

5. Environmental Analysis

5.9 HYDROLOGY AND WATER QUALITY

This section of the Draft Program Environmental Impact Report (Draft PEIR) evaluates the potential impacts of the Clovis General Plan Update to hydrology and water quality conditions in the City of Clovis, its sphere of influence (SOI), and the Plan Area outside the SOI. Hydrology deals with the distribution and circulation of water, both on land and underground. Water quality deals with the quality of surface and groundwater. Surface water includes lakes, rivers, streams, and creeks. Groundwater is below the surface of the earth.

5.9.1 Environmental Setting

5.9.1.1 REGULATORY BACKGROUND

Federal

Safe Drinking Water Act

The Federal Safe Drinking Water Act (SDWA) provides regulations on drinking water quality in Clovis. The SDWA gives the U.S. Environmental Protection Agency (EPA) the authority to set drinking water standards, such as the National Primary Drinking Water regulations (NPDWRs or primary standards). The NPDWRs protect drinking water quality by limiting the levels of specific contaminants that are known to occur or have the potential to occur in water and can adversely affect public health. All public water systems that provide service to 25 or more individuals are required to satisfy these legally enforceable standards. Water purveyors must monitor for these contaminants on fixed schedules and report to the EPA when a maximum contaminant level (MCL) has been exceeded. MCL is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. Drinking water supplies are tested for a variety of contaminants, including organic and inorganic chemicals (e.g., minerals), substances that are known to cause cancer (e.g., carcinogens), radionuclides (e.g., uranium and radon), and microbial contaminants (e.g., coliform and *Escherichia coli*). Changes to the MCL list are typically made every three years, as the EPA adds new contaminants or, based on new research or new case studies, revises MCLs for some contaminants. The California Department of Public Health, Division of Drinking Water and Environmental Management, is responsible for implementation of the SDWA in California.

Clean Water Act

The federal Water Pollution Control Act (also known as the Clean Water Act [CWA]) is the principal statute governing water quality. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and gives the EPA the authority to implement pollution control programs, such as setting wastewater standards for industry. The statute's goal is to end all discharges entirely and to restore, maintain, and preserve the integrity of the nation's waters. The CWA regulates both the direct and indirect discharge of pollutants into the nation's waters. The CWA sets water quality standards for all contaminants in surface waters and makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under its provisions. The CWA mandates permits for wastewater and stormwater discharges, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as dredging and the filling of wetlands. The CWA also funds the construction of sewage treatment plants and recognized the need for planning to address

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nonpoint sources of pollution. Section 402 of the CWA requires a permit for all point source (a discernible, confined, and discrete conveyance, such as a pipe, ditch, or channel) discharges of any pollutant (except dredge or fill material) into waters of the United States.

Storm Water Pollution Prevention Plans

Pursuant to the CWA, in 2001, the State Water Resources Control Board (SWRCB) issued a statewide general National Pollutant Discharge Elimination System (NPDES) Permit for stormwater discharges from construction sites (NPDES No. CAS000002). Under this Statewide General Construction Activity permit (Order 2009-0009-DWQ), discharges of stormwater from construction sites with a disturbed area of one or more acres are required to either obtain individual NPDES permits for stormwater discharges or to be covered by the General Permit. Coverage by the General Permit is accomplished by completing and filing a Notice of Intent with the SWRCB and developing and implementing a Storm Water Pollution Prevention Plan (SWPPP). Each applicant under the General Construction Activity Permit must ensure that a SWPPP is prepared prior to grading and is implemented during construction. The SWPPP must list best management practices (BMPs) implemented on the construction site to protect stormwater runoff and must contain a visual monitoring program; a chemical monitoring program for "nonvisible" pollutants to be implemented if there is a failure of BMPs; and a monitoring plan if the site discharges directly to a water body listed on the State's 303(d) list of impaired waters.

National Pollutant Discharge Elimination System

Under the NPDES program promulgated under Section 402 of the CWA, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain an NPDES permit. The term pollutant broadly includes any type of industrial, municipal, and agricultural waste discharged into water. Point sources are discharges from publicly owned treatment works (POTWs), discharges from industrial facilities, and discharges associated with urban runoff. Though the NPDES program addresses certain specific types of agricultural activities, the majority of agricultural facilities are defined as nonpoint sources and are exempt from NPDES regulation. Pollutant contributors come from direct and indirect sources. Direct sources discharge directly to receiving waters, and indirect sources discharge wastewater to POTWs, which in turn discharge to receiving waters. Under the national program, NPDES permits are issued only to direct point source discharges. The National Pretreatment Program addresses industrial and commercial indirect dischargers. Municipal sources are POTWs that receive primarily domestic sewage from residential and commercial customers. Specific NPDES program areas applicable to municipal sources are the National Pretreatment Program, the Municipal Sewage Sludge Program, Combined Sewer Overflows (CSOs), Wastewater Collection Agencies Sanitary Sewer Overflows, and the Municipal Storm Water Program. Nonmunicipal sources include industrial and commercial facilities. Specific NPDES program areas applicable to these industrial/commercial sources are: Process Wastewater Discharges, Non-Process Wastewater Discharges, and the Industrial Storm Water Program. NPDES issues two basic permit types: individual and general. Also, the EPA has recently focused on integrating the NPDES program further into watershed planning and permitting (EPA 2004).

The NPDES has a variety of measures designed to minimize and reduce pollutant discharges. All counties with storm drain systems that serve a population of 50,000 or more, as well as construction sites one acre or more in size, must file for and obtain an NPDES permit. Another measure for minimizing and reducing pollutant discharges to a publicly owned conveyance or system of conveyances (including roadways, catch basins, curbs,

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gutters, ditches, man-made channels and storm drains, designed or used for collecting and conveying stormwater) is the EPA's Storm Water Phase II Final Rule. The Phase II Final Rule requires an operator (such as a City) of a regulated small municipal separate storm sewer system (MS4) to develop, implement, and enforce a program (e.g., BMPs, ordinances, or other regulatory mechanisms) to reduce pollutants in postconstruction runoff to the City's storm drain system from new development and redevelopment projects that result in the land disturbance of greater than or equal to one acre. The MS4 Permit in effect in the Plan Area is Order No. R5-2013-0080 issued by the Central Valley Regional Water Quality Control Board (RWQCB) in 2013. The Fresno Metropolitan Flood Control District (FMFCD) is the local enforcing agency of the MS4 NPDES permit. A region-wide MS4 Permit that would cover the entire Central Valley RWQCB Region, and would cover storm drainage systems in cities as small as 10,000 population, is under development by the Central Valley RWQCB (CVRWQCB 2014).

Water quality treatment for postconstruction discharges to stormwater in the FMFCD Master Plan Area is provided by detention and retention basins that are parts of FMFCD's stormwater drainage system. The City of Clovis is a co-permittee on the NPDES permit that the FMFCD's urban stormwater drainage system operates under; this permit is described in detail under *Regional*, below.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 mandate the Federal Emergency Management Agency (FEMA) to evaluate flood hazards. FEMA provides Flood Insurance Rate Maps (FIRMs) for local and regional planners to promote sound land use and floodplain development, identifying potential flood areas based on the current conditions. To delineate a FIRM, FEMA conducts engineering studies referred to as Flood Insurance Studies (FISs). The most recent FIS and FIRM were completed and published for Clovis on February 18, 2009. Using information gathered in these studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas (SFHAs) on FIRMs.

The Flood Disaster Protection Act (FDPA) requires owners of all structures in identified SFHAs to purchase and maintain flood insurance as a condition of receiving federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. Community members within designated areas are able to participate in the National Flood Insurance Program (NFIP) afforded by FEMA. The NFIP is required to offer federally subsidized flood insurance to property owners in communities that adopt and enforce floodplain management ordinances that meet minimum criteria established by FEMA. The National Flood Insurance Reform Act of 1994 further strengthened the NFIP by providing a grant program for state and community flood mitigation projects. The act also established the Community Rating System (CRS), a system for crediting communities that implement measures to protect the natural and beneficial functions of their floodplains, as well as managing erosion hazards.

The City of Clovis, under NFIP, has created standards and policies to ensure flood protection. These policies address development and redevelopment, compatibility of uses, required predevelopment drainage studies, compliance with discharge permits, enhancement of existing waterways, cooperation with the U.S. Army Corps of Engineers (Corps) and the FMFCD for updating, and method consistency with the RWQCB and proposed BMPs.

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State

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act (Water Code sections 13000 et seq.) is the basic water quality control law for California. Under this act, the SWRCB has ultimate control over state water rights and water quality policy. In California, the EPA has delegated authority to issue NPDES permits to the SWRCB. The state is divided into nine regions related to water quality and quantity characteristics. The SWRCB, through its nine RWQCBs carries out the regulation, protection, and administration of water quality in each region. Each regional board is required to adopt a Water Quality Control Plan or Basin Plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region's ground and surface water, and local water quality conditions and problems. The City of Clovis is in the Central Valley Region, Region 5, in the Fresno and Academy hydrologic areas. The Water Quality Control Plan for the Tulare Lake Region (part of RWQCB Region 5 that included Clovis) was revised in 2004.¹ This Basin Plan gives direction on the beneficial uses of the state waters within Region 5, describes the water quality that must be maintained to support such uses, and provides programs, projects, and other actions necessary to achieve the standards established in the Basin Plan.

