



# Groundwater Management Plan

## Malibu Valley Groundwater Basin

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**DRAFT**

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## 1 Introduction and Background

On-site wastewater disposal systems (OWDS) have allegedly contributed to the non-point source pollution of Malibu Creek and Lagoon, resulting in the Los Angeles Regional Water Quality Control Board (LARWQCB) adopting Resolution R4-2009-007 in November 2009. This resolution approved an amendment to Chapter IV of the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) prohibiting OWDS and OWDS discharges in the Malibu Civic Center Area. In 2010, the State Water Resources Control Board (SWRCB) adopted Resolution 2010-0045 which approved the amendment and established a phased schedule for compliance. The resolutions prohibit all new OWDSs and discharges from existing systems based on a phased schedule to cease discharges from Phase 1 systems by November 5, 2015 (presently under consideration for revision to November 5, 2017) and Phase 2 systems by November 5, 2019. A third phase may be implemented, if necessary, following operation of Phase 1 and 2, and upon completion of a water quality sampling program to determine if implementation of Phases 1 and 2 have resulted in a meaningful decrease in Bacteria and Nitrogen in Malibu Lagoon.

The Phase 1 and 2 OWDS systems were defined in the resolutions and have become known as “The Prohibition Area.” An August 2011 Memorandum of Understanding (MOU), signed by both the City of Malibu (City) and the LARWQCB, memorializes the requirements of the resolutions and defines the Prohibition Area. Following execution of the MOU, the City embarked on a program to design and construct a centralized wastewater collection, treatment and disposal system for the Civic Center area of the City and a small portion of unincorporated Los Angeles County. This program includes the construction of the Civic Center Wastewater Treatment Facility (CCWTF), where wastewater from the Prohibition Area will be collected and treated to a standard set forth in Title 22 of the California Code of Regulations (CCR) for unrestricted reuse of disinfected tertiary recycled water. The resultant recycled water will be used for landscape irrigation within the Civic Center and surrounding areas to the maximum extent possible; however, anticipated irrigation demands are not expected to utilize all recycled water generated by the CCWTF. Recycled water not used for landscape irrigation will be injected into the underlying Malibu Valley Groundwater Basin for disposal or percolated into the aquifer in Winter Canyon.

### 1.1 Purpose of the GWMP

The purpose of the Malibu Valley Groundwater Basin Groundwater Management Plan (GWMP) is to provide a framework to manage, protect and enhance the groundwater basin in order to sustain the beneficial uses of local groundwater resources. In developing this plan, the City and basin stakeholders hope to achieve the following objectives:

- Develop a better technical understanding of the groundwater basin’s hydrogeology, the implications of overlying land uses on the underlying groundwater quality, and groundwater-surface water interactions.
- Develop a forum and collaborative process for defining issues and identifying and implementing actions to manage the groundwater resource (both quality and supply).
- Define implementation measures (if necessary) to ensure the long-term sustainability of the groundwater resource.
- Develop a groundwater monitoring program to coordinate ongoing and future data collection efforts and to facilitate analysis of water quality trends into the future.
- Provide a framework for adaptively managing the groundwater basin and implementing future management activities.

The CCWTF Project will have significant impacts on the use and groundwater quality of the Malibu Valley Groundwater Basin through the introduction of recycled water injection into the underlying Civic Center Gravels and the removal of OWDS discharges. In implementing the CCWTF Project, the City is charged with ensuring that the beneficial uses of the Malibu Valley Groundwater Basin remain intact and with monitoring for groundwater elevation and quality changes resulting from the implementation and operation of the project over a 20+ year period. At present, the groundwater basin is designated as having a potential future use as a municipal supply. Analyses conducted for the CCWTF Project have shown that, following implementation, the groundwater basin designated use will be protected; however, additional measures must be taken to ensure that potential future use and protection of basin groundwater quality. These management measures are documented in a new groundwater management ordinance under development by the City of Malibu that will establish prohibition and consultation zones around the proposed injection wells in order to protect human health and to ensure the designed performance of the injection system. Because the ordinance will be incorporated into City's municipal code and as the City is the lead for the Local Coastal Program (LCP), which requires obtaining a Coastal Development Permit and City approval for new well construction within the LCP boundaries, the City becomes, by default, the implementing agency for groundwater basin management.

This GWMP is being prepared for the Malibu Valley Groundwater Basin, located in Los Angeles County, California, and assumes that the City of Malibu is the groundwater management organization charged with implementing this plan.

## 1.2 Geographic Setting

The Malibu Valley Groundwater Basin (DWR groundwater basin no. 4-22) is a small alluvial basin, approximately 613 acres in size, located along the Los Angeles County coastline (Figure 1-1). The basin is bounded by the Pacific Ocean on the south, and by the Santa Monica Mountains, composed of non-water-bearing Tertiary age rocks, on all remaining sides. The valley is typified by steep canyons that generally run north to south, and is drained by Malibu Creek to the Pacific Ocean (DWR, 2003).

Development overlying the groundwater basin is predominantly urban in nature (commercial and residential), and includes a significant amount of residential development and undeveloped land. The basin is flanked on both sides by canyons - the Sweetwater Canyon to the east, and the Winter Canyon to the west. The Malibu Coast Fault is mapped across the basin in an east-west direction and is aligned approximately along Civic Center Way (Leighton, 1994); however, this fault is not a groundwater barrier (DWR, 1975). In general, there are four hydrostratigraphic units within the Malibu Valley Groundwater Basin (from shallowest to deepest): shallow alluvium, a low permeability zone that covers most of the groundwater basin, Civic Center Gravels, and bedrock. More detailed information regarding the groundwater basin is included in Chapter 3 of this Plan.

Figure 1-1: Malibu Valley Groundwater Basin



### 1.3 Local Agencies

The Malibu Valley Groundwater Basin underlies most of the City of Malibu, although the basin does underlie a small portion of unincorporated Los Angeles County in northern end of the groundwater basin. Local agencies overlying the groundwater basin or having jurisdictional authority in the groundwater basin include the following:

- City of Malibu
- LARWQCB
- National Park Service
- Resource Conservation District of the Santa Monica Mountains
- California State Coastal Conservancy
- Las Virgenes Municipal Water District
- Malibu Coastal Land Conservancy

## 1.4 Salt and Nutrient Management Plan

This GWMP has been prepared conjunctively with a Salt and Nutrient Management Plan (SNMP) for the groundwater basin. A SNMP is a management document required as part of the State's Recycled Water Policy adopted by SWRCB in May of 2009. The SNMP is intended to characterize various sources of salts and nutrient loadings to the groundwater basin, help understand the effects of those loading on groundwater quality within the basin, and to provide a framework for managing land use- and groundwater-related activities within the basin to minimize these impacts. The SNMP will be used along with this GWMP to proactively manage the groundwater basin in coordination with the Basin Plan. Specifically, the SNMP is focused on managing quality impacts on the groundwater, while the GWMP is intended, primarily, to manage the quantity impacts. Together, both the SNMP and GWMP manage all aspects of groundwater basin management in a collaborative manner. As such, these two documents have been prepared conjunctively, with joint basin management goals and objectives, a coordinated conceptual model, and complementing management strategies and monitoring plans.

As required by the State's Recycled Water Policy, required elements of a SNMP are as follows:

- A basin/subbasin-wide monitoring plan that includes an appropriate network of monitoring locations.
- Provision for annual monitoring of constituents of emerging concern (CECs) consistent with recommendations by California Department of Public Health (CDPH) and SWRCB.
- Water recycling and stormwater recharge/use goals and objectives.
- Salt and nutrient source identification, basin/subbasin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.
- Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.
- An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

The degree of specificity of the SNMP is dependent on the complexity of the groundwater basin, source water quality, stormwater recharge, and other factors. The SNMP for the Malibu Valley Groundwater Basin is a document separate from this GWMP; however, it has been tailored toward local water conditions, and has been designed to be implemented jointly with this GWMP.

## 2 Need for Groundwater Management Planning

### 2.1 Legislative Requirements

Groundwater is a resource shared by numerous users; it does not recognize or adhere to jurisdictional boundaries and cannot be tagged for use by certain users. Groundwater rights in California have evolved through case law since the late 1800s. Currently, four basic methods are available for managing groundwater resources in the State:

- Local agency management under authority granted by the California Water Code;
- Local agency management granted under other applicable state statutes (such as through a GWMP);
- Local government groundwater ordinances or joint powers agreements (JPA);
- Court adjudication

In September of 2014, the Governor signed the Sustainable Groundwater Management Act (SGMA) of 2014, requiring the formation of Groundwater Sustainability Agencies (GSAs) and the development of Groundwater Sustainability Plans (GSPs) for all groundwater basins identified in the Bulletin 118 designated by the California Department of Water Resources (DWR) as having a high or medium priority. Implementing regulations and guidelines associated with the SGMA have not yet been prepared and released but will affect groundwater management in the designated basins. The Malibu Valley Groundwater Basin has been designated as a Very Low Priority groundwater basin, as such, the SGMA does not, at this time, apply to groundwater management for this basin.

For Very Low and Low Priority groundwater basins, no California law requires that any of the aforementioned groundwater management forms be applied within a basin. As such, management has historically been instituted after local agencies or landowners recognize specific issues in groundwater conditions. The level of groundwater management in any basin or subbasin, to date, is often dependent on water availability and demand, as well as groundwater quality and the regulatory status of a groundwater basin (i.e., has it been adjudicated).

In an effort to standardize groundwater management, the California Legislature passed Assembly Bill (AB) 255 (Stats. 1991, Ch. 903) in 1991. This legislation authorized local agencies overlying basins subject to critical overdraft conditions, as defined in DWR's Bulletin 118 (DWR, 2003), to establish programs for groundwater management within their service areas. Water Code §10750 *et seq.* provided these agencies with the powers of a water replenishment district to raise revenue for facilities to manage the basin for the purposes of extraction, recharge, conveyance, and water quality management. Seven local agencies adopted plans under this authority. The Malibu Valley Groundwater Basin has been critically overdrafted in the past. Seawater intrusion occurred in 1950 and again in 1960, when seawater advanced 0.5 miles inland (DWR, 2003). In response to this situation, Los Angeles County Waterworks District 29 (Water District 29) was established as a special district in 1959 by a public election that authorized the formation of the district (reference <http://dpw.lacounty.gov/wwd/web/About/Overview.aspx>). Once established, Water District 29 constructed water distribution systems in Malibu between 1962 and 1970 and started distribution of imported potable water into the basin. Most private potable supply wells were subsequently abandoned.

The provisions of AB 255 were repealed in 1992 with the passage of AB 3030 (Stats. 1992, Ch. 947). This legislation greatly increased the number of local agencies authorized to develop a GWMP and set forth a common management framework for local agencies throughout California. AB 3030, codified in California Water Code § 10750 *et seq.*, provides a systematic procedure for developing a groundwater management plan by local agencies overlying the groundwater basins defined by DWR's Bulletin 118 (DWR, 1975) and updates (DWR, 1980, 2003). Upon adoption of a plan, the authorizing agency(ies) identified in the GWMP could possess the same authority as a water replenishment district to "fix and

collect fees and assessments for groundwater management” (Water Code, §10754). However, the authority to fix and collect these fees and assessments is contingent on receiving a majority of votes in favor of the proposal in a local election (Water Code, §10754.3)

In 2002, the California Legislature passed Senate Bill (SB) 1938 (Stats. 2002, ch. 603) providing local agencies with incentives for improved groundwater management. While not providing a new vehicle for groundwater management, SB 1938 modified the Water Code by requiring specific elements be included in a GWMP for an agency to be eligible for certain funding administered by DWR for groundwater projects. Through AB 3030 and SB 1938, local agencies can now develop GWMPs that guide the sustainable use of the groundwater resource while also providing access to certain State funding sources.

In 2009, the SWRCB adopted the Statewide Recycled Water Policy to streamline permitting and promote use of recycled water. It was intended to promote recycled water use while protecting high quality groundwater basins and to provide statewide regulatory consistency.

In 2014, California implemented a three bill legislation comprised of AB 1739, SB 1168, and SB 1319, collectively known as the Sustainable Groundwater Management Act. As previously mentioned, the new legislation requires the formation of new local GSAs responsible for establishing long term locally-based sustainability management plans and ultimately protecting groundwater quality within their jurisdictions. Each GSP is required to include requisite monitoring and management for the basin over a 50-year planning horizon, with measureable objectives to be achieved every 5 years. However, as previously noted, the Malibu Valley Groundwater Basin has been designated as a Very Low Priority basin by DWR and therefore these legislation requirements do not apply.

## 2.2 Regulatory Requirements

Water quality objectives (WQOs) provide a reference for assessing groundwater quality in the Malibu Valley Groundwater Basin. In general, WQOs reflect primary and secondary Maximum Contaminant Levels (MCLs) or drinking water standards; however, in some cases, basin-specific WQOs have been established in the Basin Plan. For the Malibu Valley Groundwater Basin (designated as a Potential Municipal (MUN) supply in the LARWQCB Basin Plan), basin-specific WQOs have been established as shown in Table 2-1.

**Table 2-1: Basin-Specific Water Quality Objectives**

Constituent	Units	WQOs
TDS	mg/L	2,000
Sulfate	mg/L	500
Chloride	mg/L	500
Boron	mg/L	2

Source: *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, 1994*

For the purposes of managing salt and nutrient loading to the groundwater basin, the SNMP utilized two indicator constituents, TDS and nitrate (as N) to simulated changes in groundwater quality under anticipated future conditions both with and without continued use of OWDS. The general groundwater WQO for nitrate-N of 10 mg/L (the primary MCL) was used for that analysis. In addition to the Basin Plan, the SWRCB has established the *Water Quality Control Plan, Ocean Waters of California* (Ocean Plan, SWRCB, 2012). Similar to the Basin Plan, the Ocean Plan establishes WQOs for the Pacific Ocean and Marine Protected Areas. The Ocean Plan does not contain WQOs for nitrate-N or TDS; however, numeric limits for ammonia are included (600 micrograms per liter [µg/L] for a 6-month median, 2,400 µg/L for a daily maximum, and 6,000 µg/L as an instantaneous maximum).

## 2.3 Groundwater Management Plan Components

Required and voluntary groundwater management plan components are set by California Water Code § 10750 *et seq.*, with additional recommendations provided by DWR Bulletin 118. California Water Code § 10750 *et seq.* requires groundwater management plans to have the following:

- Documentation of public involvement
- Basin Managements Objectives (BMOs), such as groundwater and water quality targets
- Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality
- Plan to involve other agencies located in the groundwater basin
- Adoption of monitoring protocols
- Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with boundaries of agencies subject to the GMP
- For agencies not overlying groundwater basins, GMP prepared using appropriate geologic and hydrogeologic principles.
- Map identifying the recharge in areas for the groundwater basin.

The following are voluntary under California Water Code § 10750 *et seq.*:

- Control of saline water intrusion
- Identification and management of well protection and recharge areas
- Regulation of the migration of contaminated groundwater
- Administration of well abandonment and destruction program
- Control and mitigation of groundwater overdraft
- Replenishment of groundwater
- Monitoring of groundwater levels
- Development and operation of conjunctive use projects
- Identification of well construction policies
- Construction and operation of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects

Finally, DWR Bulletin 118 recommends the following:

- Management with guidance of advisory committee
- Description of area to be managed under GMP
- Links between BMOs and goals and actions of GMP
- Description of GMP monitoring programs
- Description of integrated water management planning efforts
- Report of implementation of GMP
- Periodic evaluation of GMP

### 3 Water Resources Settings

The Malibu Valley Groundwater Basin (DWR groundwater basin no. 4-22) is a small alluvial basin, approximately 613 acres in size, located along the Los Angeles County coastline. The basin is bounded by the Pacific Ocean on the south, and by the Santa Monica Mountains, composed of non-water-bearing Tertiary age rocks, and uplifted bedrock on all remaining sides. The valley is typified by steep canyons that generally run north to south, and is drained by Malibu Creek to the Pacific Ocean (DWR, 2003).

The Malibu Valley Groundwater Basin is located in a Mediterranean climate, characterized by cool wet winters and warm dry summers, with the majority of precipitation occurring between November and April. This area lies in the semi-permanent high-pressure zone of the eastern pacific; as a result, the climate is mild, tempered by cool sea breezes, and occasionally interrupted by infrequent periods of extremely hot weather, winter storms or Santa Ana winds. Average annual rainfall is about 12 inches (Jones and Stokes, 2009).

#### 3.1 Land and Water Use

Development overlying the groundwater basin is predominantly urban in nature, and includes a significant amount of residential development and undeveloped land. The basin is flanked on both sides by canyons - the Sweetwater Canyon to the east, and the Winter Canyon to the west. The Malibu Coast Fault is mapped across the basin in an east-west direction and is aligned approximately along Civic Center Way (Leighton, 1994); however, this fault is not a groundwater barrier (DWR, 1975) and is not classified as an active fault under the Aquist-Priolo Act. In general, there are four hydrostratigraphic units within the Malibu Valley Groundwater Basin (from shallowest to deepest): shallow alluvium, a low permeability zone that covers most of the groundwater basin, Civic Center Gravels, and bedrock. Bedrock is at or near land surface in the upland areas, and beneath the unconsolidated sediments that are present in the Civic Center Area along Malibu Creek and Lagoon. Historical groundwater use has been from the shallower alluvium, which has been shown to be in hydraulic connection with the adjacent Malibu Creek and the ocean. At present, all potable water demands are met by imported water delivered by Los Angeles County Waterworks District 29, and the groundwater basin, while designated as Municipal under the LARWQCB's Water Quality Control Plan: Los Angeles Region (Basin Plan), is not presently used for local water supplies.

#### 3.2 Groundwater Resources

##### 3.2.1 Hydrogeology

Water-bearing formations in the Malibu Valley Groundwater Basin are composed of Holocene alluvium, consisting of clays, silts, sands and gravels, overlying impermeable bedrock. Alluvial sediments deposited in the Civic Center Area by Malibu Creek and other small drainages are estimated to range in thickness from a feather edge near the valley walls to around 170 feet in the central part of the main body of alluvium, and can be generally subdivided into three categories or strata (layers): (1) a shallow zone of permeable alluvial sediments, (2) underlain by a sequence of fine-grained estuarine deposits, with (3) an underlying coarse-grained stratum commonly referred to as the "Civic Center Gravels" (GeoSoils, 1989; Leighton, 1994; ECI, 2000; Ambrose and Orme, 2000; Fugro West, Inc., 2005; Geosyntec Consultants, 2007). Depth to the water table is typically on the order of 5 to 13 feet below ground surface and is deeper in upland canyon areas (such as Winter Canyon).

##### Shallow Alluvium

The shallow alluvial zone is capped by modern floodplain deposits and, in some locations, with artificial fill. This zone generally consists of silts and sands, and is underlain by a very fine grained, low-permeability zone containing clay and silt layers, especially in the central part of the alluvium. The

shallow alluvium deposits tend to be coarser grained near the valley walls, along the northern edge of the alluvium, and to the east along the present day course of Malibu Creek and Lagoon. This zone appears to be in connection with Malibu Creek and Lagoon.

