This section describes the regulatory setting, regional hydrology and water quality impacts that are likely to result from project implementation, and measures to reduce potential impacts related to stormwater drainage, flooding and water quality. This section is based in part on the following documents, reports and studies:

- City of Davis General Plan (City of Davis 2007,as amended through 2013),
- City of Davis 2010 Urban Water Management Plan (Brown Caldwell 2011),
- Flood Control Master Plan for the Cannery (Mackay and Somps, November 2012), attached as Appendix L1,
- Water Supply Master Plan for the Cannery (Mackay and Somps, September 2012),
- Sanitary and Sewer Master Plan for the Cannery (Mackay and Somp, September 2012).
- Technical Memorandum: Tentative Map Consistency Analysis Flood Control Master Plan Performance Standards (MacKay and Somps, January 2013), attached as Appendix L2.
- Peer Review of the November 2012 Cannery Flood Control Master Plan (West Yost, January 2013).

Comments were received during the public review period or scoping meeting for the Notice of Preparation regarding this topic from the following: BJ Klosterman (March 27, 2012), George Heubeck (March 27, 2012), James Herota, Central Valley Flood Protection Board (April 2, 2012), Elizabeth M. Lee, P.E., Central Valley Regional Water Quality Control Board (April 6, 2012), Davis Neighbors, Inc. (April 9, 2012), and BJ Klosterman (April 11, 2012). Each of the comments related to this topic are addressed within this section.

3.9.1 EXISTING SETTING

REGIONAL HYDROLOGY

The project site is located in the City of Davis, within Yolo County at the southwestern end of the Sacramento Valley, approximately 30 miles north of the confluence of the San Joaquin and Sacramento Rivers. The Sacramento Valley is bordered by the Coast Ranges and Delta on the west and the foothills of the Sierra Nevada to the east. Water resources in this region include rivers, streams, sloughs, marshes, wetlands, channels, harbors, and underground aquifers. The topography is generally flat, and is drained by the Sacramento River and the Yolo Bypass, which is part of the Sacramento River Flood Control Project.

Climate

Summers in the City are warm and dry, and winters are cool and mild. The region is subject to wide variations in annual precipitation, and also experiences periodic dry periods and wild fires in the regional watershed and surrounding areas with chaparral and oak lands. Summers can be hot at

times with weekly periods of 100 degree Fahrenheit temperatures, greatly increasing summer irrigation requirements.

The City's average monthly temperature ranges from 45 to 75 degrees Fahrenheit, but the extreme low and high daily temperatures have been 12 and 116 degrees Fahrenheit, respectively. The historical annual average precipitation is approximately 19 inches. The rainy season normally begins in November and ends in March. Evapotranspiration (ETo) records, which measure the loss of water from the soil both by evaporation and by transpiration from the plants growing thereon, indicate average monthly values ranging from 1.2 inches in the City's wet January to 8.3 inches in much drier June and July. Low humidity usually occurs in the summer months, from May through September. The combination of hot and dry weather results in high water demands during the summer.

Watersheds

A watershed is a region that is bound by a divide that drains to a common watercourse or body of water. Watersheds serve an important biological function, oftentimes supporting an abundance of aquatic and terrestrial wildlife including special-status species and anadromous and native local fisheries. Watersheds provide conditions necessary for riparian habitat.

The State of California uses a hierarchical naming and numbering convention to define watershed areas for management purposes. This means that boundaries are defined according to size and topography, with multiple sub-watersheds within larger watersheds. Table 3.9-1 shows the primary watershed classification levels used by the State of California. The second column indicates the approximate size that a watershed area may be within a particular classification level, although variation in size is common.

TABLE 3.9-1. STATE OF CALIFORNIA WATERSHED HIERARCHY NAMING CONVENTION

WATERSHED LEVEL	*APPROXIMATE SQUARE MILES (ACRES)*	*DESCRIPTION*
Hydrologic Region (HR)	12,735 (8,150,000)	Defined by large-scale topographic and geologic considerations. The State of California is divided into ten HRs.
Hydrologic Unit (HU)	672 (430,000)	Defined by surface drainage; may include a major river watershed, groundwater basin, or closed drainage, among others.
Hydrologic Area (HA)	244 (156,000)	Major subdivisions of hydrologic units, such as by major tributaries, groundwater attributes, or stream components.
Hydrologic Sub-Area (HSA)	195 (125,000)	A major segment of an HA with significant geographical characteristics or hydrological homogeneity.

SOURCE: CALIFORNIA DEPARTMENT OF WATER RESOURCES, 2012

HYDROLOGIC REGION

The City of Davis is located in the Sacramento River Hydrologic Region, which covers approximately 17.4 million acres (27,200 square miles) and all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Small areas of Alpine and Amador counties are also

within the region. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. Other significant features include Mount Shasta and Lassen Peak in the southern Cascades, Sutter Buttes in the south central portion of the valley, and the Sacramento River, which is the longest river system in the State of California with major tributaries the Pit, Feather, Yuba, Bear and American rivers. The region is home to over two million people. Area population centers include Sacramento, Redding, Chico, and Davis.

VALLEY PUTAH-CACHE HYDROLOGIC UNIT

The City of Davis is located within the Valley Putah-Cache Hydrologic Unit. For purposes of regional planning, hydrologic units are generally considered to be the appropriate watershed planning level. However, the hydrologic unit level is generally too large in terms of a planning scale for individual projects, and a hydrologic area or hydrologic subarea may be considered more appropriate.

LOWER PUTAH CREEK HYDROLOGIC AREA

The City of Davis is located within the Lower Putah Creek Hydrologic Area. This watershed is approximately 225,301 acres and is bound by Putah Creek to the south and Cache Creek to the north. The headwaters of the watershed begin just west of Winters near Lake Berryessa and extend to the east approximately 25 miles to the Sacramento River. There are 17 water bodies on the 303(d) list (list of impaired and threatened waters), six of which have a TMDL for various pollutants. A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. None of the listed 303(d) water bodies are located in the vicinity of the project site.

LOCAL SETTING

The project site is approximately 98.4 acres located at 1111 East Covell Boulevard, within the incorporated boundary of the City of Davis. The project site is located in Section 3, Township 8 North, Range 2 East, Yolo County, California, MDB&M. The approximate parcel centroid can be found at UTM 609,874 M E; 4,268,871 M N (Zone 10 North) and is portrayed on the Davis, California USGS 7.5-Minute Series Topographic Quadrangle.

Within the Lower Putah Creek Hydrologic Area, there are three principal watersheds located in the Davis area including: Dry Slough, Willow Slough, and Covell Drain (Figure 3.9-1 Principal Watersheds Map). The project site is located within the Covell Drain watershed. The Dry Slough and the Willow Slough are located to the west and north of the project site and contribute flows to the Willow Slough Bypass channel which is the downstream boundary condition in the hydraulics analysis for the proposed project.

The major streams that drain the unincorporated County areas around Davis are Putah Creek to the south and Willow Slough Bypass to the north, both of which empty into the Yolo Bypass.

Willow Slough Bypass is a leveed channel that drains approximately 200 square miles and receives flows from Willow, Cottonwood, Chickahominy, and Dry Sloughs south of Cache Creek. Figure 3.9-2 provides a hydrology map of the project vicinity.

Several major drainage facilities exist near and/or downstream of the project site. They are listed below and are shown on Figure 3.9-3- Regional Drainage Facilities.

- H Street Pump Station
- F Street Channel
- Covell Drain
- Channel A
- Willow Slough Bypass

Flooding

The risks of flooding hazards in the City of Davis and immediate surroundings are primarily related to large, infrequent storm events. These risks of flooding are greatest during the rainy season between November and March. Flooding events can result in damage to structures, injury or loss of human and animal life, exposure to waterborne diseases, and damage to infrastructure. In addition, standing floodwater can destroy agricultural crops, undermine infrastructure and structural foundations, and contaminate groundwater.

100-YEAR FLOODPLAIN

The 100-Year floodplain denotes an area that has a one percent chance of being inundated during any particular 12-month period. Floodplain zones (Special Flood Hazard Areas [SFHA]) are determined by the Federal Emergency Management Agency (FEMA) and used to create Flood Insurance Rate Maps (FIRMs). These tools assist communities in mitigating flood hazards through land use planning. FEMA also outlines specific regulations, intended to be adopted by the local jurisdictions, for any construction, whether residential, commercial, or industrial within 100-year floodplains.

Lands within the FEMA-designated 100-year floodplain (SFHA) are subject to mandatory flood insurance as required by FEMA. The insurance rating is based on the difference between the base flood elevation (BFE), the average depth of the flooding above the ground surface for a specific area, and the elevation of the lowest floor. Because the City of Davis participates in the National Flood Insurance Program, it must require development permits to ensure that construction materials and methods will mitigate future flood damage, and to prevent encroachment of development within floodways. New construction and substantial improvements of residential structures are also required to "have the lowest habitable floor (including the basement if it is, or easily could be 'habitable') elevated to or above the base flood level." Non-residential structures must have their utility systems above the BFE or be of flood-proof construction. Figure 3.9-4 illustrates the areas within the FEMA designated 100-year floodplain. The FEMA 100-year floodplain encroaches onto the northeast portion of the project site.

CURRENT DRAINAGE AND FLOODING

Current drainage patterns and flooding on the project site are shown on Figure 3.9-5. It should be noted that the limits of existing flooding shown on Figure 3.9-5 is different than the flooding limits shown on the FEMA Flood map (Figure 3.9-4). The difference is due to the fact that the topographic information used to create Figure 3.9-5 is based on accurate field survey data compared to the FEMA map that is based on less accurate USGS topographic mapping. It also is different, because the referenced study (Appendix L1) has postulated a Base Flood Elevation (BFE), which has not yet been acknowledged by FEMA. FEMA had not established a BFE at the time that the most recent FIRM was adopted.