Regional

Fresno Metropolitan Flood Control District Stormwater Quality Master Plan

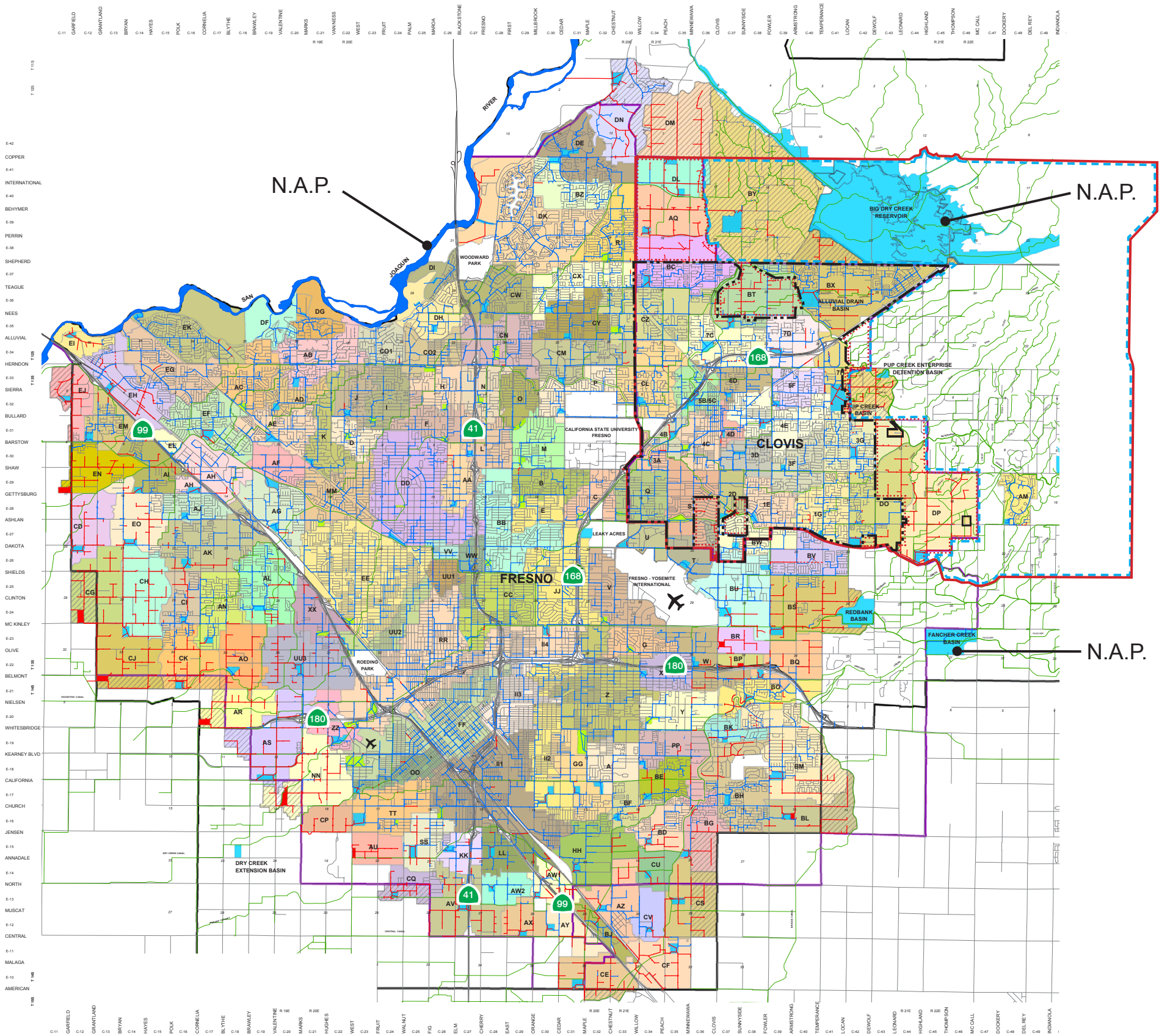
Discharges of stormwater to the storm drainage system within FMFCD's Storm Drainage and Flood Control Master Plan area must meet the requirements of FMFCD's Fresno-Clovis Storm Water Quality Master Plan (SWQMP) issued in 1999. The SWQMP was issued pursuant to NPDES Permit No. CA0083500, Central Valley RWQCB Order No. 5-01-048 issued in 2001. The cities of Clovis and Fresno, Fresno County, the FMFCD, and California State University Fresno, are co-permittees on this permit. The entire urban flood control system area is shown on Figure 5.9-1, *FMFCD Urban Flood Control System Area*; Figure 5.9-2, *Existing Urban Flood Control System In and Near Clovis*, shows a closer view of the urban flood control system in and surrounding the Plan Area. The SWQMP requires implementation of the following six categories of BMPs by participating agencies, including FMFCD and the City of Clovis. The FMFCD manages urban stormwater runoff in the Fresno-Clovis Area. The City of Clovis Public Utilities Department maintains streets and gutters that convey stormwater to storm drain inlets (Rourke 2014; FMFCD 2012; FMFCD 1999).

- **Public Involvement and Education Program.** Educates the public to better understand and participate in the control of urban runoff pollution, and to solicit support for the program.
- **Illicit Discharge Program.** Identify and eliminate illicit connections to the storm drain system; control and eliminate illegal dumping into the storm drain system.

¹ Region 5 spans the entire Central Valley, most of the Sierra Nevada, and continues north through parts of the Cascade Range and Modoc Plateau to the Oregon border. The Tulare Lake Region extends generally from Fresno south to the Tehachapi Mountains next to the south end of the San Joaquin Valley.

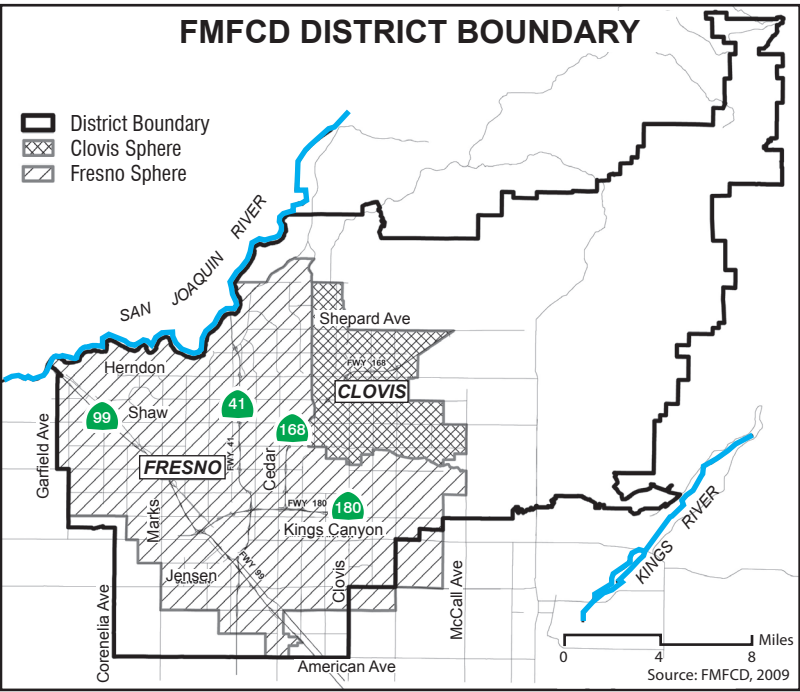
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Figure 5.9-1



FMFCD Urban Flood Control System Area

- Clovis City Boundary
- Sphere of Influence Boundary
- Rural Areas Beyond the City and Sphere of Influence
- Plan Area Boundary
- F.M.F.C.D Boundary
- Drainage Area Boundary
- Drainage Area Designation
- Existing Pipelines
- Design Pipelines
- Proposed Pipelines
- Channels and Canals
- Acquired Basin Facility
- Landsaped Basin Facility
- Proposed Basin Facility
- Non-Planned Areas
- AG Use Fee Exemption
- N.A.P. Not A Part



Source: City of Clovis, 2012; Fresno Metropolitan Flood Control District, 2013

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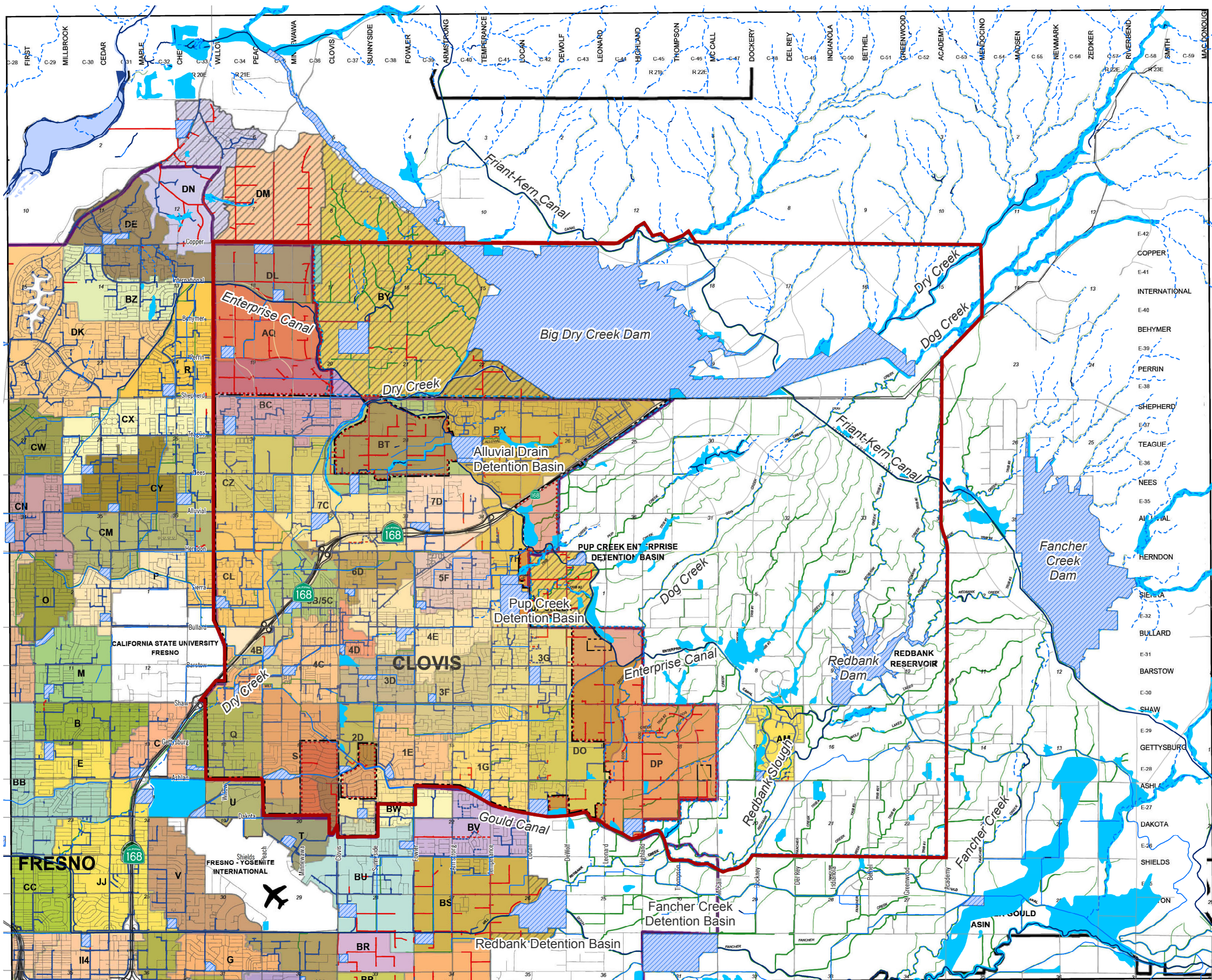
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Figure 5.9-2