#### Low Permeability Zone

The low-permeability zone underlying the shallow alluvium consists of very fine grained clay and silt deposits that have been interpreted as extending from just north of Civic Center Way, south to Malibu Colony Road, and from the western edge of the groundwater basin (west of Stuart Ranch Road), to the west side of Cross Creek Road. This zone retards the downward movement of groundwater from the shallow alluvium to the underlying Civic Center Gravels, and appears to be deeper and somewhat thicker on the southeastern side of the basin.

#### Civic Center Gravels

The Civic Center Gravels underlie the shallow estuarine deposits and low permeability zone over much of the Civic Center area. These deposits are described (Leighton, 1994) and confirmed with subsequent borings in 2011 and 2013 as consisting of predominantly sands with gravel and cobbles. The top of the Civic Center Gravels is relatively flat, dipping slightly to the south and west. The Civic Center Gravels are interpreted to extend from just north of Civic Center Way, south to Malibu Road on the west side of the basin, and from just north of Civic Center Way to the Pacific Coast Highway near the eastern edge of Legacy Park. The full thickness and horizontal extent of the Civic Center Gravels is not known because of a lack of deep borings at the northern and western ends of the groundwater basin but they are estimated to be on the order of 10 to 140 feet thick.

In the summer of 2013, an electrical resistivity survey was conducted along the Malibu shoreline and immediately offshore of the Civic Center area. This survey used electrical current to identify high and low resistivity materials, indicating either the types of soils through which the current traveled (with clays and silts being less resistive than sands and gravels) and/or the type of water contained in the soils (with saltier water being less resistive than fresher water). The survey identified the Civic Center Gravels as a higher resistivity zone (i.e., consisting of sands and gravels) present below a shallow zone consisting of low resistivity material. This low resistivity material layer is thought to consist of clay-rich unconsolidated material (Cardno Entrix, 2013), similar to materials identified in onshore borings, and correlates with the low permeability zone previously identified. The resistivity of the Civic Center Gravels was higher on the west side of the groundwater basin than on the east, suggesting that the aquifer contains fresher water and is more permeable on the west side of the basin, correlating with one of the identified ancient Malibu Creek channels (McDonald Morrissey Associates, 2014). The resistivity of the Civic Center Gravels zone was lower by about an order of magnitude on the east side, suggesting that the groundwater in this area is brackish or the aquifer contains more silt and clay, or both. Based on the survey results, the fresh to brackish water zone appears to rise towards the sea floor offshore and south of the beach on the western side of the groundwater basin, suggesting that groundwater is discharging through the sea floor offshore and that the Civic Center Gravels continue offshore beneath the sea floor.

#### Bedrock

A large bedrock valley lies beneath the City of Malibu and is overlain by unconsolidated materials containing zones of permeable sand and gravel deposits as previously described. Bedrock mapping shows that the lowest bedrock elevations occur in the western and central part of the basin, to the west of the current location of Malibu Creek and Lagoon. Onshore geophysical surveys conducted in 2009 show the bedrock layer dropping in elevation from -20 feet below the ground surface level at the foot of the hills on the north side of the Civic Center Area, to an elevation of -120 to -140 feet from Legacy Park to Malibu Road (Cardno Entrix, 2013). The shape and characteristics of the bedrock layer are consistent with two ancient water courses carved by Malibu Creek approximately 60,000 and 20,000 years ago, leading to the ocean.

### 3.2.2 Groundwater Balance Components

McDonald Morrissey and Associates (2014) estimated that the total average annual inflow to the Malibu Valley Groundwater Basin is approximately 168,000 cubic feet per day (ft<sup>3</sup>/d) or 1.25 million gallons per day (mgd). Sources of recharge to the system include infiltration from Malibu Creek, infiltration from OWDSs, irrigation return, upland runoff, and infiltration of precipitation.

Groundwater recharge to the Malibu Valley Groundwater Basin occurs by several different processes as follows:

- Surface water and groundwater runoff from upland areas recharges alluvial deposits as it flows from the upland areas to the edges of the alluvial deposits on the valley floor. Surface water infiltration is especially evident in the western part of the alluvium at the artificial wetland near the intersection of Civic Center Way and Stuart Ranch Road, on what is typically referred to as the Smith Parcel.
- Direct recharge of groundwater from subsurface wastewater dispersal (onsite wastewater treatment systems or OWTS) occurs within the shallow alluvium at each dispersal bed. Dispersal systems in upland areas adjacent to the alluvium can also provide indirect recharge to the basin in the form of groundwater runoff.
- Infiltration of precipitation directly into the alluvium can occur where land is not covered with impervious surfaces. Additionally, infiltration of precipitation from upland areas in the form of groundwater recharge at the basin's margins.
- Recharge from infiltration of Malibu Creek into underlying alluvial deposits occurs when surface water flow infiltrates into permeable alluvium in the upper reaches of the creek.
- Excess irrigation required to flush root zones for maintenance of turf and other vegetation results in groundwater recharge. Irrigation in upland areas also can cause groundwater recharge to the alluvium via ground and surface water runoff.

The degree to which each of these various mechanisms of recharge can be quantified is variable. Recharge caused by the infiltration of subsurface wastewater dispersal may be easiest to quantify because recharge rates are directly related to water use and water use data are available for the basin. Recharge from infiltration of Malibu Creek along the upper reaches of alluvial deposits may be estimated from stream gaging data. Recharge from infiltration of precipitation and upland runoff cannot be directly measured and therefore must be estimated.

Groundwater sinks are areas where groundwater discharges out of the alluvial groundwater flow system. Potential groundwater sinks include natural discharge to surface waters and the ocean, evapotranspiration from riparian vegetation, and pumping wells used for irrigation or other water uses in the study area. The magnitude of these sinks were estimated as follows:

- Discharges to the Ocean and Malibu Lagoon were estimated using water table maps to identify what portions of the groundwater basin discharge to the Lagoon versus which discharge to ocean and the approximate flux rate of these discharges (which varies over time).
- Evapotranspiration from groundwater can occur where the root zone of vegetation is at or below the water table. The most likely place for this to occur in the study area is along Malibu Creek and Lagoon where there is riparian vegetation and shallow depths to water. The Las Virgenes Municipal Water District estimated the water demand of riparian vegetation along Malibu Creek

downstream of the Tapia Water Reclamation Facility using a method that takes into account vegetation species type and density along with microclimatic characteristics. Results of this study estimated that riparian vegetation consumes approximately 1.2 cubic feet per second (cfs) of water in the reach below the treatment plant and Cross Creek Road, a distance of about 4 miles, which is approximately 0.3 cfs per mile.

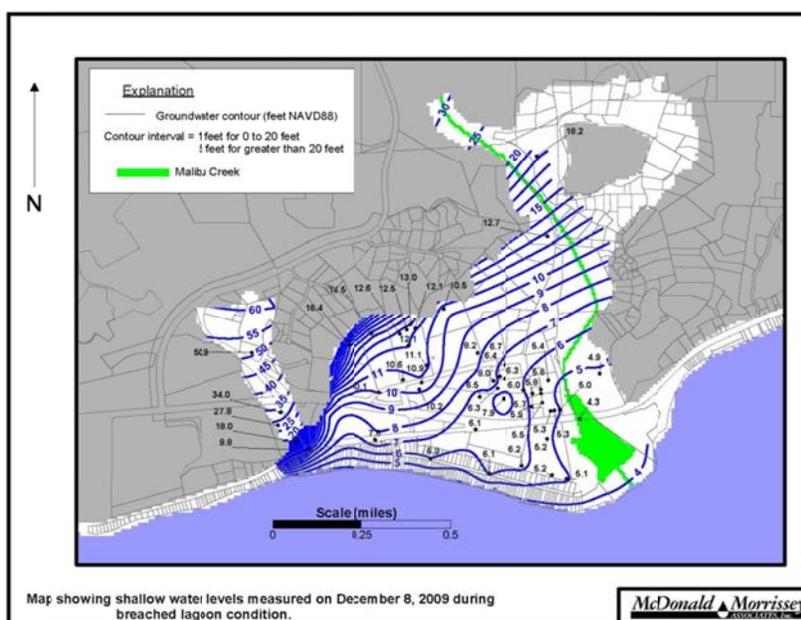
- The County of Los Angeles Department of Health Services – Environmental Health Division regulates water supply wells in Malibu. All water wells require permits issued by the County of Los Angeles Environmental Health Division. At present, there is no documentation of any pumping wells in the study area, however, observations made during field studies indicate that there may be a few private domestic wells in the study area that are being used for irrigation. The amount of pumping that occurs from such wells is considered to be negligible.

Because the Malibu Valley Groundwater Basin is not actively used as a potable water supply, the groundwater basin is presently in steady-state, with total discharges approximately equal to total recharge.

Groundwater flow directions are generally from upland areas to the south and southeast toward the Pacific Ocean and Malibu Lagoon (Figure 3-1). Groundwater elevations are influenced by tidal fluctuations and by the lagoon stage elevation (as determined by breached or open conditions). In general, groundwater level variations in Winter Canyon, and on the west side of the alluvium, are most closely related to variations in precipitation. Groundwater levels at wells in the vicinity of the lagoon, especially east of Cross Creek Road, are closely related to variations in lagoon stage. Groundwater levels in wells completed in the Civic Center Gravels also exhibit water-level variations that are affected by lagoon stage. Groundwater levels in wells closest to the coast, especially those wells south of the Pacific Coast Highway, are most directly influenced by tidal variations.

Average groundwater travel times to Malibu Creek and Lagoon in the shallow alluvium are generally faster than to the ocean because of the high hydraulic conductivity of subsurface materials near the Creek and Lagoon. McDonald Morrissey and Associates estimated that groundwater discharges to Malibu Creek and Lagoon at an annual average rate of approximately 36,000 ft<sup>3</sup>/d. Analysis under both Lagoon conditions (breached or open lagoon) revealed a very-slow-moving groundwater flow system, with as great as a 50-year travel time from the upstream OWDSs to the Lagoon and/or ocean (RMC, 2013).

**Figure 3-1: Groundwater Flow Direction**



### 3.2.3 Groundwater Quality

While there are many groundwater monitoring wells screened in the shallow alluvium of the Malibu Valley Groundwater Basin, there are limited groundwater quality data related to parameters other than nitrogen (total nitrogen, nitrate, nitrite and/or ammonia) and bacteria. In general, shallow groundwater in the basin appears to be affected by tidal influences on water quality in Malibu Lagoon and along the shoreline. Groundwater samples collected from wells adjacent to Malibu Lagoon indicate elevated sodium and chloride concentrations, with concentrations decreasing with distance from the tidal channel. Groundwater samples also indicated elevated levels of magnesium and sulfate, commensurate with, but somewhat lower than, the concentrations observed in the deeper groundwater.

Little data exist regarding groundwater quality in the Civic Center Gravels. In general, groundwater quality in the Civic Center Gravels is of good quality with near neutral pH, high silica, low iron and relatively low manganese concentrations. Geochemical analyses of samples from the Civic Center Gravels indicates that there is generally little difference in the major ionic composition of groundwater in this zone. In general, groundwater in the basin meets primary and secondary drinking water standards for all constituents except TDS, sulfate, and chloride. Additionally, manganese concentrations, while generally low, are at or above the current aesthetic drinking water standard of 0.050 mg/L. Finally, groundwater in the Civic Center Gravels contains nutrient parameters at concentrations less than their detection limits. These parameters include Total Kjeldahl Nitrogen (TKN), ammonia, nitrate, total phosphorus and orthophosphate

Differences in Civic Center Gravel groundwater do exist, predominantly in regards to the sulfate-bicarbonate percentages. Groundwater in the central and eastern side of the basin (as observed at either end of Legacy Park) are typically of either a sodium-magnesium-calcium-sulfate water chemistry type (MCWP-MW01) or sodium-calcium-sulfate chloride water chemistry type (MCWP-MW02), with increasing concentrations of manganese, sulfate and TDS as one moves to the west and south. Groundwater in the southern part of the basin, as measured at MCWP-MW03 on Malibu Road, is an unusual magnesium-sodium-sulfate water chemistry type containing the highest concentrations of sulfate and TDS measured in the basin. In general, groundwater in the eastern side of the basin, near Malibu Lagoon and Creek, contains a minor seawater component, while groundwater south of Pacific Coast Highway appears to be more affected by seawater than at other locations in the groundwater basin.

### 3.3 Surface Water Resources

Infiltration of stream flow is a common source of recharge to alluvial aquifers. Recharge occurs as streams flow from steep upland areas, which are predominantly bedrock, onto more permeable, relatively flat, alluvial deposits. The rate of recharge is controlled by the difference in head between the stream and the underlying groundwater and the permeability of the streambed and underlying alluvial deposits.

Infiltration of stream flow has been observed as Malibu Creek exits the canyon and crosses onto the alluvial deposits along the coastal plain. Some of this water is lost to evapotranspiration and to infiltration along the stream channel above the main body of alluvium. But based upon available data, a significant amount recharges the alluvial deposits in the Civic Center area. These recharge rates are estimated to be on the order of 0.5 to 2 cubic feet per second (cfs) during low flows, and may be higher during flood conditions (Stone Environmental, Inc., 2004).

Malibu Creek stream flow data are collected at the County of Los Angeles Flood Control District continuous recording gage F130R, (formerly USGS gaging station 111055500), located 0.3 miles downstream of Cold Creek and approximately 3.5 miles upstream from Arizona Crossing. The gaging station was installed in 1931 and operated cooperatively by the USGS and the County of Los Angeles until 1978. From 1979 until the present, the gage has been operated by County of Los Angeles. Flows

recorded at the gage include releases from the Las Virgenes Municipal Water District Tapia Water Treatment Facility which was constructed in 1965.

The USGS has operated a stream gage near the bridge over Malibu Creek on Cross Creek Road since December 2007. Daily flows at this USGS gage, and the County gage 3.5 miles upstream, are shown in Figure 16 for the period December 2007 to October 2009. During winter periods, when most of the precipitation and associated runoff occurs, stream flow is generally greater at the downstream gage. During the summer/fall period when there is very little precipitation, there is a consistent loss of flow between the two gages of about 1 to 10 cfs. During these periods, flow at the upstream gage is mostly from release of treated waste water at the Tapia Plant. By the time this flow reaches the downstream gage at Cross Creek Road much of the water has infiltrated into the alluvium along Malibu Creek.

In addition to the stream gage data from 2007-2009 described above, infiltration of stream flow has been observed as Malibu Creek exits the canyon and crosses onto the alluvial deposits along the coastal plain on several earlier occasions. On August 23, 1999, flow at the County gaging station was measured at 1.4 cfs and a similar flow was observed the following day about 4,000 feet above the mouth of the Canyon. Another 2,300 feet downstream, flow had decreased to about 1 cfs and 3,300 further downstream, just below Cross Creek Road, the stream was dry (Entrix, Inc., 1999). On September 10, 1998 a similar pattern was noticed. Flow near the mouth of the canyon was 8.2 cfs and 600 feet downstream of Cross Creek Road, it was 6.4 cfs, a decrease of 1.8 cfs (Entrix, Inc., 1999).

On September 24, 2003 Malibu Creek had an average daily flow of 3.0 cfs at the County gage (written comm., County of LA DPW, April 2, 2004). Stream flow in the Creek was measured at 0.6 cfs 3,200 feet above Cross Creek Road/Arizona Crossing and the stream channel was dry just above the Cross Creek Road bridge (written comm., McDonald Morrissey Associates, Inc., 2003). Entrix (1999) also states that LVMWD staff observed that “the stream is almost always dry below Cross Creek Road in the late summer months.” Examination of streamflow records show that average daily flows during the late summer months are typically 2 to 4 cfs. Some of this water is lost to evapotranspiration and to infiltration along the stream channel above the main body of alluvium but, based upon available gaging data, a significant amount recharges the alluvial deposits in the Civic Center area. These recharge rates are estimated to be on the order of 0.5 to 2 cfs during low flows, and may be higher during flood conditions. Stream flow that infiltrates to groundwater during dry periods may move as hyporheic flow through the coarse alluvium along the Malibu Creek channel and ultimately discharge to the upper reaches of the lagoon.

Groundwater elevation maps constructed in order to determine general directions of groundwater flow in the alluvium and to differentiate between groundwater flow to the ocean and lagoon were prepared by Stone Environmental, Inc. (2004). Data used to construct those maps were collected on September 25, 2003 and on March 9, 2004. During the September 2003 measurements, the barrier beach was intact and the lagoon was flooded. During the March 2004 measurements, the barrier beach was breached and flow in Malibu Creek was discharging to the ocean. In addition, a synoptic water level measurement was conducted on December 8, 2009 during a condition when the lagoon was partially breached. During each of the three synoptic measurements mentioned above, groundwater levels and lagoon stage were measured during a relatively short period of time to minimize the effects that tidal variations had on groundwater elevations. Contour maps of observed water levels for the September 2003, March 2004 and December 2009 measurements are shown in Figures 3-2, 3-3 and 3-4, respectively.

During both the flooded and breached lagoon conditions, groundwater from the western side of the alluvial flow system and from Winter Canyon alluvium discharges to the ocean. Groundwater flow from the eastern side of the alluvial flow system discharges to Malibu Lagoon and Creek. The groundwater flow divide can shift slightly depending upon lagoon conditions but in general, available groundwater level maps show that groundwater in the alluvial deposits in Winter Canyon and the west side of the

alluvial deposits discharges to the Ocean. Groundwater in the eastern parts of the basin discharges to the Lagoon, except along the eastern shoreline near Malibu Pier where groundwater discharges to the ocean.

