ELEMENTARY SCHOOL	INACTIVE - NEEDS EVALUATION	SCHOOL INVESTIGATION	6144 CLARK AVENUE	LAKEWOOD
HUCK INTERNATIONAL - LAKEWOOD OPS, C/O HUCK FASTENERS	REFER: OTHER AGENCY	TIERED PERMIT	3969 PARAMOUNT BOULEVARD	LAKEWOOD
CLASSIC CLEANERS/SOUTHBAY PLACE	REFER: 1248 LOCAL AGENCY	EVALUATION	4427 REDONDO BEACH BLVD.	LAWNDALE
SMITH ELEMENTARY SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	14609 GREVILLEA AVENUE/4721 WEST 147TH STREET	LAWNDALE

Project Status Definitions

1. ***Completed – Case Closed***
A closure letter or other formal closure decision document has been issued for the site.

2. ***Open – Assessment & Interim Remedial Action***
An "interim" remedial action is occurring at the site AND additional activities such as site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring.

3. ***Open – Inactive***
No regulatory oversight activities are being conducted by the Lead Agency.

4. ***Open – Remediation***
An approved remedy or remedies has/have been selected for the impacted media at the site and the responsible party (RP) is implementing one or more remedy under an approved cleanup plan for the site. This includes any ongoing remedy that is either passive or active, or uses a combination of technologies. For example, a site implementing only a long term groundwater monitoring program, or a "monitored natural attenuation" (MNA) remedy without any active groundwater treatment as part of the remedy, is considered an open case under remediation until site closure is completed.

5. ***Open – Site Assessment***
Site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring at the site. Examples of site assessment activities include, but are not limited to, the following: 1) identification of the contaminants and the investigation of their potential impacts; 2) determination of the threats/impacts to water quality; 3) evaluation of the risk to humans and ecology; 4) delineation of the nature and extent of contamination; 5) delineation of the contaminant plume(s); and 6) development of the Site Conceptual Model.

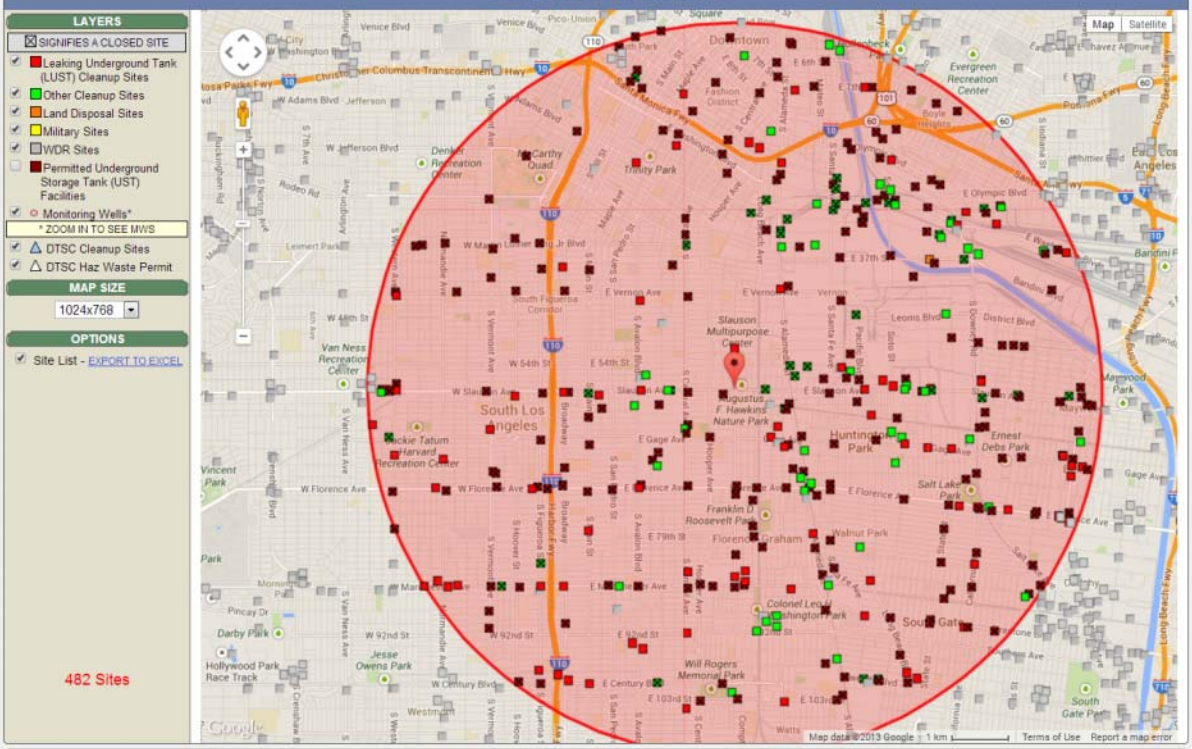
6. ***Open – Verification Monitoring (use only for UST, Chapter 16 regulated cases)***
Remediation phases are essentially complete and a monitoring/sampling program is occurring to confirm successful completion of cleanup at the Site. (e.g. No "active" remediation is considered necessary or no additional "active" remediation is anticipated as needed. Active remediation system(s) has/have been shut-off and the potential for a rebound in contaminant concentrations is under evaluation).

7. ***Open – Reopen Case (available selection only for previously closed cases)***
This is not a case status. This field should be selected to record the date that the case was reopened for further investigation and/or remediation. A case status should immediately be selected from the list of case status choices after recording this date.

8. ***Open – Eligible for Closure***
Corrective action at the Site has been determined to be completed and any remaining petroleum constituents from the release are considered to be low threat to Human Health, Safety, and the Environment. The case in GeoTracker is going through the process of being closed.