Drainage: Runoff from the south half of the project site is currently collected in storm drain pipes which discharge via three 36-inch pipes that cross under the railroad and outlet into the F Street Channel. Runoff from the north portion of the project site flows overland to the east in a very gentle swale and discharges onto neighboring farmland in a sheet flow manner towards Channel A between F Street and Pole Line Road. This neighboring farmland is flooded when the flows in Channel A exceed the channel capacity and spill out into the fields, or if flows that could normally flow over or under Pole Line Road are impeded.

An eight-foot wide by three-foot high box culvert located under the railroad drains naturally-occurring runoff from the west side of the railroad right-of-way under the railroad so it could continue flowing easterly onto the subject property. However, during periods of high flow in the F Street Channel, the Channel is breached and flood waters flow through the box culvert and pond along the east side of the railroad in a railroad side ditch until they breach the ditch bank and spill onto the northern portion of the project site.

As described in the 2012 Cannery Flood Control Master Plan, under existing conditions, using the County's 100-year/10-day design event (worst case), an estimated 55± cubic feet per second (cfs) (94.9± acre-feet) spills from the railroad ditch across the project site. The railroad culvert spill then drains across the project site and combines with runoff from the project site. The combination of the railroad culvert spill and the onsite runoff generates a total runoff of approximately 70± cfs (122.2± acre-feet) that enters the neighboring property during the County's 100-year/10-day design event. The combined flows discharge onto the neighboring property near the northeast corner of the project site.

Flooding: Between the Railroad and Pole Line Road, flooding occurs along Channel A. This flooding occurs principally because its capacity is exceeded in even relatively small storms. Under existing conditions, stormwater overtops the channel banks at various locations on both the north and south sides of the channel and spills onto adjoining land. These overflows generally pond adjacent to the channel and run eastward towards Pole Line Road until the water in the channel recedes and the spills can re-enter the channel. Water that spills onto the north side of Channel A does not re-enter Channel A, but instead drains east and north towards the North Davis Drain and Willow Slough Bypass. In addition to the Channel A spills, water spills out of the Covell Drain just upstream of Channel A.

Dam Failure

The Monticello Dam located approximately 25 miles from Davis at Lake Berryessa has the potential to inundate the City of Davis if it were to fail. The failure of this dam is estimated by the California Emergency Management Agency to cause flooding up to three meters in Davis. Dam failure is generally a result of structural instability caused by improper design or construction, instability resulting from seismic shaking, or overtopping and erosion of the dam.

Larger dams that are higher than 25 feet or with storage capacities over 50 acre-feet of water, are regulated by the California Dam Safety Act, which is implemented by the California Department of Water Resources, Division of Safety of Dams (DSD). The DSD is responsible for inspecting and monitoring these dams. The Act also requires that dam owners submit to the California Office of Emergency Services inundation maps for dams that would cause significant loss of life or personal injury as a result of dam failure. The County Office of Emergency Services is responsible for developing and implementing a Dam Failure Plan that designates evacuation plans, the direction of floodwaters, and provides emergency information.

Stormwater Quality

Potential hazards to surface water quality include the following nonpoint pollution problems: high turbidity from sediment resulting from erosion of improperly graded construction projects, concentration of nitrates and dissolved solids from agriculture or surfacing septic tank failures, contaminated street and lawn run-off from urban areas, and warm water drainage discharges into cold water streams.

A critical period for surface water quality is following a rainstorm which produces significant amounts of drainage runoff into streams at low flow, resulting in poor dilution of contaminants in the low flowing stream. Such conditions are most frequent during the fall at the beginning of the rainy season when stream flows are near their lowest annual levels and contaminants have accumulated on impervious surfaces over the drier summer months. Besides greases, oils, pesticides, litter, and organic matter associated with such runoff, heavy metals such as copper, zinc, and cadmium can cause considerable harm to aquatic organisms when introduced to streams in low flow conditions.

Urban stormwater runoff was managed as a non-point discharge (a source not readily identifiable) under the Federal Water Pollution Control Amendments of 1972 (PL 92-500, Section 208) until the mid-1980s. However, since then, the Federal Environmental Protection Agency has continued to develop implementing rules which categorize urban runoff as a point source (an identifiable source) subject to National Pollution Discharge Elimination System (NPDES) permits. Rules now affect medium and large urban areas, and further rulemaking is expected as programs are developed to meet requirements of Federal water pollution control laws.

Surface water pollution is also caused by erosion. Excessive and improperly managed grading, vegetation removal, quarrying, logging, and agricultural practices can lead to increased erosion of exposed earth and sedimentation of watercourses during rainy periods. In slower moving water

bodies these same factors often cause a buildup of sediment, which ultimately reduces the capacity of the water system to percolate and recharge groundwater basins, as well as adversely affects both aquatic resources and flood control efforts.

303(d) Impaired Water Bodies: Section 303(d) of the federal Clean Water Act requires States to identify waters that do not meet water quality standards or objectives and thus, are considered "impaired." Once listed, Section 303(d) mandates prioritization and development of a Total Maximum Daily Load (TMDL). The TMDL is a tool that establishes the allowable loadings or other quantifiable parameters for a waterbody and thereby the basis for the States to establish water quality-based controls. The purpose of TMDLs is to ensure that beneficial uses are restored and that water quality objectives are achieved.

There are seventeen 303(d) impaired waterbodies in the Lower Putah Creek Hydrologic Area, including major rivers, creeks, and tributaries. Two of the impairments are located along the Cache Creek, two are located along Putah Creek, three are located along the Sacramento River, and ten are located along the Delta Waterways. These water bodies are impaired by a variety of contaminants including: mercury, chlorpyrifos, DDT, diasinon, total dissolved solids, exotic species, Group A pesticides, and unknown toxicities. These constituents originate from a variety of sources, but generally include agricultural activities, resource extraction, urban runoff/storm sewers, and unknown sources.

WATER RESOURCES

Davis Groundwater Supply

The City currently uses groundwater as its sole potable water supply source. The City pumps from the Sacramento Valley groundwater basin, Yolo subbasin, 5-21.67. The Yolo subbasin is not adjudicated and there are no legal restrictions to groundwater pumping. The Department of Water Resources' Bulletin 118 does not consider the basin to be in overdraft. In 2006, the City and UC Davis developed a groundwater management plan (GWMP) that focuses on the sustainability of the yield and water quality of the groundwater basin.

The City's deep aquifer zone exists throughout the Davis planning area, and is more predominant to the north and west. The deep aquifer zone slopes downward from the Plainfield Ridge, 3.5 miles west of the Davis planning area, with gradual flattening towards the east. These productive aquifers occur in the Tehama and younger formations, which are found at depths of 700 feet to 1500 feet below ground surface.

Aquifers in the Davis area are recharged by a number of sources. Deep percolation of rainfall and to a lesser extent irrigation water, are major components of groundwater recharge. Other significant sources include infiltration in streambeds, channels, and the Yolo Bypass. Relatively course-grained deposits line both Putah and Cache Creeks, allowing substantial infiltration.

Water moves very slowly between aquifers at different depths. In some places, water moves between aquifers through wells that have been screened at a number of different depths to enhance production. This causes the well columns to act as open pipes to equalize the water

pressure of aquifers at different depths. The deep aquifer has a much longer recharge period as compared to the intermediate depth aquifer, on the order of thousands of years versus hundreds of years, respectively. Both the City and UC Davis are increasingly reliant on the deep aquifer due to its superior quality of water.

The City has few physical constraints on its groundwater supply other than the pumping capacities of existing wells. The Plainfield Ridge creates a minor restriction to east-west groundwater flow just west of the City. There are no other major restrictions to horizontal groundwater flow in the area (DWR "Bulletin 118", 2004).

The City has been studying the deep aquifer and groundwater pumping capacity for many years. In 2004, the City prepared a *Davis Deep Aquifer Assessment Technical Memorandum* (Brown and Caldwell and Winzler & Kelley, December 2004) in support of the City's EIR for its Well Capacity Replacement Project. Because of concerns expressed over possible interference with University of California, Davis deep aquifer groundwater well capacity, the *Final Well Capacity Replacement EIR* (July 2005) limited the City's deep aquifer groundwater capacity to an additional 4,500 gpm. With the construction of Well DDW-33 on the Cannery Site, and DDW-34 on the City's property (currently used as the Corporation Yard), the City will have constructed the deep well capacity documented in the *Final Well Capacity Replacement EIR*. Replacement of existing wells, such as the failing deep well DDW-29, can be completed, but construction of additional deep well capacity would require an update to the *Final Well Capacity Replacement EIR.*

Groundwater Quality

Water quality affects the City's water management strategies through efforts to comply with Federal and State drinking water regulations. These regulations require rigorous water quality testing, source assessments, and treatment in some cases. Drinking water quality also impacts wastewater quality and affects the City's National Pollutant Discharge Elimination System (NPDES) permit requirements regulating discharges to the environment. The challenges related to groundwater quality is one of the reasons the City is pursuing a surface water supply.

The quality of the existing groundwater supply sources and planned surface water supply sources over the next 25 years in the City of Davis is expected to be adequate. However, future water quality regulations (e.g. related to chromium) could result in the need to treat Davis' groundwater. Groundwater found in the intermediate depth wells has high total dissolved solids and hardness, which causes scaling in plumbing systems and taste and odor issues. Over one-half of the residential homes in Davis use water softeners to lower hardness levels. In recent years a number of City intermediate-depth wells have been removed from service due to water quality problems, including high concentrations of nitrates, iron, manganese, and selenium. The City has constructed wells in the deep aquifer to obtain water with higher overall quality versus the current quality of water from the intermediate depth aquifer. Groundwater will continue to be disinfected, and treated as necessary to meet drinking water standards.

As deep well pumping continues, some lower quality intermediate depth aquifer water will flow into the deep aquifer. As indicated above, the vertical hydraulic connection between the

intermediate and deep aquifers does not allow as much flow as horizontal connection. However, some flow would be expected. The rate at which the deep aquifer water quality would degrade is not known at this time.