Figure 3-2: Water Levels Measured on September 25, 2003 during Flooded Lagoon Conditions

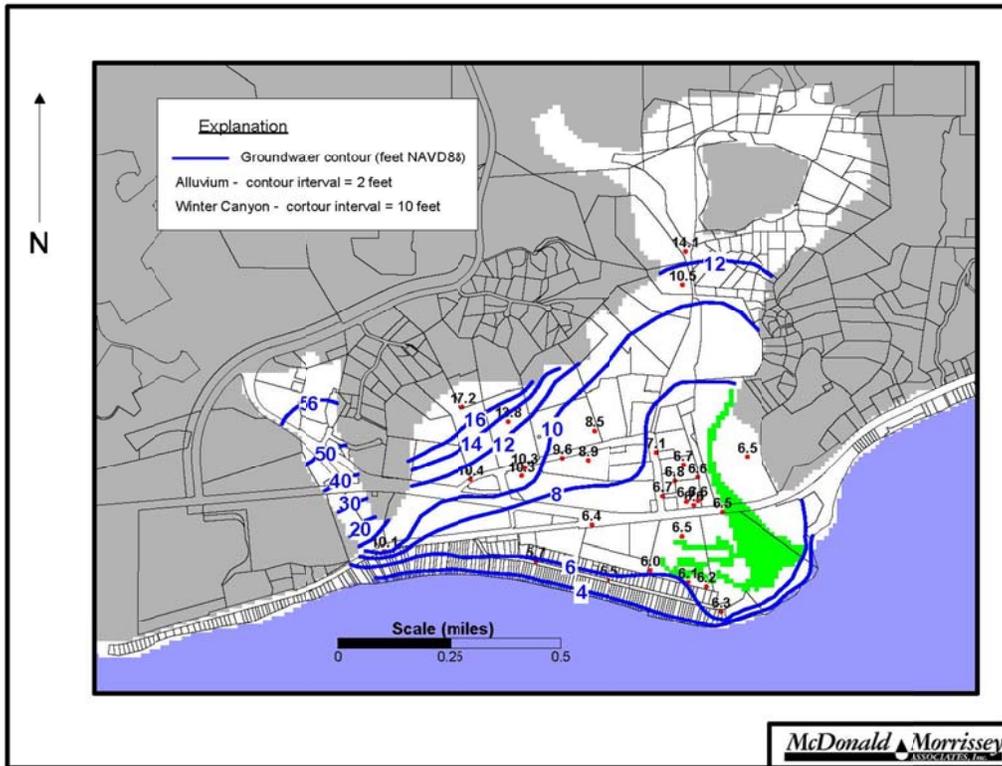


Figure 3-3: Water Levels Measured on March 9, 2004 during Breached Lagoon Conditions

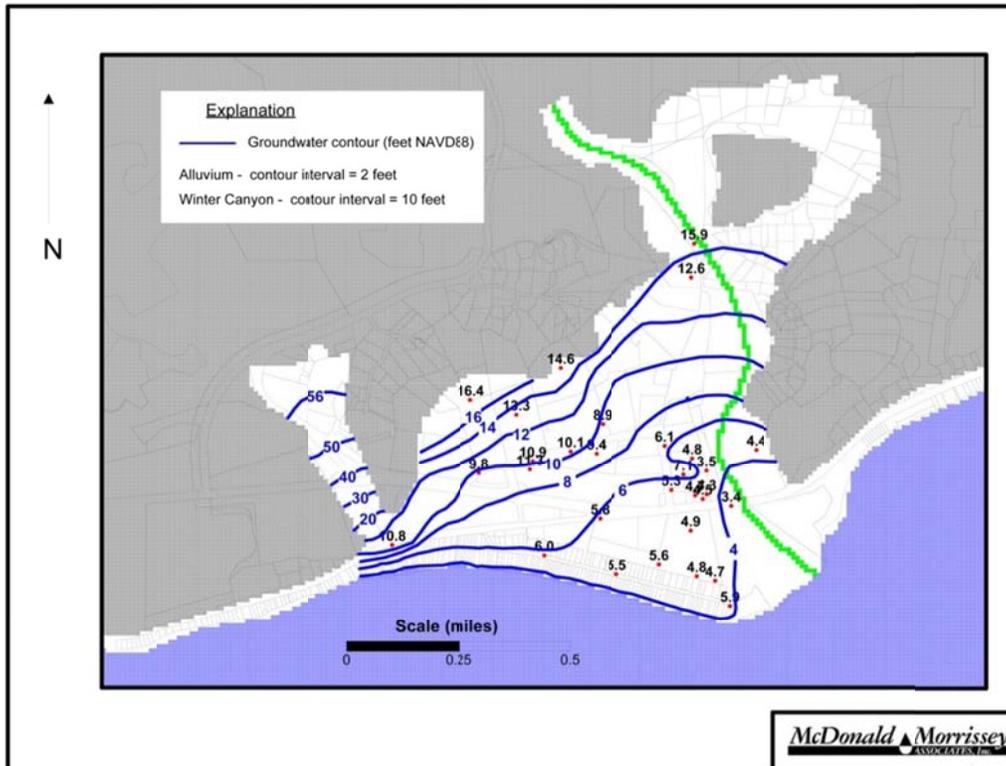
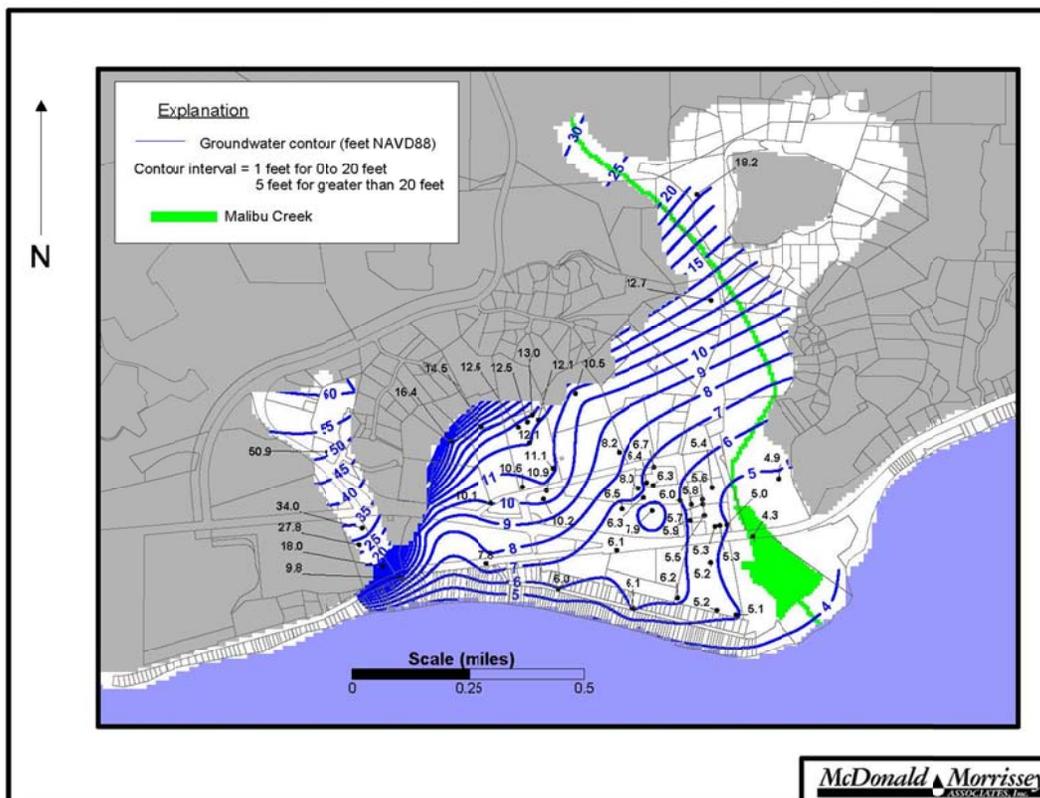


Figure 3-4: Water Levels Measured on December 8, 2009 during Breached Lagoon Conditions



## 4 Goals and Objectives

At a December 11, 2013 stakeholder meeting, and again at the December 12, 2013 Technical Advisory Committee (TAC) meeting, RMC, in conjunction with stakeholders, identified preferred basin management objectives (BMOs) and goals that the GWMP and SNMP will aim to achieve. This process identified specific goals and objectives for future groundwater use, water recycling, and the reuse of stormwater that will align with anticipated future development overlying the Basin. A critical element of goal setting was development of goals and objectives for the GWMP and SNMP that did not conflict with those of other plans, studies and projects, and that presented a comprehensive picture of regional groundwater management and current and projected future groundwater use.

Basin management goals and objectives will result in a more reliable supply and for the long-term protection of the groundwater basin and will depend on the needs seen by area stakeholders. This chapter discusses the goals for the GWMP, but also discusses the goals for using recycled water and stormwater in the basin as required for the SNMP.

### 4.1 Basin Management Objectives

Basin management objectives that were identified and discussed with stakeholders during the December meetings include:

- **BMO-1:** Avoidance of groundwater overdraft and associated undesirable effects (such as seawater intrusion)
- **BMO-2:** Protection of surface water resources
- **BMO-3:** Minimize impacts on local water supply
- **BMO-4:** Minimize impacts on groundwater quality

These qualitative BMOs address issues related to groundwater levels, groundwater quality, subsidence, and the interaction of groundwater with surface water. The BMOs will be achieved as described in the following sections. Additionally, the BMOs will be supported by management actions such as:

- Monitoring;
- Integration of recycled water resources;
- Public education and conservation programs; and
- Well ordinances including construction, abandonment, and destruction policies.

#### 4.1.1 BMO-1: Avoid Groundwater Overdraft

At present, there are no production wells within the Malibu Valley Groundwater Basin, and there are limited extractions occurring for non-potable water use. The City will work to meet this BMO by managing in the installation of future groundwater extraction wells and through groundwater quality monitoring. The City will use its new groundwater management ordinance as the primary vehicle for ensuring that groundwater overdraft does not occur. Achievement of this objective will be measured via water elevation and water quality monitoring programs in the groundwater basin. These monitoring programs will be implemented by both the City and private parties; however, the City will coordinate data collection and reporting to ensure that all data are located in a central location and to ensure regular analysis of water quality data. Additionally, the City will be providing disinfected tertiary-treated recycled water to users overlying the groundwater basin and will promote the use of recycled water as an alternative non-potable water supply. This recycled water distribution will act as a means of offsetting existing limited groundwater pumping and will help to avoid groundwater overdraft conditions in the

future. Achievement of this objective will be measured by maintaining and/or improving chloride and TDS concentrations in monitoring wells near the ocean.

#### **4.1.2 BMO-2: Protect Surface Water Resources**

Key to protection surface water resources is protecting the groundwater-surface water interactions. This includes minimizing impacts on flow rates to/from Malibu Creek and Lagoon, and ensuring that groundwater quality to the Creek and Lagoon limit nutrient and bacteria loading. The CCWTF Project, once fully implemented, will provide great strides towards improving surface water quality. The success of this project, and this BMO, will be measured via groundwater and surface water monitoring to be conducted as part of the CCWTF. Successful achievement of this objective will be measured by the metrics set forth in the Total Maximum Daily Loads (TMDLs) set forth by the USEPA and the State for Malibu Creek and Lagoon; these include a 7 mg/L mean annual dissolved oxygen concentration, and targets of 1mg/L total nitrogen and 0.1 mg/L total phosphorus during the summer, and 8 mg/L total nitrogen for the winter.

#### **4.1.3 BMO-3: Minimize Impacts on Local Water Supply**

At present, all potable water supplies in the City areas overlying the Malibu Valley Groundwater Basin are imported and distributed by Los Angeles County Water Works District No. 29 (District 29). District 29 has indicated in its Urban Water Management Plans that it has the ability to meet the City's potable water demands through build-out. As previously noted, there are no production wells within the Malibu Valley Groundwater Basin (as a result of historical groundwater overdraft), and there are limited extractions occurring for non-potable water use. As part of the CCWTF, the City will begin distributing disinfected tertiary-treated recycled water to users overlying the groundwater basin. The City will promote the use of recycled water as an alternative non-potable water supply and as a means of offsetting existing limited groundwater pumping. This recycled water production and distribution will help to minimize impacts on local water supplies resulting from limiting groundwater extractions. Achievement of this BMO will be measured by the volume of recycled water distributed for non-potable water uses relative to groundwater extractions occurring for the same purpose.

#### **4.1.4 BMO-4: Minimize Impacts on Groundwater Quality**

Groundwater quality will be protected by ensuring that groundwater limitations set forth in discharge permits issued by the LARWQCB are being met. This includes, but is not limited to, project-specific permits and meeting the WQOs set forth in the Basin Plan for the Malibu Valley Groundwater Plan. The City will use its new groundwater management ordinance as the primary vehicle for ensuring that groundwater quality is protected. Achievement of this objective will be measured via water quality monitoring programs in the groundwater basin. These monitoring programs will be implemented by both the City and private parties; however, the City will coordinate data collection and reporting to ensure that all data are centrally located and to ensure regular analysis of water quality data.

### **4.2 SNMP-Specific Goals**

Goals for recycling and stormwater capture and use are based on stakeholder input and on the information contained in relative Urban Water Management Plans (UWMPs) and other planning documents. Additionally, water conservation programs and ordinances provide a useful basis for understanding and assessing recycling activities. The City and Water District 29 implement extensive water conservation programs, ranging from residential, commercial, industrial and municipal to programs, and the City has

implemented a stormwater capture and program through development and implementation of its Legacy Park project.

### 4.2.1 Recycled Water Goals

Recycled water goals are based on information provided in Water District 29’s 2010 UWMP and current and projected future recycled water usage data. Existing recycled water use is presented in Table 4-1 and is based on current recycled water usage data provided by the City. These values represent present recycled water use within the basin, which is currently used for recharge only. Future plans for the City’s recycled water system include providing recycled water to areas of the City for irrigation plus additional groundwater recharge.

Table 4-1 also presents the projected 2035 recycled water use in the basin. These future estimates represent the recycled water goals for the basin.

**Table 4-1: Current Use and Future Goals for Recycled Water**

Provider	Current Use (AFY)	2035 Use (AFY)
Water District 29	0	0
City of Malibu (Irrigation)	0	140
City of Malibu (Recharge)	30	2,750

### 4.2.2 Stormwater Recharge Goals

The City and stakeholders in the Malibu Valley Groundwater Basin are actively working to increase the ability to put stormwater to beneficial use through irrigation and other non-potable uses. The City is engaged in several scientific studies and engineering projects to improve water quality in nearby surface water bodies which include a significant stormwater treatment element. For example in 2007, the City began operating its Civic Center Stormwater Treatment Facility (SWTF), which processes up to 1,400 gallons per minute (gpm) of stormwater runoff from the Civic Center area to remove trash, suspended solids, metals, and indicator bacteria.

In 2010, the Legacy Park Project was completed; this project included developing the Legacy Park site into a public amenity providing education, passive recreation and habitat improvements, in addition to providing stormwater treatment to remove pathogens. Treated stormwater flows are then reused to the maximum extent possible as an irrigation supply for Legacy Park and other landscaping. Dry-and wet-weather flows that exceed the irrigation demand are directed to a 33,000 gallons per day (gpd) dispersal field in the southeast corner of the Legacy Park Site. The project also includes Low Impact Development (LID) features such as bioswales and permeable pavement that increase recharge of stormwater.

The City also recently constructed the Malibu Civic Center Linear Park, which incorporates LID features including stormwater capture and treatment. The linear park includes a 0.5 acre greenbelt planted with native trees and plants and irrigated with either treated stormwater or recycled water.

In addition to the stormwater treatment improvements provided by the SWTF and Legacy Park project, the City has also begun to incorporate stormwater treatment and runoff solutions into their other municipal projects. The recently completed Cross Creek Road Improvement Project provides an excellent example of street improvement projects that protect against water quality degradation from stormwater runoff and maximizes the potential for water reuse. This environmentally superior project provides several benefits, including:

- Minimizes stormwater runoff with:
  - Permeable pavers on street angled vehicle parking

- Permeable pavement on sidewalk areas
- An enhanced landscaping plan that allows for increased stormwater infiltration
- Connections for an irrigation supply that uses treated stormwater or recycled wastewater that has been treated to Title 22 standards

While these efforts and others are continuing in the basin, the benefit of recharging stormwater (which is likely to be low in TDS) is not included in the groundwater quality analyses in the SNMP due to uncertainties in the projected quantity and volumes of stormwater recharge at this time and limited storage volume in the groundwater basin. Not including stormwater in the future water quality analysis at this point is a conservative approach as stormwater would likely decrease TDS and nitrate concentrations in the groundwater basin. Future updates to the SNMP may consider these efforts as they continue to be developed and implemented. Future updates to the SNMP could also include quantitative goals for stormwater recharge as they are established through these planned efforts. Stormwater recharge and/or reuse will, however, be addressed in the SNMP in a qualitative manner.

## 5 Groundwater Management

### 5.1 Definition of Groundwater Basin

The Malibu Valley Groundwater Basin was defined in DWR's Bulletin 118 as Groundwater Basin No. 4-22. As previously noted, it is a small alluvial basin bounded by the Pacific Ocean on the south, by the Santa Monica Mountains, and by uplifted non-water-bearing rocks on all remaining sides. The valley is typified by steep canyons that generally run north to south, and is drained by Malibu Creek to the Pacific Ocean (DWR, 2003).

### 5.2 Basin Management Elements

The basin management goals and objectives presented in Chapter 4 were selected to manage and protect the Malibu Valley Groundwater Basin from contamination and saltwater intrusion while not significantly impacting flows to/from Malibu Creek and Lagoon (which provide habitat for sensitive species) or the quality of those surface waters. In order to protect and improve the basin, this Plan attempts to provide information and guidance to:

- Better understand the basin hydrogeology, how the above land use may impact the quality of the basin's water supply, and the processes behind groundwater-surface water interactions (Kennedy, 2014)
- Bring together various stakeholders so as to create a collaborative effort in identifying and implementing actions that affect groundwater quality and supply in both short-term and long-term scenarios.
- Maintain efforts to monitor and collect groundwater data in order to project quality and quantity trends. These data may be used to provide a framework for groundwater basin management.

Figure 1-1 shows the Malibu Valley Groundwater Basin. The basin management elements discussed below presents information and offers possible actions that can be implemented to achieve the BMOs. Selected management measures, and possible actions for achieving those measures, are discussed in Chapters 6 and 8, respectively.

#### 5.2.1 Maintain Groundwater Levels

Groundwater in the Malibu Valley Groundwater Basin generally moves from the hills in the north, south towards the Pacific Ocean. Groundwater levels in the Civic Center area of Malibu fluctuate in response to several factors. These factors include variations in precipitation, runoff into the artificial wetland, lagoon stage and breaching condition, and tidal stage. In general, groundwater level variations in Winter Canyon, and on the west side of the alluvium, are most closely related to variations in precipitation. Groundwater levels at wells in the vicinity of the lagoon, especially east of Cross Creek Road, are closely related to variations in lagoon stage and breaching condition. Groundwater levels in wells completed in the Civic Center Gravels also exhibit water-level variations that are affected by lagoon and tidal stage. Groundwater levels in wells closest to the coast, especially those wells south of the Pacific Coast Highway, are most directly influenced by tidal variations.

The following steps can be taken to maintain groundwater levels:

- Locate natural recharge areas within the basin.
- Create measures to protect recharge areas (such as developing overlay maps identifying sensitive recharge areas), and coordinate and encourage land use planning agencies to limit unsuitable land development practices.

- Examine existing conditions so as to form a water budget. This budget may be used for evaluation of artificial recharge alternatives, of conjunctive use projects, and water conservation programs.
- Evaluate the location and volume of pumping to ascertain and minimize surface water-groundwater impacts.

Maintaining groundwater elevations will be critical to achieving BMO-1, Avoiding Groundwater Overdraft, for protecting the quality of groundwater (BMO-4, Minimizing Impacts on Groundwater Quality).

