

3.10 Hydrology

This section of the EIR evaluates whether adoption of the 2004 Land Use Element, Zoning Code Revisions, and Central District Specific Plan will impact groundwater supplies or drainage facilities, or create polluted runoff.

The 2004 Mobility Element guides the continuing development of a multi-modal circulation system that supports planned growth and does not contain policies that could potentially affect groundwater resources or stormwater runoff. Thus, the Mobility Element is not addressed in this section.

Through the Initial Study process, it was found that the project will have a less than significant impact or no impact on water quality and waste discharge standards, and will not result in the location of any structure within a 100-year flood hazard area.

Environmental Setting

Groundwater Supply

The City of Pasadena Water and Power Department operates the domestic water system throughout the City. According to the City's 2000 Urban Water Management Plan¹, Pasadena's water supply is drawn from a variety of sources, including groundwater, local surface water, and imported water. The City may also choose from additional water supplies in the form of short- and long-term transfers with the Kinneloa Irrigation District, and is currently investigating the use of recycled water within its service area. Table 30 indicates the City's water sources as of 2000.

Table 30
Pasadena's Water Supplies -
Year 2000

Sources	Acre-feet per year
Purchased from wholesaler (imported water from MWD)	17,920
City-produced groundwater	19,000
Transfers	180
Exchanges in Recycled Water	0
Total	37,100

Source: City of Pasadena. *2000 Urban Water Management Plan*.
December 2000.

¹ City of Pasadena. Pasadena 2000 Urban Water Management Plan. December 2000.

The City obtains the majority of its groundwater from the Raymond Groundwater Basin, which is bounded by the San Gabriel Mountains to the north, the San Rafael Hills to west, and the Raymond fault to the east and south. The long-term yield of the Raymond Basin is about 30,000 acre-feet per year. Pumping rights in the Basin are adjudicated, or determined by a court order, and managed by the Raymond Basin Management Board. Seventeen agencies share pumping rights within the Basin; the largest entitlement belongs to Pasadena with 42% (12,708 acre-feet per year) of the total adjudicated rights. The City currently has adequate well capacity to pump its adjudicated amount.

Natural recharge to the Basin is mainly from direct percolation of precipitation and ephemeral stream flow from the San Gabriel Mountains to the north. The principal streams bringing surface inflow are the Arroyo Seco, Eaton Creek, and Santa Anita Creek. Some stream runoff is diverted into spreading grounds as a source of artificial replenishment, and some is impounded behind small dams that allow the water to infiltrate and contribute to groundwater recharge of the Basin. To assist with groundwater recharge, the Pasadena Water and Power Department, on behalf of the Raymond Basin pumpers, diverts water from the Arroyo Seco at a diversion structure several hundred yards above the mouth of the Arroyo near the Jet Propulsion Laboratory. The water is directed into 13.5 acres of percolation ponds that line the east side of the Devil's Gate Reservoir. Pasadena has the right to divert as much as 25 cubic feet per second (cfs) of the Arroyo Seco and Millard Canyon stream flow.

To conserve water resources, including groundwater, and prepare for possible shortages, the City established the Water Shortage Procedures chapter (Section 13.10) within its Utilities and Sewers Municipal Code. The purpose of the code is to:

. . . provide water shortage procedures with voluntary and mandatory provisions to minimize the effect of a water shortage to the customers of the city and, by means of this chapter, to adopt provisions that will significantly reduce the consumption of water over an extended period of time thereby extending the available water required for the customers of the city while reducing the hardship of the city and the general public to the greatest extent possible.

Surface Hydrology

Two major stream channels traverse the City. On the west, the Arroyo Seco's deeply entrenched channel originates in the San Gabriel Mountains and flows southward along the eastern side of the San Rafael Hills, eventually reaching the Los Angeles River. To the east, Eaton Wash exits the mountains and flows south, where it is joined by the combined drainages from Pasadena Glen and Hastings Canyons. The Eaton Wash channel then continues southward across the valley eventually reaching the Rio Hondo River. Both major stream channels, as well as the combined channels from Pasadena Glen and Hastings Canyons, have been modified by flood control dams near the base of the mountains, and both have been confined to manmade channels or storm drains in their lower reaches across the valley. In most years, both channels carry very little water, with peak discharges typically of less than 1,000 cfs for Arroyo Seco and less than 500 cfs for Eaton Wash. The heaviest peak discharges in these watersheds have occurred most often between November and March. However, the City of Pasadena is currently not vulnerable to flooding associated with the Arroyo Seco and Eaton Canyon Creek.²

² City of Pasadena. *Technical Background Report to the Safety Element of the City of Pasadena General Plan*. Prepared by Earth Consultants International, June, 2002.

