4.9 HYDROLOGY AND WATER QUALITY

This section discusses the existing hydrological setting for the project site, including runoff, storm drainage, and flood control. This section describes regulations and policies affecting local hydrology and water quality, identifies impacts that may result from development of the infill site, and recommends mitigation measures to reduce potential impacts, where appropriate. Impacts associated with water supply, including groundwater supplies, are discussed in Section 4.15, "Utilities," of this volume.

4.9.1 Environmental Setting

REGIONAL HYDROLOGY

The project site is located at the southern border of the City of Davis, in the southwestern end of the Sacramento Valley, approximately 30 miles north of the confluence of the San Joaquin and Sacramento Rivers. The Sacramento and San Joaquin valleys make up the Great Valley geomorphic province of California, bounded by the Sierra Nevada to the east and the Coast Range to the west. The two rivers join in the Sacramento-San Joaquin Delta, a massive complex of wetlands, marshes, and channels, and enter the Pacific Ocean at the San Francisco Bay. The historic channel of the North Fork of Putah Creek (Putah Creek channel) flows through the project site.

Sacramento River Watershed

The Sacramento River is the largest river and watershed system in California and the second largest (by discharge) river in the United States. Its watershed covers 27,000 square miles and carries 31 percent of the state's total surface water runoff. Primary tributaries include the Pit, Feather, and American Rivers (Sacramento River Watershed Program [SRWP] 2015). The mouth of the Sacramento River is at Suisun Bay near Antioch where it combines with the San Joaquin River.

Putah Creek Watershed

Putah Creek originates from springs in the Mayacama Mountains of the Coast Range. The stream flows eastward, eventually entering Lake Berryessa. Putah Creek exits this lake through the Monticello Dam, becoming the border between Yolo and Solano Counties, ultimately flowing into the Yolo Bypass (a man-made portion of the Sacramento floodplain). Putah Creek receives tertiary treated effluent from the University of California at Davis (UC Davis) wastewater treatment plant located approximately 0.5 mile south of the project site.

Putah Creek forks approximately 1.5 miles west of the project site. The North Fork is the original stream channel. It historically flowed northeast toward the City of Davis, through the project site, and dissipated in a series of canals and ditches between Davis and the Yolo Bypass. The South Fork was constructed in the 1870s to protect the City of Davis from flooding (UC Davis 2010). In 1948, a U.S. Army Corps of Engineers (USACE) levee project at the mouth of the North Fork completely eliminated flows from the North Fork (Jones 2006). The Putah Creek channel contains the U.C. Davis Arboretum Waterway, which was constructed in 1969. The primary source of water in the Arboretum Waterway is tertiary treated effluent from the UC Davis wastewater treatment plant. The waterway also functions as a stormwater detention basin for the campus. While the original North Fork flowed east, years of dredging and grading have altered the stream topography so that the Arboretum Waterway now flows to the west (Jones 2006). When the waterway fills with stormwater runoff, excess water is pumped out and discharged to the South Fork of Putah Creek.

Local Hydrology

The Putah Creek channel crosses the project site and is directed through a 12-inch culvert before continuing southward towards I-80. The Nishi site is characterized by relatively flat agricultural land that generally drains to the southwest. A drainage ditch flows northeast from the intersection of I-80 and the Union Pacific Railroad (UPRR) tracks, along the I-80 right-of-way, and eventually discharges to the historic channel. This

drainage ditch receives storm water flows from the Nishi site, the I-80 right of way, and off-site flows from approximately 58 acres of land on the UC Davis campus west of the project site. Drainage from West Olive Drive flows into the City of Davis storm drain system and ultimately to the South Fork of Putah Creek.

Floodplain

The Putah Creek channel crosses the project site, separating the Nishi and West Olive Drive areas. Approximately 6.2 acres of land surrounding the historic channel is located within the mapped Federal Emergency Management Agency (FEMA) 100-year flood zone (Figure 4.9-1). There are no 200- or 500-year floodplains within the project site (West Yost 2015).

Jurisdictional Water of the United States

The main stem of Putah Creek, which is located approximately one mile south of the project site, is a "water of the United States," under the jurisdiction of the USACE. Waters of the United States generally include navigable waters (waters used for transport or commerce) and their tributaries, including wetlands with a clear connection to these waters, and all impoundments of these waters. The USACE distinguishes between wetland and non-wetland waters (commonly referred to as "other waters"). Wetlands are defined as areas that are inundated or saturated by surface or groundwater for a sufficient duration to support a prevalence of vegetation adapted for life in saturated soil conditions (Title 33 CFR Section 328.3[b]). A delineation of jurisdictional waters has not yet been completed for the project site. It is possible the Putah Creek channel, which was historically connected to the Putah Creek channel, could be considered jurisdictional by the USACE.

Surface Water

The natural flow pattern of Putah Creek has been altered by water storage in Lake Berryessa and irrigation demands. Flows from Monticello Dam (Lake Berryessa) are high in summer and low in winter in all but the wettest years (SRWP 2015). Before 2000, stream flows near Davis were very low during the summer and fall (0 to 60 cubic feet per second [cfs]). The Putah Creek water accord (completed in May 2000) brought an end to a decade long dispute over water rights and stream flow requirements for fish and other natural resources and established permanent surface flows to the western boundary of the Yolo Bypass (SRWP 2015).

Historic prospecting, natural weathering, and venting from geothermal springs have created high levels of mercury and boron within Putah Creek (SRWP 2015). Consequently, the section of Putah Creek from Solano to the Putah Creek Sinks (Yolo Bypass) is listed as an Impaired Water by the U.S. Environmental Protection Agency (EPA) because of high levels of these elements.

Groundwater

The project site overlays the Yolo Subbasin which is located within the broader Sacramento Valley Groundwater Basin. Fresh water is primarily found in upper layers of coarse textured, buried river and stream deposits and in the deeper Tehama Formation. The Tehama Formation ranges from 1,500 to 2,500 feet thick and is the largest source of fresh water in the subbasin (California Department of Water Resources [DWR] 2004). Beneath the Tehama Formation are brackish volcanic and marine sedimentary rocks with low permeability. The upper limit of these rocks generally coincides with the fresh/saline boundary.

Groundwater levels are impacted by periods of drought, which are often combined with increased groundwater pumping, but generally recover quickly during wet years. Long term trends do not indicate significant declines in water levels, with the exception of pumping depressions in the vicinity of Davis, Woodland, and the Dunnigan/Zamora areas (DWR 2004). Groundwater storage for the Yolo Subbasin in the aquifer found between 20 and 420 feet below ground surface has been estimated as 6,455,940 acre-feet (af).

The groundwater in the subbasin is generally high in calcium (generally over 180 milligrams per liter [mg/L] $CaCo_3$) and magnesium, with localized areas of high selenium and boron. Total dissolved solids are 574 ppm on average (DWR 2004). In the east Yolo subbasin, beneath the City of Davis and UC Davis, average concentration of arsenic in the Tehama formation are 0.04 mg/L, which exceeds the EPA maximum contaminant level (MCL) of 0.01 mg/L (Yolo County 2009).