### 5.2.2 Control Degradation of Groundwater Quality

The Malibu Valley Groundwater Basin experienced seawater intrusion in the 1950s, and again in the 1960s when seawater advanced 0.5 miles inland (DWR 1975). In December of 1954 and April of 1969, chloride concentrations exceeding 100 mg/L were found in groundwater in the coastal part of the basin (DWR 1975). Groundwater basin connections to Malibu Creek and Lagoon on the east side, and to the Pacific Ocean on the south side, affect local groundwater quality. The following actions can be taken to control the degradation of groundwater quality.

- Define and understand areas within the basin that have poor water quality. Identify contaminate sources so as to find solutions to reduce groundwater contamination.
- Support existing efforts to mitigate the effects of poor water quality, such as continued coordination with regulatory agencies to remediate known contamination plumes.
- Coordinate with other local agencies to work together to create groundwater protection measures.
- Evaluate and manage the location and pumping rate of groundwater extractions to minimize the potential for future seawater intrusion and protect against impacts to surface water-groundwater interactions.
- Manage overlying land uses to minimize salt and nutrient loading to the groundwater basin.
- Educate the public as to land use practices that may result in groundwater degradation.

By achieving this basin management element, BMO-4, Minimizing Impacts on Groundwater Quality, can be met.

### 5.2.3 Groundwater Monitoring Assessment

Groundwater conditions in the Malibu Valley groundwater basin are monitored by multiple agencies and local private parties, with results reported to the LARWQCB. Additionally, as part of the CCWTF Project, a comprehensive groundwater monitoring program will be required for implementation. At present, individual agencies and permit holders within the groundwater basin are responsible for evaluating their groundwater monitoring needs and updating their individual groundwater monitoring plans as needed. In order to avoid the collection of duplicated data and to facilitate the comprehensive evaluation of all groundwater-related data collected in the groundwater basin, all current and future groundwater monitoring programs in the Malibu Valley Groundwater Basin should be coordinated, with data collected, assessed, managed and/or reported by a single entity. Implementation of this basin management element will facilitate meeting BMO-1, Avoiding Groundwater Overdraft, and BMO-4, Minimizing Impacts on Groundwater Quality.

### 5.2.4 Evaluate Feasible Water Conservation Measures

Water conservation practices are evaluated to determine their ability to affect water levels and water quality within the basin. The following additional water conservation measures are proposed for the Malibu Valley Groundwater Basin:

- Reuse of treated wastewater to offset imported potable supplies and groundwater pumping.
- Water conservation via water audits, interceptive programs, water metering, sewage fees, and other efforts.

As the retail purveyor of potable water in the Malibu Valley Groundwater Basin, District 29 has historically taken the lead in implementing water conservation programs in the Malibu service area. These efforts should be continued, and District 29 should coordinate with the City of Malibu and other basin entities to identify and implement other reasonable and feasible conservation programs, as appropriate. Implementation of this basin management element will aid in meeting BMO-3, Minimizing Impacts on Local Water Supply.

### 5.2.5 Coordination and Cooperation

At present, as the lead local regulatory entity in the Malibu Valley Groundwater Basin, the City of Malibu leads several stakeholder coordination and outreach efforts, including holding regular stakeholder and TAC meetings for key projects. In addition to these efforts, the following measures can be implemented to enhance local and regional coordination and cooperation.

- Encourage and assist coordination efforts between local agencies in forming groundwater protection projects and programs.
- Coordinate with state agencies, federal agencies, neighboring water entities and related agencies, and non-governmental organizations. These entities may include the LARWQCB, District 29, and the Los Angeles County Department of Public Health.
- Create an educational outreach program to educate the public as to the importance of groundwater basin protection.

Coordination and cooperation between the City and local stakeholders will facilitate meeting all BMOs.

## 5.3 Monitoring Activities

At present, monitoring activities in the Malibu Valley Groundwater Basin are conducted on a site-by-site basis per project-specific permit requirements and/or programs. As part of the CCWTF Project, a groundwater and surface water monitoring program has been developed as part of permit requirements. This proposed program is summarized below and will likely be implemented over time with the project itself. This monitoring program will be the largest within the groundwater basin, and will eventually form the backbone of a basin-wide monitoring program to be implemented as part of the SNMP and to gather data to meet the requirements of the MOU between the City and the LARWQCB. The details of this basin-wide program have not yet been finalized and will be coordinated with local and regional groundwater stakeholders.

### 5.3.1 Groundwater

#### Groundwater Elevation Monitoring

The groundwater elevation monitoring program for the CCWTF project for compliance with the project-specific Waste Discharge Requirement (WDR) will consist of elevation monitoring in nine (9) monitoring wells (six shallow monitoring wells and three deep groundwater monitoring wells). This will include three well pairs in various locations around the groundwater basin, one shallow well in the upgradient (northern) part of the groundwater basin, and two monitoring wells in Winter Canyon (Figure 5-1). Baseline groundwater monitoring for compliance with the MOU will begin in 2015, and elevation monitoring will continue thereafter to provide a better understanding of the groundwater elevation conditions of the Civic Center Area, including elevation trends relative to tidal, lagoon and precipitation influences. Elevation levels and water quality measurements will be taken concurrently in a uniform

procedure. To determine groundwater elevation, a depth-to-groundwater below top of casing (btoc) will be measured by an electronic well sounder with a surveyor’s measuring tape, measuring to the nearest 1/100<sup>th</sup> of a foot. This measurement and the top-of-casing elevations will be taken by a licensed surveyor, who can then use these values to calculate a final groundwater elevation. Data will be summarized in regular reports provided to the LARWQCB. After two years of monitoring, the groundwater monitoring well network and constituents to be analyzed will be reevaluated for appropriateness in meeting monitoring objectives in conjunction with the LARWQCB.

**Groundwater Quality Monitoring – Waste Discharge Requirements**

Groundwater monitoring for water quality within the Malibu Valley Groundwater Basin will utilize the same nine monitoring wells as the elevation monitoring previously described. The mix of shallow and deep monitoring wells will ensure adequate spatial and vertical coverage of the basin in the vicinity of the proposed CCWTF injection to be able to monitor for potential adverse impacts. Figure 5-1, below, shows the monitoring locations that will be included in the monitoring program; information regarding the monitoring wells is included in Table 5-1. The monitored parameters and frequency are described in Table 5-2. Wells will be purged prior to groundwater sampling to ensure that samples are representative of the groundwater basin. Purging will be performed prior to collecting the water quality samples so as to obtain accurate measurements of temperature, pH, electroconductivity, and total dissolved solids. The samples obtained are within a tolerance of ±10% accuracy. Groundwater samples are then couriered to a State-certified analytical laboratory for testing. Analytical data will be tabulated, reviewed, and analyzed for trends; results will be summarized in a monitoring report submitted to the LARWQCB.

**Figure 5-1: Groundwater Monitoring Locations in the Malibu Valley Groundwater Basin for WDR Compliance**



**Table 5-1: Groundwater Sampling Locations for WDR Compliance Monitoring**

Well Name	Screened Zone
LAMW-5S	Winter Cyn
SMBRP-9	Shallow
SMBRP-12	Shallow
MCWP-MW-04S	Shallow
MCWP-MW-04D	Deep
MCWP-MW07S	Shallow
MCWP-MW07D	Deep
MCWP-MW09	Deep
TY-MW-1	Winter Cyn

**Table 5-2: Groundwater Sample Analyses and Frequency**

Constituents	Units	Type of Sample	Minimum Frequency of Analysis - Baseline	Minimum Frequency of Analysis – Long Term
Water level elevation <sup>[1]</sup>	Feet	Recorder	Annually	Quarterly
pH	pH units	Grab	Annually	Quarterly
BOD <sub>5</sub> 20 <sup>o</sup> C	mg/L	Grab	Annually	Quarterly
Turbidity	NTU	Grab	Annually	Quarterly
Total Coliform	MPN/100mL	Grab	Annually	Quarterly
Fecal Coliform	MPN/100mL	Grab	Annually	Quarterly
Enterococcus Coliform	MPN/100mL	Grab	Annually	Quarterly
Total Suspended Solids	mg/L	Grab	Annually	Quarterly
Residual Chlorine	mg/L	Grab	Annually	Quarterly
Total Organic Carbon	mg/L	Grab	Annually	Quarterly
Oil and grease	mg/L	Grab	Annually	Quarterly
Nitrate + Nitrite as Nitrogen	mg/L	Grab	Annually	Quarterly
Nitrate as nitrogen	mg/L	Grab	Annually	Quarterly
Nitrite as nitrogen	mg/L	Grab	Annually	Quarterly
Ammonia nitrogen	mg/L	Grab	Annually	Quarterly
Organic Nitrogen	mg/L	Grab	Annually	Quarterly
Total Nitrogen	mg/L	Grab	Annually	Quarterly
Total Phosphorus	mg/L	Grab	Annually	Quarterly
Total Dissolved Solids	mg/L	Grab	Annually	Quarterly
Sulfate	mg/L	Grab	Annually	Quarterly
Chloride	mg/L	Grab	Annually	Quarterly

Constituents	Units	Type of Sample	Minimum Frequency of Analysis - Baseline	Minimum Frequency of Analysis – Long Term
Boron	mg/L	Grab	Annually	Quarterly
Methylene Blue Active Substances (MBAS)	mg/L	Grab	Annually	Quarterly
Constituents listed in Tables A1 to A5	Various	Grab	Annually	Annually
Constituents of Emerging Concern (CECs)	Various	Grab	Annually	Annually
Priority Pollutants	µg/L	Grab	Annually	Annually

Note: Constituents listed in Tables A1 to A5 and for CECs and Priority Pollutants are included in Appendix A.

**Table 5-3: Groundwater Sample Containers**

Constituents	Sampling Container
Total Coliform, Fecal Coliform, Enterococcus	Bacti Bottles with Sodium Thiosulfate
TDS, pH, Nitrate, Nitrite, Sulfate, Chloride	500 mL polyethylene bottles
Ammonia, Total Nitrogen, Organic Nitrogen, Total Phosphorus	500 mL polyethylene bottles with Sulfuric Acid
Boron	500 mL polyethylene bottles with Nitric Acid
17β-estradiol, Caffeine, Triclosan, Sucralose, N,N-Diethyl-meta-toluamide, NDMA	1 L amber glass with Sodium Azide and Ascorbic Acid

**Groundwater Quality Monitoring – Salt and Nutrient Management Plan (SNMP)**

Groundwater monitoring for SNMP implementation will tier off the previously-described monitoring program for WDR compliance. This monitoring program will utilize the same nine wells as for the WDR-compliance monitoring, and will include an additional seven (7) wells for a total of 16 wells (Table 5-4). This mix of shallow and deeper monitoring wells are spatially distributed around the Malibu Valley Groundwater Basin as shown in Figure 5-2, and will monitor for potential impacts to the groundwater basin resulting from recycled water irrigation (in addition to the recycled water injection, that will be evaluated as part of the WDR-compliance monitoring program). All wells included in this monitoring program will be sampled for nitrate as nitrogen and TDS on a semi-annual basis.

Table 5-4: Groundwater Sampling Locations for SNMP Monitoring

Well Name	Screened Zone	Sampled for WDR Compliance?
LAMW-5S	Winter Cyn	Yes
SMBRP-9	Shallow	Yes
SMBRP-12	Shallow	Yes
SMBRP-13	Shallow	No
MCWP-MW10	Shallow	No
CCPE	Shallow	No
MBCMw-9	Shallow	No
WF-MW-2	Shallow	No
MCWP-MW-04S	Shallow	Yes
MCWP-MW-04D	Deep	Yes
MCWP-MW07S	Shallow	Yes
MCWP-MW07D	Deep	Yes
MCWP-MW09	Deep	Yes
MCWP-MW05	Deep	No
MCWP-MW06	Deep	No
TY-MW-1	Winter Cyn	Yes

Figure 5-2: Groundwater Monitoring Locations in the Malibu Valley Groundwater Basin for SNMP Compliance



**Groundwater Quality Monitoring – MOU Compliance**

Groundwater monitoring for compliance with the City’s MOU with the LARWQCB will also tier off the previously-described monitoring program for WDR compliance and will utilize most of the same wells as for SNMP monitoring (Table 5-5). The monitoring wells used in this program are focused on providing the necessary information to document changes to water quality in the Shallow Alluvium as a result of CCWTF implementation. As such, wells used in this program are aligned so as to capture changes in shallow groundwater quality downgradient of key areas currently on OWDSs and adjacent to Malibu Creek and Lagoon (Figure 5-3). All wells included in this monitoring program will be sampled for nitrate, nitrite, ammonia (all as nitrogen), organic nitrogen, total phosphorus, and fecal and total coliform bacteria on a semi-annual basis.

**Table 5-5: Groundwater Sampling Locations for MOU Monitoring**

Well Name	Screened Zone	Sampled for WDR Compliance?
LAMW-5S	Winter Cyn	Yes
SMBRP-9	Shallow	Yes
SMBRP-12	Shallow	Yes
SMBRP-13	Shallow	No
MCWP-MW10	Shallow	No
CCPE	Shallow	No
MBCMW-9	Shallow	No
WF-MW-2	Shallow	No
MCWP-MW-04S	Shallow	Yes
MCWP-MW-04D	Deep	Yes
MCWP-MW07S	Shallow	Yes
MCWP-MW07D	Deep	Yes
MCWP-MW09	Deep	Yes
TY-MW-1	Winter Cyn	Yes

Figure 5-3: Groundwater Monitoring Locations in the Malibu Valley Groundwater Basin for MOU Compliance



### 5.3.2 Surface Water

A surface water monitoring program will be implemented in Malibu Creek and Lagoon and in near-shore ocean areas. Six monitoring stations are to be established in Malibu Lagoon, and four are to be established in the near-shore ocean area along Malibu Road (see Figure 5-4).

Surface water samples will be collected at ankle depth beneath the surface. Samples will be carefully taken in the field by trained field personnel. Differences in samples due to tidal fluctuation will be corrected for. Water temperature, the physical appearance of the sample, the sample location, the date and time, the water elevation, and the direction of the current will be recorded in field notes. Samples will be couriered to a State-certified analytical laboratory for further analysis. Analytical data will be tabulated, reviewed, and analyzed for trends; results will be summarized in a monitoring report submitted to the LARWQCB.



**Table 5-6: Surface Water Sample Analyses**

Constituents	Units	Type of Sample	Minimum Frequency of Analysis
Total Coliform	MPN/100mL	Grab	Quarterly
Fecal Coliform	MPN/100mL	Grab	Quarterly
Nitrate as nitrogen	mg/L	Grab	Quarterly
Nitrite as nitrogen	mg/L	Grab	Quarterly
Ammonia nitrogen	mg/L	Grab	Quarterly
Organic Nitrogen	mg/L	Grab	Quarterly
Total Phosphorus	mg/L	Grab	Quarterly

**Table 5-7: Ocean Water Sample Analyses**

Constituents	Units	Type of Sample	Minimum Frequency of Analysis
Total Coliform	MPN/100mL	Grab	Quarterly
Fecal Coliform	MPN/100mL	Grab	Quarterly
Nitrate as nitrogen	mg/L	Grab	Quarterly
Nitrite as nitrogen	mg/L	Grab	Quarterly
Ammonia as nitrogen	mg/L	Grab	Quarterly
Organic Nitrogen	mg/L	Grab	Quarterly
Total Phosphorus	mg/L	Grab	Quarterly

**Table 5-8: Surface Water Sample Containers**

Constituents to be Analyzed (Method)	Sampling Container	Hold Time	Comments
Total Coliform (9221B) Enterococcus (9230B)	Bacti Bottles with Sodium Thiosulfate	8 hours	
Nitrate (300.0) Nitrite (300.1)	500 mL polyethylene bottles	48 hours	Samples can be preserved with Sulfuric Acid for 28 day hold time
Ammonia (SM 4500-NH3_D) Organic Nitrogen (350.1/351.2) Boron (200.7 Rev 4.4) Chloride and Sulfate (300.0) Total Phosphorus (365.3)	500 mL polyethylene bottles with Sulfuric Acid	28 days	Organic Nitrogen is a calculated value

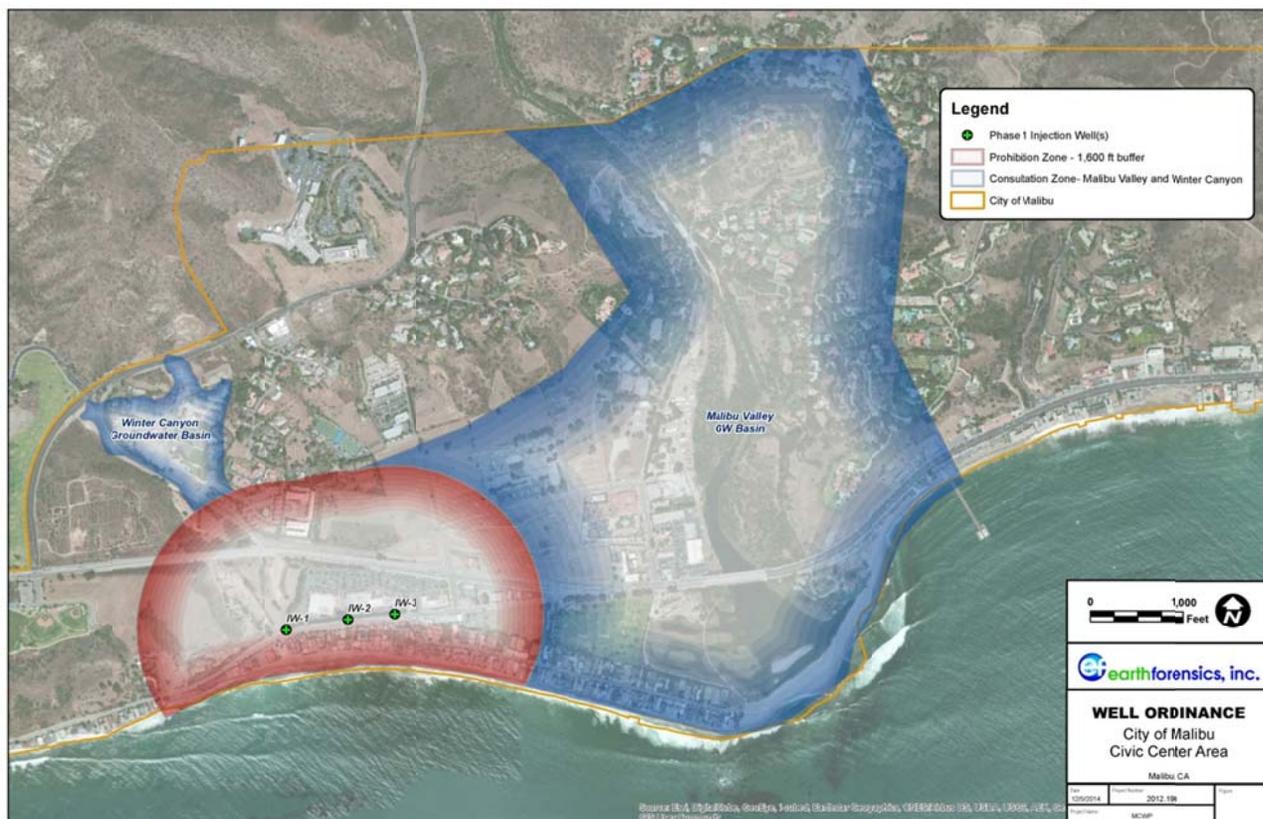
## 6 Groundwater Protection Measures

The following are general categories of measures that, when implemented, will help protect the beneficial uses of the Malibu Valley Groundwater Basin. Specific strategies or actions within each of the categories that can be implemented are described in Chapter 8 as part of the Implementation Plan.