LINK TO THIS MAP

GEOTRACKER



SHOW SITES WITHIN 20000 FEET OF THE FOLLOWING ADDRESS: compton ave and e slauson Go

SITE LIST

SITE NAME	GLOBAL ID	CLEANUP STATUS	ADDRESS	CITY
1ST INTERNATIONAL FINANCE INC	T0603705472	COMPLETED - CASE CLOSED	4557 SLAUSON AVE E	MAYWOOD
76 PRODUCTS STATION #0898	T0603700476	COMPLETED - CASE CLOSED	1543 HOOVER ST S	LOS ANGELES
76 PRODUCTS STATION #0999	T0603700416	COMPLETED - CASE CLOSED	8600 FIGUEROA ST S	LOS ANGELES
76 PRODUCTS STATION #4010	T0603700647	COMPLETED - CASE CLOSED	791 CENTRAL AVE S	LOS ANGELES
76 STATION #0914	T0603737656	OPEN - ELIGIBLE FOR CLOSURE	5916 WESTERN AVE. S.	LOS ANGELES
76 STATIONE #1841 (FORMER)	T0603756292	COMPLETED - CASE CLOSED	3225 FIRESTONE BLVD	SOUTH GATE
7TH ST L.A. PUBLIC WORKS MAINT FACILITY	T0603779702	COMPLETED - CASE CLOSED	2300 E 7TH ST	LOS ANGELES
A & N SERVICE CORPORATION	T0603746550	OPEN - REMEDIATION	7831 ALAMEDA ST S	LOS ANGELES
A COMMUNITY OF FRIENDS	SL184581441	COMPLETED - CASE CLOSED	9130 SOUTH FIGUEROA ST	LOS ANGELES
ABC BINS	T0603765586	COMPLETED - CASE CLOSED	8801 ALAMEDA ST.	LOS ANGELES
ACE BEVERAGE COMPANY	T0603788711	OPEN - ELIGIBLE FOR CLOSURE	3616 NOAKES STREET	LOS ANGELES
ACE PAPER COMPANY	T0603792046	COMPLETED - CASE CLOSED	2835 EAST WASHINGTON BLVD	LOS ANGELES
ACTA	T0603760880	COMPLETED - CASE CLOSED	2026 SANTA FE AVE S.	LOS ANGELES
ACTA NORTH INDUSTRIAL MEDICAL CLINIC	SL0603780270	COMPLETED - CASE CLOSED	2112 SANTA FE	LOS ANGELES

MAP AN ADDRESS: Go!

STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER

PROJECT SEARCH RESULTS

SEARCH CRITERIA: CERRITOS, Open,Open - Assessment & Interim Remedial Action,Open - Eligible for Closure,Open - Inactive,Open - Referred,Open - Remediation,Open - Reopen Case,Open - Site Assessment,Open - Verification Monitoring, LUFT, SLIC, LANDFILL, DOD, DODPRIV, DODUST, WDR

14 RECORDS FOUND — EXPORT TO EXCEL — PAGE 1 OF 1

		SITE / FACILITY NAME	SITE / FACILITY TYPE	CLEANUP STATUS	ADDRESS (OR PARTIAL ADDRESS)	CITY	ZIP	COUNTY
[REPORT]	[MAP]	ARCO #1673	LUST CLEANUP SITE	OPEN - REMEDIATION	12157 ARTESIA BLVD	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	AT&T WIRELESS (CA 1014)	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	12911 183RD STREET	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	CHEVRON #9-7645 (FORMER)	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	17255 BLOOMFIELD AVE.	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	CITY OF CERRITOS, CITY YARD	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	16540 MARQUARDT AVE S	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	CROWN CLEANERS SITE (FORMER)	CLEANUP PROGRAM SITE	OPEN - SITE ASSESSMENT	11900 S ST UNIT 114	CERRITOS		LOS ANGELES
[REPORT]	[MAP]	EXXON #7-3657 (FORMER)	LUST CLEANUP SITE	OPEN - REMEDIATION	11007 SOUTH ST E	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	INTERNATIONAL COATINGS	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	13929 E 166TH STREET	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	PRUDENTIAL OVERALL SUPPLY	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	17641 FABRICA WY E	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	SHELL STATION #135148	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	16821 NORWALK BLVD.	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	SHELL STATION (FORMER)	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	12560 ARTESIA BLVD	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	TARGET STORES	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	20200 BLLOMFIELD AVE.	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	TEXACO	LUST CLEANUP SITE	OPEN - REMEDIATION	11004 SOUTH ST	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	VOLVO OF CERRITOS	LUST CLEANUP SITE	OPEN - INACTIVE	18303 STUDEBAKER RD	CERRITOS	90703	LOS ANGELES
[REPORT]	[MAP]	WORLD OIL #61 (FORMER)	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	10970 SOUTH ST	CERRITOS	90703	LOS ANGELES

0.1679688 seconds

STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER

PROJECT SEARCH RESULTS

SEARCH CRITERIA: LAKEWOOD, Open,Open - Assessment & Interim Remedial Action,Open - Eligible for Closure,Open - Inactive,Open - Referred,Open - Remediation,Open - Reopen Case,Open - Site Assessment,Open - Verification Monitoring, LUFT, SLIC, LANDFILL, DOD, DODPRIV, DODUST, WDR