Average yearly precipitation in the Pasadena area is approximately 20 inches. During the past 80 years, the Los Angeles County Department of Public Works (LACDPW) and the U.S. Army Corps of Engineers constructed several detention/debris basins in the hills above Pasadena. The LACDPW has also made channel alterations, including concrete linings, earthen bottoms with concrete stabilizers, and rock-riveted side slopes. These flood control structures are presently owned and operated by LACDPW, which has jurisdiction over watercourses in the Pasadena area, as well as the regional flood control system in the county. In addition, property owners in the hillside areas have constructed numerous small dikes to impound water. The City of Pasadena has participated in the National Flood Insurance Program since 1984. However, there are no flood-prone areas recognized within the City.³

The City of Pasadena is a member of the Los Angeles County Stormwater Program, which regulates and controls stormwater and urban runoff into the Los Angeles River, San Gabriel River, tributaries to these rivers, and ultimately the Pacific Ocean. The Los Angeles County Stormwater Program is the local enforcement mechanism of the National Pollutant Discharge Elimination System (NPDES), which controls water pollution by regulating point sources that discharge pollutants into waters of the United States. In the Pasadena area, NPDES permits are filed with the California Regional Water Quality Control Board, Los Angeles Region. The City of Pasadena's Stormwater Management and Discharge Control Code (Section 8.70 of the Municipal Code) contains measures to regulate non-stormwater discharges to the municipal stormwater system; control of spillage, dumping or disposal of materials into the municipal stormwater system; and reduce pollutants in stormwater and urban runoff to the maximum extent practicable.

Thresholds Used to Determine Level of Impact

Implementation of the 2004 Land Use Element, Zoning Code Revisions, and Central District Specific Plan will have a significant impact if such implementation will:

- 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
- Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff

Environmental Impact

Groundwater Supply

2004 Land Use Element and Zoning Code Revisions

The 2004 Land Use Element prescribes targeted growth and sets forth district-wide land use, mobility, and urban design concepts and strategies. With implementation of 2004 land use policy, the City's population is expected to increase by approximately 16,979 persons by the year 2015, to a total of 158,213 persons. New development as a result of the 2004 Land Use Element policy will

³ Federal Emergency Management Agency. *Flood Insurance Rate Maps*.

increase demand for water. The City’s Urban Water Management Plan estimates that total system per capita water use (excluding agricultural use) averages 170 gallons per capita per day. Based on this consumption rate, the City is expected to demand 30,128 acre-feet per year (af/yr) in 2015. The *Pasadena 2000 Urban Water Management Plan* estimates a supply of 42,400 af/yr in 2015, as indicated in Table 31. Thus, the projected future water demand as a result of the 2004 Land Use Element will be well within the projected supply reported in the *Pasadena 2000 Urban Water Management Plan*.

**Table 31
Pasadena’s Projected Water Supplies -
Year 2015**

Sources	Acre-feet per year
Purchased from wholesaler (imported water from MWD)	23,820
City-produced groundwater	18,400
Transfers	180
Exchanges in Recycled Water	0
Total	42,400

Source: City of Pasadena. *Pasadena 2000 Urban Water Management Plan*. December 2000.

To avoid groundwater depletion, a major groundwater storage program, the Raymond Basin Conjunctive Use Program, has been under negotiation with the Metropolitan Water District of Southern California (MWD) for several years. This program would allow MWD to build a pipeline and additional pumps and wells for the storage of up to 75,000 acre-feet of imported water in the Basin, with a dry year yield of up to 25,000 af/yr, to meet regional needs. The City maintains a storage account in the Basin to supplement its annual extraction rights. The storage of groundwater from other sources ensures that there is a minimum level of water in the Raymond Basin, and the City’s purchase of imported water from MWD will ensure that adequate supply will be available without depleting the City’s wells. According to the *Pasadena 2000 Urban Water Management Plan*, the City is currently exploring dry year water transfer options with MWD to ensure adequate supply and prevent groundwater basin depletion.