### 6.1 Management of Groundwater Basin

At present, there are no potable water supply wells within the Malibu Valley Groundwater Basin. However, as part of the CCWTF Project, three injection wells will be installed in the basin and used to disperse unused disinfected tertiary-treated recycled water. These wells have been located and designed to minimize groundwater elevation and quality impacts on the groundwater basin and to promote flow of the injected water south to the ocean. As such, protection zones will be established around these wells, to ensure that other groundwater uses/extractions do not impact the designed performance of these wells, to protect human health against the potential ingestion of the injected recycled water, and to provide an injection barrier against possible future seawater intrusion. Figure 6-1, below, shows the proposed locations of the wellhead protection areas established under the City’s new groundwater well ordinance.

**Figure 6-1: Proposed Prohibition and Consultation Zones**



In general, the City’s new groundwater management ordinance (Ordinance No. 385) will designate the City as the primary management agency for the Malibu Valley Groundwater Basin; however, the authority to issue well construction or destruction permits will remain with the Los Angeles County Department of Public Health (LADPH) (see Section 6.4, below). This ordinance, combined with the City’s land use planning and development ordinances and regulations, promotes a comprehensive approach to managing basin recharge (including protection of recharge areas), groundwater basin quality and the interactions between the groundwater basin and the adjacent Malibu Creek and Lagoon.

## 6.2 Protection of Recharge Areas

Precipitation and surface water runoff, effluent of domestic septic systems, and infiltration at the basin's margins are the primary sources of flow into the groundwater basin. Recharge areas associated with these inflow sources included unpaved land in the groundwater basin and at the basin's margin/intersection with upland areas. Development of these areas have the potential to limit precipitation and surface water runoff recharge. To this end, the City requires that new projects retain onsite the Storm Water Quality Design Volume (SWQDV) defined as the greater of the 85<sup>th</sup> percentile, 24-hour storm event or the 0.75", 24-hour storm event. Alternatives are available if a development cannot meet this criteria, but the goals of this requirement are to maximize onsite recharge and minimize the potential for pollutants to become entrained in the stormwater runoff and contributing to water quality impacts of local surface water bodies.

## 6.3 Regulation of the Migration of Contaminated Groundwater

The City of Malibu has had limited industrial and agricultural development and, to date, consists primarily of residential and commercial development. As such, there are limited areas of groundwater contamination associated with development-related pollutants, and most of these are located around Pacific Coast Highway. The migration and remediation of contaminated groundwater is of primary concern to local urban and water supply agencies, including the City of Malibu and LARWQCB, and the LARWQCB actively requires that identified areas of contamination be investigated and remediated.

While the City does not have authority or responsibility for remediation of contamination, it is committed to coordinating with responsible parties and regulatory agencies to keep the local entities informed of the status of known groundwater contamination in the Basin. To address the management of contaminated areas of the groundwater basin, the following actions may be implemented:

- Coordinate with USGS and/or other appropriate agencies to expand network of monitoring wells to provide an early warning system.
- If detections occur in existing or future monitoring wells, facilitate meetings between the responsible parties and potentially impacted water agency(ies) and regulatory agency(ies) to develop strategies to minimize the further spread of contaminants. For example, groundwater injection and/or extraction patterns could be altered in the vicinity of a pollutant plume to change the groundwater gradient.
- Provide a forum to share all information on mapped contaminant plumes and leaking underground storage tank (UST) sites in order to develop groundwater extraction patterns and onsite planning of future production or monitoring wells.
- Meet with representatives of LARWQCB staff to establish a positive relationship and identify ways to have open and expedient communications regarding any new occurrences of contamination. Open communication channels are especially important when contamination is believed to have reached the water table.
- Track upcoming regulations on septic systems, National Pollutant Discharge Elimination System (NPDES) Permits, agricultural discharges and other regulatory programs that pertain to water quality.

## 6.4 Identification of Well Construction Policies

It is the responsibility of the Los Angeles County Department of Public Health (LADPH) to protect human health. The Environmental Health Division, Drinking Water Program is responsible for reviewing plans and approving private residential water wells within designated cities (including the City of Malibu) and unincorporated areas of the County, as well as regulating small water systems. They retain this authority under the following codes:

- Los Angeles County Code, Title 28, Plumbing, Chapter 6, Section 601.1 provides the County with jurisdictional authority to ensure that each plumbing fixture be provided with an adequate supply of potable running water piped in an approved manner so as to prevent backflows or cross-connections.
- Los Angeles County Code, Title 11, Health and Safety, Section 11.38.165 which requires laboratory analyses showing that the water quality meetings the primary bacteriological and chemical requirements of the Safe Drinking Water Standards and specifies requirements for well construction.
- California Water Well Standards, Bulletin 74-90/74-80 which specifies required standards for well construction, abandonment and destruction.

In addition, under the City's approved Local Coastal Program, water well siting and construction is regulated relative to protecting human health and the beneficial uses of the groundwater basin.

## **6.5 Administration of Well Abandonment and Destruction Programs**

As with well construction, the LADPH is responsible for issuing permits for the abandonment and/or destruction of wells. Similar to well construction, the County utilizes the State's Water Well Standards as its primary requirements for well abandonment and/or destruction. The City of Malibu, at this time, does not administer a well abandonment and destruction program.

## **6.6 Mitigation of Overdraft Conditions/Manage Saline Water Intrusion**

As previously noted, the Malibu Valley Groundwater Basin has historically experienced overdraft conditions, which were mitigated by the cessation of groundwater pumping and the introduction of imported water supply. However, the groundwater basin retains its beneficial use designation as a municipal water supply and, as such, has the potential to once again be utilized as a supply and result in overdraft conditions. To mitigate for possible future conditions that could, once again, trigger saltwater intrusion into the groundwater basin, the City of Malibu is implementing the CCWTF Project, which includes the injection of unused recycled water into the Malibu Valley Groundwater Basin in an area adjacent to the Pacific Ocean. The result of this injection will be a partial injection barrier, restricting seawater intrusion. Additionally, the City of Malibu will be enacting a new groundwater management ordinance that will establish prohibition and consultation zones around the proposed injection wells in order to protect human health and to ensure the designed performance of the injection system. Because the ordinance will be incorporated into City's municipal code and as the City is the lead for the Local Coastal Program (LCP), which requires obtaining a Coastal Development Permit and City approval for new well construction within the LCP boundaries, the City is, and will be, able to manage groundwater extraction from the basin and control/mitigate overdraft and/or seawater intrusion. Finally, the City will continue to encourage the use of Low Impact Development (LID) techniques and other similar practices that will look to retain stormwater runoff onsite and to encourage the onsite percolation of precipitation.

## 7 Stakeholder Involvement

The primary stakeholders involved in the management of the Malibu Valley Groundwater Basin are:

- The City of Malibu as the Local Coastal Program implementing agency and land use planning agency;
- The LADPH as the entity primarily responsible for well construction and destruction permits and the regulation of small community systems; and
- The LARWQCB as the entity primarily responsible for protecting the quality of groundwater within the State.

At the local level, the City has engaged two stakeholder groups during the development of this GWMP and the accompanying SNMP. The first stakeholder group is a Technical Advisory Committee (TAC) that was originally convened for the Malibu Civic Center Wastewater Treatment Facility (CCWTF) Project. The second is a public stakeholder group that was also convened for the CCWTF and has now been broadened to include the GWMP and corresponding SNMP. Additional information regarding these two stakeholder groups is discussed below.

In addition to the afore-mentioned stakeholder groups, the City regularly coordinates with several federal, state and local agencies in addition to numerous public and non-profit organizations. Local agencies working within the basin are the City of Malibu, the Resource Conservation District of the Santa Monica Mountains, Las Virgenes Municipal Water District, and Malibu Coastal Land Conservancy. Public and non-profit organizations the City routinely coordinates with includes Heal the Bay, Surfriders and BayKeepers.

### 7.1 Advisory Committee

The Technical Advisory Committee (TAC) originally convened for the Malibu CCWTF project is a primary stakeholder group for the GWMP. It has served in an advisory role for surface water and groundwater management activities within the Malibu Valley Groundwater Basin for the development of this GWMP. Additional committees may be formed as needed and the composition of the TAC may change as this GWMP is implemented. The TAC typically meets one to four times per year at City Hall.

### 7.2 Public Involvement

The City of Malibu holds public meetings and hearings for projects and programs within the City limits. Development of the GWMP and SNMP has been presented at several public workshops and stakeholder meetings. These meetings/presentations will continue, as needed, with implementation of the groundwater basin management activities identified herein.

### 7.3 Developing Relationships with State and Federal Agencies

Through its City management and implementation of the Local Coastal Program, the City of Malibu has developed relationships with many federal and state agencies, including the LARWQCB, SWRCB, California Coastal Commission, National Park Service (for Malibu State Beach), and the Los Angeles County Departments of Public Works and Public Health. The City will continue to maintain these relations and will be expanding and utilizing them, as needed, to identify and implement groundwater basin management activities.

## 8 Groundwater Management Plan Implementation

### 8.1 Implementation Plan

The following identifies the steps the City of Malibu will undertake to implement this GWMP.

#### 8.1.1 Basin-Wide Management Actions

The following basin-wide management actions are recommended for the implementation to achieve the basin management objectives described in Section 5.2.

- Active groundwater management and adaptation
- Identification and protection of natural recharge areas
- Management to control the migration of contaminated groundwater
- Management of saline/saltwater intrusion
- Control of wastewater salinity/nutrient loads
- Stormwater capture and recharge management
- Land use regulation
- Groundwater monitoring programs
- Public outreach and cooperation with other entities on water resource-related issues

Each of these is described in more detail below. Table 8-1 summarizes these actions and identifies their present status.

##### 8.1.1.1 Active Groundwater Management and Adaptation

At present, there are no production wells operating in the Malibu Valley Groundwater Basin. With implementation of the CCWTF Project, an injection well field will be constructed and operated, requiring the development of a groundwater management ordinance manage future groundwater use to protect the operational integrity of the injection wells, protect public health, and to reduce the potential for seawater intrusion into the groundwater basin. As described in Section 6.1, this ordinance will establish prohibition and consultation zones for well construction and use, and combined with the City's Local Coastal Program (LCP) and land use planning authorities, will allow the City to actively manage the groundwater basin and to adapt to changing conditions. The City will continue to coordinate with the Los Angeles County Department of Public Health in the issuance of well construction permits, and will continue to implement all regulations, guidelines and permits governing the reuse of disinfected treated effluent in the basin. These actions will further aid the City in groundwater basin management. Additionally, the City will continue to implement its current requirement that projects requiring a Coastal Development Permit and falling into one of eight pre-defined categories prepare a Water Quality Management Plan (WQMP) to show how treatment control BMPs and/or structural BMPs will be used to minimize or prevent the discharge of polluted runoff after construction. Finally, the City will continue to work cooperative within the groundwater basin to aid in meeting the Total Maximum Daily Limits (TMDLs) that have been issued for Malibu Creek and Lagoon as these waters are directly connected to the shallow alluvium of the Malibu Valley Groundwater Basin.

##### 8.1.1.2 Identification and Protection of Natural Recharge Areas

Groundwater in the Malibu Valley Groundwater Basin is replenished through runoff from upland areas, subsurface wastewater dispersal, precipitation infiltration, Malibu Creek/Lagoon, and infiltration from excess irrigation. More efficient irrigation practices will result in a reduction of the amount of applied water and subsequently reduce the amount of deep percolation. This creates the need to identify areas of natural recharge and develop plans for protection. Actions could include:

- Consideration of parcel location and soil types relative to the groundwater basin prior to issuing a building permit on undeveloped lands.
- Limitations on the amount of impervious service in new development and/or requirements to retain and recharge stormwater runoff onsite.
- Programs to educate the public and planning entities about the importance of protecting recharge areas.

To implement these actions, recharge areas need to be identified. GIS-based maps of natural areas can be used to inform planning entities of the importance of these areas in order to make the proper protection recommendations.

### **8.1.1.3 Control of Contaminated Groundwater Migration**

The City's Environmental Sustainability Department will continue to coordinate with other local, state and federal regulatory agencies to protect water resources and manage the migration of contaminated groundwater within the groundwater basin.

### **8.1.1.4 Saline Water/Saltwater Intrusion Management**

Key to managing saltwater intrusion into the Malibu Valley Groundwater Basin is limiting the potential for overdraft conditions to occur. This can best be achieved by both managing groundwater extractions and by promoting basin recharge. While one means for sustaining and enhancing recharge in a groundwater basin is through the use artificial recharge as a means to supplement natural recharge, shallow groundwater levels in the Malibu Valley Groundwater Basin limit, for the most part, the viability of large-scale artificial recharge projects. However, should the groundwater basin be used as a regulatory water supply in the future, this concept may need to be considered. Possible project concepts may include the conjunctive use of surface water and groundwater, or the potential for stormwater capture and recharge. In the interim, the City can best prevent overdraft/saltwater intrusion by managing groundwater extractions and promoting the use of onsite stormwater runoff retention and percolation. Additionally, as previously described in Section 6.1, as part of the CCWTF project, unused recycled water will be injected into the Malibu Valley Groundwater Basin at locations along Malibu Road, approximately 120 feet north of the Pacific Ocean. This injection will result in the formation of a partial injection barrier, which will help to limit saltwater intrusion into the groundwater basin.

As part of the CCWTF permitting requirements, the City of Malibu will be enacting a groundwater management ordinance to manage the location and extraction from new wells in the groundwater basin. As described in Section 6.1, the City's new groundwater management ordinance (Ordinance No. 385), combined with the City's land use planning and development ordinances and regulations and management of the LCP (including issuance of Coastal Development Permits), promotes a comprehensive approach to managing basin recharge (including protection of recharge areas), groundwater basin quality and the interactions between the groundwater basin and the adjacent Malibu Creek and Lagoon. The authority to issue well construction or destruction permits will, however, remain with the Los Angeles County Department of Public Health (LADPH).

The City's program for managing stormwater runoff is described below in Section 8.1.1.6.

### **8.1.1.5 Management of Salt and Nutrient Loads to Recycled Water**

Implementation of the CCWTF will result in the use and injection of disinfected recycled water in the Malibu Valley Groundwater Basin. As one source of salt and nutrient loading to the basin, management of salt and nutrient contributions via wastewater to the treatment plant will be necessary to ensure that the treatment system is not overloaded and the discharges of these types of constituent to the basin are managed to the most practical extent possible.

The CCWTF has been designed to nitrify/denitrify the wastewater loads it will receive. This will aid in minimizing nutrient concentrations in the resultant recycled water. The processes do not, however, treat

for salts and therefore salt loads to the system must be managed externally. To achieve this, the City will be enacting an ordinance banning the use of salt-based regenerative water softeners within the groundwater basin. This common method for controlling salt loads should aid in minimizing the transfer of those salts to the groundwater basin.

#### **8.1.1.6 Stormwater Capture and Recharge**

Stormwater capture and recharge encompasses both the capture and percolation of stormwater runoff, but also limiting the pollutants that can be carried by such runoff. Primary to this is the City's compliance with the MS4 permits issued by the LARWQCB. The Municipal Storm Water Permitting Program implemented by the SWRCB regulates storm water discharges from municipal separate storm sewer systems (MS4s) to protect surface water and groundwater quality. The permits were issued in two phases, with Phase I covering National Pollutant Discharge Elimination System General Permit (NPDES) storm water permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities, and Phase II covering smaller municipalities (population less than 100,000), including non-traditional Small MS4s (such as military bases, public campuses, prison and hospital complexes). The City of Malibu falls into the Phase II permitting process, and compliance with this program will aid in both stormwater management and groundwater basin protection.

The City will also continue to implement programs and regulations that promote stormwater capture and recharge. The City promotes green architecture (including LID techniques) through its Green Building Standards Code and requires all new projects retain onsite the Storm Water Quality Design Volume (SWQDv) defined as the greater of the 85<sup>th</sup> percentile, 24-hour storm event or the 0.75", 24-hour storm event. Additionally, the City requires that all projects needing a Coastal Development Permit include a Stormwater Management Plan (SWMP) to mitigate the effect of development on stormwater after construction and to maximize, to the extent practicable, the percentage of permeable surfaces and the retention of dry-weather runoff on the site.

#### **8.1.1.7 Land Use Regulation**

Groundwater in the Malibu Valley Groundwater Basin is affected by overlying land use and interconnections with Malibu Creek and Lagoon on the east and the Pacific Ocean to the south. To maintain groundwater quality within the basin, areas of poor water quality in the basin should be mapped using GIS and this information used to develop strategies to control the migration and movement of poor quality water into and within the basin. Additionally, future land use should be considered carefully by the City's Planning Department before issuing building permits to minimize the potential for groundwater quality impacts resulting from these new land uses. Finally, the City will continue to implement Ordinance No. 343 that requires homeowners to maintain water-efficient landscapes.

#### **8.1.1.8 Groundwater Monitoring**

Groundwater elevation and quality monitoring is currently occurring in the Malibu Valley Groundwater Basin, and will be consolidated and formalized, to some extent, following the implementation of the CCWTF Project. Local agencies and individual permit holders will continue to monitor groundwater levels and quality as required by their permits and should provide these data to the City for consolidation into a single database for analysis. Significant changes in groundwater elevations and/or quality should be reported and investigated as needed, allowing the appropriate subsequent actions to be undertaken as appropriate.

As part of its compliance with CCWTF-related permits, the City will be implementing a groundwater and surface water monitoring program to evaluate potential impacts to the basin resulting from injection of unused recycled water. This program is described in Section 5.3.1. Additionally, the City will be developing two supplemental monitoring programs, tiering off the one requires by the CCWTF permits, to meet the monitoring objectives of the SNMP for the Malibu Valley Groundwater Basin, and to evaluate groundwater improvements as a result of CCWTF implementation as required by its MOU with the LARWQCB. These two supplemental programs are also described in Section 5.3.1.

### **8.1.1.9 Public Outreach**

The City has currently been implementing public outreach efforts as part of its CCWTF project implementation and SNMP development. The City will continue to use forums such as these project-related stakeholder meetings to supplement its general outreach programs relative to groundwater management. Additionally, there are several, publically available websites that provide excellent information on groundwater management, salinity control, and recycled water use. These websites can be used to assist in promoting public outreach and understanding.

