

4.7. Hydrology and Water Quality

This section discusses the hydrology and water quality issues associated with construction and operation of the proposed Civic Center Wastewater Treatment Facility Project (“the Project”). It includes a review of existing hydrologic conditions based on available information and an analysis of direct and indirect impacts of the Project. Where feasible, mitigation measures are recommended to reduce the level of impacts.

The Project would be constructed in three phases and has four main elements that could result in impacts to hydrologic resources: 1) wastewater treatment facility; 2) pump stations; 3) wastewater collection and recycled water distribution system pipelines; and 4) percolation ponds and groundwater injection wells. For the purposes of this section, “Project area” refers to the area that encompasses the extents of the four main elements described above and the area that would be served by these proposed Project facilities, and “Project site” refers specifically to those areas that would be disturbed by construction activities associated with these four main elements. The Project would include a Local Coastal Program Amendment (including amendments to the Local Implementation Plan (LIP) for wastewater systems and water quality), and modification of zoning for the wastewater treatment facility to include an Institutional District Overlay.

4.7.1. Environmental Setting

Regulatory Setting

Federal Regulations

Clean Water Act

The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation’s surface waters, including lakes, rivers, and coastal wetlands. It is based on the principle that all discharges into the nation’s waters are unlawful unless specifically authorized by a permit. Permit review is the CWA’s primary regulatory tool.

Section 303 Impaired Waters

California adopts water quality standards to protect beneficial uses of state waters as required by CWA Section 303 and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne). Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments of surface waters. In California, the State Water Resources Control Board (State Water Board) develops the list of water quality-limited segments, while the U.S. Environmental Protection Agency (USEPA) approves each state’s list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. Section 303(d) also establishes the Total Maximum Daily Load (TMDL) process to guide the application of state water quality standards.

On October 11, 2011, USEPA issued its final decision regarding the water bodies and pollutants. In this decision, the USEPA added to California’s 2010 303(d) List. The Section 303(d) list for the Los Angeles Hydrologic Region implicates pH, ammonia, chromium, copper, dichlorodiphenyltrichloroethane

(DDT), polycyclic aromatic hydrocarbons (PAHs), zinc, cadmium, lead, coliform, viruses, invasive species, trash, scum, algae, oil, chlorpyrifos as well as other pesticides, and volatile organic compounds for a total of 829 individual impairments (reach/constituent combinations) (LARWQCB 2009, SWRCB 2011).

Malibu Creek is listed on California's 303(d) list for barriers to fish passage, benthic macroinvertebrate bioassessments, coliform bacteria, invasive species, nutrients, scum/foam, sediments, selenium, sulfates, and trash. Malibu Lagoon is listed for eutrophication, pH, coliform bacteria, and viruses, and contains benthic community and swimming advisories. Surfrider Beach is listed for coliform bacteria, DDT, and PCBs from non-point sources. The TMDL process established to address these impairments is further described in the section below entitled *Water Quality Control Plan Los Angeles Region*.

Section 401 Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect the quality of the state's waters (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Section 401 certification or waiver is under the jurisdiction of the Regional Water Quality Control Boards (RWQCBs) and will be required for Phase 2 of the proposed Project.

Section 402 Discharge to Surface Waters

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by USEPA. In California, the State Water Board is authorized to oversee the NPDES program through the RWQCBs. The NPDES program issues both general permits (those that cover a number of similar or related activities) and individual permits.

Municipal Activities

Municipal discharges of stormwater runoff are regulated under the NPDES Waste Discharge Permit for Municipal Small Storm Sewer Systems (MS4) (MS4 Permit). Adopted on November 8, 2012 by the Los Angeles RWQCB (Order No. R4-2012-0175, NPDES No. CAS004001), the permit covers an area of approximately 3,100 square miles and serves a population of about 10 million. The City is a permittee of the 2012 MS4 Permit. The MS4 Permit was created for the purpose of protecting the beneficial uses of receiving waters in the Los Angeles region by ensuring that MS4s in the County of Los Angeles are not causing or contributing to exceedances of applicable water quality objectives. The MS4 Permit allows the permittees to customize their stormwater programs through the development and implementation of an Enhanced Watershed Management Program (EWMP) to achieve compliance with certain receiving water limitations and water quality based effluent limitations. The City, County of Los Angeles and Los Angeles County Flood Control District agreed to collaborate on the development of an EWMP. The EWMP is currently being developed and is anticipated to be completed by June 2016.

In addition, the City launched its Clean Water Program in 2001 and participates with the County in a 2006 campaign that funds bacterial source identification along Malibu beaches. Through a Memorandum of Understanding (MOU) with the Los Angeles RWQCB, the City also pursues testing and enforcement activities related to leaking on-site wastewater treatment systems (City of Malibu 2006b).

An important requirement of the City's MS4 Permit is implementation of the New Development/Redevelopment Project Performance Criteria. The performance criteria for new development projects call for control of pollutants, pollutant loads, and runoff volume emanating from the Project site by minimizing the impervious surface area and retaining on-site the storm water quality design volume (SWQDv). The SWQDv is defined as the greater of the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, as determined by the Los Angeles County 85th percentile precipitation isohyetal map. These criteria were incorporated into design of the wastewater treatment facility.

Construction Activities

Most construction projects that disturb one acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a public notice of intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP [for the Project would](#) include an overview of the BMPs that would be implemented to prevent soil erosion and discharges of other construction-related pollutants that could contaminate nearby water resources.

Dewatering Activities

Pumping of groundwater seepage from an excavation and subsequent discharge is considered a dewatering discharge. Small amounts of construction-related dewatering are covered under the General Construction Permit. For dewatering discharges that do not meet the criteria in the General Construction Permit, the RWQCB should be consulted and may require that an individual NPDES permit and/or waste discharge requirements (WDR) be obtained for dewatering activities or [for other related](#) ~~that the~~ activities not covered under an existing General Permit.

Wastewater Discharges

Wastewater discharges to surface water are regulated through the NPDES Permit Program, which controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or wastewater outfalls. In California, discharges of wastewater to the ground are regulated through Waste Discharge Requirements (WDRs). There are three types of WDRs – NPDES (municipal stormwater and point flows), Chapter 15 (land disposal), and non-Chapter 15 (covering other discharges). For the proposed Project, a Master Reclamation Permit would be issued, combining Water Reclamation Requirements (WRR), permitting the reclamation of municipal wastewater to create recycled water meeting Title 22 standards for unrestricted reuse, with WDR requirements governing the distribution and reuse of that recycled water (including groundwater injection and percolation).

Section 404 Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (Corps) for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity. The wastewater treatment plant site contains one jurisdictional blue-line drainage feature, Winter Canyon Creek, which is located in the southeastern portion of site adjacent to the intersection of Civic Center Way and Pacific Coast Highway (PCH) (ICF 2013). However, all infrastructure construction would occur outside a 100-foot boundary around that drainage feature except immediately adjacent to the existing driveway onsite. As part of the

improvements to this road, an infiltration buffer will be added immediately adjacent to the portion of the road within the 100-foot buffer to minimize the potential for pollutants to runoff to the adjacent wetlands.

The proposed wastewater collection/distribution system would be constructed primarily within existing roadways; however, under Phase 2, it would include a pipeline crossing on an existing bridge over Malibu Lagoon and a trenchless crossing of Malibu Creek. Neither crossing is expected to affect jurisdictional features.

Underground Injection Control Program

The Underground Injection Control (UIC) Program regulates groundwater injection operations under Title 40 of the Code of Federal Regulations. The Safe Drinking Water Act (SDWA) establishes requirements and provisions for the UIC Program, including Part 144 – Underground Injection Control Program, and Part 148 – Underground Injection Control Program: Criteria and Standards. Under the UIC Program, injection wells are grouped in six classes of injection wells depending on function, construction and operating features. The U.S. Environmental Protection Agency (USEPA) regulates these types of wells and associated injection practices to protect public health by preventing injection wells from impacting underground sources of drinking water. Specifically, project proponents must register their injection wells with the UIC Program and obtain a permit from the USEPA or from a designated state program. Federal permit requirements may also be included in state-issued permits, and must be as stringent as federal permit requirements.

Floodplain Regulations

Federal Flood Insurance Program

In response to increasing costs of disaster relief, Congress passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The intent of these acts was to reduce the need for large, publicly funded flood control structures and disaster relief by restricting development on floodplains. FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues flood insurance rate maps (FIRMs) for communities participating in the National Flood Insurance Program. These maps delineate flood hazard zones in the community. The locations of FEMA-designated floodplains in the Project area are included in the discussion of physical setting, Section 4.7.2, below.

Executive Order 11988 – Floodplain Management

Executive Order 11988, Floodplain Management, addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies that are constructing, permitting, or funding to:

- Avoid incompatible floodplain development;
- Be consistent with the standards and criteria of the National Flood Insurance Program; and
- Restore and preserve natural and beneficial floodplain values.

This order applies to the proposed Project because Project facilities, including pump stations and injection wells, would be located within FEMA Zone A, the 100-year floodplain. The wastewater treatment plant site is outside the 100-year floodplain.

Sewage Sludge Use and Disposal Rule

The 40 CFR Part 503 rule establishes quality requirements for the use and disposal of sewage sludge, also known as biosolids. It also is a tool for encouraging public acceptance and expanding markets for the beneficial use of biosolids as a soil conditioner or fertilizer. The rule helps biosolids managers identify “exceptional quality” biosolids, those that meet Class A pathogen reduction requirements, the most stringent metals limits (pollutant concentrations) and vector control requirements. The rule encourages municipal wastewater treatment plants to treat biosolids to a higher quality level and minimize constraints on use. The rule requires relatively expensive pollution control equipment and/or management practices, further assuring clean and safe biosolids that can be applied in the least restrictive manner, thereby maximizing the beneficial uses of the biosolids. This rule is not applicable to the Project as biosolids would be hauled off the Project site for appropriate disposal at an alternative location. No biosolids processing will occur on the Project site.

State Regulations

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act (“Porter-Cologne” or “the Act”) established the State Water Resources Control Board (State Water Board) and divided the state into nine regional basins, each with an RWQCB. The State Water Board is the primary state agency responsible for protecting the quality of the state’s surface and groundwater supplies.

The Act authorizes the State Water Board to draft state policies regarding water quality in accordance with CWA Section 303. In addition, the Porter-Cologne Act authorizes the State Water Board to issue WDRs for projects that would discharge to state waters. Porter-Cologne requires that the State Water Board or the RWQCB adopt water quality control plans, otherwise referred to as basin plans, for the protection of water quality. A basin plan must:

- Identify beneficial uses of water to be protected;
- Establish water quality objectives for the reasonable protection of the beneficial uses; and
- Establish a program of implementation for achieving the water quality objectives.

Basin plans also provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. Basin plans are updated and reviewed every three years in accordance with Article 3 of Porter-Cologne and CWA Section 303(c).

Statewide General Waste Discharge Requirements for Recycled Water Use

On June 3, 2014, the State Water Board adopted General Waste Discharge Requirements for Recycled Water Use, Water Quality Order No. 2014-0090-DWQ. This General Permit builds on the 2009 Statewide General Permit for Landscape Irrigation with Recycled Water (described below) The Recycled Water General Permit established and -authorizes certain uses of recycled water statewide, such as landscape irrigation with recycled water and use of recycled water for indoor non-potable uses such as toilet flushing, through the creation of a general permitting process, complete with general waste discharge requirements and required monitoring frequency. On April 25, 2014, the Governor of California issued an Executive Order declaring a continued state of emergency with respect to 2013-2014 drought and instructing the State Water Board SWRCB to adopt general WDRs that would facilitate the use of treated wastewater as a potential mechanism to alleviate water supply pressure. The Executive Order suspended the environmental review process under CEQA.

allowing for the expedited adoption of the General Order. In order to ensure that there are no significant impacts related to the General Permit, the General Order permits the use of treated recycled water for non-potable uses such as irrigation, but does not authorize the use of recycled water to replenish groundwater resources, dispose of treated wastewater or use recycled water for domestic or animal water supply. These uses are still permitted on a project-specific basis.

Statewide General Permit for Landscape Irrigation with Recycled Water

In 2009, the State Water Board adopted General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water (Landscape Irrigation General Permit), Water Quality Order No. 2009-006-DWQ. The Landscape Irrigation General Permit established requirements to manage recycled water for landscape irrigation uses in a manner that is protective of public health and the environment. On July 7, 2009, in accordance CEQA, the State Water Board, acting as the lead agency, adopted Resolution No. 2009-0059, which certified a Mitigated Negative Declaration for the Landscape Irrigation General Permit and determined that adoption of the waste discharge requirements would have no significant effect on the environment. Implementation of recycled water irrigation in a manner that meets the conditions of the Landscape Irrigation General Permit can be considered to have a less than significant effect on the environment.

Water Quality Control Plan, Los Angeles Region

The Los Angeles RWQCB, which has jurisdiction over the ~~program~~Project area, adopted the most recent amendments to the *Water Quality Control Plan, Los Angeles Region – Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) in 2010 (Los Angeles RWQCB 1994, amended 2007) and currently has multiple proposed amendments to the plan under consideration. State policy for water quality control is directed at achieving the highest water quality consistent with the maximum benefit to the people of the state. To develop water quality standards consistent with the uses of a water body, the Los Angeles RWQCB attempts to classify historical, present, and future beneficial uses as part of its Basin Plan.

The Los Angeles RWQCB, in conjunction with the USEPA, recently established TMDLs for Malibu Creek and Lagoon. The TMDL specifically addresses the impaired benthic biota in the Malibu Creek main stem and Malibu Lagoon, while discussing conditions throughout the watershed that may affect these impairments. The TMDL, published in 2013, contains numeric targets for nitrogen, phosphorous, bacteria, and several other parameters that result attainment of the water quality standards. These numeric targets were assigned based on response targets and comparison with natural conditions and include specific quantifiable measures directly associated with biotic impairment and sedimentation. Additional TMDLs have been established for Malibu Creek and Lagoon in 2004, 2008 and 2009 for bacteria and trash, while TMDLs for bacteria were established in 2002 for Santa Monica Bay. As such, numeric targets contained within these TMDLs would be incorporated into Project operating permits, either directly and/or indirectly as appropriate, by the RWQCB.

Water Quality Control Plan, Ocean Waters of California

The revised *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) was adopted by the State Water Board in October 2012 (Resolution No. 2012-0057). The Ocean Plan contains water quality objectives and effluent limits (numerical and narrative) that apply to all discharges to the coastal waters of California. Waste management systems that discharge to the ocean must be designed and operated in a manner that will maintain a healthy and diverse marine

community. As with the TMDLs (described above), these water quality objectives will be incorporated in Project operating permits, either directly and/or indirectly as appropriate, by the RWQCB.

California Department of Fish and Wildlife Streambed Alteration Agreement

A streambed alteration agreement (California Department of Fish and Game Code 1600 *et seq.*) is required for any work in a creek or stream and its floodplain. Streambed alteration agreements may impose conditions to protect water quality during Project construction. The proposed wastewater collection system element would be constructed primarily within existing roadways; however, it may include a pipeline crossing on the existing Pacific Coast Highway bridge over Malibu Lagoon and a trenchless crossing of Malibu Creek in the Serra neighborhood during Phase 2. These stream crossings are not anticipated to affect the Malibu Creek and Lagoon streambed. Additionally, construction on the treatment facility site will be adjacent to delineated wetlands in the southeastern portion of the site. The Project has been designed, however, such that all project facilities are located outside the delineated wetlands.

Groundwater Management Act of 1992 (AB 3030)

California's Groundwater Management Act (Water Code Sections 10750–10756) gave existing local agencies expanded authority over the management of groundwater resources in basins recognized by the California Department of Water Resources (DWR). Its intent was to promote the voluntary development of groundwater management plans to ensure stable groundwater supplies for the future. Under the Act, a groundwater management plan is defined as providing for “planned use of the groundwater basin yield, storage space, transmission capability, and water in storage.”

The Act stipulates the technical components of a groundwater management plan, as well as procedures for a plan's adoption, including passage of a formal resolution of intent to adopt a groundwater management plan and holding a public hearing on the proposed plan. The Act also requires agencies to adopt rules and regulations to implement an adopted plan, and empowers agencies to raise funds to pay for the facilities needed to manage the basin, such as extraction wells, conveyance infrastructure, recharge facilities, and testing and treatment plants.