23 RECORDS FOUND — EXPORT TO EXCEL — PAGE 1 OF 1

		SITE / FACILITY NAME	SITE / FACILITY TYPE	CLEANUP STATUS	ADDRESS (OR PARTIAL ADDRESS)	CITY	ZIP	COUNTY
[REPORT]	[MAP]	ALLEN TIRE COMPANY	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	5855 CARSON ST E	LAKEWOOD	90713	LOS ANGELES
[REPORT]	[MAP]	ARCO #1749	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	4265 WOODRUFF AVE.	LAKEWOOD	90713	LOS ANGELES
[REPORT]	[MAP]	ARCO #5217	LUST CLEANUP SITE	OPEN - REMEDIATION	20940 NORWALK BLVD	LAKEWOOD	90715	LOS ANGELES
[REPORT]	[MAP]	CHEVRON #9-8392	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	20314 NORWALK BLVD	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	COLET PROPERTY	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	6170 BELLFLOWER BLVD	LAKEWOOD	90713	LOS ANGELES
[REPORT]	[MAP]	DEUTSCH FASTENER FACILITY	CLEANUP PROGRAM SITE	OPEN - VERIFICATION MONITORING	3969 PARAMOUNT BLVD	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	EXXONMOBIL #18-FVO	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	11160 DEL AMO BLVD.	LAKEWOOD	90715	LOS ANGELES
[REPORT]	[MAP]	GTE - BIXBY PLANT YARD	CLEANUP PROGRAM SITE	OPEN - SITE ASSESSMENT	3770 INDUSTRY AVENUE	LAKEWOOD		LOS ANGELES
[REPORT]	[MAP]	LA CO SHERIFF LAKEWOOD STATION	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	5130 N CLARK AVE	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	LAKEWOOD KOHL'S	CLEANUP PROGRAM SITE	OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION	2650 E. CARSON STREET	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	LONG BEACH LINCOLN MERCURY MAZDA	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	3500 CHERRY AVE	LAKEWOOD	90807	LOS ANGELES
[REPORT]	[MAP]	MOBIL #18-MNK	LUST CLEANUP SITE	OPEN - REMEDIATION	4311 SOUTH ST E	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	MOBIL #18-MPL (FORMER #11-MPL)	LUST CLEANUP SITE	OPEN - REMEDIATION	2626 DEL AMO BLVD	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	ONE HOUR MARTINIZING FACILITY	CLEANUP PROGRAM SITE	OPEN - SITE ASSESSMENT	4009 HARDWICK ST	LAKEWOOD		LOS ANGELES
[REPORT]	[MAP]	PARAMOUNT - LAKEWOOD TANK FARM SITE	CLEANUP PROGRAM SITE	OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION	2918 EAST 56TH WAY	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	ROCKET #2 (FORMER)	LUST CLEANUP SITE	OPEN - REMEDIATION	3500 SOUTH ST	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	ROCKWELL	CLEANUP PROGRAM SITE	OPEN - SITE ASSESSMENT	2770 E. CARSON ST.	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	SHELL #204-4115-0405	LUST CLEANUP SITE	OPEN - REMEDIATION	4905 BELLFLOWER BLVD	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	SHELL SERVICE STATION	LUST CLEANUP SITE	OPEN - REMEDIATION	6819 CARSON ST. E.	LAKEWOOD	90713	LOS ANGELES
[REPORT]	[MAP]	SHELL SERVICE STATION	LUST CLEANUP SITE	OPEN - REMEDIATION	21003 BLOOMFIELD AVE.	LAKEWOOD	90714	LOS ANGELES
[REPORT]	[MAP]	SHELL STATION (FORMER)	LUST CLEANUP SITE	OPEN - REMEDIATION	5910 DEL AMO BLVD. E.	LAKEWOOD	90713	LOS ANGELES
[REPORT]	[MAP]	SMITH'S FOOD & DRUGS/MOSKOWITZ	LUST CLEANUP SITE	OPEN - REMEDIATION	3440 SOUTH ST E	LAKEWOOD	90712	LOS ANGELES
[REPORT]	[MAP]	TOSCO - 76 STATION #4330	LUST CLEANUP SITE	OPEN - REMEDIATION	4870 BELLFLOWER BLVD	LAKEWOOD	90713	LOS ANGELES

0.1640625 seconds

STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER

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PROJECT SEARCH RESULTS

SEARCH CRITERIA: NORWALK, Open,Open - Assessment & Interim Remedial Action,Open - Eligible for Closure,Open - Inactive,Open - Referred,Open - Remediation,Open - Reopen Case,Open - Site Assessment,Open - Verification Monitoring, LUFT, SLIC, LANDFILL, DOD, DODPRIV, DODUST, WDR

31 RECORDS FOUND — EXPORT TO EXCEL — PAGE 1 OF 1

		SITE / FACILITY NAME	SITE / FACILITY TYPE	CLEANUP STATUS	ADDRESS (OR PARTIAL ADDRESS)	CITY	ZIP	COUNTY
[REPORT]	[MAP]	A. J. PADELFORD AND SONS, INC.	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	11821 161ST ST	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	ARCO #1690	LUST CLEANUP SITE	OPEN - REMEDIATION	12209 ROSECRANS AVE E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	CERRITOS COMMUNITY COLLEGE	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	11110 ALONDRA BLVD E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	COAST PLAZA DOCTORS HOSPITAL	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	13100 STUDEBAKER ROAD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	CONOCOPHILLIPS #251021	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	12042 E FIRESTONE BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	CONOCOPHILLIPS #256350	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	10951 E IMPERIAL HWY	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	DOD - NORWALK DFSP-KINDER MORGAN	CLEANUP PROGRAM SITE	OPEN - REMEDIATION	15306 NORWALK BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	EUROPA FOREIGN AUTO REPAIR	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	11737 E FIRESTONE BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	EXXONMOBIL #18-F2Q	LUST CLEANUP SITE	OPEN - REMEDIATION	12616 IMPERIAL HWY.	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	FIVE POINTS U-SERVE, INC.	LUST CLEANUP SITE	OPEN - REMEDIATION	14145 SAN ANTONIO DR	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	GPM PROPERTIES	CLEANUP PROGRAM SITE	OPEN - INACTIVE	NW OF SAN ANTONIO DR/FOSTER RD	NORWALK		LOS ANGELES
[REPORT]	[MAP]	JOHN VAYNA	LUST CLEANUP SITE	OPEN - REMEDIATION	13363 EXCELSIOR DR E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	KERBER BROTHERS	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	14006 GRACEBEE AVE	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	LA CO SHERIFF NORWALK STATION	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	12335 E CIVIC CENTER DR	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	MOBIL #18-FTA	LUST CLEANUP SITE	OPEN - REMEDIATION	12800 ROSECRANS AVE. E.	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	MOBIL 18-GG4	LUST CLEANUP SITE	OPEN - REMEDIATION	11009 ROSECRANS AVE E.	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	NAZ ARCO STATION	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	15604 PIONEER BLVD S	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	NORWALK, FUEL TERMINAL DFSP - DOD - NORWALK DFSP	MILITARY CLEANUP SITE	OPEN - REMEDIATION	15306 NORWALK BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	P & M SERVICE STATION #918	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	11520 ALONDRA BLVD E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	SHELL SERVICE STATION (FORMER)	LUST CLEANUP SITE	OPEN - REMEDIATION	10644 ALONDRA BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	SHELL WIC #204-5472-1703	LUST CLEANUP SITE	OPEN - REMEDIATION	11821 ROSECRANS AVE E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	SUPPOSE-U-DRIVE TRUCK LEASE	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	13456 E ROSECRANS AVE	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	TEXACO SS #106-0180	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	10916 E ROSECRANS AVE	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	THRIFTY #057	LUST CLEANUP SITE	OPEN - REMEDIATION	12158 ALONDRA BLVD	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	TOSCO - 76 STATION #6093	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	14960 CARMENITA RD S	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	TOSCO/UNOCAL # 30996	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	10641 FIRESTONE BLVD. E.	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	UNITED OIL # 46	LUST CLEANUP SITE	OPEN - ELIGIBLE FOR CLOSURE	16516 PIONEER BLVD, S	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	UNITED OIL #17	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	11353 IMPERIAL HWY. E.	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	UNITED OIL #21	LUST CLEANUP SITE	OPEN - SITE ASSESSMENT	12030 ROSECRANS AVE E	NORWALK	90650	LOS ANGELES
[REPORT]	[MAP]	UNOCAL/GPM TANK FARM SITE (FORMER)	CLEANUP PROGRAM SITE	OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION	13537 SAN ANTONIO DR	NORWALK		LOS ANGELES
[REPORT]	[MAP]	YOUNG ESTATE PROPERTY	LUST CLEANUP SITE	OPEN - REMEDIATION	13531 EXCELSIOR DR	NORWALK	90650	LOS ANGELES