Surface Water

The City currently utilizes no surface water, relying solely on local groundwater resources for its entire community water supply. The City is planning on purchasing wholesale surface water from the Woodland Davis Clean Water Agency (WDCWA) and estimates availability of the water by 2016, after which some of the City's intermediate aquifer wells would be kept for emergency supply; deep aquifer wells would remain online to help supply maximum day and peak hour demands.

Water Distribution System

The City's water distribution system operates as a single pressure zone with one elevated tank and two ground level storage tanks with booster pump stations. The hydraulic grade in the system is based on the level in the elevated tank. The wells are controlled by a Supervisory Control and Data Acquisition (SCADA) system based on the level in the elevated tank.

PIPELINES

The City's water system consists of piping ranging from 6 to 14-inches (in). Almost 90 percent of the distribution system consists of 6 to 10-in diameter pipelines. The City's pipeline system was constructed to support localized supply, with wells spread throughout the City. This type of localized supply does not require large diameter transmission mains.

STORAGE FACILITIES/BOOSTER PUMP STATIONS

There are three storage tanks in the City's water system: the Elevated Tank, West Area Tank (WAT) and the East Area Tank (EAT). The three tanks have a combined storage capacity of 8.5 million gallons (MG). The WAT has a booster pumping capacity of 4,200 gpm and the EAT has a total pumping capacity of 8,000 gpm. The WAT and EAT fill during off-peak demand periods and then the booster station pumps stored water back into the system during peak periods based on time and system pressure.

INTERTIES

The only other water system to which the City is connected is the UC Davis water system via two interties of which UC Davis retains ownership. UC Davis entered into a water supply agreement with the City on July 9, 2010, and it is in effect through June 30, 2016. The water supply agreement allows the City to receive water supply up to 300,000 cubic feet per year with a flow rate not to exceed 1,500 gpm from UC Davis.

Water Use

Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial, and public authority customers, as well as unaccounted-for

water. For the period 1995 to 2010 annual treated groundwater production for the City's water system varied from just under 11,955 acre-feet/year (2010) to over 15,112 acre-feet/year (2002). The City has seen a decrease is the annual water use over the past several years but expects total water use to increase to 13,749 acre-feet/year by 2020 and to 15,917 acre-feet/year in 2035.

3.9.2 REGULATORY SETTING

There are a number of regulatory agencies whose responsibility includes the oversight of the water resources of the state and nation including the Federal Emergency Management Agency, the US Environmental Protection Agency, the State Water Resources Control Board, and the Regional Water Quality Control Board. The following is an overview of the federal, state and local regulations that may be applicable to projects within the City of Davis.

FEDERAL AND STATE

Clean Water Act (CWA)

The Clean Water Act (CWA), initially passed in 1972, regulates the discharge of pollutants into watersheds throughout the nation. Section 402(p) of the act establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES Program. Section 402(p) requires that stormwater associated with industrial activity that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit.

The State Water Resources Control Board (SWRCB) is responsible for implementing the Clean Water Act and does so through issuing NPDES permits to cities and counties through regional water quality control boards. Federal regulations allow two permitting options for stormwater discharges (individual permits and general permits). The SWRCB elected to adopt a statewide general permit (Water Quality Order No. 2003-0005-DWQ) for small MS4s covered under the CWA to efficiently regulate numerous stormwater discharges under a single permit. Permitees must meet the requirements in Provision D of the General Permit, which require the development and implementation of a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable. The SWMP must include the following six minimum control measures:

1) Public Education and Outreach on Stormwater Impacts

2) Public Involvement/Participation

3) Illicit Discharge Detection and Elimination

4) Construction Site Stormwater Runoff Control

5) Post-Construction Stormwater Management in New Development

6) Redevelopment and Pollution Prevention/Good Housekeeping for Municipal Operations

303(d) Impaired Water Bodies: Section 303(d) of the federal Clean Water Act requires States to identify waters that do not meet water quality standards or objectives and thus, are considered "impaired." Once listed, Section 303(d) mandates prioritization and development of a Total Maximum Daily Load (TMDL). The TMDL is a tool that establishes the allowable loadings or other quantifiable parameters for a waterbody and thereby the basis for the States to establish water quality-based controls. The purpose of TMDLs is to ensure that beneficial uses are restored and that water quality objectives are achieved.

Federal Emergency Management Agency (FEMA)

As noted above, Davis is a participant in the National Flood Insurance Program (NFIP), a Federal program administered by FEMA. Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year. Communities are occasionally audited by the Department of Water Resources to insure the proper implementation of FEMA floodplain management regulations.

California Water Code

The Federal Clean Water Act places the primary responsibility for the control of surface water pollution and for planning the development and use of water resources with the states, although this does establish certain guidelines for the States to follow in developing their programs and allows the Environmental Protection Agency to withdraw control from states with inadequate implementation mechanisms.

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Division 7 of the California Water Code) (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and each of the RWQCBs power to protect water quality, and is the primary vehicle for implementation of California's responsibilities under the Federal Clean Water Act. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a water quality control plan (Basin Plan) for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its State water policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

National Pollutant Discharge Elimination System (NPDES)

National Pollutant Discharge Elimination System (NPDES) permits are required for discharges of pollutants to navigable waters of the United States, which includes any discharge to surface waters, including lakes, rivers, streams, bays, the ocean, dry stream beds, wetlands, and storm sewers that are tributary to any surface water body. NPDES permits are issued under the Federal Clean Water Act, Title IV, Permits and Licenses, Section 402 (33 USC 466 et seq.)

The RWQCB issues these permits in lieu of direct issuance by the Environmental Protection Agency, subject to review and approval by the Environmental Protection Agency Regional Administrator. The terms of these NPDES permits implement pertinent provisions of the Federal Clean Water Act and the Act's implementing regulations, including pre-treatment, sludge management, effluent limitations for specific industries, and anti- degradation. In general, the discharge of pollutants is to be eliminated or reduced as much as practicable so as to achieve the Clean Water Act's goal of "fishable and swimmable" navigable (surface) waters. Technically, all NPDES permits issued by the RWQCB are also Waste Discharge Requirements issued under the authority of the California Water Code.

These NPDES permits regulate discharges from publicly owned treatment works, industrial discharges, stormwater runoff, dewatering operations, and groundwater cleanup discharges. NPDES permits are issued for periods of five years or less, and are therefore to be updated regularly. The rapid and dramatic population and urban growth in the Central Valley Region has caused a significant increase in NPDES permit applications for new waste discharges. To expedite the permit issuance process, the RWQCB has adopted several general NPDES permits, each of which regulates numerous discharges of similar types of wastes. Stormwater discharges from industrial and construction activities in the Central Valley Region can be covered under these general permits, which are administered jointly by the SWRCB and RWQCB.

Water Quality Control Plan for the Central Valley Region

The Water Quality Control Plan for the Central Valley Region (Basin Plan) includes a summary of beneficial water uses, water quality objectives needed to protect the identified beneficial uses, and implementation measures. The Basin Plan establishes water quality standards for all the ground and surface waters of the region. The term "water quality standards," as used in the Federal Clean Water Act, includes both the beneficial uses of specific water bodies and the levels of quality that must be met and maintained to protect those uses. The Basin Plan includes an implementation plan describing the actions by the RWQCB and others that are necessary to achieve and maintain the water quality standards.

The RWQCB regulates waste discharges to minimize and control their effects on the quality of the region's ground and surface water. Permits are issued under a number of programs and authorities. The terms and conditions of these discharge permits are enforced through a variety of technical, administrative, and legal means. Water quality problems in the region are listed in the Basin Plan, along with the causes, where known. For water bodies with quality below the levels necessary to allow all the beneficial uses of the water to be met, plans for improving water quality

are included. The Basin Plan reflects, incorporates, and implements applicable portions of a number of national and statewide water quality plans and policies, including the California Water Code and the Clean Water Act.

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 aspects of the proposed project:

MUNICIPAL WATER SUPPLY

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

Policy WATER 2.1. Provide for the current and long-range water needs of the Davis Planning Area, and for protection of the quality and quantity of groundwater resources.

Policy WATER 2.2. Manage groundwater resources so as to preserve both quantity and quality.

Policy WATER 2.3. Maintain surface water quality.

FLOOD HAZARDS AND PROTECTION

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

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

Standard. No development may occur in flood-prone areas, including all areas below an elevation of 25 feet, unless mitigation of flood risk is assured. Any mitigation proposed by the project proponent to mitigate flood risks shall demonstrate that the mitigation/design does not adversely impact other properties.

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

STORMWATER DRAINAGE

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 Citywide, 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.

REGIONAL COORDINATION

Goal WATER 4. Monitor issues in the region that affect quality and quantity of water in the Davis Planning Area.

Policy WATER 4.1. Research, monitor, and participate in issues in Yolo County and the area of origin of the City's groundwater that affect the quality and quantity of water.

3.9.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed project will have a significant impact on the environment associated with hydrology and water quality if it will:

- 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, siltation, run-off or flooding on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of or the substantial increase in 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;
- 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; or
- Result in inundation by seiche, tsunami or mudflow.

IMPACTS AND MITIGATION

Impact 3.9-1: The project may violate water quality standards or waste discharge requirements during construction (Less than Significant with Mitigation)

Construction-Related Water Quality Impacts: Grading, excavation, removal of vegetative cover, and loading activities associated with construction activities could temporarily increase runoff, erosion, and sedimentation. Construction activities also could result in soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at construction sites and staging areas.

As required by the Clean Water Act, each phase of construction will require an approved Stormwater Pollution Prevention Plan (SWPPP) that includes best management practices for grading, and preservation of topsoil. The project proponent or contractor is required to submit the SWPPP with a Notice of Intent to the Regional Water Quality Control Board (RWQCB) to obtain coverage under the State Construction General Permit. The State Water Resources Control Board (SWRCB) is an agency responsible for reviewing the SWPPP with the Notice of Intent, prior to issuance coverage under the State Construction General Permit for the discharge of stormwater during construction activities. Implementation of the following mitigation measures would ensure consistency with the regulatory requirements and ensure that the proposed project would have a **less than significant** impact on construction related water quality.