Drinking Water Source Assessment and Protection (DWSAP) Program

The 1996 federal Safe Drinking Water Act amendments require each state to develop and implement a Source Water Assessment Program. Section 11672.60 of the California Health and Safety Code requires the Department of Health Services (DHS, the precursor to the California Department of Public Health [CDPH]) to develop and implement a program to protect sources of drinking water, specifying that the program must include both a source water assessment program and a wellhead protection program. In response to both of these legal mandates, DHS developed the DWSAP Program.

California's DWSAP Program addresses both groundwater and surface water sources. The groundwater portion of the DWSAP Program serves as the state's wellhead protection program. In developing the surface water components of the DWSAP Program, DHS integrated the existing requirements for watershed sanitary surveys. The City of Malibu is consulting with CDPH regarding compliance with drinking water source protection requirements.

Regulations Governing Recycled Water Use

Water Recycling Law

Chapter 7 of the California Water Code, also known as the Water Recycling Law, establishes the intent of the legislature to encourage water recycling as a method by which to increase the ability to meet growing water needs in California. The law authorizes the State Water Board to loan money to local agencies to develop water recycling facilities and CDPH to create water-recycling criteria. In addition, the State Water Board developed reporting requirements and established permitting procedures for the Regional Boards in conjunction with CDPH.

Title 22, California Code of Regulations Criteria for Recycled Water Quality

CDPH holds the authority to set criteria for recycled water production and use. Title 22, Division 4 of the California Code of Regulations defines these criteria, which pertain to treatment processes, water quality, and reliability. Title 22 establishes minimum water quality criteria requirements for various use categories, including irrigation, wetlands, and industrial uses. For unrestricted reuse, including use at parks and playgrounds, schoolyards and other unrestricted access facilities, Title 22 specifies disinfected tertiary treatment. Title 22 also specifies that for disinfected tertiary-treated water, there must be a separation of 50 feet between areas irrigated with recycled water and domestic groundwater wells.

Regulations Governing Use of Disinfected Tertiary Recycled Water

The CDPH has produced “The Purple Book,” which contains California health laws related to reuse of disinfected tertiary recycled water (California Department of Health Services 2001). Disinfected tertiary recycled water is defined as filtered and subsequently disinfected wastewater that exhibits extremely low levels of coliform bacteria and turbidity. [The Project would produce disinfected tertiary level recycled water.](#) Allowable uses for disinfected tertiary recycled water include:

- Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop;
- Parks and playgrounds, school yards, residential landscaping, and unrestricted access golf courses;
- Industrial cooling that involves the use of a cooling tower;
- Flushing toilets and urinals, priming drain traps, industrial process that may come into contact with workers, structural firefighting, decorative fountains, commercial laundries, consolidation of backfill around potable water pipelines, and car washes; and
- Any other irrigation uses not prohibited.

Limitations and requirements include distance from domestic water supply wells (irrigation or surface impoundments); restrictions on spray, mist, or runoff; purple pipe requirements to prevent cross connections; monitoring for total coliform and turbidity; signage and public notification; training, system maintenance, and reporting; and backflow prevention devices.

Disinfected tertiary-treated effluent may be used for groundwater recharge of domestic water supply aquifers by surface spreading, if the effluent is of a quality that fully protects human health at all times. For groundwater recharge projects, CDPH makes recommendations to the RWQCB based

on the relevant aspects of the project, including effluent quality and quantity, proposed operations, soil characteristics, hydrogeology, residence time, and distance to withdrawal.

Local Regulations

City of Malibu General Plan

The City's General Plan was adopted in 1996 (City of Malibu 1996a) and last revised in 2014⁴³ with the adoption of the Housing Element Update. The general plan is primarily a policy document that sets goals and policies concerning the community and gives direction to growth and development. In addition, it outlines the programs that were developed to accomplish the goals and policies of the general plan.

Land Use Element

The General Plan's Land Use Element serves as a guide for future development within the City. It includes a land use policy map that prescribes the location and distribution of land use types and intensities throughout the City and a statement concerning the City's goals and policies relating to land use planning. Below is a list of goals, policies and implementation measures outlined in the Land Use Element related to hydrology and water quality.

Land Use (LU) Goal 1: The natural and environmental resources of Malibu are protected and enhanced.

- **LU Policy 1.1.2:** The City shall ensure that land uses avoid or minimize adverse impacts on water quality and other natural resources, such as undisturbed watershed and riparian areas.
- **LU Policy 1.1.3 (also Conservation Policy 1.3.11):** The City shall control surface runoff and associated pollutant loads into coastal waters, wetlands, and riparian areas.
- **LU Implementation Measure 4:** Regulate grading and excavation to minimize impacts of construction on water quality and natural resources. These regulations shall require the use of best management practices (BMPs) to control erosion and manage stormwater. These BMPs may include the use of seasonal and mandatory year-round control measures such as tarps, sandbag dams, on-site retention of first-flush rain, temporary drainage courses and erosion control measures, de-silting ponds, sediment traps, filter fencing, straw bales, and catch basin filtration.
- **LU Implementation Measure 5:** Minimize the deleterious effects of runoff by limiting impermeable lot coverage to no more than 45 percent of lot size for lots 0.25 acre or smaller, 35 percent for lots between 0.25 and 0.50 acre, and 30 percent for lots greater than 0.50 acre. The maximum impermeable lot coverage shall be 25,000 square feet. Pools and spas shall not be included within the calculation for the amount of impermeable lot coverage. These limits shall not apply to beachfront lots.
- **LU Implementation Measure 6:** Evaluate any increase in peak flow rate from surface runoff for proposed development and mitigate any adverse impacts on property or the environment. Require a drainage control system, including on-site retention or detention where appropriate for all new development. Storm runoff control systems shall be designed to ensure that the maximum rate of stormwater runoff does not exceed the peak level that existed prior to development.

- **LU Policy 1.3.1:** The City shall regulate development in floodways.
- **LU Implementation Measure 18:** Implement the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) program in Flood Hazard Overlay Areas.
- **LU Implementation Measure 29:** Require setbacks from blue-line streams to protect natural drainage systems.

Conservation Element

The Conservation Element of the General Plan serves as a guide for the conservation, protection, restoration, management, development, and appropriate and responsible utilization of the City's existing natural resources. The Conservation Element has the following goals and policies as well as implementation measures pertaining to hydrology and water quality:

- **Conservation (CON) Policy 1.1.5:** The City shall protect and reclaim Malibu's threatened natural resources, such as beaches, estuaries, intertidal zone and marine habitats, marine life, the ocean, tide pools, streams, waterfalls, and wetlands wildlife and plant life and their habitats.
- **CON Implementation Measure 6:** Identify and regulate point sources of pollution to protect riparian and marine areas.
- **CON Implementation Measure 41:** To protect wetlands, the intertidal zone and kelp beds from siltation, minimize the runoff and erosion caused by earth movement by requiring development to use best construction management practices.
- **CON Implementation Measure 42:** Require grading plans for all new development designed to ensure that potential negative effects of runoff and erosion on sensitive resources are minimized.
- **CON Implementation Measure 60:** Develop a plan for restoration of Malibu Lagoon addressing the advantage of (a) constructing additional wetlands; (b) widening the existing estuary; (c) establishing receiving water standards; and (d) requiring a drainage system for the Project area and other areas currently draining into the estuary and lower creek.

City of Malibu Local Coastal Program

The City lies entirely within with the California Coastal Zone as defined by the California Coastal Act. Section 30231 of the Coastal Act requires the use of means to maintain and enhance water quality, including managing wastewater discharges, controlling runoff, protecting groundwater and surface water, encouraging wastewater recycling, and protecting streams. The Coastal Act requires that its goals and policies be implemented by local government through the Local Coastal Program (LCP) process. The Malibu LCP is composed of two parts: the Land Use Plan (LUP) and the Local Implementation Plan (LIP); both were certified by the California Coastal Commission on September 13, 2002.

Land Use Plan

The LUP provides for the protection of water quality and contains a variety of policies that support natural resource protection, public access, and coordinated development. Policies related to hydrology and water quality are listed below.

- **Policy 3.78:** New development shall prevent or reduce nonpoint-source pollution in the near-shore environment through implementation of the nonpoint-source pollution and private sewage disposal system policies.
- **Policy 3.79:** Grading and landform alteration shall be limited to minimize impacts from erosion and sedimentation on marine resources.
- **Policy 3.95:** New development shall be sited and designed to protect water quality and minimize impacts on coastal waters by incorporating measures designed to ensure the following:
 - Protecting areas that provide important water quality benefits, areas necessary to maintain riparian and aquatic biota, and/or areas that are susceptible to erosion and sediment loss;
 - Limiting increases of impervious surfaces;
 - Limiting land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and
 - Limiting disturbance of natural drainage features and vegetation.
- **Policy 3.96:** New development shall not result in the degradation of the water quality of groundwater basins or coastal surface waters, including the ocean, coastal streams, or wetlands. Urban runoff pollutants shall not be discharged or deposited such that they adversely affect groundwater, the ocean, coastal streams, or wetlands, consistent with the requirements of the Los Angeles Regional Quality Control Board’s municipal stormwater permit and the California Ocean Plan.
- **Policy 3.97:** Development must be designed to minimize, to the maximum extent feasible, the introduction of pollutants of concern that may result in significant impacts on runoff from impervious areas. To meet the requirement to minimize “pollutants of concern,”¹ new development shall incorporate a BMP or a combination of BMPs best suited to reduce pollutant loading to the maximum extent feasible.
- **Policy 3.98:** A water quality checklist shall be developed and used in the permit review process to assess potential water quality impacts.
- **Policy 3.99:** Post-development peak stormwater runoff discharge rates shall not exceed the estimated pre-development rate. Dry-weather runoff from new development must not exceed the pre-development baseline flow rate to receiving water bodies.
- **Policy 3.100:** New development shall be sited and designed to minimize impacts on water quality from increased runoff volumes and nonpoint- source pollution. All new development shall meet the requirements of the Los Angeles Regional Water Quality Control Board in its Standard Urban Stormwater Mitigation Plan for Los Angeles County and Cities in Los Angeles County (March 2000) or subsequent versions of this plan.

¹ Pollutants of concern are defined in the Standard Urban Stormwater Mitigation Plan for Los Angeles County and Cities in Los Angeles County as consisting of “any pollutants that exhibit one or more of the following characteristics: current loadings or historic deposits of the pollutant are impacting the beneficial uses of a receiving water, elevated levels of the pollutant are found in sediments of a receiving water and/or have the potential to bioaccumulate in organisms therein, or the detectable inputs of the pollutant are at concentrations or loads considered potentially toxic to humans and/or flora or fauna.”

- **Policy 3.101:** If the State Water Resources Control Board (State Board) or the California Regional Water Control Board, Los Angeles Region (Regional Board) revise the California Water Quality Control Plan, Los Angeles Region (Basin Plan), the Water Quality Control Plan for Ocean Waters of California (California Ocean Plan), or other applicable regulatory requirements, the City of Malibu should consult with the State Board, Regional Board and the Coastal Commission to determine if an LCP amendment is appropriate.
- **Policy 3.102:** Post-construction structural BMPs (or suites of BMPs) should be designed to treat, infiltrate, or filter the amount of stormwater runoff produced by all storms up to and including the 85th percentile, 24-hour storm event for volume-based BMPs and/or the 85th percentile, 1-hour storm event (with an appropriate safety factor, i.e., 2 or greater) for flow-based BMPs. This standard shall be consistent with the most recent Los Angeles Regional Water Quality Control Board Municipal Stormwater Permit for the Malibu region or the most recent California Coastal Commission Plan for Controlling Polluted Runoff, whichever is more stringent.
- **Policy 3.110:** New development shall include construction phase erosion control and polluted runoff control plans. These plans shall specify BMPs that will be implemented to minimize erosion and sedimentation, provide adequate sanitary and waste disposal facilities, and prevent contamination of runoff by construction chemicals and materials.
- **Policy 3.111:** New development shall include post-development phase drainage and polluted runoff control plans. These plans shall specify site design, source control and treatment control BMPs that will be implemented to minimize post-construction polluted runoff, and shall include the monitoring and maintenance plans for these BMPs.
- **Policy 3.112:** Storm drain stenciling and signage shall be provided for new storm drain construction in order to discourage dumping into drains. Signs shall be provided at creek public access points to similarly discourage creek dumping.
- **Policy 3.113:** Outdoor material storage areas shall be designed using BMPs to prevent stormwater contamination from stored materials.
- **Policy 3.114:** Trash storage areas shall be designed using BMPs to prevent stormwater contamination by loose trash and debris.
- **Policy 3.115:** Permits for new development shall be conditioned to require ongoing maintenance when maintenance is necessary for effective operation of required BMPs. Verification of maintenance shall include the permittee's signed statement accepting responsibility for all structural and treatment control BMP maintenance until such time as the property is transferred and another party takes responsibility.
- **Policy 3.119:** New development that requires a grading permit or local SWPPP shall include landscaping and re-vegetation of graded or disturbed areas, consistent with Policy 3.50. Any landscaping that is required to control erosion shall use native or drought-tolerant non-invasive plants to minimize the need for fertilizer, pesticides, herbicides, and excessive irrigation. Where irrigation is necessary, efficient irrigation practices shall be required.
- **Policy 3.120:** New development shall protect the absorption, purifying, and retentive functions of natural systems that exist on the site. Where feasible, drainage plans shall be designed to complement and utilize existing drainage patterns and systems, conveying drainage from the developed area of the site in a non-erosive manner. Disturbed or degraded natural drainage systems shall be restored, where feasible, except where there are geologic or public safety concerns.

- **Policy 3.126:** Wastewater discharges shall minimize adverse impacts to the biological productivity and quality of coastal streams, wetlands, estuaries, and the ocean. On-site treatment systems (OSTs) shall be sited, designed, installed, operated, and maintained to avoid contributing nutrients and pathogens to groundwater and/or surface waters.
- **Policy 3.140:** New septic systems shall be sited and designed to ensure that impacts to Environmentally Sensitive Habitat Area (ESHA), including those impacts from grading and site disturbance and the introduction of increased amounts of groundwater, are minimized. Adequate setbacks and/or buffers shall be required to protect ESHA and other surface waters from lateral seepage from the sewage effluent dispersal systems.
- **Policy 3.144:** Cooperation and coordination with the Los Angeles Regional Water Quality Control Board to ensure septic system conformance with regional water quality standards shall be provided.
- **Policy 5.48:** A water conservation and wastewater recycling program should be developed in coordination with Los Angeles County and the applicable water purveyors for respective water service areas.
- **Policy 5.50:** The installation of reclaimed water lines to provide irrigation for approved landscaping or fuel modification areas (Zone A or B, if required) for approved development may be permitted, if consistent with all policies of the LUP.
- **Policy 5.51:** The use of reclaimed water in lieu of fresh water supplies for the maintenance of public lands and other non-consumptive uses shall be encouraged and supported provided such use can be found to be consistent with all applicable policies of the LCP.
- **Policy 7.19:** A City-wide public sewer system may be designed and proposed, in consultation with the Departments of Health Services and Public Works where it is found to be the least environmentally damaging wastewater treatment alternative, where it is designed to serve a capacity of development which does not exceed the amount allowed by the LCP, and where it is found to be consistent with all other policies of the LCP. In particular, the proposed method of effluent disposal shall be required to be consistent with policies requiring the protection of marine resources, riparian habitat and water quality.
- **Policy 7.20:** Any proposed sewer system shall be submitted to and approved by the Coastal Commission as an LCP amendment prior to issuance of local permits and construction.
- **Policy 7.21:** Any assessment district formed to finance construction of a public sewer system shall be considered a public works project pursuant to PRC Section 30114 and must be found consistent with all applicable policies of the LCP including the ultimate level of growth allowed by the LCP and shall not be effective until and unless the Coastal Commission has approved the proposed system as an LCP amendment.

Local Implementation Plan

The LIP contains zoning designations and permitted uses, standards regarding Environmentally Sensitive Habitat Areas, scenic protection standards, public access requirements, and water quality protection, among others. The implementation measures governing hydrology and water quality under various sections of LIP are as follows.

