CHAPTER FIVE: PUBLIC UTILITIES

5.1 OVERVIEW

The goal of the Public Utilities chapter is to identify the necessary utilities required to serve the Dunnigan Specific Plan (DSP). This section provides an overview of the existing and future public utilities and identifies the backbone infrastructure necessary to serve the Plan Area. The intent of this chapter is to ensure the timely implementation of public utilities and services to maintain the specified levels of service for the Plan Area. Phasing of infrastructure improvements and funding obligations are detailed in the Public Facilities Financing Plan and the DSP Development Agreement.

5.1.1 Utility Services

The 3110 acre Dunnigan Specific Plan Area does not currently have the urban services or facilities that are required for development to occur. The intent is to form a County Service Area (CSA) for basic municipal utilities such as water, sewer, recycled water, and storm drain for new and existing communities. Table 5.1 lists the utility entities that will serve the Plan Area.

Table 5.1 – Utility Providers

Utility	Provider/ Authority
Sanitary Sewer Collection	Dunnigan CSA
Sanitary Sewer Treatment	Dunnigan CSA
Water	Dunnigan Water District or Dunnigan CSA[1]
Recycled Water Wholesaler Recycled Water Distribution	Dunnigan CSA
Drainage and Flood Control	Dunnigan CSA
Electric Service	Pacific Gas & Electric
Natural Gas	Pacific Gas & Electric
Telephone & Communications	To be determined
Cable TV and Broadband	To be determined

[1] See discussion in Section 5.3 below pertaining to the water authority for the Dunnigan Specific Plan

5.2 GOALS AND POLICIES

It is the intent of the Plan Area to comply with the Yolo County 2030 General Plan Goals and Policies to ensure abundant, safe and sustainable public utilities and infrastructure to support the needs of existing and future generations, pursuant to the following principles:

- The Plan Area, through this document and future efforts, will coordinate with the water purveyors and water users to manage supplies to avoid long-term overdraft, water quality degradation and land subsidence. This will be accomplished by providing reliable and sustainable water sources via surface water from the Tehama-Colusa canal paired with supplemental groundwater for the planned development demands.

- The Plan Area will incorporate the use of recycled water to reduce the demand on the ground water aquifer and for distribution and use to mitigate irrigation demands. Where feasible, water efficiency standards for appliances and fixtures higher than required by the minimum County regulations will be incorporated, offsetting the plan wide water demands.
- Future efforts in planning the water distribution system will include water quality education for the water users.
- The Plan Area will promote innovative and efficient options for sewage treatment and encourage the use of compact wastewater treatment facilities. The sewer service infrastructure will be extended to the existing developments within the Dunnigan Specific Plan Area boundary to reduce the potential for widespread septic system problems. The sewer infrastructure system will be designed for 200-year flood protection for the wastewater treatment facility.
- The Plan Area will increase the availability and reliability of power to rural areas and encourage expanded coverage and enhanced quality for communication technologies.

5.3 WATER SUPPLY AND DISTRIBUTION SYSTEM

This section describes the proposed water infrastructure plan for the Plan Area, in conformance with the intent of the following principles and guidelines:

- Prior to approval of the first tentative map or other development in the Plan Area, a comprehensive final Water Master Plan for the Plan Area will be completed to identify the final treatment, storage, and delivery systems, address well locations, phasing, and financing of water infrastructure. The water infrastructure plan will be consistent with the County's General Plan, and will meet the County's standard specifications or an acceptable alternative.
- In order to provide adequate fire flow to the service area, the water distribution system installed throughout the Plan Area will meet the requirements of the County including 3,500 gpm for two hour duration. Fire hydrants and water mains will be installed to meet applicable fire protection standards and County design standards.
- The final design will seek to reduce operational complexities and maintenance requirements of the system. The design will also seek opportunities for energy efficiency in the treatment and distribution of water.

5.3.1 Existing Water Supply and Distribution

The Plan Area is predominately included within the water service area of the Dunnigan Water District (DWD). Portions of Plan Area, primarily the Hardwoods and several smaller parcels are not within the pre-specific plan DWD service area. The District's service area, overlaid with the Plan Area boundary, is indicated on Exhibit 5.1. DWD's surface water supply is delivered via the Tehama-Colusa canal, which is a US Bureau of Reclamation (USBR) facility. DWD withdraws water from the canal via three existing turnouts and one existing pumping station. Two of the turnouts are located within the Plan Area boundary with the third located just north of the Plan Area. The DWD distributes the canal water via an existing distribution system within the District's service area. The DWD distribution system pulls water from the existing turnouts in the

Tehama-Colusa canal and distributes to the east, through existing canals to properties on the east side of Interstate 5. Deliveries are predominantly to agricultural users, with a nominal percentage (less than 10%) to industrial users.

The

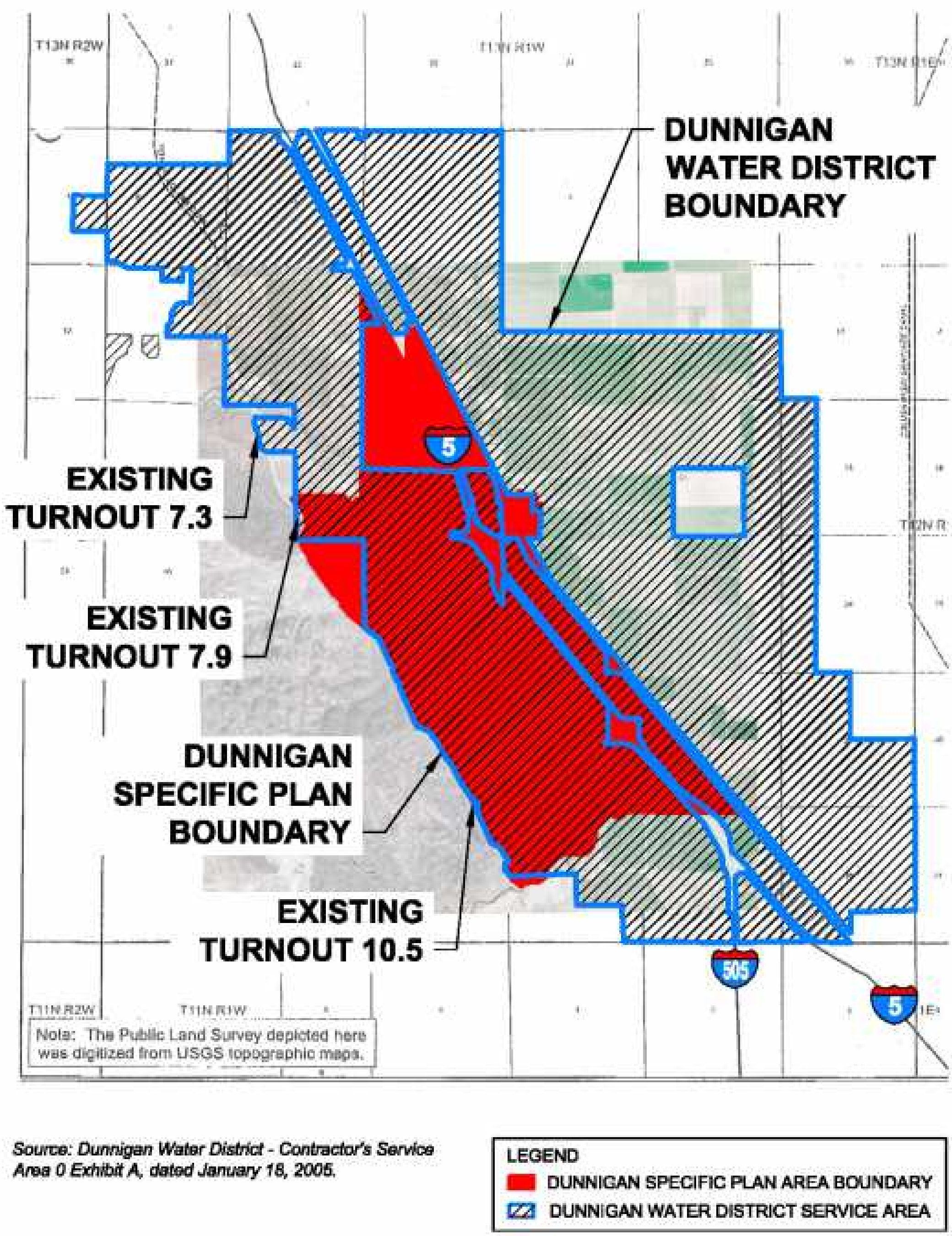


Exhibit 5.1 Existing Water District Boundary

primary source of potable water for the Plan Area will be supplied by DWD surface water allocation, withdrawn from the Tehama-Colusa Canal. DWD holds a contractual entitlement of 19,000 acre-feet per year of Central Valley Project (CVP) water, valid through 2025, with a right to renew. Actual deliveries have historically been less than the full contract amount because of lower demand. The existing agricultural water demand within the District is typically in the range 14,000 to 18,000 acre-feet of water per year. Decreases in agricultural demand will be offset by an increase in demand from new domestic and industrial uses within the Plan Area. By maximizing the use of surface water under DWD's existing CVP contract, potential impacts on local groundwater overdraft may be reduced. The annual per acre allocation of water supply available within the District at 100% CVP supply is 1.67 acre feet per acre, which amounts to a 5,194 acre foot annual allocation to the 3,110 acres Plan Area within the District in the post-annexation condition. In years when the full CVP allocation is available, surface water provided using the DWD pro rata allocation will be sufficient to meet 100% of Plan Area water demands at full-build out.

Existing residences and businesses in the Plan Area (including Old Town and the Hardwoods Area, together referred to as Existing Phase or "X") are served by private domestic wells not in the DWD. The existing mobile home park development, Country Fair Estates, located east of I-5 is served by its own community water system, not within the DWD, and an independent wastewater system.

5.3.2 Planned Water Supply and Distribution

The Plan Area water system will consist of a new potable municipal water system for domestic and municipal use and a non-potable system for the irrigation of landscape areas.

5.3.2.1 Water Supply Assessment

The California Water Code requires coordination between land use lead agencies and public water suppliers to ensure that prudent water supply planning has been conducted and that planned water supplies are adequate to meet both existing and planned future project demands. Senate Bill 610 (Chapter 643, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. The statute requires detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. The statute also requires this detailed information to be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects.

California Water Code Sections 10910-10915 (amended by SB 610) require land use lead agencies to identify the public water system that may supply water for a proposed development project and to request from said public water system a water supply assessment ("WSA") for the project. The purpose of the WSA is to demonstrate that the public water system has sufficient water supplies to meet the water demands associated with the proposed project in addition to meeting the existing and planned future water demands projected for the next 20 years. The DSP WSA is included as an appendix to the EIR and was considered in the analysis of the project's potential impacts on water supply, as discussed in the EIR.

5.3.2.2 Potable Water Supply

The Plan Area will be serviced by a new municipal water system. The Plan Area boundary includes areas outside of the current Dunnigan Water District boundary. Approximately 573 acres of the Dunnigan Specific Plan lie outside of the pre-Specific Plan Dunnigan Water District service area, including approximately 385 acres of the Hardwoods subdivision. Properties not within the DWD service area are required to be annexed to Dunnigan CSA prior to development.

The pro rata allocation of water available from DWD in a year when 100% of its contract supply is available is 5,194 acre feet, which is adequate to meet the Plan Area potable water demand after wastewater recycling and conservation, estimated to be 4,621 acre feet annually. Based on the 29 year historical period, DWD receives 100% of its CVP supply in approximately 75% of years. In the remaining 25% of years, the Plan Area will supplement surface water supplies by using groundwater wells within the Plan Area.

The intake point from the Tehama Colusa Canal for Dunnigan CSA may utilize existing canal turnout 7.9 or a new turnout. The raw water will be pumped from the turnout to a new treatment, storage, and distribution pump station site near the turnout for treatment and distribution to the Plan Area. The location of the existing turnouts and the proposed tank(s) and treatment facility site are shown on Exhibit 5.2, Backbone Potable Water System. A larger version of this exhibit is provided in Appendix D.

Estimates of domestic demand have been prepared based on the land use plan using adjusted Yolo County unit demands approved by the Yolo County Planning and Public Works Department in 2012, as described in Appendix D, Water Supply Technical Appendix. Unit demands have been reduced based on an assumption of the use of efficient fixtures resulting in the adjusted water demands. A summary of the total water demand by phase is shown below in Table 5.2.

Table 5.2 Water Demand By Phase

Phase	Total Water Demand[1] (gpd)[3]	Total Average Day Demand[1] (ADD) (ac-ft/yr)	Total Maximum Day Demand[2] (MDD) (gpd)[3]
Phase 1	1,383,000	1,549	2,766,000
Phase 2	1,124,000	1,259	2,248,000
Phase 3	1,048,000	1,174	2,096,000
Phase 4	1,386,000	1,552	2,772,000
Phase Existing (X)	477,000	534	954,000
Total[3]	**5,418,000**	**6,069**	**10,836,000**

The water infrastructure plan is based on a water model of the backbone water infrastructure. This model utilizes the water demands calculated in Appendix D, applied to the nodes associated with each land use type. The infrastructure system has been sized to account for the Maximum Day Demand (MDD) throughout the Plan Area and the minimum required fire flow at any single node within the Plan Area. A map identifying the water infrastructure, the skeleton distribution nodes and the preliminary pipe sizes is in Appendix D, Figure 9.