MITIGATION MEASURES

Mitigation Measure 3.9-1: *Prior to the commencement of grading activities, the project proponent shall submit, and obtain approval of, an NOI and SWPPP to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall utilize BMPs and technology to reduce erosion and sediments to meet water quality standards. Such BMPs may include: temporary erosion control measures such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation. The SWPPP shall be kept on site and implemented during construction activities and shall be made available upon request to representatives of the City of Davis and/or RWQCB.*

Mitigation Measure 3.9-2: *Prior to the commencement of grading activities, the project proponent shall submit, and obtain approval of, a Spill Prevention Countermeasure and Control Plan (SPCC) to the Yolo County Health Department. The SPCC shall specify measures and procedures to minimize the potential for, and effects from, spills of hazardous, toxic, or petroleum substances during all construction activities, and shall meet the requirements specified in the Code of Federal Regulations, title 40, part 112.*

Impact 3.9-2: The project may violate water quality standards or waste discharge requirements during operation (Less than Significant)

Operational Impacts: The long-term operations of the proposed project could result in impacts to surface water quality from urban stormwater runoff. The proposed project would result in new impervious areas associated with streets, driveways, parking lots, buildings, and landscape areas. Normal activities in these developed areas include the use of various automotive petroleum products (i.e. oil, grease, fuel), household hazardous materials, heavy metals, pesticides, herbicides, and fertilizers. Within urban areas, these pollutants are generally called nonpoint source pollutants. The pollutant levels vary based on factors such as time between storm events, volume of storm event, type of land uses, and density of people.

The proposed project will be required to comply with the best management practices (BMPs) and criteria established in the City of Davis Manual of Stormwater Quality Control Standards for New Development and Redevelopment (June 2008). The proposed project incorporates this requirement by including BMP features that treat runoff close to the source.

For example, along the project's north edge, a 150-foot agricultural buffer is planned. The buffer will include a stormwater detention basin area with water quality functions, habitat area and a greenbelt. The detention basin is designed to receive flows from within the project and, in storm events, detain and treat stormwater flows. The basin will be heavily naturalized with vegetation and gentle side slopes.

The use of these stormwater quality features in the design of the proposed project will minimize nonpoint source pollution in stormwater. The most significant BMP feature in the proposed project is the detention basin proposed on the north side of the project site. However, a systems approach to stormwater treatment is planned. The systems approach will incorporate site design measures, source control measures, and treatment control measures. Below is a list of these measures:

Site Design Measures

- Protect slopes and channels
- Minimize impervious areas
- Reduce effective imperviousness
- LID grass swale/channel
- LID stormwater planter
- LID vegetated swale
- Disconnected down spouts
- Separated sidewalks
- Drought tolerant planting

Source Control Measures

- Storm drain stenciling and signage
- Outdoor material storage areas

- Outdoor trash storage area design
- Loading/unloading area design
- Vehicle and equipment wash area

Treatment Control Measures

- Bio-swales
- Grass swales
- Wet pond
- Stormwater/Planter

As described above, there are extensive BMPs incorporated into the design of the proposed project. These BMPs are specifically designed and incorporated to minimize the long-term urban runoff impacts. These BMPs are proposed by the applicant, and are embodied in the project description and design. Each phase of development will be required to comply with the BMPs and criteria established in the City of Davis Manual of Stormwater Quality Control Standards for New Development and Redevelopment. Through the preparation of improvement and grading plans these measures will be refined so that they will functionally minimize stormwater quality impacts. Consistency with the City of Davis Manual of Stormwater Quality Control Standards for New Development and Redevelopment and implementation of the BMPs included in the proposed project plans will ensure that the proposed project would have a **less than significant** impact on long-term stormwater quality.

MITIGATION MEASURES

None Required.

Impact 3.9-3: Project implementation could interfere substantially with groundwater recharge (Less than Significant)

(*Note: The following discussion is associated with potential impacts of the proposed project on groundwater as it relates to stormwater infiltration and groundwater recharge. Depletion of groundwater supplies as it relates to water usage is addressed in Section 3.15- Utilities.*)

The proposed project would result in new impervious surfaces and could reduce rainwater infiltration and groundwater recharge. Infiltration rates vary depending on the overlying soil types. In general, sandy soils have higher infiltration rates and can contribute to significant amounts of ground water recharge; clay soils tend to have lower percolation potentials; and impervious surfaces such as pavement significantly reduce infiltration capacity and increase surface water runoff.

According to the *Soil Survey of Yolo County, California* (USDA 1972), the soils on the project site include: Yolo silt loam (Ya) (permeability is moderate), Yolo silty clay loam (Yb) (permeability is moderately slow), Rincon silty clay loam (Rg) (permeability is slow), Pescadero silty clay, saline alkali (Pb) (permeability is slow), and Sycamore silty clay loam (St) (permeability is moderately slow). The infiltration rates of these soils are generally low provided the high amounts of clay and silt.

The new impervious surfaces, such as pavement, concrete, and structures that would be built on the project site would reduce infiltration capacity. However, the project site is not considered a significant groundwater recharge area for the region and the high silt and clay within the soils limit the infiltration ability of the project site. Implementation of the proposed project would have a **less than significant** impact to groundwater recharge.

Impact 3.9-4: Project implementation could alter the existing drainage pattern in a manner which would result in substantial erosion, siltation, flooding, or polluted runoff (Less than Significant with Mitigation)

An analysis of drainage and flood control was prepared for the project in the 2012 Flood Control Master Plan (FCMP) for the Cannery (MacKay and Somps), which is included as Appendix L1. The FCMP was prepared based on the Illustrative Land Use Plan contained in the Notice of Preparation for the project. The Illustrative Land Use Plan included several major flood control features that mitigated adverse flooding impacts associated with development of the project. Following preparation of the 2012 FCMP, the Tentative Map for the proposed project was prepared, resulting in revisions to the proposed onsite development plan and layout, including changes to the proposed onsite stormwater detention facilities. These proposed changes to the onsite stormwater detention facilities are addressed in the *Technical Memorandum: Tentative Map Consistency Analysis Flood Control Master Plan Performance Standards* (MacKay and Somps, January 2013), which is included as Appendix L2.

The FCMP evaluated regional flood flows to assess the potential flood impacts of the Project to adjacent lands. An on-site detention basin system is proposed to eliminate potential off-site impacts. The FCMP did not define or evaluate the future on-site storm drain system, other than the detention basin system. The technical memorandum titled *Tentative Map Consistency Analysis Flood Control Master Plan Performance Standards* provided a comparison between the drainage plan proposed in the FCMP and the drainage plan shown on the tentative map.

The FCMP analyzed several design storms and developed an intricate flood control scheme to mitigate the project's impacts. The major drainage features contained in the Illustrative Land Use Plan include a two-cell detention basin, an overflow weir to the east, an overflow berm (internally divides the forebay cell from the detention cell of the detention basin), a drainage pump station, and an interceptor ditch to capture and route drainage flows that spill out of the F Street channel onto the project site through an existing box culvert under the adjacent railroad along the west side of the project site. The operation of the detention basin and associated pump station is tightly controlled by a telemetry system that monitors the levels of detention within the basin, the operation of the existing H Street Pump Station, and the water levels within the F Street Drainage Channel.

Existing Drainage: Existing drainage near the northeast corner of the project site flows off of the project site onto the neighboring property to the east. A small portion of these flows are the result of onsite rainfall runoff from the north half of the project site. The majority of these flows are a result of overflows from the F Street Channel, which currently drains across the project site and

then onto the neighboring property. Improvements are proposed to route the flows from both onsite and offsite sources through an on-site detention basin located at the north end of the project site. The south half of the project site currently drains to the F Street Channel through pipes under the railroad tracks. These pipes are proposed to be abandoned and runoff from the south half of the project site will be re-directed to the on-site detention basin.

Proposed Improvements: The proposed project would create new impervious surfaces, which would result in an incremental reduction in the amount of natural soil surfaces available for infiltration of rainfall and runoff. As such, additional runoff during storm events would be generated. In order to avoid adverse downstream drainage impacts and to protect proposed onsite development from flooding, the proposed Tentative Map includes a series of key features and flood control improvements. These key features are described below and depicted in Figure 3.9-6.

The key features of the proposed flood control improvements shown on the Tentative Map are described as follows:

a. Two celled detention basin (separate forebay and detention cells)

b. 3:1 and 4:1 side slopes adjacent to the urban/subdivision and 3:1 side slopes adjacent to open space/agricultural areas

c. Open Channel with bio-swale along western perimeter of site from existing 8'x3' box culvert under railroad tracks (to capture, convey and deliver the F Street Channel flows that spill through the existing 8'x3' box culvert under railroad to the proposed detention basin)

d. Proposed 8'x3' box culvert under proposed Emergency Vehicle Access (EVA) to F Street

e. Overflow Weir (External) shown as 200' in length (Elevation 37.5 feet (NGVD 29 Datum) along easterly boundary of site at historical location of discharge onto neighboring agricultural lands lying easterly of the project site

f. Overflow Berm (Internal) with unidentified size pipe and weir elevation of 38.0 feet (NGVD 29 Datum)

g. Minimum Detention Basin Bottom Elevation of 25.5 feet (NGVD 29 Datum)

h. High water elevation of 38.6 feet (NGVD 29Datum) and top of basin rim elevation of 39.6 feet (NGVD 29 Datum)

Based on the results of the FCMP, the performance standards shown in Table 3.9-2 were developed for the proposed on-site flood control improvements.