Chapter 17 of the LIP provides standards related to the projection of water quality. The purpose of this chapter is to protect and enhance coastal waters within the City in accordance with the policies of the City's LCP, Sections 30230, 30231, 30232 and 30240 of the California Coastal Act, and the City's municipal NPDES permit requirements under the RWQCB. To implement the certified LCP,

application submittal requirements, development standards, and other measures are provided to ensure that permitted development shall be sited and designed to conserve natural drainage features and vegetation, prevent the introduction of pollutants into coastal waters, and protect the overall quality of coastal waters and resources. The various sections of the chapter applicable to the Project are:

- **Section 17.3:** Application Submittal Requirements: Gives a list of requirements and procedures for application for a coastal development permit.
- **Section 17.4:** Development Standards: Discusses BMP requirements and their implementation and also elaborates on site design, source control, and treatment control BMPs.
- **Section 17.5:** Development-Specific Design Standards: This section discusses specific land use design standards.
- **Section 17.6:** Prohibited Activities.
- **Section 17.7:** Good Housekeeping Activities.
- **Section 17.8:** Hydromodification.
- **Appendix A:** Stormwater Best Management Practices.
- **Appendix B:** BMP Implementation Tables.

In addition, Chapter 9 of the LIP, Hazards, has measures to ensure that new development shall minimize risks to life and property in areas of high hazard, including flood hazard. To implement the certified LCP, development standards, permit and application requirements, and other measures are provided to ensure that permitted development is sited and designed to minimize risks associated with tsunamis and flood-prone areas.

Stormwater Management Plan

All projects that require a coastal development permit must submit a Stormwater Management Plan (SWMP) to the City's Department of Public Works in order to mitigate the post-construction effects of stormwater runoff. The Project must be designed to maximize, to the extent practicable, the extent of permeable surfaces and the retention of additional stormwater runoff generated from the Project. The SWMP is required to contain the following components: 1) a local SWPPP, which contains construction BMPs (see discussion under CWA Section 402 above); 2) a Hydrology/Hydraulics Report, which shows the pre- and post-development flow rates for a 100-year storm event; and 3) site plans and grading and drainage plans that illustrate the stormwater BMPs.

City of Malibu Floodplain Management Ordinance

Title 15.20 of the City of Malibu Municipal Code (M.M.C.) is the Floodplain Management Ordinance. The purpose of the ordinance is to minimize public and private losses due to flooding within flood hazard areas. The M.M.C. dictates certain construction standards that are required to be used in flood hazard areas, including standards for water and wastewater plants. The M.M.C. includes the following methods and provisions:

- A. Restrict or prohibit uses that are dangerous to health, safety, and property due to water or erosion hazards or result in damaging increases in erosion or flood heights or velocities;
- B. Requires that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;

- C. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- D. Control filling, grading, dredging, and other development that may increase flood damage; and
- E. Prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or may increase flood hazards in other areas.

City of Malibu Tsunami Emergency Response Plan

The City of Malibu adopted an updated Standardized Emergency Management System - Multi Hazard Functional Plan (SEMS-MHFP Emergency Operations Plan) on April 9, 2012 (City of Malibu 2012). The Plan includes an Emergency Response Plan for Tsunami Operations, which summarizes emergency response in the event of a tsunami, including alerts and warnings, evacuation, and damage assessment.

Environmental Setting

The Project area in the City of Malibu ("City") is an area of approximately 330 acres containing many commercial businesses, as well as County and City buildings in Phase 1, as well as residential and recreational areas in Phases 2 and 3. The Project area is located predominantly on an alluvial plain north of Pacific Coast Highway, on the west side of lower Malibu Creek and Malibu Lagoon; some portions of the proposed wastewater treatment/reuse element extend east of Malibu Creek and south of Pacific Coast Highway (see Figure 3, in Chapter 2, Project Description). The ground surface gently descends southeastward toward Malibu Creek, Malibu Lagoon, and the Pacific Ocean. The Santa Monica Mountains rise steeply to the north of the Project area. The wastewater treatment facility site is located on a 4.8-acre parcel on the south side of Civic Center Way. The site is divided into two terraces by an approximately 10-foot-high slope. Winter Canyon Creek crosses the southeastern portion of the wastewater treatment facility site.

General Climate

The Los Angeles region has a Mediterranean climate, with hot, dry summers and mild winters. On average, the region experiences 329 days of sunshine per year. The average annual temperature is 67.3 degrees Fahrenheit (°F), with a monthly average maximum temperature of 72.1° F in August and a monthly average minimum temperature of 49.7° F in December. The average annual rainfall in the City is approximately 16 inches per year, with the most rainfall occurring between November and March (City of Malibu 2013). The standard annual average evapotranspiration rate (ET_o) for the area is 44.2 inches per year. ET_o measures the loss of water to the atmosphere by evaporation from soil and plant surfaces and transpiration from plants (Los Angeles Department of Water and Power [LADWP] 2011). Total precipitation in the watershed is conveyed to Malibu Creek as surface runoff, infiltrates into the soil, and recharges groundwater supplies, or evapotranspirates.

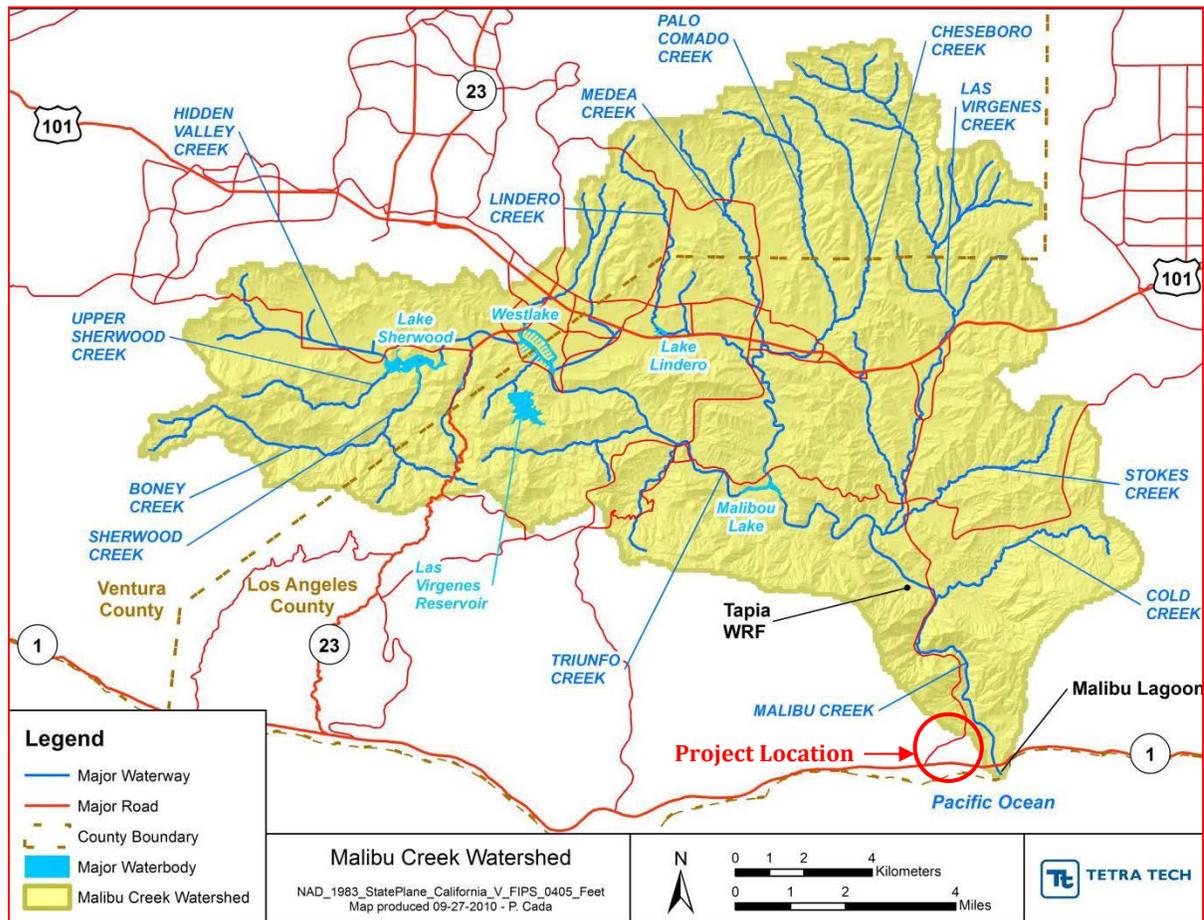
Hydrology

The Los Angeles hydrologic region, as defined by the Los Angeles RWQCB, encompasses all coastal drainages flowing to the Pacific Ocean between Rincon Point (on the coast of western Ventura County) and the eastern Los Angeles County line, as well as the drainages of five coastal islands (Anacapa, San Nicholas, Santa Barbara, Santa Catalina, and San Clemente).

The Project area covers two watersheds (see Figure 4.7-1): the Malibu Creek and Winter Canyon Creek watersheds. The majority of the Project area is situated within the 109-square-mile Malibu Creek watershed, which is the second largest watershed draining to Santa Monica Bay. The Malibu Creek watershed contains mostly undeveloped mountain areas, large-acreage residential properties, and many natural stream reaches (Los Angeles RWQCB 2011). Stream flow is regulated by Lake Sherwood Dam, Lake Eleanor Dam, Malibu Lake Dam, Rindge Dam, and Crags Dam; other small recreational dams may also affect low summer flows. Stream flow data at the County's Malibu Creek stream gauge (F130-R Malibu Creek below Cold Creek) reported a total of 52,071 cubic feet per second (cfs) for the 04/05 water year (October 1, 2004–September 30, 2005). Average stream flow was 143 cfs, with a maximum of 7,330 cfs during a January storm event (Los Angeles County Department of Public Works 2007).

The western part of the Project area, including the wastewater treatment facility site, is in the Winter Canyon Watershed, which trends southeast and encompasses approximately 150 acres (City of Malibu 2013). The drainage area is mostly undeveloped and contains rugged mountainous to hilly terrain. The overall relief of the watershed is 1,325 feet from the Santa Monica Mountains to the Pacific Ocean. The lower reaches of Winter Canyon, including portions adjacent to the wastewater treatment facility site, have experienced considerable man-made alterations over the years by grading and by placement of various storm water control measures (City of Malibu 2013). Winter Canyon Creek is depicted as a perennial or intermittent stream in the City's General Plan; however, much of the natural stream channel northwest of the wastewater treatment facility site has been routed through an underground concrete culvert beneath Civic Center Way and PCH, discharging to the south by Malibu Road. The creek is above ground as it flows through the southeast portion of the wastewater treatment facility site. Water can be present in the limited exposed surface portions (daylight portions) of the creek, including in the dry summer months. However, substantial surface flows typically occur only during and immediately following storm events (City of Malibu 2013).

The remaining portions of the Project area are located within the Malibu Creek Watershed. Due to the steep and impervious nature of the Malibu Creek headlands, as well as the very rapid runoff of variable amounts of annual rainfall, there are no dependable local surface water supplies and very limited groundwater supplies within the watershed. However, current surface flow regimes differ from historical patterns. Construction of Pacific Coast Highway and Malibu Canyon Road divided and diverted much of the watershed runoff from sheet flow into the ocean to the Malibu Creek channel (City of Malibu 1996d). Both increased urbanization from the more developed upper watershed and discharges from the upstream Tapia Wastewater Treatment Plant have increased the volume of water being conveyed downstream to the Project area (City of Malibu 1996d; LARWQCB 2011; McDonald Morrissey Associates 2004). Due to increased irrigation runoff and discharge of recycled

Figure 4.7-1. Malibu Creek Watershed

Source: USEPA, 2013

water, Malibu Creek (from Westlake Lake to Malibu Lagoon) was virtually perennial for several years (minimum flow volume for 04/05 water year was 1.3 cfs). However, since 1999, the Tapia Wastewater Treatment Plant has been restricted from discharging recycled water from April 15 through November 15.

Malibu Lagoon lies at the terminus of the Malibu Creek watershed. Malibu Lagoon is a small, brackish estuary of approximately 13 acres (exclusive of adjacent associated land), but it is one of only two remaining coastal marshes in Los Angeles County. The estuary provides migratory bird habitat, fish migration and spawning habitat, and it affects adjoining water-based recreation at Surfrider Beach (City of Malibu 1996a). The Lagoon typically remains closed by a natural sandbar much of the year, except for winter when ocean influences breach the sandbar and Creek flows help maintain the opening. This episodic breach, which occurs as a result of stream flows exceeding ocean influences, has led to greatly fluctuating salinity levels and has disturbed efforts to restore the Lagoon. In May of 2013, the Malibu Lagoon Restoration Project was completed. This project included removing old fill, recontouring the Lagoon to improve tidal flow and habitats, and replanting with native plants. Surfing and swimming are popular off the beaches in the immediate area and there is considerable concern over contaminated Lagoon water affecting recreational users (Los Angeles RWQCB 2011).

Groundwater

The Project area overlies the Malibu Valley Groundwater Basin (DWR Groundwater Basin No. 4-22), a small groundwater basin in the Malibu Creek watershed. Figure 4.7-2 shows the location of the groundwater basin.

The Malibu Valley Groundwater Basin 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, on all remaining sides. The valley is typified by steep canyons that generally run north to south, and is flanked on both sides by canyons - Sweetwater Canyon to the east, and Winter Canyon to the west. The basin is drained by Malibu Creek to the Pacific Ocean (DWR 2003).

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 175 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).

Hydrostratigraphy

Malibu Valley Groundwater Basin

Alluvium

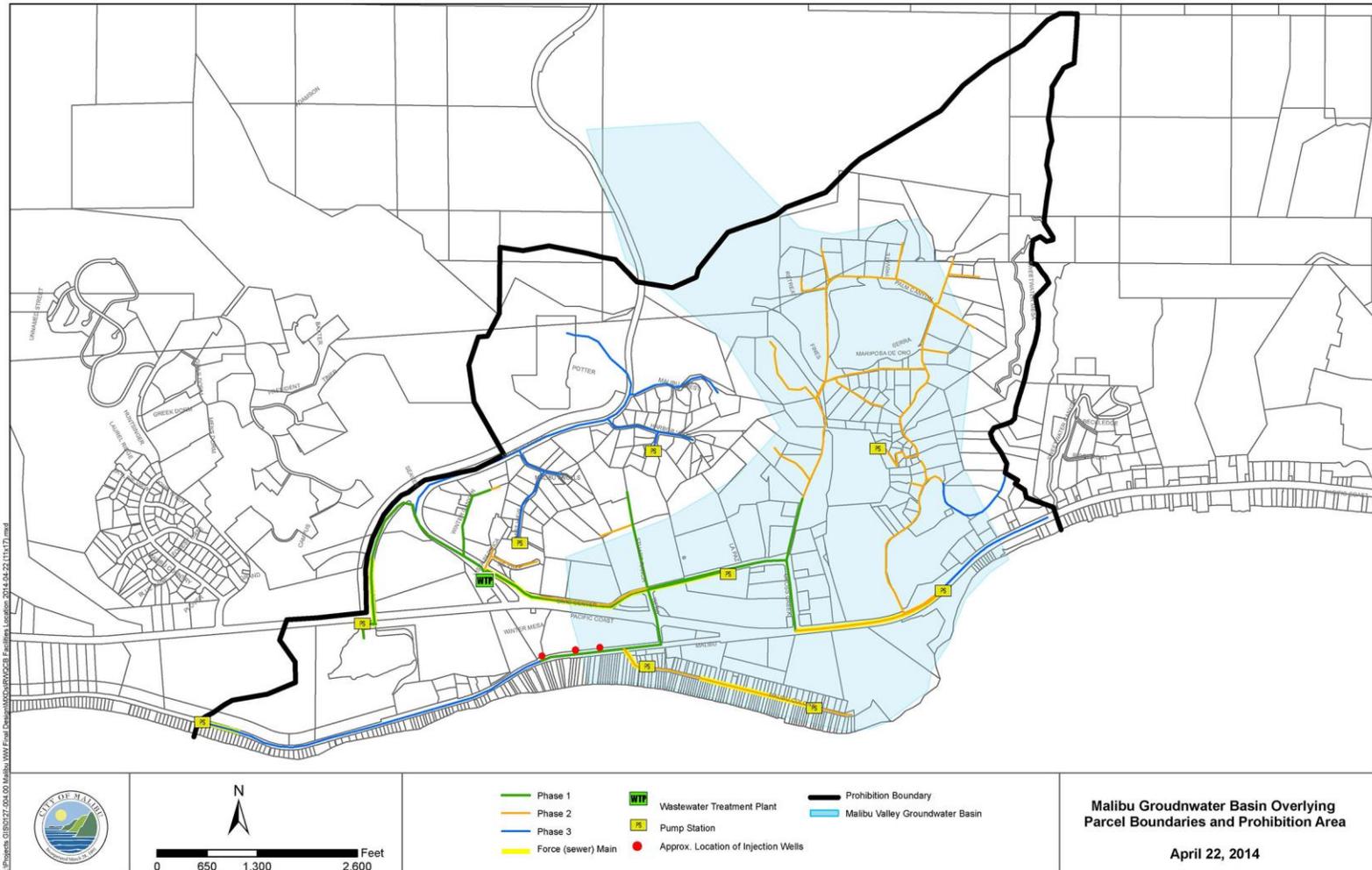
The shallow alluvial zone is capped by modern floodplain deposits and, in some locations, with artificial fill. This zone generally consists of silts and sands, ranges in thickness from 0 to 25 feet, and is underlain by a very fine grained, low-permeability zone containing clay and silt layers, especially 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 hydraulically connected beneath the ground surface to Malibu Creek and Lagoon and is the hydrostratigraphic zone into which OWDS discharges occur.