Existing Urban Flood Control System In and Near Clovis

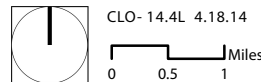


- Plan Area Boundary
- Clovis City Boundary
- Sphere of Influence Boundary
- Non-SOI Plan Area
- F.M.F.C.D. Boundary
- Drainage Area Boundary
- BQ Drainage Area Designation
- Existing Pipelines
- Design Pipelines
- Proposed Pipelines
- Channels and Canals
- Acquired Basin Facility
- Landscape Basin Facility
- Proposed Basin Facility
- Non-Planned Areas
- Ag Use Fee Exemption
- Flood Control Basins and Reservoirs
- 100-Year Flood Zone (Zone A)
- Stream / River
- Canal / Ditch
- Artificial Path



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- **Structural Controls Program.** Plan, design, and build regional stormwater retention basins to provide storm drainage services, pollution removal, flood control, and groundwater recharge. Review and modify hydrologic/hydraulic design standards as necessary to improve stormwater quality.

Structural features provide spill containment, prevent contact of rainfall or runoff with materials that may contaminate runoff, or otherwise reduce or eliminate the generation or release of a pollutant, and may include roof coverings, valves, and features that otherwise satisfy the “no exposure” exemption provided by NPDES regulations.

- **Operations and Maintenance Program.** Review and revise current storm drainage system maintenance practices to increase removal of stormwater pollutants. Review and revise roadway maintenance operations practices as needed to reduce pollutants in runoff.
- **Construction and Development Program.** Design and implement a comprehensive control program for stormwater pollution related to construction site management. Require site drainage designs and post construction measures that prevent stormwater pollution and provide stormwater treatment, where local conditions warrant.

Stormwater treatment controls for postconstruction pollutants include vegetated swales and strips that filter and settle suspended pollutants in stormwater and provide biological treatment through microbial action and plant uptake. A swale is a linear depressed area that receives flow from an upstream pipeline, gutter, or other conveyance. A strip is a nondepressed area that intercepts sheet flow from a parallel contributing surface.

- **Commercial and Industrial Program:** Develop and implement a program to monitor and control pollutants in stormwater discharges to municipal systems from municipal landfills, hazardous waste treatment, storage, disposal, and recovery facilities, and industrial facilities. Coordinate stormwater control with existing programs for spill prevention, containment, and response. Educate the commercial and industrial sectors about BMPs to reduce priority pollutants in stormwater runoff.

Stormwater Discharges from Construction Operations

Construction operations of one acre or more must prepare and implement SWPPPs pursuant to the Statewide Construction General Permit.

Requirements for Control of Post-Construction Pollutants from Developments

Central Valley Regional Water Quality Control Board MS4 Permit. The area within FMFCD’s Storm Drainage and Flood Control Master Plan area has been granted an exemption from some new NPDES requirements governing stormwater discharges to municipal storm drain systems (Rourke 2014). Areas outside of the Master Plan Area must comply with the requirements of the Central Valley RWQCB Order No. R5-2013-0080 issued in 2013, including the following:

Certain categories of development and redevelopment projects are required to implement structural BMPs to infiltrate or treat specified stormwater volumes or flow rates. Those categories of projects are: residential subdivisions of 10 or more units; commercial developments over 100,000 square feet; automotive repair shops;

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restaurants; parking lots 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to urban runoff; street and roads; retail gasoline outlets; and redevelopment projects creating or adding 5,000 square feet or more of impervious surfaces on an already developed site.

Such projects are required to infiltrate or treat either the volume of runoff produced from a 24-hour, 85th percentile storm (approximately equivalent to a 24-hour two-year storm) or the maximum runoff rate produced by the 85th percentile hourly rainfall intensity. Structural BMPs, which include infiltration trenches, dry wells, and infiltration basins, are designed mainly as infiltration devices, but may also treat stormwater and release the water into municipal storm drainage facilities.

City of Clovis

City of Clovis Municipal Code Chapter 8.7 requires payment of Local Drainage Fees to fund construction of local drainage facilities—that is, elements of the Fresno Metropolitan Flood Control District Urban Storm Drainage System serving the drainage area in which a proposed development lies—before approval of a final subdivision map; or where land is not subdivided, before the beginning of any work on such land development.

City of Clovis Municipal Code Chapter 8.12 prohibits construction, location, or alteration of structures in a 100-year flood zone designated by FEMA² except with a development permit from the City Building Official. Permits for construction in 100-year flood zones require provisions for flood risk reduction, including anchoring, flood-resistant materials, and construction methods, with lowest floors elevated above the base flood elevation. Fully enclosed areas below the lowest floor of such structures must be designed to allow floodwater to enter and exit.

County of Fresno

County of Fresno Code of Ordinances Chapter 17.64 requires payment of local drainage fees for costs of construction of FMFCD drainage facilities before beginning of work on a land development or, where land is subdivided for development, before recordation of a final subdivision map.

5.9.1.2 EXISTING CONDITIONS

Regional Drainage

Stormwater runoff in the City of Clovis is conveyed through a system of street gutters, underground storm drains, retention/detention basins, pumping stations, and open channels that are maintained by the FMFCD. The FMFCD also manages the flood control and storm drainage infrastructure in the City of Fresno.

The Plan Area is in three hydrologic areas, all of which are parts of the South Valley Floor hydrologic unit. Approximately the southwest half of the Plan is in the Fresno hydrologic area; most of the remainder of the Plan Area is in the Academy hydrologic area; and parts of the northernmost non-SOI Plan Area are in the Humphreys Station hydrologic area (DLRP 2013), as shown in Figure 5.9-3, *Hydrologic Areas*.

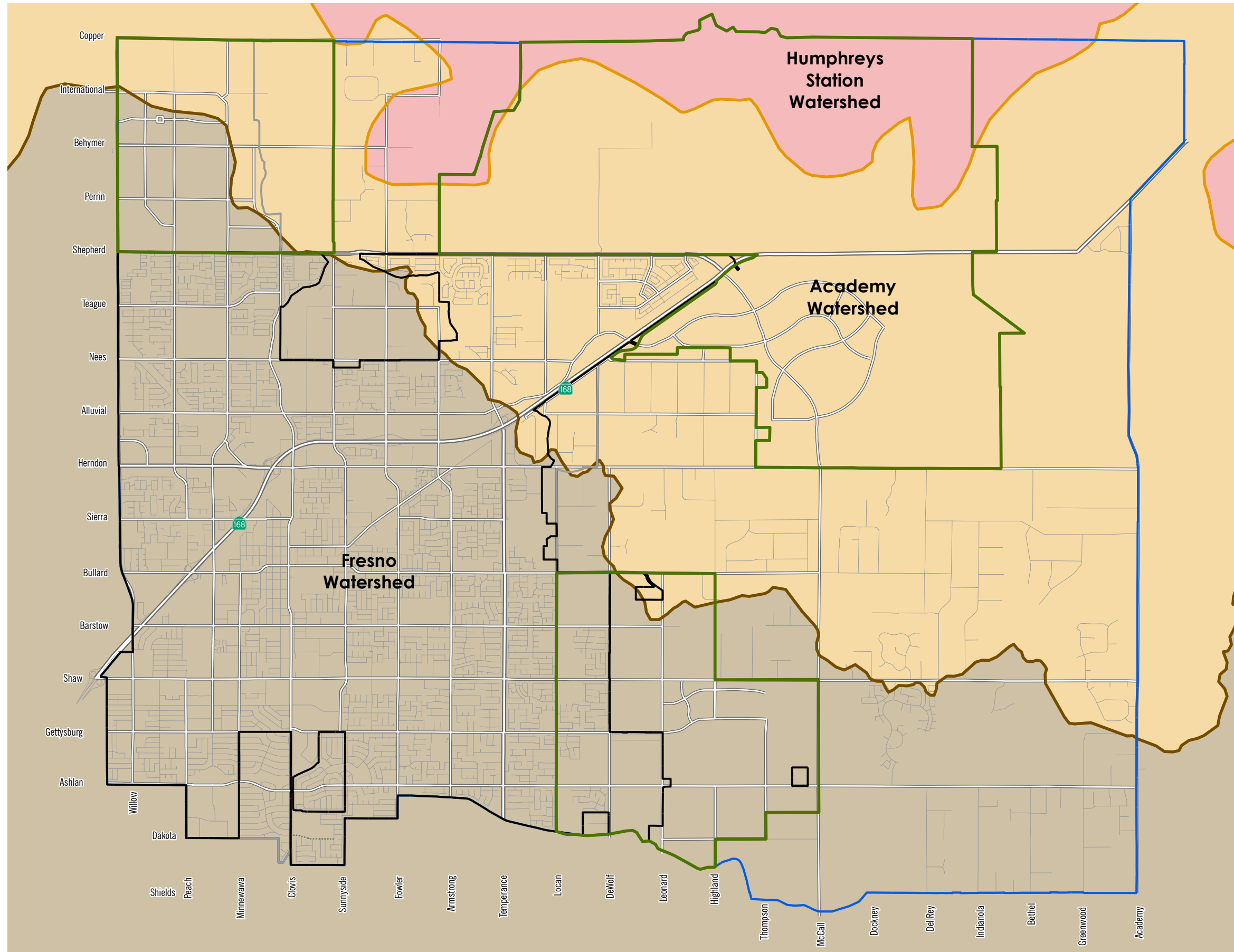
² 100-year flood zones in the City of Clovis are termed Special Flood Hazard Zones by the City.