The Plan Area will also utilize recycled water for distribution to landscape areas as described in Section 5.4. The available recycled water will be applied to the areas shown on Exhibit 5.3. As a result of this recycled water component of the Plan Area, the domestic demand associated with these green spaces has been eliminated, reducing the overall domestic water demand within the Plan Area. The demands in Tables 1 and 2 in Appendix D for each land use have been reduced based on the amount of recycled water used for irrigation as identified in Section 5.4. Table 5.3 summarizes the net potable water demand, accounting for the reduction in the total water demand from the use of recycled water in the Plan Area. The net potable water demand is the total water demand from Table 5.2 above minus the recycled water demand. Appendix D provides additional information and data related to potable and recycled demands.

Table 5.3: Net Potable Water Demand Summary By Phase

Phase	Total Water Demand[1] (gpd)[3]	Recycled Water Demand [2] (gpd)[3]	Net Potable Average Day Demand[1] (gpd)[3]	Net Potable Average Day Demand [4] (ADD) (ac-ft/yr)
Phase 1	1,383,000	312,000	1,071,000	1,200
Phase 2	1,124,000	378,000	746,000	836
Phase 3	1,048,000	329,000	719,000	805
Phase 4	1,386,000	274,000	1,112,000	1,246
Phase Existing (X)	477,000	0	477,000	534
Total [3]	**5,418,000**	**1,293,000**	**4,125,000**	**4,621**

[1] Reduction to County standard demands based on 2.6 pph for the Dunnigan Specific Plan Area & the use of E friendly fixtures throughout the Dunnigan Specific Plan Area.
[2] Recycled Water Demand based on the irrigation use factors identified in Table 5.4.1 below.
[3] Gallons per day rounded to the nearest 1000 gallons.
[4] Net Potable Water Demand = Total Adjusted Water Demand – Recycled Water Demand

The sizing of the water treatment plant is a function of maximum-day domestic demand. Surface water treatment will involve screening, possibly using pressurized strainers, clarification possibly using dissolved air flotation, filtration possibly using microfilter membranes, and disinfection possibly using chlorine contact tanks. Water quality testing of the canal water will be conducted in order to determine the specific water treatment requirements. To the extent feasible, it is anticipated that the water treatment plant will be built in multiple phases to accommodate the phased build out of the Dunnigan Specific Plan Area.

The required water tank storage volume is a function of operational storage, fire flow storage and emergency storage. The water storage capacity will be phased in increments as the project builds out, as described in Appendix D. The projected operational storage, the fire flow storage and the emergency storage sums to 4.54M gallons. It is anticipated that the water tanks will be constructed in two phases based on the ultimate storage volume that will be required. Each phase of the water tank construction is planned to be sited at a single location, as indicated on Exhibit 5.2.

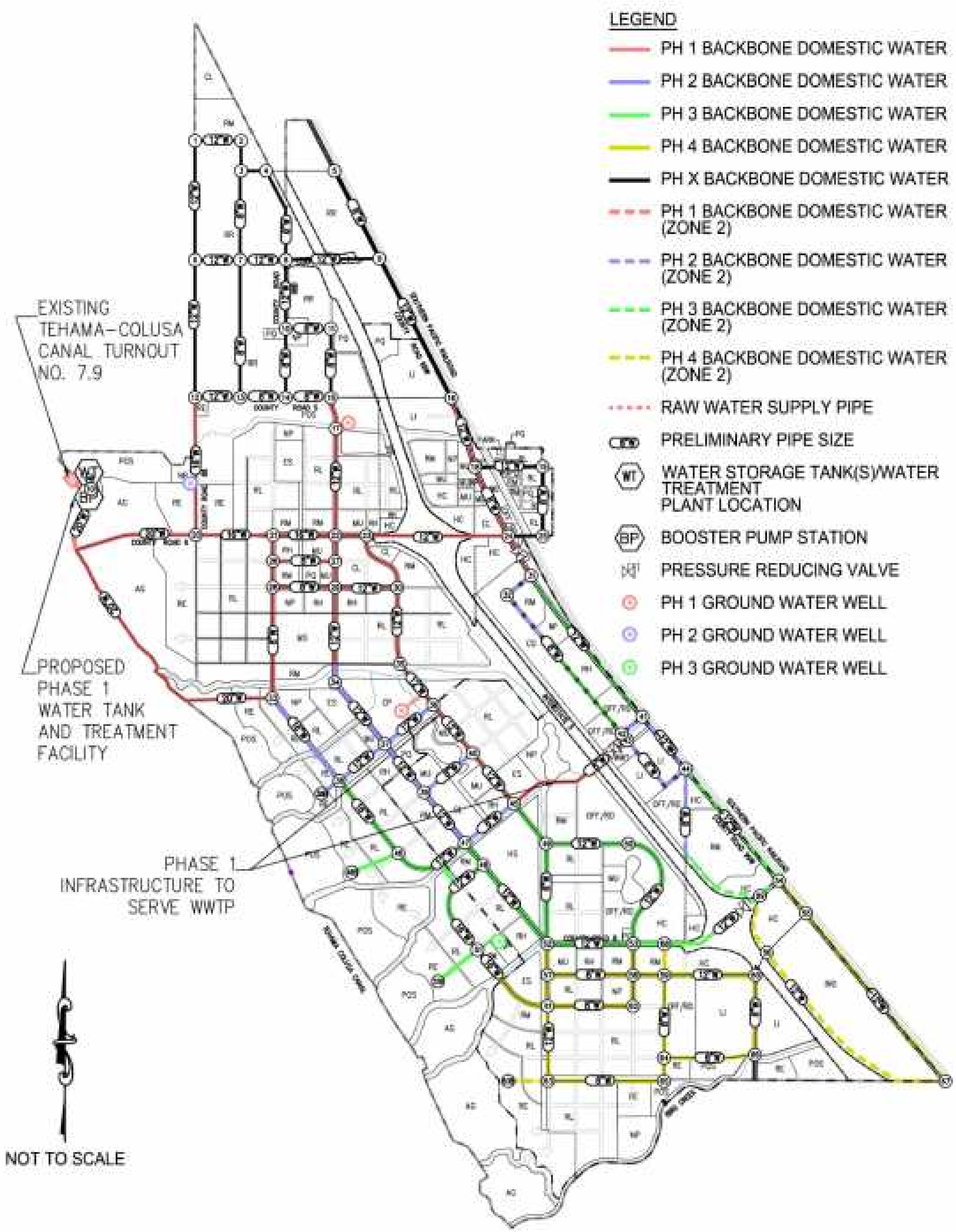


Exhibit 5.2: Backbone Potable Water System

The Plan Area will require new wells to supply supplementary water. The proposed well construction will be phased following completion of the well analysis study, including the installation of test wells to assess the water quality and aquifer production and drawdown. A program of water quality testing of samples from the test wells will inform the treatment requirements for well water. Appendix D describes the potential water quality anticipated to be encountered, potential well-head treatment, potential size of the proposed wells, and potential locations. As build out of the Plan Area progresses, demand projections may be periodically updated. The final number of new wells and storage volume required at full build out of the Plan Area may be adjusted per revised water demand projections.

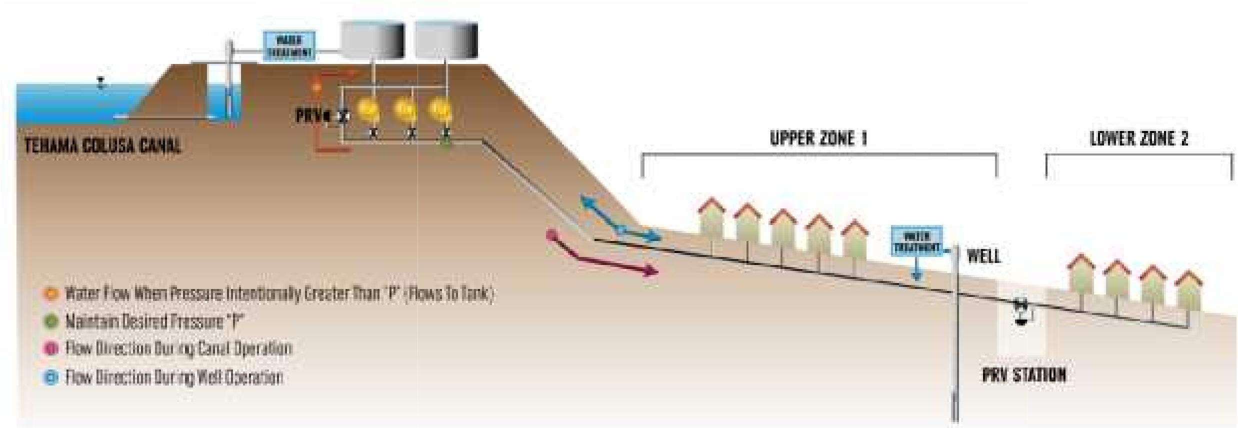
5.3.2.3 Potable Water Distribution System

A new municipal water distribution network will be provided in the Plan Area. The general arrangement of the proposed, phased water distribution piping is shown on Exhibit 5.2. A detailed Water Master Plan will be prepared after adoption of the Specific Plan and prior to development. The initial pressures and flows planned for the individual phases are included in the preliminary analysis, and will be finalized with the detailed Water Master Plan. Upon application for each Tentative Map, each project will be reviewed for consistency with the Water Master Plan. The Water Master Plan will identify adequate pressure and flows in accordance with the Yolo County standards and the water conservation provisions of the Dunnigan Specific Plan.

Distribution facilities are sized to provide delivery to meet water demands during peak hour conditions and at the same time meet fire protection needs. Peaking factors, fire flow requirements and a normal pressure range (typically 45 to 100 psi) are considered in planning and designing the distribution pipe network, as required by the County's Standard Specifications.

New “backbone” water lines will form the basis of a grid extending through the Plan Area as main roads are built. Within neighborhoods, it is anticipated that local distribution lines will typically be 8-inch diameter; “backbone” distribution lines in major roadway corridors will be larger. Looping of water mains will be required as individual neighborhoods are built out. As identified on the Exhibit 5.2, Backbone Potable Water System, multiple pipe crossings of Interstate 5 are necessary. These crossings will be accomplished through trenchless technology. The determination of which trenchless technology and the number of crossings required for any one development will be determined at the time of the Tentative Map application.

The Plan Area spans ground elevations from about elevation (EL) 50 at the southeastern limit, to around EL 190 near the Tehama-Colusa Canal. This elevation difference of approximately 140 feet corresponds to a static water pressure difference of about 55 psi. Because of this, the Plan Area requires two pressure zones. The upper zone (covering the higher ground elevations) will require booster-pumping to achieve the required flow and pressure. The required booster pump for the upper pressure zone would result in static pressures in the lower elevation that exceed the normal pressure range. As a result, a separate water infrastructure loop (lower pressure zone) will be required for the lower elevations. In order to provide adequate fire flows in the northern and southern portions of the lower pressure zone, this zone may require booster-pumping, but to a lesser extent than the upper zone. Groundwater will be connected to the upper zone with a connection to the water storage tanks through a pressure relief valve, as shown in the Pressure Zone Diagram on Page 5-10.



Pressure Zone Diagram

5.4 RECYCLED WATER SUPPLY AND DISTRIBUTION

The intent for the recycled water system is to irrigate landscape areas, including public landscaped medians, parks, greenways and landscaped front yards of the lower density residential areas. The source of water for the recycled water system is tertiary treated effluent from the Wastewater Treatment Plant (WWTP). The areas identified to receive recycled water are shown on Exhibit 5.3.

5.4.1 Existing Recycled Water Supply and Distribution

A recycled water system does not currently exist within the Plan Area.

5.4.2 Planned Recycled Water Supply and Distribution

In addition to the potable water system, it is envisioned that the areas identified in Exhibit 5.3 will be supplied with non-potable irrigation water. There are up to three potential sources of non-potable irrigation water: recycled water, untreated surface water from the Tehama-Colusa Canal or untreated groundwater. The primary source for the non-potable irrigation supply will be recycled water from the Wastewater Treatment Plant. Supplemental water will be provided using untreated water from the Tehama-Colusa Canal or untreated groundwater.

The use of recycled water in the Plan Area will reduce the use of potable water for irrigation water demand and reduce demands on the groundwater aquifer. The Sequential Batch Reactor (SBR), as described in Section 5.5.2, is capable of producing recycled water exceeding California's Title 22 standards for recycled water use.