TABLE 3.9-2: FLOOD CONTROL PERFORMANCE STANDARDS

Minimum Basin Capacity (Combined Volume of Forebay & Detention Basin Cells)	41.8± Acre-Feet During County 100-Year/10-Day Event at Maximum WSE's specified below
Detention Basin Slopes Urban/Subdivision Side Agricultural/Open Space Side	 4:1 Maximum 3:1 Maximum
Maximum Water Surface Elevation Detention Basin Forebay	 38.34' (NGVD 29 Datum) 37.69' (NGVD 29 Datum)
Maximum Pumped Discharge (Pump Station located in northwest corner of detention basin site)	31 cfs to F Street Channel
Minimum Pad Elevation	39.34' (NGVD 29 Datum)
Overflow Weir (External) Crest Length Crest Elevation Maximum Discharge	 200' 37.5' (NGVD 29 Datum) 101 cfs (200-Year County Method)
Overflow Berm (Internal) Crest Length Crest Elevation Storm Drain Pipe	 25' 37.7' (NGVD 29 Datum) 18" Dia x 40 lf at 0.025 ft/ft (Invert In 29.0'/Invert Out 28.0') (NGVD 29 Datum)
Minimum Basin Floor Elevation	28.0' (NGVD 29 Datum)
Flow Into west side Bio-Swale Site From Railroad 8'x3' Box Culvert (drains to detention basin)	56 cfs from F Street Channel
Pump Station Operations Telemetry Control System	Two Gaging Stations in F Street Channel and associated telemetry inter-ties between the proposed Pump Station and (a) the two gaging stations and (b) the H Street Pump Station
Pump Station Operation	The FCMP sets forth very specific criteria relating to pumping rates and on/off cycles to assure that downstream impacts are mitigated

Description of Detention Basin Operations: The FCMP analyzed the operation of the detention basins quite extensively in terms of the fill/drain cycle during various design events (see Attachment 4 to Appendix H of the FCMP). During each storm, flows will enter the detention basin and the pump station will automatically operate according to the referenced operation criteria.

During the peak periods of the various storms, depending on the cycling of the H Street Pump Station and the resultant water surface elevations in the F Street Channel, the proposed pump station will cycle off to maintain downstream water surface elevations below existing levels. During these periods, the detention basin will continue to fill until downstream flows subside and the proposed pump station cycle returns to operation.

A review of the results of this analysis provides an estimate of duration of detention during the various design events. Table 3.9-3 includes a summary of the durations of detention for various representative design events.

These estimates of the duration of detention indicate the detention basin will empty relatively quickly after cessation of each design event, and will remain empty during most of the year.

TABLE 3.9-3: ESTIMATED DURATION OF DETENTION

DESIGN EVENT	ESTIMATED TIME
City 2-Year/24-Hour Event	1.0± Days
City 10-Year/24-Hour Event	1.0± Days
City 100-Year/24-Hour Event	1.5± Days
County 100-Year/10 Day Event	5.0± Days
County 200-Year/10 Day Event	7.0± Days

The three existing 36" pipes that drain the south half of the project site are proposed to be abandoned. Runoff from the south half of the project site will be collected in pipe systems and conveyed to the proposed drainage swale along the northwestern perimeter of the site, and into the proposed detention basin, which will be located at the north end of the project site. The proposed drainage swale, located along the west boundary of the property, will also collect and convey the railroad ditch spill to the detention basin. In larger storms, this swale will also provide detention capacity.

The detention basin will operate as two sub-basins (the forebay and the main detention basin) that will merge into one operating basin as the depth of storage increases and the overflow berm is overtopped.

The forebay is designed to handle flows that historically flowed off the project site onto the neighboring property to the east. The weir heights and low flow pipes will facilitate the delivery of historical peak flows to the neighboring property while also lowering the intensity of flows from the project site in the detention basin and forebay. A spillway weir at the top of the forebay is proposed near the northeastern corner of the project site where runoff has historically flowed from the project site onto the neighboring property. When water in the forebay exceeds the weir crest elevation, it will follow the historic pattern of draining onto the neighboring property. This spillway will be equipped with a concrete energy dissipating and flow spreading structure to distribute the discharge from the forebay in a laminar (sheet flow) fashion to mimic the historical

manner in which flows discharged from the project site onto the neighboring property. During peak flow events this flow spreading structure will be submerged by the backwater from Channel A, which will act to decrease turbulence and erosive forces in the water leaving the basin.

As the detention basin fills, a proposed pump station (located near the northwest corner of the basin) will discharge flows to the F Street Channel at a rate that won't exceed historical 2-year/24-hour City Method levels. The maximum pumping rate of the proposed pump station under this operating scenario is 31 cfs (MacKay & Somps, 2012) while the existing peak 2-year/24-hour flow rate is also 31 cfs.

Operation of the proposed pump station will be controlled by operation of the H Street Pump Station. When the H Street Pump Station is operating, its discharge pushes a large volume of water down the F Street Channel. During these periods the proposed pump station will be locked out so that the total flow in Channel A does not exceed historical levels. (The proposed pump station and the H Street pump station will not discharge to the F Street Channel simultaneously during peak flow periods.)

Eventually, as the flows fill the detention basin, the water surface of the larger detention basin will breach over the internal berm that separates the forebay from the larger detention basin and fill the forebay and the detention basin to its maximum level. The maximum discharge from the forebay to the neighboring property is 43± cfs during the County's 100-year/10-day design event (compared to an existing rate of 70± cfs during the same design event).

Conclusion: The proposed project will result in new impervious surfaces, increased runoff, and an alteration of the existing drainage pattern. To assess and manage these potential storm drainage issues, a Flood Control Master Plan was prepared. The Flood Control Master Plan addresses the existing drainage patterns on and off site, models storm events, and provides a design for a storm drainage system that could accommodate a wide range of storm events under various design standards. The Flood Control Master Plan is not intended to provide a final design of the detention basin but is intended to verify that the proposed concept can achieve the required goals.

The Flood Control Master Plan shows that the proposed drainage improvements can be sized to ensure that downstream properties are not significantly affected, and in many instances the modeling shows that drainage conditions for downstream neighbors are slightly improved. The proposed drainage improvements are considered conceptual until the exact configuration and engineering design is developed through the preparation of improvement plans.

The drainage plans presented in technical memorandum titled *Tentative Map Consistency Analysis Flood Control Master Plan Performance Standards* (Appendix L2) and the FCMP (Appendix L1) are similar, however while the technical memorandum finds that the differences between the two insignificant, there are potentially significant differences that must be addressed when the final land use map is accepted by the City, as discussed below:

- Both plans include storm drain collection systems that flow from the south to the north and into a detention basin, a grassy swale, or a forebay.

- The detention basin and forebay have different sizes in the two plans, but the total combined storage volumes are similar between both plans.

- The differences in the proposed storm drain systems probably result in different tributary areas flowing to the detention basin and the forebay. This change could significantly change the performance of the flow over the overflow weir and onto the adjacent property to the east.

- For the tentative map drainage system to match the performance of the FCMP drainage system, the size and elevation of the overflow weir and the overflow berm (between the forebay and the detention basin) may need to be revised based on an analysis that uses the final tentative map land uses and drainage systems. It should be possible to develop configurations for the weirs that result in the tentative map drainage plan achieving similar performance as the current FCMP drainage plan.

Consequently, the changes from the FCMP drainage system to the tentative map drainage system represent a **potentially significant** impact. The implementation of Mitigation Measure 3.9-3 would ensure that the FCMP is revised to be consistent with the adopted Tentative Map; the revised drainage system meets or exceeds the performance standards identified in Table 3.9-2; that the weirs are designed to limit post development peak discharges and volumes to the property to the east to no more than the rates and volumes under existing conditions; and the revised drainage system plans meet or exceed the City's and the County's planning and design criteria. The implementation of Mitigation Measure 3.9-3 would reduce this impact to a **less than significant** level.

MITIGATION MEASURES

Mitigation Measure 3.9-3: *Prior to approval of the Final Map for the project, and prior to the commencement of any grading operations, the project proponent shall prepare an update to the Flood Control Master Plan. The revised FCMP must be reviewed and approved by the City of Davis Department of Public Works prior to the commencement of grading activities. The updated FCMP shall address the following:*

- *The final land uses and areas of impervious surface in the Tentative Map shall be included in the FCMP and the drainage calculations in the FCMP shall address the drainage and runoff rates of the final conditions in the approved Tentative Map.*

- *The FCMP shall include a figure showing the final locations and sizes of the storm drainage facilities throughout the project site, and shall include water surface elevations for the City of Davis 10-year and 100-year storms.*

- *The FCMP shall include a table showing the Rational Method Calculations for determining the storm drain pipe sizes.*

- *All building pads shall be set at least 1.0 foot above the 100-year water elevation.*

- *The FCMP and the project's drainage system shall meet or exceed the performance drainage standards shown in Table 3.9-2, and the weirs shall be designed to limit post development peak discharges and volumes to the property to the east to no more than the rates and volumes under existing conditions for design storms up to the 200-year event.*
- *The revised drainage system shall meet or exceed the City's and the County's drainage planning and design criteria.*

Impact 3.9-5: The proposed project could otherwise substantially degrade water quality (Less than Significant)

Water Quality Impacts from Discharges to 303(d) Listed Water Bodies: Section 303(d) of the federal Clean Water Act requires States to identify waters that do not meet water quality standards or objectives and thus, are considered "impaired." Once listed, Section 303(d) mandates prioritization and development of a Total Maximum Daily Load (TMDL). The TMDL is a tool that establishes the allowable loadings or other quantifiable parameters for a waterbody and thereby the basis for the States to establish water quality-based controls. The purpose of TMDLs is to ensure that beneficial uses are restored and that water quality objectives are achieved.

Previously listed mitigation measures (3.9-1 and 3.9-2) require the project proponent to submit a Notice of Intent and SWPPP to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP will utilize BMPs and technology to reduce erosion and sediments to meet water quality standards during construction.

Additionally, the project design includes the use of stormwater quality features that will minimize nonpoint source pollution and long-term urban runoff impacts. For instance, along the project's north edge, a 150-foot agricultural buffer is planned. The buffer will include a stormwater detention basin area with water quality functions, and a greenbelt. The detention basin is designed to receive flows from the project and, in storm events, detain and treat stormwater flows. The basin will be heavily naturalized with vegetation and gentle side slopes. It is not anticipated that there will be standing water in the basin other than for the period immediately following a storm.