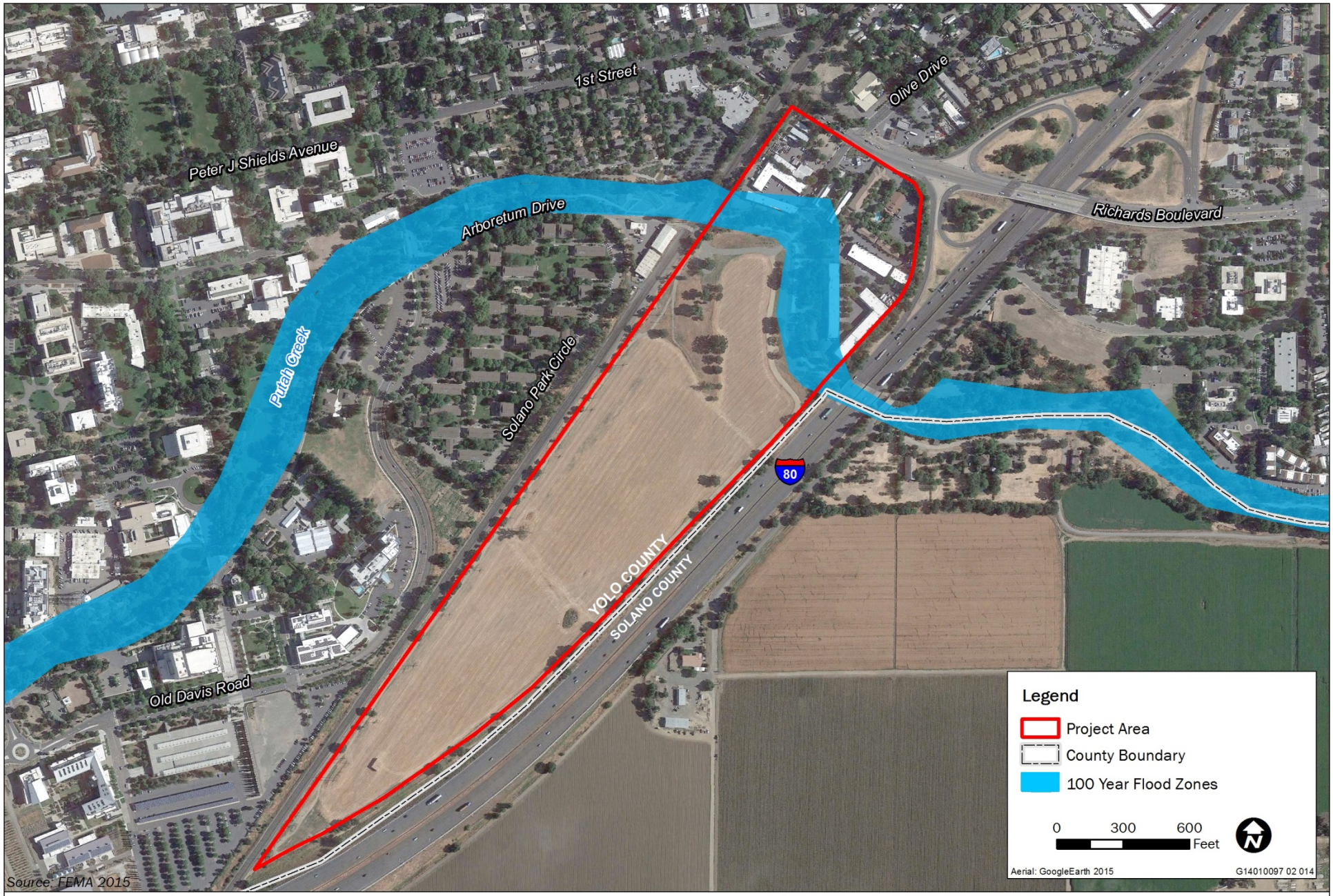

Figure 4.9-1 **Designated 100-Year Flood Zones**

Because of the presence of brackish water in the Delta, overdrafting of groundwater resources could lead to salt water intrusion which could ultimately affect the local water supply although none has been observed to date (Yolo County 2009).

Soils

The project site is underlain but Quaternary (present time to 1.6 million years ago) alluvial deposits. The Natural Resources Conservation Service (NRCS) Soil Survey of Yolo County (NRCS 2015) indicates that the following soil mapping units occur beneath the project site (see Figure 4.6-1 for soil map unit boundaries):

- Sycamore Silty Clay Loam, drained (Ss): This is a deep soil formed in mixed alluvium on nearly level flood plains. This soil is somewhat poorly drained with moderate runoff potential, and is in Hydrologic Group C (soils with moderately high runoff potential when thoroughly wet). The sycamore soil can be acidic and can be highly corrosive to uncoated steel.

- Yolo Loam (Yo): This soil formed on level to moderately sloping alluvial fans in alluvium from sedimentary rocks. It is deep and well drained with low runoff potential, and is in Hydrologic Group B (soils with moderately low runoff potential when thoroughly wet). The Yolo soil is moderately corrosive to uncoated steel.

Monticello Dam

The Monticello Dam on Lake Berryessa is located approximately 25 miles from the City of Davis. The dam is a 270-foot-high, thin-arch, concrete structure which impounds a maximum of 1,602,300 af of water (Yolo County 2012). Uncontrolled water released into Putah Creek could occur either from a major or partial dam failure or from a landslide into Lake Berryessa which could cause overtopping of the dam. Seismic evaluation of Monticello dam indicates that it could withstand a magnitude 6.5 earthquake with the epicenter located 0.5 miles from the dam (Yolo County 2012). The size and topography of the lake relative to the size of a potential landslide makes the possibility of dam overtopping unlikely, however any landslide that would place debris in the outlet works or spillway of the dam could be a threat (Yolo County 2012). In the event of a dam failure, the City of Davis would have approximately 2 hours and 45 minutes to evacuate before being reached by floodwaters. Because the dam is located in a narrow canyon with the bulk of the water stored in the lake upstream, failure of the dam would release water at a constant rate for many hours. Although most areas would see floodwaters less than 2 meters deep, the flooding would last for more than 24 hours (Ward 2014).

4.9.2 Regulatory Setting

FEDERAL

Clean Water Act

Section 404

The Clean Water Act (CWA) consists of the Federal Water Pollution Control Act of 1972 and subsequent amendments. The CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the act prohibits the discharge of fill material into waters of the United States, including wetlands, except as permitted under separate regulations by USACE and EPA. To discharge dredged or fill material into waters of the United States, including wetlands, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE.

Section 401

Under CWA Section 401, applicants for a Section 404 permit must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water

quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The federal government delegates water pollution control authority under CWA Section 401 to the states (and in California, ultimately to the regional water quality control boards [RWQCBs]).

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point sources discharging pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. Two types of nonpoint source discharges are controlled by the NPDES program: discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems. The goal of the NPDES nonpoint source regulations is to improve the quality of stormwater discharged to receiving waters to the maximum extent practicable. The RWQCBs in California are responsible for implementing the NPDES permit system (see the discussion of state regulations below).

Section 303

Section 303(d) of the CWA requires states to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of the pollutant that the water body can receive and still be in compliance with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. EPA must either approve a TMDL prepared by the state or disapprove the state's TMDL and issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

Federal Antidegradation Policy

The Federal Antidegradation Policy was enacted to provide protection to high-quality water resources of national importance. It directs states to develop and adopt statewide antidegradation policies that include protecting existing instream water uses and maintaining a level of water quality necessary to protect those existing uses and the water quality of high-quality waters. In EPA's Clean Water Act regulations regarding water quality standards (40 CFR Chapter 1, Section 131.12[a][3]), the criteria for requiring an antidegradation standard includes: "where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected."