The non-potable irrigation system is planned to distribute recycled water to the areas shown on Exhibit 5.3. The total water demand, including both indoor and outdoor land uses, is based on adjusted Yolo County standards, as shown in Appendix D. The portion of the total demand used for irrigation is based on the assumptions shown in Table 5.4 and further described in Appendix D.

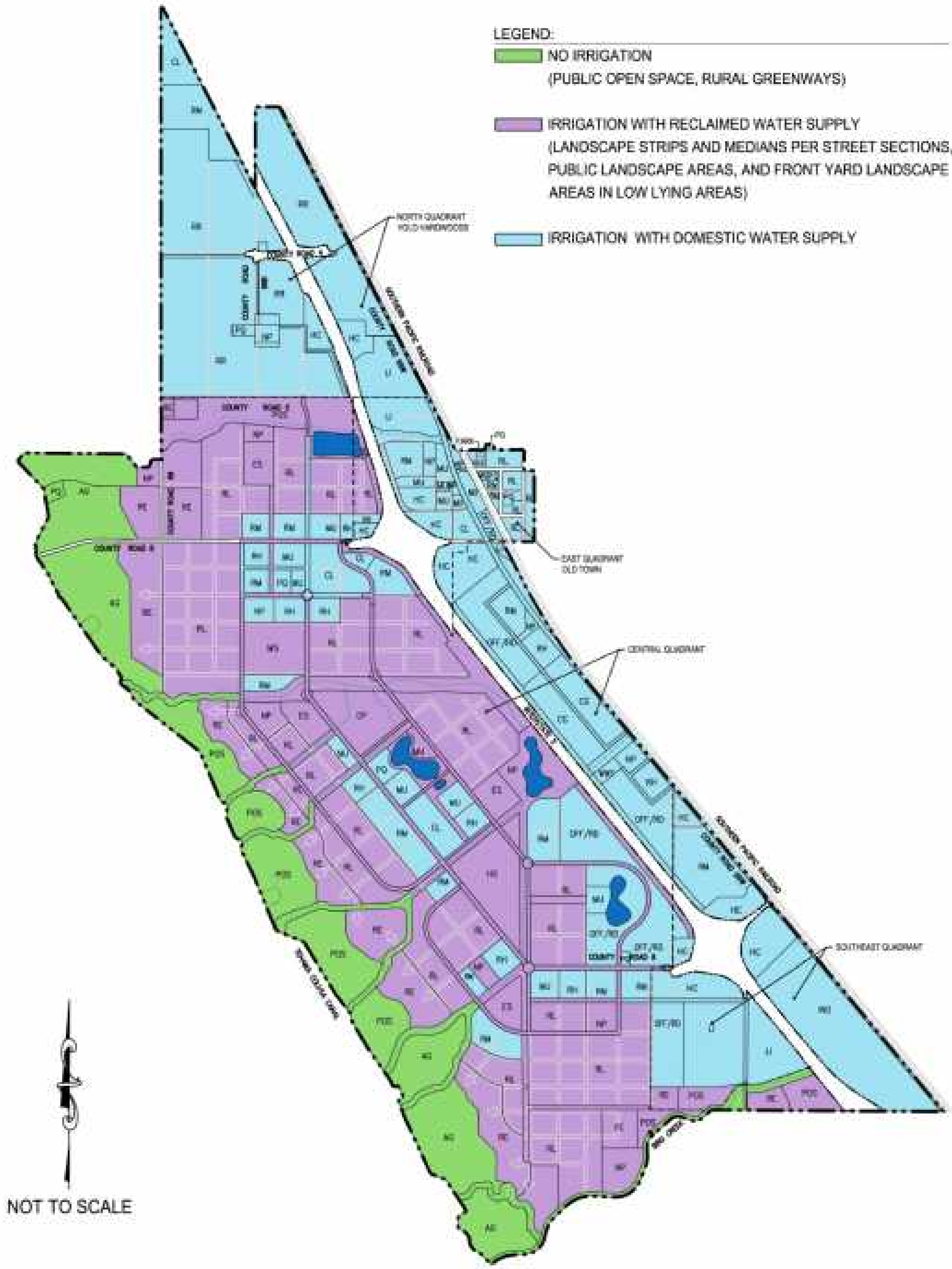


Exhibit 5.3: Distribution Areas for Non-potable Irrigation Water

It is anticipated that the approval of a discharge permit from the Regional Water Quality Control Board will be obtained following approval of the Specific Plan. The amount of storage required for the non-potable irrigation system will be a function of the rate of development relative to the time required to obtain a discharge permit. Prior to receipt of the discharge permit, interim wet weather storage will be required during the winter months for the flows associated with any portion of Plan Area development. An on-site temporary location for wet weather storage basin(s) has been identified and an analysis of the possible storage scenarios is described in detail in Appendix D. Appendix D also presents alternatives based on the timeframe of discharge permit approval. These scenarios are presented as Alternative 1 and Alternative 2.

Once the discharge permit is acquired, the storage of the recycled water for irrigation is proposed to be in Lake #2, which is the located adjacent to the Community Park. This lake is centrally located for efficient distribution throughout the Plan Area. Recycled water will be pumped from the WWTP to Lake #2, and then pumped from the lake as needed into a non-potable water distribution system (purple pipe) for use as landscape irrigation water.

Table 5.4: Outdoor Water Consumption by Land Use

Land Use	% of Permeable Area For Irrigation
RE-Rural Estates	35%[1]
RL-Residential Low Density	30%[2]
Parks (POS)	95-100%[3]
Open Space Areas (Greenways)	75%
Public Uses (ES, MS, HS)	50%[4]

1 Assumed: Average net lot size 20,000 s.f.; Max. lot coverage: 35%= 8,800 s.f. house footprint, other impervious areas:; 30%=6,000, remaining pervious area **35**%=7,000 s.f./RE du

2 Assumed: Average net lot size: 5,500 s.f.; Max. lot coverage: 40%=2,200 s.f. house footprint, other impervious areas:; 30%=1650, remaining pervious area **30**%=1,650 s.f./RL du

3 Assumed: Nearly all area is permeable

4 From the UC Davis Center For Water and Land Use

Based on these percentages, irrigation use of non-potable water will result in a reduction to the total potable water demand of approximately 23.9%. This irrigation use will require approximately 1.30M gallons per day of recycled water.

5.5 WASTEWATER COLLECTION AND TREATMENT

This section describes the proposed wastewater collection and treatment plan for the Plan Area, in conformance with the intent of the following principles and guidelines:

- Prior to approval of the first tentative map or other development in the Plan Area, a comprehensive final wastewater infrastructure plan will be completed identifying an acceptable wastewater collection, treatment, and reuse/discharge system. The wastewater infrastructure plan will be consistent with the County’s General Plan, and will meet the County's standard specifications or an acceptable alternative.

- The final design will seek to reduce operational complexities and maintenance requirements of the system. The design will also seek opportunities for energy efficiency in wastewater collection, treatment and reuse/discharge.

5.5.1 Existing Wastewater Collection and Treatment

The Plan Area is not served by a public wastewater collection and treatment system. The existing Old Town, Hardwoods, the Country Estates mobile home development and highway commercial areas were served by either, private onsite wastewater treatment systems (septic tanks) or one of nine small private wastewater pond treatment systems, which do not receive any secondary treatment.

5.5.2 Planned Wastewater Collection and Treatment

The Plan Area will be served by a municipal wastewater collection system and central Wastewater Treatment Plant (WWTP). The general arrangement of the planned collection system is indicated in Exhibit 5.4. A larger version of this exhibit is provided in Appendix E, Wastewater Technical Appendix. It is estimated that the Plan Area, including the existing development, will generate an average daily wastewater flow of approximately 2.2M gallons per day at build out, as shown in Table 5.5.

Table 5.5 :Wastewater Demand Summary By Phase

Phase	Average Daily Flow (ADF) [2] (gpd) [5]	I & I (gpd)	Average Daily Flow (ADF) [2] with I&I (gpd) [5]	Peak Daily Flow[4] with I&I (gpd) [5]	Peak Daily Flow[4] with I&I (AF/yr)
Phase 1	600,800	357,480	958,300	2,159,900	2,419
Phase 2	416,300	299,940	716,200	1,548,800	1,735
Phase 3	180,600	254,520	435,100	796,300	892
Phase 4	366,200	264,240	630,400	1,362,800	1,526
Phase Existing (X)	553,600	357,360	911,000	2,018,200	2,261
Total	**2,117,500**	**1,533,540**	**3,651,000**	**7,886,000**	**8,833**

[1] Reduction to County standard demands based on 2.6 pph for the Dunnigan Specific Plan Area & the use of E friendly fixtures throughout the Dunnigan Specific Plan Area
[2] Average Daily Flow (ADF) = Average Day Demand x Wastewater Reclamation Facility Peaking Factor (1.0)
[3] Inflow and Infiltration (I & I)= Service Area x 600 gpd/acre (Yolo County Improvement Standards, Section 7)
[4] Adjusted Peak Daily Flow = ADF x Pipe Sizing Peak Factor (3.0)
[5] Gallons per day rounded to the nearest 100 gallons
[6] See Appendix E Tables 1 through 5 for more detailed information

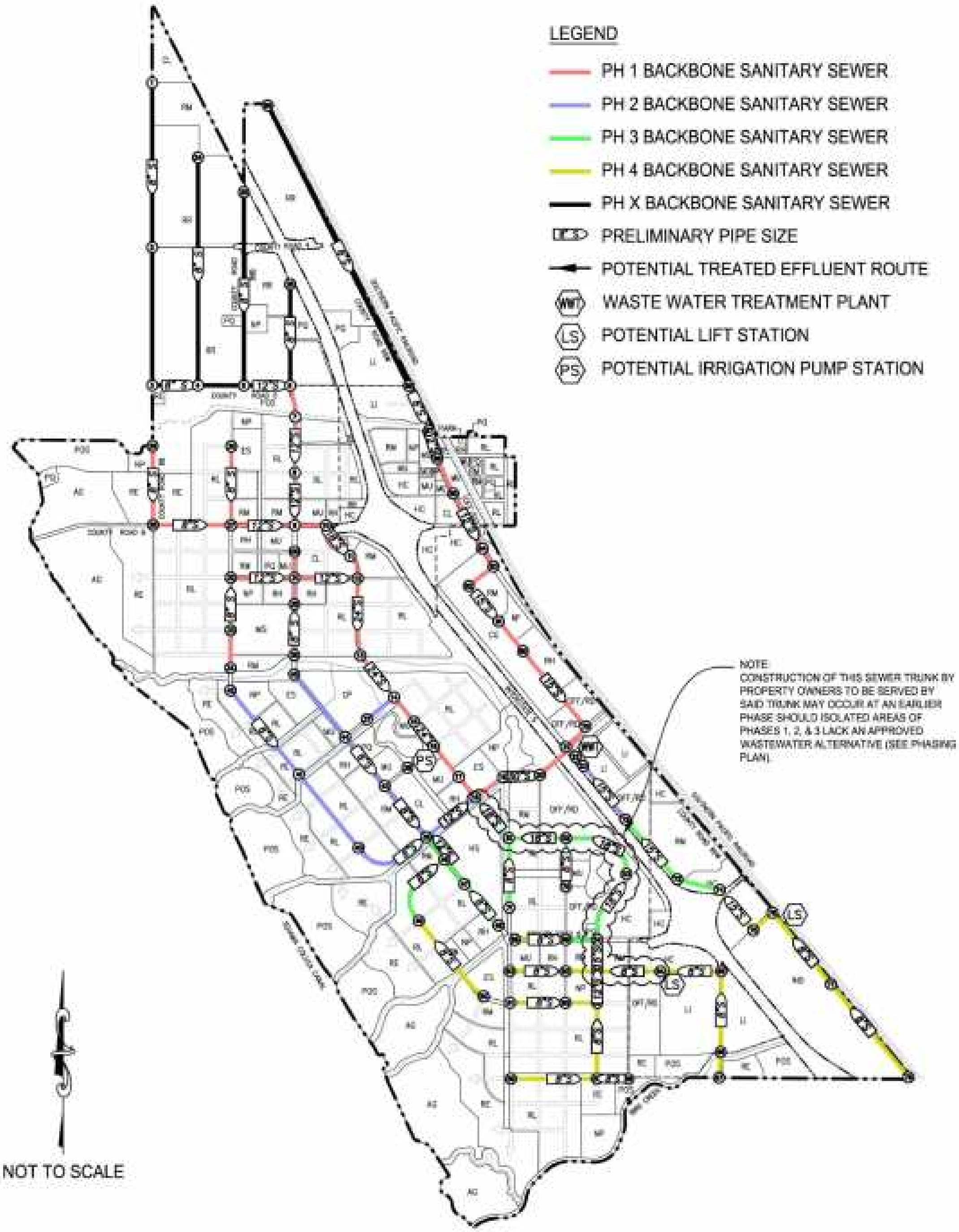


Exhibit 5.4: Backbone Sanitary Sewer System

Effluent that exceeds California Title 22 treated effluent standards can be achieved with an SBR Plant with ultraviolet (UV) treatment. In addition, due to essentially no exterior odors produced by the SBR system, it can be sited within the limits of the Plan Area to maintain consistency with the County General Plan. A Customized Design Report (CDR) will be prepared to provide details regarding the components, conceptual layout, architectural renderings, and phasing of the SBR plant subsequent to DSP approval and prior to approval of the first Tentative Map. The SBR plant will be constructed in stages which correlate to the wastewater flows from the phases of the development. The first stage will develop a 0.75 mgd plant, which allows for 0.15 MGD additional treatment capacity for phase 1. Two subsequent construction stages for the waste water treatment plant are anticipated, with a total capacity of the ultimate waste water flows of 2.2M gallons per day, as projected in Table 5.5.