Back to Top Contact Us

0.1328125 seconds

LINK TO THIS MAP

GEOTRACKER

LAYERS

- ☒ SIGNIFIES A CLOSED SITE
- ☑ Leaking Underground Tank (LUST) Cleanup Sites
- ☑ Other Cleanup Sites
- ☑ Land Disposal Sites
- ☑ Military Sites
- ☑ WDR Sites
- ☐ Permitted Underground Storage Tank (UST) Facilities
- ☐ Monitoring Wells*

* ZOOM IN TO SEE MWS

- ☐ DTSC Cleanup Sites
- ☐ DTSC Haz Waste Permit

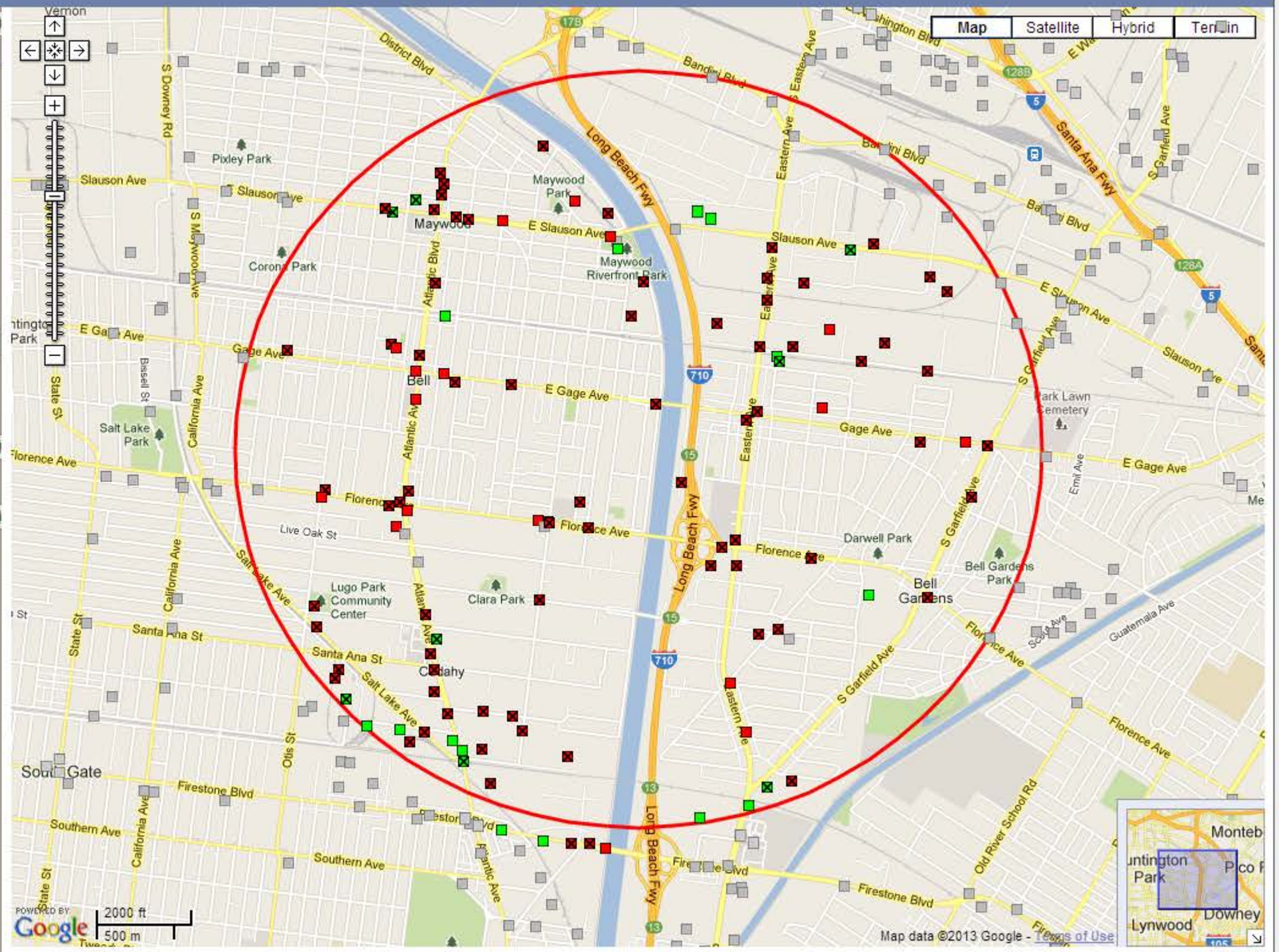
MAP SIZE

1024x768

OPTIONS

☑ Site List - EXPORT TO EXCEL

128 Sites



☑ SHOW SITES WITHIN 8000 FEET OF THE FOLLOWING ADDRESS: southall lane and chanslor ave, cudahy Go