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Figure 5.9-3

Hydrologic Areas

- Watersheds
- Academy Watershed
 - Fresno Watershed
 - Humphreys Station Watershed
- Urban Center Boundary
- City Boundary
- Sphere of Influence Boundary
- Plan Area Boundary

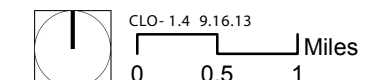


Source: California Department of Water Resources, 2003.



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Local Surface Waters and Drainage

The Plan Area is within the drainages of three streams: Dry Creek, Dog Creek, and Redbank Slough (see Figure 5.9-2). On the north, Dry Creek discharges into the Herndon Canal in the City of Fresno west of Clovis. South of Dry Creek, Dog Creek is a tributary of Redbank Slough, which discharges into Mill Ditch south of Clovis (USGS 2012). A network of storm drains in the City and the Plan Area discharges into 31 retention basins, most of which provide drainage for a one- to two-square-mile area. Most of the Plan Area east and northeast of the City is not in drainage areas served by retention basins. Those areas drain to streams that discharge into reservoirs, including Big Dry Creek Reservoir in the north-central part of the Plan Area and Redbank Creek Dam and Reservoir in the southeast part of the Plan Area. Fancher Creek Dam and Reservoir are near the east Plan Area boundary.

Detention and retention basins in the FMFCD's flood control system are sized to accommodate stormwater from each basin's drainage area in builtout condition. The current capacity standard for FMFCD basins is to contain runoff from six inches of rainfall during a ten-day period and to infiltrate about 75 to 80 percent of annual rainfall into the groundwater basin (Rourke 2014). Basins are highly effective at reducing average concentrations of a broad range of contaminants, including several polyaromatic hydrocarbons, total suspended solids, and most metals (FMFCD 2013). Pollutants are removed by filtration through soil, and thus don't reach the groundwater aquifer (FMFCD 2014). Basins are built to design criteria exceeding statewide Standard Urban Stormwater Mitigation Plan (SUSMP) standards (FMFCD 2013). The urban flood control system provides treatment for all types of development—not just the specific categories of development defined in a SUSMP—thus providing greater water quality protection for surface water and groundwater than does a SUSMP.³

In addition to their flood control and water quality functions, many FMFCD basins are used for groundwater recharge with imported surface water during the dry season through contracts with the Fresno Irrigation District (FID) and the cities of Fresno and Clovis; such recharge totaled 29,575 acre feet during calendar year 2012 (FMFCD 2013).

The pipeline collection system in the urban flood control system is designed to convey the peak flow rate from a two-year storm.

Most drainage areas in the urban flood control system do not discharge to other water bodies, and drain mostly through infiltration into groundwater. When necessary, FMFCD can move water from a basin in one such drainage area to a second such basin by pumping water into a street and letting water flow in curb and gutter to a storm drain inlet in an adjoining drainage area (Rourke 2014). Two FMFCD drainage areas discharge directly to the San Joaquin River, and three to an irrigation canal, without storage in a basin. Six drainage areas containing basins discharge to the San Joaquin River, and another 39 basins discharge to canals (FMFCD 2013).

A proposed development that would construct more impervious area on its project site than the affected detention/retention basin is sized to accommodate is required to infiltrate some stormwater onsite, such as through an onsite detention basin or drainage swales (Rourke 2014).

³ Such categories are listed in the description of the MS4 Permit in Section 5.9.1.1, Regulatory Background, above.

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The Big Dry Creek Reservoir has a total storage capacity of about 30 thousand acre-feet (taf) and controls up to 230-year flood flows. Fancher Creek Dam and Reservoir hold up to 9.7 taf and controls up to 200-year flood flows. Redbank Creek Dam and Reservoir hold up to 1 taf and controls up to 200-year flood flows. Table 5.9-1 summarizes all of the major FMFCD flood control reservoirs and detention basins.

Table 5.9-1 Major Flood Control Structures in FMFCD Service Area

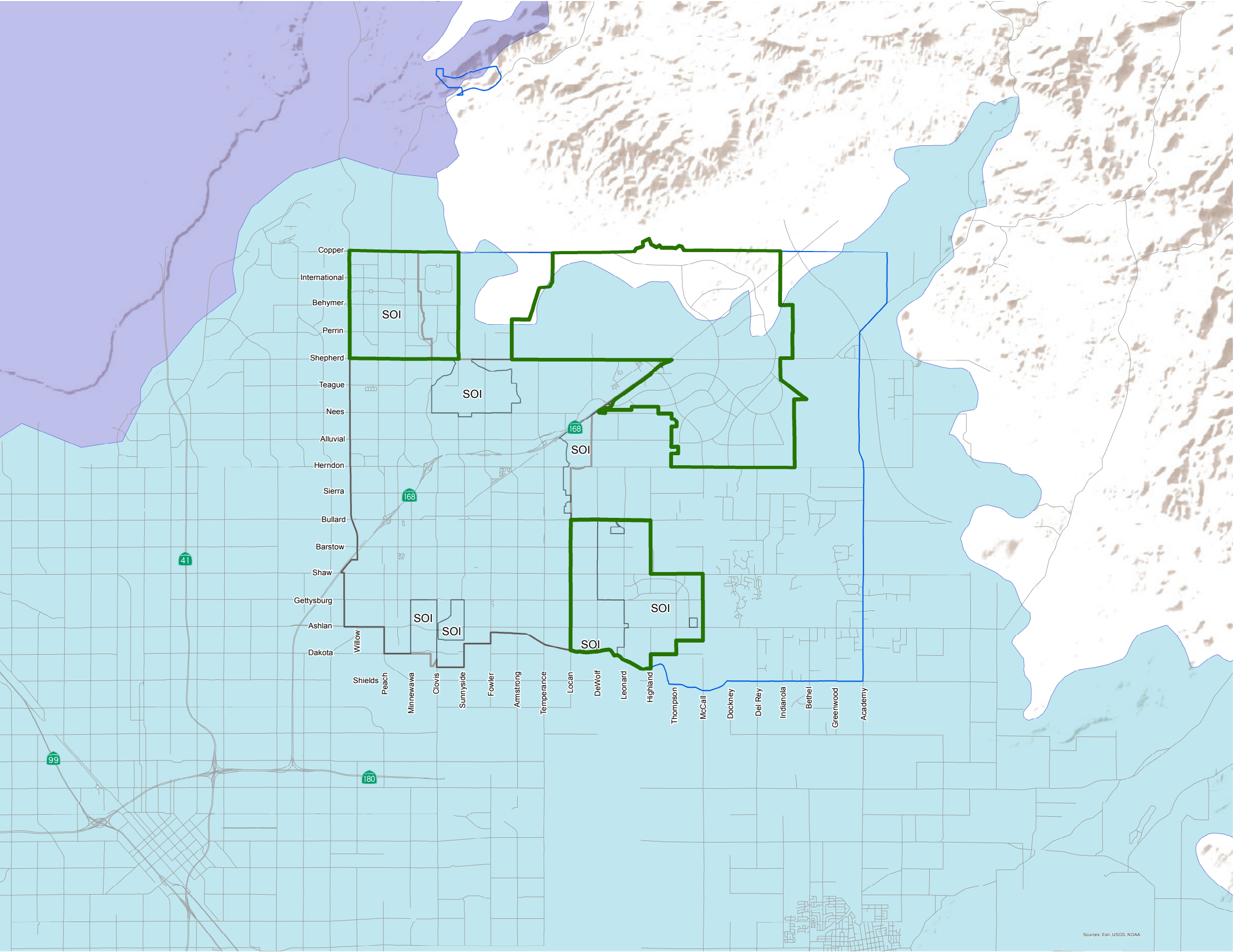
Structure Name	Storage/Flow Capacity	Flood Control Capacity	Purpose
Dams and Reservoirs			
Big Dry Creek Dam and Reservoir	30,200 af	230-year events	Controls Big Dry and Dog creeks
Fancher Creek Dam and Reservoir	9,700 af	200-year events	Controls Fancher and Hog creeks, and several unnamed tributaries to Redbank Creek
Redbank Creek Dam and Reservoir	1,030 af	200-year events	Controls the flows of Redbank Creek
Detention Basins			
Alluvial Drain Detention Basin	385 af	200-year events	Controls flows from Alluvial Drain and an unnamed tributary
Redbank Creek Detention Basin	940 af	200-year events	Controls flows from Redbank Creek
Pup Creek Detention Basin	785 af	200-year events	Controls flows from Pup Creek and from an unnamed tributary
Fancher Creek Detention Basin	1,891 af	200-year events	Controls the flows of Fancher Creek and Mud Creek watersheds
Big Dry Creek Detention Basin	260 af	NA	Control flows in Big Dry Creek from rural streams and urban discharges
Holland Creek Rediversion Channel	1,044 cubic feet per second	NA	Redirects historic Holland Creek flows back to the Kings River
Source: FMFCD 2007			