5.6 DRAINAGE AND FLOOD CONTROL

The proposed Plan Area drainage infrastructure and stormwater management system addresses the existing flood hazard constraints/drainage limitations of the area while mitigating hydrologic impacts and providing the required stormwater quality treatment. In addition, the proposed drainage infrastructure elements have been creatively planned to provide aesthetic benefits and integrate elements of sustainability while adding long term value to the community.

5.6.1 Watershed Description

The Plan Area is encompassed by three regional watersheds associated with the existing drainage systems which generally drain from west to east and include (1) Bird Creek to the south, (2) Azevedo Drain in the central portion, and (3) Dunnigan Creek to the north. These watersheds, illustrated on Exhibit 5.5, Regional Watershed Map, originate west of the Plan Area in the Hungry Hollow and Dunnigan Hills, which have significant topographic relief. The watersheds drain to the east into the relatively flat Colusa Basin and ultimately the Colusa Canal. These watersheds are primarily undeveloped and the majority of the soils are composed primarily of hydrologic soil group C and D, which are less permeable and have a higher runoff potential. Exhibit 5.6 depicts the Regional Hydrological Soils Map. The corresponding tributary drainage area of each watershed at the I-5 freeway crossing is approximately 5.38 square miles to Dunnigan Creek, 4.58 square miles to Azevedo Drain, and 18.80 square miles to Bird Creek. The distribution of the Plan Area acreage and the relative percentage is approximately 856 acres to Dunnigan Creek (27%), 1978 acres to Azevedo Drain (64%), and 333 acres to Bird Creek (11%). The average annual weighted precipitation in Dunnigan is approximately 20.20 inches, the estimated 100-year 24-hour precipitation is approximately 4.99 inches, and the 200-year 24-hour precipitation is 5.41 inches (an increase of 8.4% between 100-year and 200-year). A detailed regional hydrology analysis was prepared using HEC-1 and XP-SWMM watershed models to establish the baseline 100-year and 200-year flows, consistent with Yolo County standard hydrology procedures and guidelines. The results are summarized in Appendix F, Hydrologic and Hydraulic Analysis and Impacts Assessment. In addition, some of the regional watershed hydrology results are presented in Table 5.6.

5.6.2 Existing Drainage and Flood Control

The current drainage facilities in the Plan Area are relatively minor, with limited hydraulic capacity, and generally consist of earthen channels that have been constructed as part of the commercial agricultural operations for Dunnigan Creek, Bird Creek, and Azevedo drain within the Colusa Basin area. There are existing culvert crossings on these regional drainages for the I-5, County Road 99, and the California Northern Railroad which are hydraulic restrictions because they have insufficient hydraulic capacity associated with the limited flow area of culverts/bridges. These drainage crossings influence the Plan Area because they limit the amount of flow to the downstream channel system, and create floodplains well outside the existing channel limits upstream of the crossing location because of the hydraulic restrictions. Improving these restrictions through increasing the hydraulic capacity or constructing new expanded culvert/bridge facilities would result in relocating flooding downstream and increasing flows to the downstream channels which had not been previously experienced. Table 5.6 summarizes the approximate hydraulic capacity estimate from the hydraulic study prepared on the creeks and estimated 100-year and 200 year flowrates for each of the regional drainage crossings.

Table 5.6: Baseline 200 & 100 year Flow Rates for Pre-Specific Plan Conditions

	Existing Regional Drainage Crossings Hydrology & Capacity					
Watershed	I-5 Freeway Crossing Flowrate			Culvert/Bridge Hydraulic Capacity (cfs) (Estimated per Hydraulic Analysis)		
	Area (sq. miles)	200-year Flowrate (cfs)	100-year Flowrate (cfs)	I-5	County Road 99	Railroad
Dunnigan Creek	4.95	1,989	1,759	1,350	750	700
Azevedo Drain	3.77	1,953	1,7323	2,900	1,950	3,500
Bird Creek	18.57	5,116	4,500	2,850	3,450	3,600

The existing earthen embankment for Tehama Colusa Canal blocks direct surface drainage from the smaller tributary watersheds to the west of the Plan Area, but a series of 13 culverts convey the flows corresponding to the existing drainage courses under the canal, as shown on Exhibit 5.7, Existing Drainage Facilities. These culverts for the canal undercrossings are generally small diameter pipes ranging from 18-inch to 30-inch, but the largest is a 4-4'x4' RCB for the Dunnigan Creek crossing. A summary of all the existing drainage facilities which surround and influence the Plan Area are illustrated in Table 5.2 found in Appendix F and correspond to the locations indicated on Exhibit 5.7, Existing Drainage Facilities.

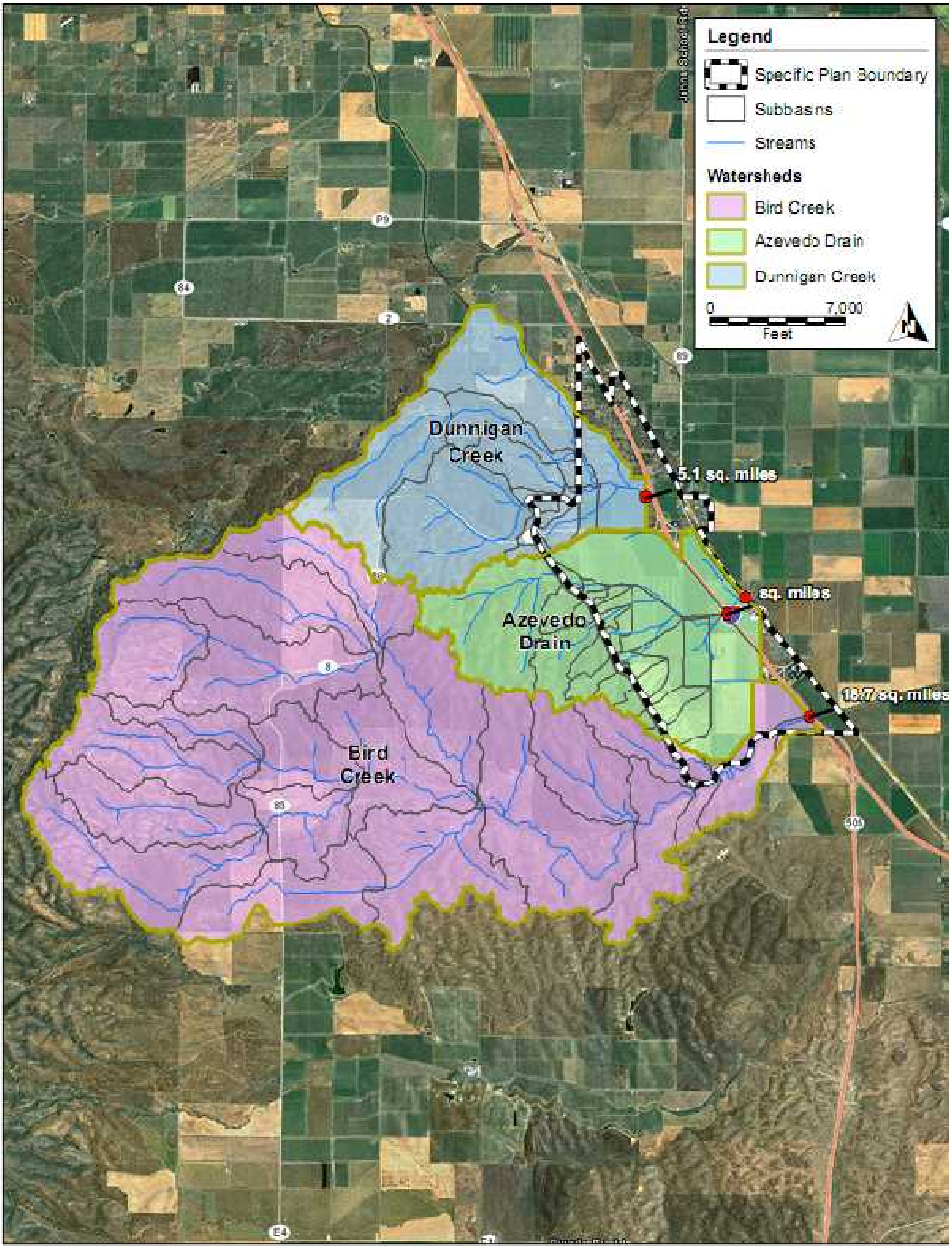
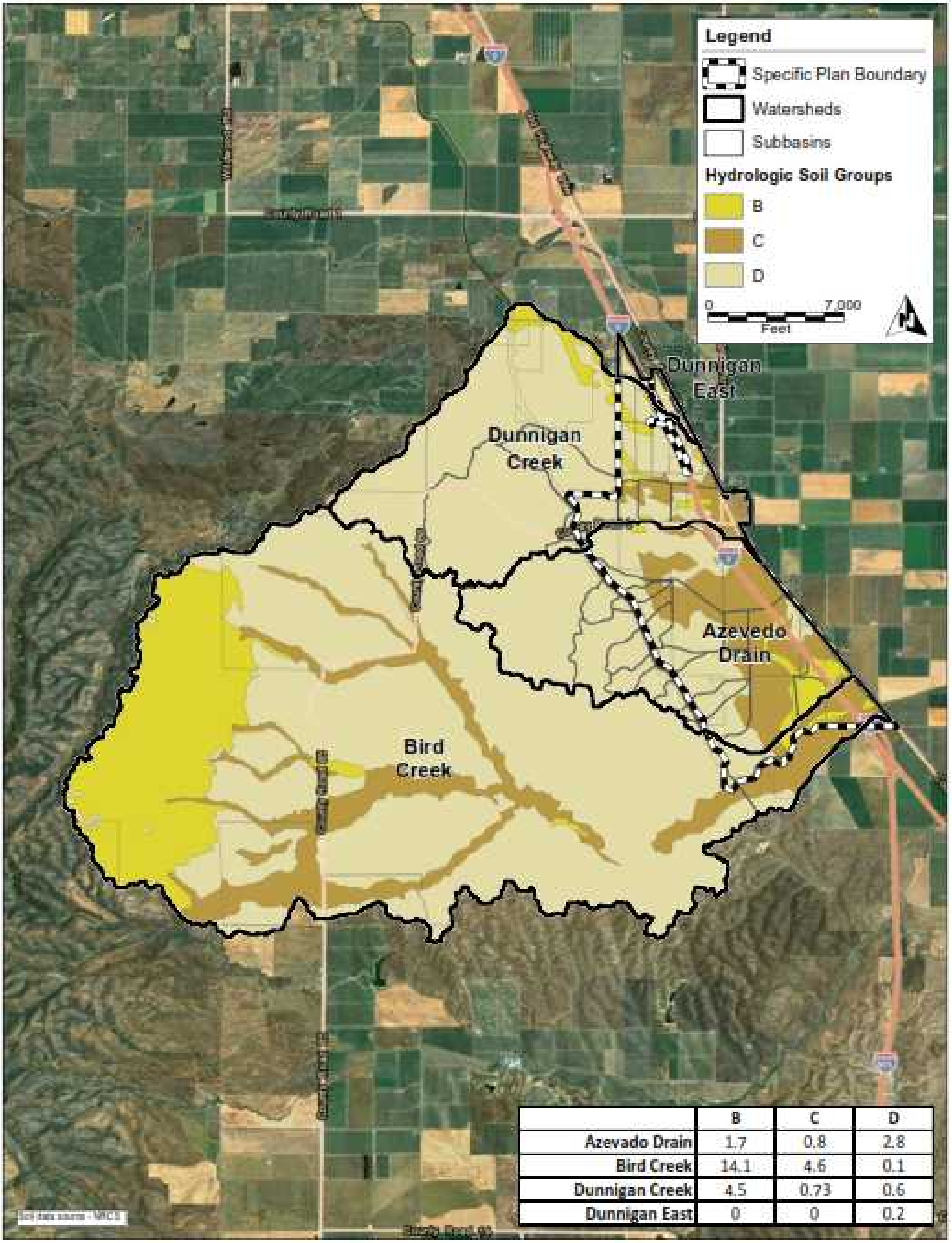