Low Permeability Zone

The low-permeability zone underlying the shallow alluvium consists of very fine-grained clay and silt deposits ranging in thickness from 0 to 90 feet. This zone has been mapped as extending from just north of Civic Center Way, south to Malibu Colony Road, and from the western edge of the main body of the alluvium near the Malibu Racquet Club, to the west side of Cross Creek Plaza. This zone limits the downward movement of groundwater from the overlying shallow alluvium to the underlying Civic Center Gravels. This zone appears to be deeper and somewhat thicker as the basin approaches the ocean and therefore provides a greater limitation on the movement of groundwater between the shallower and deeper alluvial zones on the southeastern side of the basin.

Figure 4.7-2. Groundwater Basin

City of Malibu's Civic Center Wastewater Treatment Facility Project



Civic Center Gravels

The Civic Center Gravels underlie the shallow estuarine deposits and low permeability zone beneath 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, sloping slightly to the south and west. The Civic Center Gravels have been mapped 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 based on available data, this strata is estimated to be on the order of 10 to ~~140~~ 160 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; in essence, how fast the electrical current moves through a material is indicative of the types of soils through which the electric 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. 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 underground fresh to brackish groundwater zone appears to rise towards the sea floor offshore and south of the beach on the western side of the groundwater basin, suggesting that currently, 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 Civic Center area 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 60,000 and 20,000 years ago, leading to the ocean.

Winter Canyon

Winter Canyon is a small watershed with one principal creek, Winter Creek, that flows intermittently within the canyon. The alluvial-filled portion of the watershed is approximately two acres in size, with overall relief of around 1,325 feet that is broken into two drainage slopes. The

lower elevation creek channel is about 3,000 feet long from the foothills to the ocean, with a slope of about 0.07 feet per foot. (ECI 2000).

Based on borings and wells constructed within Winter Canyon, the alluvium is generally brown, loose to dense, moist, slight silty or clayey, fine to medium grained sand and gravel. North of PCH, the alluvium is estimated to be approximately 20 to 70 feet deep, while south of PCH, alluvium appears to range from 50 to 90 feet deep. Measured depth to groundwater within Winter Canyon ranged from around 12 feet above sea level in the area adjacent to Malibu Road, to 50 feet above sea level at the northern end of the canyon, and is well below the base of the wetlands identified on the proposed treatment facility site (that is, the wetlands is not in connection with the groundwater table). While hydrogeologically separate from the larger Malibu Valley Groundwater Basin by a bedrock rise, the Winter Canyon alluvium does merge with groundwater basin formations at the southern end of the canyon, immediately before reaching the ocean. Figure 4.7-3 is a cross-section of Winter Canyon hydrogeology.

Groundwater Flow

McDonald Morrissey and Associates (2013) estimated that the total average annual inflow to the Malibu Valley Groundwater Basin is approximately 222,000 cubic feet per day (ft³/d) or 1.7 million gallons per day (mgd). Sources of recharge to the system are infiltration from Malibu Creek, infiltration from OWDSs, irrigation return, upland runoff, and infiltration of precipitation.

Groundwater flow directions are generally to the south and southeast toward the Pacific Ocean and Malibu Lagoon. Groundwater elevations are influenced by tidal fluctuations and by 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 75,000 ft³/d. Hydrologic analyses revealed that, overall, the groundwater flow system is very slow moving, taking as long as 50 years for discharges from the upstream OWDSs to reach the Lagoon and/or ocean (RMC 2013).

Field and modeling studies have concluded that shallow depth to the groundwater table (shallow alluvium) in the Project area is essentially under the influence of surface water. Approximately 23 percent of the groundwater flowing into the Project area is from percolation of OWDS discharges.

Storm Drainage

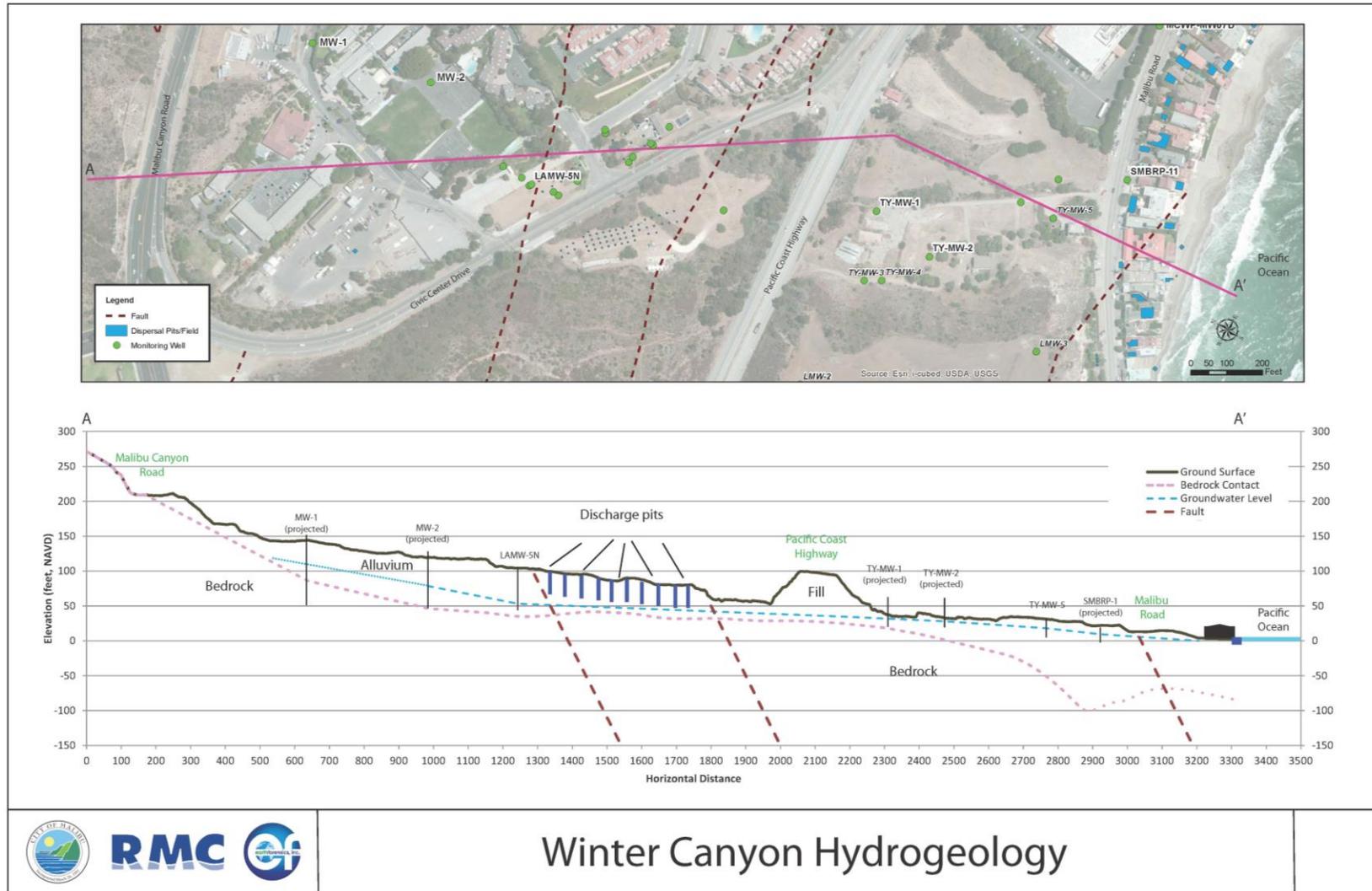
The Civic Center area of the City of Malibu contains a varied system of storm drainage facilities that convey stormwater flows from three main storm drain arteries along Malibu Road, Civic Center Way, and Cross Creek Road. Numerous smaller pipe laterals tie into this master drainage system at intermittent locations throughout the Project area.

Dry-weather runoff from the Project area watershed is estimated to be 7,000 gallons per day (gpd) based on regional flow measurements and Project area land use data. Dry-weather runoff is currently treated at one of ~~two-three~~ existing stormwater treatment plants; the first located on the north side of Civic Center Way, just west of Cross Creek Road, ~~and~~ the second in Paradise Cove (outside the Project area); ~~and the third in Marie Canyon~~. The treated dry-weather runoff is discharged into Malibu Creek or Santa Monica Bay. As of April 2008, treated stormwater from the stormwater treatment plant on Civic Center Way is used to irrigate landscaping along Cross Creek Road.

Stormwater runoff from the Project area watershed drains to three outfalls to Malibu Creek and Malibu Lagoon. Pump stations at each of the three outfall locations capture and convey a portion of the stormwater runoff to stormwater treatment plants prior to discharge. Treatment includes media filtration to remove particulates, and ozone disinfection to reduce bacteria to levels below water quality objectives at each of the three drain sites. The maximum capacity of the stormwater treatment plant is 1,400 gallons per minute (gpm).

The proposed Civic Center Wastewater Treatment Facility has been designed such that the facility will be graded to direct all stormwater runoff from the facility ~~is routed~~ to designed capture locations and returned via pumping to the headworks for treatment. Stormwater runoff falling outside of the designated facility will continue to following existing flow paths to existing runoff management infrastructure.

Figure 4.7-3. Winter Canyon Hydrogeology



Flooding

The City has been historically susceptible to major storm activity, as are most California coastal communities. Localized flooding occurs along the coast, Malibu Lagoon, and Malibu Creek, as well as within low-lying areas upstream, during peak storm events. One major underlying problem associated with area-wide drainage is that many outfalls into Malibu Creek are underwater during the course of storm events, causing stormwater flows to back up in the system. Localized flooding continues until a given storm passes, Creek and Lagoon water levels recede, and consequently flooded areas are then allowed to drain to their appropriate outfalls (City of Malibu 1996c). Flooding in the Project area has also occurred in the past as a result of the low profile of the Pacific Coast Highway bridge over Malibu Lagoon. However, replacement of the bridge in 1995 increased the bridge profile, and water flows have since been able to pass under the bridge unimpeded. No flood events have occurred since the bridge was replaced.

The Federal Emergency Management Agency (FEMA) provides information on flooding hazards and frequency for cities and counties on its flood insurance rate maps (FIRMs). FEMA identifies designated zones to indicate flood hazard potential. In general, flooding occurs along waterways, with infrequent localized flooding also occurring because of constrictions in storm drain systems or surface water ponding. Those areas within the 100-year floodplain have an annual probability of flooding of 1 percent.

According to the FEMA FIRMs, the treatment plant site and Bluffs Park pump station are located outside identified flood plain zones, but the Legacy Park pump station, two other future pump stations, and a number of pipelines would be located within the Zone A 100-year floodplain area. Figure 4.7-4 shows the FEMA flood zones in the Project area.

- Zone A is a high-risk area with a 1 percent annual chance of flooding (i.e., the 100-year floodplain) and a 26 percent chance of flooding over the life of a 30-year mortgage. Mandatory flood insurance purchase requirements apply.
- Zone X includes areas outside the 100-year floodplain, areas of 100-year sheetflow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees.

Development within the City must comply with the City's Floodplain Management Ordinance (described in the Regulatory Setting section above), which requires that all structures in Zone A be elevated to at least 1 foot above the base flood elevation as determined by the City, or incorporate appropriate flood-proofing measures such that the structure is watertight, with the inclusion of walls that are substantially impermeable to the passage of water. All new and replacement water supply and sanitary sewage systems must also be designed to minimize or eliminate infiltration of flood waters into the stormwater systems as well as discharge from the sanitary sewage systems into flood waters.

Figure 4.7-4. FEMA Flood Zones

City of Malibu's Civic Center Wastewater Treatment Facility Project



Seiche, Tsunami, and Mudflow Hazards

A seiche is a wave that oscillates in lakes, bays, or gulfs because of seismic or atmospheric disturbances. In the event of a seismic disturbance, a seiche could be possible within Malibu Lagoon. A tsunami is a series of sea waves caused by an earthquake beneath the ocean floor, submarine volcanic eruptions, or an underwater landslide. In the open ocean, tsunami waves travel at speeds as rapid as 600 miles per hour. As the waves enter shallow water near the coastline, wave heights may rise rapidly and cause substantial damage to coastline structures.

Southern California has several faults near the coastline, as well as several offshore canyons that could experience an underwater landslide triggered by a local earthquake. The rupture of any of these coastline faults could result in a local tsunami, which would be ashore in 10 minutes or less (City of Malibu 2012). The wastewater treatment facility site would be outside the inundation zone, but all of the pump stations, injection well facilities, and a large portion of the pipelines in the Project area would be within the inundation zone mapped by the City in its Emergency Response Plan for Tsunami Operations.

Mudflows are mass wasting of dirt and debris that occurs after intense rainfall or snowmelt, volcanic eruptions, earthquakes, and severe wildfires. The speed of the slide depends on the amount of precipitation, steepness of slope, vibration of the ground, and alternate freezing and thawing of the ground. Mudflows originating within the slopes of the Santa Monica Mountains could potentially spread to the Project area.

Water Quality

The Los Angeles region is the state's most densely populated and industrialized region. The Los Angeles RWQCB regulates more than 1,000 dischargers of wastewater from point sources in the region, more than 700 of which are discharged to surface waters that are regulated under the National Pollutant Discharge Elimination System (NPDES). In addition, the Los Angeles RWQCB prescribes Waste Discharge Requirements (WDRs) for the remaining discharges.

Malibu Creek has a history of water quality problems, including nutrients, coliform, trash, and metals due to urbanization. Stormwater runoff carries pollutants such as trash and debris, oil and grease, nitrogen, phosphorus, hydrocarbons and other organic matter, heavy metals, bacteria, and suspended sediments. As noted above in the regulatory setting, in 2010, Malibu Creek was listed as impaired by coliform bacteria, nutrients, scum/foam, sediments, selenium, sulfates, and trash (SWRCB 2011), and a TMDL was issued [by the USEPA for Malibu Creek and Lagoon on July 2, 2013 and approved as an amendment to the Basin Plan by the State Water Board SWRCB under Resolution 2013-008](#). While natural and wildlife sources contribute non-point source pollution, human activities are the primary source of pollution, including potentially malfunctioning on-site wastewater disposal systems (OWDSs) and runoff from horse corrals. Nutrient inputs are contributed by urban runoff and from the Tapia Wastewater Treatment Plant, which discharges tertiary-treated effluent into Malibu Creek (LARWQCB 2011). Nutrients are of particular concern in Malibu Lagoon due to eutrophication and algal blooms, which degrade endangered fisheries habitat.

As noted in the Project Description, on November 5, 2009, the LARWQCB adopted Resolution No. R4-2009-007, which prohibits any new discharges from OWDSs, the cessation of all commercial discharges from OWDSs on November 5, 2015, and the cessation of all residential discharges from OWDSs on November 5, 2019. The Project is designed to comply with this prohibition, which is

intended to result meaningful reductions in bacterial and nutrient impairments of Malibu Creek, Malibu Lagoon, and nearby beaches.