SITE LIST

LINK TO THIS MAP

GEOTRACKER

LAYERS

- ☒ SIGNIFIES A CLOSED SITE
- ☑ Leaking Underground Tank (LUST) Cleanup Sites
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* ZOOM IN TO SEE MWS

- ☐ DTSC Cleanup Sites
- ☐ DTSC Haz Waste Permit

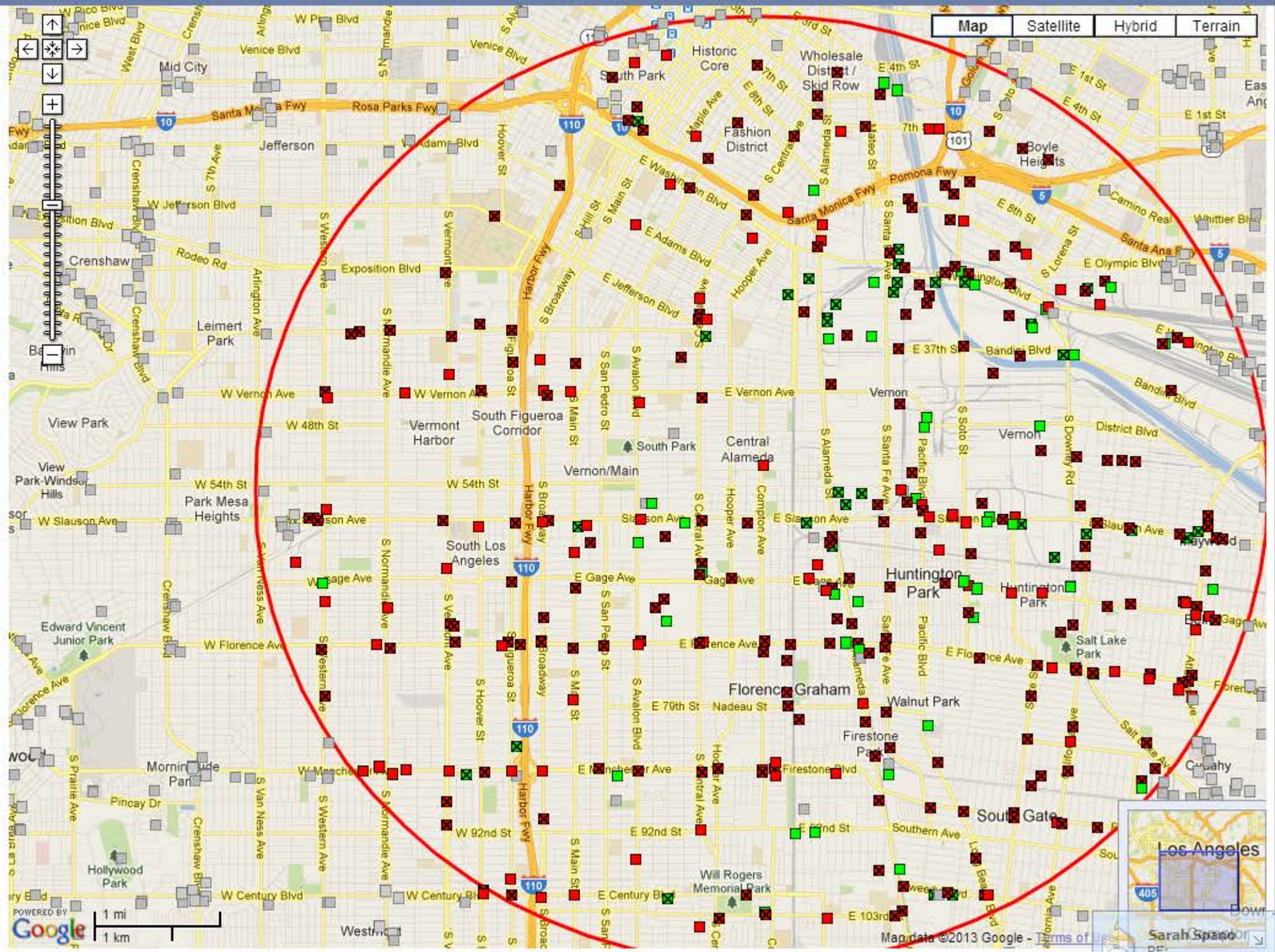
MAP SIZE

1024x768

OPTIONS

☑ Site List - EXPORT TO EXCEL

477 Sites



☑ SHOW SITES WITHIN 20000 FEET OF THE FOLLOWING ADDRESS: compton ave and e slauson ave, los angeles ca Go

SITE LIST

Sarah Spano
RE:
Hey so where is this pumper appendix data? And that report you were talking about yesterday? WRD's report I

12:59 PM
1/11/2013

LINK TO THIS MAP

GEOTRACKER

LAYERS

SIGNIFIES A CLOSED SITE

- [x] Leaking Underground Tank (LUST) Cleanup Sites
- [x] Other Cleanup Sites
- [x] Land Disposal Sites
- [x] Military Sites
- [x] WDR Sites
- [ ] Permitted Underground Storage Tank (UST) Facilities
- [x] Monitoring Wells*