Regulated Floodplain

Floodplain Management Executive Order 11988 (May 24, 1977) directs all federal agencies to evaluate potential effects of any actions it may take in the floodplain and to avoid all adverse impacts associated with modifications to floodplains. It also directs federal agencies to avoid encroachment into the 100-year floodplain, whenever there is a practicable alternative, and to restore and preserve the natural and beneficial values served by the floodplains.

FEMA oversees floodplain management and runs the National Flood Insurance Program (NFIP) adopted under the National Flood Insurance Act of 1968. FEMA prepares Flood Insurance Rate Maps that delineate the regulatory floodplain to assist local governments with land use and floodplain management decisions to meet the requirements of the NFIP. In general, the NFIP mandates that development is not to proceed within the 100-year regulatory floodplain, if the development is expected to increase flood elevation by one foot or more. Very limited development is allowed in designated 100-year floodways (i.e., flood flow channels and areas with sufficient directional flow velocity of 100-year floodwaters).

STATE

State Water Resources Control Board

In California, the State Water Resources Control Board (SWRCB) has broad authority over water quality control issues for the state. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include the California Department of Health Services (DHS) (for drinking water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Wildlife (formerly Department of Fish and Game), and the Office of Environmental Health and Hazard Assessment. Regional authority for planning, permitting, and enforcement is delegated to the nine regional water boards. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans. The Central Valley RWQCB is responsible for the water bodies in the project vicinity.

Executive Order B-29-15

On April 1, 2015, the Governor of California proclaimed a continued state of emergency due to severe drought conditions, directing the SWRCB to enhance emergency regulations adopted in 2014 and reaffirmed on March 17, 2015. The Governor's Executive Order B-29-15 sets 2013 as a base water use year and directed the SWRCB to impose restrictions to achieve a statewide 25 percent water reduction through February 28, 2016.

On May 5, 2015, the SWRCB adopted an emergency regulation requiring an immediate 25 percent reduction in overall potable urban water use statewide in accordance with Executive Order B-29-15. Based on the City of Davis' average residential gallons per capita per day usage between July-September 2014, the City's total potable water production must be reduced by 28 percent for each month as compared to the amount used in the same month in 2013.

Water Quality Control Plan for the Sacramento and San Joaquin River Basins

The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) presents water quality standards and control measures for surface and ground waters of the region. The Basin Plan designates beneficial uses for water bodies and establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. The Basin Plan contains both narrative and numeric water quality objectives for the region. Ambient water quality standards are set as objectives for a body of water and effluent limits (or discharge standards) are conditions in state or federal wastewater discharge permits, such as the NPDES permits. Land uses and activities that could degrade water quality and best management practices (BMPs) that could be used to address various nonpoint sources of pollution are identified in the Basin Plan.

Beneficial Uses

The Basin Plan (Central Valley RWQCB 1998) defines and designates the existing beneficial uses for surface and groundwater in the project area.

Existing beneficial uses of Putah Creek (surface water) include:

- **Municipal and Domestic Supply**-waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply
- **Agricultural Supply** -waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- **Water Contact Recreation**- water used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These include, but are not limited to swimming, water-skiing, fishing, and others.

- **Noncontact Water Recreation-**used of waters used for recreational activities involving proximity to water, but not normally involving body contact with water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, and others.

- **Wildlife Habitat**-uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species, such as waterfowl.

- **Freshwater Habitat** -uses of water that support warm (and potentially cold) water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

- **Spawning, Reproduction, and Development**- uses of water s that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.

The beneficial uses of groundwater in Central Valley Region include the following:

- **Municipal and Domestic Supply** – Definition provided above.

- **Agriculture Supply** – Definition provided above.

- **Industrial Service Supply** – Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

- **Industrial Process Supply** – Uses of water for industrial activities that depend primarily on water quality.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is California's statutory authority for the protection of water quality. The act sets forth the obligations of the SWRCB and RWQCBs under the CWA to adopt and periodically update water quality control plans, or basin plans. Basin plans are plans in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The Porter-Cologne Act also requires waste dischargers to notify the RWQCBs of such activities by filing Reports of Waste Discharge and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements, NPDES permits, Section 401 water quality certifications, or other approvals.

NPDES Permits

The SWRCB and RWQCB require specific NPDES permits for a variety of activities that have potential to discharge pollutants to waters of the state and adversely affect water quality. To receive an NPDES permit a Notice of Intent to discharge must be submitted to the RWQCB and design and operational BMPs must be implemented to reduce the level of contaminated runoff. BMPs can include the development and implementation of regulatory measures (local authority of drainage facility design) various practices, including educational measures (workshops informing public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures (label storm drain inlets as to impacts of dumping on receiving waters), and structural measures (filter strips, grass swales, and retention basins). All NPDES permits also have inspection, monitoring, and reporting requirements.

General Permit for Stormwater Discharges Associated with Construction Activity

The SWRCB adopted the statewide NPDES General Construction Permit in August 1999. The state requires that projects disturbing more than 1 acre of land during construction file a Notice of Intent with the RWQCB to be covered under this permit. Construction activities subject to the General Construction Permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. A storm water pollution prevention plan

(SWPPP) must be developed and implemented for each site covered by the permit. The SWPPP must include BMPs designed to prevent construction pollutants from contacting stormwater and keep products of erosion from moving off-site into receiving waters throughout the construction and life of the project; the BMPs must address source control and, if necessary, pollutant control.

State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described previously, the SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy provides as follows:

a) Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

b) Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements.

Safe Drinking Water Act

As mandated by the Safe Drinking Water Act (Public Law 93-523), passed in 1974, EPA regulates contaminants of concern to domestic water supply. Such contaminants are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary maximum contaminant levels (MCLs). MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 established an accelerated schedule for setting drinking water MCLs. EPA has delegated to the DHS the responsibility for California's drinking water program. DHS is accountable to EPA for program implementation and for adoption of standards and regulations that are at least as stringent as those developed by EPA. Title 22 of the California Administrative Code (Article 16, Section 64449) defines secondary drinking water standards, which are established primarily for reasons of consumer acceptance (i.e., taste) rather than for health issues.

LOCAL

City of Davis General Plan

The City of Davis General Plan contains the following goals and policies that are relevant to Hydrology and Water Quality:

Goal WATER 2: Ensure sufficient supply of high quality water for the Davis Planning Area.

- **Policy WATER 2.2:** Manage groundwater resources so as to preserve both quantity and quality.
- **Policy WATER 2.3:** Maintain surface water quality.

Goal WATER 3: Design stormwater drainage and detention facilities to maximize recreational, habitat, and aesthetic benefits.

- **Policy WATER 3.1:** Coordinate and integrate development of storm ponds and channels City –wide, to maximize recreational, habitat, and aesthetic benefits.

- **Policy WATER 3.2:** Coordinate and integrate design, construction, and operation of proposed stormwater retention and detention facilities City-wide, to minimize flood damage potential and improve water quality.

Goal HAZ 1: Provide flood protection which minimizes potential damage, while enhancing recreational opportunities, wildlife habitats, and water quality.

- **Policy HAZ 1.1:** Site and design developments to prevent flood damage.

- **Policy HAZ 1.2:** Continue to provide flood control improvements that are sensitive to wildlife habitat and open space preservation.