Additionally, local and regional agencies will continue to work together to coordinate outreach to residents in the Malibu Valley Groundwater Basin to promote education regarding groundwater management issues, water resource quality protection, and to coordinate, as needed, on the implementation of groundwater basin management activities.

## **8.2 Groundwater Management Plan Implementation Report**

A report summarizing groundwater conditions and describing ongoing groundwater management activities is to be published on an annual basis. The report will summarize the results of monitoring efforts in the groundwater basin, and will document progress made in the implementation of management activities described herein and the effect of these activities on meeting the basin management objectives.

## **8.3 Financial Planning for Recommended Actions/Project Implementation**

Successful implementation of the GWMP is contingent upon securing funding to complete the program. Two primary avenues are available for funding: grant funding and local funding internally generated by stakeholders and/or groundwater use fees.

### **8.3.1 Grant Funding**

Potential grant funding opportunities are to be identified and pursued by basin stakeholders on an as-needed and as available basis. Recently, grant funds have been provided through the Integrated Regional Water Management Grant Program, and the City of Malibu participates as a member of the Greater Los Angeles County (GLAC) Integrated Regional Water Management (IRWM) Region. The City will continue to monitoring state and federal funding opportunities to identify those most relevant and likely to result in funding to implement basin management strategies identified herein.

### **8.3.2 Local Funding**

There are several methods though which funding can be generated internally. Part of the revenue from local water agencies can be utilized for implementation of this GWMP. Alternatively, the City can levy fees or taxes for properties overlying the groundwater basin and/or for groundwater extractors. Local financial support or contributions are often required by state grant programs and other outside sources of funding, and these can be met through in-kind services provided by the City. Finally, local contributions can aid the acquisition of external funding for plan implementation.

## **8.4 Periodic Review of Groundwater Management Plan**

To ensure this GWMP stays current and to adapt to changing conditions, periodic review and updates of this GWMP will be conducted. The groundwater monitoring reports described in Chapter 5 will be used to help determine whether the GWMP requires updating. Reviews will identify areas where the plan has been successfully implemented and areas where additional efforts are required. The update will also reevaluate the basin management strategies remaining to be implemented to determine if they are still reasonable and/or if a new course of action is required. Management efforts can then be focused accordingly to maximize the monitoring and protection of the groundwater basin.

Table 8-1: Summary of Management Actions

Category	Description	Existing/Planned	Description	BMOs Met
Groundwater Management and Adaptation	Groundwater Management Ordinance	Planned	Manage groundwater extractions from existing wells and installation and extraction from new wells	BMO-1, 2, 4
	Water Quality Mitigation Plan (WQMP)	Existing	For projects that require a Coastal Development Permit and fall into one of 8 pre-defined categories, a WQMP must be prepared to show how treatment control BMPs and/or structural BMPs will be used to minimize or prevent the discharge of polluted runoff after construction.	BMO-2, 4
	Well construction/destruction permits	Existing	Los Angeles County Department of Public Health issues permits for groundwater construction and destruction	BMO-1, 4
	Recycled water non-potable reuse regulations, guidelines and permits	Existing	Implement regulations, guidelines and permits as part of the CCWTF recycled water delivery system will help to mitigate future recycled-water related loadings to the groundwater basin.	BMO-2, 3, 4
	Total Maximum Daily Loads (TMDLs)	Existing	As a result of surface water-groundwater interactions between Malibu Creek/Lagoon and the MVGB, aid in meeting TMDLs for Malibu Creek/Lagoon will aid in protecting groundwater quality	BMO-2
Protect/Enhance Groundwater Recharge	Land development approvals	Existing	Manage development to protect key basin recharge areas	BMO-2, 3
	Mapping of basin recharge areas	Planned	Recharge zones for the groundwater basin will be mapped and used in consideration of land use approvals	BMO-1, 4
	Stormwater runoff retention ordinance	Existing	New projects are to retain onsite the Storm Water Quality Design Volume (SWQDV) defined as the greater of the 85 <sup>th</sup> percentile, 24-hour storm event or the 0.75", 24-hour storm event.	BMO-2, 4
Contaminated Groundwater Migration Control	Regulatory coordination	Existing	The City's Environmental Sustainability Department coordinates with other local, state and federal regulatory agencies to protect water resources and manage the migration of contaminated groundwater	BMO-2, 4
Saline Water Intrusion Management	Recycled water injection as part of CCWTF	Planned	Injection will establish a partial recharge barrier against future saline water intrusion	BMO-1, 4
	Groundwater Management Ordinance	Planned	Manage groundwater extractions from existing wells and installation and extraction from new wells	BMO-1, 2, 4
Groundwater Monitoring	Groundwater elevation and water quality monitoring program	Planned	Groundwater monitoring will be required as part of the WRR/WDR for the CCWTF	BMO-1, 3, 4
	SNMP monitoring program	Planned	A supplemental monitoring program will be implemented, tiering off the WDR monitoring program, to provide necessary information for SNMP implementation	BMO-3, 4
	MOU monitoring program	Planned	A supplemental monitoring program will be implemented, tiering off the WDR monitoring program, to provide necessary information for evaluating the impacts of CCWTF implementation per MOU requirements	BMO-2

Category	Description	Existing/Planned	Description	BMOs Met
Wastewater Salinity/Nutrient Control	Regenerative salt-based water softeners ordinance	Planned	Control loading of salts in wastewater to reduce salts in recycled water	BMO-4
	CCWTF construction and operation	Planned	Wastewater collection and nitrogen treatment	BMO-1, 2, 3, 4
Stormwater Capture/Runoff Management	LID and stormwater BMPs	Existing	City promotes green architecture (including LID techniques) through its Green Building Standards Code and implementation of State General Permits	BMO-2, 4
	Stormwater runoff retention ordinance	Existing	New projects are to retain onsite the Storm Water Quality Design Volume (SWQDv) defined as the greater of the 85 <sup>th</sup> percentile, 24-hour storm event or the 0.75", 24-hour storm event.	BMO-2, 4
	MS4 NPDES permits issued by LARWQCB	Existing		BMO-2, 4
	Stormwater Management Plans (SWMP)	Existing	All projects which require a Coastal Development Permit must include a SWMP to mitigate the effect of development on stormwater after construction and must maximize, to the extent practicable, the percentage of permeable surfaces and the retention of dry-weather runoff on the site	BMO-2, 4
Public Outreach	MVGB GWMP and SNMP	Planned	City is presently preparing a SNMP and GWMP for the MVGB	BMO-2, 4
	Cooperation and coordination between water-related entities	Ongoing	The City currently coordinates with multiple entities in the groundwater basin on water resource-related issues, including, but not limited to, the LARWQCB, National Park Service, Resource Conservation District of the Santa Monica Mountains, California State Coastal Conservancy, Las Virgenes Municipal Water District, Malibu Coastal Land Conservancy	BMO-1, 2, 3, 4
	Southern California Salinity Coalition ( <a href="http://www.socalsalinity.org">www.socalsalinity.org</a> )	Existing		BMO-3
	WateReuse Association ( <a href="http://www.watereuse.org">www.watereuse.org</a> ) and WateReuse Research Foundation ( <a href="http://www.watereuse.org/foundation">www.watereuse.org/foundation</a> )	Existing		BMO-3
Land Use Regulation	Land development approvals	Existing	Manage development to protect key basin recharge areas	BMO-2, 3
	Landscape water conservation requirements	Existing	M.W.C. Section 9.22, City Ordinance No. 343 requires homeowners to maintain water-efficient landscapes	BMO-3

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Appendix A – Constituent Lists from Monitoring and Reporting Plan, Draft Order No. R4-2015-XXXX

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# CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LOS ANGELES REGION

320 West 4<sup>th</sup> Street, Suite 200, Los Angeles, California 90013  
(213) 576-6660 • Fax (213) 576-6640  
<http://www.waterboards.ca.gov/losangeles/>

## MONITORING AND REPORTING PROGRAM CI. NO. 10042 FOR CITY OF MALIBU (MALIBU CIVIC CENTER WASTEWATER TREATMENT PLANT – PHASES I & II PROJECTS) (File No. 11-087)

This Monitoring and Reporting Program (MRP) No. CI 10042 is issued pursuant to California Water Code section 13267, which authorizes the Regional Water Quality Control Board, Los Angeles Region, (Regional Board) to require the City of Malibu (City) who discharges the tertiary-treated wastewater generated from the Malibu Civic Center Wastewater Treatment Facility (Civic Center Facility) into aquifers and/or recycles it for landscape irrigation to furnish technical or monitoring reports. The reports required herein are necessary to assure compliance with Waste Discharge Requirements (WDRs) and Water Recycling Requirements (WRRs) Order No. R4-2015-XXXX and to protect the waters of the state and their beneficial uses. The evidence that supports the need for the reports is set forth in the WDRs/WRRs and the Regional Board record.

### I. SUBMITTAL OF REPORTS

1. The City shall comply with the Electronic Submittal of Information (ESI) requirements by submitting all reports required under the MRP, including electronic data format (EDF) groundwater and surface water monitoring data, injection location data, and monitoring reports. These reports shall be received by the Regional Board via the State Water Resources Control Board (State Water Board) GeoTracker database under Global ID WDR100000359 on the dates indicated as follows:
  - A. **Quarterly Monitoring Reports** shall be received by the Regional Board by the 30<sup>th</sup> day of the month following the end of each quarterly monitoring period according to Table 1. The first Quarterly Monitoring Report under this program must be received by the Regional Board by July 30, 2015.

<b>Table 1 – Reporting Period and Due</b>	
<b>Reporting Period</b>	<b>Report Due</b>
January ~ March	April 30
April ~ June	July 30
July ~ September	October 30
October ~ December	January 30

- B. **Annual Summary Report** shall be received by the Regional Board by March 1 of each year. The first Annual Summary Report under this program must be received by the Regional Board no later than March 1, 2016.

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2. If there is no discharge and/or water recycled during any reporting period, the report shall so state. Data collected during installation of injection wells or monitoring wells shall be included in the quarterly and annual report.
3. The data shall include the well specifications, ordinances, well heads elevation to mean sea level (MSL) and the method to develop the well. The construction of wells shall follow *California Well Standards* of the California Department of Water Resources.
4. All report shall be prepared by or under the direction of a licensed engineer in the State of California or a certified hydrogeologist in the State of California. All monitoring reports must include, at minimum, the following:
  - A. Well and surface water station identification, date and time of sampling;
  - B. Sampler identification, and laboratory identification; and,
  - C. Quarterly observation of groundwater levels, recorded to 0.01 feet MSL, and flow direction.

## II. MONITORING REQUIREMENTS

1. Monitoring shall be used to determine compliance with the requirements of the Order No. R4-2015-XXXX and shall include, but not limited to, implementation and documentation of the following:
  - A. Locations of each groundwater and surface water monitoring station where representative samples can be obtained and the rationale for the selection. The City must include a map, at a scale of 1 inch equals 1,200 feet or less, that clearly identifies the locations of the Civic Center Facility, all groundwater monitoring wells, injection wells, and surface water monitoring stations.
  - B. Sampling protocols (specified in 40 CFR Part 136 or American Water Works Association standards where appropriate) and chain of custody procedures.
  - C. For groundwater monitoring, outline the methods and procedures to be used for measuring water levels; purging wells; collecting samples; decontaminating equipment; containing, preserving, and shipping samples; and maintaining appropriate documentation. Also include the procedures for handling, storing, testing, and disposing of purge and decontamination waters generated from the sampling events.
  - D. For surface water monitoring, outline the methods and procedures to be used for collecting samples; decontaminating equipment; containing, preserving, and shipping samples; and maintaining appropriate documentation. Also include the procedures for handling, storing, testing, and disposing of decontamination waters generated from the sampling events.
  - E. Laboratory or laboratories, which conducted the analyses. Include copy or copies of laboratory certifications by the Environmental Laboratory

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Accreditation Program (ELAP) of the State Water Board's Division of Drinking Water (DDW) every year or when the City changes their contract laboratory.

- F. Analytical test methods used and the corresponding Detection Limits for Purposes of Reporting (DLR) for unregulated and regulated chemicals. Please see the DDW's website at [http://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/EDT.shtml](http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDT.shtml) for unregulated and regulated chemicals.
- F. Quality assurance and control measures.
2. The samples shall be analyzed using analytical methods described in 40 CFR Part 136; or where no methods are specified for a given pollutant, by commercially available methods approved by the United State Environmental Protection Agency (USEPA) or DDW, Regional Board and/or State Board. The City shall select the analytical methods that provide reporting detection limits (RDLs) lower than the limits prescribed in the accompanying Order No. R4-2015-XXXX.
  3. The City shall instruct its laboratories to establish calibration standards so that the RDLs (or its equivalent if there is a different treatment of samples relative to calibration standards) are the lowest calibration standard. At no time shall the City use analytical data derived from extrapolation beyond the lowest point of the calibration curve.
  4. Upon request by the City, the Regional Board, in consultation with the USEPA or DDW and the State Board Quality Assurance Program, may establish RDLs, in any of the following situations:
    - A. When the pollutant has no established method under 40 CFR 136 (revised May14, 1999, or subsequent revision);
    - B. When the method under 40 CFR 136 for the pollutant has a RDL higher than the limit specified in this Order; or,
    - C. When the City agree to use a test method that is more sensitive than those specified in 40 CFR Part 136 and is commercially available.
  5. Samples of disinfected effluent must be analyzed within allowable holding time limits as specified in 40 CFR Part 136.3. All QA/QC analyses must be run on the same dates when samples were actually analyzed. The City shall make available for inspection and/or submit the QA/QC documentation upon request by Regional Board staff. Proper chain of custody procedures must be followed and a copy of that documentation shall be submitted with the quarterly report.
  6. For unregulated chemical analyses, the City shall select methods according to the following approach:
    - A. Use drinking water methods, if available;
    - B. Use DDW-recommended methods for unregulated chemicals, if available;

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- C. If there is no DDW-recommended drinking water method for a chemical, and more than a single USEPA-approved method is available, use the most sensitive USEPA-approved method;
  - D. If there is no USEPA-approved method for a chemical, and more than one method is available from the scientific literature and commercial laboratory, after consultation with DDW, use the most sensitive method;
  - E. If no approved method is available for a specific chemical, the City's laboratory may develop or use its own methods and should provide the analytical methods to DDW or the Regional Board for review. Those methods may be used until DDW recommended or USEPA-approved methods are available.
  - F. If the only method available for a chemical is for wastewater analysis (e.g., a chemical listed as a priority pollutant only), sample and analyze for that chemical in the treated and disinfected effluent. Use this approach until the City's laboratory develops a method for the chemical in drinking water, or until a DDW-recommended or USEPA-approved drinking water method is available.
  - G. The City is required to inform the Regional Board, in event that D, E, F is occurring.
7. For constituents of emerging concerns (CECs) analyses:

CECs (see Attachment C2) are being collected for information purposes. There are currently no standards for the constituents listed in attachment C2. The attached reporting limits shall be used for these constituents.

### III. REPORTING REQUIREMENTS

The City shall submit all reports to the Regional Board by the dates indicated in Section I. All quarterly, and annual monitoring reports shall contain a separate section titled "Summary of Non-Compliance", which discusses the compliance records and corrective actions taken or planned that may be needed to bring the reuse into full compliance with water recycling requirements. All quarterly and annual reports shall clearly list all non-compliance with WDRs/WRRs, as well as all excursions of effluent limits.

#### 1. Quarterly reports

- A. These reports shall include, at a minimum, the following information:
  - a. The volume of the effluent and the volume of treated wastewater used for land disposal~~injection~~ via injection~~land disposal~~, landscape irrigation, and/or percolation. If no recycled water is used during the quarter, the report shall so state.
  - b. The date and time of sampling and analyses on the effluent, groundwater, and surface water.
  - c. All analytical results of samples collected during the monitoring period of

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- the effluent, groundwater, and surface water.
- d. Documentation of all QA/QC procedures that were followed during sampling and laboratory analyses
  - e. Records of any operational problems, plant upset and equipment breakdowns or malfunctions, and any discharge(s) used for land disposal~~injection~~ via injection~~land disposal~~, landscape irrigation, and/or percolation.
  - f. Discussion of compliance, noncompliance, or violation of requirements.
  - f. All corrective or preventive action(s) taken or planned with schedule of implementation, if any violation occurs.

B. For the purpose of reporting compliance with numerical limitations, analytical data shall be reported using the following reporting protocols:

- a. Sample results greater than or equal to the RDL must be reported “as measured” by the laboratory (i.e., the measured chemical concentration in the sample);
- b. Sample results less than the RDL, but greater than or equal to the laboratory’s method detection limit (MDL), must be reported as “Detected, but Not Quantified”, or DNQ. The laboratory must write the estimated chemical concentration of the sample next to DNQ as well as the words “Estimated Concentration” (may be shortened to Est. Conc.); or
- c. Sample results less than the laboratory’s MDL must be reported as “None-Detected”, or ND.

C. If the City samples and performs analyses (other than for process/operational control, startup, research, or equipment testing) on any sample more frequently than required in this MRP using approved analytical methods, the results of those analyses shall be included in the report. These results shall be included in the calculation of the average used in demonstrating compliance with average effluent, receiving groundwater water, etc., limitations.

D. The Regional Board may request supporting documentation, such as daily logs of operations.

## 2. Annual Reports

A. Tabular and graphical summaries of the monitoring data (quality of tertiary treated effluent, groundwater, and surface water; quantity of injected water) obtained during the previous calendar year. A comparison of laboratory results against effluent limits contained in these WDR/WRRs and notations of any exceedences of limits or other requirements shall be summarized and submitted at the beginning of the report.

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- B. Discussion of the compliance record and corrective or preventive action(s) taken or planned that may be needed to bring the treated effluent, including the treated effluent used for recycled water, into full compliance with the requirements in the accompanying Order No. R4-2015-XXXX.
- C. An in-depth discussion of the results of the final effluent monitoring, groundwater monitoring, and surface water monitoring programs conducted during the previous year includes:

- a. Any change of receiving groundwater and surface water quality resulting from injection and use of recycled water for landscape irrigation; and,
- b. Any change of groundwater flow pattern resulting from injection.

Temporal and spatial trends in the data shall be analyzed, with particular reference to comparisons between stations with respect to distances from the monitoring wells and comparisons to data collected during previous years. Appropriate statistical tests and indices, subject to approval by the Executive Officer, shall be calculated and included in the annual report.