* ZOOM IN TO SEE MWS

- [ ] DTSC Cleanup Sites
- [ ] DTSC Haz Waste Permit

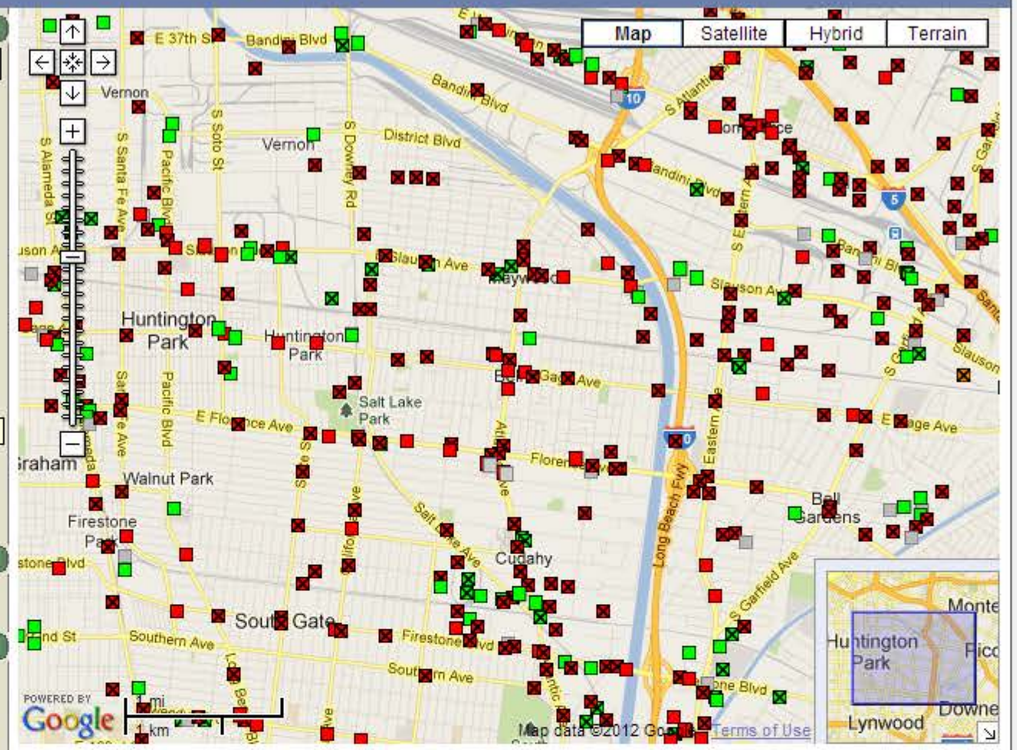
MAP SIZE

640x480

OPTIONS

- [x] Site List - EXPORT TO EXCEL

488 Sites



- [ ] SHOW SITES WITHIN 1000 FEET OF THE FOLLOWING ADDRESS: Bell, Ca Go

SITE LIST

SITE NAME	GLOBAL ID	CLEANUP STATUS	ADDRESS	CITY
1ST INTERNATIONAL FINANCE INC	T0603705472	COMPLETED - CASE CLOSED	4557 SLAUSON AVE E	MAYWOOD
3M - SALES & DISTRIBUTION CTR	SLT43579577	COMPLETED - CASE CLOSED	6023 S. GARFIELD AVE	COMMERCE
3M-SALES & DIST. CTR.	T0603705306	OPEN - VERIFICATION MONITORING	6023 GARFIELD AVE S	COMMERCE
4600 SUPER SERVICE	T0603702996	COMPLETED - CASE CLOSED	4600 WASHINGTON BLVD E	COMMERCE
7-ELEVEN STORE #33459	T0603717850	COMPLETED - CASE CLOSED	5536 WASHINGTON BLVD. E.	COMMERCE
76 STATIONE #1841 (FORMER)	T0603756292	COMPLETED - CASE CLOSED	3225 FIRESTONE BLVD	SOUTH GATE
A & N SERVICE CORPORATION	T0603746550	OPEN - SITE ASSESSMENT	7831 S ALAMEDA ST	LOS ANGELES
AAA RADIATOR OLD#022190-05	T0603702949	COMPLETED - CASE CLOSED	5844 CLARA ST E	BELL GARDENS
ABC BINS	T0603765586	COMPLETED - CASE CLOSED	8801 ALAMEDA ST.	LOS ANGELES
ABC SERVICE STATION/L. HARMON	T0603704012	COMPLETED - CASE CLOSED	4200 SOUTHERN AVE	SOUTH GATE
ACE CITY DELIVERY	T0603702700	COMPLETED - CASE CLOSED	6453 BANDINI BLVD	COMMERCE
ADEL WIGGINS GROUP	T0603702676	COMPLETED - CASE CLOSED	5000 TRIGGS ST E	COMMERCE
ADVANCE PROCESS SUPPLY COMPANY	SLT4L3401806	OPEN - SITE ASSESSMENT	6480 CORVETTE ST.	COMMERCE

MAP AN ADDRESS: Go!

LINK TO THIS MAP

GEOTRACKER

LAYERS

SIGNIFIES A CLOSED SITE

- [x] Leaking Underground Tank (LUST) Cleanup Sites
- [x] Other Cleanup Sites
- [x] Land Disposal Sites
- [x] Military Sites
- [x] WDR Sites
- [ ] Permitted Underground Storage Tank (UST) Facilities
- [ ] Monitoring Wells*