City of Davis Municipal Code

Following Executive Order B-29-15, the City of Davis adopted an Urgency Ordinance to add section 39.02.045 to Chapter 39 of the municipal code to adopt certain water conservation measures, prohibit certain water wasting activities, establish penalties for violations and declaring the ordinance to be an urgency ordinance necessary for the immediate preservation of the public health, safety and welfare to take effect immediately. Specifically, one requirement states that, "No irrigation with potable water of landscapes outside of newly constructed homes and buildings in any manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development."

4.9.3 Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact on hydrology and water quality 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 preexisting nearby wells would drop to a level that 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 rate or amount of surface runoff 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;

- fail to provide applicable urban level of flood protection (protection from or removal from 200-year floodplain) pursuant to the CA Government Code Section 65007;
- expose people or structures to significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam;
- result in inundation by seiche, tsunami or mudflow; or
- conflict, or create an inconsistency, with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating environmental effects related to hydrology and water quality.

METHODS AND ASSUMPTIONS

Components of the Nishi Sustainability Implementation Plan That Could Affect Project Impacts

The following goals and objectives from the Nishi Sustainability Implementation Plan are applicable to the evaluation of hydrology and water quality impacts (Note: the goals and objectives from the sustainability implementation plan related to water conservation are addressed appropriately in Section 4.15, "Utilities"):

Goal 4: Maximize water and wastewater efficiency through the use of conservation, reuse and integrated landscaping and stormwater management strategies.

- **Objective 4.4:** Incorporate creative low-impact development (LID) solutions to meet stormwater treatment and water quality requirements.

Impact Analysis Methodology

As noted in Chapter 3, "Project Description," this EIR evaluates development of the Nishi site at a project level and potential redevelopment that may occur within West Olive Drive as a result of rezoning/redesignation at a programmatic level.

Evaluation of potential hydrologic and water quality impacts was based on a review of existing information from previously completed documents that address water resources in the project vicinity. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section. In determining the level of significance, the analysis assumes that the project would comply with relevant federal, state, and local ordinances and regulations.

ISSUES NOT EVALUATED FURTHER

Inundation by Tsunami, Seiche, or Mudflow

Tsunamis are large waves created by earthquakes, undersea landslides, or volcanic eruptions. Low-lying coastal areas such as tidal flats, marshes, and former bay margins that have been artificially filled are susceptible to inundation. A tsunami entering the narrow mouth of the San Francisco Bay would dissipate as the energy of the wave is allowed to spread through the wide and shallow waters of the bay and delta. The California Department of Conservation prepares tsunami inundation maps for coastal areas and all populated areas at risk to tsunami within the state based on the maximum tsunami threat for that area. No areas of Yolo County are at risk from tsunami (California Department of Conservation 2013); therefore, this issue is not evaluated further. Additionally, because the project site is distant from any large water bodies that could create seiche waves and located in level topography where the risk of mudflow is minimal, these issues are also dismissed from further evaluation.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

Impact 4.9-1: Construction-related water quality impacts.

Nishi Site

The development of the Nishi site could impact water quality through ground disturbance and erosion leading to sediment delivery, and the potential release of hazardous materials during construction. Compliance with Central Valley WQCB and USACE permit conditions would minimize the potential water quality impacts related to construction activities, resulting in a **less-than-significant** impact.

Development of the Nishi site would result in extensive disturbance during construction. Removal of vegetation, excavation, grading, and stockpiling of soils during the installation of utilities and foundations would create soil disturbance which could lead to accelerated erosion and transport of sediment into the Putah Creek channel. Development of the Nishi site would require the use of hazardous materials such as fuels, lubricants, coolants, hydraulic fluids, and cleaning solvents. The use and handling of these materials presents the potential to degrade water quality through accidental spills.

The disturbance associated with development of the Nishi site would exceed one acre and would therefore be required to comply with the statewide NPDES General Construction Permit (Order No. 2010-0014 DWQ). This permit requires the development of a site-specific stormwater pollution prevention plan (SWPPP) that would have to comply with established regulatory standards and would include site-specific BMPs which reduce the potential for impacts to water quality resulting from stormwater runoff. Additionally, a hazardous materials spill response plan is a required component of the NPDES permit SWPPP and would reduce the potential of directly and indirectly affecting water quality through construction-related hazardous material spills. The SWPPP would be prepared by a Qualified SWPPP Practitioner and would be designed to meet the stormwater control needs of the project. The following is a list of standard BMPs that may be incorporated into the projects SWPPP and are based on practices described in the California Stormwater Quality Association's (CASQA) Best Management Practice Handbook Portal (California Stormwater Quality Association 2010):

- *Runoff control BMPs:* These measures include grading surfaces to control sheet flow, barriers or berms that force sheet flows around protected areas, and stormwater conveyances such as channels, drains, and swales. These practices and features collect runoff and redirect it to prevent contamination to surface waters. Calculations will be made for anticipated runoff, and the stormwater conveyances would be constructed, designed, and located to accommodate these flows.

- *Erosion control blankets/mats, geotextiles, plastic covers:* These erosion control methods will be used on flat or sloped surfaces to keep soil in place and can be used to cover disturbed soil to prevent runoff.

- *Gravel/sandbag barrier:* A temporary sediment barrier will be constructed using gravel or sand filled bags to prevent sediment from disturbed areas from reaching existing drainages by reducing the volume of sheet flows.

- *Hydraulic, straw, and wood mulch:* The use of these various mulches will temporarily stabilize soil on surfaces with little or no slope.

- *Preservation of existing vegetation:* Preserving the existing vegetation to the maximum extent possible will provide protection of exposed surfaces from erosion and can keep sediment in place. Sensitive areas defined in Section 4.4, "Biological Resources," of this volume will be clearly indicated and protected during and after construction.

- *Scheduling and planning:* Appropriate scheduling and planning provide ways to minimize disturbed areas, which reduces the amount of activity in the project area that requires protection and minimizes the duration of exposure of disturbed soils to erosion.

- *Stabilized construction entrance/exit*. A graveled area or pad can be built at points where vehicles enter and leave a construction site. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff and to help control dust.

- *Storm drain inlet protection:* Protection consists of devices and procedures that detain or filter sediment from runoff, thereby preventing them from reaching drainage systems that will be used following construction, as well as surface waters.

- *Spill prevention and control:* Any spills or releases of materials will be cleaned up immediately and comprehensively. Appropriate and easily accessible cleanup equipment, including spill kits containing absorbents, will be located in several areas around the site. Used cleanup materials will be disposed of properly and in accordance with applicable regulations. Hazardous or toxic material spills must be treated as hazardous waste and be treated and disposed of accordingly.

The SWPPP will also identify responsibilities for site inspection and monitoring, and any necessary maintenance of construction BMPs. Because construction of the Nish Site would require implementation of adequate measures to control on-site stormwater and protect water quality as part of the planning and design phase of implementation, the potential for construction related impacts to water quality would not be substantial.

Olive Drive currently crosses the Putah Creek channel via a solid block wall structure with a 12-inch culvert (Figure 4.9-2). The project would replace this structure with a either a full span or two pier bridge structure. Replacement of the existing structure would require excavation and removal of the road and existing fill materials, removal of the walls and culvert, and excavation for the installation of the new bridge abutments and piers. These activities would create ground disturbance and increase the potential for erosion. Additionally, the runoff from heavy and prolonged rain events could create flowing water within the historic channel, potentially carrying sediment into the Yolo Bypass.