Exhibit 5.5 Regional Watershed Map



	B	C	D
Azevado Drain	1.7	0.8	2.8
Bird Creek	14.1	4.6	0.1
Dunnigan Creek	4.5	0.73	0.6
Dunnigan East	0	0	0.2

Exhibit 5.6- Regional Hydrologic Soils

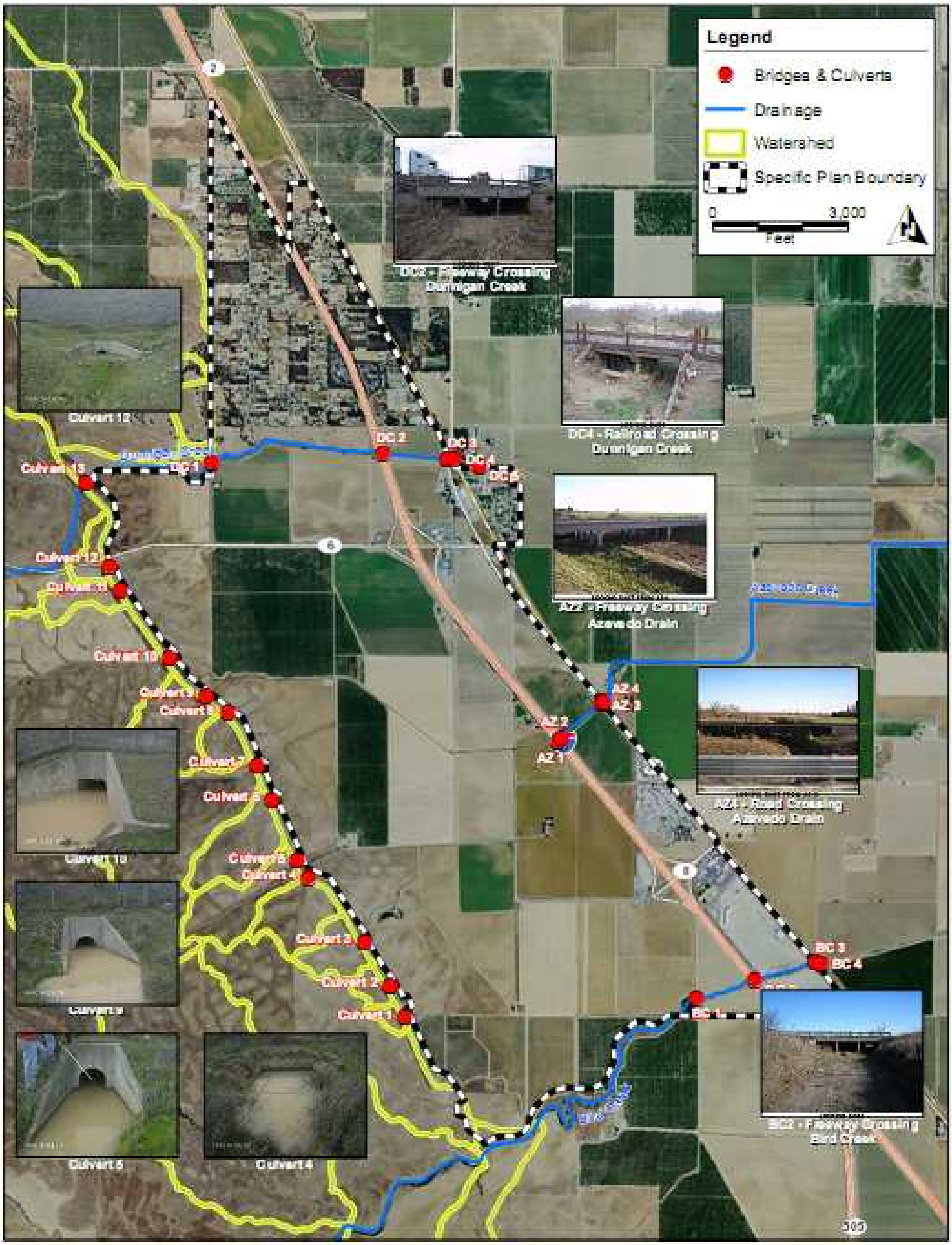


Exhibit 5.7 Existing Drainage Facilities

5.6.3 Existing Regional Floodplain

The Federal Emergency Management Agency (FEMA) has mapped flood hazards for the 100-year floodplain which encumber portions of the Plan Area, corresponding to the primary regional drainage courses, Dunnigan Creek and Bird Creek, with Zone A. These are illustrated on Exhibit 5.8 FEMA Flood Hazard Zones representing the current published Flood Insurance Rate Maps (FIRM) for Yolo County (FIRM panels 06113C00125G and 06113C0275G) which have been revised and became effective June 2010. Yolo County is a participant in the National Flood Insurance Program (NFIP) and must adopt / enforce minimum floodplain management standards including identification of flood hazards and flooding risks. In addition, California has adopted a 200-year level of flood protection requirement under Section 50465 of the Health and Safety Code for urbanizing areas in the Central Valley which has also been incorporated in the Yolo County drainage criteria.

The published FIRM for the Plan Area does not necessarily depict the most accurate 100-year floodplain boundaries and a more detailed hydrologic / hydraulic analysis was conducted to more accurately establish the baseline floodplain limits for the specific plan. Regional hydrologic watershed models were generated utilizing HEC-1/ HEC-HMS while the detailed floodplain hydraulic models were generated in HEC-RAS/Geo-RAS utilizing digital topography as well as field surveyed information of the existing drainage facilities. These detailed hydraulic analyses of the regional channel floodplains for Bird and Dunnigan Creeks indicated that both the engineered channels and the culvert/bridge crossing for the roadways/railroads do not have sufficient capacity for the existing 100-year flows, resulting in large floodplains outside the channel limits upstream of the hydraulic restrictions.

The detailed hydraulic analysis of these Plan Area floodplains, shown on Exhibit 5.9, Bird Creek Floodplain and Exhibit 5.10, Dunnigan Creek Floodplain, illustrate portions of the northern and southern areas within the Plan Area, west of the I-5 freeway. These areas are encumbered by the 100-year floodplain, but it is generally shallow flooding from flows overtopping the existing channel near the freeway. In addition, the existing engineered earthen channels or drainage canals for the three major regional systems downstream of the Plan Area boundary do not have sufficient capacity for either the existing 100-year or 200-year flows because of the relatively small channel geometry and the topography in the valley floor of the Colusa Basin is extremely flat. These characteristics result in a wide shallow floodplain in the valley floor extending from the Colusa Canal and this regional flooding trend is illustrated on the FIRM as shown on Exhibit 5.8, FEMA Flood Hazard Zones.

