

3F. Hydrology and Water Quality

3F.1 Introduction

This analysis describes existing and proposed hydrological conditions on and around the project site and discusses potential project-related impacts to surface water and groundwater resources, including water quality, flooding, and stormwater runoff. Mitigation for potential impacts is prescribed, as appropriate.

3F.2 Environmental Setting

Climate and Topography

The project site is in an area that is primarily residential and open space towards the base of the San Gabriel Mountains. In general the site slopes gently to moderately towards the east. Ground elevations range from approximately 1,200 to 1,300 feet above mean sea level (msl). Elevations above the project site along the ridge line reach up to 1675 feet above msl. A drainage, filled during the original construction of the site, runs across the project area. To the east of the project site, the topography flattens out along the Arroyo Seco.

The climate of the Pasadena and vicinity is characterized as Mediterranean with mild, reasonably wet winters and warm to hot, mildly humid summers. Temperatures are generally moderate with a comparatively small range of temperatures between the winter low and the summer high. The region's rainy season extends from November to April, with relatively dry conditions for the remainder of the year. Average annual rainfall at Pasadena the nearest weather station to the project site, is approximately 20 inches (Western Regional Climate Center, 2007).

Surface Water Hydrology

Regional Drainage

The project site is located within the Arroyo Seco watershed, a sub-watershed of the Los Angeles River Watershed. The Arroyo Seco stream has its headwaters in the San Gabriel Mountains approximately 15 miles north of the project site and flows south from a highly incised canyon that becomes mostly channelized in the urban areas before draining into the Los Angeles River near downtown Los Angeles. The Arroyo Seco stream is approximately 22 miles long and drains approximately 32 square miles of steep mountainous terrain. The stream is dammed at the base of the San Gabriel Mountains creating the Devils Gate Dam and Reservoir, below which the stream becomes mostly channelized.

Local Drainage Patterns

The project area lies at the western edge of a highly urbanized area, most of which is served by the City of Pasadena's storm drainage system. There are numerous unnamed drainages which drain the eastern San Rafael Hills and flow east toward Arroyo Seco. The project site stretches

across two of these drainages, one of which was filled to create a level lot for construction. Stormwater runoff from the project site originates as overland sheet flow across impervious and pervious surfaces. The landscaped areas of the project area release overland sheet flows which drain towards abutting streets of Pegfair Estates, Carnarvon Drive, Pegfair Lane, and Liverpool Drive (Pasadena Department of Public Works, 2007).

Groundwater

The project site is located in the Raymond Groundwater Basin which is bound by the San Gabriel Mountains to the north, the San Rafael Hills on the southwest, the drainage divide at Pickens Canyon Wash to the west, and the Raymond fault to the southeast (California Department of Water Resources, DWR, 2004). The water bearing materials of the basin are predominantly made up of unconsolidated alluvial gravels, sands and silts deposited by streams flowing out of the San Gabriel Mountains. The alluvium is divided into Younger alluvium and older alluvium. The Younger alluvium generally ranges in thickness up to a maximum of 150 feet whereas the Older alluvium can reach over 1,100 feet thick near Pasadena (DWR, 2004). Groundwater levels in the basin vary but overall have fluctuated over the last 20 years within about 30 feet on average of their long-time mean elevations (RBMB 1999 as referenced in DWR, 2004). Groundwater quality in the basin is characterized as typically calcium bicarbonate in character that has shown some exceedances of fluoride, nitrate, volatile organic compounds, and radiation (occasionally detected near the San Gabriel Mountains).

At the project site, depth to groundwater was not encountered during the exploratory drilling conducted for the preliminary geotechnical investigation (Geotechnologies, 2003). The borings ranged in depth from 5 to 101 feet below ground surface. Discrete seepage locations were identified in several borings although thought to occur from watering of landscaping. The seepage quantities were generally small and found above the fill-bedrock contact or within the fractured bedrock (Geotechnologies, 2003). Seepage contributes to a constant low volume flow of water onto the adjacent streets of Pegfair Estates, Carnarvon Drive, Pegfair Lane, and Liverpool Drive. This condition has resulted in algae growth, attraction of insects, odors and pedestrian safety issues.