These stormwater quality features are intended to treat runoff close to the source. Through the preparation of improvement and grading plans these measures will be refined so that they will functionally minimize stormwater quality impacts, which would reduce the impacts on downstream 303(d) impaired water bodies. Implementation of previously listed mitigation measure and the BMPs outlined in the project description will ensure that the proposed project would have a **less than significant** impact on these issues.

Impact 3.9-6: The project may place housing or structures that would impede/redirect flows 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 (Less than Significant with Mitigation)

As shown on Figure 3.9-4, a 7.5+/- acre area, located towards the northeast corner of the project site, is currently identified by FEMA to be in a SFHA (Zone A, in this case). Zone A indicates a 100-year flood plain where base flood elevations have not been determined. The FEMA FIRM map for this area is based on preliminary analysis and large contour interval USGS topography. Formal drainage studies using more accurate topographic data and current modeling techniques must be submitted to FEMA to more accurately establish the limits of the 100-year flood plain. When such studies are submitted and approved, FEMA will concur in the determination of a base flood elevation for this project, and perhaps adjacent lands.

A Flood Control Master Plan was prepared for the proposed project to more accurately establish the 100-year flood plain (Appendix L1). A HEC-RAS analysis was used to estimate the base flood elevation for the portion of project site that is contained within the existing 100-year flood plain at a proposed water surface elevation of 38.13' using the NGVD29 basis of elevation (datum).

The volume of water contained within the 100-year flood plain area was estimated using digital terrain modeling techniques and comparing this water surface elevation and the existing ground elevation obtained from design level topographic mapping of the project site. Based on this comparison, the volume of the flood plain covering a portion of the project site is estimated to be 15.5± acre-feet assuming the south levee of Channel A fails (4.5±acre-feet without levee failure). This is larger than the mapped FEMA 100-year floodplain.

The proposed project would include development in areas that are currently mapped and designated Zone A by FEMA. Additionally, the proposed project includes development in areas that are currently within the calculated 100-year floodplain according to modeling. As such, a storm drainage system was designed for the proposed project to accommodate stormwater runoff and to eliminate the FEMA 100-year floodplain from areas proposed for development. The storm drainage system includes a detention facility that is sized to accommodate peak flows and floodwaters. The drainage system will convey storm flows in underground drainage pipes for the design storm and overland through streets during the 100-year storm event.

Additionally, areas developed within the calculated 100-year floodplain would require fill to bring the site elevations above the modeled flood elevation. Prior to any development in areas currently mapped as Zone A, a Conditional Letter of Map Revision (CLOMR) from FEMA would be required. With the implementation of the following mitigation measures the proposed project would have a **less than significant** impact on these environmental issues.

MITIGATION MEASURES

Mitigation Measure 3.9-4: *Prior to commencement of grading operations, the project proponent shall prepare and submit an application for Conditional Letter of Map Revision (CLOMR) to FEMA for approval. The CLOMR shall include revised local base flood elevations based on current modeling of the project site. No building permit shall be issued in the area impacted by the CLOMR until a CLOMR has been approved by FEMA.*

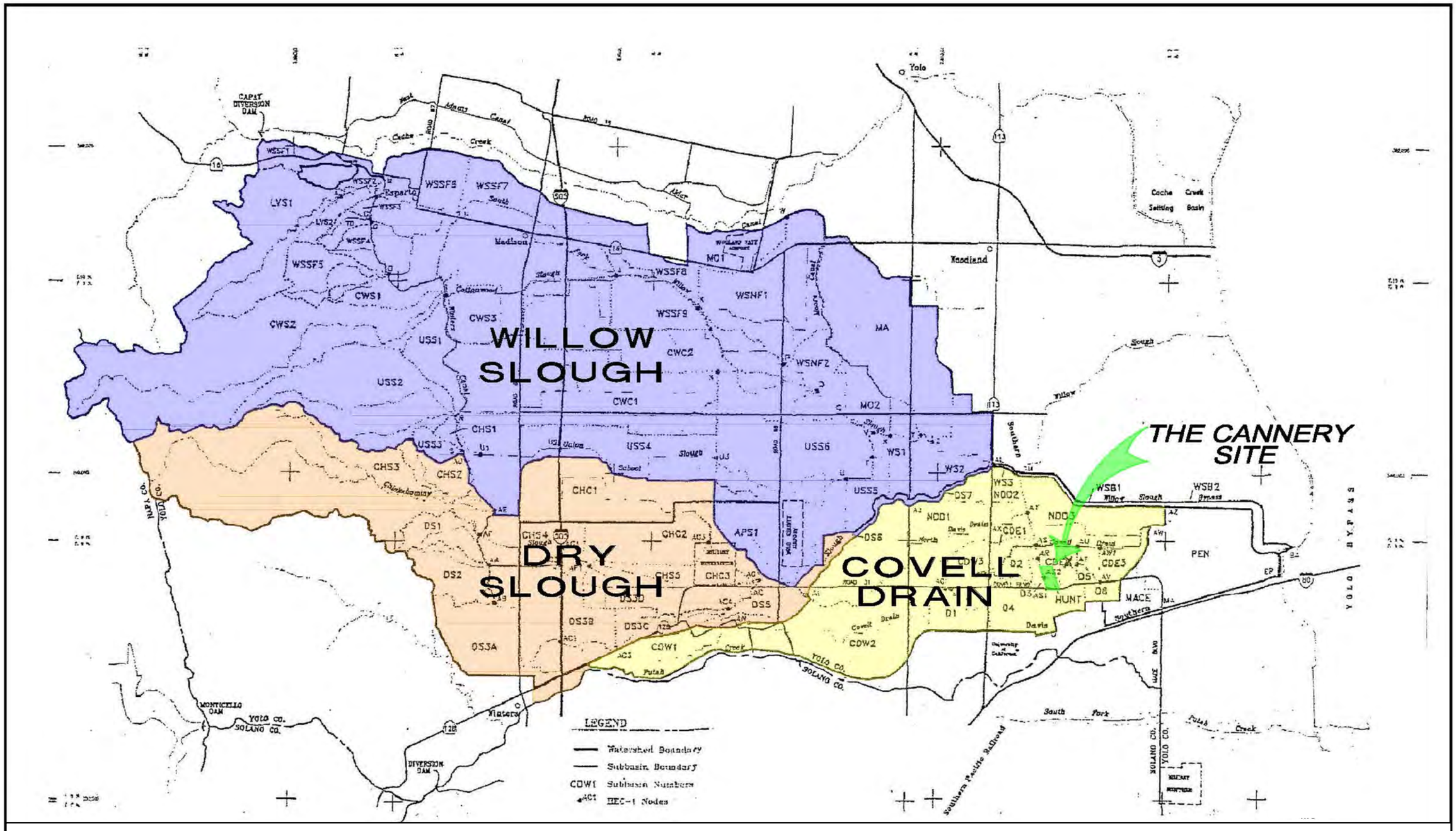
Mitigation Measure 3.9-5: *The building pads for all onsite structures shall be set a minimum of 1.0 foot above the maximum 100-year water surface elevations on the project site, as shown on the Conditional Letter of Map Revision (CLOMR) approved by FEMA. No building permit shall be issued until a CLOMR has been approved by FEMA, and it has been demonstrated that no building pads would be placed below 1.0 feet above the calculated local base flood elevations.*

Impact 3.9-7: The project may expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, seiche, tsunami, or mudflow (Less than Significant)

The project site is not located in an area that is at risk of flooding from a levee failure, seiche, tsunami, or mudflow, beyond the potential for localized flooding at the site, as described above.

A seiche is a standing wave in an enclosed or partially enclosed body of water. Seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbors and seas. The key requirement for formation of a seiche is that the body of water be at least partially bounded, allowing the formation of the standing wave. A tsunami is a series of water waves caused by the displacement of a large volume of a body of water, typically an ocean or a large lake. Earthquakes, volcanic eruptions, landslides, and other disturbances above or below water all have the potential to generate a tsunami. There are no large bodies of standing water in the vicinity of the project site. As such, there is no potential for the project to be exposed to seiches or tsunamis. Additionally, the project site and surrounding areas are relatively flat, which essentially eliminates the potential for mudflows on the project site.

However, the City of Davis, including the project site, is located such that a catastrophic failure of Monticello Dam at Lake Berryessa could cause flooding of up to three meters. Due to the size of this dam, it is regulated by California Dam Safety Act, which is implemented by the California Department of Water Resources, Division of Safety of Dams (DSD). The DSD is responsible for inspecting and monitoring the dam in perpetuity. The proposed project would not result in actions that could result in a higher likelihood of dam failure at Monticello Dam. There will always be a remote chance of dam failure that results in flooding of the City of Davis, including the project site. However, given the regulations provided in the California Dam Safety Act, and the ongoing monitoring performed by the DSD, the risk of loss, injury, or death to people or structures from dam failure is considered **less than significant**.



CITY OF DAVIS: THE CANNERY PROJECT

Figure 3.9-1: Principal Watersheds Map

Data source: MacKay & Somps (November 30, 2011).
Map date: January 23, 2013.