* ZOOM IN TO SEE MWS

- [ ] DTSC Cleanup Sites
- [ ] DTSC Haz Waste Permit

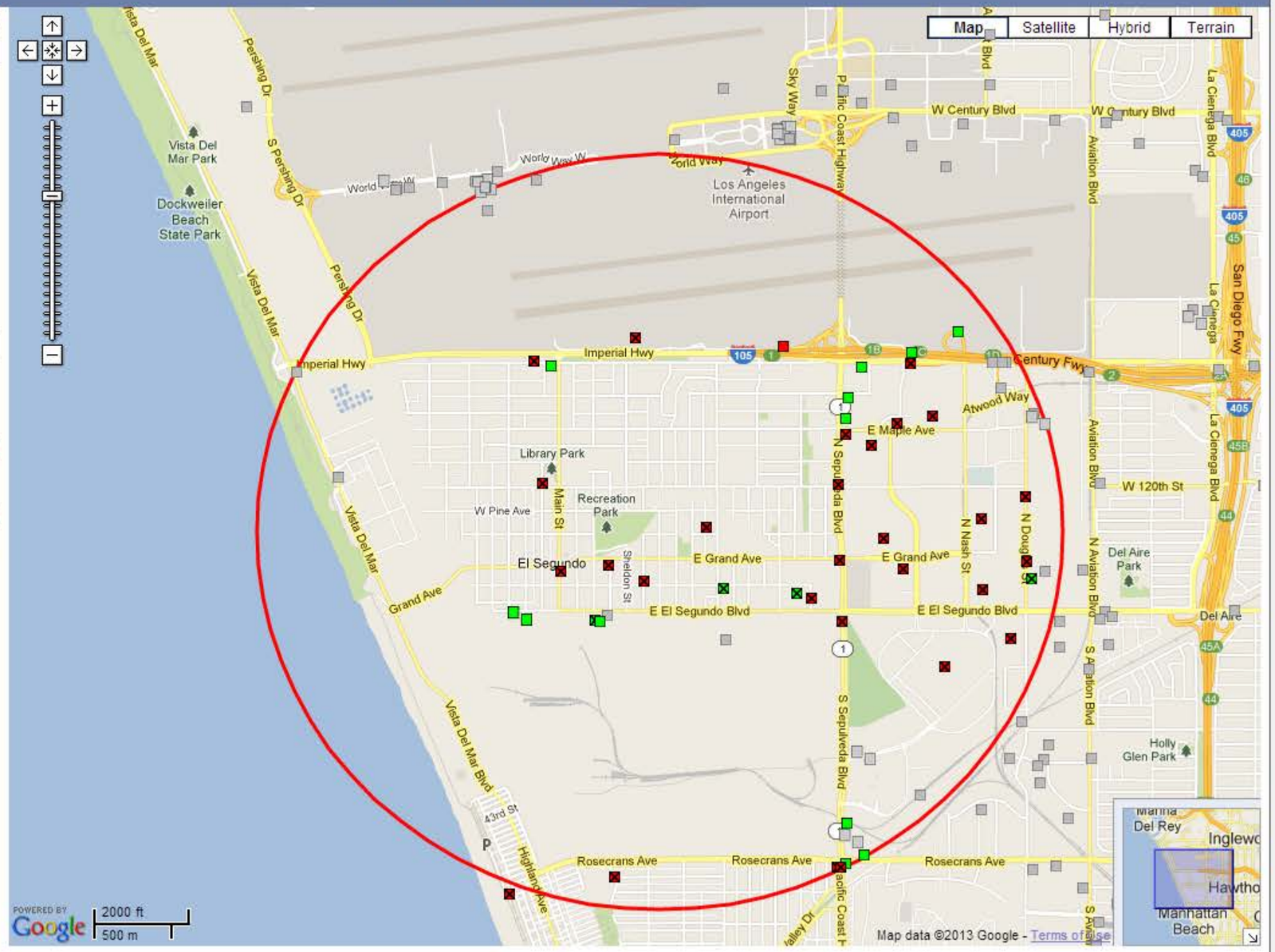
MAP SIZE

1024x768

OPTIONS

- [x] Site List - EXPORT TO EXCEL

54 Sites



SHOW SITES WITHIN 8000 FEET OF THE FOLLOWING ADDRESS: grand ave and sierra st, el segundo, ca Go

SITE LIST

12:39 PM
1/11/2013

LINK TO THIS MAP

GEOTRACKER

LAYERS

- ☒ SIGNIFIES A CLOSED SITE
- ☑ Leaking Underground Tank (LUST) Cleanup Sites
- ☑ Other Cleanup Sites
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- ☑ WDR Sites
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* ZOOM IN TO SEE MWS

- ☐ DTSC Cleanup Sites
- ☐ DTSC Haz Waste Permit

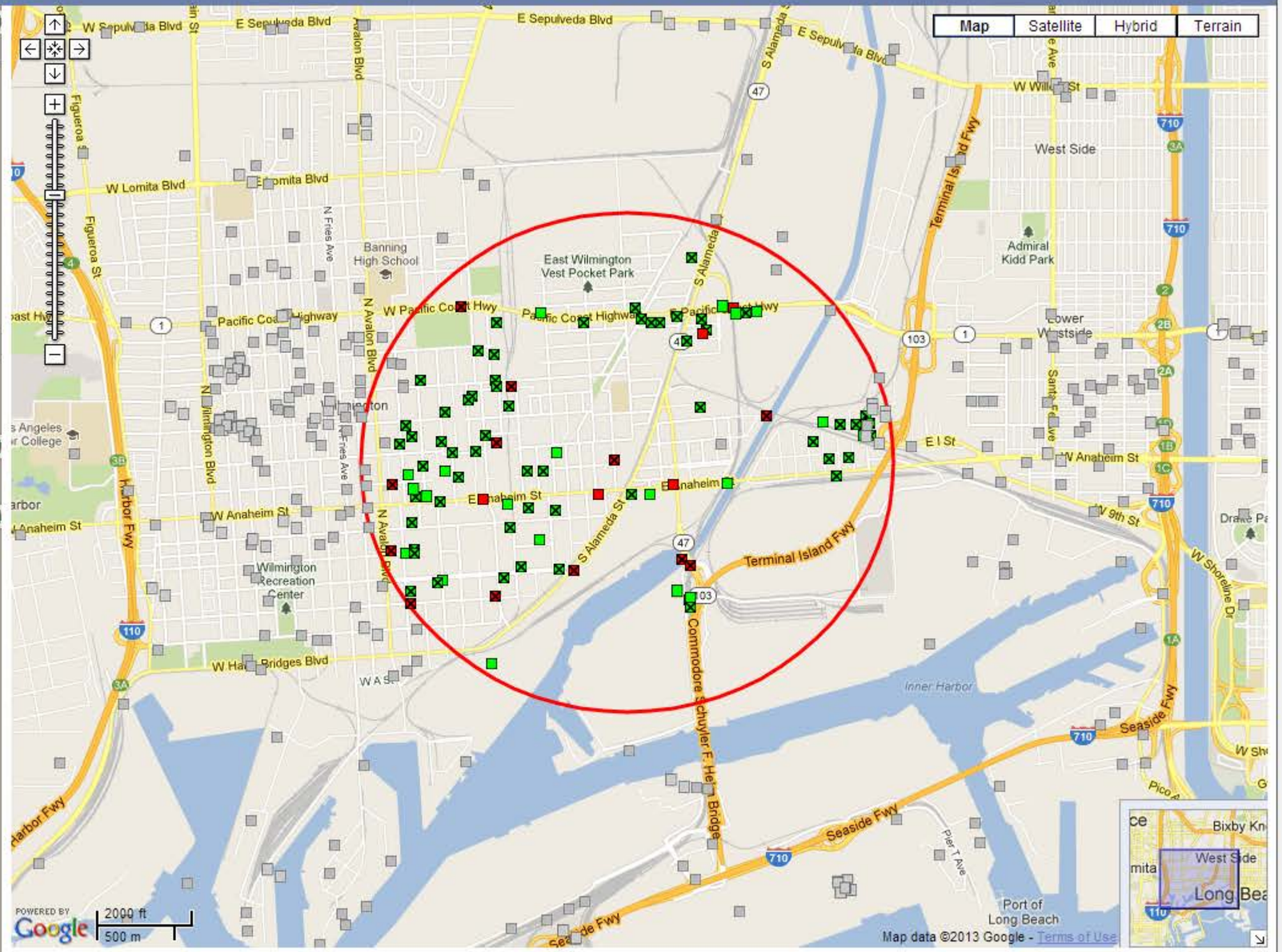
MAP SIZE

1024x768

OPTIONS

☑ Site List - EXPORT TO EXCEL

134 Sites



☑ SHOW SITES WITHIN 5280 FEET OF THE FOLLOWING ADDRESS: s alameda st and e anaheim st, los angeles, ca Go