Another issue associated with Project area groundwater quality is seawater intrusion. The Malibu Valley Groundwater Basin experienced seawater intrusion in 1950, and again in 1960 when seawater advanced 0.5 miles inland due to overdraft pumping of the groundwater basin (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). Subsurface hydraulic interconnections between Malibu Creek and Lagoon on the east side of the groundwater basin and the Pacific Ocean on the south side of the groundwater basin also affect local groundwater quality.

While there are many groundwater monitoring wells screened in (drawing water from) 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 in 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, commiserate with, but somewhat lower than, the concentrations observed in the deeper groundwater.

Limited data also exist regarding groundwater quality in the deeper 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 indicate 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 total dissolved solids (TDS), sulfate, and chloride. Additionally, manganese concentrations, while generally low, are at or above the current aesthetic (secondary) 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, total phosphorus and orthophosphate.

Differences in Civic Center Gravel groundwater quality do exist across the groundwater basin, both in composition and location. 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 (indicating a higher degree of connectedness with the Pacific Ocean on the southern side of the groundwater basin).

4.7.2. Environmental Impact Analysis

Thresholds of Significance

For the purposes of this EIR and in accordance with Appendix G of the State CEQA Guidelines, the Project would result in a significant impact with respect to hydrology and water quality if it would:

1. Violate any water quality standards or waste discharge requirements.
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater

table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site.
4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
5. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
6. Otherwise substantially degrade water quality.
7. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
8. Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
9. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
10. Be subject to inundation by seiche, tsunami, or mudflow.

Impacts

Impact HWQ-1: Would the Project Violate Water Quality Standards or Otherwise Degrade Water Quality, Including as a Result of Erosion or Sedimentation?

Construction Impacts

During the construction period, excavation, grading and well drilling activities would result in exposure of soil to runoff, potentially causing entrainment of sediment in the runoff. Soil stockpiles and excavation within street rights-of-way along the Project alignment would be exposed to runoff and, if not managed properly, the runoff could cause increased sedimentation in sewers outside of the Project alignment. The accumulation of sediment could result in blockage of flows, potentially resulting in increased localized ponding or flooding.

The potential for chemical releases is present at most construction sites. Once released, substances such as fuels, oils, paints, and solvents could be transported to nearby surface waterways (including Winter Canyon Creek and the adjoining wetland area at the wastewater treatment facility site) and/or groundwater in stormwater runoff, wash water, and dust control water, potentially reducing the quality of the receiving waters. Also, if dewatering² of excavations is necessary, the discharges from dewatering could affect surface water quality. However, potential impacts of dewatering would be addressed by treating water as needed before discharging to the storm drain system.

The City or its contractor would obtain coverage under the NPDES General Permit for Construction Activities, which would cover both runoff from the construction site and disposal of groundwater from dewatering as an authorized non-stormwater discharge. The preparation and implementation of a Project-specific Storm Water Pollution Prevention Plan (SWPPP) would ensure that impacts to

² Dewatering is the removal of groundwater seepage from a construction site using well points or pumps.

storm water quality are less-than-significant. The City of Malibu would require the contractor to prepare and submit a SWPPP, along with a Notice of Intent to comply with the General Construction Permit, before starting construction. [These are standard conditions of approval for coastal development permits.](#)

The Project SWPPP would include a description of Best Management Practices (BMPs) to be applied to minimize the discharge of pollutants during construction. These BMPs would apply to all construction activities, including well drilling and construction of the wastewater treatment facility, pump stations and pipelines. Construction-period BMPs would include, but are not limited to the following:

- Identifying all storm drains and creeks along the Project alignment and adjacent to the wastewater treatment plant and pump station sites, and ensuring that all workers are aware of their locations to prevent pollutants from entering them.
- Protecting all storm drain and catch basin inlets.
- Developing an erosion control and sediment control plan for wind and rain.
- Developing spill response and containment procedures, and immediately cleaning up and disposing of any leaks or spills. Any leaking vehicles and heavy equipment will be repaired immediately or removed from the site. One or more spill containment kits will be placed on site, and personnel trained in proper use and disposal methods. Use of dry cleanup methods whenever possible
- Refueling vehicles and heavy equipment in a designated site located at least 500 feet from creeks and drainage swales.
- Washing concrete trucks, paint, equipment, or similar activities only in areas where polluted water and materials can be contained for subsequent removal from the site. Wash water will not be discharged to the storm drains, street, drainage ditches, creeks, or wetlands. Areas designated for washing functions will be at least 100 feet from any storm drain, water body, or sensitive biological resources. The location(s) of the washout area(s) will be clearly noted at the construction site with signs; the applicant will designate a washout area, acceptable to Building and Safety and Planning Department staff. The washout areas will be shown on the construction and/or grading and building plans and will be in place and maintained throughout construction.
- Storing construction equipment in a defined area at least 100 feet from any wetlands or water bodies.
- Separating any polluted runoff from clean site runoff through use of berms or ditches to divert surface runoff around the construction site.
- Covering exposed stockpiles of soil or other erosive material during the rainy season.
- Placing trashcans liberally around project site and maintain properly.
- Constructing roadwork pavement, concrete, and asphalt and apply seal coat during dry weather only.
- Covering storm drains and manholes in the construction area when paving or applying seal coat, slurry, fog seal, or other coatings.
- Inspecting active construction areas regularly to ensure that BMPs are intact.
- Conducting daily cleaning of active construction areas as needed.
- Educating employees and subcontractors about BMPs through periodic tailgate meetings.

- Regularly maintaining all BMPs at project site.

Implementation of the SWPPP, and its associated BMPs, would begin with the commencement of construction and continue through the completion of construction and would reduce any impacts to less than significant.

Operations Impacts

Operational activities would include ongoing operation of the wastewater treatment facility, pump stations, and pipelines, and use of recycled water for landscape irrigation, with remaining water dispersed through percolation or groundwater injection.

Operation and Maintenance of Treatment Plant, Collection Pipeline and Pump Stations

Operation and maintenance of the wastewater treatment plant and pump stations would not be expected to result in water quality impacts. Per the City's 2012 MS4 Permit, stormwater BMPs would be incorporated into Project building and grading plans. All of the stormwater runoff within the wastewater treatment facility would either be detained for infiltration on the site, or captured and conveyed to the headworks of the treatment facility. This would be consistent with the City's Stormwater Management Plan, which dictates installation of post-construction BMPs to prevent pollutants from entering the storm drainage system during occupation. On-site integration of water quality control measures, such as biofilters adjacent to site driveways, would further reduce the transport and release of water pollutants into Winter Canyon Creek, Malibu Creek, and Malibu Lagoon. Biosolids would be hauled by tanker truck to the Joint Water Pollution Control Plant operated by the Sanitation Districts of Los Angeles County, or other suitable permitted facility. Because trucks would be completely enclosed and biosolids would be conveyed to properly permitted sites, no water quality impacts are expected to result from biosolids disposal.

Collection system pipelines and pump stations would be located underground and are not expected to pose a substantial risk of rupture or leakage. The likelihood of an overflow or bypass of untreated or partially treated wastewater at the treatment facility is remote because the treatment tanks would be located below ground and designed with excess storage capacity to meet minimum influent storage capacity requirements. Risk of leak or rupture would be minimized and reduced to acceptable levels through proper design and construction practices and through normal daily operator surveillance of the facilities. In addition, the wastewater treatment facility is designed so that flows on-site would be captured and sent to the headworks, which would capture any leaks on site and, as described in Section 3.4.4 of Chapter 3 – Project Description, the Project would be operating under permits requiring the development and implementation of a sewer system management plan (SSMP) that includes, among other things, an emergency response plan to address pipeline breaks and overflows. Given these factors, the potential for release of pollutants at the from the collection system pipelines, and pump stations and the wastewater treatment facility and resulting impacts is considered less than significant.

Operation of Recycled Water Distribution Pipeline and Irrigation with Recycled Water

Use of recycled water for landscape irrigation is not expected to have adverse effects on water quality. The Mitigated Negative Declaration that was prepared for the State's General Permit for Landscape Irrigation Uses of Municipal Recycled Water ([State Water Resources Control Board/SWRCB](#), 2009) acknowledges that there could be degradation of groundwater resulting from recycled water but states that: "Degradation of groundwater by constituents in recycled water after

effective source control, treatment, and control may be determined to be consistent with maximum benefit to the people of California.” The document then goes on to say that:

“This determination is based on considerations of reasonableness under the circumstances of the recycled water use. Factors to be considered include:

- Past, present, and probable beneficial uses of the receiving water (as specified in the applicable Water Quality Control Plan;
- Economic and social costs, tangible and intangible, of the recycled water usage compared to the benefits;
- Environmental aspects of the recycled water usage; and
- Implementation of feasible alternative treatment or control methods.

The proposed General Permit establishes terms and conditions of discharge to ensure that the discharge does not unreasonably affect present and anticipated beneficial uses of groundwater and surface water for the following reasons:

- Recycled water will be applied at agronomic rates reflecting the seasonal hydraulic and nutrient requirements of the Use Area;
- The Producer is responsible for ensuring that recycled water meets the quality standards of the General Permit and associated waste discharge requirement order(s) for the WWTP(s); and
- The discharge to surface waters, unless otherwise authorized by an NPDES permit, is prohibited.”

Finally, the document states that:

“To comply with the proposed General Permit, Producers and Distributors must implement, and ensure users implement, the following treatment and control measures necessary to avoid pollution or nuisance and maintain the highest water quality consistent with the maximum benefit to the people of the state:

- Treatment and use standards necessary to produce disinfected tertiary recycled water and implement the applicable Title 22 Requirements;
- Recycled water application at agronomic rates;
- Identify and implement best management practices;
- Develop, maintain, and implement an Operation & Maintenance Plan; and
- Trained personnel (e.g., recycled water supervisor). “

Compliance with the ~~State Water Resources Control Board (SWRCB)~~ [State Water Board](#) General Waste Discharge Requirements (WDRs) for Landscape Irrigation Uses of Municipal Recycled Water (Recycled Water General Permit) (Order No. 2009-0006-DWQ) and/or similar provisions included in a Project-specific WDR would ensure the protection of surface and groundwater quality. As noted above, recycled water must be applied at rates that meet the water needs of landscape areas, and without over-irrigating (i.e. application at “agronomic rates”); Title 22 expressly requires that any irrigation runoff must be contained within the recycled water use area (unless authorized by the LARWQCB). To ensure appropriate application, personnel using recycled water would be appropriately trained. With implementation of the [permit condition](#) measures described above, potential recycled water irrigation-related impacts to water quality would be reduced to less than significant levels [and no mitigation is required](#).

Injection and Percolation

As described in Chapter 3, Project Description, planned dispersal operations for the Project aim are to reuse as much recycled water for irrigation and non-potable reuse as feasible possible; any unused recycled water would be dispersed underground. Dispersal is anticipated to be predominantly via injection into the Malibu Valley Groundwater Basin; however, percolation ponds will be constructed at the treatment CCWTF plant site for use along with existing seepage pits at the site as redundant dispersal capacity. Use of these percolation facilities (new percolation ponds and existing seepage pits) on a regular basis is not anticipated.

In its draft regulation for replenishment of groundwater with recycled municipal wastewater, the CDPH defines recycled municipal wastewater as recycled water that is the effluent from treatment of a wastewater of municipal origin, such as the recycled water that would be generated by the Project. In forming the draft requirements, CDPH acknowledges that recycled waters of municipal origin is of 'common' quality (that is, generally the same), provided the wastewater management agency administers an industrial pretreatment and pollutant source control program. To this end, the primary constituents of concern to be addressed for recycled water injection are pathogenic microorganisms, salts, nutrients and constituents of emerging concern³ (CECs). Recycled water to be produced by the Project would be disinfected to meet Title 22 standards for unrestricted recycled water use, and would be monitored as specified in the WDRs to ensure that there are no unacceptable pathogen risks.

In its Statewide Recycled Water Policy, the State Water Resources Control Board (State Water Board) acknowledges the potential for salts and nitrogen compounds to be of concern relative to the use of recycled water and its potential impacts on groundwater quality because high levels of salts and nutrients can make groundwater unsuitable for drinking. The policy therefore calls for the preparation of a Salt and Nutrient Management Plan (SNMP) to aid in management of these compounds relative to groundwater quality when evaluating and approving recycled water projects. Finally, in the Statewide Recycled Water Policy, the State Water Board acknowledges concerns regarding constituents of emerging concern (CECs). In response, it requires regular monitoring for CECs consistent with recommendations by CDPH and the 'blue-ribbon' advisory panel that was convened by the State Water Board to guide future actions relating to CECs.

In evaluating the potential for impacts on groundwater quality resulting from the injection of recycled water, groundwater quality change analyses were conducted, focusing on changes to groundwater salinity and nitrogen compound concentrations. This analysis focused on impacts to the Malibu Valley Groundwater Basin as the majority of the unused recycled water will be injected in this groundwater basin. Impacts to Winter Canyon groundwater are not expected to be significant as the percolation facilities at the treatment CCWTF plant site would will not be used on a regular basis but rather to provide back-up dispersal capacity to the proposed injection wells. Pathogenic microorganisms were not considered as the Project recycled water would be disinfected, and CECs were not considered because, while technology allows for the detection of CECs in water, there is currently no frame of reference to determine what risks may or may not exist nor any regulatory guidelines or standards against which to evaluate detectable concentrations. It has been documented that CEC concentrations in septic tank effluent ranges from tens of nanograms per liter

³ Constituents of emerging concern (or CECs) are a class of diverse, relatively unmonitored chemicals such as pharmaceuticals, personal care products and other trace organic chemicals that has emerged as a new issue for regulators to address. At present, the State is currently working on protocols for addressing potential CECs that may be found in recycled water.

to tens of micrograms per liter (Schaidler, et. al, 2013); therefore, it is anticipated that, at present, OWDS discharges are contributing CECs to the Malibu Valley Groundwater Basin. Little research has been done to date to study the fate and transport of CECs in the subsurface and/or to compare the efficacy of CEC removal by various treatment technologies. A study by the U.S. Environmental Protection Agency (August 2010) noted that UV disinfection, such as that included for the proposed Project, will result in some removal of selected CECs. Another study did find, however, that the CEC removal efficiencies of OWDSs were relatively lower than or comparable to those from centralized municipal treatment plants (Du et. al., 2014). T, and therefore, the Project, when implemented, would likely result in less than or similar levels of CEC discharges to the Malibu Valley Groundwater Basin and the Winter Canyon alluvium to those which occur under present conditions.

Consistent with the approach for evaluating the potential for groundwater impacts as part of SNMP development, indicator constituents were selected to evaluate salinity and nitrogen compound concentration changes over time. Total Dissolved Solids (TDS) was selected as the primary indicator parameter for salinity for the following reasons:

- It is a constituent regularly monitored and detected in both source and receiving waters;
- It is conservative in the environment;
- It is representative of other salts (TDS is a compilation of general minerals and provides a good relative indicator of concentration trends in the groundwater basin for other salts); and
- It is a constituent subject to a water quality objective (WQO) within the Basin Plan.

Nitrate was selected as an indicator for nitrogen compounds for similar reasons. Nitrate is one of the primary constituents for both groundwater and recycled water quality monitoring and WQOs for nitrate have been established in the Basin Plan. The analysis of future groundwater quality trends to be anticipated from the Project is found in the Technical Memorandum entitled *Assimilative Capacity and Anti-Degradation Analysis for Proposed Injection Dispersal* (RMC 2014a).

Overall, the injection and/or percolation of recycled water into the Malibu Valley Groundwater Basin would decrease TDS groundwater concentrations with time, and would result in increased concentrations of nitrogen in the Civic Center Gravels, though this increase would be offset by decreases in nitrogen concentrations in the shallow alluvium. In general, the overall loading of nutrients to the groundwater basin would be reduced due to improved wastewater effluent treatment, and the direct discharges to groundwater would be limited to a few locations within the groundwater basin rather than dispersed throughout the basin. Additionally, the area of the groundwater basin that would be affected by injection is small relative to the overall size of the groundwater basin, and groundwater modeling demonstrates that all flows would go to the Pacific Ocean/Santa Monica Bay and not Malibu Creek or Lagoon.