Flooding

Flooding is defined as the inundation of normally dry land as a result of rise in the level of surface waters or rapid accumulation of stormwater runoff. Flooding can also occur due to tsunamis, seiches, or failure of dams. Tsunamis are waves caused by an underwater earthquake, landslide, or volcanic eruption. Since the project site is located inland, it could not experience a tsunami. A seiche is a rhythmic motion of water in a partially or completely landlocked water body caused by landslides, earthquake-induced ground accelerations, or ground offset. There are no bodies of water large enough to produce seiche waves that would affect the project site. The project site is also not located in an inundation area of a dam as the site is located well upland of the Arroyo Seco valley that might be affected by any failure of the Devils Gate Dam.

Regional flooding hazards are evaluated by the Federal Emergency Management Agency (FEMA) and presented in community Flood Insurance Rate Maps (FIRMs) as part of the floodplain mapping program. There are no flood-prone areas that are recognized within the City of Pasadena by FEMA.

Surface Water Quality

The Clean Water Act (CWA) is the primary federal law regulating water quality in the U.S. and forms the basis for several state and local laws throughout the country. Surface water quality in the project area is monitored by the Los Angeles Regional Water Quality Control Board (RWQCB). The Water Quality Control Plan for the Los Angeles Region (Basin Plan), prepared by the Los Angeles RWQCB, identifies the beneficial uses of surface waters within its region and specifies water quality objectives to maintain the continued beneficial uses of these waters. The beneficial uses of Arroyo Seco south of Devils Gate Dam, as identified in the Basin Plan, include potential municipal use, intermittent recreational use, potential warm water habitat, potential wildlife habitat, and existing rare species habitat.

Section 303(d) of the federal CWA requires states to identify waterbodies that do not meet water quality standards and are not supporting their beneficial uses. Arroyo Seco is listed on the Section 303(d) List of Impaired Water Bodies with pollutant/stressors of algae, high coliform count, and trash. According to the Section 303(d) List, this contamination is attributable to nonpoint sources (USEPA, 2003a).

Placement of a waterbody on the 303(d) List of Impaired Water Bodies acts as the trigger for developing a pollution control plan, called a Total Maximum Daily Load (TMDL), for each water body and associated pollutant/stressor on the list. The TMDL serves as the means to attain and maintain water quality standards for the impaired water body. During each 303(d) listing cycle the water bodies on the list are prioritized and a schedule is established for completing the TMDLs. The San Gabriel River Reach 3 (Whitter Narrows to Ramona) segment has been given a high priority for algae and coliform and low priority for trash TMDL development. The proposed completion date for the TMDL development for algae and coliform on the Arroyo Seco was 2002, but it is not currently included on the completed TMDL development list (USEPA, 2003b).

3F.3 Regulatory Framework

Clean Water Act

The federal Clean Water Act, enacted by Congress in 1972 and amended several times since inception, is the primary federal law regulating water quality in the U.S. and forms the basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The Clean Water Act prescribes the basic federal laws for regulating discharges of pollutants into waters of the U.S., which includes setting water quality standards for contaminants in surface waters, establishing wastewater and effluent discharge limits from various industry categories, and imposing requirements for controlling nonpoint-source pollution. At the federal level, the Clean Water Act

is administered by the USEPA. At the state and regional levels, the act is administered and enforced by the State Water Resources Control Board (SWRCB) and the RWQCBs.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is the primary statute covering the quality of waters in California. The act sets out specific water quality provisions and discharge requirements regulating the discharge of waste within any region that could affect the quality of state waters. Under the act, the SWRCB has the ultimate authority over state water rights and water quality policy. The nine RWQCBs are responsible for the oversight of water quality on a day-to-day basis at the local/regional level. Within each region, the RWQCBs have prepared and periodically updated Basin Plans that identify existing and potential beneficial uses for specific water bodies. The project site is located within the jurisdiction of the Los Angeles RWQCB.