Although the increased demand for water supply resulting from development pursuant to the 2004 Land Use Element is not expected to substantially burden groundwater resources, the Element will contribute to existing conservation efforts, as demonstrated by the following objectives and policies:

Objective 9 Open Space Preservation and Acquisition: Preserve and acquire open space in Pasadena in order to enhance the quality of Pasadena life.

Policy 9.5 Stewardship of the Natural Environment: Encourage and promote the stewardship of the natural environment, including water conservation, clean air, natural open space protection, and recycling. Encourage the use of native, water conserving and regionally appropriate landscaping.

Objective 18 Improved Environment: Improve the quality of the environment for Pasadena and the region.

Policy 18.2 Water Conservation: Increase the efficiency of water use among Pasadena residents, and commercial and industrial organizations.

To further ensure that groundwater supplies will not be impacted by future development pursuant to implementation of the 2004 Land Use Element, mitigation measures are recommended to guarantee that the City follow through with its plans to fully investigate additional measures to maintain supply and prevent groundwater depletion.

Conclusion:

Since projected future water demand will not exceed supply, the impact of the 2004 Land Use Element and Zoning Code Revisions on water resources and groundwater supply will be less than significant. Mitigation measures, although not required, are recommended to maintain adequate groundwater supply.

Central District Specific Plan

The Central District Specific Plan provides guidelines for focused growth and development within the Central District. Population within the Central District is expected to increase by approximately 7,095 persons in 2015, resulting in an increase in water consumption by 1,351 af/yr. This represents 4.5% of the City's total projected future demand, and is well within the future supply estimated by the *Pasadena 2000 Urban Water Management Plan*. Impact on groundwater supply due to development pursuant to the Central District Specific Plan will therefore be less than significant.

Conclusion:

Impact on groundwater supply due to implementation of the Central District Specific Plan will be less than significant.

Surface Hydrology and Drainage Facilities

2004 Land Use Element and Zoning Code Revisions

The 2004 Land Use Element and Zoning Code Revisions establish the distribution and intensity of land use within the City and identify where growth and development efforts are to be focused over the next 11 years. Since Pasadena is nearly built out, absorbing new development and growth will involve recycling underutilized parcels and renovating existing structures. Growth in previously undeveloped hillside areas will be limited. Therefore, the increase in impervious surfaces as a result of implementation of the 2004 Land Use Element and Zoning Code Revisions will be minimal, and the amount and velocity of stormwater runoff is not expected to exceed the capacity of the stormwater drainage system. However, nuisance flooding could occur in areas without adequate drainage facilities; for this reason, the adopted General Plan Safety Element contains goals and policies to reduce the risk of flooding. The following goal and policy will apply to all individual development projects pursuant to the 2004 Land Use Element policy:

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

Policy F-1.1 The City will continue to discourage development in flood hazard areas and will strengthen the City's maintenance program for stormwater detention basins, culverts, and storm drains to minimize future flooding events.

An implementation program in the adopted Safety Element requires new construction in upstream areas in the San Gabriel Mountains and San Rafael Hills to perform hydrological studies to assess the impact of construction on already developed areas located down gradient. The assessment of possible impacts on County drains and privately owned debris basins downstream of proposed individual projects is mandatory. If the analyses indicate a potential hazard, storm improvements shall be required. Fees to pay for the improvements may be assessed to the development project, as appropriate. In addition, the City will continue to maintain the culverts and storm drain system to prevent the accumulation of debris or other obstructions that could hamper the effectiveness of the system during rainy days.

Stormwater runoff is further regulated by Municipal Code Section 4.19.060 (Use and Disbursement of Fees), which requires all new development to pay an impact fee, part of which will be used for street improvements, including storm drains. In addition, major developments that impact the capacity of downstream lines are required to upgrade adjacent system components to mitigate impacts at the developer's expense.

The 2004 Land Use Element will be consistent with the adopted Safety Element flood prevention polices, and development will be subject to the City's impact fees to improve storm drains, the implementation of which will ensure a less than significant impact on drainage systems.