The anticipated increases in groundwater nitrate concentrations in the Civic Center Gravels are considered a degradation of the groundwater basin. To ensure that the anticipated increase in nutrient concentrations do not cause a significant adverse impact, the applicant must obtain approval from the Regional Board through an antidegradation analysis that complies with the state's antidegradation policy. To comply with the antidegradation policy, similar to the use of recycled water for irrigation, the analysis must demonstrate the anticipated increases in nitrate concentration will not affect present and future beneficial use of groundwater and will not result in water quality less than that prescribed in the policies. Furthermore, waste discharges that lead to

increased volume or concentration of waste are required to meet WDRs, which will result in the best practicable control of discharges necessary to assure that pollution or a nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people will be maintained.

The *Assimilative Capacity and Anti-Degradation Analysis for Proposed Injection Dispersal* (RMC 2014a) has been prepared to comply with these requirements and demonstrates:

- Past, present, and probable beneficial uses of the receiving water (as specified in the applicable Basin Plan) are either improved or remain unaffected by the nitrate concentration increase (that is, nitrate concentrations in the Civic Center Gravels projected into the future remain below the numerical water quality objective set forth in the Basin Plan for groundwater with a Municipal designated use);
- Water quality improvements to be gained by eliminating nitrogen loading in the shallow alluvium connected to Malibu Creek and Lagoon, which are 303(d) listed water bodies;
- Economic and social costs, tangible and intangible, of the continued use of OWDS relative to the benefits to be achieved by the Project;
- Environmental aspects of the recycled water usage (including the seawater intrusion barrier benefits to be achieved via the injection program); and
- Implementation of feasible alternative treatment or control methods.

Measures to control the loading of salts and nutrients to the groundwater basin resulting from the injection and percolation of recycled water (and the associated increases in groundwater concentrations for those constituents) would help to mitigate impacts associated with the Project, and could include identifying and implementing BMPs that would reduce salt and nutrient loading to the basin. These BMPs could include, but are not limited to, the use of biofiltration treatment systems to address loadings from stormwater recharge, landscape irrigation management practices and education, and water softener ordinances to reduce the use of softeners using salts. These measures would be documented in a site-specific WDR for the Project that would be issued by the LARWQCB. Measures to reduce salt and nutrient loading would also be included in the basin-wide SNMP currently being prepared; this plan would be adopted by the LARWQCB as part of its Basin Plan implementation chapter. When implemented, these BMPs would ensure that treatment and control measures necessary to minimize pollution or nuisance would be followed to maintain high water quality consistent with the maximum benefit to the people of the state and compliance with regulatory standards (water quality objectives) for the aquifer use designation. Compliance with the site-specific WDR and the basin-wide SNMP would reduce nutrient-loading impacts to less than significant.

Recycled water to be injected and/or percolated into the groundwater basin would include a residual chlorine concentration of 2 mg/L designed to prevent the recurrence of pathogens in the distribution pipelines and to minimize the potential for biological growth in the injection wells. The interaction of dissolved organic carbon with disinfection residuals creates the potential for the formation of disinfection byproducts (DBPs), the most common of which are trihalomethanes (THMs) and halo acetic acids (HAAs). Therefore, there is a potential for the introduction of THMs and/or HAAs into the groundwater basin as part of the Project's recycled water injection program. Federal and state primary drinking water standards presently exist for both THMs and HAAs.

On September 19, 2012, the State Water Board adopted general waste discharge requirements for aquifer storage and recover (ASR) projects that recharge groundwater with treated drinking water (General Order). The *General Waste Discharge Requirements for Aquifer Storage and Recovery*

Projects that Inject Drinking Water into Groundwater (Order 2012-0010) was created to provide consistent regulation of ASR projects statewide and to provide a streamlined review and permitting process for ASR projects. The Order acknowledges that the primary concern when injecting potable water into groundwater is the formation of DBPs generated by drinking water treatment and chlorine residuals required pursuant to domestic water supply permits, and that some disinfectant and disinfection by-products will likely be present in the injected water. The Order then states that the degradation of groundwater by some of the constituents of concern (including DBPs) associated with a potable water ASR project is consistent with the maximum benefit to the people of the state if the minimum treatment and control technologies are employed. Therefore, the threshold of significance is whether the concentrations of these constituents are consistent with the maximum benefit to the people of the state using the minimum treatment and control technologies.

As previously noted, similar to potable water, the Project's recycled water would contain residual chlorine to prevent the regrowth of pathogens while in the distribution system, and this residual chlorine could interact with dissolved organic carbon to form DBPs, which could then be present in the water injected in the groundwater basin.

Recently, there have been multiple studies to evaluate and understand the fate and transport of DBP in the subsurface. Studies (Pavelic et al. 2006, 2007; Quanrud et al. 2003; Pyne 2006; City of Roseville 2011) have indicated that in anoxic (oxygen-depleted) aquifers, in-situ biological and geochemical processes reduce DBP concentrations and/or inhibit the formation of DBPs. Based on data collected to date, the Civic Center Gravels aquifer of the Malibu Valley Groundwater Basin is under anoxic conditions, and therefore significant groundwater quality impacts from DBPs are not expected to occur. Furthermore, while the Malibu Valley Groundwater Basin is designated as having municipal uses in the Basin Plan, the basin is not currently being used as a potable water supply. Implementation of the well ordinance to manage new wells in the basin as described below would further mitigate the potential for impacts on drinking water from DBPs that may be introduced into the groundwater basin in the area of the injection wells.

In summary, the proposed Project is being conducted to meet the City's obligations under the MOU, which in turn is aimed at providing water quality benefits to Malibu Creek and Lagoon, a 303(d) listed water body. The long-term beneficial uses of the groundwater basin as a municipal supply would remain intact. Therefore, the potential for groundwater impacts from DBP formation and the continuing discharge of CECs is considered to be less than significant.

The Malibu Valley Groundwater Basin is designated as a municipal groundwater supply in the Los Angeles RWQCB's Basin Plan. While groundwater is not presently used as a municipal water supply, the designation allows for the potential future use as such. To ensure that there are no associated future impacts from the use of groundwater mixed with injected recycled water as a potable water supply, the City of Malibu is developing an ordinance to manage the future installation of wells within the groundwater basin. This method of basin management has been utilized at other locations in the state on a case-by-case basis to address potential impacts on both groundwater quality and levels. Furthermore, to address the use of recycled water in groundwater basin management, CDPH released draft regulations in November of 2011 addressing groundwater injection of recycled water from domestic wastewater sources into aquifers designated as a source of drinking water (such as the Malibu Valley Groundwater Basin). CDPH is currently working on completing the regulations; however, the draft regulations released on March 28, 2013 include the requirement for identification of a zone of restricted well development for the protection of public health from inadequately treated recycled municipal wastewater or recharge water. Therefore, the

City's well management ordinance would delineate a zone of restricted well development and include requirements to be met before a well construction permit could be issued. Adoption of the proposed ordinance:

- Would not cause a direct physical change nor a reasonably foreseeable indirect adverse physical change to the environment;
- Would not affect the City's ability to provide sufficient potable water supplies, as recycled water provided for irrigation would offset potable water use and as the primary water purveyor in the City, Los Angeles County Waterworks District 29, has documented in its 2010 Urban Water Management Plan that it has sufficient supplies to meet the City's demands through build-out; and
- Is not a project pursuant to CEQA as defined in Public Resources Code 21065.

This proposed ordinance would not apply to monitoring wells constructed for groundwater quality monitoring because these wells simply monitor groundwater quality and elevations and do not affect flow directions or gradients.

With respects to ocean waters, based on hydrogeological studies and groundwater flow modeling conducted to date, recycled water injected and/or percolated into the Malibu Valley Groundwater Basin would be transported, along with existing groundwater flows, to Santa Monica Bay and the Pacific Ocean. These subsurface flows would diffuse upwards from the ocean floor once offshore due to density differences between the relatively 'fresh' groundwater-recycled water mix and the salty ocean water. Figure 4.7-5 is a conceptual representation of this offshore flow.

It is estimated that a 1:10 'fresh' groundwater to ocean water dilution would occur within 2 feet of the mixed groundwater-recycled water emerging from the ocean floor (RMC 2014b), and that assuming an initial ocean nitrate concentration of 1.5 mg/L and an injected nitrate concentration of 8 mg/L (which is conservative, given that the injected recycled water will be mixing with ambient groundwater, thereby lowering the nitrate concentration in the combined water dispersing to the ocean), ocean nitrate concentrations would increase a maximum of 8 percent to approximately 1.62 mg/L, assuming a 10 foot mixing depth. Therefore, ocean water quality impacts resulting from the Project are not anticipated to be significant.

Impact HWQ-2: Would the Project Substantially Deplete Groundwater Supplies or Interfere Substantially with Groundwater Recharge?

The Project would not result in the depletion of groundwater supplies. While construction of the wastewater treatment plant would result in an overall increase in paved areas, the Project would not result in a substantial decrease in groundwater recharge. As part of the project, The City would also need to adopt ordinances to address well installation and use in the Prohibition [AreaZone](#). The ordinance would only serve to place limits on installation of new wells, and would thus not have any effect on depletion of groundwater supplies or on groundwater recharge. Therefore, there would be no impacts on groundwater supplies resulting from the Project.

Effects on Groundwater Levels

The wastewater treatment facility, injection well facilities, and pump stations would create a minor amount of new impervious surface area in the Project area, but this is not expected to have a substantial effect on groundwater recharge. Irrigation with recycled water would be done at rates

that would meet the water needs of the irrigated area and is not expected to result in percolation of substantial amounts of water into the groundwater basin. The Project includes both groundwater injection and percolation, so the net effect on groundwater would be to increase groundwater levels in the vicinity of the injection wells (Geosyntec Consultants 2013).

The percolation and injection of recycled water has been designed to prevent the rise of groundwater levels to within 5 feet of ground surface, except in certain areas where shallower groundwater levels have traditionally occurred (e.g. wetlands). (A depth to water limit of 5 feet was selected to reflect the approximate depth of septic systems in the Project area at lower elevations.) The potential for groundwater mounding from groundwater injection was evaluated (Geosyntec Consultants 2013; McDonald Morrissey and Associates 2014), and results are shown in Figures 4.7-6, -7, -8 and -9 for current conditions and Phases 1, 2, and 3 of the Project, respectively (areas in gray on these figures are outside the study area). These results indicate that injection of treated effluent from the wastewater treatment facility has little to no impact on shallow groundwater elevations at the injection sites, and that these groundwater levels would remain at or below current levels. The results also indicate that, as OWDSs are removed from operation, shallow groundwater elevations decrease (drop) as a result of the transference of recharges from the shallow alluvium to the deeper Civic Center Gravels. Therefore, there are no significant impacts associated with rising groundwater levels resulting from the Project, nor any impacts associated with groundwater depletion.