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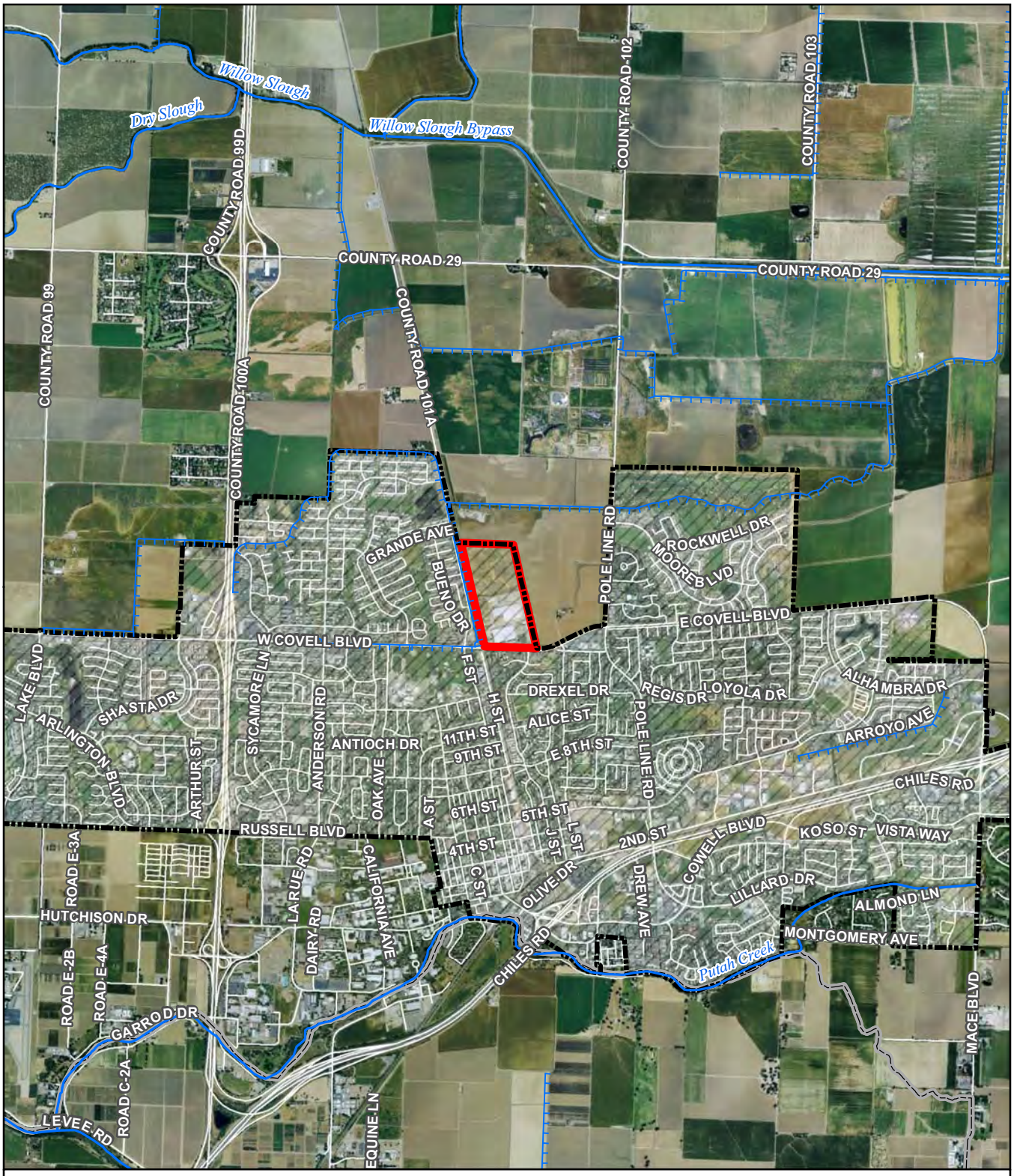

City of Davis: The Cannery Project

Figure 3.9-2 Hydrology Map

- Stream or River
- Canal or Ditch
- Project Site
- City of Davis

N

0 1,000 2,000

Feet

1:48,000

Data sources: USGS National Hydrography Dataset (NHD), ArcGIS Online BING Aerials; City of Davis GIS; Yolo County GIS; Map date: May 21, 2012.

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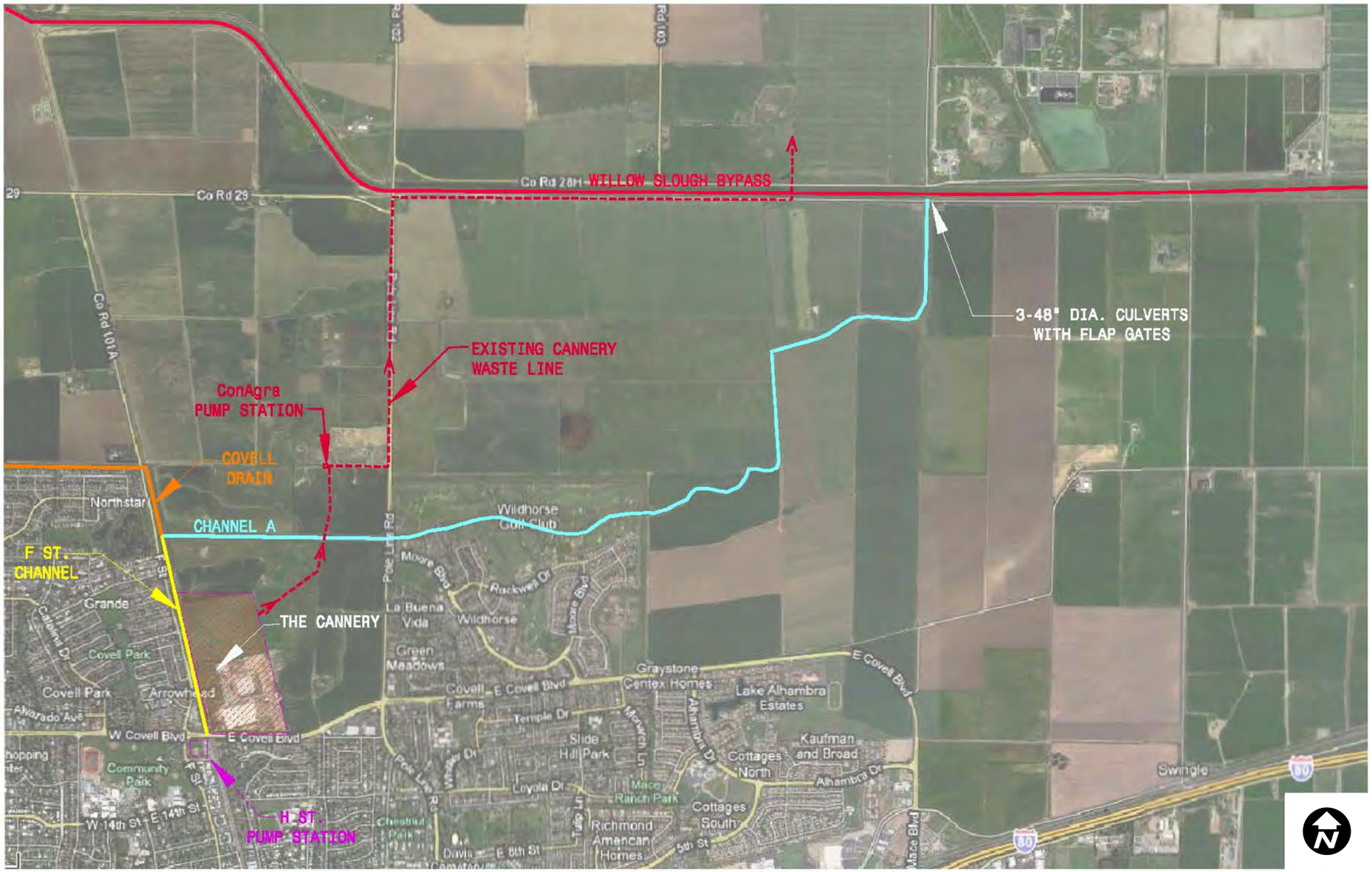

CITY OF DAVIS: THE CANNERY PROJECT

Figure 3.9-3: Regional Drainage Facilities

Data source: MacKay & Somps (November 30, 2011).
Map date: January 23, 2013.

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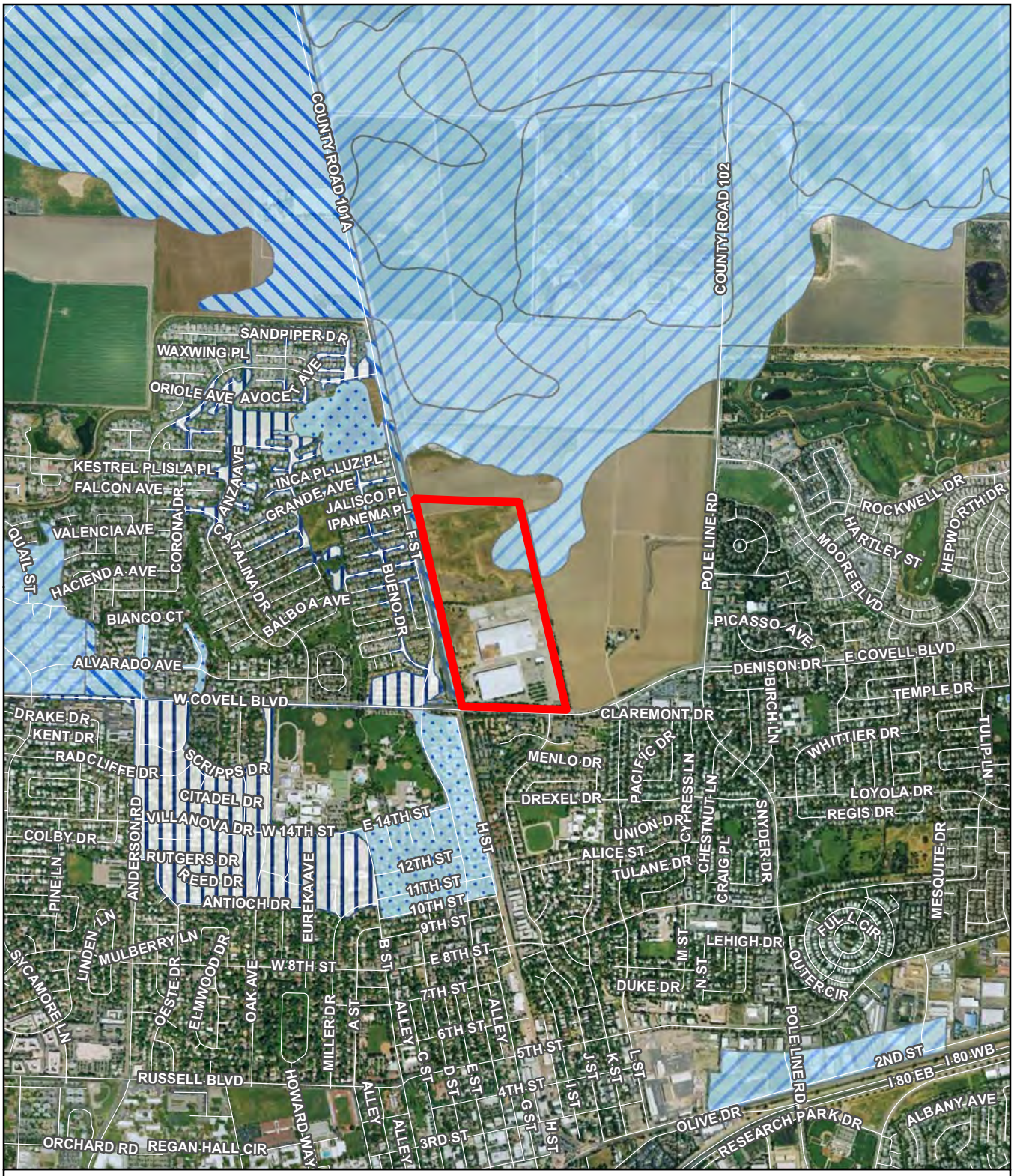