Source: provided by Ascent Environmental Inc. 2015

Figure 4.9-2 Existing Putah Creek Channel Crossing

Although jurisdictional waters of the United States have not yet been delineated within the project site, the USACE has indicated that the Putah Creek channel is likely a jurisdictional water (USACE 2015). Because the permanent disturbance associated with the bridge replacement would be less than 0.5 acres, the project would require a USACE Nationwide Section 404 permit for maintenance or replacement of a previously authorizes and currently serviceable structure, and a SWQCB Section 401 Water Quality Certification. The conditions of the nationwide permit would include limiting the amount of channel modification or disturbance to the minimum necessary to construct the project; placement of excavated or dredged materials in an area that has no waters of the United States; limiting riprap to the minimum necessary to protect the structure; and restoration or stabilization of temporarily disturbed areas. As required by mitigation included in Section 4.4, "Biological Resources," any wetland areas that are disturbed during the bridge replacement process would be restored, enhanced, or replaced in accordance with USACE regulation (refer to Mitigation Measure 4.4-7a). The Section 401 water quality certification would be issued by the Central Valley RWQCB. To receive this certification the project must show that it would not create a violation of any water quality standards.

The development of the Nishi site could impact water quality through ground disturbance and erosion leading to sediment delivery, and the potential release of hazardous materials during construction. Compliance with Central Valley WQCB and USACE permit conditions would minimize the potential water quality impacts related to construction activities, resulting in a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

West Olive Drive

The potential redevelopment of West Olive Drive may require construction activities including excavation and ground disturbance, demolition and removal of existing structures, and the use of hazardous materials. However, these activities would be subject to protective NPDES permit and building code conditions which would minimize the potential for discharge of contaminated surface water runoff. Therefore, the redevelopment of West Olive Drive would have a **less-than-significant** impact relative to water quality.

The potential redevelopment of West Olive Drive may require construction activities including excavation and ground disturbance, demolition and removal of existing structures, and the use of hazardous materials. Contaminants such as soil particles, demolition wastes, or the accidental release of hazardous materials could be carried in stormwater runoff into the existing drainage system and the Putah Creek channel. Although the channel is isolated from stream flows, heavy and prolonged storm events could generate sufficient runoff to create flowing water and carry potential contaminants downstream to the Yolo Bypass.

As described above in regards to the Nishi site, the protective conditions included in the required NPDES permit for construction activities disturbing one acre or more would protect Putah Creek channel from the discharge of construction related contaminants. Additionally, if any redevelopment projects are proposed that disturb less than one acre, they would be subject to the California Green Building Standards Code (adopted by the City of Davis in 2013) which requires that projects that are less than one acre (not covered by the RWQCB NPDES permit) control stormwater and limit erosion and runoff during and after construction. The City of Davis may also require construction stormwater BMPs and inspections for sites less than one acre (City of Davis 2006).

Construction activities resulting from the potential redevelopment of West Olive Drive would be subject to protective NPDES permit and building code conditions which would minimize the potential for discharge of contaminated surface water runoff. Therefore, the redevelopment of West Olive Drive would have a ***less-than-significant*** *impact to water quality.*

Mitigation Measures

No mitigation measures are required.

Impact 4.9-2: Water quality impacts during operation.

Nishi Site

The development of the Nishi site could result in an increase in pollutants carried in stormwater runoff. However, drainage from the site would not be discharged to a surface water (Putah Creek channel is an abandoned channel which only receives stormwater runoff) and the project would be required to meet the City of Davis stormwater quality management standards, as found in the City's Manual of Stormwater Quality Control Standards for New Development and Redevelopment, which include LID site design, source control, stormwater treatment, and regular maintenance of stormwater system components. Compliance with these standards would minimize potential for stormwater runoff generated by the Nish Site to adversely impact water quality. Therefore, this would be a **less-than-significant** impact.

The Nishi site is currently dry-farmed, which entails regular soil disturbance and application of fertilizers, herbicides, and pesticides. Stormwater runoff from agricultural areas can carry sediment and chemicals into adjacent water bodies. Development of the Nishi site would result in extensive disturbance during construction. Removal of vegetation, excavation, grading, and stockpiling of soils during the installation of utilities and foundations would create soil disturbance which could lead to accelerated erosion and transport of sediment into the Putah Creek channel. As the Nishi site is developed, the expected types of pollutants would expand to include urban pollutants such as oil and grease, organic compounds, and trash. Although the project site is disconnected from natural surface waters, large storm events could generate enough runoff from the site and the surrounding urban area to create flows within Putah Creek channel and carry pollutants into the Yolo Bypass.

The potential for the Nishi site to generate polluted runoff would be minimized through mandatory compliance with the City of Davis stormwater program. The City of Davis stormwater program operates under a MS4 NPDES permit from the Central Valley RWQCB. This permit requires the City to enforce a post-construction stormwater management program for new development and redevelopment. The City's Stormwater Management Plan includes control measures to improve the quality and reduce the quantity of stormwater runoff to protect receiving waters. Additionally, the City's Manual of Stormwater Quality Control Standards for New Development and Redevelopment (Manual) contains standards for stormwater quality control measures and provides guidance on the design and implementation (City of Davis 2008). The standards control measures include general LID site design criteria (required for all new projects), as well as source control and treatment control BMPs. Source control BMPs prevent the exposure of materials and activities to rainfall to prevent pollutants from being carried away in stormwater runoff. Treatment control measures and engineered systems that filter or treat runoff to remove pollutants. Control measures for each category are described below:

- LID Site Design
  - Conserve Natural Areas
  - Protect Slopes and Channels
  - Minimize Impervious Areas (minimize sidewalks and street widths, cluster development, use porous paving materials)
  - Minimize Effective Imperviousness (using grass channels or swales, grass filter strips, stormwater planters, porous pavement filters, or trench and vault)
- Source Control Measures
  - Storm drain stenciling and signage
  - Outdoor storage area design
  - Trash storage area design
  - Loading/Unloading dock area design
  - Vehicle/equipment/accessory wash area design
  - Fueling area design
- Treatment Control Measures (projects must select one or more of the following)
  - Alternative/proprietary treatment control measures
  - Constructed wetland basin
  - Extended detention basin
  - Grass swale
  - Grass filter strip
  - Infiltration basin
  - Infiltration trench/vault
  - Media filter
  - Porous pavement filter
  - Stormwater planter
  - Vegetated swale
  - Wet pond

All new development and redevelopment project are required to submit a Project Stormwater Quality Control Plan (SWQCP) that demonstrates that the project will implement all of the applicable control measures listed above and will conform to all requirements of the standards as described in the Manual. The SWQCP is additional to the SWPPP required by the NPDES general construction permit.

Although the details of the Nishi site's SWQCP are not known at this time, the preliminary land use plan proposes large stormwater detention basin located on four acres in the western portion of the site. This basin would discharge to the existing drainage swale that parallels I-80 and ultimately flows into the dry Putah Creek channel. Additionally, the project would minimize impervious surfaces and include installation of "green roofs" on the three large residential structures. Green roofs provide stormwater benefits by making use of the natural biological, physical, and chemical processes found in plant and soil interactions to prevent airborne pollutants from entering the storm drain system. They also reduce the runoff volume and peak discharge rate by retaining or slowing down the water that would otherwise flow directly off the roof. Additional LID control measures will be incorporated into the project as the site plan develops and will be included in the SWQCP for review and approval by the City of Davis.