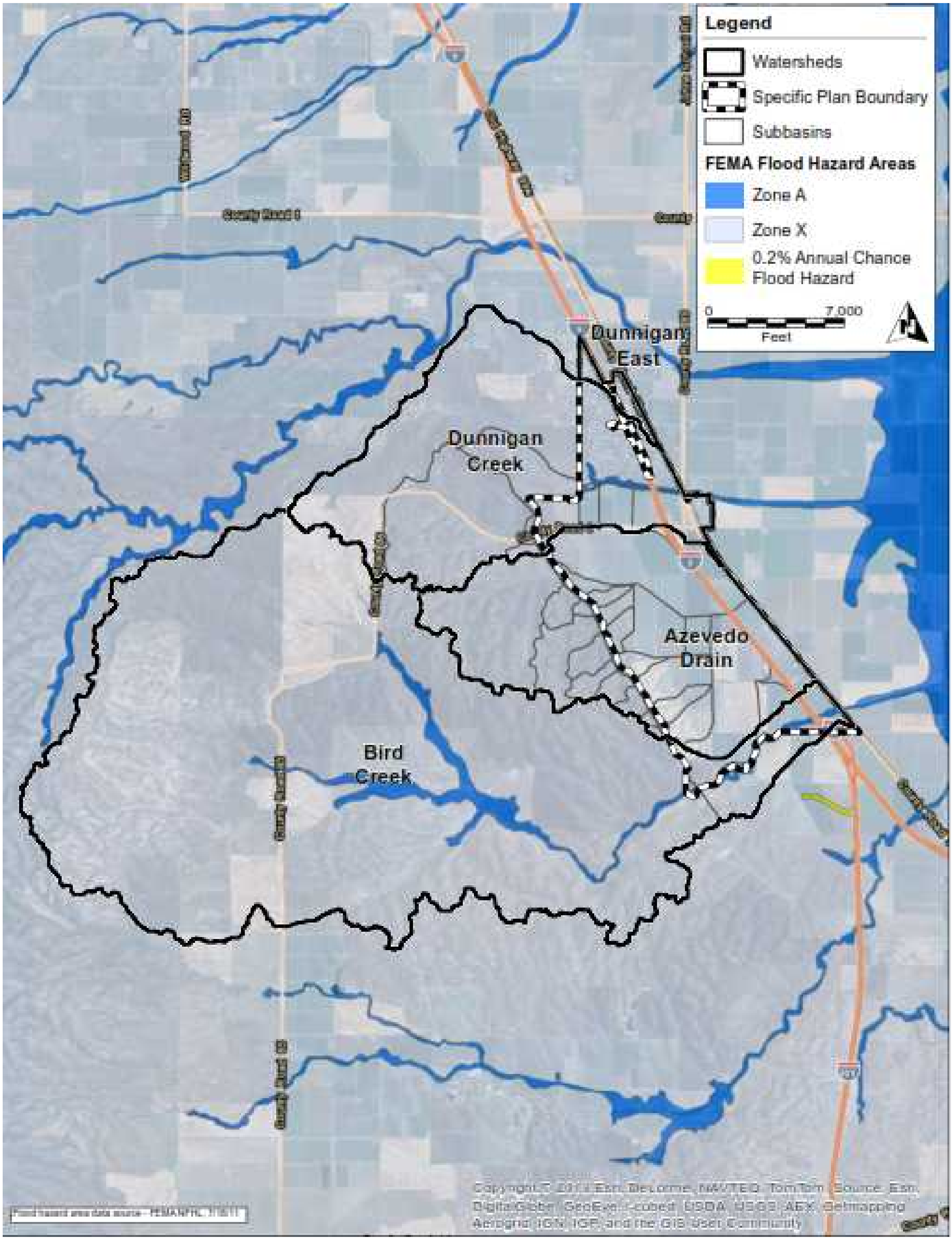


Exhibit 5.8 FEMA Flood Hazard Zones

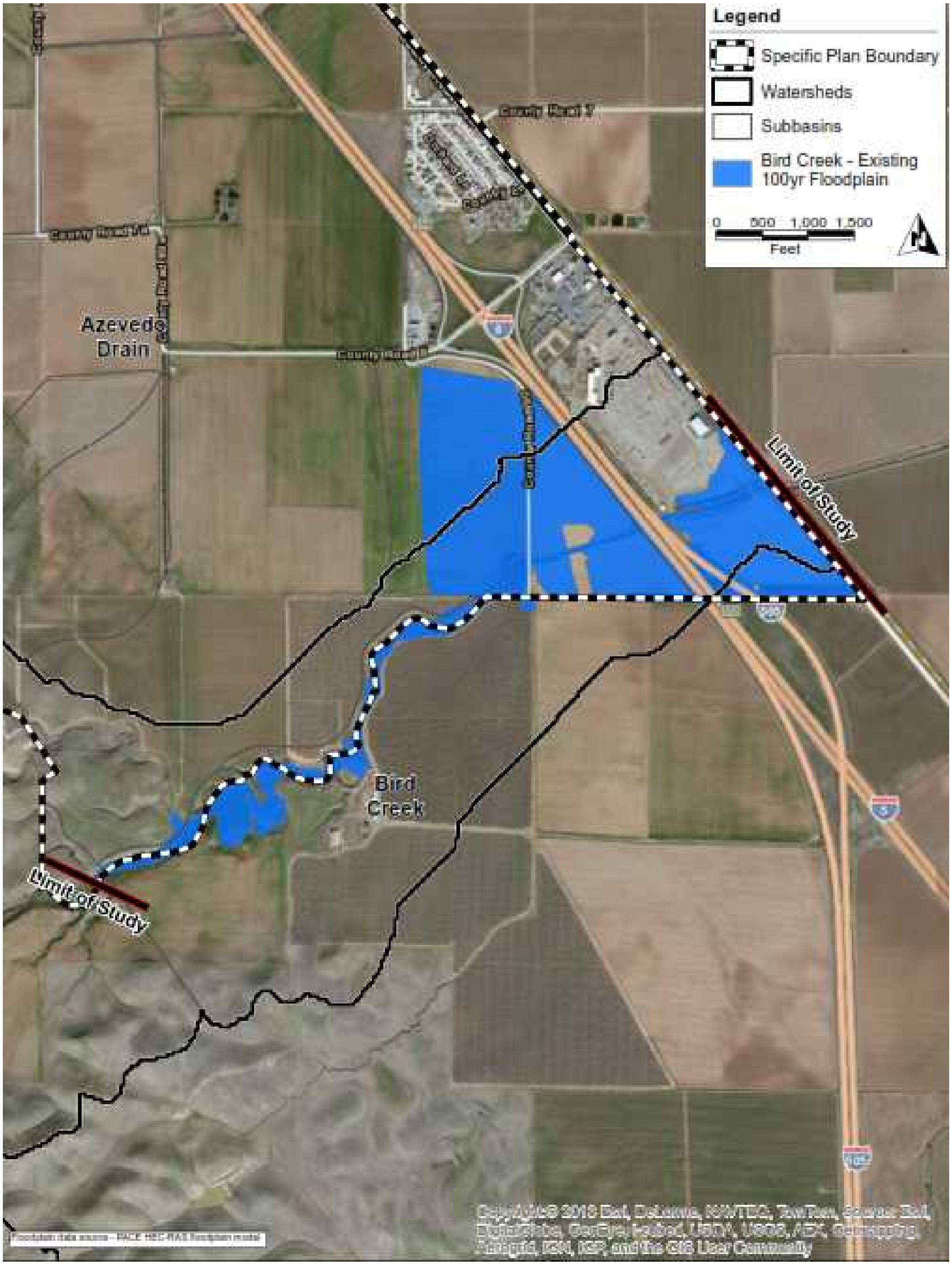


Exhibit 5.9 Bird Creek Existing Floodplain

Exhibit 5.10 Dunnigan Creek Existing Floodplain

5.6.4 Planned Drainage Improvements

The proposed drainage system improvements can generally be divided between onsite stormwater collection/conveyance/treatment facilities for urban runoff and regional flood protection from the existing creek floodplains. The regional flood protection improvements consist of stormwater storage facilities that detain flows in order to meet the limiting capacity of the existing hydraulic restrictions. The onsite drainage improvements consisting of underground storm drain pipe, landscaped drainage corridors, combined water quality/flow attenuation detention basins, and manmade lake systems. The onsite drainage infrastructure correspond to the three regional watersheds; Dunnigan Creek, Azevedo Drain and Bird Creek. The onsite drainage infrastructure has been designed to achieve significant inherent stormwater management benefits which will: (1) mitigate increases in peak flowrate from the development to below the existing conditions, (2) direct all stormwater to pass through treatment facilities (3) mitigate existing flood hazards within the Plan Area and improve existing downstream flooding through peak flow reduction from onsite temporary runoff storage, (4) collect and recycle nuisance and dry-weather urban flows, and (5) provide aesthetic and natural elements through integration of manmade open water bodies and natural manmade stream corridor systems that can provide a passive recreational feature. The proposed drainage improvements, stormwater management facilities, and flood protection for the project will be designed to meet the Yolo County requirements outlined in the *County of Yolo – Improvement Standards* (2008), *Yolo County City/County Drainage Manual (Volume 1)* (rev. February 2010), and *Yolo County City/County Drainage Manual – Storm Water Treatment Measures (Volume 2)* (rev. February 2010). These guidelines address requirements from FEMA flood protection as well as State Floodsafe minimum standards and minimum NPDES / RWQCB standards for stormwater water quality.

5.6.5 On-site Drainage Infrastructure

The onsite drainage facilities, shown on Exhibit 5.11, Proposed Onsite Drainage Facilities, illustrate the preliminary infrastructure plan to accommodate the storm runoff generated within Plan Area. The drainage facilities are divided between the three major regional watersheds and maintain the same tributary drainage areas. A larger version of this exhibit is provided in Appendix F. The proposed onsite drainage plan includes the following:

(1) Conventional underground storm drain pipe for collection of localized urban runoff;
(2) constructed landscaped drainage corridors which provide the primary drainage conveyance through the project and also integrate multi-function stormwater basins along both sides of the corridors for treatment and detention;
(3) manmade lake systems used as for drainage conveyance and temporary stormwater storage in some of the development areas; and
(4) preservation and enhancement of the upstream natural drainage corridors entering the Plan Area.

The development of stormwater mitigation depicted in Figure 5.11, Development Stormwater Mitigation Facilities, will include a variety of treatment system including the combined water quality treatment basins as well as the manmade lake systems, various low impact development (LID) features for stormwater control and stormwater detention facilities to attenuate the peak discharge from the development to avoid impacting existing downstream hydraulic restrictions. A separate detailed hydrologic/hydraulic model utilizing XP-SWMM was generated for preliminary design and analysis of the onsite drainage facilities consistent with the Yolo County requirements. Refer to Appendix F for detailed information on the modeling and resulting sizing of the backbone drainage system. Results from the onsite XP-SWMM model are illustrated in the different facility sizing of the onsite backbone drainage system and the runoff storage volume requirements as part of stormwater mitigation for both water quality and flood protection.

Localized surface runoff generated from the development areas and streets from the local watershed areas, illustrated on Exhibit 5-12, Onsite Watershed Map, will be initially intercepted by surface inlets and collected in an underground storm drain pipe system that will be primarily located within the street right-of-way. The storm drain system will be designed with a minimum for 10-year flow capacity, while checking the systems function to provide both a minimum of a 100-year and 200-year level of flood protection within the development areas using the streets for overland flow. The intent is to limit the amount of underground pipe (secondary system) and rely on landscaped drainage corridors (primary system) as the major hydraulic conveyance system within the Plan Area which will provide both 100-year and 200-year level of flood protection with different freeboard (safety factor) per Yolo County standards.

The layout of the storm drain collection system is intended to convey surface runoff to the closest landscaped stream corridor channel or lake system. The stormwater collected in the storm drain pipes will outlet at either a combined detention/water quality basin or a manmade lake for treatment and stormwater peak attenuation. All stormwater runoff generated within the Plan Area will be treated prior to discharging into the landscaped drainage channel corridors or existing regional drainage courses.

The multi-function detention/water quality basins will be located on either side of the landscape drainage corridor and provide storage for both water quality treatment as well as peak flow attenuation. The basins would be designed to meet the minimum Yolo County requirements for detention basin facilities as well as meeting the primary objective of attenuating the peak 100-year development flowrate to below the hydraulic capacity of the smallest downstream regional culvert/bridge restriction. The channel geometry and grading design of the site provide the 200-year level of protection with the minimum freeboard criteria outlined in the Yolo County standards as well as other incorporating the additional design requirements for open channel systems including maintenance and access features. This ensures that the development runoff peak flowrate will be mitigated to a level below the existing condition values as well as improving the existing downstream flooding issues associated with the hydraulic limitations. The stormwater attenuation uses the combined onsite storage from the landscaped corridor detention basins and temporary surcharge storage of the manmade lake systems.

The underground storm pipe system will collect surface stormwater generated from the smaller local planning development areas based on the 10-year storm event and convey it to one of the storm water mitigation facilities which include the primary drainage corridors that contain the combined attenuation/treatment basins or manmade lake systems.

Manmade naturalized drainage corridors will serve as the primary drainage conveyance for urban runoff collected in the Azevedo Drain watershed and are designed based on County Improvement Standards to provide the 100-year and 200-year protection with the corresponding appropriate freeboard. This open channel corridor will be a relatively wide landscaped drainage channel that will be designed with geomorphic features resembling natural stream systems including meandering alignment, variable widths, and alternating variable terraces. Onsite roadway culverts/bridges will be provided at all locations where the onsite road system crosses the open channels and these facilities are designed to hydraulically convey the 200-year flowrate so that the maximum water surface is contained within the channel.