Water Quality Control Plans (Basin Plans)

Each RWQCB is required to develop, adopt, and implement a Water Quality Control Plan (Basin Plan) for its respective region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in each region. Basin Plans identify beneficial uses of surface waters and groundwater within the corresponding region; specify water quality standards, known as water quality objectives, for both surface water and groundwater; and develop the actions necessary to maintain the standards to control nonpoint and point sources of pollutants to the state's waters. All discretionary projects requiring permits from the RWQCB (i.e., waste and pollutant discharge permits) must implement Basin Plan requirements (i.e., water quality standards), taking into consideration the beneficial uses to be protected.

NPDES Program

Since 1972, the Clean Water Act (CWA) has regulated the discharge of pollutants to waters of the U.S. from all point sources. Section 402(d) of the CWA establishes a framework for regulating nonpoint source (NPS) stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). Established in 1990, Phase I of the NPDES stormwater program regulates stormwater discharges from major industrial facilities, large and medium-sized municipal separate storm sewer systems (those serving more than 100,000 persons), and construction sites that disturb five or more acres of land. In 1999 the NPDES stormwater program was expanded to include Phase II. Pursuant to the Phase II NPDES Final Rule in December 1999, discharges of stormwater associated with construction activities that result in the disturbance of one acre of land or more must also apply for coverage under the statewide NPDES General Construction Activities Permit.

Los Angeles County and 84 incorporated cities, including Pasadena, receive coverage under the NPDES stormwater program under NPDES Permit No. CAS004001. The permit, first issued by the Los Angeles RWQCB in 2001, regulates municipal stormwater and urban runoff discharges

within the jurisdictions covered by the permit and requires that permittees develop and implement programs for stormwater management.

NPDES General Construction Permit

To comply with the NPDES General Construction Permit requirements, developers are required to submit a Notice of Intent (NOI) to the State Water Resource Control Board's (SWRCB) Division of Water Quality. The NOI includes general information on the types of construction activities that will occur at construction sites. Developers are required to submit a site-specific plan called the Storm Water Pollution Prevention Plan (SWPPP) to minimize the discharge of pollutants during construction. The SWPPP must include a description of the Best Management Practices (BMPs) that will be employed to reduce stormwater pollutants to the Maximum Extent Practicable (MEP¹) for water quality protection. This includes implementation of BMPs aimed at sediment control, erosion control, and construction materials control (i.e. paint, solvents, concrete, petroleum products) to prevent stormwater pollutants from leaving construction sites, as well as a detailed description of (and schedule for) all monitoring. Construction activities that are subject to the project include, but are not limited to: clearing, grading, demolition, excavation, construction of new structures, and reconstruction of existing facilities involving removal and replacement that results in soil disturbance.

Los Angeles Standard Urban Stormwater Mitigation Plan

The Los Angeles Standard Urban Stormwater Mitigation Plan (SUSMP), approved by the Los Angeles RWQCB in 2000, was developed as part of the municipal stormwater program to address post-construction stormwater pollution from new development and redevelopment projects. The SUSMP defines water quality design standards to ensure that stormwater runoff is managed for water quality concerns, and to insure that pollutants carried by storm water are confined and not delivered to waterways. Depending on the types of pollutants that can be anticipated to occur in stormwater runoff from a site, project applicants are required to select appropriate source control and treatment control BMPs from the list included in the SUSMP. In combination, these treatment control BMPs must be sufficiently designed and constructed to treat or filter the first 0.75-inch of stormwater runoff from a storm event. As one of the permittees under the Los Angeles NPDES municipal stormwater permit, projects in Pasadena are subject to the SUSMP requirements (Los Angeles County Department of Public Works, LACDPW, 2002).

City of Pasadena General Plan

The City of Pasadena General Plan contains goals, policies, and programs to guide future growth and development in the City of Pasadena. Relevant policies are presented below.