The development of the Nishi site could result in an increase in pollutants carried in stormwater runoff. However, drainage from the site would not be discharged to a surface water (Putah Creek channel is an abandoned channel which only receives stormwater runoff) and the project would be required to meet the City of Davis stormwater quality management standards which include LID site design, source control, stormwater treatment, and regular maintenance of stormwater system components. Compliance with these standards would minimize potential for stormwater runoff generated by the Nish Site to adversely impact water quality. Therefore, this would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

West Olive Drive

Redevelopment of West Olive Drive would not significantly alter the quality of stormwater runoff from the site. Additionally, potential redevelopment projects within West Olive Drive would be designed to comply with the City of Davis stormwater quality management standards, which would minimize the potential for stormwater runoff from redevelopment uses to adversely affect water quality. This would be a **less-than-significant** impact.

West Olive Drive is currently developed and has a high level of impervious cover. Additionally, the stormwater runoff from the potential new uses proposed for the area would be similar in character and quality to the stormwater generated by the existing uses.

Redevelopment projects within West Olive Drive would be required to comply with the City of Davis stormwater quality management standards discussed above in regard to the Nishi site. This would include submission of a SWQCP for review and approval by the City of Davis. Compliance with these standards would minimize the potential for stormwater runoff from redevelopment uses to adversely affect water quality.

Potential redevelopment projects within West Olive Drive would be designed to comply with the City of Davis stormwater quality management standards, which would minimize the potential for stormwater runoff from redevelopment uses to adversely affect water quality. This would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

Impact 4.9-3: Impacts to groundwater recharge.

Nishi Site

Development of the Nishi site would create impervious surfaces which could increase runoff and reduce groundwater recharge within the vicinity of the project. However, the LID stormwater management components of the project would infiltrate precipitation on site would minimize potential impacts to groundwater recharge. This would be a **less-than-significant** impact.

This discussion is focused on the potential for the project to interfere with groundwater recharge through the addition of impervious surfaces. Potential impacts related to the sufficiency of groundwater resources and the water demand of the project are addressed in Section 4.15, "Utilities." The development of the Nishi site would create new impervious surfaces which could reduce the ability of the site to capture rainwater and could affect groundwater recharge in the immediate vicinity. Approximately 20 acres of the Nishi site is located on the sycamore silty clay loam soil map unit (see Figure 4.6-1). In their native condition, these soils are somewhat poorly drained and have moderate runoff potential (NRCS 2015). The long term agricultural use of the site has possibly further reduced the ability of rainwater to move through these soils through compaction related to regular cultivation and heavy equipment traffic. The sycamore soils underlay the north eastern portion of the Nishi site, including the location of the northernmost three structures. The remainder of the site is composed of the Yolo loam, which is a deep and well-drained soil. Because this soil has lower clay content and is less susceptible to compaction, the long term agricultural use of the site may have had less of an impact on water movement within the soil. Under existing conditions, runoff from the sycamore soils accumulates in the southwestern portion of the site and is infiltrated by the Yolo soils. This trend would be continued by the proposed installation of a stormwater detention pond, located within the Yolo loam soil map unit.

Although the addition of impervious surfaces would concentrate runoff and increase the runoff from the developed areas of the site, the project would incorporate LID stormwater management measures that would infiltrate stormwater on-site to the maximum extent possible. The stormwater detention pond would have the capacity to capture and infiltrate the additional runoff generated by the proposed developed during a 100-year storm event (Cunningham Engineering 2015). Additional LID features would be integrated into the project design to capture and infiltrate stormwater at the source of runoff. The LID stormwater management components included in the Nishi site design would continue to allow rainwater infiltration and would minimize the potential affects to groundwater recharge.

Development of the Nishi site would create impervious surfaces which could increase runoff and reduce groundwater recharge within the vicinity of the project. However, the LID stormwater management components of the project would infiltrate precipitation on site would minimize potential impacts to groundwater recharge. This would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

West Olive Drive

West Olive Drive is currently developed with limited pervious surfaces. Redevelopment of the area would not significantly alter the rate of groundwater recharge beneath the site. Therefore, redevelopment of West Olive Drive would have a **less-than-significant** impact on groundwater recharge.

West Olive Drive is currently developed and contains a high degree of impervious land cover. The proposed redevelopment of this area would not affect the existing rate of stormwater infiltration and would not alter groundwater recharge conditions.

Because potential redevelopment within West Olive Drive as a result of redesignation/rezoning as part of the project would not affect the rate of stormwater infiltration or groundwater recharge, this would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

Impact 4.9-4: Drainage and runoff impacts.

Nishi Site

The existing drainage patterns and stormwater volume would be altered by the development of the Nishi site. The potential downstream impacts would be minimized through mandatory compliance with the City of Davis' stormwater ordinance. Alteration of the existing drainage system could create backwater or flooding conditions for the existing upstream properties. This would be a **potentially significant** impact.

Development of the Nishi site would increase impervious surfaces and would alter the existing drainage pattern, potentially affecting properties upstream and downstream of the site. Upstream contributors to the site include the I-80 right-of-way and off-site flows from approximately 58 acres of land on the UC Davis campus west of the project site. Excess stormwater flows generated by the project would be discharged into the Putah Creek channel, which passes through residential properties in the area downstream. Figure 4.9-3 presents the conceptual drainage plan the Nishi site and shows flow patterns from the proposed impervious areas directed to a stormwater detention basin, from there flowing to the existing drainage ditch, and finally discharged to the Putah Creek channel. The detention basin is preliminarily designed to be 4.4 acre-feet, which is adequate size for a 100-year storm event, as required by city drainage standards. If the proposed development prevented drainage flows from upstream areas from entering the site, it could create backwater conditions or flooding in upstream areas. On the downstream side, concentrated flows of runoff generated by the project could result in scouring and erosion of the Putah Creek channel at the discharge location and could contribute to increased risk of flooding.

The design of the Nishi stormwater system could be made to accommodate upstream flows from I-80 and off-site flows from the UC Davis campus and allow them to pass through the property. It is likely that the project site plan will make this accommodation, but because the site plan is not completed at the time of this writing and because there are no ordinances that mandate pass-through or infiltration of upstream flows, this provision cannot be guaranteed.

The potential for adverse downstream affects would be addressed through compliance with the City of Davis stormwater ordinance. As described under Impact 4.9-2, all development and redevelopment projects in the City of Davis are required to prepare a Project Stormwater Quality Control Plan (SWQCP). The SWQCP must demonstrate that the project meet the standards of the City of Davis Manual of Stormwater Quality Control Standards, which specifies that a projects stormwater system must be sized to capture and treat 80 percent or more of the average annual rainfall volume (City of Davis 2008). The Project SWQCP (along with design calculations for all stormwater control features) must be approved by the Public Works Department before building permits will be issued for the project. Because development of the Nishi site would be subject to compliance with City of Davis stormwater management standards, including preparation of an approved SWQCP before permit approval, the potential for downstream drainage impacts would be minimized.