Groundwater

Clovis is underlain by the Kings Groundwater Basin that spans 1,530 square miles of central Fresno County and small areas of northern Kings and Tulare counties. Figure 5.9-4, *Kings Groundwater Basin*, shows that the basin is bounded on the north by the San Joaquin River, on the west by the Delta-Mendota and Westside Subbasins, the south by the Kings River South Fork and the Empire West Side Irrigation District, and on the east by the Sierra Nevada foothills. Depth to groundwater in 2012 ranged from 160 feet along the west City boundary to 70 feet at the east City boundary, 25 feet at the southeast SOI boundary, and about 20 feet at the eastern Plan Area boundary (FID 2013). The Kings Subbasin has been identified as critically overdrafted (Provost & Pritchard 2011).

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Figure 5.9-4

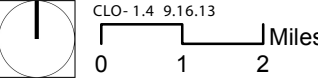
Kings Groundwater Basin



- Groundwater Sub-Basins
- Kings
 - Madera
- Urban Center Boundary
- City Boundary
- Sphere of Influence Boundary
- Plan Area Boundary



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Source: California Department of Water Resources, 2003.

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In the Plan Area, groundwater levels are monitored by the City of Clovis and FID. The area has not experienced land subsidence due to groundwater pumping since the early 1900s (FID 2006). Subsidence occurs when underground water or natural resources (e.g., oil) are pumped to the extent that the ground elevation lowers. No significant land subsidence is known to have occurred in the last 50 years as a result of land development, water resources development, groundwater pumping, or oil drilling (FID 2006). Regional ground subsidence in the Plan Area was mapped as less than one foot by the US Geological Survey in 1999 (Galloway and Riley 1999). However, groundwater levels in the San Joaquin Valley are forecast to hit an all-time low in 2014 (UCCHM 2014).

Flood Hazards

The urban areas of Clovis are largely protected from flooding through the use of the flood control infrastructure maintained by the FMFCD. Regionally, the major flood issues are associated with the San Joaquin River, the Kings River, and their tributaries. Three major dams have been constructed to control flows on the rivers, including Friant and Mendota Dams on the San Joaquin River and Pine Flat Dam on the Kings River. In addition, a number of reservoirs, detention basins, and canals have been constructed on streams east of the Fresno-Clovis area to prevent flooding and to convey flows around developed areas.

Designated 100-Year Flood Zones

There are 100-year flood zones (Zone A designated by FEMA) in the City along Dry Creek, the West Branch of the Clovis Ditch, and the northeast side of the Enterprise Canal where the canal blocks drainage from flowing southwestward. In the remainder of the Plan Area, there are additional 100-year flood zones along Dog Creek in the east part of the SOI and along a drainage channel in the northeast part of the SOI. There are also 100-year flood zones along Redbank Slough, Dog Creek, Pup Creek, and in the Big Dry Creek Reservoir (see Figure 5.9-5, *Water Bodies and Flood Zones*). Retention basins are also mapped as 100-year flood zones.

Seismically Induced Dam Inundation

Much of central and western Clovis, as well as the northwest parts of the Plan Area, are in the dam inundation area for Big Dry Creek Reservoir. Small parts of the southeast portion of the Plan Area are in the dam inundation area for Redbank Reservoir in the southeast Plan Area. Parts of the southeast portion of the Plan Area are in the dam inundation area for Fancher Creek Reservoir next to the east Plan Area boundary.

The Big Dry Creek Reservoir and dam have a capacity to hold up to 30 thousand acre-feet (taf) of water; however, due to seepage concerns and lack of inflow, storage has never exceeded 15 taf, and it is usually around 10 taf. Controlled outflows are made into Big and Little Dry Creeks through low-level release structures. In the event that the storage at Big Dry Creek Reservoir exceeds 30 taf, floodwater would spill from the reservoir through an ungated spillway to the Little Dry Creek Flood Channel (Bureau of Reclamation 2003).

Redbank and Fancher Reservoirs do not have capacities as large as that of the Big Dry Creek Reservoir. Flood flows from these reservoirs are managed through the Redbank-Fancher Creeks Flood Control Project, a flood control program of the FMFCD. This system consists of five major flood control facilities throughout the FMFCD service area, including dams, reservoirs, channels, and streams. Most of these structures, except the Big Dry Creek Detention Basin, are in or near the Plan Area and are listed in Table 5.9-1. The FMFCD has made

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significant improvements to the flood control infrastructure throughout its service area and has a number of facilities to control flooding caused by dam inundation.

Seiches and Tsunamis

Seiche

A seiche is a surface wave created when an inland water body is shaken, usually by an earthquake or due to a change in atmospheric pressure. Inland water bodies in the Plan Area that could generate seiches are retention basins and reservoirs and include the Pup Creek Basin, the Alluvial Drain Basin, the Big Dry Creek Reservoir, Fancher Creek Dam, and Redbank Reservoir.

Tsunami

A tsunami is a series of ocean waves caused by a sudden displacement of the ocean floor, most often due to earthquakes. The Plan Area ranges in elevation from about 335 feet above mean sea level (amsl) at the southwest corner of the City to about 584 feet amsl at the northeast corner of the Plan Area. The City is about 114 miles inland from the Pacific Ocean; therefore, the chances of a tsunami impacting the Plan Area are negligible.

Mudflows and Debris Flows

A mudflow is a landslide composed of saturated rock debris and soil with a consistency of wet cement. Grades in the Plan Area are very gentle and average approximately 0.2 percent. The flat nature of Plan Area would not be sufficient to cause mudflows.

5.9.2 Thresholds of Significance

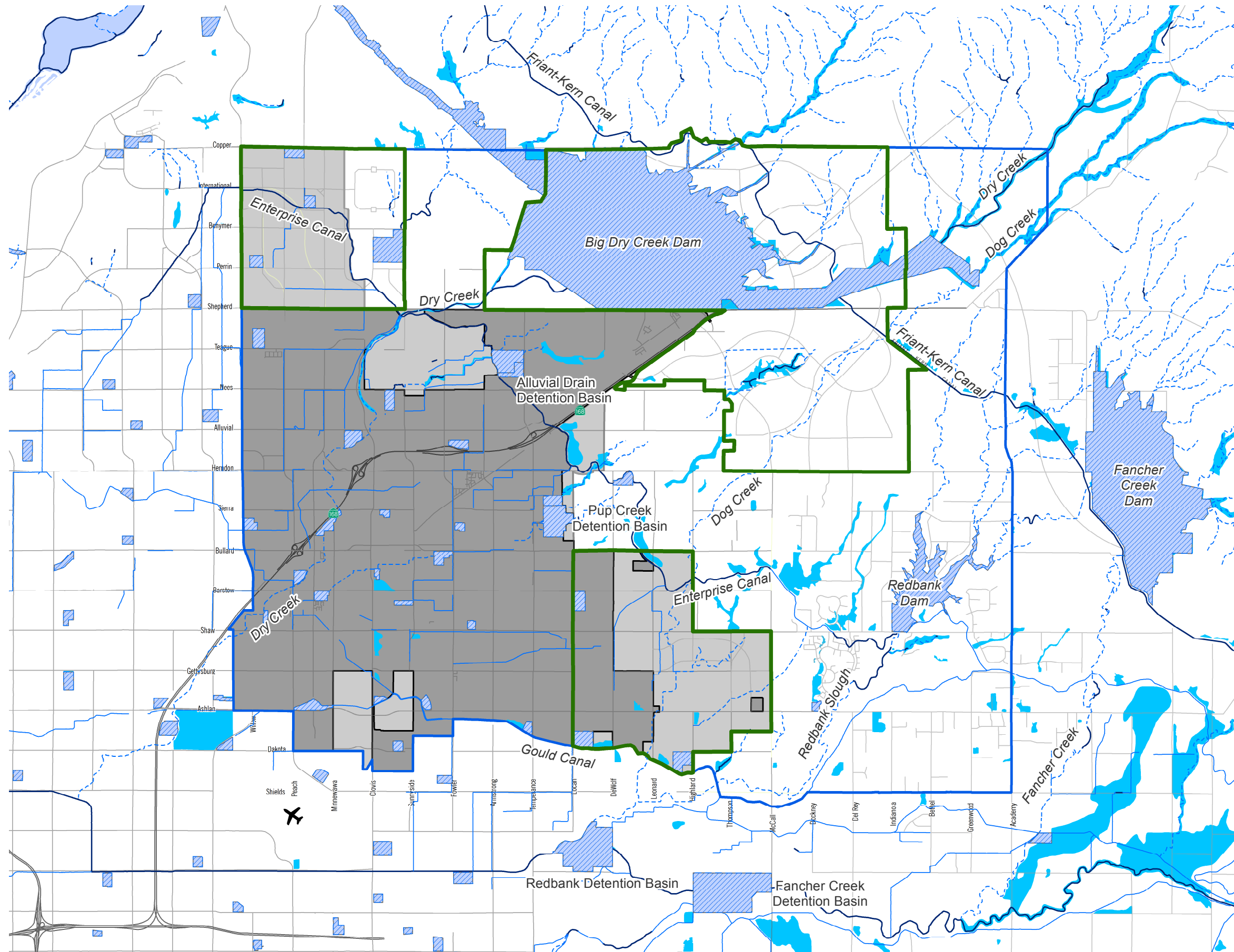
According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would:

- HYD-1 Violate any water quality standards or waste discharge requirements.
- HYD-2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site.
- HYD-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- HYD-5 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.