¹ The MEP standard relies on BMPs that emphasize pollution prevention and source control, with additional structural controls as needed.

Flood Hazards

Goal F-1: Minimize injury, loss of life, property damage, and economic and social disruption caused by flood and inundation hazards.

Program F-1.6: In the San Gabriel Mountains and the San Rafael Hills, the City will assess the potential environmental impacts that new construction in upstream areas will have on already developed areas downgradient. Hydrological studies to assess the impacts shall be required for all new construction in the hillsides to determine the necessity and impact that new development will have on the County drains and privately owned debris basins downstream from new development. If the analyses indicate potential hazard, storm improvements shall be required. Fees to pay for the improvements may be assessed to the developers, as appropriate.

3F.4 Impacts and Mitigation

3F.4.1 Methodology

The construction of the proposed project may potentially expose people to earthquake, slope instability, subsidence, liquefaction or other seismic hazards. Mitigation measures to reduce potential impacts will be recommended and assessed for expected effectiveness and potential impacts if implemented.

3F.4.2 Significance Criteria

The criteria used to determine the significance of an impact are based on Appendix G of the *CEQA Guidelines*. For this analysis, implementation of the proposed project would result in redevelopment in the project area may result in significant impacts if it would:

- Violate any water quality standards or waste discharge requirements;
- 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);
- 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;
- 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 amount of surface runoff in a manner that would result in flooding in a manner that would result in flooding on- or off-site;

- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- 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;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- 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;
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or
- Require or result in the construction of storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

3F.4.3 Project Impacts

Impact 3F.1: Construction activities at the project site could result in construction-related impacts on surface water quality (less than significant with mitigation).

Minor earthwork that would occur as part of construction activities includes demolition of existing pavement, stripping of existing surface vegetation, site grading, and soil excavation. During construction, established groundcover that currently serves to stabilize site soils would be removed, potentially resulting in increased erosion and increased sediment load in receiving water bodies. Construction activities can also generate hazardous waste products such as adhesives, solvents, paints, and drilling and petroleum products that, if not managed appropriately, can adhere to soil particles, become mobilized by rain or runoff, and contribute to nonpoint-source pollution. In addition, during excavation and grading, contaminated soils may be exposed and/or disturbed; this could impact surface water quality through contact during storm events. Increased soil erosion and the accidental discharge of construction materials and/or contaminated soils from the project site could adversely affect water quality downstream in the Arroyo Seco.

Construction-related impacts to water quality during construction activities are considered potentially significant if not mitigated. However, compliance with NPDES General Construction

Permit requirements would reduce the potential for adverse water quality impacts to receiving waters from construction activities to less than significant.

Mitigation Measures

Mitigation Measure 3F.1: Prior to construction of any element of the Master Plan, a NOI and SWPPP shall be submitted to the RWQCB. Implementation of the SWPPP shall start with the commencement of construction and continue through the completion of the project. At a minimum, the SWPPP shall include a description of construction materials, practices, and equipment storage and maintenance; a list of pollutants likely to contact stormwater during construction; site-specific erosion control and storm water quality BMPs to be employed during construction; and an inspection and monitoring program. At a minimum, the following measures shall be included as part of the SWPPP to prevent adverse impacts to water quality during project construction.

Site Grading and Earthwork

The following SWPPP BMPs shall be required to prevent construction-related silt and erosion from entering the storm drainage system and downstream waters:

- The amount of exposed soil shall be limited and erosion control procedures implemented for those areas that must be exposed.
- Grading activities shall be phased so that graded areas are revegetated or otherwise covered as soon as possible following disruption.
- Appropriate dust suppression techniques, such as watering and tarping, shall be used in areas that must be exposed.
- The area shall be secured to control off-site migration of pollutants.
- Construction entrances shall be designed to facilitate removal of debris from vehicles exiting the site, by passive means such as paved/graveled roadbeds, and/or by active means such as truck washing facilities.
- Truck loads shall be tarped.
- Roadways and parking lots shall be regularly swept to prevent generation of fugitive dust by local traffic.
- Simple sediment filters shall be constructed at or near all entrances to the storm drainage system.