The drainage system of the Nishi site would be designed to meet the requirements of the City of Davis stormwater management standards which would minimize the potential erosion and flooding risks to downstream properties. However, alteration of the existing drainage patterns on-site could affect drainage originating upstream of the property resulting in backwater conditions or flooding. This would be a ***potentially significant*** *impact.*

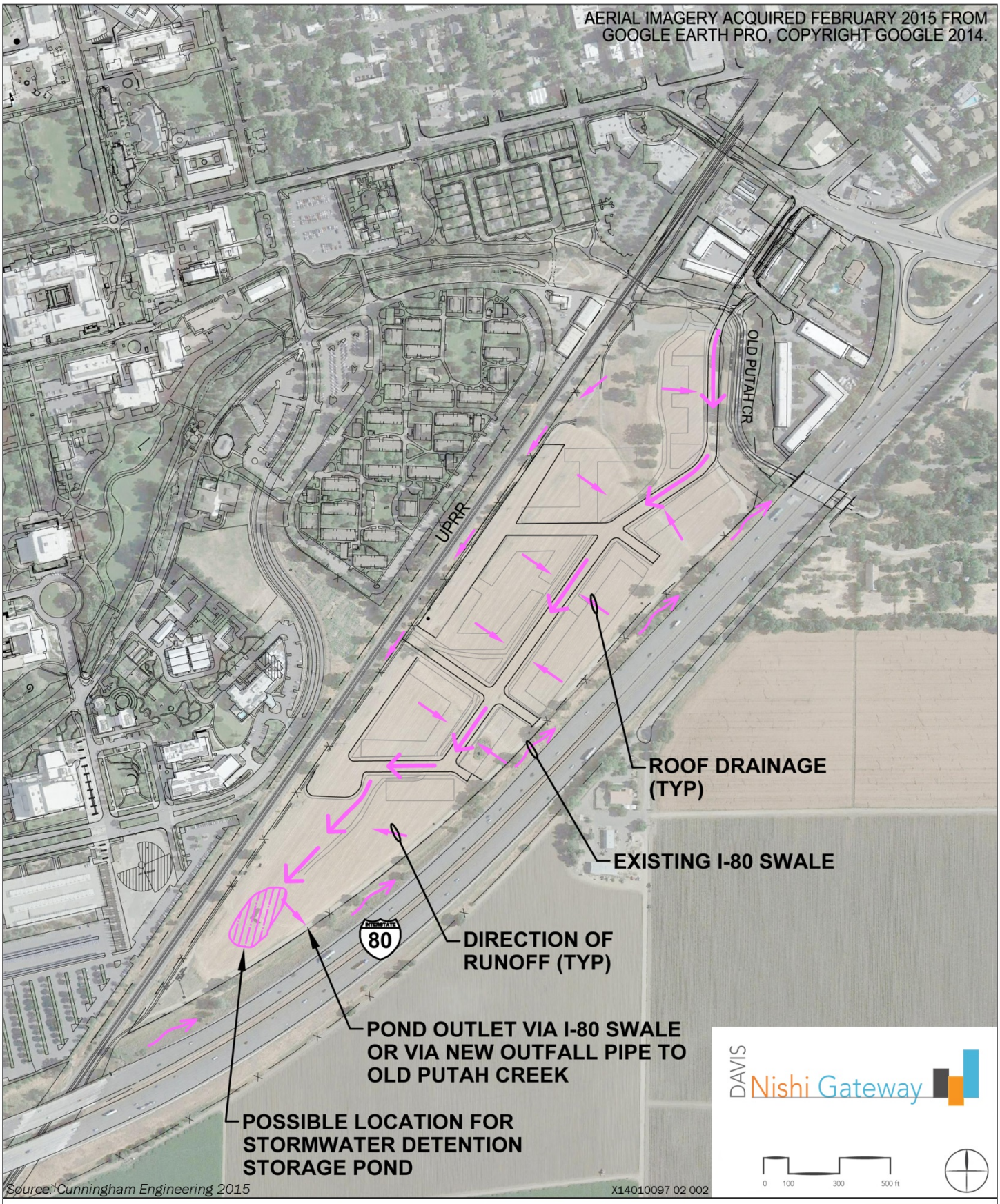

Figure 4.9-3 **Conceptual Drainage System**

ASCENT ENVIRONMENTAL

Mitigation Measures

Mitigation Measure 4.9-4: The SWQCP prepared for the City of Davis and before the issuance of building permits shall incorporate provisions to accommodate the existing volume of upstream drainage flows from the I-80 right-of-way and the 58-acre section of the UC Davis campus west of the project area. These flows may be conveyed directly through the site (pass-through) or infiltrated in part or in whole within the Nishi stormwater management system. Development of the Nishi site shall not create backwater conditions or upstream flooding.

Significance after Mitigation

Implementation of Mitigation Measure 4.9-4 would minimize the risk of backwater conditions or flooding on upstream properties resulting from alterations to the existing drainage system within the Nishi site. This mitigation measure, in combination with the existing City of Davis stormwater management regulations described above, would reduce the potential drainage and runoff impacts of development of the Nishi site to a **less-than-significant** level.

West Olive Drive

Potential redevelopment of uses within West Olive Drive would not substantial increase runoff volumes and would be required to comply with the provisions of the City of Davis stormwater ordinance. For this reason, the potential impacts related to site drainage and runoff volumes would be **less-than-significant.**

West Olive Drive does not receive upstream flows from adjacent properties. Drainage from the site is currently discharged to the Putah Creek channel via a local stormdrain system. Because the site is currently developed with a high degree of impervious cover, the potential redevelopment would not result in a significant increase in impervious surfaces. Additionally, any potential redevelopment projects would be required to comply with the City of Davis stormwater ordinance (discussed above in regard to the Nishi site and under Impact 4.9-2), which incorporates LID stormwater management principals. This could create an opportunity to increase on-site infiltration and reduce stormwater discharges.

Potential redevelopment of uses within West Olive Drive would not substantially increase runoff volumes and would be required to comply with the provisions of the City of Davis stormwater ordinance. For this reason, the potential impacts related to site drainage and runoff volumes would be ***less-than-significant****.*

Mitigation Measures

No mitigation measures are required.

Impact 4.9-5: Floodwater impacts.

Nishi Site

A small portion of the northern part of the Nishi site is located in the FEMA 100-year flood zone, however this space would be reserved for parks and greenways and would not be developed. In addition, the existing crossing of Putah Creek channel would be replaced with a bridge structure which would reduce the potential obstruction of flood flows and reduce the potential for flooding. There are no 200- or 500-year floodplains within the project site. Failure of the Monticello dam would inundate the Nishi site with up to two meters of water for a period of approximately 24 hours. However, the dam structure is managed by the BOR's rigorous dam safety program and is capable to withstanding strong seismic shaking in the near vicinity. Therefore, the potential for flooding of the Nishi site to impact 100-year flood waters or to be inundated as a result of dam failure would be a **less-than-significant** impact.

FEMA Flood Zone

Approximately 5.9 acres of the land area surrounding the Putah Creek channel are within the FEMA 100-year flood zone (see Figure 4.9-1); 2.7 of these acres are located on the Nishi site. The Nishi development project

conceptual plan has designated this area as a park or greenway space and would place no new structures within the designated flood zone. The existing crossing over Putah Creek channel is a block-wall and fill structure with a 12-inch culvert provided for water flow (see Figure 4.9-2). The Nishi project would remove this obstruction and replace it with a free-span or two-pier bridge which would better accommodate stream flows and reduce the potential for flooding. There are no 200- or 500-year floodplains within the project site.