Figure 4.7-5. Conceptual Model of Near-Shore Hydrogeology and Groundwater Flow

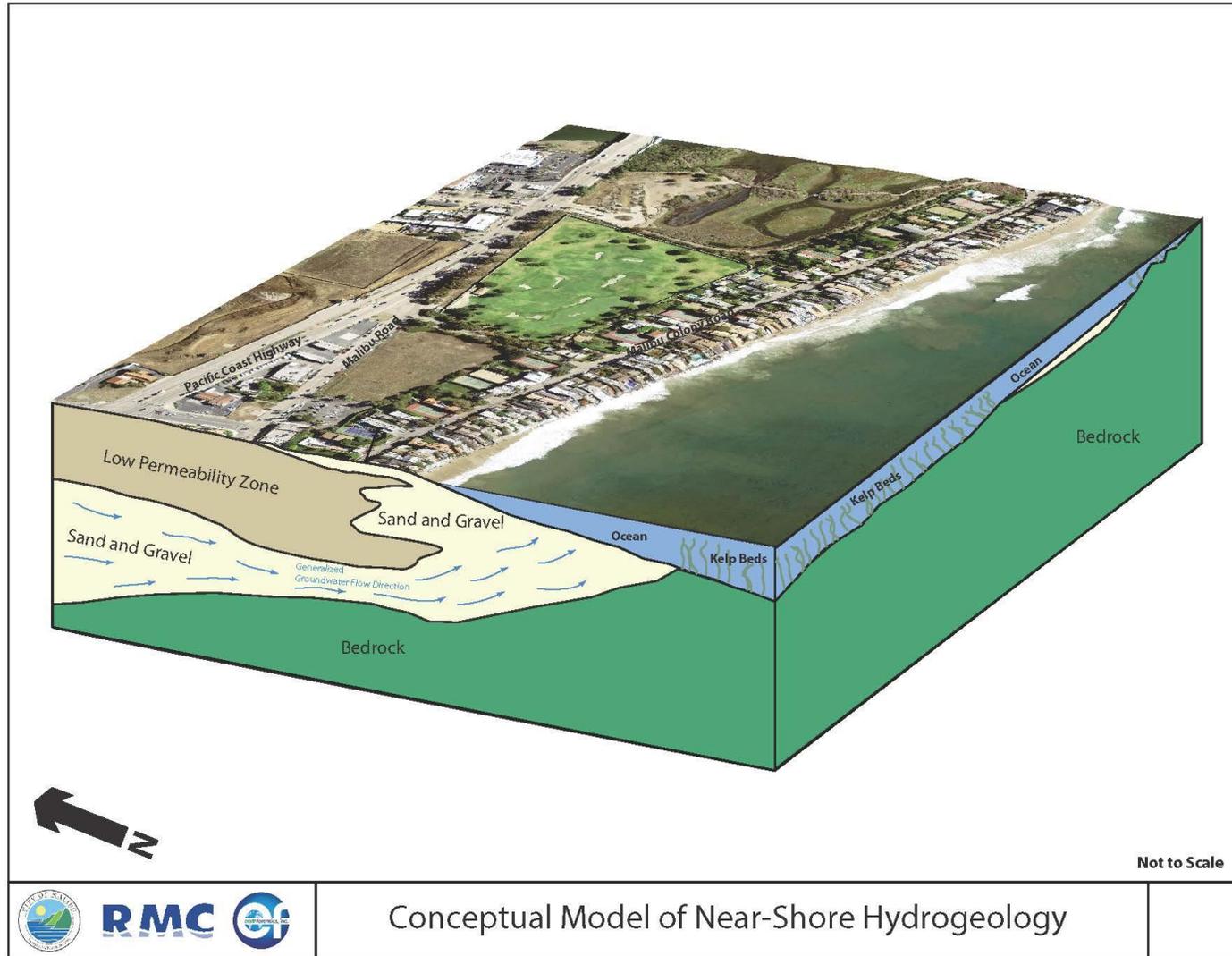


Figure 4.7-6. Minimum Depth to Groundwater under Current Conditions

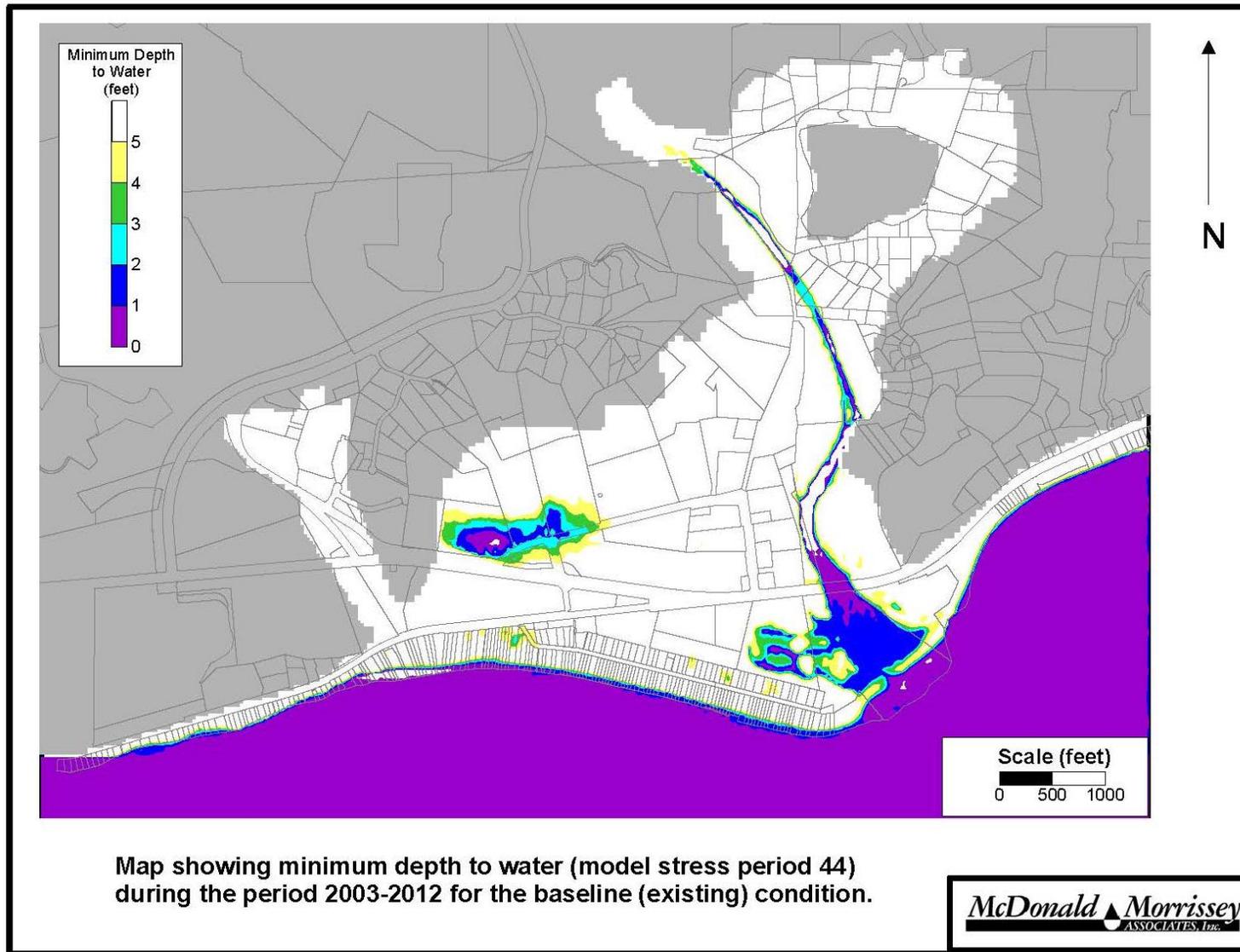


Figure 4.7-7. Minimum Depth to Groundwater after Phase 1 Injection of Wastewater

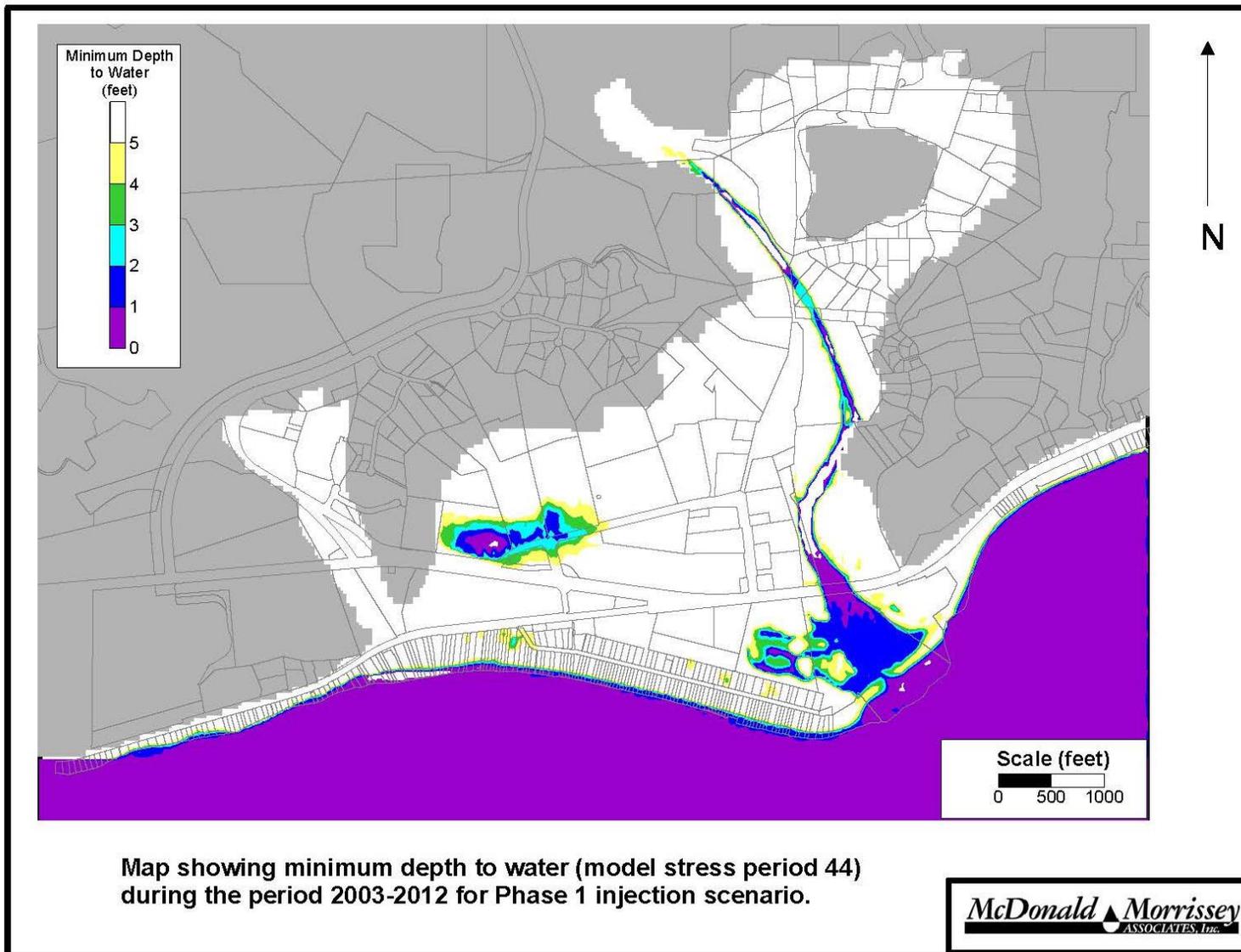


Figure 4.7-8. Minimum Depth to Groundwater after Phase 2 Injection of Wastewater

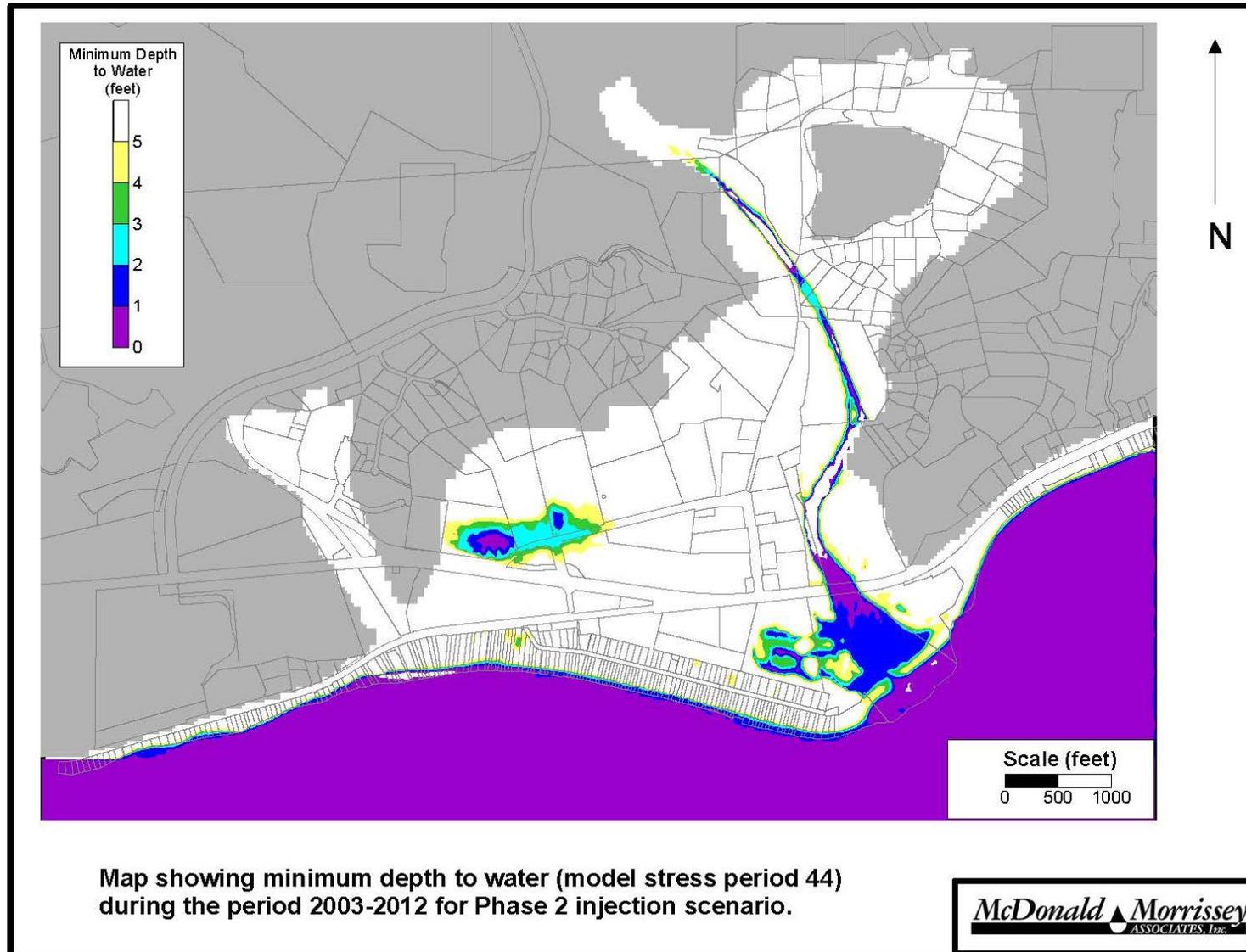
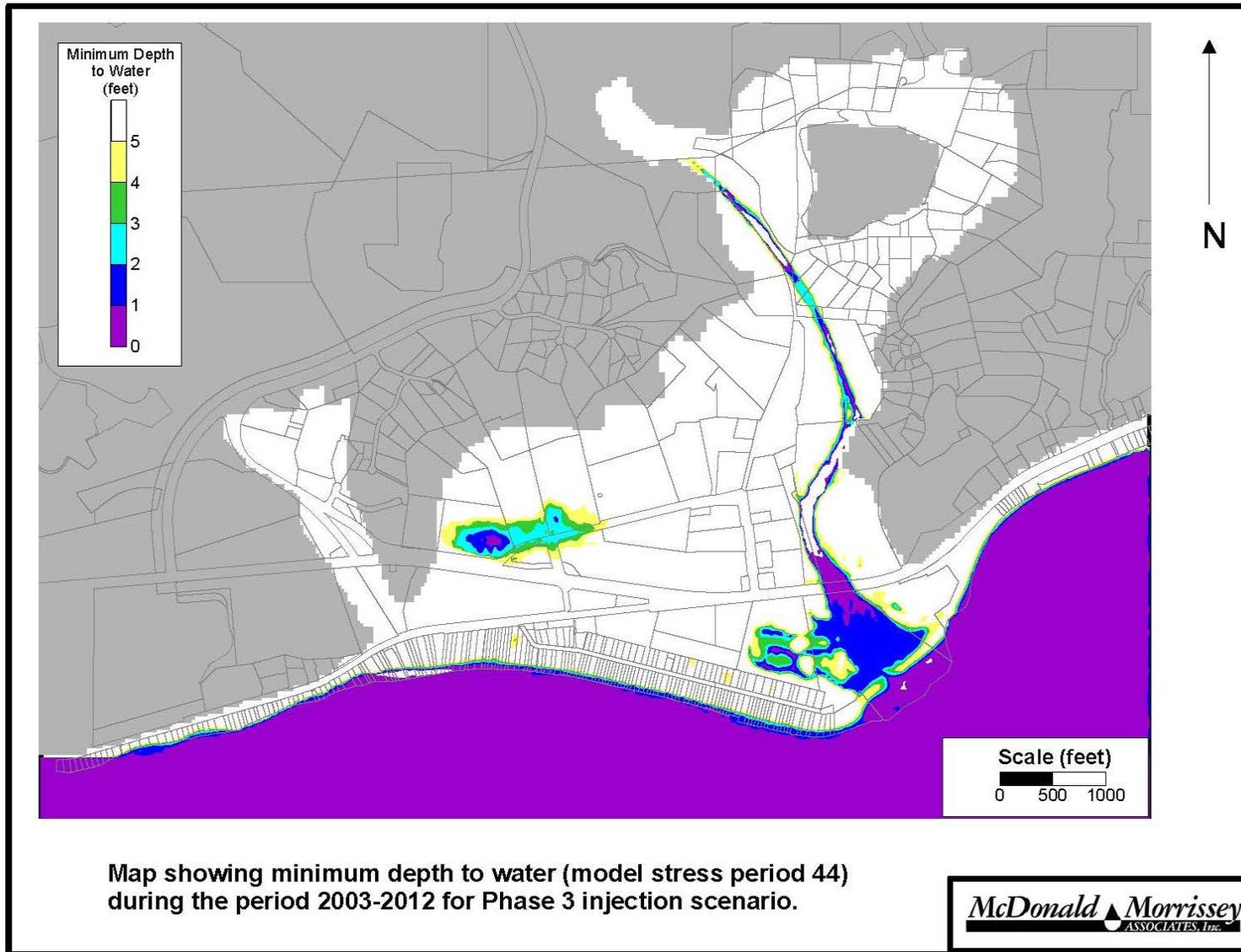


Figure 4.7-9. Minimum Depth to Groundwater after Phase 3 Injection of Wastewater



Effects on Malibu Creek and Lagoon Flows

As previously discussed, the shallow alluvium of the Malibu Valley Groundwater Basin appears to have a subsurface hydraulic connection with Malibu Creek and Lagoon. Based on simulations of Project implementation, groundwater elevations in the shallow alluvium are expected to decrease on the order of 1/10th of a foot as OWDSs are removed from service. These changes in shallow groundwater hydrology could have an impact on the flows to and/or in Malibu Creek and Lagoon; however, it is important to recognize that the recent restoration of Malibu Lagoon may also result in significant changes to surface water elevations in Malibu Creek and Lagoon in the future. Given that this restoration project has only been recently completed, there are no baseline surface water elevation and/or flow data to which an analysis can be compared, and therefore a qualitative analysis of the potential impacts resulting from implementation of the Project was conducted.

Groundwater flow modeling conducted in support of the Project (McDonald Morrissey and Associates 2014) indicates that, [under maximum injection conditions](#) and as each phase of the Project is implemented, average annual flows from the groundwater basin to Malibu Creek and Lagoon would increase as a result of changes in flow regime in that hydraulic zone. In general, the injected flows will create a groundwater mound, with all injected recycled water flowing to the Ocean. Groundwater upgradient of the injection site will be diverted by the injection mounding to some extent, redirecting some of the shallower upgradient flows to Malibu Creek. This change in upgradient groundwater flow regime will occur over the length of the Creek, minimizing potential impacts to the Creek and Lagoon. These changes in flows are shown in Figure 4.7-10; and at the end of Phase 3, basin outflows to Malibu Creek and Lagoon could potentially increase by about 18 percent. These simulations assume, however, that more recycled water would be injected into the Malibu Valley Groundwater Basin than would actually occur under planned operating conditions; the simulations documented in the modeling analysis included in Appendix G4 represent the maximum injection conditions and assume more recycled water injected into the groundwater basin than will be produced at the treatment plant. Table 2-1, below, compares the maximum injection conditions evaluated in the groundwater modeling with anticipated [treatment plant CCWTF](#) operating conditions.