Construction Debris

The following SWPPP BMPs shall be required to prevent construction debris from entering the storm drainage system and downstream waters:

- During construction and operation, all construction materials shall be handled and disposed of in accordance with all applicable laws and regulations. Properly labeled recycling bins shall be utilized for recyclable construction materials including solvents, water-based paints, vehicle fluids, broken asphalt and concrete, wood, and vegetation. Non-recyclable materials and wastes must be taken to an appropriate landfill. Toxic wastes must be discarded at a licensed, regulated disposal site by a licensed waste hauler.
- All leaks, drips and spills occurring during construction shall be cleaned up promptly and in compliance with all applicable laws and regulations to prevent contaminated soil on paved surfaces that can be washed away into the storm drains.
- If materials spills occur, they should not be hosed down. Dry cleaning methods shall be employed whenever possible.

Equipment Maintenance

The following SWPPP BMPs shall be required to prevent fuel, oil, and other fluids associated with construction vehicles and heavy machinery from entering the storm drainage system and downstream waters:

- All leaks, drips and spills occurring during construction shall be cleaned up promptly and in compliance with all applicable laws and regulations to prevent contaminated soil on paved surfaces that can be washed away into the storm drains.
- If materials spills occur, they should not be hosed down. Dry cleaning methods shall be employed whenever possible.
- The project applicant/developer shall conduct truck wheel cleaning and truck washing to prevent dirt in storm water.
- The project applicant/developer shall keep vehicles in good working order.

Contaminated Soils

- The SWPPP shall include the following protocols to prevent contaminated soils from entering the storm drainage system and downstream waters:
- Protocols for the investigation and evaluation of previously unidentified contaminated soils that may be encountered during project development, including controls that may be required to prevent the migration of contaminated soils into storm water runoff.

Significance After Mitigation: Less than significant.

Impact 3F.2: Redevelopment of the project site could result in increased non-point source pollution in stormwater runoff (less than significant with mitigation).

Non-point source (NPS) pollution is the leading cause of degraded water quality in the U.S. and urban areas are an important source of NPS pollution. NPS pollutants fall into four main categories: sediments, nutrients, chemicals or toxic substances, and pathogens. NPS pollutants are washed by rainwater from rooftops, landscape areas, and streets and parking areas into the drainage network. Pollutant concentrations in site runoff are dependent on a number of factors including: 1) land use conditions; 2) site drainage conditions; 3) intensity and duration of rainfall; 4) the climatic conditions preceding the rainfall event; and 5) implementation of water quality BMPs. Due to the variability of urban runoff characteristics, it is difficult to estimate pollutant loads for NPS pollutants. However, post-construction pollutants in runoff would be consistent with dense urban areas. Due to higher densities and intensity of use for residential, commercial, and retail land uses, increases in the levels of trash, nutrients, bacteria, pesticides and herbicides, and oil and grease from the increased intensity of land uses could potentially occur, adversely affecting receiving waterbodies such as the Arroyo Seco.

Post-construction water quality impacts resulting from future redevelopment of the project site are considered potentially significant if not mitigated. However, adherence to SUSMP requirements, required for compliance with NPDES municipal stormwater permit requirements, would effectively preclude substantial adverse impacts to water quality in receiving waterbodies.

Mitigation Measures

Mitigation Measure 3F.2: The project applicant shall comply with Los Angeles SUSMP requirements. The Los Angeles SUSMP, adopted in 2000, was developed by the County of Los Angeles to prevent and control the detrimental effects of new and redevelopment projects on post-construction stormwater quality and runoff by reducing post-construction pollutants in stormwater discharges.