Dam Failure

The entire City of Davis is located in the floodplain beneath Monticello Dam at Lake Berryessa. A catastrophic failure of this dam could cause flooding of up to two meters deep within City of Davis and the Nishi site, which could last for up to 24 hours (Ward 2014). The dam is not likely to be affected by seismic activity. The recent seismic evaluation of the dam indicates that it is capable of withstanding a magnitude 6.5 earthquake with the epicenter located 0.5 miles from the dam (Yolo County 2012). Other potential causes of dam failure include overtopping of dam capacity (usually because of unexpectedly heavy rainfall in the watershed), spillway blockage, failure of the dam foundation because of poor maintenance, and failure because of piping and seepage from internal cracks in the dam structure (Burns 2014).

Dam safety is a comprehensive and long-term process that continues throughout the life of any dam. Appropriate site maintenance, continuous inspection and monitoring, and implementation of periodic site improvements will improve the safety of most dam facilities (Yolo County 2012). The Monticello dam is managed by the U.S. Department of Interior, Bureau of Reclamation (BOR). The BOR's dam safety program includes a four-step program that continuously monitors the status of dams. Every four years the dam is reviewed and inspected. This involves an assessment of seismic, hydrologic, and static parameters. If this review indicates any items of concern, further studies are completed to fully understand the potential area of weakness and corrective actions are taken. In addition, daily visual inspections of the dam are completed by the Solano Water District dam tender (Burns 2014).

The Yolo County Multi Hazard Mitigation Plan (2012) places the probability of failure of any of the County's dams at less one percent for the period of the next 100 years. For this reason, combined with the stability of the Monticello Dam and the ongoing BOR dam safety program, the potential for flooding of the Nishi site as a result of dam failure would be minimal.

A small portion of the Nishi site is located in the FEMA 100-year flood zone, however this space would be reserved for parks and greenways and would not be developed. In addition, the existing crossing of Putah Creek channel would be replaced with a bridge structure which would reduce the potential obstruction of flood flows and reduce the potential for flooding. Failure of the Monticello dam would inundate the Nishi site with up to two meters of water for a period of approximately 24 hours. However, the dam structure is managed by the BOR's rigorous dam safety program and is capable to withstanding strong seismic shaking in the near vicinity. Therefore, the potential for the Nishi site to impact 100 year flood waters or to be inundated as a result of dam failure would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

West Olive Drive

A portion of the West Olive Drive area is located in the FEMA 100-year flood zone, however this space is reserved for parks and greenways and any redevelopment would comply with the City of Davis flood ordinance. Failure of the Monticello dam would inundate West Olive Drive with up to two meters of water for a period of approximately 24 hours. However, the dam structure is managed by the BOR's rigorous dam safety program and is capable to withstanding strong seismic shaking in the near vicinity. Therefore, the potential for the redevelopment of West Olive Drive to impact 100 year flood waters or to create structures that would be inundated as a result of dam failure would be a **less-than-significant** impact.

West Olive Drive is located in the same flood hazard areas as the Nishi site discussed above. The Putah Creek channel is within the 100-year flood zone, however no structures are currently located within the flood zone and redevelopment would occur in accordance with the City of Davis' flood ordinance which regulates the placement of structures within the flood zone. In addition, West Olive Drive would be inundated by flood waters in the event of a catastrophic failure of Monticello dam. For the same reasons discussed above in regard to the Nishi site, the potential for this to occur is considered minimal.

A portion of the West Olive Drive area is located in the FEMA 100-year flood zone, however this space is reserved for parks and greenways and any redevelopment would comply with the City of Davis flood ordinance. Failure of the Monticello dam would inundate West Olive Drive with up to two meters of water for a period of approximately 24 hours. However, the dam structure is managed by the BOR's rigorous dam safety program and is capable to withstanding strong seismic shaking in the near vicinity. Therefore, the potential for the redevelopment of West Olive Drive to impact 100 year flood waters or to create structures that would be inundated as a result of dam failure would be a ***less-than-significant*** *impact.*

Mitigation Measures

No mitigation measures are required.

Impact 4.9-6: Conflict, or create an inconsistency, with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating environmental effects related to hydrology and water quality.

Nishi Site

Implementation of the project within the Nishi site would be consistent with the policies of the City of Davis General Plan related to hydrology and water quality. This would be a **less-than-significant** impact.

The City of Davis General Plan includes policies to protect environmental resources, including hydrology and water quality. The features of the proposed development of the Nishi site and mitigation measures discussed in this document are consistent with the policies of the City of Davis General Plan as shown in Table 4.9-1.

Development of the Nishi site as part of the project would not conflict with any local policies or ordinances protecting hydrology and water quality. Impacts would be ***less than significant****.*

Mitigation Measures

No mitigation measures are required.

West Olive Drive

Redevelopment that could occur as a result of the redesignation/rezoning of parcels located in West Olive Drive would be consistent with the policies of the City of Davis General Plan related to hydrology and water quality. This would be a **less-than-significant** impact.

Similar to what was discussed above, potential redevelopment of West Olive Drive would not create conflicts or result in inconsistencies with the policies of the City General Plan related to hydrology and water quality.

Potential redevelopment associated with the proposed General Plan Amendment and zoning change of West Olive Drive would not conflict with any regulations established for the protection of hydrology and water quality. Impacts would be ***less than significant****.*

Mitigation Measures

No mitigation measures are required.

Table 4.9-1 City of Davis General Plan Policy Consistency

Policy	Project Consistency
Policy WATER 2.2: Manage groundwater resources so as to preserve both quantity and quality.	Development of the project site would increase the level of impervious surfaces on the site but would maintain stormwater flows on-site in a detention basin designed to maintain stormwater flows and volumes from the project site. As such, the project would be designed in such a manner to maintain existing stormwater flows such that the rate of percolation into the groundwater table would be maintained, consistent with this policy.
Policy WATER 2.3: Maintain surface water quality.	As noted above, drainage from the site would not be directly discharged to surface water, and the project would be required to meet the City of Davis stormwater quality management standards which include LID site design, source control, stormwater treatment, and regular maintenance of stormwater system components. As a result, implementation of the project would be consistent with this policy.
Policy WATER 3.1: Coordinate and integrate development of storm ponds and channels City – wide, to maximize recreational, habitat, and aesthetic benefits.	The primary stormwater detention area to be located in the southern portion of the project site is currently anticipated to be maintained in a naturalized condition and be adjacent to a recreational path. Therefore, the project would integrate recreational, habitat, and aesthetic benefits of on-site stormwater facilities, consistent with this policy.
Policy WATER 3.2: Coordinate and integrate design, construction, and operation of proposed stormwater retention and detention facilities City-wide, to minimize flood damage potential and improve water quality.	The design of the project would be subject to City review and approval prior to implementation. Further, the detention basin would be required to accommodate stormwater flows, including during a 100-year event, from the project site, consistent with this policy.
Policy HAZ 1.1: Site and design developments to prevent flood damage.	No structures, including residential structures, would be located within areas currently designated as potential flood areas. Further, the project's on-site detention facilities would be designed to maintain and accommodate stormwater flows, including during flood events, from the project site, consistent with this policy.
Policy HAZ 1.2: Continue to provide flood control improvements that are sensitive to wildlife habitat and open space preservation.	The project site would include additional native vegetation and open space that would improve the aesthetic and habitat conditions along the Putah Creek channel, consistent with this policy.

Source: City of Davis General Plan 2007, Ascent Environmental 2015