Table 4.7-1. Comparison of Simulated Maximum Injection Conditions with Planned Operating Conditions

Project Phase	Simulated Maximum Injection Conditions	Planned Operating Injection Conditions		
		Total Recycled Water Projection	Estimated Annual Reuse from Irrigation and Other Non-Potable Uses	Planned Average Injection Rate
Phase 1	311,000 gpd	191,000 gpd	43,000 gpd	148,000 gpd
Phase 2	498,000 gpd	361,000 gpd	97,000 gpd	264,000 gpd
Phase 3	612,000 gpd	507,000 gpd	134,000 gpd	373,000 gpd

gpd – gallons per day

If the same groundwater flow model is used to simulate injection at the planned average injection rate shown above, basin outflows to Malibu Creek and Lagoon [would](#) change minimally, with

groundwater basin outflows to Malibu Creek and Lagoon increasing slightly from current conditions (by approximately 2.4 percent or 13,000 gpd) in Phase 1 due to planned commercial development in the Civic Center Area. Groundwater basin outflows to Malibu Creek and Lagoon would increase by approximately 3 percent above baseline (or approximately 16,000 gpd) in Phase 2, but then decrease to approximately 2 percent above baseline conditions (or approximately 12,000 gpd) in Phase 3 as domestic OWDSs cease operations. These increases ~~are~~ would be within the natural variations of flow rates within Malibu Creek and Lagoon by season and annually. Based on historical flow data as presented in Table 6-1 of the Total Maximum Daily Loads (TMDLs) for Malibu Creek and Lagoon (USEPA, 2013), median daily flow in Malibu Creek between 2007 and 2010 was 3.6 cfs; this is equivalent to 2.3 million gallons per day. Therefore, the maximum anticipated increase in groundwater flows to Malibu Creek using the planned average injection rate (16,000 gpd in Phase 2) is approximately 0.69% of the total flows in the creek. And as breaching typically results from a large pulse of surface water flows resulting from storm events, this minor increase in flows to Malibu Creek are unlikely to impact the breaching patterns in the Creek/Lagoon. (based on historic data, flows in Malibu Creek vary between 0 and 500 cubic feet per second (or between 0 and 323 million gallons per day, on average—see Figure 2.11 in Appendix G4).

Furthermore, under the planned average injection rate, all injected flows ~~will~~ would go to the Pacific Ocean (unchanged from scenarios with the maximum recycled water injections); see Appendix G5 for the additional numerical modeling analysis results. Therefore, the quality of the additional groundwater flowing to Malibu Creek and Lagoon would be unchanged in terms of some key constituents, such as salinity, and improved for other cases, such as nutrients, as a result of Project implementation. Salinity changes resulting from the increased groundwater flow to Malibu Creek are also anticipated to be negligible. Based on groundwater sampling conducted to date (and as documented in the Assimilative Capacity and Anti-Degradation Analysis memorandum included in Appendix G2), average groundwater TDS concentrations for the Malibu Valley Groundwater Basin is 2,100 mg/L. Per Table 7-3 of the TMDLs for Malibu Creek and Lagoon (USEPA, 2013), median stream specific conductivity in Malibu Creek at Cross Creek Road between 1998 and 2010 was 1,869 μ S/cm; this is equivalent to 1,200 mg/L TDS. Using a mass balance approach, the additional groundwater flowing to Malibu Creek as documented above will increase Malibu Creek TDS concentrations by approximately 6 mg/L or 0.51%. Under planned ~~project~~ Project operating conditions, the potential future impacts of additional groundwater flows to Malibu Creek and Lagoon are not considered to be significant.

On average, under current conditions, OWDS flows to the shallow alluvium, and therefore to Malibu Creek and Lagoon, total approximately 324,360 gpd. Current conditions are not at buildout, while modeled conditions for Phase 3 of the Project do represent buildout conditions in the Civic Center Area. At projected Civic Center Area buildout, OWDS flows to the groundwater basin are expected to increase to 469,280 gpd; a 45 percent increase in flows to Malibu Creek and Lagoon. Therefore, by implementing the Project, the potential future impacts of additional groundwater flows to Malibu Creek and Lagoon will be reduced, and thus this impact is considered not to be of significance.

Impact HWQ-3: Would the Project Substantially Alter the Existing Drainage Pattern of the Site or Area or Create or Contribute Runoff Water that Would Exceed the Capacity of Existing or Planned Stormwater Drainage Systems?

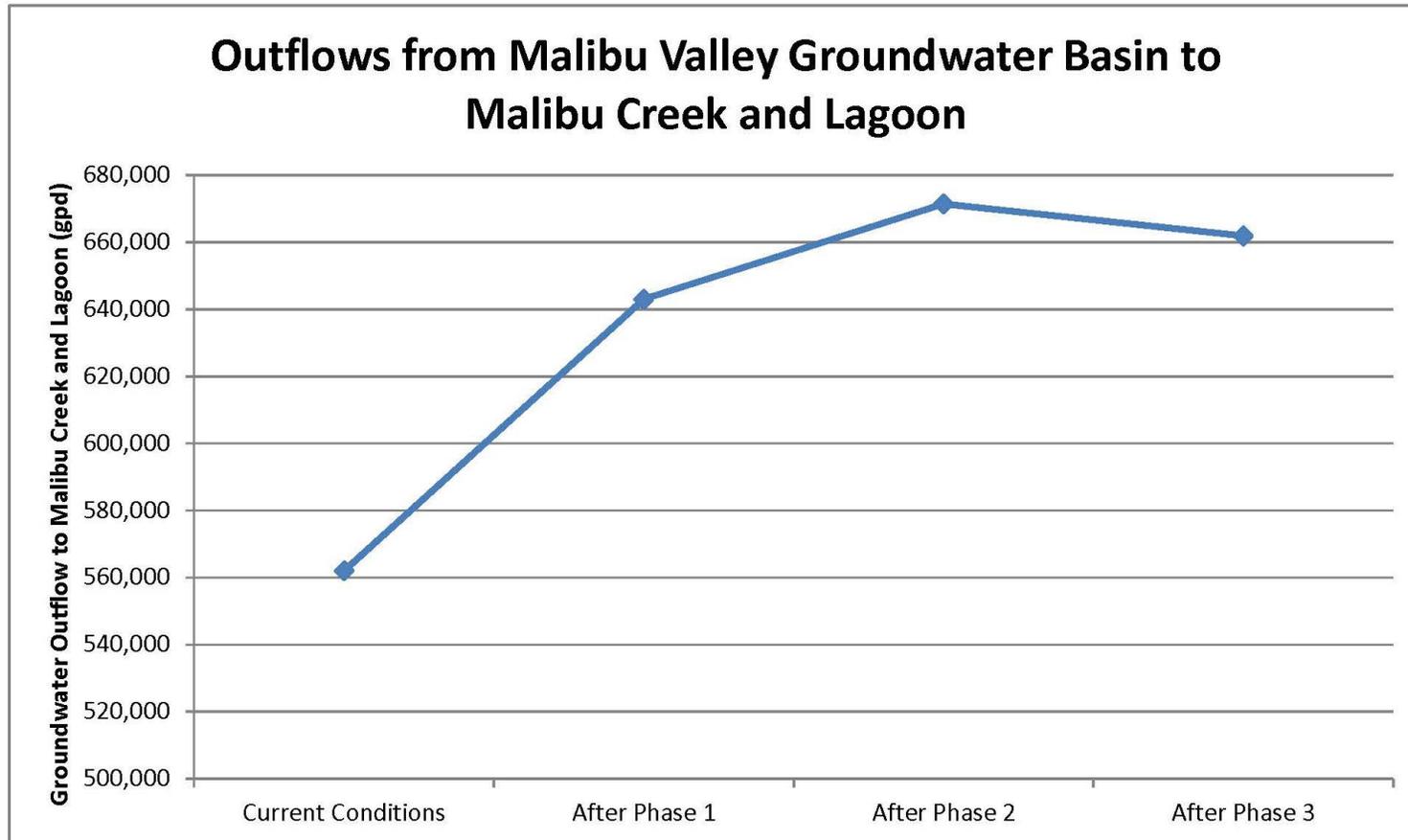
The Project would alter the existing drainage patterns in the Project area as a result of construction of a new wastewater treatment plant, injection wells, and pump stations. New pipelines would be constructed in existing roadways and would not alter drainage patterns.

The area of construction associated with the injection wells (and associated facilities) and the pump stations would be relatively small. Much of these structures would be located below grade, and site grading following construction would be returned to existing conditions as much as possible. The additional impermeable surfaces resulting from the construction of these facilities would be small and is not expected to significantly increase runoff that could cause flooding.

The wastewater treatment facility construction would require grading in order to prepare the site for construction, but construction activities would not be expected to increase runoff. Once operational, the facility has been designed and graded such that all runoff from storm events would be captured and routed back to the headworks of the facility for treatment, which would ensure compliance with SWMP requirements, LIP Chapter 17, and the City's MS4 Permit. Runoff from the portion of the site access road passing through the 100-foot ESHA buffer would pass through a vegetated buffer before entering the wetlands area. Construction of the treatment facility would also result in the installation of a sidewalk along the south side of Civic Center Way. A curb and gutter system would be constructed as part of the sidewalk installation, directing stormwater runoff to an existing 84-inch diameter stormwater pipeline via an existing inlet on Civic Center Way. Improvements would be made to this inlet as part of the facility construction

As a result of Project design, the impacts associated with runoff causing flooding or exceeding the capacity of storm drains would be less than significant.

Figure 4.7-10. Changes in Basin Outflows to Malibu Creek and Lagoon with Project Implementation



Impact HWQ-4: Would the Project Place Housing or Other Structures within a 100-Year Flood Hazard Area?

The Project would not construct any housing or habitable structures within the 100-year floodplain. The wastewater treatment plant site, ~~and~~ Bluffs Park pump station, ~~and the injection well heads~~ would be outside the 100-year floodplain, but the Legacy Park pump station ~~and~~, two other future phase pump stations, ~~and the injection well locations~~ would be within the 100-year floodplain. The existing detention pond at Legacy Park, which was constructed as part of the Legacy Park Project, is expected to provide adequate capacity to address the potential for on-site flooding at the Legacy Park pump station site. In addition, pump stations would be relatively small, with the majority of the structure located underground. Only a vent, electrical panel, transformer, and backup generator would be above ground, and these features are small enough that they are not expected to impede or redirect flood flows. ~~In order to ensure ongoing system operations in the event of a flood, above-ground pump station features would be mounted on concrete pedestals at elevations above the anticipated flood level. Similarly, the injection wells would be constructed with the wellheads at grade, but these wellheads would be sealed. Above-grade structures at each site, such as electrical control panels, would be relative small such that they are not expected to impede or redirect flood flows.~~ Impacts associated with flooding thus would be less than significant.

Impact HWQ-5: Would the Project Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Flooding, including Flooding as a Result of the Failure of a Levee or Dam?

The Project does not include any levees or dams nor is it located in a levee or dam failure inundation zone, so there would be no potential for impacts associated with levee or dam failure.

As previously discussed, recycled water injected into the Malibu Valley Groundwater Basin will flow to the ocean unimpeded, and therefore will not result in a risk of flooding. Recycled water percolated in Winter Canyon will infiltrate (migrate) to the water table, located between 12 and 50 feet mean sea level; well below the fill underlying PCH. Therefore, as with the Malibu Valley Groundwater Basin, percolated groundwater will flow unimpeded to the ocean within the Winter Canyon watershed much as is presently occurring.

Impact HWQ-6: Would the Project Be Subject to Inundation from Seiche, Tsunami or Mudflow?

The wastewater treatment facility site is outside the tsunami inundation zone identified by the City of Malibu (City of Malibu 2012), but the pump stations, injection wells and a large portion of the pipelines are within the tsunami inundation zone. However, because these structures are not habitable, and would, for the most part, be located underground, they would not subject humans to these hazards. Above-grade structures associated with the pump stations and injection well sites, including electrical panels, transformers and generators, could potentially be impacted by tsunami flows and could pose a potentially significant impact. However, with the development and implementation of Mitigation Measure HY-1 below, this risk would be reduced to less than significant.

The wastewater treatment plant is approximately one mile from Malibu Lagoon and is therefore not at risk from a seiche. There is only one above-grade pipeline that would be proximate to Malibu

Lagoon and it would be located on the Pacific Coast Highway bridge. This bridge was designed to consider conditions such as this, and the pipeline crossing would be at similar level of risk due to a seiche as the bridge itself. Therefore, this impact is considered to be less than significant.

Finally, the wastewater treatment facility would be located on a property that abuts a steep slope on its western side. As part of the geotechnical analyses conducted in support of plant design, this hillside was evaluated for geotechnical stability and the Project is designed to address any potential landslides or mudflows that could occur as a result of intense rainfall. To that end, this impact is considered to be less than significant.

4.7.3. Mitigation Measures

The proposed Project would comply with all applicable regulatory water quality and hydrologic requirements described above under Regulatory Setting, including compliance with the RWQCB's Basin Plan, the [State Water Board](#) SWRCB's Recycled Water Policy, as well as the State's General Permit requirements including preparation and implementation of a SWPPP.

MM HY-1: The City will prepare and implement a Tsunami Response Plan for the Project that defines emergency response and coordination procedures. The Tsunami Response Plan shall contain significant information specific to actions that may be necessary related to receipt of a tsunami watch, warning, or as a result of an actual tsunami. The first priority of emergency management response shall be the protection of life and property.

No additional measures are proposed or required.

4.7.4. Significant Unavoidable Adverse Impacts

The Project would result in increased nitrate concentrations in the Civic Center Gravels; however, the long-term average concentration is not expected to exceed the water quality objective for this constituent as set forth in the Basin Plan (LARWQCB 1994). As discussed above, the Project would comply with SWMP requirements, LIP Chapter 17, and the City's MS4 Permit. As such, the Project is not expected to have any significant unavoidable adverse impacts on hydrology or water quality.

4.7.5. Cumulative Impacts

The geographic scope of potential cumulative impacts related to water quality and hydrology encompasses the Project site and immediate vicinity. Cumulative projects in the general vicinity include a variety of residential, commercial and public facilities projects (see list of cumulative projects in Chapter 3, Project Description, of the EIR). All of these projects have the potential to result in construction-period water quality impacts, which could result in cumulatively significant impacts. However, all projects would be required to comply with the City's LUP Policy 3.110, which requires that new development shall include construction phase erosion control and polluted runoff control plans that specify BMPs that would be implemented to minimize erosion and sedimentation, provide adequate sanitary and waste disposal facilities, and prevent contamination of runoff by construction chemicals and materials. In addition, many of the projects are large enough that they must prepare a SWPPP and comply with the Statewide General Construction Permit (where available, acreage of related projects is listed in Table 3-1.3 in the Project Description). With implementation of these measures, significant cumulative construction-period water quality impacts are not expected.

The vast majority of the cumulative projects would result in creation of new impervious surface area, which would increase runoff and potentially decrease groundwater recharge. However, each project must comply with General Plan Policy 3.99 and other City stormwater management requirements that require that post-development stormwater runoff discharge rates shall not exceed the estimated pre-development rates. Cumulative effects on the storm drainage system are thus expected to be less than significant.

None of the other cumulative projects would include an element of groundwater injection or recharge, so no cumulative increase in groundwater levels would be expected.

LA RWQCB Resolution R4-2009-007 prohibits the construction of new OWDS within the Prohibition Zone and State Water Board Resolution 2010-0045 approved the amendment and established a phased schedule for compliance; therefore, all new development would be expected to connect to the Project for wastewater services. Under the MOU, existing commercial OWDSs with individual WDRs that are located within the Prohibition Zone may continue to operate in the groundwater basin until 2015 for commercial facilities or 2019 for residential facilities, and these OWDSs cannot be increased in size. The cumulative impacts of these operating OWDSs and Project-related discharges to the groundwater basin were analyzed in the SNMP prepared for the groundwater basin in support of the Project. This analysis indicated that TDS concentrations in the groundwater basin may decrease as a result of Project implementation, but that groundwater nitrate concentrations in the Civic Center Gravels could increase, though this increase would be offset by decreases in nitrogen concentrations in the shallow alluvium. Although the Project may cause degradation of deeper groundwater quality in the basin, the Project would comply with the WDR/WRR issued by the LARWQCB, long-term concentrations would be below the Water Quality Objective established for the groundwater basin in the Basin Plan, and the beneficial use of the basin would be protected. Therefore, impacts from recycled water injection on groundwater quality is considered to be less-than-significant. Furthermore, in accordance with the state's antidegradation policy, the Project is for a greater benefit to the people of the state (assisting in meeting the TMDL on Malibu Creek and Lagoon), this groundwater degradation is acceptable.