- D. The description of any changes and anticipated changes including any impacts in operation of any unit processes or facilities shall be provided.
- E. A list of the analytical methods employed for each test and associated laboratory quality assurance/quality control procedures shall be included. The report shall restate the laboratories used by the City to monitor compliance with the accompanying Order, their status of certification, and provide a summary of analyses.
- F. The report shall confirm operator certification and provide a list of current operating personnel, their responsibilities, and their corresponding grade of certification.
- G. The report shall also summarize any change of the **Operation, Maintenance, and Monitoring Plan (OMM Plan)** due to the optimization of the existing Civic Center Facility operation. The summary shall discuss conformance with the Civic Center Facility's OMM Plan for operations, maintenance, and monitoring of the Civic Center Facility, and whether the OMM Plan requires revision for the current facilities.
- H. Each annual report shall summarize the groundwater flow and transport and summary of the injection operations for the project. This report shall also use the most current data for the evaluation of the transport of injected water including concerns of emerging constituents; such evaluations must include, at a minimum, the following information:
  - a. Total quantity of water injected into each major aquifer;
  - b. Estimates of the rate and path of flow of the injected water; and,

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- c. Data used as parameters to calculate the rates of groundwater flow and volume of injected water reaching Santa Monica Bay, Malibu Creek and Lagoon.

**IV. WATER QUALITY MONITORING REQUIREMENTS**

**1. Influent Monitoring**

- A. Influent monitoring is required to:
  - a. Determine compliance with WDRs/WRRs permit conditions.
  - b. Assess Civic Center Facility performance.
- B. The City shall monitor influent to the Civic Center Facility at Influent Pump Station located in the main stream of the influent channel prior to the headworks as specified in Table 2.

Table 2 – Influent Monitoring			
Constituents	Units <sup>[1]</sup>	Type of Sample	Minimum Frequency of Analysis
Total waste flow	gpd	Recorder	Continuous <sup>[2]</sup>
Total suspended solids	mg/L	24-hour comp.	Weekly
BOD <sub>5@20° C</sub>	mg/L	24-hour comp.	Weekly

[1]. gpd: gallons per day;  
 mg/L: milligram/liter;

[2]. The City shall report the daily minimum, maximum, and average values.

**2. Effluent Monitoring**

- A. Effluent monitoring is required to:
  - a. Determine compliance with WDRs/WRRs permit conditions and water quality standards.
  - b. Assess Civic Center Facility performance, identify operational problems and improve Facility performance.
- B. The City shall monitor the discharge of tertiary-treated effluent at downstream of all treated effluent passing through this station, including the final disinfection process. If more than one analytical test method is listed for a given parameter, the City must select from the listed methods and corresponding Minimum Level.
- C. The following shall constitute the effluent monitoring program, specified in Table 3:

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<b>Table 3 – Effluent/Recycled Water Monitoring</b>			
<b>Constituent</b>	<b>Unit <sup>[1]</sup></b>	<b>Type of Sample <sup>[2]</sup></b>	<b>Minimum Frequency of Analysis</b>
Total Flow	gpd	Recorder	Continuous <sup>[3]</sup>
pH	pH units	Grab	Daily
BOD <sub>5@20 °C</sub>	mg/L	24-hour composite	Daily the first month and Weekly thereafter <sup>[4]</sup>
Turbidity	NTU	Recorder	1.2 Hours <sup>[5]</sup>
Total Coliform	MPN/100mL	Grab	Daily
Fecal Coliform	MPN/100mL	Grab	Daily
Total Suspended Solids	mg/L	Grab	Weekly
Residual Chlorine	mg/L	Grab	Daily
Oil and Grease	mg/L	Grab	Monthly
Nitrate + Nitrite as Nitrogen	mg/L	Grab	Weekly
Nitrate as Nitrogen	mg/L	Grab	Weekly
Nitrite as Nitrogen	mg/L	Grab	Weekly
Ammonia Nitrogen	mg/L	Grab	Weekly
Organic Nitrogen	mg/L	Grab	Weekly
Total Nitrogen <sup>[6]</sup>	mg/L	Grab	Weekly
Total Phosphorus	mg/L	Grab	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly
Sulfate	mg/L	Grab	Monthly
Chloride	mg/L	Grab	Monthly
Boron	mg/L	Grab	Monthly
MBAS <sup>[7]</sup>	mg/L	Grab	Monthly
Constituents listed in Attachments A1 to A5	various	Grab/24-hour composite	Quarterly
CECs <sup>[8]</sup> in Attachment C	various	Grab	Annually
Priority Pollutants in Attachment D	µg/L	Grab	Annually

- [1]. NTU: nephelometric turbidity unit;  
 MPN/100mL: Most Probable Number/100 milliliter
- [2]. Grab sample is an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. When an automatic composite sampler is not used, composite sampling shall be done as follows: If the duration of the discharge is equal to or less than 24 hours but greater than eight (8) hours, at least eight (8) flow-

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- weighted samples shall be obtained during the discharge period and composited. For discharge duration of less than eight (8) hours, individual 'grab' sample may be substituted. 24-hour composite is for semi-volatile and volatile chemicals.
- [3]. The City shall report the daily minimum, maximum, and average values. The City shall report the estimated daily volume of wastewater used for irrigation and for spray disposal.
  - [4]. The BOD shall be sampled and analyzed daily for the first month after initiation of operation, and weekly thereafter. If the concentration of BOD exceeds the effluent limits specified in the Order, the Discharger shall immediately begin to sample and analyze for BOD on a daily basis. The sampling frequency may resume back to weekly when the concentration of BOD in the daily sample again meets the BOD effluent limits.
  - [45]. The turbidity samples must be taken at intervals of no more than 1.2 hours over a 24-hour period to determine compliance for turbidity. If the continuous turbidity meter and recorder failed, grab sampling may be substituted for a period of up to 24-hours.
  - [56]. Total nitrogen: Sum of nitrate, nitrite, organic nitrogen and ammonia (all expressed as nitrogen).
  - [67]. MBAS: Methylene Blue Active Substances
  - [78]. CECs: Constituents of Emerging Concerns. The City shall monitor the CECs in the effluent discharge. The City shall follow the requirements as discussed in the accompanying Permit Section IX.24.B. Analysis under this section is for monitoring purposes only. Analytical results obtained will not be used for compliance determination purposes, since the methods have not been incorporated into 40 CFR part 136.

D. CECs: CECs, listed in Attachment D, shall be monitored annually. The Executive Officer may add or delete chemicals from this list as new analytical methods become available and may also make revisions to approved analytical methods as needed. A revised CECs list will be made available to the City when changes occur. The City shall request (and submit a justification for) any deviation from the attached list for EO approval, if a change is required, before collecting samples.

### 3. Groundwater Monitoring

A. Groundwater Monitoring Well Specifications: Table 4 shows specifications of groundwater monitoring wells for baseline and long-term groundwater monitoring programs.

Table 4 – Specifications of Groundwater Monitoring Wells			
ID	Monitoring Well Location	Well Depth (BGS <sup>(1)</sup> )	Purpose of Monitoring Location
SMBRP-9	34°2'16.46" N; 118°41'34.90" W	45 feet	Upgradient water quality in the shallow alluvium
TY-MW-1	34°2'4.91" N; 118°41'51.03" W	41 feet	Downgradient water quality in Winter Canyon
MCWP-MW04S	34°2'7.08" N; 118°41'28.07" W	20 feet	Upgradient shallow alluvial water quality of the Malibu Colony Plaza

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<b>ID</b>	<b>Monitoring Well Location</b>	<b>Well Depth (BGS<sup>(1)</sup>)</b>	<b>Purpose of Monitoring Location</b>
MCWP-MW07S	34°2'0.73" N; 118°41'40.97" W	20 feet	Downgradient shallow alluvial water quality of the Malibu Colony Plaza; adjacent to injection zone
SMBRP-12	34°1'58.25" N; 118°41'24.49" W	25 feet	Cross-gradient deep water quality
LAMW-5S	34°2'13.48" N; 118°41'56.09" W	20-80 feet	Upgradient water quality in Winter Canyon
MCWP-MW04D	34°02'7.00" N; 118°41'27.90" W	148 feet	Upgradient deep Civic Center Gravels water quality of injection wells
MCWP-MW07D	34°2'0.70" N; 118°41'40.70" W	134 feet	Deep Civic Center Gravels water quality adjacent to injection wells W-1 and w-2
MCWP-MW09	34°1'58.26" N; 118°41'24.32" W	95 feet	Cross-gradient deep Civic Center Gravels water quality of injection wells

BGS: Below ground surface.

B. Baseline groundwater monitoring:

a. Baseline groundwater monitoring is required to:

- i. Establish groundwater water quality database prior to land disposal ~~injection~~ via injection ~~land disposal~~ for deep aquifer (Civic Center Gravels) and landscape irrigation for shallow aquifer (Shallow Alluvium); and,
- ii. Determine the responsibility of possible non-compliances in the future.

b. The City shall ~~conduct~~ initiate the baseline groundwater quality monitoring to collect data by ~~June 4~~ October 15, 2015 and shall ~~continue~~ conclude the baseline monitoring ~~to do so~~ prior to initiation of the land disposal ~~injection~~ via injection ~~land disposal~~. Representative samples of groundwater shall be collected at nine (9) monitoring wells of SMBRP-9, TY-MW-1, MCWP-MW04S, MCWP-MW07S, SMBRP-12, LAMW-5S, MCWP-MW04D, MCWP-MW07D, and MCWP-MW09, from major aquifers, including the aquifers of Shallow Alluvium, Civic Center Gravels, and Winter Canyon Alluvium specified in Table 4.

c. Table 5 sets forth the minimum constituents and parameters for monitoring baseline groundwater quality.

<b>Constituents</b>	<b>Units</b>	<b>Type of Sample</b>	<b>Minimum Frequency of Analysis<sup>(2)</sup></b>

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<b>Table 5 – Baseline Groundwater Monitoring</b>			
<b>Constituents</b>	<b>Units</b>	<b>Type of Sample</b>	<b>Minimum Frequency of Analysis<sup>[2]</sup></b>
Water level elevation <sup>[1]</sup>	Feet	Recorder	Annually
pH	pH units	Grab	Annually
BOD <sub>5</sub> 20 <sup>o</sup> C	mg/L	Grab	Annually
Turbidity	NTU	Grab	Annually
Total Coliform	MPN/100mL	Grab	Annually
Fecal Coliform	MPN/100mL	Grab	Annually
Total Suspended Solids	mg/L	Grab	Annually
Residual Chlorine	mg/L	Grab	Annually
Total Organic Carbon	mg/L	Grab	Annually
Oil and grease	mg/L	Grab	Annually
Nitrate + Nitrite as Nitrogen	mg/L	Grab	Annually
Nitrate as nitrogen	mg/L	Grab	Annually
Nitrite as nitrogen	mg/L	Grab	Annually
Ammonia nitrogen	mg/L	Grab	Annually
Organic Nitrogen	mg/L	Grab	Annually
Total Nitrogen	mg/L	Grab	Annually
Total Phosphorus	mg/L	Grab	Annually
Total Dissolved Solids	mg/L	Grab	Annually
Sulfate	mg/L	Grab	Annually
Chloride	mg/L	Grab	Annually
Boron	mg/L	Grab	Annually
MBAS	mg/L	Grab	Annually
Constituents listed in Attachments A1 to A5	Various	Grab	Annually
CECs in Attachment C	Various	Grab	Annually
Priority Pollutants in Attachment D	µg/L	Grab	Annually

[1]. Water level elevations must be measured to the nearest 0.01 feet, and referenced to mean sea level.

[2]. ~~Semi-annually shall include sample collected from wet and dry season.~~

C. Long-Term Groundwater Monitoring after Discharge:

- a. Long-term groundwater monitoring is used to monitor any possible impact of land disposal injection via injection and land disposal and landscape

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irrigation or percolation on the receiving water quality of groundwater aquifers, Santa Monica Bay, Malibu Creek and Lagoon.

- b. Long-term groundwater monitoring after discharge shall be collected the minimum constituents and parameters, specified in Table 6, for monitoring groundwater quality at monitoring wells of SMBRP-9, MCWP-MW04S, MCWP-MW07S, SMBRP-12, MCWP-MW04D, MCWP-MW07D, and MCWP-MW09 from major aquifers, including the aquifers of Shallow Alluvium, Civic Center Gravels, and Winter Canyon Alluvium.

<b>Table 6 – Long-Term Groundwater Monitoring</b>			
<b>Constituents</b>	<b>Units</b>	<b>Type of Sample</b>	<b>Minimum Frequency of Analysis<sup>[2]</sup></b>
Water level elevation <sup>[1]</sup>	Feet	Recorder	Quarterly
pH	pH units	Grab	Quarterly
BOD <sub>5</sub> 20 °C	mg/L	Grab	Quarterly
Turbidity	NTU	Grab	Quarterly
Total Coliform	MPN/100mL	Grab	Quarterly
Fecal Coliform	MPN/100mL	Grab	Quarterly
Total Suspended Solids	mg/L	Grab	Quarterly
Residual Chlorine	mg/L	Grab	Quarterly
Total Organic Carbon	mg/L	Grab	Quarterly
Oil and grease	mg/L	Grab	Quarterly
Nitrate + Nitrite as Nitrogen	mg/L	Grab	Quarterly
Nitrate as nitrogen	mg/L	Grab	Quarterly
Nitrite as nitrogen	mg/L	Grab	Quarterly
Ammonia nitrogen	mg/L	Grab	Quarterly
Organic Nitrogen	mg/L	Grab	Quarterly
Total Nitrogen	mg/L	Grab	Quarterly
Total Phosphorus	mg/L	Grab	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly
Sulfate	mg/L	Grab	Quarterly
Chloride	mg/L	Grab	Quarterly
Boron	mg/L	Grab	Quarterly
MBAS	mg/L	Grab	Quarterly
Constituents listed in Attachments A1 to A5	Various	Grab	Annually
CECs in Attachment C	µg/L	Grab	Annually

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<b>Table 6 – Long-Term Groundwater Monitoring</b>			
<b>Constituents</b>	<b>Units</b>	<b>Type of Sample</b>	<b>Minimum Frequency of Analysis<sup>[2]</sup></b>
Priority Pollutants in Attachment D	µg/L	Grab	Annually

- [1]. Water level elevations must be measured to the nearest 0.01 feet, and referenced to mean sea level.
- [2]. ~~Annually shall include samples~~ shall be collected from wet during the dry season each year.

c. If more than 10% of the permitted quarterly flow, specified in WDRs Table 8, is diverted to and discharged via the percolation ponds, the City shall collect groundwater samples at TY-MW-1 and LAMW-5S on a quarterly and annually basis as shown in MRP Table 6. If the 10% threshold is not exceeded, the monitoring frequency shall be adjusted to either an annual monitoring or the quarterly that the 10% was exceeded.

**4. Injection Well Monitoring**

A. Injection Well Specifications: Table 7 shows specifications of injection wells.

<b>Table 7 – Specifications of Injection Wells</b>			
<b>ID</b>	<b>Location</b>	<b>Screen Intervals (BGS)</b>	<b>Well Depth (BGS)</b>
W-1	34°1'59.97" N; 118°41'45.59" W	55 feet to 134 feet	170 feet
W-2	34°2'0.83" N; 118°41'40.09" W	55 feet to 134 feet	170 feet
W-3	34°2'1.34" N; 118°41'34.75" W	55 feet to 134 feet	170 feet

B. The City shall record the volume and injection rate in gallons per day of treated wastewater injected through W-1 to W-3.

**5. Surface Water Monitoring**

A surface water monitoring program is implemented to evaluate the quality of surface waters at near-shore ocean and the Malibu Lagoon, and any changes in quality that might result from the injection.

A. Surface Water Monitoring Stations

Table 8 specifies locations and monitoring depths of four (4) near shore and six (6) Malibu Lagoon and Creek surface water monitoring stations.

**Table 8 – Specifications of Surface Water Monitoring Stations**

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ID	Location	Monitoring Depth
<b>Near shore</b>		
N-001	34°1'56.22" N; 118°41'38.75" W	Ankle depth
N-002	34°1'55.21" N; 118°41'21.13" W	Ankle depth
N-003	34°1'54.58" N; 118°40'47.30" W	Ankle depth
N-004	34°1'47.34" N; 118°42'17.10" W	Ankle depth
<b>Malibu Lagoon and Creek</b>		
L-001	3402'14.27" N; 118040'59.31" W	1 foot below surface water
L-002	3402'11.97" N; 118041'1.51" W	1 foot below surface water
L-003	3402'6.66" N; 118040'58.52" W	1 foot below surface water
L-004	3402'1.81" N; 118040'58.55" W	1 foot below surface water
L-005	3402'0.65" N; 118040'49.29" W	1 foot below surface water
L-006	3401'58.44" N; 118041'7.10" W	1 foot below surface water

B. Surface Water Monitoring Constituents and Frequency

The City shall collect the minimum constituents, specified in Table 9, for monitoring surface water quality at ten (10) stations, specified in Table 8.

Constituents	Units	Type of Sample	Minimum Frequency of Analysis
Total Coliform	MPN/100mL	Grab	Quarterly
Fecal Coliform	MPN/100mL	Grab	Quarterly
Nitrate as nitrogen	mg/L	Grab	Quarterly
Nitrite as nitrogen	mg/L	Grab	Quarterly
Ammonia nitrogen	mg/L	Grab	Quarterly
Organic Nitrogen	mg/L	Grab	Quarterly
Total Phosphorus	mg/L	Grab	Quarterly

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During wet-weather event, stormwater runoff will impact surface water monitoring stations. The surface water monitoring shall be conducted no earlier than three days, since rain (0.1 inch and greater) ceases.

**VI. GENERAL MONITORING AND REPORTING REQUIREMENTS**

1. The City shall comply with all Standard Provisions (Attachment B) related to monitoring, reporting, and recordkeeping.
2. For every item where the requirements are not met, the City shall submit a statement of the actions undertaken or proposed which will bring the treated effluent and/or treated effluent used for the recycled water program into full compliance with requirements at the earliest possible time, and submit a timetable for implementation of the corrective measures.
3. Monitoring reports shall be signed by either the principal Executive Officer or ranking elected official. A duly authorized representative of the aforementioned signatories may sign documents if:

- A. The authorization is made in writing by the signatory;
- B. The authorization specifies the representative as either an individual or position having responsibility for the overall operation of the regulated facility or activity; and,

The written authorization is submitted to the Executive Officer of this Regional Board.

4. The monitoring report shall contain the following completed declaration:  
  
"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment."

Executed on the \_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_  
\_\_\_\_\_  
Signature  
\_\_\_\_\_  
Title

5. The City shall retain records of all monitoring information, including all calibration and maintenance, monitoring instrumentation, and copies of all reports required by this Order, for a period of at least three (3) years from the date of sampling measurement, or report. This period may be extended by request of the Regional Board at any time and shall be extended during the course of any unresolved litigation regarding the regulated activity.