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Figure 5.9-5

Water Bodies and Flood Zones

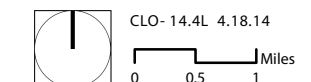


- Flood Control Basins and Reservoirs
- 100-Year Flood Zone (Zone A)
- Stream / River
- Canal / Ditch
- Artificial Path
- City Boundary
- Sphere of Influence Boundary
- Urban Center Boundary
- Plan Area Boundary



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- HYD-6 Otherwise substantially degrade water quality.
- HYD-7 Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- HYD-8 Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- HYD-9 Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- HYD-10 Be subject to inundation by seiche, tsunami, or mudflow.

5.9.3 Environmental Impacts

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

Impact 5.9-1: Development pursuant to the proposed project would increase the amount of impervious surfaces in the Plan Area and would therefore increase surface water flows into drainage systems within the Fresno and Academy watersheds. [Thresholds HYD-4 and HYD-5]

Impact Analysis:

2035 Scenario

Increase in Impervious Areas

The 2035 Scenario would result in a substantial increase in impervious areas through development of net increases of about 8,900 housing units and 24.4 million square feet of nonresidential land uses. The 2035 Scenario involves development in the City, much of the SOI, and in the Northwest and Northeast urban village centers.

Drainage System Improvements

Redevelopment in the existing urban areas and new development in the undeveloped areas would require improvements of existing facilities or construction of new facilities.

FMFCD Urban Storm Water Drainage System

Most of the areas where development is anticipated in the 2035 Scenario are already served by the urban drainage system. Developments would be required to pay Local Drainage Fees to fund drainage improvements pursuant to the FMFCD Master Plan serving the affected Master Plan drainage areas before the approval of a final subdivision map or before the beginning of any work on such developments. The current capacity standard for FMFCD basins is to contain runoff from six inches of rainfall during a ten-day period and infiltrate about 75 to 80 percent of annual rainfall into the groundwater basin (Rourke 2014). The pipeline collection system in the urban flood control system is designed to convey the peak flow rate from a two-year storm (FMFCD 2013).

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Urban Storm Water Drainage System Expansion

The FMFCD Board of Directors approves addition of new drainage areas to the urban stormwater system after the cities of Fresno or Clovis expand their SOIs to serve those expansions. Developers are required to pay local drainage fees to the City of Clovis, County of Fresno, or City of Fresno, respectively, to fund construction of detention basins and storm drains to serve those developments. Storm drains and detention basins may be built by FMFCD, developers, or both (Rourke 2014). Expansions of the urban storm water system are also required for the expansion areas to be covered under the exemption from some NPDES requirements for the FMFCD Storm Drainage Master Plan area.

Central Valley RWQCB MS4 Permit Requirements

Some development projects in accordance with the General Plan Update outside of the current boundary of the urban drainage system could be developed before the urban drainage system is built to serve those projects' sites. Such development would be required to comply with the MS4 Permit; the current MS4 Permit regulating stormwater discharges to municipal storm drain systems in the Fresno-Clovis Area is Order No. R5-2013-0080, issued by the Central Valley RWQCB in 2013. Such projects would be required to infiltrate or treat approximately the rate or volume of stormwater from a two-year storm (see Section 5.9.1.1, *Regulatory Background*, for further explanation)

Full Buildout

Increase in Impervious Areas

At ultimate post-2035 buildout of the General Plan Update about 32,751 acres of the Plan Area would be developed with residential, commercial, industrial, institutional, and roadway land uses that would be partly impervious. The remaining Plan Area would consist of open space, water, or agricultural designations. Currently, approximately 19,755 acres of the Plan Area are developed with residential, commercial, industrial, institutional, and roadway land uses that are partly impervious.

Impervious areas at full Plan buildout, compared to such areas in existing conditions, were estimated using California Impervious Surface Coefficients issued by the Office of Environmental Health Hazard Assessment (OEHHA 2010), as shown below in Table 5.9-2. Full Plan buildout is estimated to increase impervious areas by about 6,853 acres. However, the proportion of developed area that would be impervious would only increase slightly from 60 percent in existing conditions to 64 percent at full GPU buildout. Future expansions of the FMFCD Urban Storm Drainage System, per policies of the City of Clovis, County of Fresno, and FMFCD, would thus be adequate to infiltrate about 75 to 80 percent of annual rainfall into the groundwater basin, as does the current urban storm drainage system.

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Table 5.9-2 Estimated Impervious Area: Full Buildout, General Plan Update

Land Use	Acreage	Impervious Surface Coefficient ¹	Impervious Area, Acres
Full Buildout, General Plan Update			
Agriculture	5,589	0	0
Rural Residential (0.5 DU/ac)	11,105	0.14	1,543
Very Low Density Residential (2 DU/ac)	775	0.35	272
Low-Density Residential and Planned Residential Community (4 DU/ac)	6,564	0.46	2,999
Medium-Density Residential (7 DU/ac)	4,400	0.54	2,386
Medium-High Density Residential (15 DU/ac)	1,751	0.66	1,154
High Density Residential (25 DU/ac)	732	0.74	539
Very High Density Residential (43 DU/ac)	123	0.83	102
General Commercial and Neighborhood Commercial	924	0.81	748
Office and Special Commercial	516	0.86	298
Light Industrial	548	0.81	444
Office Park	964	0.69	665
Mixed Use	1,002	0.80	802
Open Space and Park	4,811	0.02	96
Public/Quasi-Public and School	1,577	0.5	680
Right-of-Way (urban and suburban roads)	5,389	0.91	4,904
Water	1,034	0	0
Total	47,804	Not applicable	17,634
Existing Conditions			
Agriculture	18,683	0	0
Rural Residential (0.5 DU/ac)	10,574	0.14	1,469
Single-Family Residential (7 DU/ac)	5,759	0.54	3,124
Multi-Family Residential and Mobile Home	632	0.74	466
Commercial	664	0.81	538
Office and Hotel	143	0.86	123
Light Industrial and Storage	440	0.81	356
Park, Vacant, and Commercial Recreation	1,572	0.02	31
Public/Quasi-Public, School, and Utilities	1,277	0.5	639
Right-of-Way (urban and suburban roads)	4,434	0.91	4,035
Water	205	0	0
Drainage Basin	3,424	0	0
Total	47,807	Not applicable	10,781
Increase in Impervious Areas, Full GPU Buildout less Existing Conditions	0	Not applicable	6,853

¹ Source: OEHHA 2010

The majority of the stormwater in the Plan Area would drain into the 31 detention basins that serve the Plan Area. The areas in the northeastern part of the Plan Area east currently drain into streams that drain into the Dry

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Creek Reservoir in the north-central part of the Plan Area or the Redbank Reservoir in the southeast part of the Plan Area.

Approval, funding, and construction of expansions to the FMFCD Urban Storm Drainage System are described above under *2035 Scenario*.

Drainage System Improvements

The above analysis regarding the urban stormwater drainage system and MS4 Permit requirements also applies to the full buildout scenario.

In addition, policies from the General Plan Update, including Open Space and Conservation Element Policies 3.1 and 3.2, encourage the use of low impact development techniques that retain or mimic natural drainage features and promote minimizing nonpoint source pollutants and stormwater runoff. When applied in conjunction with federal and state flood control efforts and City ordinances, these policies would reduce the potential drainage impacts of development in the Plan Area to less than significant levels.

Impact 5.9-2:	Development pursuant to the General Plan Update would increase the demand on groundwater use and also increase impervious surfaces in the Plan Area, which would impact opportunities for groundwater recharge. [Threshold HYD-2]
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Impact Analysis:

2035 Scenario

Groundwater Recharge

New development in accordance with the General Plan Update would increase the amount of impervious surface in the Plan Area, potentially affecting the amount of surface water that filters into the groundwater supply. Groundwater levels are monitored in the Plan Area by the FID and the City of Clovis. As described in the 2010 City of Clovis Urban Water Management Plan (UWMP), groundwater recharge occurs both naturally and artificially throughout the City. The Kings Groundwater Basin area is recharged through a joint effort between the Cities of Clovis and Fresno and the FID (CDWR 2006). Approximately 8,400 acre-feet per year (afy) of water are intentionally recharged into the Kings Groundwater Basin by the City of Clovis, and approximately 7,700 afy of water naturally flow into groundwater in the City's boundaries (Clovis 2011).

The FMFCD urban stormwater drainage system would provide groundwater infiltration for runoff from developed land uses in detention basins in the drainage system service area. The process of expansion of the FMFCD urban storm drainage system is explained above under the analysis of the 2035 Scenario under Impact 5.9-1.

Projects pursuant to the proposed General Plan Update and developed outside of the FMFCD urban stormwater drainage system would be required to meet the requirements of NPDES regulations, including the implementation of BMPs to improve water retention and vegetation on project sites.