SITE LIST

LINK TO THIS MAP

GEOTRACKER

LAYERS

- ☒ SIGNIFIES A CLOSED SITE
- ☑ Leaking Underground Tank (LUST) Cleanup Sites
- ☑ Other Cleanup Sites
- ☑ Land Disposal Sites
- ☑ Military Sites
- ☑ WDR Sites
- ☐ Permitted Underground Storage Tank (UST) Facilities
- ☐ Monitoring Wells*
  * ZOOM IN TO SEE MWS
- ☐ DTSC Cleanup Sites
- ☐ DTSC Haz Waste Permit

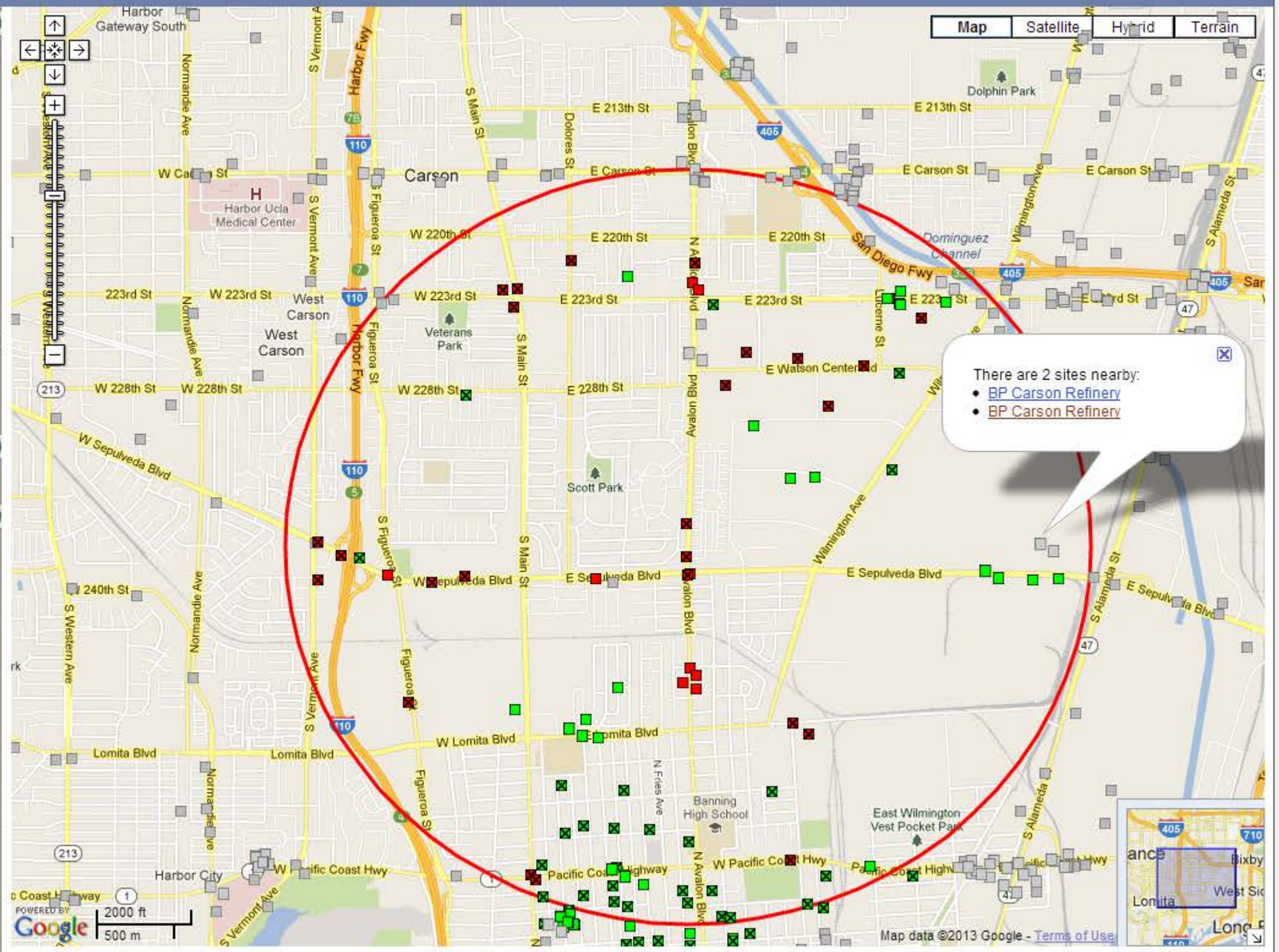
MAP SIZE

1024x768

OPTIONS

☑ Site List - EXPORT TO EXCEL

129 Sites



SHOW SITES WITHIN 8000 FEET OF THE FOLLOWING ADDRESS: e sepulveda blvd and avalon blvd, carson, ca Go

LINK TO THIS MAP

GEOTRACKER

LAYERS

SIGNIFIES A CLOSED SITE

- [x] Leaking Underground Tank (LUST) Cleanup Sites
- [x] Other Cleanup Sites
- [x] Land Disposal Sites
- [x] Military Sites
- [x] WDR Sites
- [ ] Permitted Underground Storage Tank (UST) Facilities
- [ ] Monitoring Wells*

* ZOOM IN TO SEE MWS

- [ ] DTSC Cleanup Sites
- [ ] DTSC Haz Waste Permit

MAP SIZE

1280x1024

OPTIONS

- [x] Site List - EXPORT TO EXCEL