The applicant shall be required to submit and then implement SUSMP design features and BMPs that are appropriate and applicable to the proposed changes to site drainage. In accordance with SUSMP requirements, the applicant shall provide for the infiltration of the runoff into the ground in order to minimize the introduction of pollutants of concern. Treatment control BMPs must be sufficiently designed and constructed to treat or filter the first 0.75-inch of stormwater runoff from a storm event. Applicable infiltration/treatment control BMPs will be selected from those identified in the *Development Planning for Storm Water Management, A Manual for the Standard Urban Storm Water Mitigation Plan* prepared by LACPWD (2002). The applicant will be required to conduct maintenance inspection of all treatment control BMPs at least once a year or as specified by the designer or manufacturer. Also, the project applicant shall be required to provide to the City or County a signed statement accepting responsibility (applicant's) for maintenance until the responsibility is legally transferred to a new owner.

Significance After Mitigation: Less than significant.

Impact 3F.3: Redevelopment of the project site could alter drainage patterns and require expansion of stormwater and wastewater systems, potentially having adverse effects on the volume and/or timing of peak runoff and wastewater flow (less than significant with mitigation).

Stormwater runoff volumes and rates generated from undeveloped, unpaved areas can increase significantly when the site is paved, the impervious surface area increased, and the capability of surface water infiltration is reduced or eliminated. However, the majority of the site is currently overlain by impervious surfaces associated with existing buildings, paved areas, and parking lots. Although the proposed project is not expected to result in a significant increase in stormwater runoff, redevelopment activities would alter existing drainage patterns. New infrastructure to support changes in drainage patterns and accommodate future runoff conditions from the project would be required to be designed in accordance with the standards set forth by LACDPW Hydrology Manual. Drainage and flood control structures and improvements in the City of Pasadena are subject to review and approval by the City of Pasadena Public Works Department, who will review and approve project storm drain plans prior to construction. As required by the City of Pasadena Public Works Department, all public storm facilities are to be designed to the standards set forth by LACDPW Hydrology Manual. Mandatory compliance with these standards would ensure potential project impacts related to stormwater conveyance would be less than significant.

Mitigation Measures

Mitigation Measure 3F.3: Changes to the storm water collection and wastewater systems at the project site shall be made in accordance with the requirements of the City of Pasadena Public Works Department. A drainage plan shall be submitted to the Planning and Development Department as well as the Department of Public Works prior to issuance of a grading or building permit. Any new sewer connections made at the project site shall be six-inch diameter vitrified clay or cast iron pipe construction with a minimum slope of two percent.

Mitigation Measure 3F.4: The landscaped slopes of the Art Center release a constant low volume stream of water that creates nuisance and maintenance issues on the abutting neighborhood streets of Pegfair Estates, Carnarvon Drive, Pegfair Lane and Liverpool Drive. The applicant shall collect the runoff before it reaches the public streets and redirect it to a pipe system or allow on-site infiltration. The means and method shall be approved by the City Engineer.

Significance After Mitigation: Less than significant.

3F.4.4 Cumulative Impacts

Impact 3F.6: The proposed project could result in adverse cumulatively considerable hydrology or water quality impacts (less than significant).

As with the proposed project, all related are subject to the same federal (Clean Water Act), State (Porter Cologne Water Quality Control Act), and local (SUSMP) regulations that protect water quality and water resources. These regulations include NPDES permit requirements, implementing stormwater pollution prevention plans, and post-development stormwater quality and quantity requirements. All of these regulations are designed to address the incremental effects of individual projects such that they do not cause a cumulatively considerable impact. Therefore, despite the potential for the related projects to alter drainage patterns and runoff conditions, the adherence to the aforementioned requirements would ensure that they do not result in cumulatively considerable impacts related to sedimentation, flooding, water quality, drainage system capacity, flood hazard areas, failure of a levee or dam, seiche, tsunami, or mudflows. The proposed project would have a less than significant impact with mitigation measures. Therefore, because of these measures, when considered in combination with other developments similarly bound by the same regulations, the proposed project's incremental contribution to water quality and quantity impacts, with proposed mitigation, would not be cumulatively considerable and is less than significant.

Mitigation: None required.