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Groundwater Use

Based on the 2010 Urban Water Management Plan, the City of Clovis is forecast to have adequate water supplies to meet estimated water demands generated by buildout of the General Plan Update under the 2035 Scenario (see the analysis of impacts on water supplies in Section 5.17.1, *Water Service*, of this Draft PEIR). It is assumed that development within Fresno Irrigation District (FID) is built out by 2030. If development occurs in areas outside the FID instead, such as in the northeast, then surface water supplies would be reduced and demand could exceed supplies or result in increased groundwater usage. Although the estimated population of the Plan Area at buildout of the 2035 Scenario, 184,100, is lower than the 2035 population estimate in the 2010 City of Clovis UWMP, 188,224, as discussed in the Section 5.17.1, *Water Service*, the duration and severity of the current drought is unknown. The potential for development in accordance with the General Plan Update to deplete groundwater or interfere with groundwater recharge, therefore, is determined to be potentially significant in the 2035 scenario.

Full Buildout

Groundwater Recharge

The above analysis of impacts of the 2035 Development Scenario on groundwater recharge also applies to full buildout of the General Plan Update.

Groundwater Use

Water demands by full buildout of the General Plan Update would exceed forecast water supplies available to the City of Clovis in 2035 per the City's UWMP. Full buildout would require the City to obtain expanded water supplies other than groundwater—that is, local surface water, imported water, recycled water (for nonpotable uses), or some combination thereof—to avoid depleting groundwater to meet water demands by full General Plan Update buildout. Potential groundwater depletion and groundwater recharge impacts of the full buildout scenario would be significant.

Impact 5.9-3: Portions of the Plan Area proposed for development are within a 100-year flood hazard area. [Thresholds HYD-7 and HYD-8]

Impact Analysis:

Proposed General Plan Land Use Designations within 100-Year Flood Zones

Proposed General Plan Update land use designations within 100-year flood zones are listed below in Table 5.9-4. The land use designations are grouped in two categories: designations for development with structures for human occupancy, and designations where such structures would either not be permitted (Open Space, Right-of-Way, and Water) or only permitted on a minimal fraction of the designated land area (Agriculture and Park).

As shown in Table 5-9-3, about half of the land within 100-year flood zones in the Plan Area would have designations permitting no or minimal structures for human occupancy, and about 87 percent of all the 100-year flood zones in the Plan Area are in the City and SOI.

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Table 5.9-3 Proposed General Plan Land Use Designations in 100-Year Flood Zones, Acres

	City of Clovis (acres)	SOI (acres)	Non-SOI Plan Area (acres)	Total Plan Area (acres)
Designations for Development with Structures for Human Occupancy				
General Commercial	19.21	0	0	19.21
High Density Residential (15.1–25.0 DU/Ac)	2.22	0	0	2.22
Industrial	22.34	0	0	22.34
Low Density Residential (2.1- 4.0 DU/Ac)	13.46	42.81	6.40	62.67
Medium Density Residential (4.1–7.0 DU/Ac)	15.48	6.37	2.70	24.56
Medium High Density Residential (7.1-15.0 DU/Ac)	6.61	0	8.50	15.11
Mixed Use Business Campus		0	1.50	1.50
Mixed Use Village	0.07	0	0.05	0.12
Neighborhood Commercial	0.25	0	0	0.25
Office	3.30	0	0	3.30
Public/Quasi-Public Facilities	4.80	29.98	0	34.78
Rural Residential	7.84	96.14	0.01	104.00
School	4.80	0	0.07	4.87
Very Low Density Residential (0.6–2.0 DU/Ac)	53.99	14.87	0	68.86
Subtotal	154.37	190.17	19.23	363.79
Designations Permitting No or Minimal Structures for Human Occupancy				
Agriculture (1 DU/20 Ac)	0	6.87	0	6.87
Open Space	4.28	18.88	18.33	41.48
Park	20.67	2.27	54.09	77.03
ROW	3.24	2.99	4.55	10.78
Water	220.97	0	0.40	221.37
Subtotal	249.16	31.01	77.37	357.53
Total	403.54	221.18	96.61	721.33

2035 Scenario

100-year flood zones in the Plan Area occur along waterways and other bodies of water, including along Dry Creek, the west branch of Clovis Ditch, Enterprise Canal, Dog Creek, Redbank Slough, Pup Creek, and the Big Dry Creek Reservoir.

Development in these areas is restricted per City of Clovis Municipal Code Section 8.12, Floodplain Management. New construction and redevelopment must meet construction requirements that limit potential for damage or

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loss of property or life due to flooding. Permits must be submitted to and approved by the City for any development project in a special flood zone designated by FEMA. Development would also comply with Environmental Safety Element Policy 1.1, Flood Zone, prohibiting development within the 100-year flood zone and dam inundation areas unless adequate mitigation is provided against flood hazards. Impacts would be less than significant.

Full Buildout

Only about 13 percent, or 96.6 acres, of the 100-year flood zones in the Plan Area are in the non-SOI Plan Area. Approximately 80 percent of such zones in the non-SOI Plan Area would have proposed GPU designations permitting no or minimal structures for human occupancy. Development in these areas would be regulated under City municipal code Section 8.12. and would comply with Environmental Safety Element Policy 1.1. Impacts would be less than significant.

Impact 5.9-4:	Construction of development projects pursuant to the General Plan Update may cause short-term increases in pollutant concentrations. Postdevelopment, the quality of storm runoff may be altered (sediment, nutrients, metals, pesticides, pathogens, and hydrocarbons). [Thresholds HYD-1, HYD-3, and HYD-6]
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Impact Analysis:

2035 Scenario

Discharges from Construction Sites to Stormwater

Proposed General Plan Update buildout would involve soil disturbance, construction, and operation of developed land uses that could each generate pollutants affecting stormwater. The 2035 Development Scenario would involve construction of net increases of about 25,200 housing units and about 24.4 million square feet of nonresidential land uses, compared to existing conditions.

Pollutants of Concern from Construction Projects

Pollutants associated with stormwater include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, oxygen-demanding substances, pesticides, and trash and debris.

Bacteria and Viruses. Bacteria and viruses are microorganisms that thrive under certain environmental conditions. Water contamination by animal or human fecal waste and excess organic waste are common causes of proliferation of these microorganisms. Water containing excessive bacteria and viruses can alter the aquatic habitat and harm humans and aquatic life.

Metals. Metals of concern as water contaminants include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors; metals are also raw materials used in nonmetal products such as fuels, adhesives, and paints. At low concentrations naturally occurring in soil, metals may not be toxic. However, certain metals at higher concentrations can be harmful to aquatic life and to humans. Humans can be impacted from groundwater contaminated with metals. Metals can become concentrated in fish and shellfish,

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and can subsequently harm humans who consume those animals. Environmental concerns have already led to restrictions on some uses of metals.

Nutrients. Nutrients are inorganic substances such as nitrogen and phosphorous; the primary sources of these substances in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams causes eutrophication, where over growth of aquatic plants and algae can lead to excessive decay of organic matter in the water, loss of oxygen in the water, and eventual death of aquatic organisms.

Pesticides. Relatively low concentrations of the active ingredients in pesticides can be toxic in water. Excessive or improper use of pesticides can cause toxic contamination in runoff.

Organic Compounds. Organic compounds are carbon based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds at certain concentrations can be hazardous to life or health. Toxic levels of solvents and cleaning compounds can be discharged to storm drains during cleaning and rinsing operations.

Oxygen-Demanding Substances. Microbial biodegradation of organic compounds such as proteins, carbohydrates, and fats, causes increased oxygen demand in water. A second category of oxygen-demanding substances is chemicals—such as ammonia and hydrogen sulfide—that react with dissolved oxygen in water to form other compounds. The oxygen demand of a substance can deplete dissolved oxygen in a water body and possibly develop septic conditions. A reduction of dissolved oxygen is harmful to aquatic life and can generate hazardous compounds such as hydrogen sulfides.

Sediments. Sediments are solid materials that are eroded from the land surface. Sediments can increase the turbidity (cloudiness) of water, clog fish gills, reduce spawning habitat, lower survival rates of young aquatic organisms, smother bottom-dwelling organisms, and suppress aquatic vegetation growth.

Trash and Debris. Trash and debris, such as paper, plastic, polystyrene foam, aluminum, and biodegradable organic matter such as leaves, grass cuttings, and food waste, may significantly impair aquatic habitat and the recreational value of a water body. In addition, trash impacts water quality by increasing biochemical oxygen demand.

Oil and Grease. Oil and grease in water bodies decreases their aesthetic value as well as water quality; one of the most important sources of oil and grease is leakage from motor vehicles.

Water-Quality Requirements for Construction Projects

Construction projects of one acre or more would be required to comply with the General Construction Permit, Order No. 2012-0006-DWQ, issued by the State Water Resources Control Board (SWRCB) in 2012. Projects obtain coverage by developing and implementing a Storm Water Pollution Prevention Plan (SWPPP) estimating sediment risk from construction activities to receiving waters, and specifying BMPs that would be used by the project to minimize pollution of stormwater. Categories of BMPs used in SWPPPs are described below in Table 5.9-4.

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Table 5.9-4 Construction BMPs

Category	Purpose	Examples
Erosion Controls and Wind Erosion Controls	Cover and/or bind soil surface, to prevent soil particles from being detached and transported by water or wind.	Mulch, geotextiles, mats, hydroseeding, earth dikes, swales.
Sediment Controls	Filter out soil particles that have been detached and transported in water.	Barriers such as straw bales, sandbags, fiber rolls, and gravel bag berms; desilting basin; cleaning measures such as street sweeping.
Tracking Controls	Minimize the tracking of soil offsite by vehicles.	Stabilized construction roadways and construction entrances/exits; entrance/outlet tire wash.
Nonstorm Water Management Controls	Prohibit discharge of materials other than stormwater, such as discharges from the cleaning, maintenance, and fueling of vehicles and equipment. Conduct various construction operations, including paving, grinding, and concrete curing and finishing, in ways that minimize nonstormwater discharges and contamination of any such discharges.	BMPs specifying methods for: paving and grinding operations; cleaning, fueling, and maintenance of vehicles and equipment; concrete curing; concrete finishing.
Waste Management and Controls (i.e. good-housekeeping practices)	Management of materials and wastes to avoid contamination of stormwater.	Spill prevention and control, stockpile management, and management of solid wastes and hazardous wastes.