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6. Records of monitoring information shall include:
  - A. The date, exact place, and time of sampling or measurements;
  - B. The individual(s) who performed the sampling or measurements;
  - C. The date(s) analyses were performed;
  - D. The individual(s) who performed the analysis;
  - E. The analytical techniques or methods used; and
  - F. The results of such analyses.
7. The City shall submit to the Regional Board, together with the first monitoring report required by this Order, a list of all chemicals and proprietary additives which could affect the quality of the treated effluent and the treated effluent used for recycled water, including quantities of each. Any subsequent changes in types and/or quantities shall be reported promptly. An annual summary of the quantities of all chemicals, listed by both trade and chemical names, which are used in the treatment process shall be included in the annual report.

#### VII. WASTE HAULING REPORTING

In the event that waste sludge, septage, or other wastes are hauled offsite, the name and address of the hauler shall be reported, along with types and quantities hauled during the reporting period and the location of final point of disposal. In the event that no wastes are hauled during the reporting period, a statement to that effect shall be submitted in the quarterly monitoring report.

#### VIII. MONITORING FREQUENCIES

~~Monitoring frequencies and parameters may be adjusted to a less frequent basis or parameters dropped revised by the Executive Officer, if the City may makes a request (with justification) to reduce the monitoring frequency or to modify the list of monitoring constituents, two years after optimizing the Civic Center Facility operation, and the Executive Officer determines that the request is adequately supported by statistical trends in the monitoring data submitted. The City shall not make any adjustments until written approval is received from the Executive Officer provides written approval after determining that the request is adequately supported by monitoring data.~~

These records and reports are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Ordered by:

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Samuel Unger, P.E.  
Executive Officer  
Date: March 12, 2015

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**Attachment A – Maximum Contaminant Levels**

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## Attachment A1

Attachment A1 Table 64431-A – Inorganic Chemicals <sup>[1]</sup>	
Chemical	Maximum Contaminant Levels (mg/L)
Aluminum	1
Antimony	0.006
Arsenic	0.01
Asbestos	7 MFL <sup>[2]</sup>
Barium	1
Beryllium	0.004
Cadmium	0.005
Chromium	0.05
Cyanide	0.15
Mercury	0.002
Nickel	0.1
Selenium	0.05
Thallium	0.002
Perchlorate	0.006
Fluoride	2

[1]. California Code of Regulation (CCR) Title 22, Section 64431.

[2]. MFL = million fibers per liter; MCL for fibers exceeding 10µm in length.

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## Attachment A2

<b>Table 4 – Radioactivity<sup>[1]</sup></b>	
<b>Chemical</b>	<b>Maximum Contaminant Levels (pCi/L)</b>
Combined Radium-226 and Radium-228	5
Gross Alpha Particle Activity (Including Radium-226 but Excluding Radon and Uranium)	15
Tritium	20,000
Strontium-90	8
Gross Beta Particle Activity	50
Uranium	20

[1]. CCR Title 22, Section 64443.

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### Attachment A3

Table 64444-A – Organic Chemicals <sup>[1]</sup>	
Chemical	Maximum Contaminant Levels (mg/L)
<b>(a) Volatile Organic Chemicals</b>	
Benzene	0.001
Carbon Tetrachloride (CTC)	0.0005
1,2-Dichlorobenzene	0.6
1,4-Dichlorobenzene	0.005
1,1-Dichloroethane	0.005
1,2-Dichloroethane (1,2-DCA)	0.0005
1,1-Dichloroethene (1,1-DCE)	0.006
Cis-1,2-Dichloroethylene	0.006
Trans-1,2-Dichloroethylene	0.01
Dichloromethane	0.005
1,2-Dichloropropane	0.005
1,3-Dichloropropane	0.0005
Ethylbenzene	0.3
Methyl-tert-butyl-ether (MTBE)	0.013
Monochlorobenzene	0.07
Styrene	0.1
1,1,2,2-Tetrachloroethane	0.001
Tetrachloroethylene (PCE)	0.005
Toluene	0.15
1,2,4-Trichlorobenzene	0.005
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
Trichloroethylene (TCE)	0.005
Trichlorofluoromethane	0.15

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<b>Table 64444-A – Organic Chemicals<sup>[1]</sup></b>	
<b>Chemical</b>	<b>Maximum Contaminant Levels (mg/L)</b>
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2
Vinyl Chloride	0.0005
Xylenes (m,p)	1.75
<b>(b) Non-Volatile synthetic Organic Chemicals</b>	
Alachlor	0.002
Atrazine	0.001
Bentazon	0.018
Benzo(a)pyrene	0.0002
Carbofuran	0.018
Chlordane	0.0001
2,4-D	0.07
Dalapon	0.2
1,2-Dibromo-3-chloropropane (DBCP)	0.0002
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.004
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene Dibromide (EDB)	0.00005
Glyphosate	0.7
Heptachlor	0.00001
Heptachlor Epoxide	0.00001
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002

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<b>Table 64444-A – Organic Chemicals<sup>[1]</sup></b>	
<b>Chemical</b>	<b>Maximum Contaminant Levels (mg/L)</b>
Methoxychlor	0.03
Molinate	0.02
Oxamyl	0.05
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated Biphenyls	0.0005
Simazine	0.004
Thiobencarb	0.07
Toxaphene	0.003
2,3,7,8-TCDD (Dioxin)	$3 \times 10^{-8}$
2,4,5-TP (Silvex)	0.05

[1]. CCR Title 22, Section 64444.

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### Attachment A4

Table 64533-A – Disinfection Byproducts <sup>[1]</sup>	
Constituent	Units
Total Trihalomethanes (TTHM)	0.08 ppb
Bromodichloromethane	
Bromoform	
Chloroform	
Dibromochloromethane	
Haloacetic acid (five) (HAA5)	0.06 ppb
Monochloroacetic acid	
Dichloroacetic acid	
Trichloroacetic acid	
Monobromoacetic acid	
Dibromoacetic acid	
Bromate <sup>[2]</sup>	0.01ppb
Chlorite <sup>[3]</sup>	1 ppb

- [1]. CCR Title 22, Section 64533, Chapter 15.5
- [2]. Bromate is listed for plant using ozone disinfection only.
- [3]. Chlorite is listed for plant using chlorine dioxide only.

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## Attachment A5

<b>Chemical</b>	<b>Units</b>
Aluminum	0.2 mg/L
Color	150 Units
Copper	1.0 mg/L
Corrosivity	Non corrosive
Foam Agents (MBAS)	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Methyl-tert-butyl-ether (MTBE)	0.005 mg/L
Odor – Threshold	3 units
Silver	0.1 mg/L
Thiobencarb	0.001 mg/L
Zinc	5 mg/L

[1]. CCR Title 22, Section 64449.

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## **Attachment B – Standard Provisions Applicable to Waste Discharge Requirements**

1. DUTY TO COMPLY

The discharger must comply with all conditions of these waste discharge requirements. A responsible party has been designated in the Order for this project, and is legally bound to maintain the monitoring program and permit. Violations may result in enforcement actions, including Regional Board orders or court orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these waste discharge requirements by the Regional Board. [CWC Section 13261, 13263, 13265, 13268, 13300, 13301, 13304, 13340, 13350]

2. GENERAL PROHIBITION

Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code (CWC). [H&SC Section 5411, CWC Section 13263]

3. AVAILABILITY

A copy of these waste discharge requirements shall be maintained at the discharge facility and be available at all times to operating personnel. [CWC Section 13263]

4. CHANGE IN OWNERSHIP

The discharger must notify the Executive Officer, in writing at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new discharger containing a specific date for the transfer of this Order's responsibility and coverage between the current discharger and the new discharger. This agreement shall include an acknowledgement that the existing discharger is liable for violations up to the transfer date and that the new discharger is liable from the transfer date on. [CWC Sections 13267 and 13263]

5. CHANGE IN DISCHARGE

In the event of a material change in the character, location, or volume of a discharge, the discharger shall file with this Regional Board a new Report of Waste Discharge. [CWC Section 13260(c)]. A material change includes, but is not limited to, the following:

- (a) Addition of a major industrial waste discharge to a discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the Waste.

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- (b) Significant change in disposal method, e.g., change from a land disposal to a direct discharge to water, or change in the method of treatment which would significantly alter the characteristics of the waste.
- (c) Significant change in the disposal area, e.g., moving the discharge to another drainage area, to a different water body, or to a disposal area significantly removed from the original area potentially causing different water quality or nuisance problems.
- (d) Increase in flow beyond that specified in the waste discharge requirements.
- (e) Increase in the area or depth to be used for solid waste disposal beyond that specified in the waste discharge requirements. [CCR Title 23 Section 2210]

6. REVISION

These waste discharge requirements are subject to review and revision by the Regional Board. [CCR Section 13263]

7. TERMINATION

Where the discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Board, it shall promptly submit such facts or information. [CWC Sections 13260 and 13267]

8. VESTED RIGHTS

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the discharger from his liability under Federal, State or local laws, nor do they create a vested right for the discharger to continue the waste discharge. [CWC Section 13263(g)]

9. SEVERABILITY

Provisions of these waste discharge requirements are severable. If any provision of these requirements are found invalid, the remainder of the requirements shall not be affected. [CWC Section 921]

10. OPERATION AND MAINTENANCE

The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality

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assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order. [CWC Section 13263(f)]

11. HAZARDOUS RELEASES

Except for a discharge which is in compliance with these waste discharge requirements, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall, as soon as (a) that person has knowledge of the discharge, (b) notification is possible, and (c) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State toxic disaster contingency plan adopted pursuant to Article 3.7 (commencing with Section 8574.7) of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the State Board or the appropriate Regional Board of the discharge. This provision does not require reporting of any discharge of less than a reportable quantity as provided for under subdivisions (f) and (g) of Section 13271 of the Water Code unless the discharger is in violation of a prohibition in the applicable Water Quality Control plan. [CWC Section 1327(a)]

12. PETROLEUM RELEASES

Except for a discharge which is in compliance with these waste discharge requirements, any person who without regard to intent or negligence, causes or permits any oil or petroleum product to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall, as soon as (a) such person has knowledge of the discharge, (b) notification is possible, and (c) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State oil spill contingency plan adopted pursuant to Article 3.5 (commencing with Section 8574.1) of Chapter 7 of Division 1 of Title 2 of the Government Code. This provision does not require reporting of any discharge of less than 42 gallons unless the discharge is also required to be reported pursuant to Section 311 of the Clean Water Act or the discharge is in violation of a prohibition in the applicable Water Quality Control Plan. [CWC Section 13272] Standard Provisions Applicable to Waste Discharge Requirements

13. ENTRY AND INSPECTION

The discharger shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

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- (a) Enter upon the discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;
- (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;
- (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
- (d) Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order, or as otherwise authorized by the California Water Code, any substances or parameters at any location. [CWC Section 13267]

14. MONITORING PROGRAM AND DEVICES

The discharger shall furnish, under penalty of perjury, technical monitoring program reports; such reports shall be submitted in accordance with specifications prepared by the Executive Officer, which specifications are subject to periodic revisions as may be warranted. [CWC Section 13267]

All monitoring instruments and devices used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices. Annually, the discharger shall submit to the Executive Office a written statement, signed by a registered professional engineer, certifying that all flow measurement devices have been calibrated and will reliably achieve the accuracy required.

Unless otherwise permitted by the Regional Board Executive officer, all analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. The Regional Board Executive Officer may allow use of an uncertified laboratory under exceptional circumstances, such as when the closest laboratory to the monitoring location is outside the State boundaries and therefore not subject to certification. All analyses shall be required to be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" [40CFR Part 136] promulgated by the U.S. Environmental Protection Agency. [CCR Title 23, Section 2230]

15. TREATMENT FAILURE

In an enforcement action, it shall not be a defense for the discharger that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is

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provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost. [CWC Section 13263(f)]

16. DISCHARGE TO NAVIGABLE WATERS

Any person discharging or proposing to discharge to navigable waters from a point source (except for discharge of dredged or fill material subject to Section 404 of the Clean Water Act and discharge subject to a general NPDES permit) must file an NPDES permit application with the Regional Board. [CCR Title 2 Section 22357]

17. ENDANGERMENT TO HEALTH AND ENVIRONMENT

The discharger shall report any noncompliance which may endanger health or the environment. Any such information shall be provided verbally to the Executive Officer within 24 hours from the time the discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours. The following occurrence(s) must be reported to the Executive Office within 24 hours:

- (a) Any bypass from any portion of the treatment facility.
- (b) Any discharge of treated or untreated wastewater resulting from sewer line breaks, obstruction, surcharge or any other circumstances.
- (c) Any treatment plan upset which causes the effluent limitation of this Order to be exceeded. [CWC Sections 13263 and 13267]

18. MAINTENANCE OF RECORDS

The discharger shall retain records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and record of all data used Standard Provisions Applicable to complete the application for this Order. Records shall be maintained for a minimum of three (3) years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

Records of monitoring information shall include:

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- (a) The date, exact place, and time of sampling or measurement;
  - (b) The individual(s) who performed the sampling or measurement;
  - (c) The date(s) analyses were performed;
  - (d) The individual(s) who performed the analyses;
  - (e) The analytical techniques or method used; and
  - (f) The results of such analyses.
19. (a) All application reports or information to be submitted to the Executive Office shall be signed and certified as follows:
- (1) For a corporation – by a principal executive officer or at least the level of vice president.
  - (2) For a partnership or sole proprietorship – by a general partner or the proprietor, respectively.
  - (3) For a municipality, state, federal, or other public agency – by either a principal executive officer or ranking elected official.
- (b) A duly authorized representative of a person designated in paragraph (a) of this provision may sign documents if:
- (1) The authorization is made in writing by a person described in paragraph (a) of this provision.
  - (2) The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
  - (3) The written authorization is submitted to the Executive Officer.

Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. [CWC Sections 13263, 13267, and 13268]”

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20. OPERATOR CERTIFICATION

Supervisors and operators of municipal wastewater treatment plants and privately owned facilities regulated by the PUC, used in the treatment or reclamation of sewage and industrial waste shall possess a certificate of appropriate grade in accordance with Title 23, California Code of Regulations Section 3680. State Boards may accept experience in lieu of qualification training. In lieu of a properly certified wastewater treatment plant operator, the State Board may approve use of a water treatment plan operator of appropriate grade certified by the State Department of Health Services where reclamation is involved.

Each plan shall be operated and maintained in accordance with the operation and maintenance manual prepared by the municipality through the Clean Water Grant Program [CWC Title 23, Section 2233(d)]

ADDITIONAL PROVISIONS APPLICABLE TO  
PUBLICLY OWNED TREATMENT WORKS' ADEQUATE CAPACITY

21. Whenever a publicly owned wastewater treatment plant will reach capacity within four (4) years the discharger shall notify the Regional Board. A copy of such notification shall be sent to appropriate local elected officials, local permitting agencies and the press. The discharger must demonstrate that adequate steps are being taken to address the capacity problem. The discharger shall submit a technical report to the Regional Board showing flow volumes will be prevented from exceeding capacity, or how capacity will be increased, within 120 days after providing notification to the Regional Board, or within 120 days after receipt of notification from the Regional Board, of a finding that the treatment plant will reach capacity within four (4) years. The time for filing the required technical report may be extended by the Regional Board. An extension of 30 days may be granted by the Executive Officer, and longer extensions may be granted by the Regional Board itself. [CCR Title 23, Section 2232]

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### Attachment C – Monitoring for Constituents of Emerging Concerns (CECs) <sup>[1]</sup>

Constituent	Reporting Limit (µg/L)
17β-Estradiol	0.001
Caffeine	0.05
NDMA	0.002
Triclosan	0.05
DEET	0.05
Sucralose	0.1

[1]: CECs are based on Table 1 Groundwater Recharge Reuse – Subsurface Application of State Water Board Resolution 2013-003

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### Attachment D – Monitoring for Priority Pollutants Listed in California Toxics Rule

Antimony	Trichloroethylene	Fluoranthene
Arsenic	Vinyl Chloride	Fluorene
Beryllium	2-Chlorophenol	Hexachlorobenzene
Cadmium	2,4-Dichlorophenol	Hexachlorobutadiene
Chromium (III)	2,4-Dimethylphenol	Hexachlorocyclopentadiene
Chromium (VI)	4,6-Dinitro-2-Methylphenol	Hexachloroethane
Copper	2,4-Dinitrophenol	Indeno[1,2,3-cd]pyrene
Lead	2-Nitrophenol	Isophorone
Mercury	4-Nitrophenol	Naphthalene
Nickel	4-Chloro-3-Methylphenol	Nitrobenzene
Selenium	Pentachlorophenol	N-nitrosodimethylamine
Silver	Phenol	N-Nitrosodi-N-propylamine
Thallium	2,4,6-Trichlorophenol	N-Nitrosodiphenylamine
Zinc	Acenaphthene	Phenanthrene
Cyanide	Acenaphthylene	Pyrene
Asbestos	Anthracene	1,2,4-Trichlorobenzene
2,3,7,8-TCDD	Benzidine	Aldrin
Acrolein	Benzo[a]anthracene	alpha-BHC
Acrylonitrile	Benzo[a]pyrene	beta-BHC
Benzene	Benzo[b]fluoranthene	gamma-BHC
Bromoform	Benzo[ghi]perylene	delta-BHC
Carbon tetrachloride	Benzo[k]fluoranthene	Chlordane
Chlorobenzene	Bis(2-chloroethoxy) Methane	4,4'-DDT
Chlorodibromomethane	Bis(2-chloroethyl) Ether	4,4'-DDE
Chloroethane	Bis(2-chloroisopropyl) Ether	4,4'-DDD
2-Chloroethylvinyl Ether	Bis(2-ethylhexyl) Phthalate	Dieldrin
Chloroform	4-Bromophenyl Phenyl Ether	alpha-Endosulfan

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Dichlorobromomethane	Butylbenzyl Phthalate	beta-Endosulfan
1,1-Dichloroethane	2-Chloronaphthalene	Endosulfan Sulfate
1,2-Dichloroethane	4-Chlorophenyl Phenyl Ether	Endrin
1,1-Dichloroethylene	Chrysene	Endrin Aldehyde
1,2-Dichloropropane	Dibenzo[ah]anthracene	Heptachlor
1,3-dichloropropylene	1,2-Dichlorobenzene	Heptachlor Epoxide
Ethylbenzene	1,3-Dichlorobenzene	PCB (Aroclor-1016)
Methyl Bromide	1,4-Dichlorobenzene	PCB (Aroclor-1221)
Methyl Chloride	3,3'-Dichlorobenzidine	PCB (Aroclor-1232)
Methylene Chloride	Diethyl Phthalate	PCB (Aroclor-1242)
1,1,2,2-Tetrachloroethane	Dimethyl Phthalate	PCB (Aroclor-1248)
Tetrachloroethylene	Di-n-butyl Phthalate	PCB (Aroclor-1254)
Toluene	2,4-Dinitrotoluene	PCB (Aroclor-1260)
1,2-Trans-Dichloroethylene	2,6-Dinitrotoluene	Toxaphene
1,1,1-Trichloroethane	Di-n-octyl Phthalate	---
1,1,2-Trichloroethane	1,2-Diphenylhydrazine	---

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