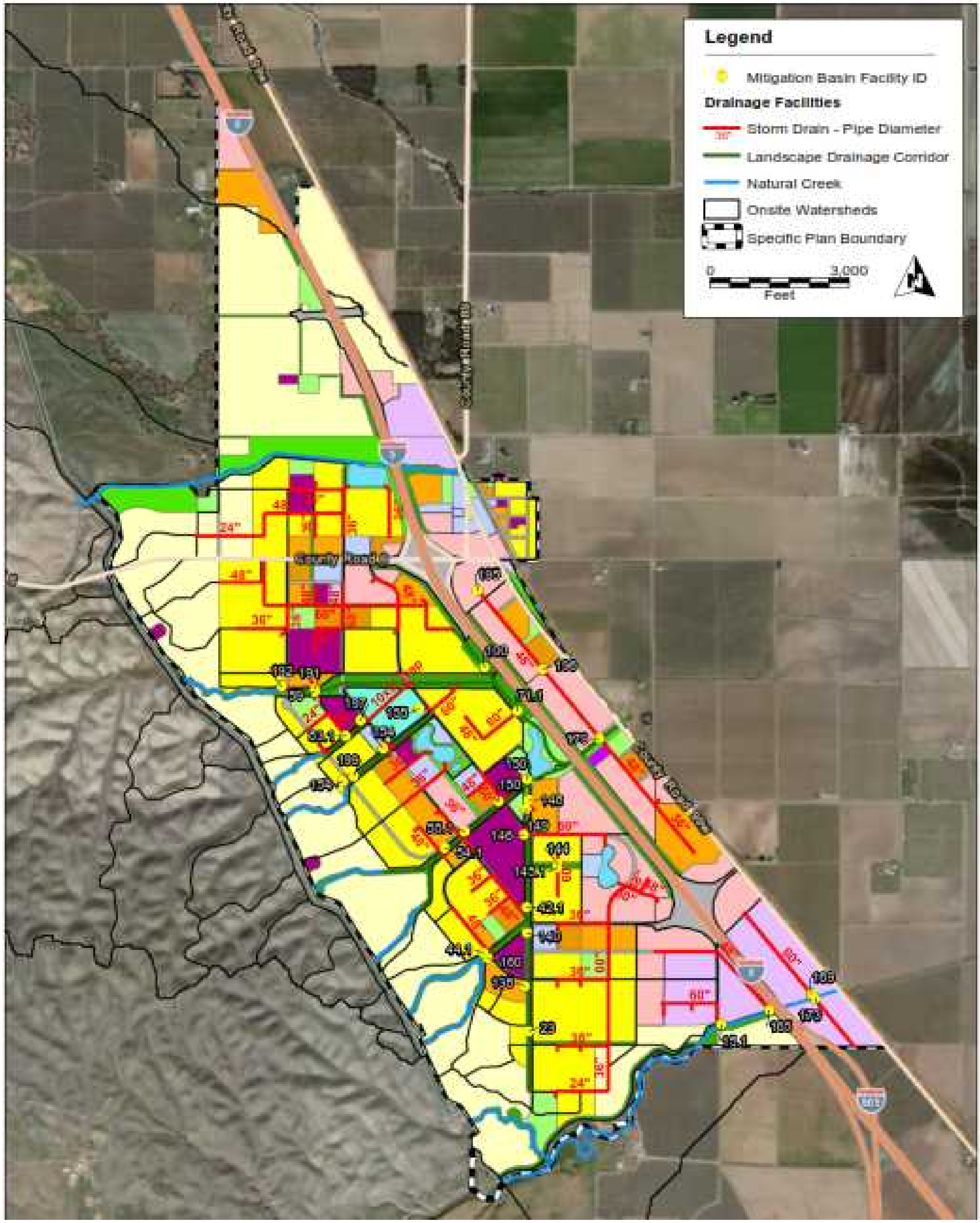


Exhibit 5.11 Proposed On-Site Drainage and Stormwater Mitigation Facilities

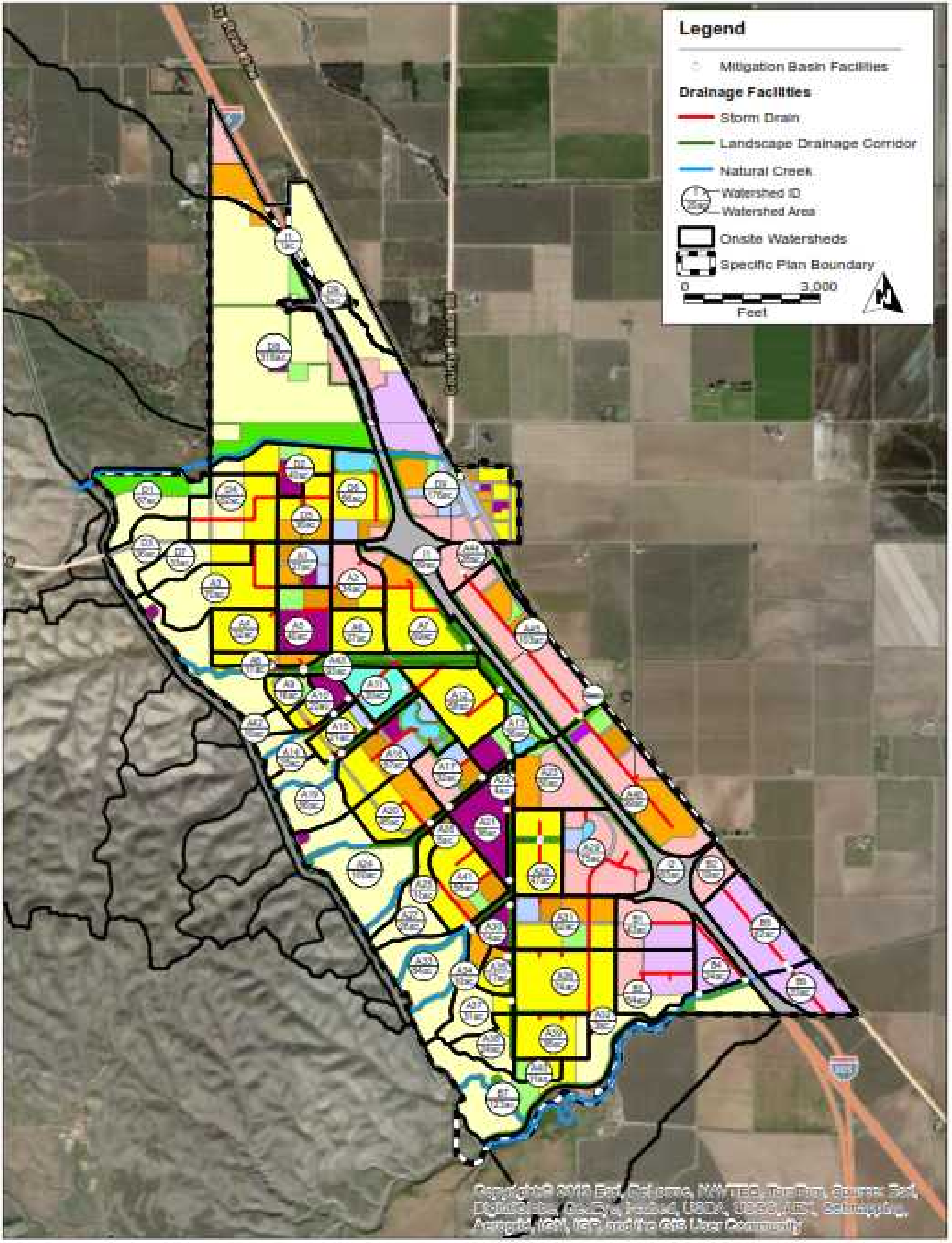


Exhibit 5.12 On-site Watershed Map

The landscape drainage corridors will also include multi-function stormwater mitigation basins integrated along the fringes of the corridors that will provide treatment for all the storm drain outfalls prior to discharging from the development. These basins will have sufficient storage to provide volume for stormwater quality treatment and peak flow attenuation. Specialized features will be provided in the basin for water quality treatment with extended detention outlets and vegetative features to accommodate dry weather flows. The basins will provide the necessary flood peak storage above the water quality storage volume corresponding to the 85% annual rainfall capture volume.

Manmade lakes will be utilized to provide stormwater conveyance and temporary storage for peak attenuation within different development areas. In addition, the manmade lakes will provide offline storage to alleviate the hydraulic restriction at the existing Azevedo Drain freeway culvert crossing. Lake 1 is located within the Dunnigan Creek watershed and Lakes 2, 3, and 4 are located in the Azevedo watershed. Lake 2 is proposed to be utilized for recycled water storage.

Table 5.7 Summary of Proposed Drainage Improvements

Onsite Drainage Infrastructure Facility by Watershed

Item	Unit	Dunnigan Creek	Azevedo Drain	Bird Creek	Total
Storm Drain 24" RCP	LF	100	600	-	700
Storm Drain 36" RCP	LF	1,600	10,600	-	12,200
Storm Drain 48" RCP	LF	6,900	17,900	1,300	26,100
Storm Drain 60" RCP	LF	-	26,300	6,600	35,300
Landscape Drainage Corridors	LF	3,700	36,000	2,400	42,100
Lakes (area)	AC	8.2	20.6	-	28.8
Total Basins & Lakes	EA	1 Lake	3 Lakes/33 Basins	4 Basins	4 Lakes/ 37 Basins

5.6.6 Regional Drainage Improvements

Regional drainage improvements will include creation of an "off-channel" detention basin for Dunnigan Creek immediately upstream of the I-5 freeway to remedy the existing downstream hydraulic restrictions. This facility will be a "flow-by" regional basin that will provide offline storage to attenuate the 100-year/200-year peak flowrates to an amount so that it does exceed the hydraulic capacity of the downstream railroad culvert/bridge. The estimated existing 200-year flowrate in Dunningan Creek at the I-5 freeway bridge is 2,220 cfs while the estimated hydraulic capacity of the downstream railroad bridge is approximately 700 cfs.

The basin will be located in the open space area north of the existing creek which already forms a natural depression with significant storage volume shown on Exhibit 5.13 (Dunnigan Creek Regional Detention Basin Facility). Additional grading will be required to develop the basin configuration/geometry to provide sufficient volume as well as a 200-foot long lateral side-weir for scalping channel flows and a low-level outlet to meter return flows to the creek. HEC-1/HEC-RAS models were utilized to analyze the hydrologic routing of the detention basin based on a preliminary grading design concept with a maximum available storage volume of 184 acre-feet with a gravity outlet from the basin. The proposed design would attenuate the peak 200-year flowrate (Qin = 389cfs and Qout = 37 cfs) with a resulting combined flowrate at the I-5 to approximately 1,746 cfs with a maximum 200-year storage in the basin of 88 acre-feet.

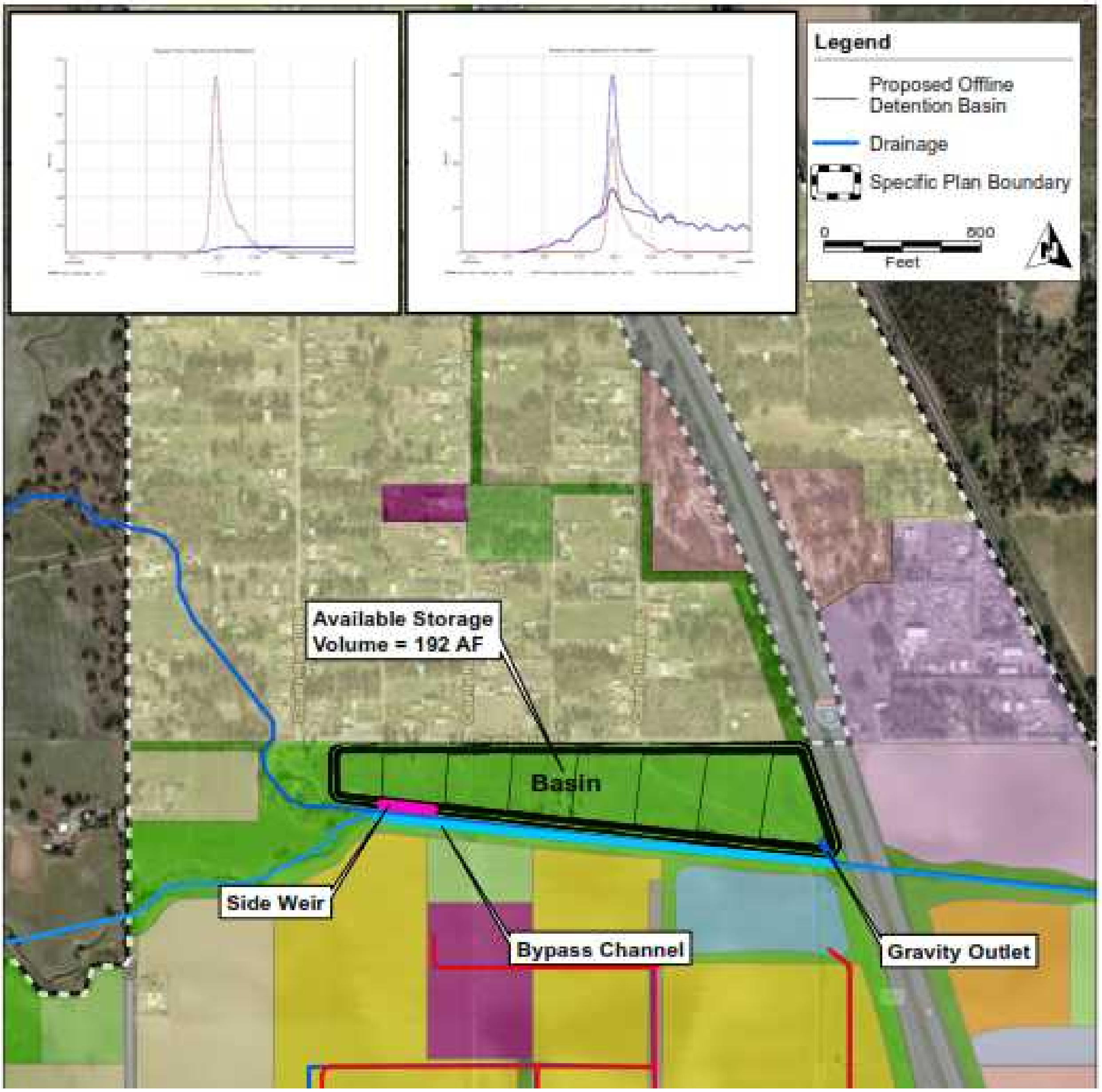


Exhibit 5-13: Dunnigan Creek Regional Detention Basin Facility

5.6.7 Stormwater Quality/ Treatment / Water Conservation and Reuse

A variety of specialized natural systems and facilities have been integrated into the overall stormwater management plan which will assist in providing stormwater quality treatment and the ability to reclaim urban runoff for recycling within the project as a valuable water resource. The detailed design for the majority of these facilities will be performed during the tentative map process since the layout for many of these facilities is dependent on the local site planning in the individual development areas. Facility sizes were estimated during preparation of the drainage master plan.

5.6.7.1 Open Space Landscape Drainage Corridors

The primary drainage conveyance through the Azevedo watershed will be in landscaped drainage corridors, generally referred to as greenways. Exhibit 5.14 provides a conceptual cross section of the landscaped drainage corridors and example photos. Effective flood control is the primary underlying objective to ensure public safety. However, non-conventional techniques which incorporate restoration of natural systems which will result in more opportunities for the public and benefits to the community. The landscape channel hydraulic characteristics become a key design factor which will provide the ability to replace conventional flood control infrastructure and focus on the natural forms, tendencies, and characteristics of restoring natural stream geometry. Recreating these landforms with the channel geometry increases long-term stability and opportunity for successful establishment of riverine landscaping. These channels will function to provide the 100-year level of flood conveyance in a stabilized landscaped corridor rather than a conventional engineered channel system and with multiple layers of water quality treatment elements. Some of the elements involved in the landscaped drainage corridors include:

- Combined landscape and flood control conveyance facilities.
- Restored naturalized stream systems and waterway corridors.
- Reclamation/reuse of urban runoff nuisance flows.
- Multi-function natural stormwater basins and combined aesthetic hydraulic structures.
- Stream stabilization involving vegetative systems and re-created natural hydraulic structures.
- Stormwater quality through continuous restored biological process

5.6.7.2 Low Impact Development (LID)

Low Impact Development (LID) features will be implemented through site design techniques distributed within the land plan as design elements for stormwater management. The LID approach combines a hydrologically functional site design with pollution prevention measures to compensate for land development impacts on hydrology and water quality. LID takes the approach of integrating natural vegetation and small-scale treatment systems into development to treat and infiltrate stormwater runoff close to where it originates. The appropriate techniques would be evaluated as part of the site planning process based on hydrologic suitability and physical constraints (i.e. infiltration). Some of the general LID integrated management techniques that can be considered include increased local surface infiltration, reducing directly connected impervious surfaces, vegetated buffers, vegetated swales, and increasing surface drainage flow paths. The EPA has developed policies and guidance encouraging the use of LID as well as new requirements within the stormwater regulations.

5.6.7.3 BMPs and Treatment

Stormwater quality treatment and mitigation will be accomplished through the use of manmade lakes and multi-function detention/water quality treatment basins. All urban runoff generated from the site will pass through one of these facilities types prior to being released downstream. The preliminary locations, as well as the approximate treatment volumes of these stormwater facilities, are identified on Exhibit 5.12.