Source: CASQA 2003.

Discharges from Developed Land Uses (Postconstruction) to Stormwater

Pollutants of Concern

Operation of developed land uses can generate the same categories of pollutants that construction projects can.

Water Quality Treatment

Water quality treatment for postconstruction discharges to stormwater in the FMFCD Master Plan Area is provided by detention and retention basins that are constituents of FMFCD's stormwater drainage system. Land development in the FMFCD Master Plan area is exempt from further water quality requirements provided that the FMFCD's Storm Water Quality Management Plan is implemented. The SWQMP contains six programs for water quality protection, described above in Section 5.9.1.1, *Regulatory Background* above.

Projects outside of Existing FMFCD Urban Flood Control System. Certain categories of projects outside of FMFCD's Urban Flood Control System area must infiltrate or treat volumes or flow rates of stormwater as specified in the MS4 Permit. The affected categories of projects are listed in Section 5.9.1.1, *Regulatory Background*, above.

Such projects are required to infiltrate or treat either the volume of runoff from a 24-hour, 85th-percentile storm or the flow rate of runoff produced by the 85th percentile hourly rainfall intensity. An 85th-percentile storm is approximately equivalent to a two-year storm.

Most of the 2035 Scenario area is within the existing FMFCD Urban Flood Control System area. The FMFCD expands its urban stormwater system after the cities of Fresno and Clovis expand their SOIs. Storm drainage

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improvements are funded by local drainage fees paid by developments and are built by the FMFCD, by developers, or both. Basins are highly effective at reducing average concentrations of a broad range of contaminants, including several polycyclic aromatic hydrocarbons, total suspended solids, and most metals (FMFCD 2013). Pollutants are removed by filtration through soil, and thus don't reach the groundwater aquifer (FMFCD 2014). Basins are built to design criteria exceeding statewide SUSMP standards (FMFCD 2013). The urban flood control system provides treatment for all types of development. Only projects outside of the master plan area at the time those projects are built would be required to infiltrate or treat stormwater pursuant to the MS4 Permit.

Full Buildout

The General Plan Update would allow for new development in areas that are currently undeveloped and redevelopment of existing urban areas. Construction activities associated with these development projects would cause an increase in onsite sediments and pollutants due to the potential use of heavy machinery and grading on the future project sites. After projects are complete, the operational use of pesticides and other lawn chemicals and driving vehicles on the future project sites would cause an increase in chemicals, nutrients, gasoline, oil, and other contaminants within the Plan Area.

Construction Water Quality Requirements

The entire Plan Area is subject to requirements of the Statewide General Construction Permit, including preparation and implementation of SWPPPs.

Postconstruction Water Quality Requirements

Within FMFCD Master Plan Area

FMFCD's urban stormwater drainage system provides water quality treatment for operation of land uses within the Master Plan area.

Outside of FMFCD Master Plan Area

Projects outside of FMFCD's Master Plan area must infiltrate or treat stormwater pursuant to requirements in the MS4 Permit.

Projects developed or redeveloped pursuant to the General Plan Update would comply with water quality requirements of the Statewide General Construction Permit, FMFCD SWQMP, and MS4 Permit, as applicable, and impacts would be less than significant.

Impact 5.9-5: Portions of the Plan Area are within the inundation area of the Big Dry Creek Reservoir, the Redbank Reservoir, and Fancher Creek Reservoir. [Threshold HYD-9]

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Impact Analysis:

2035 Scenario

Portions of the 2035 Scenario area are within the inundation areas of Big Dry Creek and Fancher Creek reservoirs. The inundation area for Redbank Reservoir is outside of the 2035 Scenario area. Big Dry Creek Dam and Reservoir is the closest and largest of these dams and, presents the most risk for inundation of developed areas even though the reservoir has only ever reached half of its full capacity. Proposed General Plan Update Environmental Safety Element Policy 1.1 would prohibit development within the 100-year flood zone and dam inundation areas unless adequate mitigation is provided against flood hazards. City requirements for flood risk reduction in design and construction of structures are in municipal code chapter 8.12, which prohibits construction, location, or alteration of structures in a FEMA 100-year flood zone except with a permit from the City Building Official. Permits for construction in 100-year flood zones require provisions for flood risk reduction, including anchoring and flood-resistant materials and construction methods, with lowest floors elevated above the base flood elevation. Fully enclosed areas below the lowest floor of such structures must be designed to allow floodwater to enter and exit. Projects in 100-year flood zones and dam inundation areas would comply with City requirements for flood risk reduction, and impacts would be less than significant.

Full Buildout

As mentioned, portions of the Plan Area are in the inundation areas of Big Dry Creek Dam and Reservoir and, to a lesser extent, of the Redbank Reservoir and of Fancher Creek Reservoir. Big Dry Creek Dam and Reservoir border the City of Clovis along its current northern City boundary. The reservoir would be included in the Plan Area of the Clovis General Plan Update (designated “Future Regional Park” in Figure 3-5, *Proposed General Plan Land Use Plan*, in Chapter 3, *Project Description*, of this Draft EIR).

As with the 2035 Development Scenario area, projects in 100-year flood zones and dam inundation areas would comply with City requirements for flood risk reduction in municipal code chapter 8.12 and Proposed General Plan Update Environmental Safety Element Policy 1.1. Impacts would be less than significant

Impact 5.9-6: The City would not be subject to inundation by tsunami or mudflow; inundation by seiche would present a low risk. [Threshold HYD-10]

Impact Analysis:

2035 Scenario

The Plan Area ranges in elevation from about 335 feet amsl at the southwest corner of the City to about 584 feet amsl at the northeast corner of the Plan Area. The City is about 114 miles inland from the Pacific Ocean and is not at risk of being inundated by a tsunami.

The Plan Area is almost entirely flat. Grades average approximately 0.2 percent and would not be steep enough to cause mudflows. Thus, there is little to no risk of mudflow hazards in the Plan Area.

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There are no lakes in or around the project's 2035 Development Scenario Area that would be subject to seiches. The Big Dry Creek Reservoir has the potential of being a large body of water, but it is generally not at full capacity, and the water level changes throughout the year due to the amount of rainfall received. The General Plan Update designates this area as a future regional park and it would not present a great seiche risk. Proposed General Plan Update Environmental Safety Element Policy 1.1 would prohibit development within the 100-year flood zone and dam inundation areas unless adequate mitigation is provided against flood hazards.

Full Buildout

Similar to the 2035 scenario, full buildout of the proposed project would not be subject to inundation by tsunami or mudflow given the flat nature of the Plan Area and far distance from the Pacific Ocean. Inundation by seiche would present a low risk. Policy 1.1 would apply throughout the Plan Area.

5.9.4 Relevant General Plan Policies and Development Code Sections

The following are relevant policies of the proposed Clovis General Plan and Development Code Update that would reduce potential hydrology and water quality impacts of future development in the Plan Area.

General Plan

Environmental Safety Element

Goal 1: Minimized risk of injury, loss of life, property damage, and economic and social disruption caused by natural hazards.

- **Policy 1.1 Flood Zone** - Prohibit development within the 100-year flood zone and dam inundation areas unless adequate mitigation is provided against flood hazards. Participate in the National Flood Insurance Program.

Open Space and Conservation Element

Goal 3: A built environment that conserves and protects the use and quality of water and energy resources.

- **Policy 3.1 Stormwater management** - Encourage the use of low impact development techniques that retain or mimic natural features for stormwater management.
- **Policy 3.2 Stormwater pollution** - Minimize the use of non-point source pollutants and stormwater runoff.

5.9.5 Existing Regulations

Federal

- Federal Safe Drinking Water Act (SDWA)
- Water Pollution Control Act (also known as the Clean Water Act [CWA])

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State

- Statewide General Construction Activity permit (NPDES Order 2009-0009-DWQ)
- Porter-Cologne Act (Water Code sections 13000 et. seq.)

Local

- City of Clovis Municipal Code
 - Chapter 6.5, Article 5, Water Efficient Landscape Ordinance
 - Chapter 6.7 Urban Storm Water Quality Management and Discharge Control
 - Chapter 8.7 Planned Local Drainage Facilities and Improvements Development Requirements, Financing Mechanisms, and Fees
 - Chapter 8.12 Flood Plain Management
- Fresno County Code of Ordinances
 - Chapter 17.64: Drainage of Land

5.9.6 Level of Significance Before Mitigation

2035 Scenario and Full Buildout

Upon implementation of regulatory requirements and standard conditions of approval, the following impacts would be less than significant for the 2035 Scenario and Full Buildout: 5.9-1, 5.9-3, 5.9-4, 5.9-5, and 5.9-6.

The following impact would be significant for both the 2035 and Full Buildout Scenarios:

- **Impact 5.9-2** Development pursuant to the General Plan Update would increase the demand on groundwater use and also increase impervious surfaces in the Plan Area, which would impact opportunities for groundwater recharge.

5.9.7 Mitigation Measures

Impact 5.9-2

2035 Scenario and Full Buildout

Details on long-term water planning and regulatory measures are included in Section 5.17, *Utilities and Service Systems*. No mitigation measures beyond the long-term facility planning, conservation measures, recycling projects, and existing regulatory measures (e.g., SB 610 and SB 221) have been identified to address the proposed project's significant impact on water supply or potentially significant impact on groundwater depletion and recharge opportunities.

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5.9.8 Level of Significance After Mitigation

Impact 5.9-2 would remain significant and unavoidable for both the 2035 Scenario and Full Buildout.

5.9.9 References

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