As discussed under Environmental Setting, Pasadena is a participant in the Los Angeles County Stormwater Program, which regulates and controls stormwater and urban runoff and enforces NPDES requirements. Thus, development associated with the 2004 Land Use Element and Zoning Code Revisions will comply with all State and federal requirements pertaining to water quality and will not be expected to increase pollutant concentrations in runoff. Individual development projects associated with the 2004 Land Use Element will be required to prepare of a Standard Urban Stormwater Mitigation Plan (SUSMP), as enforced by the City's Stormwater Management and Discharge Control Ordinance (Section 8.70.097 of the Pasadena Municipal Code). New development projects must retain or treat the first 0.75-inch of rainfall in a 24-hour period. This measure ensures that pollutants are separated from stormwater runoff prior to its release into storm drain channels, catch basins, and eventually larger natural bodies of water. The SUSMP requires that:

- All construction sites within the City adhere to established Best Management Practices (BMPs) for the reduction of potential pollutants.
- Develop pollution prevention plans for construction sites.
- Incorporate structural as well as treatment control BMPS.
- Perform an on-going inspection and maintenance program for developments that install treatment control BMPs.

The City's SUSMP ordinance controls stormwater quality in two phases: development planning and construction. All development projects must comply with the Los Angeles County Municipal Storm Water Permit issued by the California Regional Water Quality Control Board and with all City ordinances.

Additionally, the 2004 Land Use Element aims to reduce polluted storm water runoff through the following policies:

Policy 18.4 Water Quality: Coordinate with local, regional, State, and federal agencies (including Los Angeles Regional Water Quality Control Board and the Los Angeles County Flood Control District) to continue to define appropriate standards to improve water quality.

Policy 18.5 Water Pollution Prevention: Continue to require, monitor, and enforce National Pollution Discharge Elimination Systems (NPDES) permits, Standard Urban Stormwater Mitigation Plans (SUSMPs), Best Management Practices, Total Maximum Daily Loads for impaired water bodies, Storm Water Quality Management Programs, and Storm Water Pollution Prevention Plans, as applicable and appropriate.

Compliance with federal and State regulations and the SUSMP requirements will ensure that development pursuant to the 2004 Land Use Element and Zoning Code Revisions will not violate any water quality standards or waste discharge requirements. Impact will be less than significant.

Conclusion:

Compliance with federal and State regulations and the SUSMP requirements will ensure that development pursuant to the 2004 Land Use Element and Zoning Code Revisions will not violate any water quality standards or waste discharge requirements. Impact will be less than significant.

Central District Specific Plan

The Central District Specific Plan identifies land use intensities and provides for an increase in both residential and nonresidential development within the planning area. The Central District is highly urbanized, and new development pursuant to implementation of the Specific Plan will consist primarily of infill projects. Thus, a limited increase in the amount of impervious surface area will result, and the amount and speed of stormwater runoff is not expected to exceed the capacity of the stormwater drainage system. All new development pursuant to the Specific Plan will comply with existing federal, State, and local water quality requirements, including NPDES requirements as enforced by the City's Stormwater Management and Discharge Control Ordinance. Impact will be less than significant.

Conclusion:

The impact of the Central District Specific Plan on stormwater drainage facilities and the potential for the creation of polluted runoff will be less than significant.

Mitigation Measures

Impact on stormwater facilities and the potential for polluted runoff will be less than significant, and no mitigation is required.

Although impact on groundwater supply will be less than significant, the following mitigation measures are recommended to improve the City's water conservation efforts and ensure that groundwater resources are not adversely impacted.

1. The City will continue current conservation efforts and actively pursue water storage and source alternatives, including the following programs:
 - Raymond Basin Conjunctive Use Program allows MWD to build a pipeline and additional pumps and wells for the storage of up to 75,000 acre feet of imported water in the basin with a dry year yield of up to 25,000 acre feet per year to meet regional needs
 - Dry year water transfer options
 - Use and production of reclaimed water, as outlined in its *2000 Urban Water Management Plan*
2. The City will require all development projects to maintain a percentage of the project site as an impervious surface for the purposes of groundwater percolation.

Level of Impact after Mitigation

Impact is less than significant.