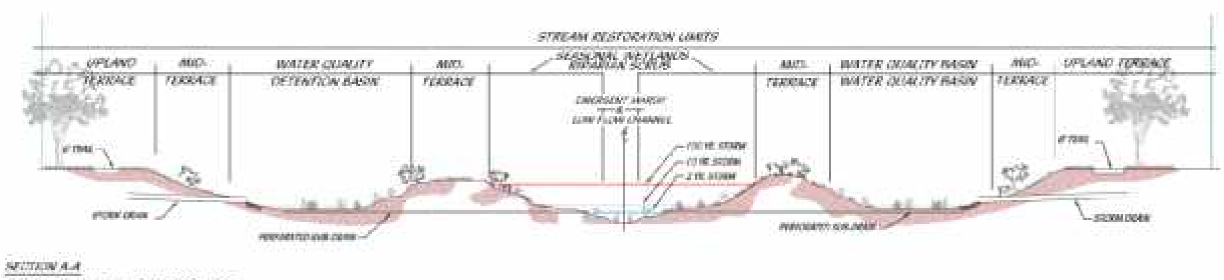


Exhibit 5-14: Conceptual Landscaped Drainage Corridor and Example Photos

5.6.7.4 Detention Basins

Detention basins will provide for onsite mitigation of peak runoff values and water quality treatment. Detention basins will be located along the fringe of the landscaped corridors at the termination of every storm drain outlet to the channel. These facilities will be combined flow control systems that will achieve the hydrologic mitigation and water quality requirements that follow County requirements for treatment as well as address hydraulic restrictions downstream. The proposed flow control system will include one or more of the following components which are illustrated in the schematic above and include: (1) duration control / water quality treatment basin; (2) pretreatment wetlands; (3) retention/infiltration basin; and (4) extended detention and primary outlet to the landscaped channels. Stormwater detention provides the most common means of meeting flow control requirements of the downstream hydraulic restriction/limitations which ensures that the runoff amounts released from the project will be less than the existing conditions to account for downstream deficiencies. The reduced flow release rate requires temporary storage of the excess volumes in a basin. The flow control basin will incorporate extended detention to provide water quality treatment for storm flows. Extended detention is designed with outlets that detain the runoff volume from the water quality design storm (85^{th} percentile 24-hour events) for a minimum detention time (48-hours) to allow particles to settle. The flow control basin will also incorporate wetland vegetation in a pre-settling area in order to provide additional treatment and mitigate nuisance / dry-weather flow.

5.6.7.5 Manmade Lakes

Four different manmade lakes are provided in the land plan as a primary element of the stormwater management infrastructure. The lakes range in surface from 5.6 to 8.2 acres and have minimum normal year round operating water depths ranging from 8 to 12 feet. The lakes are lined with an impermeable membrane and has a constructed lake edge system designed specifically to provide a more natural appearance of an actual native lake environment rather than an engineered bulkhead through the use of embedded boulder and rubble into a concrete shoreline veneer and wetland planter.

The manmade lakes are specially designed with features to anticipate the long-term operating requirements through ensuring the optimum health of the lake. The manmade lakes create a sustainable natural aquatic environment that functions to provide an aesthetic and passive recreational landscape feature for the community, runoff storage/attenuation/conveyance, a functioning "natural ecosystem" for a lake water quality and urban stormwater runoff treatment facility. The lakes also provide the ability to completely reuse and recycle urban nuisance flow that were originally consider waste but now can become a valuable non-potable water resource for landscape irrigation. The lake allows for surcharge storage above the normal lake operating water level for water quality treatment and significant peak flood storage attenuation.

Critical issues involved in the design of a lake system include the ability to maintain long term water quality which generally focuses on algae control, nutrients, alkalinity, and temperature. All water bodies will experience the natural eutrophication process related to the depletion of the available supply of dissolved oxygen from increased nutrients and minerals. However, the manmade lake is a unique dynamic natural treatment system that relies on natural processes in the aquatic environment through the establishment of an active ecosystem with wetlands, active water processes, and open water body. Design features intended to remove mosquito habitats are also integrated into the manmade lakes, effectively preventing mosquitoes from reproducing. Properly designed lakes offer very little shallow water habitat favored by mosquitoes, contain clean, moving water, and support abundant predators.

The proposed lake system employs the use of multiple layers of treatment to facilitate water quality improvement through lake water quality measures (biofilters and aeration), urban stormwater runoff controls (water quality filters and wetland planter areas), and lake retention of runoff. These three elements work either through management of urban stormwater runoff or through lake water quality maintenance to ensure that the water within the lakes and any discharge from the development is of the same or better quality than that discharged prior to development. Exhibit 5-15 through 5-19 show examples of the lake elements.

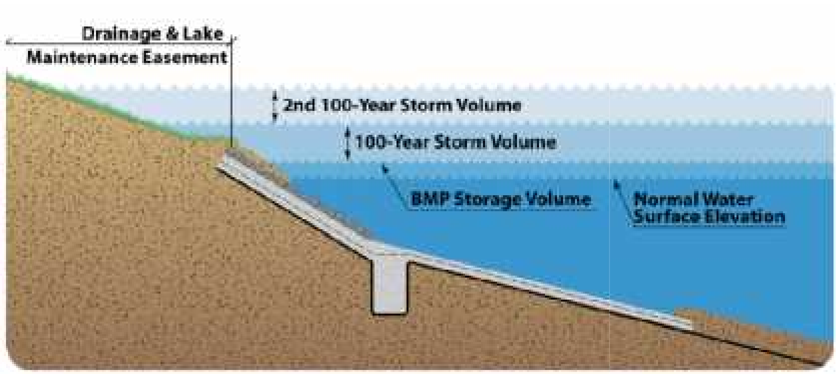


Exhibit 5-15: Manmade Lakes

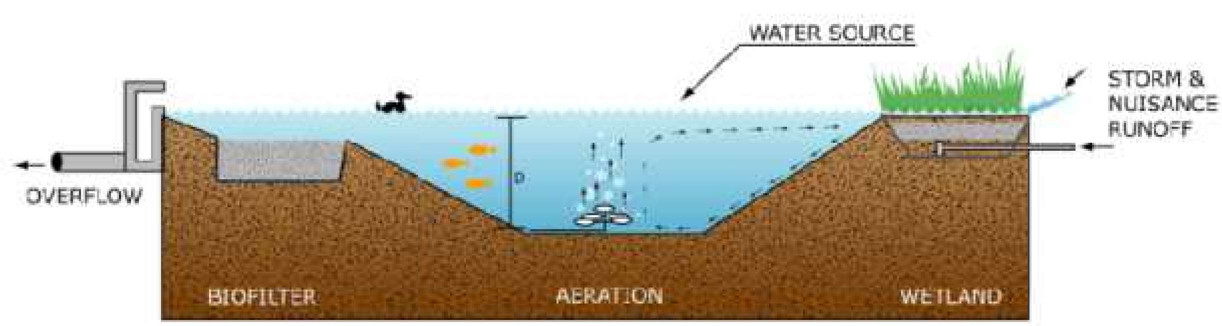


Exhibit 5-16: Schematic Diagram of Manmade Lake Elements

Exhibit 5-17: Example photos of lake aeration system

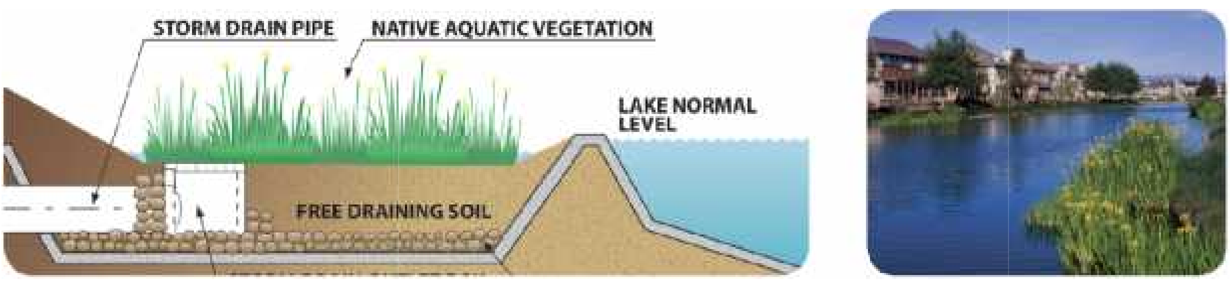


Exhibit 5-18: Example of Submergent and Emergent Wetland Vegetation

Under Construction

Construction Completed

Exhibit 5.19: Example Photos of Biofilter (submerged gravel bed)

5.7 ELECTRICAL SERVICE

Electric service will be provided by PG&E. A summary of existing and proposed facilities are described below. Although the DSP will include alternative energy sources such as solar, the substation upgrades and/or new construction will be designed such that the peak demand can be supplied in the event that alternative sources are offline or underperforming. Demand estimates for electric service assumes redundancy with alternative energy sources.

5.7.1 Existing Electrical Facilities

There are two substations in the vicinity of the Dunnigan Specific Plan (DSP) Area. The Dunnigan Substation is located approximately 2.3 miles north of County Road 4 and approximately one-quarter mile east of Interstate 5. It serves the specific plan area consisting of the old town of Dunnigan, several mobile home parks, residences and agricultural properties east and west of Interstate 5. The Dunnigan Substation has a 12 kV rated primary distribution systems and is currently close to full capacity.

The Zamora Substation is also rated 12kV and operates close to full capacity, and is located on County Road 14, east of Interstate 5 approximately 7 miles south of CR 9. This location does not make the Zamora Substation a viable current option for serving the DSP.

Two overhead transmission alignments are located in the general vicinity of the DSP Area. A 115 kV transmission line traverses in a general northeast/southwest alignment south of the Zamora Substation and through Knights Landing. A 230 KV transmission alignment is located in the hills west of the Tehama Canal, approximately 4 miles from the west edge of the DSP. Overhead distribution lines are present along some of the internal existing County roads providing service to agricultural properties for wells and residential use.

5.7.2 Proposed Electrical Facilities

Electric service could be provided to the Dunnigan Specific Plan Area either by upgrading the existing Dunnigan Substation or adding a new substation. If utilized, the Dunnigan Substation will require significant upgrades and expansion. Additional transformer banks would need to be installed, existing distribution systems reinforced, and new distribution systems added. If Dunnigan Substation is chosen to serve DSP, PG&E would install an additional backup transmission circuit (looping the 60 kV). Dunnigan is a 60 to 12 kV substation, so service would likely remain 12 kV.

Alternatively, a new substation could be constructed to serve the Plan Area. The new substation would provide service at 21 kV and could be fed from any of three transmission lines: 1) a new 230 kV to 21kV could be built within the existing 230 kV transmission corridor west of the Tehama Canal, or 2) PG&E could extend a radial 230 or 115 kV transmission line east to the site and construct the substation at or within the central quadrant, or 3) the 60 kV line serving the Dunnigan Substation could be extended south to the project and a substation constructed in the northern portion of the project.

If a new substation is located onsite, it will be centrally located in an industrial or commercial zone. General requirements for the site are minimum 1.5 acres, served by overhead transmission lines and an access road capable of transporting a 200,000 pound distribution transformer and transportation trailer.

Exhibit 5.20: Electrical Substation and Transmission Options

If a new substation were added, PG&E would determine the timeframe for upgrading from the current 12 kV service to the ultimate 21 kV service based on economic factors. While upgrading to 21 kV service would ultimately occur, PG&E could serve the first phase (the first 2500 units in the northern portion) at 12 kV, before adding a substation to serve the balance of the project at 21 kV. The estimated average electric demand for the DSP is 37.7 megawatts (MW) and the peak electric demand estimate is 87.4 MW. See Appendix K for additional information regarding load estimate calculations.

5.8 NATURAL GAS SERVICE

Gas service will be provided by PG&E. A summary of existing and proposed facilities are described below.

5.8.1 Existing Gas Facilities

PG&E currently has two independent gas distribution systems within the Dunnigan Specific Plan Area. The Old Town Dunnigan area is served through a 2" distribution piping supplied by a regulation station located at 2nd & Main Streets. The supply for the regulation station is a 1 ¼" feeder main tapped into a 20" steel transmission line. The 1 ¼" feeder main, regulation station, and existing distribution piping can support minimal growth.

At County Roads 7 & 8 the mobile home park and commercial developments, between Highway 99W and Interstate 5, are served through 2" and 4" distribution piping. The supply source is the 20" gas transmission line and a regulation station located east of the development on County Road 7. This regulation station and piping also can support only minimal growth. None of the gas facilities currently cross Interstate 5.

5.8.2 Proposed Gas Facilities

PG&E anticipates the need for a new distribution regulation station fed from the 20" transmission line via a steel distribution feeder main to be located west of I-5 and ideally somewhat centered in the plan area. This will require a freeway crossing. Requirements for a new regulation station site are 20' x 100' Public Utility Easement with year round access.

Distribution mains will consist of high density polyethylene (HDPE) pipe (i.e., poly) and range in size from 2" to possibly 8" in diameter. Peak demand for natural gas is estimated to be 831 million cubic feet per hour (MCFH). See Appendix K for additional information regarding load estimate calculations.

5.9 TELEPHONE AND COMMUNICATIONS SERVICE

Telephone service to the DSP will be determined prior to the approval of the first tentative tract map. The communication facilities located in the streets of the development will include a mix of fiber optic and copper cable and their supporting facilities. Although the trench layout has not been specified at this time, it is generally consist of multi-duct lines within the backbone area and duct plus buried lines within the secondary areas of the project.

Communications for the DSP will be part of a larger community connectivity infrastructure platform. This platform will provide the hardware for community connectivity and is discussed in greater detail in Chapter 9.