City of Davis: The Cannery Project

Figure 3.9-4 FEMA Flood Hazard Map

- Project Site
- 0.2% Annual Chance Flood Hazard
- A - 100-yr Flood, No BFEs
- AE - 100-yr Flood, BFEs determined
- AH - 100-yr Flood, Ponding

N

0 500 1,000

Feet

1:24,000

Data sources: Federal Emergency Management Agency Map Service Center (MSC), ArcGIS Online BING Aerials; City of Davis GIS; Yolo County GIS; Map date: May 14, 2012.

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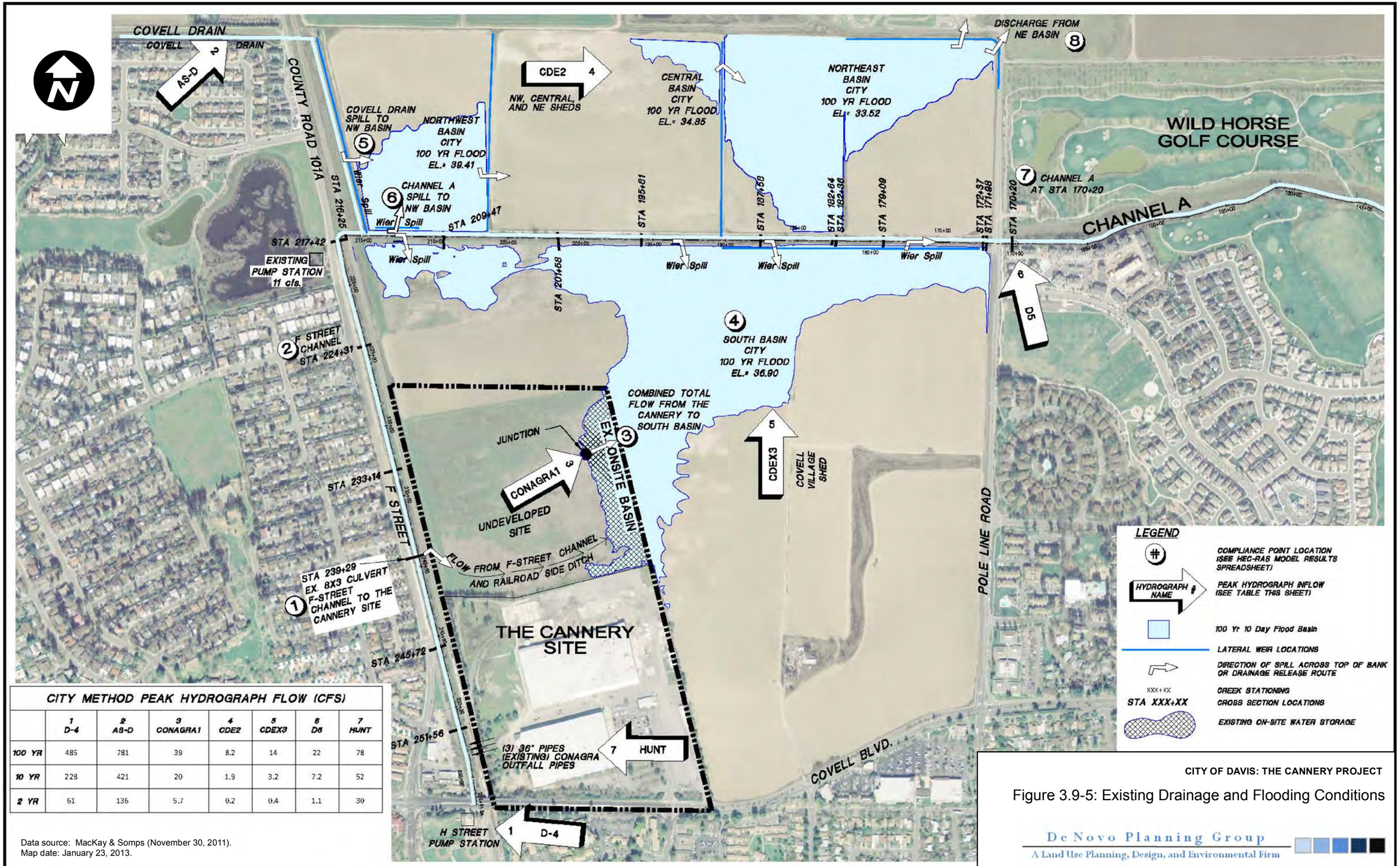

CITY METHOD PEAK HYDROGRAPH FLOW (CFS)

	1 D-4	2 AS-D	3 CONAGRA1	4 CDE2	5 CDEX3	6 D6	7 HUNT
100 YR	485	781	39	8.2	14	22	78
10 YR	228	421	20	1.9	3.2	7.2	52
2 YR	61	136	5.7	0.2	0.4	1.1	30

Data source: MacKay & Somps (November 30, 2011).
Map date: January 23, 2013.

CITY OF DAVIS: THE CANNERY PROJECT

Figure 3.9-5: Existing Drainage and Flooding Conditions

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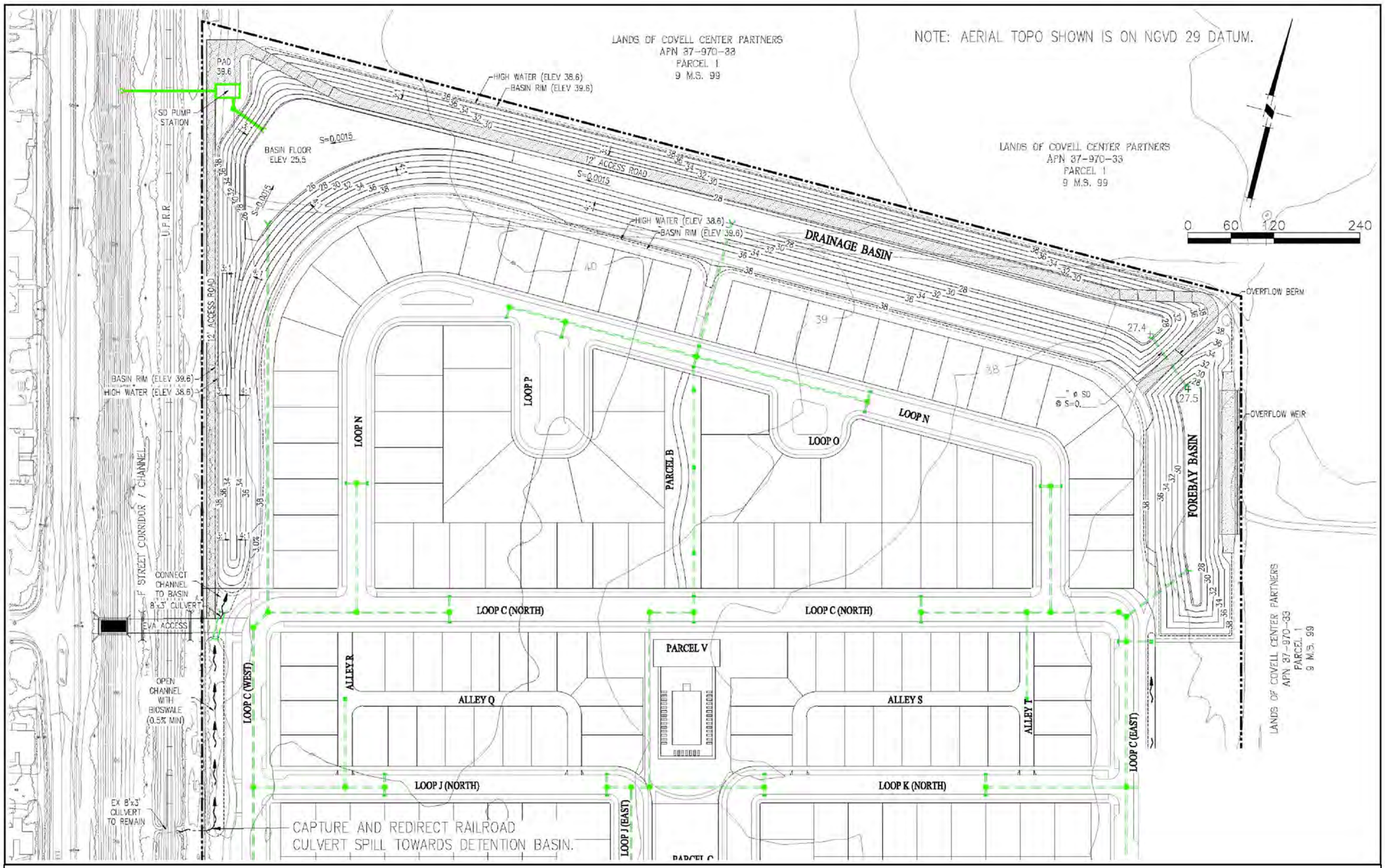

CITY OF DAVIS: THE CANNERY PROJECT

Figure 3.9-6: Proposed Drainage Improvements

Data source: MacKay & Somps (November 30, 2011).
Map date: January 23, 2013.

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